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Graduate School of Engineering and Management, Air Force Institute of Technology, "Academic Year 2019-2020 Faculty Excellence Showcase, AFIT Graduate School of Engineering & Management" (2020). *AFIT Documents*. 70.

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ACADEMIC YEAR
2019-2020

Faculty Excellence SHOWCASE



**GRADUATE SCHOOL OF
ENGINEERING & MANAGEMENT**

Contents

Dean's Message	3
Value Proposition of AFIT	4
Graduate School Dean's Bio	5
ENY: Aeronautics & Astronautics.....	6-29
ENG: Electrical & Computer Engineering	30-62
ENP: Engineering Physics.....	63-107
ENC: Mathematics & Statistics	108-126
ENS: Operational Sciences.....	127-148
ENV: Systems Engineering & Management...	149-178
Graduate School Faculty Directory	179



FACULTY QUICK FACTS

55+

**Faculty Patents
Awarded
Since 2001**



Number of patents awarded to Graduate School faculty between 2001-2019.

256

**Refereed
Publication
Authorships**



Number of refereed publication authorships by Graduate School department faculty during FY 2019.

30+

**Fellows of
Professional
Organizations**



Graduate School faculty members have over 30 professional association membership designations as Fellows.

247

**Faculty-advised
Dissertations & Theses**



Number of PhD dissertations and MS theses completed and submitted to the Defense Technical Information Center during FY 2019.

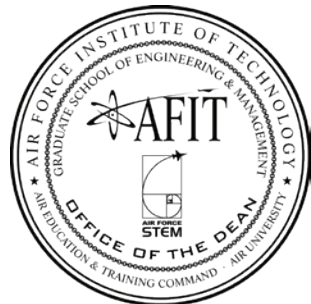
Dean's Message

The quality of an academic institution is predicated on the quality of the faculty, which when enmeshed with the superior student body, produces a spectacular formula for excellence. The often heard question of "Why AFIT?" is easily answered by "Why Not AFIT!"



Adedeji B. Badiru

Dean, Graduate School of
Engineering and Management



There is no place like the Air Force Institute of Technology (AFIT). There is no academic group like AFIT's Graduate School of Engineering and Management. Although we run an educational institution similar to many other institutions of higher learning, we are different and unique because of our defense-focused graduate-research-based academic programs. Our programs are designed to be relevant and responsive to national defense needs. Our programs are aligned with the prevailing priorities of the US Air Force and the US Department of Defense. Our faculty team has the requisite critical mass of service-tested faculty members. The unique composition of pure civilian faculty, military faculty, and service-retired civilian faculty makes AFIT truly unique, unlike any other academic institution anywhere. This is an asset that has helped to position the Air Force as the most technologically advanced and lethal force in the world. The trifecta of cultures embracing the military, academia, and federal processes makes AFIT very adaptive and relevant to the operational needs of the Air Force, the Department of Defense, and the Federal priorities.

Over eighty percent of our students are active military officers. These specially-selected officers, in combination with approved civilians and contractors, make the intellectual environment uniquely defense focused. The super sharp makeup of our students helps to keep faculty on their

intellectual toes, thereby increasing the platform of excellence of the faculty.

We are directly engaged in game-changing technologies such as Hypersonics, Directed Energy, Autonomy, Digital Engineering, Defense Innovation, and Artificial Intelligence. In the true sense of living up to the innovation culture of Dayton, Ohio, our faculty have received over 55 U.S. Patents in recent years. Our faculty have over 30 professional association membership designations as Fellows. This is one of the highest per capita Fellow designations among major institutions.

I am immensely proud of the quality of our faculty when benchmarked against other faculty groups in the nation and around the world. It is in that context that we have put together this Faculty Excellence Showcase, which is designed to be shared worldwide. Please join me in congratulating our faculty for the level of excellence we have achieved collectively.

With the best AFIT regards to all,

A handwritten signature in black ink, reading "Adedeji B. Badiru".

Adedeji B. Badiru, Ph.D., PE, PMP, FIIE
Dean, Graduate School of Engineering
and Management

The views expressed in this publication are those of the authors and do not reflect the official policy or position of the Air Force Institute of Technology, United States Air Force, Department of Defense, or United States government.

The Value Proposition of AFIT

The Graduate School of Engineering and Management at the Air Force Institute of Technology offers a unique value proposition to the United States Air Force and the Department of Defense. This value proposition is enabled by the synergy between our outstanding faculty, the rigorous and focused academic programs they create and provide, and the unique operational context of the institute and the collective work of our students and faculty. This uniqueness is unparalleled and not replicated anywhere else. AFIT has the uniqueness of operating in three different cultures, involving the military, the civilian academia, and the Federal Government. We are primarily a military organization that happens to have an academic mission. As an academic institution, we strive to meet and exceed the expectations for graduate programs and laud our values and contributions to the academic community. At the same time, we must recognize, appreciate, and promote the unique non-academic values and accomplishments that our faculty team brings to the national defense, which is a priority of the Federal Government. In this respect, through our diverse and multi-faceted contributions, our faculty, as a whole, excel, not only along the metrics of civilian academic expectations, but also along the metrics of military requirements, and national priorities.

The underlying values promoting excellence in performance to meet the needs and mission of the United States Air Force are not always apparent in compilations of academic profiling, but they are essential in the scheme of national defense. Many of our civilian faculty and administrators have prior military service experience, which elevates the unity of purpose and enhances the culture of AFIT. Many of our military faculty have been recognized for their unique contributions to national defense missions and serve as invaluable role models for the students of AFIT. Thus, the defense-focused activities of our faculty provide a platform of uniqueness, relevance, and responsiveness to national priorities. This booklet celebrates the unique values imparted by our trifecta of operational cultures.

What AFIT Provides That Cannot be Found in Other Academic Programs

- Unwavering, undiluted, and uncompromised commitment to classified work. Other institutions that may do classified work do not have the singularity of focus in that pursuit
- Salutatory responsiveness to the needs of the Air Force, the Department of Defense, and national defense
- Unshifting focus on what matters to the U.S Air Force
- Military faculty actively involved in military deployments, thereby increasing our military relevance
- Academic courses taught by PhD-credentialed full-time faculty instead of teaching assistants
- Embedded understanding by faculty, staff, and administrators of what the AFIT students need to deliver their missions to the Air Force, the Department of Defense, and the national defense



"The military faculty contribute a diverse breadth of military experience to the Air Force focused educational mission while providing an active duty perspective for the students. As role models and mentors, the military faculty serve a vital function in AFIT's mission. The Air Force invests considerable resources to educate and prepare military faculty, and faculty with several years of experience can provide a vastly improved educational experience for students, both in terms of instructional effectiveness and research quality."

Footnote: Many of the other contributions our faculty make to national defense are not items we can write or talk about in an open document.



Dr. Adedeji B. Badiru, PE, PMP, FIIE

PhD Industrial Engineering, University of Central Florida

Dean, Graduate School of Engineering and Management

Professor of Systems Engineering

Most Notable Publications

Badiru, A. B. (2019), Project Management: Systems, Principles, and Applications, Second Edition, Taylor & Francis CRC Press, Boca Raton, FL

Badiru, Adedeji B. (2019), Systems Engineering Models: Theory, Methods, and Applications, Taylor & Francis/CRC Press, Boca Raton, FL.

Badiru, Adedeji B., Oye Ibidapo-Obe, and Babs J. Ayeni (2019), Manufacturing and Enterprise: An Integrated Systems Approach, Taylor & Francis/CRC Press, Boca Raton, FL.

Badiru, Adedeji B. and Cassie B. Barlow, editors (2019), Defense Innovation Handbook: Guidelines, Strategies, and Techniques, Taylor & Francis/CRC Press, Boca Raton, FL

Badiru, Adedeji B. (2019), "Quality insights: Umbrella Theory for Innovation: A Systems Framework for Quality Engineering and Technology," *International Journal of Quality Engineering and Technology*, in press

Badiru, Adedeji B. (2018), "Quality insights: artificial neural network and taxonomical analysis of activity networks in quality engineering," *International Journal of Quality Engineering and Technology*, Vol. 7, No. 2, 2018, pp 99-107.

Selected Honors & Awards

- Outstanding Global Engineering Education Award, Industrial Engineering and Operations Management (IEOM) award (2016)
- Air Force-level Winner of National Public Service Award, The American Society for Public Administration and the National Academy of Public Administration (2015)
- IIE Medallion Award, Institute of Industrial Engineers (2012)
- ASC Award for Outstanding Scientists and Engineers, Dayton Affiliate Society Council (ASC), 2009
- Honor Societies: Tau Beta Pi, Phi Kappa Phi, Alpha Pi Mu, Kappa Mu Epsilon, Omega Alpha

Significant Accomplishments

- DEJI® Model – Trademark for systems Design, Evaluation, Justification, and Integration
- Fellow, Institute of Industrial & Systems Engineering (IISE)
- Fellow, Nigerian Academy of Engineering
- ABET Program Evaluator (PEV)



Research Interest Areas

- Systems Engineering Models
- Mathematical Modeling
- Learning Curve Models
- Systems Optimization
- Risk Quantification
- Analysis and Control
- Engineering Economic Analysis



Dr. Bradley S. Liebst

PhD, Aeronautical Engineering, Massachusetts Institute of Technology

Department Head, Aeronautics & Astronautics Engineering

Professor of Aerospace Engineering

Most Notable Publications

B. S. Liebst, W. L. Garrard, and J. A. Farm, "Design of a Multivariable Flutter Suppression/Gust Load Alleviation System", *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 11, No. 3, pp. 220-229, May-June 1988.

B. S. Liebst and P. Torvik, "Asymptotic Approximations for Systems Incorporating Fractional Derivative Damping", *ASME Journal of Dynamic Systems, Measurement, and Control*, Vol. 118, No. 3, pp. 572-579, September, 1996.

B. S. Liebst and R. Cobb, "Structural Damage Identification Using Assigned Partial Eigenstructure", *AIAA Journal*, Vol. 35, No. 1, January 1997, pp. 152-158.

B. S. Liebst and R. Cobb, "Sensor Placement and Structural Damage Identification From Minimal Sensor Information", *AIAA Journal*, Vol. 35, No. 2, February 1997, pp. 369-374.

B. S. Liebst, "The Dynamics, Prediction, and Control of Wing Rock in High-Performance Aircraft", *Philosophical Transactions of the Royal Society*, London, No. 356, 1998, pp. 2257-2267.

B. S. Liebst, Chapa, M., and Leggett, D., "Nonlinear Pre-Filter to Prevent Pilot-Induced Oscillations Due to Actuator Rate Limiting", *AIAA Journal of Guidance, Control and Dynamics*, Vol. 25, No. 4, July-August 2002, pp. 740-747.

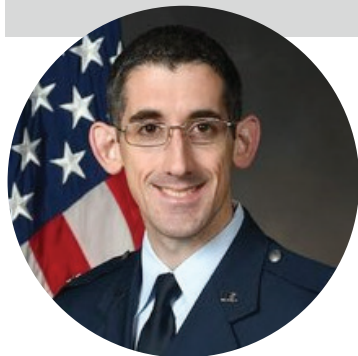
Selected Honors & Awards

- AFIT Leadership Excellence Award (2014)
- Affiliate Societies Council of Dayton Educator of the Year Award (2014)
- Best Paper of the Year from the Journal of Aerospace Engineering (2002)
- Best Institute of Technology Professor at University of Minnesota (1987)



Research Interest Areas

- Eigenstructure assignment control
- Stability and control of aerospace vehicles
- Aircraft handling qualities
- Passive and active control of large flexible structures



Maj Robert A. Bettinger

PhD, Astronautical Engineering, Air Force Institute of Technology

Deputy Director, Center for Space Research & Assurance

Assistant Professor of Astronautical Engineering

Most Notable Publications

Schmitt, S., **Bettinger, R. A.**, "The Potentiality of Space Enterprise Force Reconstitution: Nationalizing Civilian Satellites during Kinetic Conflicts," *Air & Space Power Journal*, Vol. 33, No. 2, Summer 2019, pp. 61-72.

Bettinger, R. A., "Linear Model for Reentry Time Prediction of Spacecraft in Low-Eccentricity, Low Earth Orbits," *Journal of Spacecraft and Rockets*, Vol. 56, No. 5, September-October 2019, pp. 1300-1311, DOI: 10.2514/1.A34334.

Bettinger, R. A., Black, J. T., Agte, J. S., "Design of Experiments Approach to Atmospheric Skip Entry Maneuver Optimization," *Journal of Spacecraft and Rockets*, Vol. 52, No. 3, May 2015, pp. 813-826, DOI: 10.2514/1.A33032.

Bettinger, R. A., Black, J. T., "Comparative Study of Phasing, Atmospheric Skip Entry, and Simple Plane Change Maneuvers," *Journal of Spacecraft and Rockets*, Vol. 51, No. 6, Nov. – Dec. 2014, pp. 1965-1975, DOI: 10.2514/1.A32872.

Bettinger, R. A., Black, J. T., "Aeroassisted Maneuvers: Potential Air and Space Law Challenges," *Journal of Space Law*, Vol. 39, No. 2, Spring/Summer 2014, pp. 217-226.

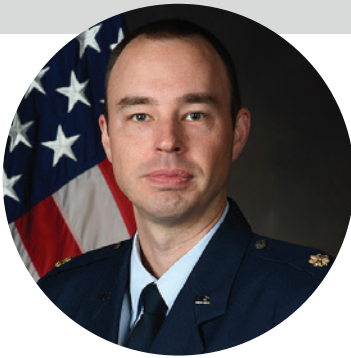
Selected Honors & Awards

- 2019 AFIT Innovation Award – Junior Faculty (Centennial Award Series)
- Field Grade Officer of the Quarter (2019)
- AU Nominee for Air Force Outstanding Scientist/Engineer – Mid-Career Military (2019)



Research Interest Areas

- Atmospheric re-entry
- Aero-assisted maneuvers
- Astrodynamics
- Spacecraft survivability



Maj Brian T. Bohan

PhD, Aeronautical Engineering, Air Force Institute of Technology

Assistant Professor of Aeronautical Engineering

Most Notable Publications

Bohan, B.T., Polanka, M.D., and Rutledge, J.L., "Sweeping Jets Issuing From the Face of a Backward-Facing Step." *Journal of Fluids Engineering*, FE-18-1755, Volume 141, Issue 12, Pages 121201 (17), doi: 10.1115/1.4043576, Dec 2019

DeMarco KJ, **Bohan B.T.**, Polanka MD, Rutledge JL, Akbari P., "Computational Analysis of an Additively Manufactured Cooled Ultra Compact Combustor Vane." *Journal of Thermal Science and Engineering Applications*, TSEA-19-1066, Volume 11, Number 5, Pages 051021 (9), October 2019, DOI: 10.1115/1.4043548

Bohan B.T., Polanka M.D., "A New Spin on Small-Scale Combustor Geometry". *Journal of Engineering for Gas Turbines and Power*, GTP-18-1227, Volume 141 (1), DOI: 10.1115/1.4040658, 2018

Bohan B.T., Blunk D.L., Polanka M.D., Kostka S., Jiang N., Roy S., Stouffer S.D., "Impact of an Upstream Film-Cooling Row on Mitigation of Secondary Combustion in a Fuel Rich Environment". *Journal of Turbomachinery*, 2013, Volume 136, Issue 3: 031008 doi:10.1115/1.4024690, Turbo-13-1055

Bohan B.T., Polanka M.D., "Analysis of Flow Migration in an Ultra-Compact Combustor". *Journal of Engineering for Gas Turbines and Power*, 2013, Volume 135, Issue 5: 051502 doi:10.1115/1.4007866.

Selected Honors & Awards

- 2016 - AFIT Student Field Grade Officer of the Quarter (#1/49)
- 2013 - Capt. Roland R. Obenland Annual Engineering Award 2012 (#1/158), Air Armament Center
- 2011 - AFIT Commandant's Award Winner – most exceptional master's thesis (#1/222)
- 2011 - AFIT Dean's Award Winner – most exceptional master's thesis in the Aero/Astro Dept. (#1/52)
- 2011 - American Institute of Aeronautics and Astronautics (AIAA) Research Excellence Award
- 2005 - Sigma Gamma Tau National Honor Society in Aerospace Engineering Inductee
- 2003 - Tau Beta Pi National Engineering Honor Society Inductee



Research Interest Areas

- Turbomachinery and Small Gas Turbine Engine Design
- Advanced Combustion Techniques
- Reduced or Eliminated Bleed Air Engine Cooling
- Unsteady Fluidic Devices
- Gas Turbine Engine Computational Modeling



Dr. Richard G. Cobb

PhD, Aeronautical Engineering, Air Force Institute of Technology

Professor of Aerospace Engineering

Most Notable Publications

Livermore, R., Lindholm, G., Neal, C., **Cobb, R.** and Colombi, J., "Heuristic Near-Optimal UAS Path Planning for Convoy Overwatch", *Journal of Unmanned Aerial Systems*, Vol 2, No 1, 2016

Humphreys, C., **Cobb, R.**, Jacques, R. and Reeger, J., "A Hybrid Technique to Rapidly Solve the Intermediate-Target Optimal Control Problem", *Global Journal of Technology & Optimization*, August 2016, DOI: 10.4172/2229-8711.1000200

Denton, J., Hodson, D., **Cobb, R.**, Mailloux, L., Grimaila, M., and Baumgartner, G., "A Model to Estimate Performance of Space-Based Quantum Communication Protocols Including Quantum Key Distribution Systems", *Journal of Defense Modeling and Simulation (JDMS)*, Nov 2016.



Research Interest Areas

- Dynamics and control of aerospace systems, including control of aircraft, spacecraft, large flexible structures, and optical systems.
 - Maneuver planning for satellite proximity operations
 - Dynamics and control techniques for lightweight space optics and optimal/novel sensor systems
 - Architectures for enhancing space situational awareness
- Recent work includes:**
- Developing optimal trajectory plans for Global Strike missions
 - Optimal aircraft air and ground collision avoidance algorithms for manned and unmanned systems
 - Active buffet alleviation using piezoelectric actuators for F-16 aircraft



Dr. Ramana V. Grandhi

PhD, Engineering Mechanics, Virginia Tech

Professor of Aeronautics and Astronautics

Most Notable Publications

Deaton, J.D., and **Grandhi, R.V.**, "A Survey of Structural and Multidisciplinary Continuum Topology Optimization: post 2000," *Journal of Structural and Multidisciplinary Optimization*, Vol. 49, 2014, pp. 1-38.

Park, I., and **Grandhi, R.V.**, "Quantifying Multiple Types of Uncertainty in Physics-based Simulation Using Bayesian Model Averaging," *AIAA Journal*, Vol. 49, No. 5, 2011, pp. 1038-1045.

Riley, M., and **Grandhi, R.V.**, "Quantification of Model-Form and Predictive Uncertainty for Multi-Physics Simulation," *Computers and Structures*, Vol. 89, Nos. 25-26, 2011, pp. 1206-1213.

Amarchinta, H.K., **Grandhi, R.V.**, Clauer, A.H., Langer, K., and Stargel, D., "Simulation of Residual Stress Induced by a Laser Peening Process through Inverse Optimization of Material Models," *Journal of Materials Processing Technology*, Vol. 210, No. 14, 2010, pp. 1997-2006.

Alyanak, E., **Grandhi, R.**, and Bae, H., "Gradient Projection for Reliability-based Design Optimization Using Evidence Theory," *Engineering Optimization*, Vol. 40, 2008, pp. 923-935.

Selected Honors & Awards

- American Society of Mechanical Engineers – ASME Fellow
- American Institute of Aeronautics and Astronautics – AIAA Fellow
- 2017 Mahatma Gandhi Pravasi Samman Award. Presented at the House of Lords, British Parliament, London, UK. NRI Welfare Society of India, representing 31 million Indians abroad.
- 2015 Distinguished Alumni Professional Achievement Award. Given by the National Institute of Technology, Warangal, India
- 2014 AIAA Sustained Service Award. Given for conference leadership, significant publications, and leadership in technical committees. Presented in Washington, DC.
- 2012 Outstanding Leadership Award. Given by Wright State University College of Engineering and Computer Science for leadership of Ph.D. in Engineering Program.



Research Interest Areas

- Aerospace Structures and Design
- Multidisciplinary Design Optimization
- Hypersonics
- Aircraft Structures



Dr. Robert B. Greendyke

PhD, Interdisciplinary Engineering (Joint Aerospace/Mechanical), Texas A&M

Associate Professor of Aerospace Engineering

Most Notable Publications

Lewis, S., James, C., Morgan, R., McIntyre, T., Alba, C., **Greendyke, R.**, "Carbon Ablative Shock-Layer Radiation with High Surface Temperatures", *AIAA Journal of Thermophysics and Heat Transfer*, Vol. 31, No. 1.

Candler, G., Alba, C., and **Greendyke, R.** "Characterization of Carbon Ablation Models Including Effects of Gas-Phase Chemical Kinetics," *AIAA Journal of Thermophysics and Heat Transfer*, posted online on April 24, 2017. DOI: 10.2514/1.T4752

Alba, C., **Greendyke, R.**, Lewis, S., Morgan, R., McIntyre, T. "Numerical Modeling of Earth Re-entry Flow with Surface Ablation", *AIAA Journal of Spacecraft and Rockets*, vol. 53, no. 1, pgs. 84-97, 2016.

Lewis, S., Morgan, R., McIntyre, T., Alba, C., **Greendyke, R.** "Expansion Tunnel Experiments of Earth Re-entry Flow with Surface Ablation", *AIAA Journal of Spacecraft and Rockets*, posted online on February 16, 2016. DOI: 10.2514/1.A33267

Alba, C., **Greendyke, R.**, Marschall, J. "Development of a Nonequilibrium Finite-Rate Ablation Model for Radiating Earth Re-entry Flows", *AIAA Journal of Spacecraft and Rockets*, vol. 53, no. 1, pgs. 98-120, 2016.



Research Interest Areas

- Aerospace engineering
- Air weapons design
- Computational fluid dynamics
- Hypersonics
- Nonequilibrium flows
- Numerical simulation



Dr. Carl R. Hartsfield

PhD, Aeronautical Engineering, Naval Postgraduate School

Assistant Professor of Aerospace Engineering

Most Notable Publications

"Understanding Surface Roughness of Additively Manufactured Nickel Superalloy for Space Applications," *Rapid Prototyping*, Travis Shelton, **Carl Hartsfield**, Ryan O'Hara. DOI: (10.1108/RPJ-02-2019-0049)

"Characterization of simulated low earth orbit space environment effects on acid-spun carbon nanotube yarns", *Materials & Design*, Vol 184, 15 Dec 2019, Ryan Kemnitz, Greg Cobb, Abhendra Singh and **Carl Hartsfield**. DOI: j.matdes.2019.108178

"Case Study: Cooling Channels for material testing applications using Laser Powder Bed Fusion," *Metal Additive Manufacturing*, Spring 2018, page 147-153, B. Doane, K. Liu, R. O'Hara, **C. Hartsfield**.

"Design and Characterization of a Space Based Imaging Experiment Computer Unit," *Journal of Aerospace Engineering*, Volume 28, Issue 3, May 2015. J. Niederhauser, **C. Hartsfield**, J. Black, DOI: (ASCE)AS.1943-5525.0000362.

"Horizontally Issuing Diffusing Flames Characterized by OH-PLIF and Visualization," *International Journal of Spray and Combustion Dynamics*, Vol 6, Number 1, 2014, pg 35-65. K. Heffernen, **C. Hartsfield**, M. Reeder, M. Polanka.

Selected Honors & Awards

- AIAA Special Service Citation, 2018
- SOCHE Faculty Excellence in Teaching Award, 2017



Research Interest Areas

- Rocket Propulsion
- Spacecraft Design
- Additive Manufacturing



Maj Joshua Hess

PhD, Aeronautical Engineering, Air Force Institute of Technology

Assistant Professor of Astronautical Engineering

Most Notable Publications

Prince, E., **Hess, J.A.**, Carr, R., Cobb, R.G., "Elliptical Orbit Proximity Operations Differential Games", *Journal of Guidance, Control, and Dynamics* (DOI 10.2514/1.G004031)

Harris, M., Kunz, D., and **Hess, J.A.**, "Analytical Determination of a Helicopter Height-Velocity Curve", *Journal of DoD Research and Engineering*, Vol 2, Issue 1, pp 2-13 (AD1066373)

Nesmith, A., Lingenfelter, A., **Hess, J.A.**, and Liu, D., "Applications of Second-Order Linear Differential Equations to Model a Hydrodynamic Ram Cavity", *Journal of Aircraft Survivability*, Fall 2019.

Scarcella, P.C., Johnson, K.W., **Hess, J.A.**, "Consider Filtering Applied to Maneuver Detection for Relative Orbit Determination", *2019 AAS/AIAA Astrodynamics Specialist Conference*, August 2019, AAS 19-872.

Newell, D.J.,* O'Hara R., Cobb, G.R., Palazotto, A.N., Kirka, M.M., Burggraf, L.W., **Hess, J.A.**, "Mitigation of scan strategy effects and material anisotropy through supersolvus annealing in LPBF IN718", *Materials Science and Engineering: A*, (DOI 10.1016/j.msea.2019.138230)

Selected Honors & Awards

- Arthur S. Flemming Award, Applied Science & Engineering, Air Education and Training Command Level (2018)

Significant Accomplishments

- Member, AIAA Survivability Technical Committee



Research Interest Areas

- Spacecraft rendezvous and proximity operations
- Spacecraft attitude determination
- Relative satellite motion
- Estimation theory
- Optimal control theory
- Adaptive estimation
- Relative navigation between satellites conducting proximity operations



Lt Col Kirk W. Johnson

PhD, Aerospace Engineering, Texas A&M University

Assistant Professor of Aerospace Engineering

Most Notable Publications

R. B. LaRue and **K. W. Johnson**, "Algorithms for Small Satellite Formation Flying," *Dayton-Cincinnati Aerospace Sciences Symposium*, February 2018.

R. B. LaRue and **K. W. Johnson**, "Reconfiguration of Small-Satellite General Circular Orbit Formations," *AIAA Paper* 2018-2219, January 2018.

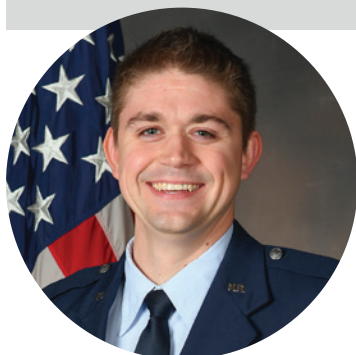
K. W. Johnson, Approaches for Modeling Satellite Relative Motion, *Dissertation*, Texas A&M University, 2016.

K. W. Johnson, S. R. Vadali, and K. T. Alfriend, "Comparison of Orbit Element Sets for Modeling Perturbed Satellite Relative Motion," American Astronautical Society Paper 16-357, February 2016 (published in *Advances in the Astronautical Sciences*, Vol. 158, Univelt, pp. 3349-3362).



Research Interest Areas

- Satellite relative motion dynamics and control (i.e. satellite formation flying, rendezvous and proximity operations)
- Satellite servicing
- Spacecraft navigation
- Space situational awareness
- Perturbation methods in orbital mechanics



Dr. Ryan A. Kemnitz

PhD, Materials Science, Air Force Institute of Technology

Assistant Professor of Aerospace Engineering

Most Notable Publications

“Characterization of simulated low earth orbit space environment effects on acid-spun carbon nanotube yarns.” **Kemnitz, R. A.**, Cobb, G. R., Singh, A. K., & Hartsfield, C. R. *Materials & Design*, Vol 184 (2019). DOI: <https://doi.org/10.1016/j.matdes.2019.108178>

“Quantifying the effects of hyperthermal atomic oxygen and thermal fatigue environments on carbon nanotube sheets for space-based applications.” Singleton, J. W., Cobb, G. R., Misak, H. E., & **Kemnitz, R. A.** *Results in Materials* 3, 100034 (2019). DOI: <https://doi.org/10.1016/j.rinma.2019.100034>

“Mitigation of anisotropic fatigue in nickel alloy 718 manufactured via selective laser melting.” Sabelkin, V. P., Cobb, G. R., Shelton, T. E., Hartsfield, M. N., Newell, D. J., O’Hara, R. P., & **Kemnitz, R. A.** *Materials & Design*, 182, 108095 (2019). DOI: <https://doi.org/10.1016/j.matdes.2019.108095>

“Quantifying the effects of ultraviolet type C radiation on the mechanical and electrical properties of carbon nanotube sheet for space-based applications.” Cobb, G. R., O’Hara, R. P., **Kemnitz, R. A.**, Sabelkin, V. P., & Doane, B. M. *Materials Today Communications*, 18, 7-13 (2019). DOI: <https://doi.org/10.1016/j.mtcomm.2018.10.016>

“In-situ characterization of bulk carbon nanotube behavior in a sheet under tensile load.” Singh, A. K., Cobb, G. R., & **Kemnitz, R. A.**, *Materials Today Communications*, 17, 493-500 (2019). DOI: <https://doi.org/10.1016/j.mtcomm.2018.10.017>



Research Interest Areas

- Additive Manufacturing
- Carbon Nanotubes
- Materials Characterization



Dr. Andrew S. Keys

PhD, Electrical Engineering, University of Alabama in Huntsville

Associate Professor

Most Notable Publications

A. S. Keys and H. C. Morris (editors), "Marshall Space Flight Center Research and Technology Report 2017," NASA/TM-2018-2199582018, NASA MSFC, 2018.

A. S. Keys, M. L. Tinker and H. C. Morris (editors), "Marshall Space Flight Center Research and Technology Report 2015," NASA/TM-2016-218221, NASA MSFC, 2016.

A. S. Keys, M. L. Tinker, A.D. Sivak (editors), "Marshall Space Flight Center Research and Technology Report 2014," NASA/TM-2015-218204, NASA MSFC, 2015.

A. S. Keys, "Overview of the NASA ETD RHESE Program," Chapter within *Extreme Environment Electronics*, editors J. D. Cressler and H. A. Mantooth, CRC Press, 2012.

A. S. Keys and R. L. Fork, "Full cycle, low loss, low distortion phase modulation from multilayered dielectric stacks with terahertz optical bandwidth," *Optics Express* [Online], vol. 7, no. 9, pp. 311-322, 23 Oct. 2000.

Significant Accomplishments

- TEDxNashville, "Why Explore Space?" (Apr 2011), <https://www.youtube.com/watch?v=VCULGeWtoLI>



Research Interest Areas

- Development of sensors and detectors for the purpose of space-based remote sensing
- Electro-optics and photonic technologies
- Optical and laser systems
- Radiation hardening of avionics and electronics
- Advancement of related space technologies



Lt Col Jeffrey R. Komives

PhD, Aerospace Engineering & Mechanics, University of Minnesota

Assistant Professor of Aerospace Engineering

Most Notable Publications

Knight, D., Chazot, O., Austin, J., Badr, M. A., Candler, G., Celik, B., Rosa, D. de, Donelli, R., **Komives, J.**, Lani, A., Levin, D., Nompelis, I., Panesi, M., Pezzella, G., Reimann, B., Tumuklu, O., and Yuceil, K., "Assessment of predictive capabilities for aerodynamic heating in hypersonic flow," *Progress in Aerospace Sciences*, 2017, pp. 1–15.

Elliott, O.S., Greendyke, R., Jewell, J.S. and **Komives, J.R.**, "Effect of CO₂ Concentration in the Hypersonic Boundary Layer on Second Mode Disturbances." In *AIAA Aviation 2019 Forum*, 2019

Oren, E. P., **Komives, J. R.**, & Peterson, D. M. "Large Eddy Simulation of Three Dimensional Wall Effects in a Scramjet Cavity Flameholder." *2018 Fluid Dynamics Conference*, 2018

Reinert, J. D., Gs, S., Candler, G. V., and **Komives, J. R.**, "Three-Dimensional Simulations of Hypersonic Double Wedge Flow Experiments," *47th AIAA Fluid Dynamics Conference*, Reston, Virginia: American Institute of Aeronautics and Astronautics, 2017.

Komives, J. R., Subbareddy, P. K., and Candler, G. V., "Development and Validation of a LES Turbulence Wall Model for Compressible Flows with Heat Transfer Direct Numerical Simulation," 2016, *46th AIAA Fluid Dynamics Conference*, 2016

Selected Honors & Awards

- AFIT MOAA Outstanding Military Professor Award, 2018
- AFIT Dept of Aeronautics and Astronautics Field Grade Officer of the Year, 2017
- John and Jane Dunning Copper Fellowship, University of Minnesota, 2014
- Eglin Air Force Base Mid-Career Military Engineer of the Year, 2010

Significant Accomplishments

- Invited Lecture: Komives, J. R. (2019) Hypersonics in the Indo-Pacific. 2019 NDIA Hypersonic Capabilities Conference, West Lafayette, IN.



Research Interest Areas

- Hypersonics
- Aerothermodynamics
- Computational Fluid Dynamics
- Machine Learning
- Boundary Layer Transition



Dr. Donald L. Kunz

PhD, Aerospace Engineering, Georgia Institute of Technology

Professor of Aerospace Engineering

Most Notable Publications

Kunz, D.L., *Intermediate Dynamics for Aeronautics & Astronautics*, Second Edition, Headmaster Press, ISBN: 978-1687350664, September 2019.

*Hope, D.N., and **Kunz, D.L.**, "Investigation of Shock Motion in Transonic Flow Using an Oscillating, Straked, Delta Wing," *AIAA Journal*, Vol. 57, No. 10, October 2019. DOI: <http://arc.aiaa.org/doi/abs/10.2514/1.J057456>. (JIF=1.080).

*Olsen, C.C., Kalyanam, K., Baker, W.P., and **Kunz, D.L.**, "Maximal Distance Discounted & Weighted Revisit Period: A Utility Approach to Persistent Unmanned Surveillance," *Unmanned Systems*, Vol. 7, No. 4, July 2019, pp. 1-18. <http://doi.org/10.1142/S2301385019500079>.

*Kim, J.P. and **Kunz, D.L.**, "Handling Qualities Assessment of an Unmanned Aircraft Using Performance and Workload Metrics," *Journal of Guidance, Control and Dynamics*, Vol 40, No. 10, October 2017, pp. 2701-2709. DOI: <http://arc.aiaa.org/doi/abs/10.2514/1.G002306> (JIF=1.651)

*Tauer, T.M., **Kunz, D.L.** and Lindsley, N.J., "Visualization of Nonlinear Aerodynamic Phenomena During F-16 Limit-Cycle Oscillation," *Journal of Aircraft*, Vol. 53, No. 3, May-June 2016, pp. 865-870. DOI: <http://arc.aiaa.org/doi/abs/10.2514/1.C033534> (JIF=0.632)

Selected Honors & Awards

- Distinguished Service Award, American Institute of Aeronautics & Astronautics (2006).
- Leadership Award, American Institute of Aeronautics & Astronautics (2004).

Significant Accomplishments

- Professional Engineer (ME) Commonwealth of Virginia



Research Interest Areas

- Rotorcraft aeromechanics
- Aeroelasticity
- Structural dynamics
- Dynamics
- UAV handling qualities



Lt Col Bryan Little

PhD, Astronautic Engineering, Purdue University

Assistant Professor of Astronautical Engineering

Most Notable Publications

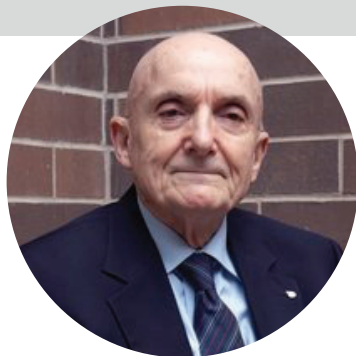
Little, B. D., Frueh, C. E., "SSA Sensor Tasking: Comparison of Machine Learning with Classical Optimization Methods," *AIAA Journal of Guidance, Controls and Dynamics*, accepted 8 Nov 19.

Little B. D., Frueh, C. E., "Multiple Heterogeneous Sensor Tasking Optimization in the Absence of Measurement Feedback," *Journal of Astronautical Sciences*, submitted 26 Apr 2019.



Research Interest Areas

- Sensor Tasking for Space Situational Awareness
- Astrodynamics
- Cis-Lunar Orbit Design
- Space Based Electro-Optical Sensor Systems



Dr. Anthony N. Palazotto

PhD, Solid Mechanics, New York University

Distinguished Professor of Aerospace Engineering

Most Notable Publications

More than 255 archival and over 450 presentations

Deleon, A., Baker, W. and **Palazotto, A.**, "Modeling a Nonlinear Melt Region as a Result of High-Speed Sliding", *Journal of Thermophysics and Heat Transfer*, Vol. 33, No. 3, July-September, 2019.

You, C., **Palazotto, A.**, and Buentello, R., "Evaluation of Thermomechanical Damage of a Slipper and Rail in a Rocket Sled System", *Journal of Testing and Evaluation*, Vol. 44, No.4, pp 1443-1453, 2016.

Just, L., Deluca, A., and **Palazotto, A.**, "Nonlinear Dynamic Analysis of an Icosahedron Frame Which Exhibits Chaotic Behavior", *ASME Journal of Computational and Nonlinear Dynamics*, Vol. 12, pp 011006-1-10, January, 2017.

Abid, N, Abu-Al-Rub, R., and **Palazotto, A.**, "Micromechanical Finite Element Analysis of the Effects of Martensite Morphology on the Overall Mechanical Behavior of Dual Phase Steel", *International Journal of Solids and Structures*, Vol. 104-105, pp 8-24, 2017.

Easterday, O., **Palazotto, A.**, Baker, W., and Branam, R., "Damping Properties of Coatings at Elevated Temperatures", *Surface and Coatings Technology*, Vol. 321, pp 186-199, 2017

Selected Honors & Awards

- AIAA Achievement Award (2004)
- Structures, Structural Dynamics and Material Award, ASCE (1986)
- Hetanyi Award, Society of Experimental Mechanics, (1982)
- Cleary Award, Air Force Material Lab (1981)

Significant Accomplishments

- Fellow in AIAA, ASCE, Engineering Mechanics Institute, and American Academy of Mechanics



Research Interest Areas

- Nonlinear mechanics
- Shell analysis
- Finite elements
- Composite materials
- Viscoplasticity
- Nonlinear dynamics



Dr. Marc D. Polanka

PhD, Mechanical Engineering, University of Texas-Austin

Professor of Aeronautical Engineering

Most Notable Publications

Over 125 conference papers and over 50 peer reviewed journal articles

Polanka, M.D., Rutledge, J.L., Bogard, D.G., and Anthony, R.J., "Determination of Cooling Parameters for a High Speed, True Scale, Metallic Turbine Vane Ring", *Journal of Turbomachinery*, Vol 139(1), pg 011001 1:9, 2017. DOI: 10.1115/1.4033974

Andrus, I.Q., **Polanka, M.D.**, King, P.I., Schauer, F.R., and Hoke, J.L., "Experimentation of a Premixed Rotating Detonation Engine Utilizing a Variable Slot Feed Plenum", *Journal of Propulsion and Power*. Vol 33, No. 6, pp. 1448-1458, 2017. DOI:10.2514/1. B36261.

Cottle, A.E., **Polanka, M.D.**, Goss, L.P., Goss, C.Z., "Investigation of Air Injection and Cavity Size within a Circumferential Combustor to Increase G-Load and Residence Time", *ASME. J. Eng. Gas Turbines Power*. 2017; 140(1): 011501-011501-12. doi:10.1115/1.4037578.

Wiese, C.J., Rutledge, J.L., **Polanka, M.D.**, "Experimental Evaluation of Thermal and Mass Transfer Techniques to Measure Adiabatic Effectiveness with Various Coolant to Freestream Property Ratios", *Journal of Turbomachinery*, Vol. 140 (2), pg 021001 1:9, Feb 2018. DOI: 10.1115/1.4038177. ASME Best Paper Award – Heat Transfer

Blantin, J.R., Ausserer, J.K., **Polanka, M.D.**, Litke, P.J., and Baranski, J.R., "Energy Balance and Power Loss Pathway Study of a 120 cc Four-Stroke Internal Combustion Engine", *Journal of Engineering for Gas Turbines and Power*, Vol. 140 (7), pg 072803 1-10, July 2018.



Research Interest Areas

- Any type of propulsion system, namely ultra compact combustor development
- Film cooling of turbine airfoils

Selected Honors & Awards

- AFIT Innovation Award, Senior Faculty, 2019
- AIAA Outstanding Section Award, Very Large Category, 1st Place, 2011, 2012, and 2018
- AFIT/EN Civilian Category III of the Year, 2017
- AETC AF Outstanding Scientist/Engineer, Senior Civilian, 2017
- AIAA Sustained Service Award, 2017
- AFIT Faculty Administrative Fellow, 2016
- SOCHE Academic Leadership Fellow, 2015
- AFIT Civilian Category III of the Year, 2015
- AFIT Charles P. Brothers Award for Outstanding Volunteer Service, 2010

Significant Accomplishments

- Fellow, American Society of Mechanical Engineers (ASME)
- Associate Fellow, American Institute of Aeronautics (AIAA)
- Chair of the AIAA Associate Fellow Committee (2018-2021)
- Vice Chair of the ASME K-14 Heat Transfer Committee (2018-2020)

- Rotating detonation engines
- Internal combustion engines
- Scramjets



Dr. Mark F. Reeder

PhD, Mechanical Engineering, Ohio State University

Professor of Aerospace Engineering

Most Notable Publications

Probst, Z., **Reeder, M.**, Johnson, R., and Grove J., "Flight-Test Experiments on Cavity Flow in an SUU- 41 Pod," *Journal of Aircraft*, Vol. 54, No. 5, September 2017, pp. 1814-1824.

Seney, S.D., Huffman, R.E., Bailey, W., Liu, D., **Reeder, M.F.**, and Stults, J. "Improving Performance of a Sliding Dielectric Barrier Discharge Actuator Using Multiple Potentials", *AIAA Journal*, Vol. 54 (10), October 2016, pp. 3316-3319.

Merrick, J. & **Reeder, M.F.**, "Sphere Release from a Rectangular Cavity at Mach 2.22 Freestream Conditions," *AIAA Journal of Aircraft*, Vol. 53, No. 3, May-June 2016, pp. 822-829.

Cleaver, T.A., Gutman, A.J., Martin, C.L., **Reeder, M.F.** & Hill, R.R., "Using design of experiments methods for applied computational fluid dynamics: A case study," *Quality Engineering*, Vol. 28 (3), May 2016, pp. 280-292.

Callaway, D., **Reeder, M.**, Greendyke, R., and Gosse, R., "Measurement and Analysis of Ablation of Solid Carbon Dioxide exposed to a Mach 3 Flow," *AIAA Journal of Spacecraft and Rockets*, Vol. 51, No. 1, January 2014, pp. 213-225.

Significant Accomplishments

- Co-author of 43 refereed journal publications and 4 US patents.
- AIAA Associate Fellow
- Member of the American Society of Mechanical Engineering
- Licensed Professional Engineer (State of Ohio)



Research Interest Areas

- Fluid Dynamics
- Air Vehicle Design
- Aerodynamic Measurement Techniques



Dr. Marina B. Ruggles-Wrenn

PhD, Mechanical Engineering, Rensselaer Polytechnic Institute

Professor of Aerospace Engineering

Most Notable Publications

S. J. Robertson, **M. B. Ruggles-Wrenn**, R. S. Hay, T. Shillig, R. Mitchell, B. Kroeger, L. Gumucio, "Static fatigue of Hi-Nicalon™-S fiber at elevated temperature in air, steam and silicic-acid-saturated steam", *Journal of the American Ceramic Society*, DOI: 10.1111/jace.16799.

M. B. Ruggles-Wrenn and T. A. Wallis, "Creep in interlaminar shear of an Hi-Nicalon™/SiC-B4C composite at 1300°C in air and in steam", *Journal of Composite Materials*, <https://doi.org/10.1177/0021998319886621>.

M. B. Ruggles-Wrenn, S. N. Minor, C. P. Przybyla, and E. L. Jones, "Creep of a Nextel™720/alumina ceramic composite containing an array of small holes at 1200°C in air and in steam", *International Journal of Applied Ceramic Technology*, Vol. 16, 2019, pp. 3-13.

M. B. Ruggles-Wrenn and M. Noomen, "Fatigue of unitized polymer/ceramic matrix composites with 2D and 3D fiber architecture at elevated temperature", *Polymer Testing*, Vol. 72, 2018, pp. 244-256.

M. B. Ruggles-Wrenn, N. J. Boucher and C. P. Przybyla, "Fatigue of three advanced SiC/SiC ceramic matrix composites at 1200°C in air and in steam", *International Journal of Applied Ceramic Technology*, Vol. 15, 2018, pp. 3-15.

Selected Honors & Awards

- Board of Governors Award, ASME (2016)
- Stinson Trophy, NAA (2015)

Significant Accomplishments

- Fellow, American Society of Mechanical Engineers (ASME)



Research Interest Areas

- Material behavior in extreme environments
- Advanced structural materials
- Composite materials and structures
- High-temperature structural design methods
- Viscoplasticity – constitutive modeling



Lt Col James L. Rutledge

PhD, Aeronautical Engineering, Air Force Institute of Technology

Associate Professor of Aeronautical Engineering

Most Notable Publications

Rutledge, J.L., Baker, W.P., 2018, "Unsteady Effects on the Experimental Determination of Overall Effectiveness," *Journal of Turbomachinery*.

Wiese, C.J., **Rutledge, J.L.**, Polanka, M.D., 2018, "Experimental Evaluation of Thermal and Mass Transfer Techniques to Measure Adiabatic Effectiveness with Various Coolant to Freestream Property Ratios," *Journal of Turbomachinery*, Vol. 140, No. 2.

Bills, J.D., Crowe, D.S., **Rutledge, J.L.**, Coy, E.B., 2018, "Modeling Fuel Film Cooling on a Flat Plate," *Journal of Thermophysics and Heat Transfer*, Vol. 32, No. 3.

Rutledge, J.L., Polanka, M.D., Greiner, N.J., 2017, "Computational Fluid Dynamics Evaluations of Film Cooling Flow Scaling Between Engine and Experimental Conditions," *Journal of Turbomachinery*, Vol. 139, No. 2.

Polanka, M.D., **Rutledge, J.L.**, Bogard, D.G., and Anthony, R.J., 2017, "Determination of Cooling Parameters for a High Speed, True Scale, Metallic Turbine Vane," *Journal of Turbomachinery*, Vol. 139, No. 1.

Selected Honors & Awards

- AFIT Outstanding Military Faculty Award
- 2017 ASME Turbo Expo Best Paper (Heat Transfer)

Significant Accomplishments

- U.S. Patent No. 9,316,547 B1: "A Method to Determine Time-Resolved Waveforms of Periodic Unsteady Heat Transfer Coefficient and Adiabatic Wall Temperature"
- Professional Engineer, State of Texas



Research Interest Areas

- Fluid dynamics
- Heat transfer
- Propulsion



Dr. Fred Schauer

PhD, Mechanical Engineering, University of Illinois at Urbana-Champaign

Associate Professor of Aeronautical Engineering

Most Notable Publications

"T63 Turbine Response to Rotating Detonation Combustor Exhaust Flow", A. Naples; J. Hoke; R. Battelle; **F. Schauer**, GTP-18-1424, *J. Eng. Gas Turbines Power*. Vol 141(2), Feb 2019.

"Thermodynamic model of a rotating detonation engine," C.A. Nordeen, D. Schwer, **F. Schauer**, J. Hoke, T.H. Barber, and B. Cetegen, *Combustion, Explosion, and Shock Waves*, Vol 50 (5), Sept 2014.

"Petroleum-based and Bio-derived Jet Fuel Efficiency Optimization Using Fuel Injection in a 34cc 4-Stroke Spark Ignition Engine," C. Wilson, **F. Schauer**, P. Litke, J. Hoke, and J.R. Groenewegen, *SAE 2011-11-08*.

"Detonation Initiation and Performance in Complex Hydrocarbon Fueled Pulsed Detonation Engines," **F. Schauer**, J. Stutrud, R. Bradley, V. Katta, and J. Hoke, *50th JANNAF Propulsion Meeting*, paper I-05, 2001.

"Stealing the Moon", **F. Schauer**, *AFRL INSPIRE Lecture*, <https://www.youtube.com/watch?v=LWWzdJ6CUIE>, 2016.

Selected Honors & Awards

- Air Force Research Laboratory Innovator of the Year (2011)
- Finalist for Collier Trophy (2009)
- American Institute of Aeronautics Engineer of the Year (2009)
- Air Force Scientist of the Year (2008)

Significant Accomplishments

- Fellow, Air Force Research Laboratory (AFRL)
- Associate Fellow, American Institute of Aeronautics (AIAA)
- AFOSR Star Team (2012-2014; 2006-2008)



Research Interest Areas

- Energy, propulsion, and power – particularly novel cycles.



Maj Levi M. Thomas

PhD, Mechanical Engineering, Purdue University

Assistant Professor of Aerospace Engineering

Most Notable Publications

Satija A, Chang Z, Lowe A, **Thomas LM**, Masri AR, and Lucht RP, "CARS Thermometry in Laminar Sooting Ethylene-Air Co-Flow Diffusion Flames with Nitrogen Dilution," *Combust. Flame* 208, 37-44 (2019). DOI:10.1016/j.combustflame.2019.06.025

Thomas LM, Lowe A, Satija A, Masri AR, and Lucht RP, "Five kHz thermometry in turbulent spray flames using chirped-probe pulse femtosecond CARS, part I: Processing and interference analysis," *Combust. Flame* 200, 405-416 (2019). DOI: 10-1016/j.combustflame.2018.11.004.

Lowe A, **Thomas LM**, Satija A, Lucht RP, and Masri AR, "Five kHz thermometry in turbulent spray flames using chirped-probe pulse femtosecond CARS, part II: Structure of reaction zones," *Combust. Flame* 200, 417-432 (2019). DOI: 10-1016/j.combustflame.2018.10.034.

Lowe A, **Thomas LM**, Satija A, Lucht RP, and Masri AR, "Chirped-Probe-Pulse Femtosecond CARS Thermometry in Turbulent Spray Flames," *Proc. Combust. Inst.* 37, 1383-1391 (2019). DOI: 10.1016/j.proci.2018.06.149.

Thomas LM, Lowe A, Satija A, Masri A, and Lucht RP, "Technique developments and performance analysis of chirped-probe-pulse femtosecond coherent anti-Stokes Raman scattering combustion thermometry," *Appl. Opt.* 56, 8797-8810 (2017). DOI: 10.1364/AO.56.008797.



Research Interest Areas

- Optical diagnostics
- Turbulent combustion
- Hypersonics
- High-speed measurement techniques

Selected Honors & Awards

- Field-Grade Officer of the Quarter, School of Engineering & Management, 2Q 2019
- Expert Marksman M4 & M9
- Field Grade Officer of the Quarter, ENY, 2Q 2018 & 1Q 2018
- Awarded Full Tuition Fellowship, Purdue Military Research Initiative, 2014

Significant Accomplishments

- Professional Engineer licensed in state of Colorado since 2013
- FAA – Part 107 Small Unmanned Aerial System (UAS) Operator, Aug 2018
- Fluent German Speaker: 3/3/2+ Defense Language Proficiency Test and Oral Proficiency
- Graduate, US Army Air Assault School, Ft Drum, NY, Summer 2004



Lt Col Michael M. Walker

PhD, Aerospace Engineering, The Ohio State University

Assistant Professor of Aerospace Engineering

Most Notable Publications

Walker, M.M., Hipp, K.D., Benton, S.I., and Bons, J.P., "Effect of Jet Spacing on Swept-Wing Leading-Edge Separation Control," *AIAA Journal*, July 2018, Vol. 56: 2907-2910, DOI: 10.2514/1.J056352

Walker, M.M., and Bons, J.P., "The Effect of Passive and Active Boundary-Layer Fences on Swept-Wing Performance at Low Reynolds Number," 2018 *AIAA Aerospace Sciences Meeting*, January 2018. DOI: 10.2514/6.2018-0793

Walker, M.M., "Replicating the Effects of a Passive Boundary-Layer Fence via Active Flow Control," *PhD Dissertation*, The Ohio State University, March 2018.

Hipp, K.D., **Walker, M.M.**, Benton, S.I., and Bons, J.P., "Control of Poststall Airfoil Using Leading-Edge Pulsed Jets," *AIAA Journal*, February 2017, Vol. 55: 365-376, DOI: 10.2514/1.J055223

Walker, M.M., Hipp, K.D., and Bons, J.P., "The Role of Spanwise Flow for Swept Wing Separation Control with Varied Spanwise Jet Spacing," 2016 *AIAA Applied Aerodynamics Conference*, June 2016. DOI: 10.2514/6.2016-3120

Selected Honors & Awards

- 2008 – Company Grade Officer of the Quarter (of 105), National Air & Space Intelligence Center
- 2011 – Senior Company Grade Officer of the Quarter (of 427), Space & Missile Center
- 2007 – Nominated to Sigma Gamma Tau – National Aerospace Engineering Honor Society
- 2003 – Outstanding Academic Performer, Air & Space Basic Course



Research Interest Areas

- Aerodynamics
- Swept-wing performance
- Active flow control
- Experimental and computational fluid mechanics



Dr. William E. Wiesel

Ph.D., Harvard University, Astronomy

Professor of Astronautical Engineering

Most Notable Publications

"Estimating Nongravitational Accelerations on High Area-to-Mass Ratio Objects", **W. E. Wiesel**, *Journal of Guidance, Control, and Dynamics*, 39, 1438-1443, 2016.

"A KAM Tori Algorithm for Earth Satellite Orbits", **W. E. Wiesel**, *Journal of the Astronautical Sciences*, 64, 46-62, 2017.

"Stochastic Dynamics of and Collision Prediction for Low Altitude Earth Satellites", Adam T. Rich, Kenneth J. Stuart, **William E. Wiesel**, *Journal of the Astronautical Sciences*; Sept 2018; 65; 3; p307-p320.

"Impulsive Control of Earth Satellites on Low-Eccentricity KAM Tori", Christopher T. Craft and **William E. Wiesel**, accepted by the *Journal of Guidance, Control, and Dynamics*, 2019.

Significant Accomplishments

Author of three widely-regarded texts on spacecraft and orbital dynamics:

- Spaceflight Dynamics
- Modern Astrodynamics
- Modern Orbit Determination



Research Interest Areas

- Orbital mechanics, especially the application of the KAM theorem to orbital systems
- Dynamical system theory
- Control and estimation
- Control of time dependent nonlinear systems
- Satellite cluster navigation
- Mission planning
- Past research interests have included solar system orbital dynamics and planetary astronomy



Maj Costantinos Zagaris

PhD, Astronautical Engineering, Naval Postgraduate School

Assistant Professor of Astronautical Engineering

Most Notable Publications

C. Zagaris and M. Romano, "Reachability Analysis of Planar Spacecraft Docking with Rotating Body in Close Proximity", *Journal of Guidance, Control, and Dynamics*, Vol. 41, No. 6, pp. 1416-1422, Jan. 2018.

C. Zagaris, H. Park, J. Virgili-Llop, R. Zappulla II, M. Romano, and I. Kolmanovsky, "Model Predictive Control of Spacecraft Relative Motion with Convexified Keep-Out-Zone Constraints", *Journal of Guidance, Control, and Dynamics*, Vol. 41, No. 9, pp 2051-2058, Sep. 2018.

J. Virgili-Llop, **C. Zagaris**, R. Zappulla II, A. Bradstreet, and M. Romano, "A convex programming-based guidance algorithm to capture a tumbling object on-orbit using a spacecraft equipped with a robotic manipulator", *International Journal of Robotics Research*, Vol. 38, No.1, pp. 40-72, Jan. 2019.

J. Virgili-Llop, **C. Zagaris**, H. Park, R. Zappulla II and M. Romano, "Experimental evaluation of model predictive control and inverse dynamics control for spacecraft proximity and docking maneuvers," *CEAS Space Journal*, Vol. 10, No. 1, pp. 37-49, May 2017.

Selected Honors & Awards

- Best Astrodynamics paper, AIAA SciTech Forum & Expo, Jan 2019
- AFIT Distinguished Graduate, Mar 2012



Research Interest Areas

- Autonomous spacecraft guidance and control
- Optimal control
- Reachability analysis
- Robotics
- Autonomous multi-agent systems



Dr. Kenneth M. Hopkinson

PhD, Computer Science, Cornell University

Department Head, Electrical & Computer Engineering

Professor of Computer Science

Most Notable Publications

*Greve, G.H., **Hopkinson, K.M.**, Lamont, G.B., Evolutionary Sensor Allocation for the Space Surveillance Network, *Journal of Defense Modeling and Simulation*, Volume 15, Issue 3, July 2018, pp. 303-322.

*Hamman, S.T., **Hopkinson, K.M.**, Fadul, J.E., A Model Checking Approach to Characterizing the Fault Tolerance of Smart Grid Protection Systems, *IEEE Transactions on Power Delivery*, Volume 32, Issue 6, December 2017, pp. 2408-2415.

*Bodnar, T., *Dering, M.L., Tucker, C., **Hopkinson, K.M.**, Use Large Scale Social Media Networks as a Scalable Sensing System for Modeling Real Time Energy Utilization Patterns, *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, Volume 47, Issue 10, October 2017, pp. 2627-2640.

*Clark, M.R., *Stewart, K.E., **Hopkinson, K.M.**, Dynamic, Privacy-preserving Decentralized Reputation Systems, *IEEE Transactions on Mobile Computing*, Volume 16, Issue 9, September 2017, pp. 2506-2517.

*Hamman, S.T., **Hopkinson, K.M.**, Markham, R.L., *Chaplik, A.M., *Metzler, G.E., Teaching Game Theory to Improve Strategic Reasoning in Cybersecurity Students, *IEEE Transactions on Education*, Volume 60, Issue 3, August 2017, pp. 205-211.

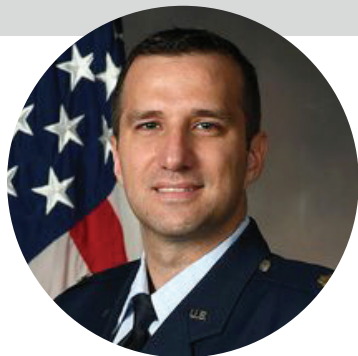
Selected Honors & Awards

- 2014 AFIT Winner and Air Education and Training Command (AETC) Runner-Up for the Educator of the Year Award
- 2010 Air Education and Training Command (AETC) Junior Civilian Scientist of the Year
- Institute of Electrical and Electronics Engineers (IEEE) Senior Member
- Association for Computing Machinery (ACM) Senior Member



Research Interest Areas

- Networking
- Security
- Cryptography
- Remote Sensing
- Sensor Fusion
- Critical Infrastructure Protection
- Space Applications



Maj David J. Becker

PhD, Electrical Engineering, Air Force Institute of Technology

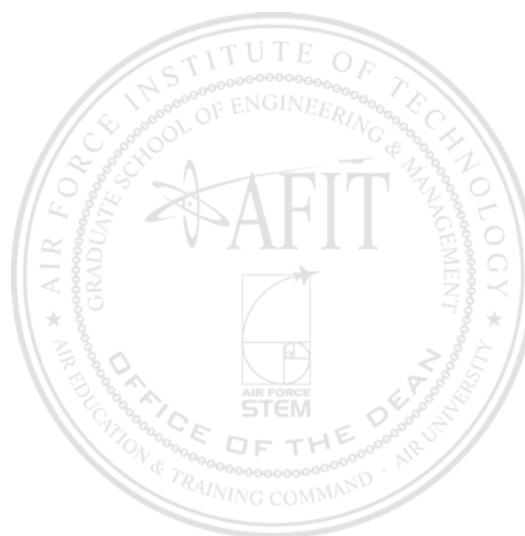
Assistant Professor of Electrical Engineering

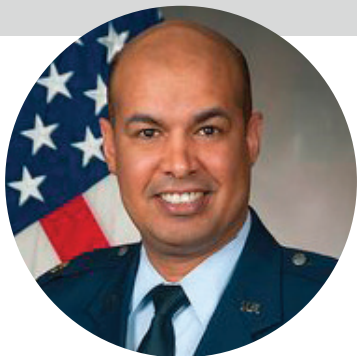
Most Notable Publications

David Becker and Stephen Cain, "Improved space object detection using short-exposure image data with daylight background," *Applied Optics* 57, 3968-3975 (2018)

D. Becker and S. Cain. "Improving space object detection using a Fourier like-lihood ratio detection algorithm," in *SPIE Optics + Photonics*, International Society for Optics and Photonics, 2016.

D. Becker and S. Cain. "A Space Object Detection Algorithm using Fourier Domain Likelihood Ratio Test," *Advanced Maui Optical and Space Surveillance Technologies Conference*, 2017.





Maj Joan A. Betances

PhD, Electrical Engineering, Air Force Institute of Technology

Assistant Professor of Computer Science

Most Notable Publications

Betances, Addison, K. Hopkinson, and M. D. Silviu.

“Context Aware Routing Managing Architecture for Airborne Networks,” in *IET Networks*, Vol. 5, No. 4, pp 85-92, 2016.

Talbot, Temple, Carbino, **Betances** “Detecting Rogue Attacks on Commercial Wireless Insteon Home Automation Systems,” *Jour of Computers & Security, Special Issue: Internet- and Cloud-of-Things: Cybercrime and Cybersecurity*, No. 74, pp. 296-307, 2018.

Sean P. O’Neill., **J. Addison Betances**, Samuel J. Stone, and Rusty, Baldwin “Comparison of Various Discrimination Techniques on Counterfeit Mixed-Signal Integrated Circuits” *International Conference on Cyber Warfare and Security*. Dayton, OH, March 2017.

Ervin*, Temple, **Betances**, “Detecting Insteon Home Automation Networks Attacks Using an SDR Radio Frequency Air Monitor,” *Proc of 13th Int’l Conf on Cyber Warfare and Security (ICCWS18)*, Washington D.C., Mar 2018.



Research Interest Areas

- Software defined radio to address bandwidth limitations
- Identify threats to GPS and wireless systems
- Emitter authentication verification



Dr. Brett J. Borghetti

PhD, Computer Science, University of Minnesota, Twin Cities

Associate Professor of Computer Science

Most Notable Publications

Westing, Nicholas M., **Borghetti, Brett J.**, Gross, Kevin C., "Fast and Effective Techniques for LWIR Radiative Transfer Modeling: A Dimension Reduction Approach", *Remote Sensing (MDPI)*, 9 Aug 2019, Vol 11, issue 6, pp. 1866-1886, DOI: 10.3390/rs11161866 <https://www.mdpi.com/2072-4292/11/16/1866/htm>

Dickey, Joshua T., **Borghetti, Brett J.**, and Junek, William, "Improving Regional and Teleseismic Detection for Single-Trace Waveforms Using a Deep Temporal Convolutional Neural Network Trained with an Array-Beam Catalog", *Sensors (MDPI)*, 31 Jan 2019, Vol 19, issue 3, pp 597-618, DOI: 10.3390/s19030597 <https://www.mdpi.com/1424-8220/19/3/597>

Hefron, Ryan G., **Borghetti, Brett J.**, Christensen, James C., Schubert Kabban, Christine M., "Deep long short-term memory structures model temporal dependencies improving cognitive workload estimation," *Pattern Recognition Letters (IEEE)*, Vol 94, 15 July 2017, pp 96-104. <https://www.sciencedirect.com/science/article/pii/S0167865517301678>

Borghetti, B.J., Giametta, J.J., & Rusnock, C.F., "Assessing Continuous Operator Workload with a Hybrid Scaffolded Neuroergonomic Modeling Approach," *Human Factors*, Vol 59, No. 1, Feb 2017, pp 134-146. DOI: 10.1177/0018720816672308 <http://journals.sagepub.com/doi/abs/10.1177/0018720816672308>

Sodemann, A.A., Ross, M.P., and **Borghetti, B.J.**, "A Review of Anomaly Detection in Automated Surveillance", *IEEE Transactions on System, Man, and Cybernetics Part C*, Vol. 42, No. 6, November 2012, pp 1257-1272. DOI: 10.1109/TSMCC.2012.2215319 <https://ieeexplore.ieee.org/document/6392472>

Selected Honors & Awards

- Human Factors and Ergonomics Society Conference Best Paper Award (2017)
- Human Factors and Ergonomics Society Conference Best Paper Award (2016)
- AETC Nominee to AF: AF STEM Outstanding Science and Educator Award (2014)



Research Interest Areas

- Improving human-machine team performance in complex environments using artificial intelligence and machine learning.
- Research experience in estimating human cognitive performance, seismic signal analysis, hyperspectral imagery analysis, statistical machine learning, genetic algorithms, self-organizing systems, neural networks, game theory, information theory and cognitive science.



Dr. Stephen C. Cain

PhD, Electrical Engineering, University of Dayton

Associate Professor of Electrical Engineering

Most Notable Publications

Nicholas J. Yielding, **Stephen C. Cain**, Michael D. Seal, "Statistical photocalibration of photodetectors for radiometry without calibrated light sources," *Opt. Eng.*, Vol. 57 no. (1) DOI:014107 (25 January 2018).

David Becker and **Stephen C. Cain**, "Improved space object detection using short- exposure image data with daylight background", *Applied Optics*, Vol. 57, Issue 14, pp. 3968-3975 (2018).

Stephen Cain and Tatsuki Watts, "Non-Paraxial Fourier propagation tool for aberration analysis and point spread function calculation", *Optical Engineering*, Vol. 55, Issue 8, DOI: 10.1117/1.OE.55.8.085104, (2016).

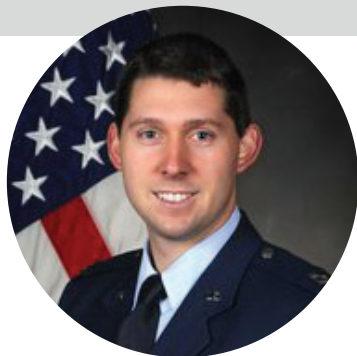
Tyler Hardy, Travis Blake, and **Stephen Cain**, "Unequal a priori probability multiple hypothesis testing in space domain awareness with the space surveillance telescope", *Applied Optics*, Vol. 55, Issue 15, pp. 4036-4046, (2016).

Richard D. Richmond and **Stephen C. Cain**, *Direct Detection LADAR Systems*, SPIE press, Bellingham, WA, 2010.



Research Interest Areas

- Remote sensing
- Image processing
- Space situational awareness



Capt Aaron J. Canciani

PhD, Electrical Engineering, Air Force Institute of Technology

Assistant Professor of Electrical Engineering

Most Notable Publications

Canciani, Aaron J. and John Raquet (2016), "Absolute Positioning Using the Earth's Magnetic Anomaly Field," *Navigation, Journal of the Institute of Navigation*, Vol. 63, No. 2, Summer, 2016, pp. 111-126.

Canciani, Aaron J. and John Raquet (2017), "Airborne Magnetic Anomaly Navigation", *IEEE Transactions on Aerospace and Electronics Systems*, Vol. 53, No. 1, February 2017.

Canciani, Aaron J. and John Raquet (2016), "Validation of a Magnetic Anomaly Navigation Mode with Flight Test Data," *ION GNSS*, Institute of Navigation. Portland, OR, September 2016.

Canciani, Aaron J. and John Raquet (2016), "Magnetic Anomaly Navigation Accuracy with Respect to Map Quality and Altitude," *International Technical Meeting*, Institute of Navigation. Monterey, CA, January 2016.

Canciani, Aaron J. and Kevin Brink (2017), "Improved Magnetic Anomaly Navigation through Cooperative Navigation," *ION Pacific Navigation and Timekeeping Conference*. Honolulu, HI, May 2017.

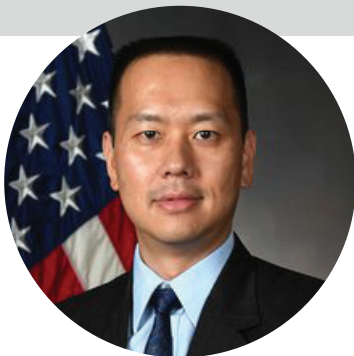
Selected Honors & Awards

- ETA Kappa Nu Instructor of the Year Award (2017-2018)
- John McLucas Basic Research Award, Top Air Force Level Basic Research (2017)



Research Interest Areas

- Navigation using environmental features
- Magnetic anomaly navigation
- GPS-denied navigation techniques
- Optimal stochastic estimation techniques



Dr. Hengky Chandraham

PhD, Electrical and Computer Engineering, Cornell University

AFIT Nanofabrication and Characterization Facility Director

Assistant Professor of Electrical Engineering

Most Notable Publications

Cong Chen, Jin Yuan, Lei Wan, **Hengky Chandraham**, Zhenshi Chen, Naoya Nishimura, Harunobu Takeda, Hiroaki Yoshioka, Weiping Liu, Yuji Oki, Xudong Fan, and Zhaohui Li (2019), "Demonstration of on-chip quantum dots microcavity lasers in a molecularly engineered annular groove," *Optics Letters*, Vol 44, pp. 495-498.

Lei Wan, **Hengky Chandraham**, Jian Zhou, Zhaohui Li, Cong Chen, Sangha Cho, Hui Zhang, Ting Mei, Huiping Tian, Yuji Oki, Naoya Nishimura, Xudong Fan, and Lingjie Jay Guo (2018), "Demonstration of versatile whispering-gallery micro-lasers for remote refractive index sensing," *Optics Express*, Vol 26, pp 5800-5809.

Lei Wan, **Hengky Chandraham**, Cong Chen, Qishu Chen, Ting Mei, Yuji Oki, Naoya Nishimura, Lingjie Jay Guo, and Xudong Fan (2017), "On-chip, high-sensitivity temperature sensors based on dye-doped solid-state polymer microring lasers," *Applied Physics Letters*, Vol 111, pp 061109.

Hengky Chandraham, Stephen C. Rand, and Xudong Fan (2017), "Evanescent coupling between refillable ring resonators and laser-inscribed optical waveguides," *Applied Optics*, Vol 56, pp 4750-4756.

Hengky Chandraham, Stephen C. Rand, and Xudong Fan (2016), "Fusion of renewable ring resonator lasers and ultrafast laser inscribed photonic waveguides," *Scientific Reports*, Vol 6, pp 32668.

Selected Honors & Awards

- IEEE NEMS Best Paper Finalist (2019)
- Sentinel of Science top engineering reviewer award (2016)
- IEEE UFFC Best Student Paper Award (2009)



Research Interest Areas

- Symbiotically enhancing electronic, phononic, magnonic, and photonic microsystems
- Optofluidics, photoacoustics, biophotonics, nonlinear optics, and optomechanics
- Mutually assisting micro- and nano-systems
- Fabrications of integrated novel micro- and nano-systems
- Molecular scale sensing



Dr. Peter J. Collins

PhD, Electrical Engineering, Air Force Institute of Technology

Professor of Electrical Engineering

Most Notable Publications

M. W. Lukacs, **P. J. Collins**, and M. A. Temple, "Classification Performance using RF-DNA Fingerprinting of Ultra-Wideband Noise Waveforms," *IET Electronic Letters*, Vol. 51, No. 10, pp. 787-789, May 2015.

M. W. Lukacs, A. J. Zeqolari, **P. J. Collins**, and M. A. Temple, "RFDNA Fingerprinting for Antenna Classification," *IEEE Antennas and Wireless Propagation Letters*, Vol. PP, No. 99, March 2015.

J. V. Paul, **P. J. Collins**, and R. A. Coutu, Jr., "Efficient Cost Function for the Optimization of an N-layered Isotropic Cloaked Cylinder," *Journal of Physics D: Applied Physics*, Vol. 46, No. 33, July 2013.

Paul, J. V., **Collins, P. J.**, and Coutu, Jr., R. A., "A New Look at Azimuthal Wave Propagation Constants of an N-Layered Dielectric Coated PEC Cylinder," *IEEE Transactions on Antennas and Propagation*, Vol. 61, No. 5, pp. 2727-2734, May 2013.

Selected Honors & Awards

- Antenna Measurement Techniques Association Distinguished Achievement Award (2018).
- IEEE/URSI Antennas and Propagation Society Piergiorgio L.E. Uslenghi Letters Prize Paper Award (2016).
- Secretary of the Air Force, Harold Brown Award Recipient (2013).

Significant Accomplishments

- Fellow, Antenna Measurement Techniques Association (2017).
- Lowe Clutter Method for Bistatic RCS Measurements, U.S. Patent 8,947,295 (2015).



Research Interest Areas

- Low Observables
- Electromagnetic materials design
- Remote sensing along with the underlying foundational disciplines of electromagnetic theory
- Computational electromagnetics
- Signature metrology



Lt Col Mark E. DeYoung

PhD

Assistant Professor of Computer Engineering

Most Notable Publications

DeYoung, M., *Salman, M., *Bedi, H., Raymond, and Tront J. "Spark on the ARC: Big data analytics frameworks on HPC clusters," *Proceedings of the Practice and Experience in Advanced Research Computing (PEARC17)*, New Orleans, LA, 9-13 July 2017.

DeYoung, M., *Kobezak, P., Raymond, R. Marchany R. and Tront J. "Privacy Preserving Network Security Data Analytics: Architectures and System Design," *Proceedings of the 51st Hawaii International Conference on System Sciences (HICSS 51)*, pp. 4504-4512, Waikoloa Village, HI, 3-6 January 2018.



Research Interest Areas

- Hardware/software co design
- Embedded systems
- Cyber situational awareness
- Computational statistics
- Software engineering
- Reverse engineering



Maj Richard Dill

PhD, Computer Science, Air Force Institute of Technology

Assistant Professor of Computer Engineering

Most Notable Publications

Orner, Jacob, **Dill, R.**, and George, N. "PROF 2.0: Improving a Methodology for Topic Map and Skill Tree Creation," *IEEE Multimedia Technologies for E-Learning*, San Diego, CA 8 – 12 December 2019.

Orner, Jacob and **Dill, R.** "PROF An Assistive Tool for Educators to Semi-Autonomously Create Topic Maps and Skill Trees," *20th Special Interest Group on Information Technology Education*, Tacoma WA, 3 – 5 October

Pendleton, Aaron and **Dill, R.** "Surveying the Incorporation of IoT Devices into Cybersecurity Risk Management Frameworks," *13th International Conference on Emerging Security Information, Systems and Technologies*, Nice, France, 27 - 31 October 2019.

Youngjun, Park and **Dill, R.** "IoTAMU: Protecting Smart Home Networks via Obfuscation and Encryption," *13th International Conference on Emerging Security Information, Systems and Technologies*, Nice, France, 27 - 31 October 2019.

Pettit, Dillon, **Dill, R.**, Graham, S. "Zero Stars: Analysis of Cyber Risk of Small COTS UAVs," *13th International Conference on Emerging Security Information, Systems and Technologies*, Nice, France, 27 – 31 October 2019.

Dukarm, Chris and **Dill, R.** "Improving Phishing Awareness in the US DoD," *18th European Conference on Cyber Warfare and Security*, Lisbon, Portugal, 4 – 5 July 2019.



Research Interest Areas

- Cyber security
- Artificial intelligence
- Algorithms
- Wargaming



Dr. Scott R. Graham

PhD, Electrical Engineering, University of Illinois at Urbana-Champaign

Director, Center for Cyberspace Research

Associate Professor of Computer Engineering

Most Notable Publications

Badenhop, C.W., **Graham, S.R.**, Mullins, B.E., Mailloux, L.O., "Looking Under the Hood of Z-Wave: Volatile Memory Introspection for the ZW0301 Transceiver", *ACM Transactions on Cyber-Physical Systems*, Vol 3 Issue 2, Dec 2018.

Nolan, B.C., **Graham, S.R.**, Mullins, B.E., Schubert-Kabban, C.M., "Automated Signal Extraction from Controller Area Networks", *IEEE Connected and Automated Vehicles Symposium*, Chicago, IL, USA, Aug 2018.

Badenhop, C.W., **Graham, S.R.**, Ramsey, B.W., Mullins, B.E., Mailloux, L.O., "The Z-Wave Routing Protocol and its Security Implications", *Elsevier Journal of Computers & Security*, Volume 68, Jul 2017, pp. 112-129.

Reber, P.E., **Graham, S.R.**, "Evaluating System on a Chip Design Security", *Journal of Information Warfare*, Vol 16, Issue 3, Summer 2017.

Gutierrez, J.A., Bindewald, J.M., **Graham, S.R.**, Rice, M.J., "Enabling Bluetooth Low Energy auditing through synchronized tracking of multiple connections", *International Journal of Critical Infrastructure Protection*, Sep 2017.

Selected Honors & Awards

- 2017 Air University Cat III Civilian of the Quarter



Research Interest Areas

- Embedded Systems Security
- Cyber Physical Systems
- Computer Communication Networks



Dr. Sanjeev Gunawardena

PhD, Electrical Engineering, Ohio University

Research Assistant Professor of Electrical Engineering

Most Notable Publications

Pentecost, S., and **Gunawardena, S.** (2018, January). Dynamic Power Allocation with Constant Envelope Transmission for Next Generation Software-Defined GPS Payloads. *Proceedings of the 2018 International Technical Meeting of The Institute of Navigation* (pp. 869-877). Reston, Virginia.

Gunawardena, S., Raquet J., and Carroll, M. (2017, January). Innovation: Correlator Beamforming for Low-Cost Multipath Mitigation. *GPS World*. Retrieved from <http://gpsworld.com/innovation-correlator-beamforming-for-low-cost-multipathmitigation/>

Gunawardena, S., Raquet, J., and Carroll, M. (2017, January). Correlator Beamforming for Multipath Mitigation in High-Fidelity GNSS Monitoring Applications. *Proceedings of the 2017 International Technical Meeting of The Institute of Navigation* (pp. 1173-11880). Monterey, California.

J. M. Guerrero, and **Gunawardena, S.** (2017, January). Characterization of Timing and Pseudorange Biases Due to GNSS Front-End Filters by Type, Temperature, and Doppler Frequency. *Proceedings of the 2017 International Technical Meeting of The Institute of Navigation* (pp. 418-444). Monterey, California

Wireman, M., **Gunawardena, S.**, and Carroll, M. (2017, January) High-Fidelity Signal Deformation Analysis of the Live Sky GLONASS Constellation using Chip Shape Processing, *Proceedings of the 2017 International Technical Meeting of The Institute of Navigation* (pp. 521-535). Monterey, California.

Selected Honors & Awards

- Civilian CAT III Award, 2016 1st Quarter, School of Engineering and Management, Air Force Institute of Technology, April 2016.

Significant Accomplishments

Dickman, J., Ahmadi, R., Cosgrove, M. A., and Gunawardena, S. (2015, January). System and Method for Detection of RF Signal Spoofing, US Patent No. 8934859. <http://www.google.com/patents/US8934859>

Gunawardena, S., Dickman, J., and Cosgrove, M. A. (2015, September). Reconfigurable Correlator for a Navigation System, US Patent No. 9124356. <http://www.google.com/patents/US9124356>

Gunawardena, S., Dickman, J., and Cosgrove, M. A. (2014, December). Systems and Methods for Adaptive Sample Quantization, US Patent No. 8923414. <http://www.google.com/patents/US8923414>

Gunawardena, S., Dickman, J., and Cosgrove, M. A. (2015, January). Packet-Based Input/Output Interface for a Correlation Engine, US Patent No. 8934384. <http://www.google.com/patents/US8934384>

Van Graas F., Soloviev, A., and Gunawardena, S. (2011, September). Systems and Methods for Acquisition and Tracking of Low CNR GPS Signals, US Patent No. 8013789, <http://www.google.com/patents/US8013789>



Research Interest Areas

Satellite Navigation and Timing (SatNav) Systems, Navigation Warfare, Advanced SatNav Signal Design and Payload Architectures, Positioning Navigation and Timing (PNT) Receiver Design, SatNav Signal Monitoring, Digital Signal Processing, Digital Systems Design, RF Systems Design, Embedded Systems Design, Reconfigurable Computing, Software Defined Radio, High Performance Computing, Domain-Specific Programmable ASICs and Architectures.



Maj Nicolas S. Hamilton

PhD, Electrical Engineering, Air Force Institute of Technology

Assistant Professor

Most Notable Publications

Nicolas Hamilton, Scott Graham, Timothy Carbino, James Petrosky, J. Addison Betances, "Adaptive-Hybrid Redundancy with Error Injection," *MDPI Journal of Electronics*, Vol. 8, No. 11, 1 Nov 2019

Nicolas Hamilton, Scott Graham, Timothy Carbino, James Petrosky, J. Addison Betances, "Adaptive-Hybrid Redundancy for Rad-Hardening," *Proceedings of the IEEE 2019 National Aerospace and Electronics Conference (NAECON)*. IEEE, 15-19 Jul 2019



Research Interest Areas

- Radiation hardening space electronics from single event upsets through hardware and software redundancy
- Field programmable gate arrays (FPGAs)
- Very large scale integrated (VLSI) circuits



Dr. Michael J. Havrilla

PhD, Electrical Engineering, Michigan State University

Professor of Electrical Engineering

Most Notable Publications

Karuppuswami, S., E. Rothwell, P. Chahal and **M. Havrilla** (2018), "A triaxial applicator for the measurement of the electromagnetic properties of materials," *Sensors*, Vol 18, No. 1, pp. 1-15.

Bogle, A., M. Hyde, **M. Havrilla** and J. Sovorn (2017), "High-temperature RF material characterization using a dual-chambered rectangular waveguide fixture," *IEEE Transactions on Instrumentation and Measurement*, Vol 66, No 9, pp. 2422-2427.

Uber, R., A. Wood and **M. Havrilla** (2017), "Analysis and Numerical Solution of Transient Electromagnetic Scattering from Two Cavities," *Journal of Computational Physics*, Vol 343, pp. 217-234.

Hyde, M. and **M. Havrilla** (2016), "A broadband, nondestructive microwave sensor for characterizing magnetic sheet materials," *IEEE Sensors Journal*, Vol 16, No 12, pp. 4740-4748.

Hyde, M., **M. Havrilla** and A. Bogle (2016), "Nondestructive determination of the permittivity tensor of a uniaxial material using a two-port clamped coaxial probe," *IEEE Transactions on Microwave Theory and Techniques*, Vol 64, No 1, pp. 239-246.

Selected Honors & Awards

- Vice President, Antenna Measurement Techniques Association (2018).
- Best student paper award, 1st place, A. Knisely, Antenna Measurement Techniques Association Conference, advised by M. Havrilla (2017).
- Elected Senior Member, Antenna Measurement Techniques Association (2016).



Research Interest Areas

- Electromagnetics
- Metamaterials
- Stealth technology
- Antennas
- Nanophotonics



Dr. Douglas D. Hodson

PhD, Computer Engineering, Air Force Institute of Technology

Associate Professor of Computer Engineering

Most Notable Publications

D.B. Worth, B.G. Woolley and **D.D. Hodson**, "SwarmSim: A Framework for Modeling Swarming UAVs using Hardware-in-the-Loop," *Journal of Defense Modeling and Simulation (JDMS)*, Jul 2017.

A.J. Roberts, L.O. Mailloux and **D.D. Hodson**, "A Case Study in Understanding and Evaluating Live Virtual Constructive Command and Control Training Effectiveness," *ITEA Journal of Test and Evaluation*, Vol 38, pp. 265-273, Jun 2017.

L.O. Mailloux, M.R. Grimaila, **D.D. Hodson** and G.B. Baumgartner, "The Benefits of Joining an Effective Research Team," *IEEE Potentials*, Vol 35, No. 3, May/June 2017.

J.R. Millar, **D.D. Hodson**, G.L. Peterson and D.K. Ahner, "Optimizing Update Scheduling Parameters for Distributed Virtual Environments," *Concurrency and Computation: Practice and Experience (CCPE), Special Issue on Trends and Advances in Collaboration Technologies and Systems*, Mar 2017.

L.O. Mailloux, M.R. Grimaila, **D.D. Hodson**, R.D. Engle*, C. McLaughlin and G.B. Baumgartner, "Modeling, Simulation, and Performance Analysis of Decoy State Enabled Quantum Key Distribution Systems," *Applied Sciences*, Jan 2017.

Selected Honors & Awards

- Southwestern Ohio Council for Higher Education (SOCHE) Faculty Excellence Award (2017).



Research Interest Areas

- Software Engineering
- Modeling and Simulation
- Real-Time Interactive Distributed Simulations
- Software Engineering Analytics



Dr. Julie A. Jackson

PhD, Electrical Engineering, The Ohio State University

Associate Professor of Electrical Engineering

Most Notable Publications

J. A. Jackson and F. Lee-Elkin, "Exploiting Channel Crosstalk for Polarimetric SAR Compressive Sensing," to appear *IEEE Transactions on Aerospace and Electronic Systems*, available online Early Access May 2019: <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8718553>

A. Evers and **J. A. Jackson**, "A Generalized Phase Gradient Autofocus Algorithm," *IEEE Transactions on Computational Imaging*, available online Early Access Feb 2019: <https://ieeexplore.ieee.org/document/8642429>

A. Evers and **J. A. Jackson**, "Cross-Ambiguity Characterization of Communication Waveform Features for Passive Radar," *IEEE Transactions on Aerospace and Electronic Systems*, vol. 51, no. 4, pp. 3440-3455, Oct 2015.

S. R. Stevens and **J. A. Jackson**, "Emitter Selection Criteria for Passive Multistatic Synthetic Aperture Radar Imaging," *IET Radar Sonar and Navigation, special topics section on Waveform Diversity and Spectrum Engineering*, vol. 8, no. 9, pp. 1267-1279, Dec. 2014.

J. A. Jackson, B. D. Rigling, and R. L. Moses, "Canonical Scattering Feature Models for 3D and Bistatic SAR," *IEEE Transactions on Aerospace and Electronic Systems*, vol. 46, no. 2, pp. 525-541, April 2010.

Selected Honors & Awards

- IEEE Aerospace and Electronic Systems Society Fred Nathanson Memorial Radar Award Winner (2019).
- Air University and AFIT Winner Civilian Category 3 Quarterly Award (2018).
- Southwestern Ohio Council for Higher Education (SOCHE) 2016 Faculty Excellence Award (2016).
- Air Force level Winner: 2012 Air Force Science, Technology, Engineering, and Mathematics (STEM) Awards, Outstanding Engineer Award, Junior Civilian Category.

Significant Accomplishments

- Serves on the IEEE AESS Radar Systems Panel



Research Interest Areas

- Radar signal and image processing
- Radar cross section scattering prediction
- Phenomenology



Lt Col David W. King

PhD, Computer Science, Air Force Institute of Technology

Assistant Professor of Computer Science

Most Notable Publications

David King, Gilbert Peterson, "Decentralized Control Strategies for Unmanned Aircraft System Pursuit and Evasion," *Proceedings of the IEEE 2019 90th Vehicular Technology Conference (VTC2019-Fall)*, 22-25 Sep 2019

David King, Lukas Esterle, Gilbert Peterson, "Entropy-Based Team Self-Organization with Signal Suppression," *Proceedings of the 2019 conference on Artificial Life (ALIFE2019)*, 29 Jul – 2 Aug 2019

David King, Gilbert Peterson, "The Emergence of Division of Labor in Multi-Agent Systems," *Proceedings of the IEEE 2019 13th International Conference on Self-Adaptive and Self-Organizing Systems (SASO2019)*, 16-20 June 2019

David King, Gilbert Peterson, "A Macro-Level Order Metric for Self-Organizing Adaptive Systems," *Proceedings of the IEEE 12th International Conference on Self-Adaptive and Self-Organizing Systems (SASO2018)*, 2 – 6 Aug 2018

David King, Gilbert Peterson, "Epaminondas: Exploring Combat Tactics," *International Computer Games Association Journal*, vol. 37, no. 3, 131-143, Jan 2014

Selected Honors & Awards

- Outstanding Contributor, Squadron Officer School, 2015
- Distinguished Graduate, AFIT, 2014
- USAFE Ground Tactical Communications CGO of the Year, 2009
- 52 FW Communications and Information CGO of the Year, 2009
- Distinguished Graduate, Expeditionary Communications and Information Officer Training, 2005
- Distinguished Graduate, ROTC, University of Maryland, College Park, 2005
- John Levitow Award, Airman Leadership School, 1999

Significant Accomplishments

- Reviewer, IEEE Conference on Autonomic Computing and Self-Organizing Systems (ACSOS)



Research Interest Areas

- Emergence
- Self-organizing systems
- Artificial intelligence
- Multi-agent systems
- Agent learning
- Machine learning
- Games



Dr. Gary B. Lamont

PhD, Electrical Engineering, University of Minnesota Institute of Technology

Professor of Electrical and Computer Engineering

Most Notable Publications

Books (6), Book Chapters (8)

Carlos A. Coello Coello, **Gary B. Lamont**, David A. Van Veldhuizen, "Evolutionary Algorithms for Solving Multi-Objective Problems", *Springer*, 2007, 2nd Revised Edition

Papers – (over 200; 1970-2017)

Jason M. Blackford and **Gary B. Lamont**, "A Novel Approach to The Real-Time Strategy Build Order Problem with Skill Level as a Metric", *IEEE Transactions on Computational Intelligence and Games*, 2016

Nicholas S. Kovach*, Alan S. Gibson*, **Gary B. Lamont**, "Hypergame Theory: A Model for Conflict, Misperception, and Deception", *International Journal of Computer Games Technology*, Volume 2015, Article ID 570639, 20 pages, Hindawi Publishing

Selected Honors & Awards

- IEEE Fritz Russ Bio-Engineering Award (2008).
- IEEE Senior Life Member (2004).
- Eta Kappa Nu AFIT Teacher of the Year (2002).



Research Interest Areas

- Evolutionary computation
- Artificial immune systems
- Bio-inspired computing
- Information security
- Intrusion and anomaly detection
- Parallel and distributed computation
- Combinatorial optimization problems (single objective and multi-objective)
- Image processing
- Protein structure prediction
- Software engineering
- Digital signal processing
- Intelligent and distributed control systems
- Autonomous multi-agent systems (unmanned ad-hoc aerial vehicles, robots, etc.)



Maj Tod Laurvick

PhD, Electrical Engineering, Air Force Institute of Technology

Assistant Professor of Electrical and Computer Engineering

Most Notable Publications

Laurvick, T.V., "3D Printed Structures for Nano-Scale Research," *Additive Manufacturing Handbook: Product Development for the Defense Industry* (Chap 21), Taylor & Francis/CRC Press, 2017

Sattler, J., Coutu, R.A. Jr., Lake, R.A., **Laurvick, T.V.**, "Modeling microporous surfaces for secondary electron emission control to suppress multipactor," *Applied Physics Letters*, vol. 122, no. 5, 2017

Laurvick, T.V., Coutu, Jr. R.A., *Sattler J.M. and Lake, R.A. "Surface Feature Engineering through Nanosphere Lithography," *SPIE Journal of Micro/Nanolithography, MEMS and MOEMS* 15, no. 3, (2016): 031602-031602

Laurvick, T.V. and Coutu, Jr. R.A. "Improving Gold/Gold Micro-Contact Performance and Reliability under Low Frequency AC through Circuit Loading," *IEEE Transactions on Components, Packaging and Manufacturing Technology* (2016)

Gwin, A.H., *Kodama, C.H., **Laurvick, T.V.**, Coutu, Jr. R.A., and Taday, P.F. "Improved terahertz modulation using germanium telluride (GeTe) chalcogenide thin films," *Applied Physics Letters* 107, no. 3 (2015): 031904



Research Interest Areas

- Applications of advanced fabrication techniques and materials to the study of micro-electrical solid state and MEMS devices.



Dr. Robert C. Leishman

PhD, Mechanical Engineering, Brigham Young University

Research Assistant Professor of Autonomy

Most Notable Publications

Leishman, R. C., Gray, J., & Raquet, J. (2017). Utilization of UAV autopilots in vision-based alternative navigation. In *30th International Technical Meeting of the Satellite Division of the Institute of Navigation, ION GNSS 2017* (Vol. 4). Portland, OR.

Leishman, R. C., & McLain, T. W. (2015). A Multiplicative Extended Kalman Filter for Relative Rotorcraft Navigation. *Journal of Aerospace Information Systems*.

Leishman, R. C., McLain, T. W., & Beard, R. W. (2014). Relative Navigation Approach for Vision-Based Aerial GPS-denied Navigation. *Journal of Intelligent and Robotic Systems*, 47(1), 97–111.

Leishman, R. C., MacDonald, J. C., Beard, R. W., & McLain, T. W. (2014). Quadrotors & Accelerometers: State Estimation with an Improved Dynamic Model. *Control Systems Magazine*, 34(1), 28–41.

Leishman, R. C., Koch, D. P., McLain, T. W., & Beard, R. W. (2013). Robust visual motion estimation using RGB-D cameras. In *AIAA Infotech @ Aerospace Conference*. Boston, MA, USA.

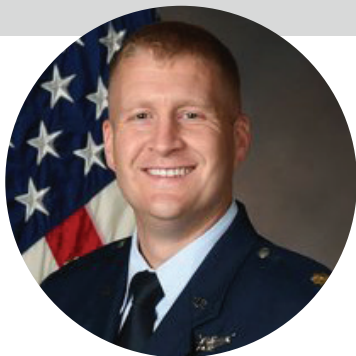
Selected Honors & Awards

- The Presidents Volunteer Service Award - Silver Category (2017).



Research Interest Areas

- Autonomous aerial vehicles
- Autonomy
- Non-GPS navigation
- Image processing
- Sensor fusion and control



Maj James R. Lievsay

PhD, Electrical Engineering, University of Oklahoma

Assistant Professor of Electrical Engineering

Most Notable Publications

B.H. Gessel and **J.R. Lievsay**, "Three-Dimensional Emitter Selection Optimization for Passive GMTI", in *Proc. 2019 Radar Conference*, Boston, MA April, 2019, pp. 1-6.

F.D. Taylor and **J.R. Lievsay**, "LTE Bandwidth and Modulation Scheme Effects on Passive Bistatic Radar", in *Proc. 2018 52nd Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA, Oct, 2018, pp. 916-919.

J.R. Lievsay and N.A. Goodman, "Modeling 3D passive STAP with heterogeneous clutter and pulse diversity waveform effects," in *IEEE Transactions on Aerospace and Electronic Systems*, vol. 54, no. 2, pp. 861-872, April 2018.

J.R. Lievsay and N.A. Goodman, "Passive radar large clutter discrete removal," in *Proc. 2018 IEEE Radar Conference*, Oklahoma City, OK, April, 2018, pp. 1167-1172.

J.R. Lievsay and N.A. Goodman, "Multi-transmitter clutter modeling for passive STAP," in *Proc. 2016 IEEE Radar Conference*, Philadelphia, May, 2016, pp. 1-6.

Selected Honors & Awards

- Hughes Centennial Fellowship, The University of Oklahoma (2014).
- Thesis Award, Advanced Technical Intelligence Award (2011).



Research Interest Areas

- Ground Moving Target Indication (GMTI)
- Space-Time Adaptive Processing (STAP)
- Passive Bistatic Radar



Dr. Richard K. Martin

PhD, Electrical Engineering, Cornell University

Professor of Electrical Engineering

Most Notable Publications

Martin, Richard K., Christian Keyser, Luke Ausley, and Michael Steinke (2018), "Pixel Classification with a Temporally Multiplexed Spectropolarimetric LADAR System," *IEEE Transactions on Geoscience and Remote Sensing*, vol. 56, no. 7, pp. 3735-3746.

Keyser, Christian, P. Khanh Nguyen, Arielle Adams, and **Richard K. Martin**, "Single-Pulse Mueller Matrix Polarimeter for Rapid Scene Characterization LADAR," *SPIE Commercial + Scientific Sensing and Imaging*, Orlando, FL, Apr 2018.

Ausley, Luke, Christian Keyser, and **Richard K. Martin**, "Temporally Multiplexed Multi-Spectral LADAR with Raman-Based Waveforms," *SPIE Commercial + Scientific Sensing and Imaging*, Orlando, FL, Apr 2018.

Martin, Richard K. and Andrew G. Klein, "Improved Student Independence Through Competitive Tinkering," *Frontiers in Education*, Indianapolis, IN, Oct 2017.

Martin, Richard K., Andrew G. Klein, Jennifer Hefner, Cody Watson, and Kirsten R. Basinet, "Making and Gaming in Signal Processing Classes," *Int. Conf. on Acoustics, Speech, and Signal Proc.*, New Orleans, LA, March 2017.

Selected Honors & Awards

- Presidential Volunteer Service Award (gold level), AFIT-NASIC team (2016).



Research Interest Areas

- Through-wall radio imaging
- Laser radar target identification
- Engineering education methodology



Dr. Laurence D. Merkle

PhD, Computer Engineering, Air Force Institute of Technology

Assistant Professor of Computer Engineering

Most Notable Publications

C. Johnson, M. McGill, D. Bouchard, M. K. Bradshaw, V. A. Bucheli, **L. D. Merkle**, M. J. Scott, Z. Sweedyk, J. Ángel, Z. Xiao, and M. Zhang. "Game Development for Computer Science Education." In *Proceedings of the 2016 ITICSE Working Group Reports (ITICSE '16)*. ACM, New York, NY, USA, 23-44, 2016.

A. Chidanandan and **L. D. Merkle**. "Use of Version Control Software in a Project-Based Introductory Computer Architecture Course." *Computers in Education Journal*, Vol. XVIII [sic], 2009, No. 3, pp 38-50.

L. D. Merkle and J. W. Luginsland. "Design Optimization for a Novel Class of High Power Microwave Sources." *Proceedings of the 2003 IEEE Congress on Evolutionary Computation*, presented in the special session on Evolutionary Design Optimization.

G. B. Lamont and **L. D. Merkle**. "Towards Effective Evolutionary Algorithms for Polypeptide Structure Prediction." In G. Fogel and D. W. Corne, editors, *Evolutionary Computation in Bioinformatics*, 2003.

B. S. Fagin and **L. D. Merkle**. "Quantitative Analysis of the Effects of Robots on Computer Science Education." *ACM Journal of Educational Resources in Computing*, Vol. 2, No. 4, December 2002, pp. 1-18.

Selected Honors & Awards

- Best Poster, 22nd Colloquium for Information Security Systems Education
- Best Paper, Mechanical Engineering Division, 2005 American Society for Engineering Education Annual Conference & Exposition
- Best Presentation, Space Situational Awareness Session, 20th Annual Advanced Maui Optical and Space Surveillance Technologies Conference, 2019.
- USAFA Department of Computer Science Research Excellence Award, 2001-02



Research Interest Areas

- Algorithms
- Computability and complexity
- Computational science and engineering
- Cybersecurity education
- Evolutionary computation
- Games in computing education
- Optimization
- Quantum computing
- Space situational awareness



Dr. Robert F. Mills

PhD, Electrical Engineering, University of Kansas

Professor of Electrical Engineering

Most Notable Publications

Span, M., Mailloux, L.O., **Mills, R.F.**, and Young, W., "Conceptual Systems Security Requirements Analysis: Aerial Refueling Case Study", accepted for publication in *IEEE Access*, 30 Jul 2018.

Rich, M.D., **Mills, R.F.**, Dube, T.E., and Rogers, S.K., "Evaluating Machine Learning Classifiers for Defensive Cyber Operations", *Military Cyber Affairs*, Vol 2, Issue 1, Article 6, pp 1-19, 2016.

Vaughan, S.L., **Mills, R.F.**, Peterson, G.L., Grimaila, M.R., Rogers, S.K., Oxley, M.E., and Patterson, R.E., "A dual-process Qualia Modeling Framework", *Biologically Inspired Cognitive Architectures (BICA) Journal*, 2016, pp 71-85.

Selected Honors & Awards

- Air Force Association Bernard A. Schriever Award for advancing aerospace power, technology, doctrine, or the Air Force as a profession (2015).
- U.S. Government Information Security Leadership Awards, Workforce Improvement Category, Team Award: Cyberspace 200/300 Professional Continuing Education Team, Air Force Cyberspace Technical Center of Excellence, International Information Systems Security Certification Consortium, Inc., (ISC)²® (2011 and 2014).



Research Interest Areas

- Electronic warfare
- Avionics security
- RF fingerprinting
- Network operations and security
- Situation awareness



Dr. Barry E. Mullins

PhD, Electrical Engineering, Virginia Tech

Professor of Computer Engineering

Most Notable Publications

S. M. Beyer, **B. E. Mullins**, S. R. Graham, and J. M. Bindewald (2018), "Pattern-of-Life Modeling in Smart Homes," *IEEE Internet of Things Journal*, vol. 5, no. 6, December 2018, pp. 5317-5325.

C. W. Badenhop, S. R. Graham, **B. E. Mullins**, L. O. Mailloux (2018), "Looking Under the Hood of Z-Wave: Volatile Memory Introspection for the ZW0301 Transceiver," *ACM Transactions on Cyber-Physical Systems*, vol. 3, no. 2, December 2018, Article 20 (pp. 20:1-20:24).

C. W. Badenhop, S. R. Graham, B. W. Ramsey, **B. E. Mullins**, L. O. Mailloux (2017), "The Z-Wave Routing Protocol and its Security Implications," *Journal of Computer and Security*, Elsevier, vol. 68, April 2017, pp. 112-129.

S. Dunlap, J. W. Butts, J. Lopez Jr., M. J. Rice, and **B. E. Mullins** (2016), "Using Timing-Based Side Channels For Anomaly Detection In Industrial Control Systems," *International Journal of Critical Infrastructure Protection*, Publisher: Elsevier, vol. 15, December 2016, pp. 12-26.

C. W. Badenhop, B. W. Ramsey, **B. E. Mullins**, L. O. Mailloux (2016), "Extraction and Analysis of Non-volatile Memory of the ZW0301 Module, a Z-wave Transceiver," *Digital Investigation*, Publisher: Elsevier, vol. 17, no. 14, June 2016, pp. 14-27.



Research Interest Areas

- Cyber-physical systems security
- Cyber operations
- Critical infrastructure protection
- Computer/network/embedded systems security
- Reverse code engineering

Selected Honors & Awards

- Research Advisor for CCR-United States Cyber Command Cyberspace Research Excellence Award (Best Cyber thesis) (2019).
- Research Advisor for Chancellor's Award Recipient (Best AFIT thesis) (2018).
- Research Advisor for AOC Academic Research Excellence Award—Information Superiority (Best Information Superiority thesis) (2018).
- Research Advisor for CCR-United States Cyber Command Cyberspace Research Excellence Award (Best Cyber thesis) (2018).



Lt Col George E. Noel

PhD, Computer Science, Air Force Institute of Technology

Assistant Professor of Computer Science

Most Notable Publications

G. Noel, G. Peterson, "Applicability of Latent Dirichlet Allocation to Multi-Disk Search", *Digital Investigations*, vol. 11, no. 1, pp 43-56, Mar 2014.

G. Noel, S. Gustafson, G. Gunsch, "Network-Based Anomaly Detection Using Discriminant Analysis", *Journal of Information Warfare*, vol. 1, no. 2, pp 12-22, 2001.

J. Orner, R. Dill, **G. Noel** "PROF 2.0 Improving a Methodology for Topic Map and Skill Tree Creation," *IEEE Multimedia Technologies for E-Learning*, San Diego, CA 8-12 December 2019.

G. Noel, G. Peterson, "Context-Driven Image Annotation Using ImageNET", *Proceedings of the 26th International Florida Artificial Intelligence Research Society Conference*, pp 462-467, 2013.

Selected Honors & Awards

- Member, Board of Referees, Digital Investigations – regular reviewer since 2014



Research Interest Areas

- Natural Language Processing
- Topic Models
- Ontology Learning
- Neural Networks
- Machine Learning
- Big Data



Dr. Scott L. Nykl

PhD, Computer Science, Ohio University

Assistant Professor of Computer Science

Most Notable Publications

N. Seydel A, W. DallmannA, and **S. Nykl**, "Visualizing behaviors when using real vs synthetic imagery for computer vision," in *Proceedings of the 2018 International Conference on Scientific Computing*, Las Vegas, NV, 2018.

K. Bentjen O, S. GrahamF, and **S. Nykl**, "Modelling Misbehaviour in Automated Vehicle Intersections in a Synthetic Environment," in *13th International Conference on Cyber Warfare and Security* (ICCWS). ICCWS, March 2018.

K. Bentjen O, S. Graham F, and **S. Nykl**, "Introducing Persistent Human Control into a Reservation-Based Autonomous Intersection Protocol," in *International Conference of Critical Infrastructure Protection*. IFIP, March 2018.

N. Becherer, J. Pecarina, **S. Nykl** and K. Hopkinson, "Improving optimization of convolutional neural networks through parameter fine-tuning," *Neural Computing and Applications*, Nov 2017.

D. T. Johnson, **S. Nykl**, and J. Raquet, "Combining Stereo Vision and Inertial Navigation for Automated Aerial Refueling," *Journal of Guidance, Control, and Dynamics*, vol. 40, no. 9, pp. 2250–2259, May 2017.

Selected Honors & Awards

- AETC MAJCOM Winner - Air Force Outstanding Scientist/Engineer, Junior (2017)
- AFIT/ ENG's 3rd Quarter Nominee (2017)
- Gage H. Crocker Outstanding Professor Award Nominee (2016)



Research Interest Areas

Computer Graphics, Interactive 3D Graphics, Synthetic Vision (SVS), Augmented Reality (AR), Computational Geometry, GPGPU (General Purpose Graphics Processing Unit) Programming, OpenGL, Level of Detail, Image-Based Rendering, Distributed Real Time Visualizations, Algorithms, Big Data, Parallel Computation, Networking, TCP/IP, Distributed Computing, Embedded Systems, Parallel/ Concurrent Programming, Multi-Core/Multi-Threading, Sensor Fusion, Neural Networks, Machine Learning, Linear Algebra, Numerical Analysis, and Data Structures



Dr. Meir N. Pachter

PhD, Applied Mathematics, Israel Institute of Technology

Professor of Electrical Engineering

Most Notable Publications

M. Pachter, E. Garcia and D. Casbeer (2018) "Toward a Solution of the Active Target Defense Differential Game", *Dynamic Games And Applications*, Appeared electronically on March 19.

M. Pachter (2018) "On Linear-Quadratic Gaussian Dynamic Games", in *Advances in Dynamic Games and Mean Field Games*, Birkhauser/Springer, pp. 301-322.

M. Pachter, E. Garcia and D. Casbeer (2017) "The Differential Game of Guarding a Target", *AIAA Journal of Guidance, Control and Dynamics*, Vol 40, No. 11, November 2017, pp. 2986 - 2993.

M. Pachter and T. J. Montgomery (2017) "Visual-INS Using a Human Operator and Converted Measurements", *IEEE Trans. on Aerospace and Electronic Systems*, Vol. 53, Issue 5, pp. 2359-2371.

A. Mirabile and **M. Pachter** (2017) "Pilot-Assisted INS Aiding Using Bearings-Only Measurements Taken Over Time", *NAVIGATION*, Vol. 64, Issue 2, pp. 183-196.

Selected Honors & Awards

- Distinguished Researcher Award, granted by the Affiliated Professional Societies, Dayton, OH (1999).



Research Interest Areas

- Guidance, Control and Navigation
- Game Theory
- Optimal Control
- System Identification
- Mathematical Modeling



Dr. Gilbert L. Peterson

PhD, Computer Science, University of Texas at Arlington

Professor of Computer Science

Most Notable Publications

Jordan, P.L., **Peterson, G.L.**, Lin, A.C., Mendenhall, M.J., and Sellers, A.J., "Narrowing the scope of failure prediction using targeted fault load injection", *Enterprise Information Systems*, October 2017, pp. 1-16 (DOI: <https://doi.org/10.1080/17517575.2017.1390167>).

Lapso, J., **Peterson, G.L.**, and *Okolica, J.S., "Whitelisting system state in windows forensic memory visualizations", *Digital Investigation*, Vol. 20, March 2017, pp. 2—15.

Bindewald, J.M., **Peterson, G.L.**, Miller, M.E., "Clustering-Based Online Player Modeling," In: Cazenave T., Winands M., Edelkamp S., Schiffel S., Thielscher M., Togelius J. (eds) *Computer Games. Communications in Computer and Information Science*, vol 705. Springer, 2017.

Schmitt, D.T. and **Peterson, G.L.**, "Feature Detection and Matching on Atmospheric Nuclear Detonation Video," *IET Computer Vision Journal*, vol. 10, no. 5, pp. 359-365, 2016.

King, D.W., and **Peterson, G.L.**, "Epaminondas: Exploring Combat Tactics", *International Computer Games Association Journal*, vol. 37, no. 3, 2015, pp. 131-143.

Selected Honors & Awards

- Chair of the IFIP Working Group 11.9 Digital Forensics (Present)
- International Federation of Information Processing Silver Core Award (2017)

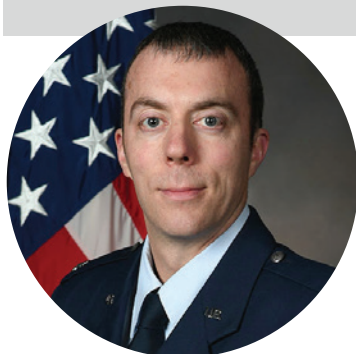
Significant Accomplishments

- 1st Place Grand Champion-Annual DoD Cyber Crime Center (DC3) Digital Forensics Challenge (2009).
- Air Force Outstanding Scientist Award, Junior Civilian (2008).
- Recipient of UTA/CSE Outstanding PhD Research Award (2001).



Research Interest Areas

- Artificial Intelligence Statistical Machine Learning
- Autonomous Robots
- Digital Forensics



Lt Col Patrick J. Sweeney

PhD, Computer Engineering, Dartmouth College

Assistant Professor of Computer Engineering

Computer Science and Engineering Division Chief

Most Notable Publications

Sweeney, P. and Cybenko, G. "An analytic approach to cyber adversarial dynamics." *SPIE Defense, Security, and Sensing*. International Society for Optics and Photonics, 2012.

Sweeney, P. and Cybenko, G. "Identifying and exploiting the cyber high ground for botnets." *Cyber Warfare*. Springer International Publishing, 2015.

Cybenko, G., *Stocco, G., and ***Sweeney, P.** "Quantifying Covertiness in Deceptive Cyber Operations." *Cyber Deception*. Springer International Publishing, 2016.

Selected Honors & Awards

- 2016 AFRL Sensors Directorate FGO of the Year
- 2016 AFRL Sensors Directorate Senior Military Scientist/Engineer of the Year



Research Interest Areas

- Cybersecurity of Embedded Systems
- Cyber Physical Systems
- Trusted and Secure Avionics
- Reverse Engineering



Dr. Clark N. Taylor

PhD, Electrical Engineering, University of California, San Diego

Assistant Professor of Computer Engineering

Most Notable Publications

D.B. Barber, J.D. Redding, T.W. McLain, R.W. Beard, and **C.N. Taylor**, "Vision-based Target Geo-location Using a Fixed-Wing Miniature Air Vehicle," *Journal of Intelligent and Robotic Systems*, Vol. 47, No. 4, pp. 361-382, Dec 2006.

C.N. Taylor and A.N. Bishop, "Homogeneous Functionals and Bayesian Data Fusion with Unknown Correlation," *Information Fusion*, v. 45, Jan 2019.

R. Sharma, R.W. Beard, **C.N. Taylor**, and S. Quebe, "Graph-based Observability Analysis of Bearing-only Cooperative Localization," *IEEE Transactions on Robotics*, Vol. 28, No. 2, pp. 522-529, Apr., 2012.

Selected Honors & Awards

- AFRL Sensors Directorate, Innovation Award, 2015.
- AFRL Sensors Directorate, Mid-Career Civilian Engineer/Scientist Award, 2014.
- AFOSR Young Investigator Award, 2007.

Significant Accomplishments

- C.N. Taylor, U.S. Patent, "Two-dimensional Color Barcode with Preserved Plane and Lossy Plane Layers," Patent # 7,118,041, 10 Oct 2006.



Research Interest Areas

- Vision-aided navigation
- Particle Filters
- Kalman Filters
- Distributed Data Fusion
- Uncertainty Estimation



Dr. Michael A. Temple

PhD, Electrical Engineering, Air Force Institute of Technology

Professor of Electrical Engineering

Most Notable Publications

Voetberg, Benjamin J., et.al., "Using Active DNA Fingerprinting to Discriminate AJP Conductive Ink Elements Embedded in Integrated Circuits," *Distribution D, Jour of DoD Rsrch & Engr (JDR&E)*, Special Edition, Vol. 2 (2) 2-12, August 2019.

Rondeau, Christopher **M.**, **Temple**, Michael A., and Lopez, Juan, "Industrial IoT Cross-Layer Forensic Investigation," *Wiley Interdisciplinary Reviews (WIREs): Forensic Science*, WIREs Forensic Sci. 2019;1:e1322, Vol. 1, No. 1, December 2018, <https://doi.org/10.1002/wfs2.1322>.

Talbot, Christopher **M.**, **Temple**, Michael A., Carbino, Timothy J., and Betances, Addison, "Detecting Rogue Attacks on Commercial Wireless Insteon Home Automation Systems," *Computers & Security*, No. 74, pp. 296-307, May 2018, <https://www.sciencedirect.com/science/article/pii/S0167404817302055>.

Bihl, Trevor J., Bauer, Kenneth W., and **Temple, Michael A.**, "Feature Selection for RF Fingerprinting with MDA and Using ZigBee Device Emissions," *IEEE Trans on Info Forensics & Security*, Vol 11, Issue 8, pp. 1862-1874, Aug 2016, <https://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=7464336>.

Reising, Donald R., **Temple, Michael A.**, and Jackson, Julie A., "Authorized and Rogue Device Discrimination Using Dimensionally Reduced RF-DNA Fingerprints," *IEEE Trans on Info Forensics and Security*, Vol. 10, Issue. 6, pp. 1180-1192, June 2015, <https://ieeexplore.ieee.org/document/7031931>.

Significant Accomplishments

- W.E. Cobb, M.A. Temple, R.O. Baldwin, E. Garcia, E. Laspe, U.S. Patent, "Intrinsic Physical Layer Authentication of Integrated Circuits," Patent # 9,036,891, 19 May 15.



Research Interest Areas

- Discovery, extraction and exploitation of Distinct Native Attribute (DNA) fingerprinting features supporting offensive, defensive and exploitive communication network operations.
- Device hardware identity and/or device normal vs. anomalous (aged, failed, attacked, etc.) operating state discrimination.



Dr. Andrew J. Terzuoli, Jr.

PhD, Electrical Engineering, The Ohio State University

Associate Professor of Electrical Engineering

Most Notable Publications

Lawrence Lee, Ivan Frasure, Trevor Nartker, Ronald Marhefka, Joseph Sugrue, **Andrew Terzuoli**, Raymond Wasky, "Deployable Cruciform Reflector Antenna With Crossed-Dipole Array Feed For L-Band Remote Sensing," *Proceedings of the 2018 IEEE International Geoscience and Remote Sensing Symposium (IGARSS 2018)*, Valencia, SP, 22-27 July 2018.

Bertus Shelters, Brannon Elmore, James Ethridge, Jaclyn Schmidt, Jarred Burley, Steven Fiorino, Joseph Sugrue, **Andrew Terzuoli**, "Calculation Of Long-Term Tropospheric Attenuation Statistics Using Weather Cubes," *Proceedings of the 2018 IEEE International Geoscience and Remote Sensing Symposium (IGARSS 2018)*, Valencia, SP, 22-27 July 2018.

Lawrence Lee, Ivan Frasure, Trevor Narker, Ronald Marhefka, Joseph Sugrue, **Andrew Terzuoli**, Raymond Wasky, "Tightly-Packed Crossed-Dipole Array for L-band Satellite Communications," *Proceedings of the 2018 IEEE Symposium on Antennas and Propagation and USNC/URSI Radio Science Meeting (APS/URSI)*, Boston, MA, 8-13 July 2018.

Bertus Shelters, Brannon Elmore, James Ethridge, Jaclyn Schmidt, Jarred Burley, Steven Fiorino, Joseph Sugrue, **Andrew Terzuoli**, "Attenuation Statistics Derivation in the V&W Band Using Weather Cubes," *Proceedings of the 2018 IEEE Symposium on Antennas and Propagation and USNC/URSI Radio Science Meeting (APS/URSI)*, Boston, MA, 8-13 July 2018.

D. Smith, P. Collins, J. Fee, J. Petrosky, **A. Terzuoli**, C. Yardim, "Ionospheric Effects on Communication Signals in the V and W Bands," *Proceedings of the 23rd Union Radio Scientifique Internationale General Assembly and Scientific Symposium (URSI 2017 GASS)*, Montreal, QUE, Can, 19-26 Aug 2017.

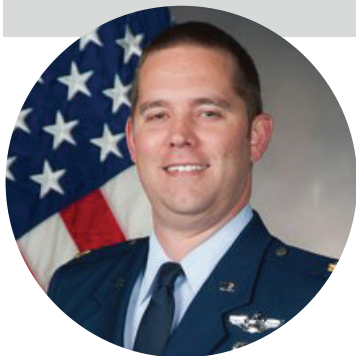
Significant Accomplishments

- Fellow of the Electromagnetics Academy (FEMA) (Present)
- IEEE Life Senior Member (Present)



Research Interest Areas

- Antennas and Electromagnetics
- Computer Model Based Studies
- Application of Parallel Computation, VLSI Technology, and RISC Architecture to Numerical and Transform Methods
- Remote Sensing & Communication
- Passive RF Sensing
- Wave Scattering, Radar Cross Section, and Stealth (LO/CLO) Technology
- Machine Vision and Image Processing
- Automated Object Recognition



Lt Col Kenneth W. Burgi

PhD, Engineering Physics, Air Force Institute of Technology

Interim Department Head, Engineering Physics

Assistant Professor of Optical Engineering

Most Notable Publications

Burgi, Kenneth, Michael Marciniak, Mark Oxley, and Stephen Nauyoks. "Measuring the reflection matrix of a rough surface." *Applied Sciences* 7, no. 6 (2017): 568.

Burgi, Kenneth, Jessica Ullom, Michael Marciniak, and Mark Oxley. "Reflective inverse diffusion." *Applied Sciences* 6, no. 12 (2016): 370.

Nagamine, Eric K., **Kenneth W. Burgi**, Samuel D. Butler, and Michael A. Marciniak. "Nonmechanical beam-steering in reflective inverse diffusion." In *Laser Beam Shaping XIX*, vol. 11107, p. 1110706. International Society for Optics and Photonics, 2019.

Burgi, Kenneth W., Michael A. Marciniak, Stephen E. Nauyoks, and Mark E. Oxley. "Exploiting redundant phase information of a reflection matrix." In *Optical Trapping and Optical Micromanipulation XIV*, vol. 10347, p. 103470K. International Society for Optics and Photonics, 2017.

Burgi, Kenneth W., Michael A. Marciniak, Stephen E. Nauyoks, and Mark E. Oxley. "Matrix methods for reflective inverse diffusion." In *Reflection, Scattering, and Diffraction from Surfaces V*, vol. 9961, p. 996100. International Society for Optics and Photonics, 2016.

Selected Honors & Awards

- Air Force Commendation Medal, 1st Oak Leaf Cluster (2013)
- Air Medal, 10th Oak Leaf Cluster (2012)
- Aerial Achievement Medal (2012)
- Air Force Achievement Medal (2005)
- Afghanistan Campaign Medal with 3 devices
- Iraq Campaign Medal with 2 Devices
- Global War on Terrorism Expeditionary Medal
- Global War on Terrorism Service Medal

Significant Accomplishments

- C-17A Instructor Aircraft Commander
- MC-12W Mission Commander
- 2,605 Flight Hours / 617 Sorties
- 1,295 Combat Flight Hours / 363 Combat Sorties



Research Interest Areas

- Scatterometry
- Statistical and adaptive optics
- Various aspects of light-matter interaction



Dr. William F. Bailey

PhD, Air Force Institute of Technology

Associate Professor Emeritus of Physics

Most Notable Publications

William J. Palm, Michael A. Marciniak, Glen P. Perram, Kevin C. Gross and **William F. Bailey**, "Wavelength and temperature-dependence of CW laser absorptance in Kapton thin films", *Optical Engineering*, Vol. 51 No. 12, 2012.

J.W. Englert, J.C. Petrosky, **W.F. Bailey**, and J.W. McClory, A. Heger, L. Tauxe, D. R. Watts, "Estimating Peak EMP Magnetic Fields Using Alternating Field Demagnetization", *Journal of Radiation Effects, Research and Engineering*, vol. 30, no. 1, pp.103-112, February 2012.

Cusumano, S.J., Fiorino, S. T., Bartell, R. J., Krizo, M. J. , **Bailey, W. F.**, Beauchamp R. L. , Marciniak, M. A., "Modeling Bistatic spectral measurements of temporally evolving reflected and emitted energy from a distant and receding target", *Journal of Applied Remote Sensing*, Vol. 5, Sept 2011.

Josyula, E., **Bailey, W.F.** and Suchyta, III, C.J., "Dissociation Modeling in Hypersonic Flows Using State-to-State Kinetics", *Journal of Thermophysics and Heat Transfer*, Vol. 25, No. 1, Jan-Mar 2011.

Selected Honors & Awards

- AF Outstanding Science and Engineering Educator—AFIT 2012
- AETC Merewether Award—AFIT 2004
- Professor Ezra Kotcher Award—AFIT 1993

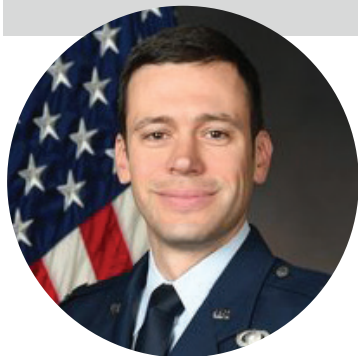
Significant Accomplishments

- Developed Directed Energy Curriculum
- Developed Space Environment Curriculum
- Initiated discussions with Director of Weather that led to approval of new program—Atmospheric Science



Research Interest Areas

- Weakly ionized gases and reactive kinetics with special applications to semiconductor processing in gas discharges
- Shock characterization in ionized flows
- Solutions of the inhomogeneous electron kinetic equation



Maj James E. Bevins

PhD, Nuclear Engineering, University of California, Berkeley

Assistant Professor of Nuclear Engineering

Most Notable Publications

Bethany L. Goldblum, Andrew W. Reddie, Thomas C. Hickey, **James E. Bevins**, et al., "The nuclear network: Multiplex network analysis for interconnected systems," *Applied Network Science*, vol. 4, no. 36, 2019.

J. E. Bevins, Z. Sweger*, N. Munshi*, B. L. Goldblum, et al., "Performance evaluation of an energy tuning assembly for neutron spectral shaping," *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, vol. 923, pp. 79–87, 2019.

James E. Bevins, Elie Katzenson, James Kendrick, Rebecca Krentz-Wee, Sarah Laderman, Yubing Tian, "A Framework for Assessing Alternate Proliferation Pathways in the Age of Non- State Actors," *Nuclear Posture Review*, vol. 25, no.1/2, 2018.

K. P. Harrig, B. L. Goldblum, J. A. Brown, D. L. Bleuel, L. A. Bernstein, **J. Bevins**, M. Harasty, T. A. Laplace, E. F. Matthews, "Neutron Spectroscopy for Pulsed Beams with Frame Overlap using a Double Time-of-Flight Technique," *Nuclear Instrumentation and Methods in Physics Research, Section A*, vol. 877, pp. 359-366, 2018.

J. E. Bevins and R. S. Slaybaugh, "Gnowee: A Hybrid Metaheuristic Optimization Algorithm for Constrained, Black Box, Combinatorial Mixed-Integer Design," *Nuclear Technologies*, 2018. (Accepted June 2018)

Additional Positions

- Research Chair, AFIT Nuclear Events Analysis and Testing Center for Specialized Research
- Air Force Technical Applications Center Endowed Term Chair for Nuclear Treaty Monitoring



Research Interest Areas

- Experimental and computational research in radiation transport modeling
- Radiation detection and spectroscopy
- Nuclear weapon effects
- Nuclear physics measurements for nuclear security and forensic applications



Dr. Abigail A. Bickley

PhD, Chemistry, University of Maryland

Research Assistant Professor of Nuclear Engineering

Most Notable Publications

M. R. Halstead, S. Lee, J. Petrosky, **A. Bickley**, J. W. McClory, S. Clark, P. Sokol, "Neutron Flux Spectrum Characterization of a Compact, Accelerator-Driven Neutron Source at Indiana University," *Journal of Radiation Effects, Research and Engineering*, 31, 117, (2013).

A. A. Bickley, M. R. Halstead, J. W. McClory, S. Lee, P. Sokol, J. C. Petrosky, "Evaluation of the Neutron Energy Spectrum Produced at the Neutron Radiation Effects Beam Line Utilizing a Computational Monte Carlo Approach," *Journal of Radiation Effects, Research and Engineering*, 31, 23, (2013).

A. A. Bickley, G.K. Demaree, J. W. McClory, W. H. Miller, T. M. Oakes, J. C. Petrosky, "Design optimization of a layered boron based solid state neutron spectrometer," *Nuclear Science Symposium and Medical Imaging Conference*, IEEE, 4872 (2011).

*Classified publications since 2013

Significant Accomplishments

- Developed PhD-level Advanced Nuclear Forensics Classes taught at the Secret/CNWDI level
- Developed MS-level Technical Nuclear Forensics Course taught at the Secret/CNWDI level
- Referee for the NA-22 program for the National Nuclear Security Administration of the US Department of Energy
- Computational support for several National Labs, and HPC at AFRL/DSRC
- Mentorship of post-doctoral researchers, interns, research assistants, and PhD students
- Member, Nuclear Event and Analysis Testing Center for Specialized Research



Research Interest Areas

- Radiation transport and modeling
- Optimization of nuclear systems
- Pre- and post-detonation nuclear forensics
- Nuclear weapons effects



Dr. Santasri R. Bose-Pillai

PhD, Electrical Engineering, New Mexico State University

Research Assistant Professor of Engineering Physics

Most Notable Publications

Santasri R. Bose-Pillai, Jack E. McCrae, Christopher A. Rice, Ryan A. Wood, Connor E. Murphy, and Steven T. Fiorino, "Estimation of atmospheric turbulence using differential motion of extended features in time-lapse imagery", *Optical Engineering*, vol. 57, no. 10, 104108 (14 pp.), Oct 2018.

Milo W. Hyde, **Santasri R. Bose-Pillai**, and Ryan A. Wood, "Synthesis of non-uniformly correlated partially coherent sources using a deformable mirror," *Applied Physics Letters*, vol. 111, no. 10, 101106 (5 pp.), Sep 2017.

Milo W. Hyde IV, and **Santasri R. Bose-Pillai**, "Partially coherent sources with circular coherence: comment," *Optics Letters*, vol. 42, no. 16, pp. 3084-3084, Aug 2017.

Jack E. McCrae, **Santasri R. Bose-Pillai**, and Steven T. Fiorino, "Estimation of turbulence from time-lapse imagery," *Optical Engineering*, vol. 56, no. 7, 071504 (9 pp.), Jul 2017.

Milo W. Hyde, **Santasri Bose-Pillai**, David G. Voelz, and Xifeng Xiao, "Generation of Vector Partially Coherent Optical Sources Using Phase-Only Spatial Light Modulators," *Phys. Rev. Applied*, vol. 6, no. 6, 064030 (12 pp.), Dec 2016.

Selected Honors & Awards

- Elected senior member of Optical Society of America and SPIE, the International Society for Optics and Photonics for outstanding contributions in the field of Optics.



Research Interest Areas

- Atmospheric turbulence characterization using optical techniques
- Mitigation of turbulence effects and turbulence compensation in directed energy
- Laser communications and imaging applications
- Synthesis of partially coherent sources and their propagation through turbulence



Dr. Larry W. Burggraf

PhD, Chemistry, University of Denver

Professor of Chemical and Engineering Physics

Most Notable Publications

"Semiconductor color-center structure and excitation spectra: Equation-of-motion coupled-cluster description of vacancy and transition-metal defect photoluminescence," J. J. Lutz, X. F. Duan, and **L. W. Burggraf**, *Physical Review B*, 97, 115108 (2018).

"The closo-Si₁₂C₁₂ molecule from cluster to crystal: A theoretical prediction," Xiaofeng F. Duan and **Larry W. Burggraf**, *J. Chem. Phys.* 144, 114309 (2016).

"Searching for stable SinCn Clusters: Combination of Stochastic Potential Surface Search and Pseudopotential Plane-Wave Car-Parinello Simulated Annealing Simulations," Xiaofeng F. Duan, **Larry W. Burggraf** and Lingyu Huang, *Molecules*, 18, 8591-8606 (2013).

"A Modulating Liquid Collimator for Coded Aperture Adaptive Imaging of Gamma-Rays," Jack G. M. FitzGerald, **Larry W. Burggraf**, Benjamin R. Kowash, and Ethan L. Hull, *IEEE Transactions on Nuclear Science*, Vol. 60, No. 3, 2300-2307 (June 2013).

"Three-dimensional electron-positron momentum distribution of O₃⁺-irradiated 6H SiC using two positron spectroscopy techniques simultaneously," Christopher Williams, **Larry Burggraf**, Paul Adamson and James Petrosky, *J. Phys. Conf. Ser.* 262(1) 012064 (2011).



Research Interest Areas

- Positron spectroscopy
- Gamma Imaging
- Radioisotope propulsion
- Surface chemistry

Selected Honors & Awards

- Recognized by Dr Ahmed Zewail (Nobel Laureate) in June 2009 Plenary Address at San Diego HPC Conference and in his autobiography "Voyage Through Time"

Patents:

- Larry W. Burggraf, Benjamin R. Kowash, Jack G. M. FitzGerald, "Reconfigurable liquid attenuated collimator", Aug 30, 2016, US9431141 B1
- Holland, D., Olesen, R., Burggraf, L., O'Day, B., Bevins, J. 2019. "Rotating Scatter Mask Design Classes for Directional Radiation Detection and Imaging." U.S. Patent Application 62,816,435, filed March 11, 2019. Patent Pending.
- Olesen, R., Egner, B., Holland, D., Martin, V., Bevins, J. 2019. "An Efficient, Dual-particle Directional Detection System using a Rotating Scatter Mask." U.S. Patent Application 62,816,451, filed March 11, 2019. Patent Pending.

Significant Accomplishments

- 2013 Nuclear Deterrence Operations Professional Team of the Year Award at the Air Education and Training Command level.
- Air Force Special Service Award (1994)
- AFRL HEDM Program ISp Award (1992)
- Air Force Institute of Technology PhD CI Distinguished Graduate (1981)



Lt Col Samuel D. Butler

PhD, Applied Physics, Air Force Institute of Technology

Assistant Professor of Physics

Most Notable Publications

Sloan, Joel A., **Samuel D. Butler**, Jessica M. Ullom, and Joseph D. Wander. "Experimental determination of glass bead retroreflectivity for aircraft geometries." *Airfield and Highway Pavements 2019: Innovation and Sustainability in Highway and Airfield Pavement Technology*. Reston, VA: 436-446 (2019).

Ewing, Becca E., **Samuel D. Butler**, and Michael A. Marciniak. "Improved grazing angle bidirectional reflectance distribution function model using Rayleigh–Rice polarization factor and adaptive microfacet distribution function," *Opt. Eng.* 57, 1 (2018).

Cruz, Diana, **Samuel D. Butler**, and Briana J. Singleton. "Radiation induced defects in high-Z shielded Ytterbium doped fibers", *Proc. SPIE*, 106290E (2018).

Lanari, Ann M., **Samuel D. Butler**, Michael A. Marciniak, and Mark F. Spencer. "Wave optics simulation of statistically rough surface scatter", *Proc. SPIE*, 1040215 (2017).

Butler, Samuel D., Stephen E. Nauyoks, and Michael A. Marciniak. "Comparison of microfacet BRDF model to modified Beckmann-Kirchhoff BRDF model for rough and smooth surfaces," *Optics Express*, Vol. 23, No. 22, pp. 29100-29112 (2015).

Selected Honors & Awards

- Meritorious Service Medal
- Joint Service Commendation Medal with 1 device
- Air Force Commendation Medal
- Joint Service Achievement Medal
- Air Force Achievement Medal with 1 device
- Afghanistan Campaign Medal with 2 devices
- Global War on Terrorism Expeditionary Service Medal
- Nuclear Deterrence Operations Service Medal with 'N' Device

Significant Accomplishments

- Deployed to Southwest Asia in direct support of combat operations during Operation: INHERENT RESOLVE.
- Deployed to Afghanistan in direct support of combat operations during Operation: ENDURING FREEDOM.
- Awarded Afghanistan Campaign Ribbon with 2 devices, and Global War on Terrorism Expeditionary Ribbon.



Research Interest Areas

- Optical scatter
- Quantum information



Dr. Michael J. Caylor

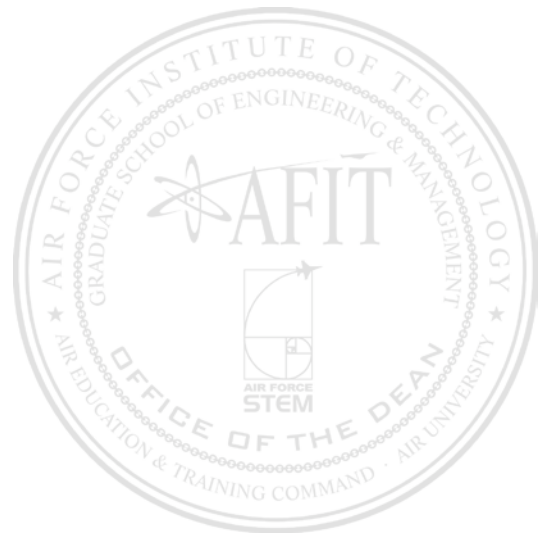
PhD, Aerospace Engineering, University of Notre Dame

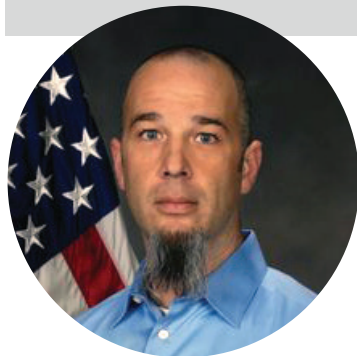
Associate Director, Center for Technical Intelligence Studies
and Research

Research Assistant Professor of Engineering Physics

Significant Accomplishments

- Managed and executed \$2.4M in center sponsor funding





Dr. Justin A. Clinton

PhD, Nuclear Engineering, Rensselaer Polytechnic Institute

Assistant Professor of Nuclear Engineering

Most Notable Publications

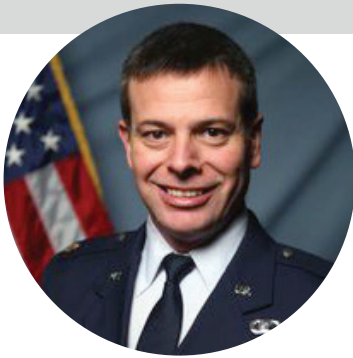
A.W. Decker, S.A. Heider, M. Millett, S.R. McHale, **J.A. Clinton**, J.W. McClory, "Verification and Validation of MCNP6.1 Neutron Protection Factor Estimates of an Armored Vehicle Surrogate Using the White Sands Missile Range Fast Burst Reactor," *Journal of Radiation Effects, Research and Engineering*, vol. 36, no. 1, pp. 65-70, April 2018

A.W. Decker, S.R. McHale, **J.A. Clinton**, J.W. McClory, and M. Millett, "Verification and Validation of MCNP6.1 Neutron Protection Factor Estimates Using the WSMR Fast Burst Reactor," *Journal of Radiation Effects, Research and Engineering*, vol. 35, no. 1, pp. 43-48, April 2017.



Research Interest Areas

- Illicit Special Nuclear Material (SNM) detection
- Computational methods for radiation transport
- Planar/tomographic imaging using gammas, neutrons, and muons



Lt Col Michael L. Dexter

PhD, Nuclear Physics, Air Force Institute of Technology

Deputy Head, Engineering Physics Department

Director, AFIT Center for Technical Intelligence Studies and Research

Assistant Professor of Nuclear Physics

Most Notable Publications

M. L. Dexter, J. W. McClory, and B. R. Kowash, "Investigation and Development of Forensic Techniques for Estimating the Mass-To-Yield Ratio of a Nuclear Detonation with Remote Optical Sensors," *Journal of Radiation Effects, Research and Engineering*, vol. 34, no. 1, pp. 43-52, December 2016.

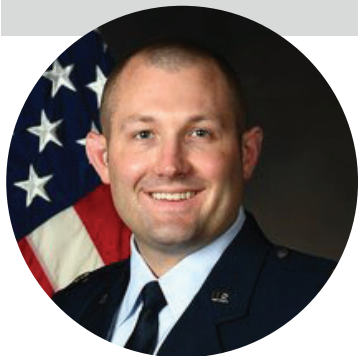
Significant Accomplishments

- Lt Col Dexter completed a deployment in 2019 as a member of a Joint Task for support of Operation Inherent Resolve as a Subject Matter Expert (SME) for combating weapons of mass destruction (CWMD).
- Developed PhD course in Advanced Nuclear Forensics taught at the Secret/CNWDI level
- Major Dexter deploying in November 2018 to Northern Iraq in support of Operation Inherent Resolve as the first-ever subject matter expert (SME) for combating weapons of mass destruction (CWMD).



Research Interest Areas

- Nuclear Weapons Effects
- Nuclear forensics
- High energy density plasma physics
- Optical transport
- Digital image processing and analysis
- High energy laser interactions



Maj Daniel J. Emmons

PhD, Applied Physics, Air Force Institute of Technology

Assistant Professor of Applied Physics

Most Notable Publications

Emmons, D. J., & Weeks, D. E. (2019). Effect of $\text{Ar}(3p54p; 2p) + M \Rightarrow \text{Ar}(3p54s; 1s) + M$ branching ratio on optically pumped rare gas laser performance. Accepted for publication in *Optics Express*, 11 Nov 2019.

Emmons, D. J., Weeks, D. E., Eshel, B., & Perram, G. P. (2018). Metastable Ar ($1s5$) density dependence on pressure and argon-helium mixture in a high pressure radio frequency dielectric barrier discharge. *Journal of Applied Physics*, 123(4), 043304.

Emmons, D. J., & Weeks, D. E. (2017). Kinetics of high pressure argon-helium pulsed gas discharge. *Journal of Applied Physics*, 121(20), 203301.



Research Interest Areas

- Ionospheric Disturbances
- Gas Discharges
- Laser & Plasma Kinetics



Col James R. Fee Jr.

PhD, Nuclear Engineering, Air Force Institute of Technology

Associate Dean, Graduate School of Engineering & Management

Assistant Professor of Nuclear Engineering

Most Notable Publications

J. R. Fee, J. C. Petrosky, "Medium-Altitude Electromagnetic Pulse (EMP) Model Requirements and Development", *Journal of Radiation Effects*, 33(1), 78-84 (May 2015).

J. R. Fee, J. C. Petrosky, B. F. Akers, "Reestablishing an Air Burst EMP Simulation Capability", *Journal of Radiation Effects*.

J. R. Fee, J. C. Petrosky, "Validation of the Air Burst EMP Simulation Capability", B-Code, *Journal of Radiation Effects*.

J. R. Fee, J. C. Petrosky, "Validation of the Air Burst EMP Simulation Capability", B-code, *2016 Hardened Electronics and Radiation Technology Conference*, Monterey, CA, 16-20 April 2016.

Selected Honors & Awards

- Meritorious Service Medal with 3 Oak Leaf Clusters, 2019
- Lt Col Charles P. Brothers Outstanding Volunteer Service Award, 2015
- Defense Meritorious Service medal with 2 Oak Leaf Clusters, 2011



Research Interest Areas

- Effects of Nuclear Weapons
- Simulations of Electromagnetic Pulses



Dr. Manuel R. Ferdinandus

PhD, Optics, University of Central Florida

Research Assistant Professor of Engineering Physics

Most Notable Publications

George, H., et al. (2019). "Nonlinearities and carrier dynamics in refractory plasmonic TiN thin films." *Optical Materials Express* 9(10): 3911-3924.

Ferdinandus, M. R., et al. (2017). "Analysis of beam deflection measurements in the presence of linear absorption." *Optical Materials Express* 7(5): 1598-1605

Ensley, T. R., et al. (2016). "Quasi-three-level model applied to measured spectra of nonlinear absorption and refraction in organic molecules." *JOSA B* 33(4): 780-796.

Reichert, M., et al. (2014). "Temporal, spectral, and polarization dependence of the nonlinear optical response of carbon disulfide." *Optica* 1(6): 436-445.

Ferdinandus, M. R., et al. (2013). "Beam deflection measurement of time and polarization resolved ultrafast nonlinear refraction." *Optics Letters* 38(18): 3518-3521.



Research Interest Areas

- Nonlinear optical characterization
- Dynamic metamaterials
- Nanoelectronics
- Photonic devices



Dr. Steven T. Fiorino

PhD, Physical Meteorology, Florida State University

Director, AFIT Center for Directed Energy

Professor of Atmospheric Physics

Most Notable Publications

Burley, J.L., **S.T. Fiorino**, B.J. Elmore, and J.E. Schmidt, 2019: "A Remote Sensing and Atmospheric Correction Method for Assessing Multispectral Radiative Transfer through Realistic Atmospheres and Clouds," *J. Atmos. Oceanic Technol.*, 36, 203–216, doi.org/10.1175/JTECH-D-18-0078.1.

Burley, J.L., **S.T. Fiorino**, B. Elmore, and J. Schmidt, 2017: "A Fast Calculating Two-Stream-Like Multiple Scattering Algorithm that Captures Azimuthal and Elevation Variations," *J. Appl. Meteor. Climatol.* 56:11, pp. 3049-3063. DOI:10.1175/JAMC-D-17-0044.1.

McCrae, J.E., S. Bose-Pillai, and **S.T. Fiorino**, 2017: "Estimation of turbulence from time-lapse imagery," *Opt. Eng.* 0001; 56(7):071504. DOI: 10.1117/1.OE.56.7.071504.

Meier, D.M. and **S.T. Fiorino**, 2016: "Application of Satellite and NWP Derived Wind Profiles to Military Airdrop Operations," *J. Appl. Meteor. Climatol.* 55, No. 10, pp. 2197–2209, DOI: http://dx.doi.org/10.1175/JAMC-D-15-0296.1

Basu S, J.E. McCrae, **S.T. Fiorino**, and J. Przelomski, 2016: "Estimation of temporal variations in path-averaged atmospheric refractive index gradient from time-lapse imagery," *Opt. Eng.* 0001;55(9):090503. DOI: 10.1117/1.OE.55.9.090503.

Van Zandt, N.R., J.E. McCrae, and **S.T. Fiorino**, 2016: "Modeled and measured image-plane polychromatic speckle contrast," *Opt. Eng.* Vol. 55 No. 2, 024106 DOI: 10.1117/1.OE.55.2.024106.

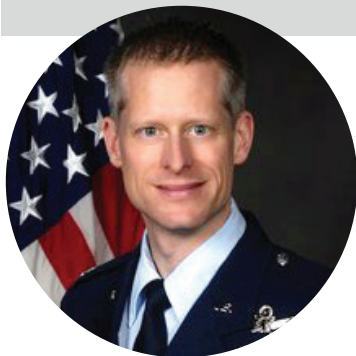
Selected Honors & Awards

- Promoted to full Professor with tenure August 2019
- Promoted from Research Associate Professor to tenure-track Associate Professor, May 2016



Research Interest Areas

- Microwave remote sensing of the environment
- Development of weather signal processing algorithms
- Atmospheric effects on military systems such as high energy lasers and weapons of mass destruction



Lt Col Anthony L. Franz

PhD, Physics, University of Maryland, College Park

Assistant Professor of Physics

Most Notable Publications

Anthony L. Franz, Jack A. Shepherd, Carlos D. Diaz (14 May 2018), "Figures of merit for the optical performance of Fresnel zone light field spectral imagers", *Proc. SPIE* 10644, Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XXIV, 106440M.

Carlos Diaz, **Anthony L. Franz**, Jack A. Shepherd (14 May 2018), "Modification of Fresnel zone light field spectral imaging system for higher resolution", *Proc. SPIE* 10644, Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XXIV, 106441C.

Jack A. Shepherd, **Anthony L. Franz** (14 May 2018), "Evaluation of plenoptic algorithm performance for measuring scene spectra captured by a diffractive plenoptic camera", *Proc. SPIE* 10669, Computational Imaging III, 1066909.

Francis D. Hallada, **Anthony L. Franz**, Michael R. Hawks (2017), "Fresnel zone plate light field spectral imaging," *Optical Engineering*, Vol 56, No 8, 081811.

Francis D. Hallada, **Anthony L. Franz**, Michael R. Hawks (2017), "Fresnel zone plate light field spectral imaging simulation", in Algorithms and Technologies for Multispectral, Hyperspectral, and Ultraspectral Imagery XXIII, David W. Messinger; Miguel Velez-Reyes, Editors, *Proceedings of SPIE* Vol. 10198, 1019804.

Selected Honors & Awards

- Southwestern Ohio Council for Higher Education (SOCHE) Faculty Excellence Award for the Department of Engineering Physics, AFIT 2017.
- AFIT winner for the 2015 Air Force Outstanding Scientist and Engineer of the Year Award, Senior Military Category 2016.

Significant Accomplishments

- Deployed, Rustamayah, Iraq, Jan 2009 - July 2009
- Deployed, Kabul, Afghanistan, Oct 2010 - Nov 2011



Research Interest Areas

- Remote Sensing
- Lasers and Optics
- Dynamics and Information in Complex Systems



Dr. Nancy C. Giles

PhD, Physics, North Carolina State University

Executive Associate Dean for Strategies

Professor of Physics

Most Notable Publications

"Self-trapped holes (small polarons) in ferroelectric KH₂PO₄ crystals," T.E.R. Dodson, L.E. Halliburton, G.S. Kedziora, C.A. Lenyk, and **N.C. Giles**, *Journal of Physics: Condensed Matter*, vol. 31, article no. 505503 (2019)."

Ir⁴⁺ ions in β -Ga₂O₃ crystals: an unintentional deep donor," C.A. Lenyk, **N.C. Giles**, E.M. Scherrer, B.E. Kananen, L.E. Halliburton, K.T. Stevens, G.K. Foundos, J.D. Blevins, D.L. Dorsey, and S. Mou, *Journal of Applied Physics*, vol 125, article no. 045703 (2019)."

Lithium and gallium vacancies in LiGaO₂ crystals," C.A. Lenyk, M. S. Holston, B. E. Kananen, L. E. Halliburton, and **N. C. Giles**, *Journal of Applied Physics*, vol. 124, article no. 135702 (2018)."

Electron paramagnetic resonance and optical absorption study of acceptors in CdSiP₂ crystals," E. M. Scherrer, L. E. Halliburton, E. M. Golden, K. T. Zawilski, P. G. Schunemann, F. K. Hopkins, K. L. Averett, and **N. C. Giles**, *American Institute of Physics (AIP) Advances*, vol 8, article no. 095014 (Sept 2018).

"Status of CdSiP₂ Development for Scaling Mid-Infrared Laser Power," C. M. Liebig, F. K. Hopkins, K.L. Averett, K.T. Zawilski, P. G. Schunemann, E. M. Scherrer, **N.C. Giles**, and L.E. Halliburton, *Laser Technology for Defense and Security XIV*, Proc. of SPIE, Vol. 10637, paper no. 106370U (2018).

Significant Accomplishments

- More than 5300 career citations of publications (under Giles or Giles-Taylor); h-index=38. Authored 198 journal publications. Served as research advisor for 6 PhD students in AFIT/ENP. In 2006, she was on sabbatical at AFRL, WPAFB, working with colleagues on wide bandgap II-VI materials. She has received funding from AFRL/RX, AFOSR, and AFRL/RD for her experimental research at AFIT. Currently serving as strategist for increased STEM education and research outreach for all AF personnel.

Book chapters:

- "Electron Paramagnetic Resonance (EPR) from β -Ga₂O₃ crystals," **N. C. Giles** and L. E. Halliburton, Chapter 8, pp. 169-190, in *Gallium Oxide (Ga₂O₃): Technology, Devices and Applications*, edited by S. Pearton, M. Mastro, and F. Ren (Elsevier, 2018)."
- HgTe-CdTe Superlattices," J.R. Meyer, C.A. Hoffman, T.H. Myers, and **N.C. Giles**, Chapter 7, pp. 535 - 593, in *Handbook of Semiconductors: Materials, Properties, and Preparation*, Vol 3a, edited by S. Mahajan (North Holland, Amsterdam, 1994).



Research Interest Areas

Solid State Physics: photoluminescence (PL), absorption, thermoluminescence, electron magnetic resonance (EPR) and time-resolved spectroscopies; aid AFRL in development of better optical and electronic materials for photorefractive, nonlinear frequency conversion, high-power electronics, and radiation detection; identification of point defects in crystalline semiconducting and optical materials; apply defect characterization to improve materials for optical parametric oscillators used in infrared countermeasures; characterize transition-metal ion charge states in laser-host materials and ultra-wide bandgap semiconductors; characterize spin systems in diamond for quantum devices.



Dr. Michael R. Hawks

PhD, Optical Sciences, Air Force Institute of Technology

Research Assistant Professor

Most Notable Publications

Thomas, R. Cobb, S. Fiorino, **M.R. Hawks**, "SNR modeling for ground-based daytime imaging of GEO-satellites in the SWIR", *2019 IEEE Aerospace Conference* (2019).

F.D. Fernandez, B.J. Steward, K.C. Gross, **M.R. Hawks**, "Implementation of a non-linear CMOS and CCD focal plane array model in ASSET", *Proceedings of the SPIE*, vol 11001 (2019).

A. Gavriales, L.A. Schlie, R.D. Loper, **M.R. Hawks**, G.P. Perram, "Analytic treatment of beam quality and power efficiency in high power transverse flow Diode Pumped Alkali Laser", *J. Opt. Soc. Am. B*, 35(9) (2018).

F.D. Hallada, A.L. Franz, **M.R. Hawks**, "Fresnel zone plate light field spectral imaging", *Opt Eng* 56(8) (2017).



Research Interest Areas

- Electro-optic and infrared remote sensing
- Hyperspectral imaging
- Computational physics



Maj Nicholas C. Herr

PhD, Applied Physics, Air Force Institute of Technology

Assistant Professor, Department of Engineering Physics

Most Notable Publications

Herr, Nicholas C., Ashley E. Gonzales, and Glen P. Perram (2018), "Kinetics, evolving thermal properties, and surface ignition of carbon fiber reinforced epoxy composite during laser-induced decomposition," *Polymer Degradation and Stability*, Vol 152, 2018, pp 147-161.

Gonzales, Ashley E., **Nicholas C. Herr**, and Glen P. Perram (2018), "Experimental study of laser irradiated graphite oxidation using IFTS," *Combustion and Flame*, Vol 192, 2018, pp 180-189.



Research Interest Areas

- High energy laser material interactions
- Atomic force
- Microscopy



Lt Col Edward Lee Hobbs

PhD, Nuclear Engineering, The University of New Mexico

Deputy Director, Nuclear Event Analysis & Testing Center
for Specialized Research (NEAT CSR)

Selected Honors & Awards

- Air Medal
- Defense Meritorious Service Medal
- Meritorious Service Medal



Research Interest Areas

- Computational Nuclear Engineering



Lt Col Michael R. Hogsed

PhD, Nuclear Effects Physics, Air Force Institute of Technology

Assistant Professor of Engineering Physics

Most Notable Publications

Michael R. Hogsed, Kevin Choe, Norman Miguel, Buguo Wang, and John Kouvetakis, "Radiation-induced electron and hole traps in Ge_{1-x}Sn_x ($x = 0 - 0.094$)," *Journal of Applied Physics*, Submitted October 2019. (2020)

E. Cazalas, **M. R. Hogsed**, S. Vangala, M. R. Snure, and J. W. McClory, "Gamma Radiation Effects in Graphene-based Transistors with h-BN Nanometer Film Substrates," *Applied Physics Letters*, Accepted November 2019. (2019)

Buguo Wang, **M. R. Hogsed**, T. R. Harris, P. M. Wallace, and J. Kouvetakis, "Enhanced optical and electrical performance of Ge_{1-x}Sn_x/Ge/Si(100) ($x=0.062$) semiconductor via inductively coupled H₂ plasma treatments," *Semiconductor Science and Technology*, vol. 34, 045014 (2019)

Buguo Wang, T.R. Harris, **M.R. Hogsed**, Y.K. Yeo, Mee-Yi Ryu, and J. Kouvetakis, "Comparison study of temperature dependent direct/indirect bandgap emissions of Ge_{1-x}ySixSny and Ge_{1-y}Sny grown on Ge buffered Si," *Thin Solid Films*, vol. 673 pp. 63-71 (2019)

Mee-Yi Ryu, Thomas R. Harris, Buguo Wang, Yung Kee Yeo, **Michael R. Hogsed**, and John Kouvetakis "Temperature-dependent photoluminescence studies of Ge_{1-y}Sny ($y=4.3\%-9.0\%$) grown on Ge-buffered Si; indicating direct bandgap cross-over point," *Journal of the Korean Physical Society* (2019)



Research Interest Areas

- Radiation effects on advanced microelectronic materials and devices
- Electrical and optical characterization of photonic Group IV semiconductor alloys



Dr. Darren E. Holland

PhD, Mechanical Engineering, University of Michigan

Research Assistant Professor of Engineering Physics

Most Notable Publications

Logan, J., **Holland, D.**, Burggraf, L., Clinton, J., O'Day, B. 2019. "Monte Carlo and Experimental Analysis of a Novel Directional Rotating Scatter Mask Gamma Detection System." *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*. 947, pp. 162698. <https://doi.org/10.1016/j.nima.2019.162698>

Olesen R., O'Day B., **Holland D.**, Burggraf L., and Bevins J., 2018. "Characterization of novel rotating scatter mask designs for gamma direction identification". *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*. In Press. <https://doi.org/10.1016/j.nima.2018.09.067>

Holland, D. E., Bevins, J. E., Burggraf, L. W., and O'Day, B. E., 2018. "Rotating scatter mask optimization for gamma source direction identification". *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*. 901, pp. 104-111. <https://doi.org/10.1016/j.nima.2018.05.037>

Holland, D. and Epureanu, B., 2013. "A component damping identification method for mistuned blisks". *Mechanical Systems and Signal Processing*. 41 (1-2), pp. 598-612. <http://dx.doi.org/10.1016/j.ymssp.2013.07.003>

Holland, D. and Epureanu, B., 2012. "Hybrid modal damping identification for bladed disks and blisks". *Journal of Vibration and Control*. 20 (1), pp. 51-65. <http://dx.doi.org/10.1177/1077546312461028>

Selected Honors & Awards

Patents:

- **Holland, D.**, Olesen, R., Burggraf, L., O'Day, B., Bevins, J. 2019. "Rotating Scatter Mask Design Classes for Directional Radiation Detection and Imaging." U.S. Patent Application 62,816,435, filed March 11, 2019. Patent Pending.
- Olesen, R., Egner, B., **Holland, D.**, Martin, V., Bevins, J. 2019. "An Efficient, Dual-particle Directional Detection System using a Rotating Scatter Mask." U.S. Patent Application 62,816,451, filed March 11, 2019. Patent Pending.

Significant Accomplishments

- Member of Nuclear Event Analysis and Testing (NEAT) Center for Specialized Research (CSR)



Research Interest Areas

- Source detection and identification
- Design optimization and uncertainty analysis
- Radiation transport modeling, simulation, verification, and validation
- Machine learning techniques for imaging



CDR Royce W. James

PhD, Plasma Physics

Visiting Professor

Director, Coast Guard Academy Plasma Lab

Most Notable Publications

M. Shilov, C. Cates, **R. James**, et al., "Dynamical plasma response of resistive wall modes to changing external magnetic perturbations," *Phys. Plasmas* 11, 2573 (2004).

M. E. Mauel, J. Bialek, A. H. Boozer, C. Cates, **R. James**, O. Katsuro-Hopkins, A. Klein, Y. Liu, D. Maurer, D. Maslovsky, G. Navratil, T. Pedersen, M. Shilov, and N. Stillitis., "Dynamics and control of resistive wall modes with magnetic feedback control coils: experiment and theory", *Phys. Plasmas* (2005).

R.W. James, E.L. Page, N. Thayer, B. Romano, D. Woodman, C. Welicka, T. Fitzgerald "Low Pressure High Density Plasma Development on a Small Helicon Plasma Experiment (HPX)," *American Physical Society's 54th Annual Meeting of the Division of Plasma Physics*, Providence, RI; November, 16, 2012.

R.W. James, "Progress on Development of Low Pressure High Density Plasmas on the Helicon Plasma Experiment (HPX)," *American Physical Society's 61st Annual Meeting of the Division of Plasma Physics*, Fort Lauderdale, FL; November, 5 - October, 24, (2019).

Freeman, **R.W. James**, R.W., Allen, L.A., Tejero, E., Daeffler, M. "CGA/NRL Impedance Probe as a ThinSat Spacecraft Payload" *American Physical Society's 61st Annual Meeting of the Division of Plasma Physics*, Fort Lauderdale, FL; November, 5 - October, 24, (2019).

Selected Honors & Awards

- Coast Guard Meritorious Service Medal
- Black Engineer of the Year Award (BEYA): Professional Achievement Award
- US Coast Guard Academy's Center for Academic Studies Summer Fellowship Award
- Coast Guard Commendation Medal
- Coast Guard Representative for National Aeronautics and Space Administration Astronaut Selection Process
- US Coast Guard Permanent Commissioned Teaching Staff (military version of Tenured Professor) sworn in – selected in 2005

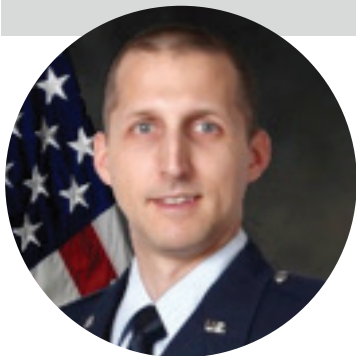
Significant Accomplishments

- Air Force Institute of Technology Visiting Faculty Fellow
- Unitarian Universalist Association President's International Award for Volunteer Service
- Special Congressional Recognition for Volunteer Service to Children and Families
- US Coast Guard Academy's Ms. Frances Neal Humanitarian Award
- Columbia University Research Fellow



Research Interest Areas

- Laboratory and Space based Magnetized Plasmas
- Plasma Interactions with Electromagnetic Radiation (with emphasis on high energy lasers)
- Fusion Energy
- Plasma Water Treatment



Lt Col Christopher A. Lenyk

PhD, Air Force Institute of Technology

Assistant Professor of Nuclear Engineering

Most Notable Publications

C. A. Lenyk, N. C. Giles, E. M. Scherrer, B. E. Kananen, L. E. Halliburton, K. T. Stevens, G. K. Foundos, J. D. Blevins, D. L. Dorsey, S. Mou, "Ir⁴⁺ ions in α -Ga₂O₃: an unintentional deep donor," *J. Appl. Phys.* 125, 045703 (2019).

C. A. Lenyk, M. S. Holston, B. E. Kananen, L. E. Halliburton, N. C. Giles, "Lithium and gallium vacancies in LiGaO₂ crystals," *J. Appl. Phys.* 124, 135702 (2018).

T. E. R. Dodson, L. E. Halliburton, G. S. Kedziora, **C. A. Lenyk**, N. C. Giles, "Self-trapped holes (small polarons) in ferroelectric KH₂PO₄ crystals," *J. Phys.: Condens. Matter* 31, 505503 (2019).

C. A. Lenyk, D. J. Bunker, J. W. McClory, S. R. McHale, B. R. Kowash, "Defining a Methodology for Data Analysis Using Streak Films," *Journal of Radiation Effects, Research and Engineering*, 33, 1-E, (2015).



Research Interest Areas

- Isolated point defects in single crystals
- Electron paramagnetic resonance (EPR)
- Thermoluminescence (TL)
- Photoluminescence (PL)
- Fourier-transform infrared (FTIR) spectroscopy
- Ultra-wide-bandgap oxides
- Scintillators
- Optical materials
- Radiation effects on materials
- Nuclear weapon effects



Dr. Robert D. Loper

PhD, Applied Physics, Air Force Institute of Technology

Assistant Professor of Physics

Most Notable Publications

Loper, Robert D. (2019), "Plasma structure of the deep solar interior," *Dynamics of the Sun & Stars: Honoring the Life & Work of Michael Thompson*.

Round, J. F., **R. D. Loper**, O. A. Nava, and S. W. Kahler (2019), "Variations of H-Normalized Heavy Ion Abundances in Large Solar Energetic ($E > 10$ MeV) Particle Events," *36th International Cosmic Ray Conference*.

Loper, Robert (2019), "Reconnection signatures in solar magnetograms during the solar storms of 4-10 September 2017," *Japan Geoscience Union Meeting 2019*.

Loper, Robert D. (2019), "Carrington-type Events as a Great Filter for Electronic Civilizations in the Drake Equation," *Pub. Astron. Soc. Pacific*. 131, 044202; doi:10.1088/1538-3873/ab028e.

Gavrielides, Athanasios, L.A. (Vern) Schlie, **Robert D. Loper**, Michael R. Hawks, and Glen P. Perram (2018), "Analytic treatment of beam quality and power efficiency in a high-power transverse flow diode pumped alkali laser," *J. Opt. Soc. Am. B*. Vol. 35, Issue 9, pp. 2202-2210; doi:10.1364/JOSAB.35.002202.

Selected Honors & Awards

- SOCHE (Southwestern Ohio Council for Higher Education) Faculty Excellence Award 2018, 2015

Significant Accomplishments

- Visiting Scientist, Solar Physics, Space Weather Prediction Center, 2019
- Space Physics SME, Air University Electromagnetic Defense Task Force, 2018-19
- Solar Weather SME, DHS/S&T Science Advisory Guide for Emergencies, 2015-19



Research Interest Areas

- Space Physics
- Space Weather
- Space Environment
- Solar Physics
- Magnetospheric Physics
- Plasma Physics



Dr. Kirk A. Mathews

PhD, Nuclear Engineering, Air Force Institute of Technology

Professor Emeritus of Nuclear Engineering

Most Notable Publications

David W. Gerts (DS-02) and **Kirk A. Mathews**, "Nonnegative Anisotropic Piecewise-Average Multigroup Cross Sections", *Nuclear Mathematical and Computational Sciences: A Century in Review, A Century Anew*, Gatlinburg, Tennessee, April 6-11, 2003, on CD-ROM, American Nuclear Society, LaGrange Park, IL (2003).*

Kirk Mathews and James Dishaw (DS-07), "Matrix Albedo for Discrete Ordinates Infinite Medium Boundary Condition", *Joint International Topical Meeting on Mathematics & Computation and Supercomputing in Nuclear Applications (M&C + SNA 2007)*. Monterey, California, April 15-19, 2007, on CD-ROM, American Nuclear Society, LaGrange Park, IL (2007).*

Mathews, K. A. and D. W. Gerts (AFIT), "Bayesian analysis for very-low-background counting of short-lived isotopes: Lowest Minimum Detectable Quantity", *Journal of Radio-analytical and Nuclear Chemistry*, Vol 276, No. 2 (2008), pp. 305-312.

Kirk Mathews, James Dishaw (DS-07), Nicholas Prins (DS-08), and Nicholas Wager (DS-04), "Adaptive Partial-Current Discrete-Ordinates Radiation Transport with Distribution Iteration: An Alternative to Source Iteration", *Nuclear Science and Engineering*, Vol 163, No. 3, November 2009, pp. 191-214.

Kirk Mathews, "Random Sampling from the Klein-Nishina Distribution: Efficiency, Parsimony, and Speed", *Nuclear Science and Engineering*, Vol 173, pp. 207-221 (2013).

Selected Honors & Awards

- Mervin E. Gross Award -- AFIT 17 Dec 1982



Research Interest Areas

- Neutral-particle radiation transport methods and algorithms: discrete ordinates spatial quadratures, angular quadratures, convergence acceleration, Monte Carlo estimators, discrete elements methods.
- Military applications of nuclear technologies



Dr. Michael A. Marciniak

PhD, Engineering Physics, Air Force Institute of Technology

Professor of Physics

Most Notable Publications

B. Adomanis, D.B. Burckel and **M. Marciniak**, "3D plasmonic design approach for efficient transmissive Huygens metasurfaces," *Optics Express* 27(15), 20928-20937 (Jul 2019).

G.E. Lott, **M.A. Marciniak** and J.H. Burke, "Three Dimensional Imaging of Trapped Cold Atoms with a Light Field Microscope," *Applied Optics* Vol. 56, No. 31, pp. 8738-8745 (Oct 2017).

J.C. Vap, S.E. Nauyoks, M.R. Benson and **M.A. Marciniak**, "Use of a novel infrared wavelength-tunable Mueller-matrix polarimetric scatterometer to measure nanostructured optical materials," *Review of Scientific Instruments* Vol. 88, pp. 103104(1-6) (Oct 2017).

S.D. Butler, S.E. Nauyoks and **M.A. Marciniak**, "Comparison of micro-facet BRDF model to modified Beckmann-Kirchhoff BRDF model for rough and smooth surfaces," *Optics Express* Vol. 23, No. 22, pp. 29100-29112 (Nov 2015).

M.R. Benson, A.G. Kinsley, **M.A. Marciniak**, M.D. Seal and A.M. Urbas, "Permittivity and permeability tensor extraction technique for arbitrary anisotropic materials," M.R. Benson,* *IEEE Photonics Journal* Vol. 7, No. 3, pp. 2600613(1-13) (Jun 2015).

Selected Honors & Awards

- 2009 Wright Memorial Chapter, Air Force Association, Col Gage H. Crocker Outstanding Professor Award (1 Jan-31 Dec 2008)

Significant Accomplishments

- "Remote sensing of hidden objects," M.G. Hoelscher and M.A. Marciniak, US Patent No. 8,976,256 B2, 10 March 2015.



Research Interest Areas

- Light-matter interaction, including polarimetric scatterometry of nanostructured materials (photonic crystals, plasmonic materials and optical meta-materials)
- Bidirectional reflectance distribution functions (BRDF) for optical signatures
- High-energy-laser damage assessment



Dr. John W. McClory

PhD, Nuclear Engineering, Air Force Institute of Technology

Associate Professor of Nuclear Engineering

Most Notable Publications

M. C. Recker, E. J. Cazalas, **J. W. McClory**, and J. E. Bevins, "Comparison of SiPM and PMT Performance Using a CLYC Scintillator with Two Optical Windows," *IEEE Transactions on Nuclear Science*, vol. 66, no. 8, pp. 1959-1965, August 2019. <http://dx.doi.org/10.1109/TNS.2019.2926246>

B.D. Campbell, **J.W. McClory**, B. Barber, G. Hansen, "Integration of Protection for Multiple Threats in Composite Materials," *Journal of Radiation Effects, Research and Engineering*, vol. 37, no. 1, pp. 32-40, April 2019.

Michael A. Ford, Buckley E. O'Day, **John W. McClory**, Manish K. Sharma, Areg Danagoulian, "Evaluation of Eu:LiCAF for neutron detection utilizing SiPMs and portable electronics," *Nuclear Instruments and Methods in Physics Research A*, vol. 908, pp. 110-116, November 2018. <https://doi.org/10.1016/j.nima.2018.08.016>

D. A. Matters, F. G. Kondev, N. Aoi, Y. Ayyad, A. P. Byrne, M. P. Carpenter, J. J. Carroll, C. J. Chiara, P. M. Davidson, G. D. Dracoulis, Y. D. Fang, C. R. Hoffman, R. O. Hughes, E. Ideguchi, R. V. F. Janssens, S. Kanaya, B. P. Kay, T. Kibédi, G. J. Lane, T. Lauritsen, **J. W. McClory**, P. Nieminen, S. Noji, A. Odahara, H. J. Ong, A. E. Stuchbery, D. T. Tran, H. Watanabe, A. N. Wilson, Y. Yamamoto, and S. Zhu, "In-beam γ -ray spectroscopy studies of medium-spin states in the odd-odd nucleus ^{186}Re ," *Physical Review C*, vol. 96, issue 1, 014318 (7 pages), July 2017. <http://dx.doi.org/10.1103/PhysRevC.96.014318>

K. S. Holliday, J. M. Dierken, M. L. Monroe, M. A. Fitzgerald, N. E. Marks, R. C. Gostic, K. B. Knight, K. R. Czerwinski, I. D. Hutcheon and **J. W. McClory**, "Plutonium segregation in glassy aerodynamic fallout from a nuclear weapon test," *Dalton Transactions*, vol. 46, no. 6, pp. 1770-1778, February 2017. <http://dx.doi.org/10.1039/c6dt04184a>

Significant Accomplishments

- Nuclear Engineering Program Curriculum Chair (2018-present)
- Member Joint National Security Applications Council-Peer Review Panel (JNSAC-PRP) (2013-present)
- Director, Nuclear Weapons Effects, Policy, and Proliferation Graduate Certificate Program (2013-present)



Research Interest Areas

- Radiation effects
- Radiation detector development
- Nuclear weapon effects



Dr. Jack E. McCrae

PhD, Physics, Air Force Institute of Technology

Research Assistant Professor of Physics

Most Notable Publications

Noah R. Van Zandt, **Jack E. McCrae**, and Steven T. Fiorino, "Modeled and measured image-plane polychromatic speckle contrast," *Opt. Eng.* 55 (2):024106 (1-7), (Feb 2016).

Santasri Basu, **Jack E. McCrae**, Steven Fiorino, and Jared Przelomski, "Estimation of temporal variations in path-averaged atmospheric refractive index gradient from time-lapse imagery," *Submitted to Optical Engineering Letters*.

Basu, Santasri, **J.E. McCrae**, and S.T. Fiorino, "Estimation of atmospheric refractive index gradient variations and Cn2 from time-lapse imagery," *Propagation through and Characterization of Atmospheric and Oceanic Phenomena (pCAOP), Imaging and Applied Optics Conference*, Arlington VA, 27-29 June 2016.

Jack E. McCrae, Santasri Basu, and Steven T. Fiorino, "Estimation of atmospheric parameters from time-lapse imagery," *Proc. SPIE 9833, Atmospheric Propagation XIII*, 983303 (May 13, 2016) doi:10.1117/12.2223986.

McCrae, J.E. and S.T. Fiorino, "Simulation of Array Tilt Effects in Laser Phased Arrays," *2016 IEEE Aerospace Conference Big Sky*, Montana. 5-12 March 2016.



Research Interest Areas

- Optics
- Lasers
- Quantum and non-linear optics
- Quantum computing
- Laser radar
- Modeling and measurements of atmospheric propagation, and imaging



Maj Omar A. Nava

PhD, Atmospheric and Oceanic Sciences, University of California Los Angeles

Assistant Professor of Atmospheric Science

Most Notable Publications

Nava, O. A., Emmons, D. J., and Loper, R. D. (2019), Influence of Thunderstorms on the Structure of the Ionosphere over North America, Abstract EGU2019-6057 presented at 2019 EGU General Assembly, Vienna, Austria, 7-11 Apr.

Merriman, D. K., **Nava, O. A.**, Meehan, J. L., and Tseng, H. R. (2019), Exploring the use of cell phone GNSS receivers for global monitoring of the ionosphere, Abstract EGU2019-18445 presented at 2019 EGU General Assembly, Vienna, Austria, 7-11 Apr.

Nava, O. A., Merriman, D. K., Meehan, J. L., and Tseng, H. R. (2019), Real-time Monitoring of the Ionosphere Using Cell Phone GNSS Technology presented at 2019 AGU Chapman Conference, Pasadena, CA, 11-15 Feb.

Katuziński, D. O., **Nava, O. A.**, Roeder W. P., and Holden, N. M. (2019), Forecasting Lightning Initiation Using Dual-Polarization Radar and Lightning Mapping Array in Southwest Utah presented at 2019 American Meteorological Society Annual Meeting, Phoenix, AZ, 6-10 Jan.

Nelson, A. M., **Nava, O. A.**, Kucas, M. E., Kosar, B., and Loper, R. D. (2019), Characterization of Tropical Cyclone Intensity Using Microwave Imagery presented at 2019 American Meteorological Society Annual Meeting, Phoenix, AZ, 6-10 Jan.

Selected Honors & Awards

- 2018 Colonel Charles A. Stone Award
- 2018 AETC Outstanding Weather Operations FGO of the Year
- 2018 AFIT FGO of the Quarter (1st Quarter)



Research Interest Areas

- Atmospheric Science
- Space Physics
- Tropical Cyclones
- Numerical Weather Prediction



Dr. Michael V. Pak

PhD, Theoretical Physics, St. Petersburg State University

PhD, Quantum Chemistry, Iowa State University

Research Assistant Professor of Physics

Most Notable Publications

Yang Yang, K.R. Brorsen, T. Culpitt, **Michael V. Pak**, S. Hammes-Schiffer "Development of a Practical Multicomponent Density Functional for Electron-Proton Correlation to Produce Accurate Proton Densities", *J. Chem. Phys.*, 147, 114113 (2017)

K.R. Brorsen, **Michael V. Pak**, S. Hammes-Schiffer "Calculation of positron binding energies and electron-positron annihilation rates for atomic systems with the reduced explicitly correlated Hartree-Fock method in the Nuclear-Electronic Orbital framework", *J. Phys. Chem. A*, 121 (2), pp 515–522 (2017)

A. Chakraborty, **Michael V. Pak**, S. Hammes-Schiffer "Development of electron-proton density functionals for multicomponent density functional theory", *Phys. Rev. Lett.*, 101, 153001 (2008)

Michael V. Pak, M.S. Gordon, "Hyperfine coupling tensors for multi-configurational quasi-degenerate perturbation theory (MCQDPT)", *J. Chem. Phys.*, 118 (1) (2003)

A.V. Tulub, V.F. Brattsev, **Michael V. Pak**, "Electron density in the interior of nuclei with allowance for QED effects in the many-electron theory of atoms", *Phys. Atom. Nuc.*, 61 (4), pp.520-524



Research Interest Areas

- Theory of quantization, topological quantum computing and quantum theory of multi-component systems.
- Development of new methods to accurately describe matter-antimatter interactions, and specifically positron annihilation in complex multi-electron environment.
- Physics of nuclear beta decay in intense radiation field.



Dr. Anil K. Patnaik

PhD, Quantum Optics, Physical Research Laboratory (India)

Associate Professor of Physics

Most Notable Publications

Influence of Coherent Population Trapping on Raman Scattering, Puja Singh, **Anil K. Patnaik**, Sukesh Roy, James R. Gord, and Yuri V. Rostovtsev, *Phys. Rev. A* 100, 023808 (2019).

Measurement of Electron Density and Temperature from Laser-Induced Nitrogen Plasma at Elevated Pressure (1–6 bar), Ashwin P. Rao, Mark Gragston, **Anil K. Patnaik**, Paul S. Hsu, and Michael B. Shattan, *Opt. Express* 27, 33779 (2019).

Recent advances in ultrafast-laser-based spectroscopy and imaging for reacting plasmas and flames, **Anil K. Patnaik**, Igor Adamovich, James R. Gord, and Sukesh Roy, *Plasma Sources Science and Technology* 26, 103001 (2017).

All-optically controlled concurrent slow-fast light, **Anil K. Patnaik**, Sukesh Roy, and James R. Gord, *Optics Letters* 36, 3272-3274 (2011).

Spontaneously generated atomic entanglement in free space: reinforced by incoherent pumping, Ling Zhou, Guo Hui Yang and **Anil K. Patnaik**, *Phys. Rev. A* 79, 062102 (2009).

Selected Honors & Awards

- Research work in international news [Physics World, 2015]
- Japanese Society for Promotion of Science (JSPS) fellowship for the period 2001-2003, with a total research grant of 3 million yen

Significant Accomplishments

- Highly cited papers with ~ 1000 citations; h-index 17, i10-index 25 (Source: Google Scholar)
- Serving as Program Committee Member in Optical Society of America conference on Laser Applications in Chemical, Security and Environmental Analysis



Research Interest Areas

- Quantum optics and information
- Laser-matter applications to hypersonics, combustion and nuclear diagnostics



Dr. Glen P. Perram

PhD, Physics, Air Force Institute of Technology

Professor of Physics

Most Notable Publications

Ashley E. Gonzales, Nicholas C. Herr, and **Glen P. Perram**, "Experimental Study of Laser Irradiated Graphite Oxidation using IFTS," *Combustion and Flame*, 192, 180-189, 2018.

Woody S Miller, Christopher A. Rice, and **Glen P. Perram**, "Temperature dependence of the helium induced broadening and shift of the Rb D1 and D2 lines," *J Quantitative Spectroscopy and Radiative Transfer*, 206, 151-156, 2018.

Ben Eshel and **Glen P. Perram**, "A five-level Ar-He laser model for characterization of a diode-pumped rare gas laser," *J Optical Society of America B* 35, 164-173, 2018.

William Bauer, **Glen P. Perram**, Timothy Haugan, "Comparison of plume dynamics for laser ablated metals: Al and Ti," *Journal of Applied Physics*, 123, 095304, 2018.

Ricardo C. Davila, Ben Eshel, **Glen P. Perram**, "Spin-orbit relaxation of cesium 82D in mixtures of helium and argon," *Journal of Physics B: Atomic, Molecular and Optical Physics*, 50 225204, 2017.

Selected Honors & Awards

- Air Force Science, Technology and Mathematics Award, Outstanding Senior Civilian Scientist
- Air Force Science and Engineering, Exploratory Team Award

Significant Accomplishments

- Fellow, Directed Energy Professional Society



Research Interest Areas

- Gas lasers
- Laser weapons
- Spectroscopy
- Chemical kinetics
- Remote sensing



Dr. James C. Petrosky

PhD, Engineering Physics, Rensselaer Polytechnic Institute

Director, Nuclear Events, Analysis & Testing Center for Specialized Research

Professor of Nuclear Engineering

Most Notable Publications

Nichole Benker, Elena Echeverria-Mora, Jennifer Hamblin, Peter A. Dowben, Axel Enders, Brant Kananen, **James Petrosky**, John McClory. "Possible detection of solar neutrons from the ISS." *American Astronomical Society Meeting Abstracts*, 232 (2018).

Christina L. Dugan, George Glenn Peterson, Alyssa Mock, Christopher Young, J. Matthew Mann, Michael Nastasi, Mathias Schubert, Lu Wang, Wia-Ning Mei, Lori Tanabe, Peter A. Dowben, **James Petrosky**. "Electrical and material properties of hydrothermally grown single crystal (111) UO₂." *The European Physical Journal B* 91:67, April, 2018.

J. R. Fee Jr. and **J. C. Petrosky**, "Validation of the Air Burst EMP Simulation Capability, B-code," *Journal of Rad Effects, Res, and Eng.* Vol 35 (SECRET), April, 2018.

David Smith, *Bertus Shelters, Derek Hesser, Peter Collins, James Fee, **James Petrosky**, Andrew Terzuoli, Caglar Yadim. "Effects of ionospheric scintillation on V and W band signals," *2017 IEEE International Symposium on Antennas and Propagation & USNC/URSI Radio Science Meeting*, 9-14 July 2017.

Christopher Young, **James Petrosky**, J. Matthew Mann, Eric M. Hunt, David Turner and Peter A. Dowben, "The lattice stiffening transition in UO₂ single crystals," *Journal of Physics: Condensed Matter*, 29 (2017), 21 November 2016.

Selected Honors & Awards

- Charles Stone Award
- Aldren Research Excellence Award
- AETC Science and Technology Professor of the Year Award
- General Bernard Schriever Award
- Member of the AETC Nuclear Deterrence Operations Professional Team of the Year

Significant Accomplishments

- NNSA Review Committee Member of the following: Radiation Effects and High Energy Density Sciences (REHEDS) research consortium, Qualification Alternatives to the Sandia Pulsed Reactor (QASPR) and the Radiation-aware Electrical Multi-Scale Model Based Design (REMS-MDB) L2 review team



Research Interest Areas

- Radiation effects on electronic devices, EMP, experimental design, radiation detection, and nuclear weapon effects.
- Narrow- and wide-band gap materials, using combinations of electrical, optical, and absorption spectroscopy to gain information on the damaging effects of ionizing and non-ionizing radiation.



Dr. Grady T. Phillips

PhD, Physics, Air Force Institute of Technology

Research Assistant Professor (ORISE)

Most Notable Publications

J. C. Withers et al., "Process control and defects in Ti-6Al-4V additive manufacturing, using plasma transferred arc (Pta) techniques," in *Materials Science and Technology Conference and Exhibition 2017*, MS and T 2017 1 (2017) [doi:10.7449/2017/MST_2017_379_385].

G. T. Phillips et al., "Oxidation and sublimation of porous graphite during fiber laser irradiation," in *Proceedings of SPIE - The International Society for Optical Engineering* 10097 (2017) [doi:10.1117/12.2253108].

G. T. Phillips et al., "Mass removal by oxidation and sublimation of porous graphite during fiber laser irradiation," *Opt. Eng.* 56(1), 011013 (2017) [doi:10.1117/1.OE.56.1.011013].

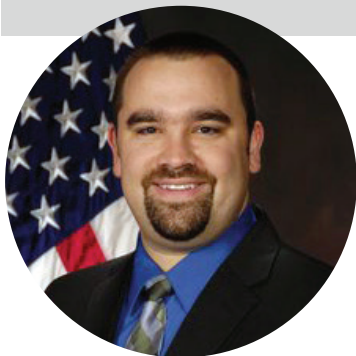
G. P. Perram and **G. T. Phillips** "Optical diagnostics for real-time monitoring and feedback control of metal additive manufacturing processes," in *Additive Manufacturing Handbook*, CRC Press, Badiru, A. (Ed.), Valencia, V. (Ed.), Liu, D. (Ed.). (2017).

D. Baseley et al., "Hyperspectral analysis for standoff detection of dimethyl methylphosphonate on building materials," *Build. Environ.* 108, 135–142 (2016) [doi:10.1016/j.buildenv.2016.08.028].



Research Interest Areas

- Spectroscopy
- Remote sensing
- Laser/material interactions
- Gas phase lasers
- Optical diagnostics



Dr. Christopher A. Rice

PhD, Optical Science and Engineering, Air Force Institute of Technology

Research Assistant Professor of Physics

Most Notable Publications

Miller, W. S., **Rice, C. A.**, & Perram, G. P. (2018). "Temperature dependence of the helium induced broadening and shift of the Rb D1 and D2 lines". *Journal of Quantitative Spectroscopy and Radiative Transfer*, 206, 151-156.

Fletcher, A., Turner, D., Fairchild, S., **Rice, C.**, & Pitz, G. (2018). "ToF-SIMS Characterization of Robust Window Material for Use in Diode Pumped Alkali Lasers". *Physica Status Solidi (A)*, 215(2), 1700728. <http://doi.org/10.1002/pssa.201700728>

Eshel, B., **Rice, C. A.**, & Perram, G. P. (2018). "Saturation spectroscopy of an optically opaque argon plasma". *Applied Physics B*, 124(2), 33. <http://doi.org/10.1007/s00340-017-6869-6>

Fiorino, S., Keefer, K., **Rice, C.**, Burley, J. L., & Schmidt, J. E. (2017). "Characterizing multispectral vertical profiles of aerosol extinction with surface-based measurements". In *Imaging and Applied Optics 2017* (3D, AIO, COSI, IS, MATH, pcAOP) (p. PTu1D.1). <http://doi.org/10.1364/PCAOP.2017.PTu1D>

Woody S, Miller, **Christopher A. Rice**, Gordon D. Hager, Mathew D. Rotondaro, Hamid Berriche, and Glen P. Perram, "High Pressure Line Shapes of the Rb D1 and D2 lines for 4He and 3He collisions," *Journal of Quantitative Spectroscopy and Radiative Transfer*, 184, 118-134, Nov 2016.

Selected Honors & Awards

- ASAF Modeling and Simulation Award for Planning, 2017



Research Interest Areas

- Atmospheric propagation of high energy lasers
- Diode pumped alkali and rare gas laser gain cell construction
- Novel laser demonstration
- Aerosol field measurements
- Modeling, simulation, and validation of directed energy simulations
- Pulsed laser ablation of titanium and carbon
- New techniques of turbulence characterization over open paths



Dr. Heidi R. Ries

PhD, Applied Physics, Old Dominion University

Interim Chief Academic Officer

Dean for Research

Professor of Physics

Most Notable Publications

"Microwave response near zero magnetic field in transition-metal-doped silicate glasses," R.R. Rakhimov, **H.R. Ries**, D.E. Jones*, L.B. Glebov, and L.N. Glebova. *Appl. Phys. Lett.* 76 (6) pp. 751-753 (2000).

"Spin dynamics of the triplet Cr⁴⁺ in the vicinity of energy level anti-crossing," R. R. Rakhimov, H. R. Horton*, D. E. Jones*, G. B. Loutts, and **H. R. Ries**. *Chem. Phys. Lett.* (319) 5-6 (2000) pp. 639-644

"Manganese-doped yttrium orthoaluminate: A potential material for holographic recording and data storage," G.B. Loutts, M. Warren*, L. Taylor*, R.R. Rakhimov, **H.R. Ries**, G. Miller, III; M.A. Noginov, M. Curley, N. Noginova, N. Kukhtarev, H.J. Caulfield, P. Venkateswarlu. *Phys. Rev. B* 57 (7) 3706-3709 (1998)

"Crystal growth, spectroscopic characterization, and laser performance of a new efficient laser material Nd:Ba₅(PO₄)₃F," G.B. Loutts, C. Bonner, C. Meegoda*, **H. Ries**, M.A. Noginov, N. Noginova, M. Curley, P. Venkateswarlu, A. Rapaport, and M. Bass, *Applied Physics Letters* 71(3) 303 (1997) (selected for inclusion in the *SPIE's Milestone Series of Selected Reprints on the subject Laser Crystal Growth*, Robert Uhrin, editor).

"Mechanism of Electrical Conductivity in an Irradiated Polyimide," **H.R. Ries**, W.L. Harries, S.A.T. Long, and E.R. Long, Jr., *J. Phys. Chem. of Solids* 50, 735 (1989).

Selected Honors & Awards

- Air Force Exemplary Civilian Service Award (2013)
- Air Force winner of the 2011 Department of Defense Women's History Month Science, Technology, Engineering and Mathematics Role Model Award, Civilian category
- Air Force winner of the 2011 National Latina Distinguished Service Award
- Ten Top Women Award (Dayton Daily News, 2009)
- Air Force Meritorious Civilian Service Award (2008)

Significant Accomplishments

- Higher Learning Commission Team Chair and Peer Reviewer
- Chair, Board of Trustees, Engineering and Science Foundation of Dayton



Research Interest Areas

- Radiation effects
- Nonlinear optical materials
- Electron paramagnetic resonance spectroscopy
- Laser processing of materials



Dr. Adib J. Samin

PhD, Mechanical Engineering, The Ohio State University

Assistant Professor of Nuclear Engineering

Most Notable Publications

Samin, A.J., Andersson, D. A., Holby, E. H., and Uberuaga, B. P. Ab initio based examination of the kinetics and thermodynamics of oxygen in Fe-Cr alloys, *Physical Review B*. 99 (2019) 174202.

Samin, A. J., Andersson, D.A., Holby, E. H., and Uberuaga, B. P. First-principles localized cluster expansion study of the kinetics of hydrogen diffusion in homogeneous and heterogeneous Fe-Cr alloys, *Physical Review B*. 99 (2019) 014110.

Samin, A. J., Holby, E. F. Andersson, D. and Uberuaga, B. P. On the role of electro-migration in the evolution of radiation damage in nanostructured ionic materials. *Electrochemistry Communications*, 2018. 96: p. 47-52.

Samin, A. J. and C.D. Taylor, A one-dimensional time-dependent model for studying oxide film growth on metallic surfaces. *Journal of Applied Physics*, 2018. 123(24): p. 245303.

Samin, A. J. and Taylor, C. A. First-principles investigation of surface properties and adsorption of oxygen on Ni-22Cr and the role of molybdenum. *Corrosion Science*, 2018. 134: 103-111.

Selected Honors & Awards

- 2018 Director's Postdoctoral Fellowship at the Los Alamos National Laboratory (LANL).
- 2010 Distinguished University Fellowship for graduate students – The Ohio State University

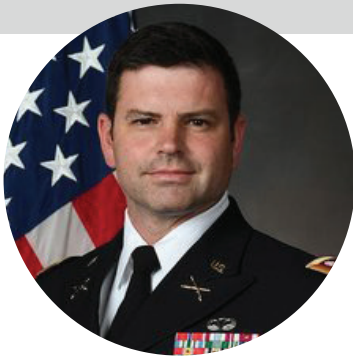
Significant Accomplishments

- 2007 Physical Chemistry Undergraduate Award – Wayne State Department of Chemistry



Research Interest Areas

- Modeling and simulation of corrosion
- Defect transport
- Electrochemical phenomena
- Radiation damage



Lt Col Michael B. Shattan

PhD, Nuclear Engineering, University of Tennessee

Assistant Professor of Nuclear Engineering

Most Notable Publications

A. P. Rao, M. Gragston, A. K. Patnaik, P. S. Hsu, and **M. B. Shattan**, "Measurement of Electron Density and Temperature From Laser-Induced Nitrogen Plasma at Elevated Pressure (1-6 Bar)," *Opt. Express*, 27, 33779-33788 (2019).

A. P. Rao, M. T. Cook, H. L. Hall, and **M. B. Shattan**, "Quantitative Analysis of Cerium-Gallium Alloys Using a Hand-Held Laser Induced Breakdown Spectroscopy Device," *Atoms* 7, 1-10 (2019).

M. Shattan, M. Gragston, Z. Zhang, J. D. Auxier, K. G. McIntosh, and C. G. Parigger, "Mapping of Uranium in Surrogate Nuclear Debris Using Laser-Induced Breakdown Spectroscopy (LIBS)," *Appl. Spectrosc.* 73, 591-600 (2019).

M. Shattan, A. Seybert, R. Gilbreath, S. Dahunsi, and H. Hall, "The use of tabletop exercises in nuclear security education," *Journal of Applied Research in Higher Education*, 10, 344-356 (2018).

M. B. Shattan, D. J. Miller, M. T. Cook, A. C. Stowe, J. D. Auxier, C. Parigger, and H. L. Hall, "Detection of uranyl fluoride and sand surface contamination on metal substrates by hand-held laser-induced breakdown spectroscopy," *Appl. Opt.* 56, 9868-9875 (2017).

Selected Honors & Awards

- Bronze Star Medal
- Defense Meritorious Service Medal
- Meritorious Service Medal
- Joint Service Commendation Medal
- Army Commendation Medal



Research Interest Areas

- The use of Laser-Induced Breakdown Spectroscopy (LIBS) for nuclear forensics purposes
- Laser Diagnostics for high temperature plasma diagnostics



Dr. Bryan J. Steward

PhD, Optical Sciences & Engineering, Air Force Institute of Technology

Research Assistant Professor of Optical Engineering

Technical Advisor, Center for Technical Intelligence Studies & Research

Most Notable Publications

Fernandez, Fernando D., **Steward, Bryan J.**, Hawks, Michael R. and Gross, Kevin C. (15 April 2019), "Implementation of a non-linear CMOS and CCD focal plane array model in ASSET," *Proceedings of SPIE*. 11001, 11001-10.

Schwaab, Matthew J., Greendyke, Robert and **Steward, Bryan J.** (9 July 2017), "Arrhenius Rate Chemistry-Informed Inter-Phase Source Terms (ARCIIST)," *20th Biennial Conference of the APS Topical Group on Shock Compression of Condensed Matter*, St. Louis, MO, Vol. 62, No. 9.

Young, Shannon R., **Steward, Bryan J.**, and Gross, Kevin C. (11 April 2017), "Development and Validation of the AFIT Sensor Simulator for Evaluation and Testing (ASSET)," *Proceedings of SPIE*. 10178, 101780A.

Steward, Bryan J. and Hawks, Michael R (2016), "End-to-End Model Enhancements and Hypothetical Detection Scenarios," Air Force Institute of Technology, DTIC No. AD1020340.

Young, Shannon R., **Steward, Bryan J.**, Hawks, Michael R., and Gross, Kevin C. (17 May 2016), "Improving Detection of Low SNR Targets Using Moment-based Detection," *Proceedings of SPIE*. 9828, 98280K.

Selected Honors & Awards

- Civilian of the Quarter: Persistent Infrared Squadron (NASIC), Category III (2013 & 2015)
- Civilian of the Quarter: GEOINT/MASINT Squadron (NASIC), Category II (Spring 2010)
- U.S. Force Science, Technology, and Engineering – Team Scientist Award (Aug 2010)
- Civilian of the Quarter: Wright Patterson Air Force Base, Category I (Fall 2006)

Significant Accomplishments

- Air Force Institute of Technology MS Applied Physics Distinguished Graduate (2006)
- National Defense Science and Engineering Graduate Fellow (Sep 2004 – Aug 2007)



Research Interest Areas

- EO/IR Remote Sensing
- Radiometric Sensor and Scene Modeling
- Signal and Image Processing Algorithm Development
- Overhead Persistent Infrared (OPIR)
- On-Orbit Sensor Characterization
- Machine Learning



Lt Col Robert C. Tournay

PhD, Atmospheric Science, Colorado State University

Assistant Professor of Atmospheric Science

Most Notable Publications

Nielsen, E. R., G. R. Herman, **R. C. Tournay**, J. M. Peters, and R. S. Schumacher, 2015: "Double impact: When both tornadoes and flash floods threaten the same place at the same time". *Wea. Forecasting*, 30, 1673–1693.

Tournay, R.C., January 2015. "Land Surface Sensitivity of Warm Season MCS Nocturnal Transition". *Presented at the American Meteorological Society Annual Meeting*, Phoenix, AZ.

Tournay, R.C., January 2017. "Delivering Decision Superiority to the Warfighter". *Presented at the American Meteorological Society Annual Meeting*, Seattle, WA.

Tournay, R.C., May 2018. "US Air Force Numerical Weather Modeling Capabilities". *Presented at the American Meteorological Society WAF/NWO Meeting*, Denver, CO.

Selected Honors & Awards

- Air Force Special Operations Command Weather Field Grade Officer of the Year, 2012
- Air Force Materiel Command Weather Field Grade Officer of the Year, 2011
- Air Force Weather Agency Company Grade Officer of the Year, 2009
- Air Force Weather Company Grade Officer of the Year, 2005



Research Interest Areas

- Land Surface-Atmosphere Interaction
- Hydrology
- Artificial Intelligence Applications to Weather Forecasting



Lt Col H. Rose Tseng

PhD, Atmospheric and Oceanic Sciences, University of California at Los Angeles

Assistant Professor and Curriculum Chair of Atmospheric Science

AFTAC Endowed Term Chair for Numerical Weather Monitoring

Most Notable Publications

Qi, L., Li, Q., Henze, D. K., **Tseng, H.-L.**, and He, C.: "Sources of springtime surface black carbon in the Arctic: an adjoint analysis for April 2008", *Atmos. Chem. Phys.*, 17, 9697-9716, <https://doi.org/10.5194/acp-17-9697-2017>, 2017.

Zhao, B., Liou, K.-N., Gu, Y., Li, Q., Jiang, J. H., Su, H., He, C., **Tseng, H.-L. R.**, Wang, S., Liu, R., Qi, L., Lee, W.-L., Hao, J.: "Enhanced PM2.5 pollution in China due to aerosol-cloud interactions", *Scientific Reports*, 7, 4453, <http://doi.org/10.1038/s41598-017-04096-8>, 2017.

Zhao, B., Liou, K.-N., Gu, Y., He, C., Lee, W.-L., Chang, X., Li, Q., Wang, S., **Tseng, H.-L. R.**, Leung, L.-Y. R., and Hao, J.: "Impact of buildings on surface solar radiation over urban Beijing", *Atmos. Chem. Phys.*, 16, 5841-5852, doi:10.5194/acp-16-5841-2016, 2016.

Selected Honors & Awards

- Air Education and Training Command Weather Field Grade Officer of the Year (2017)



Research Interest Areas

- Nuclear monitoring (source term estimation and uncertainty quantification)
- Aerosols' role in precipitation generation
- Ionosphere wave propagation
- Space-terrestrial weather coupling
- Ionosphere climatology
- Terrestrial decadal climatology
- Climate and sustainable farming practices
- Arctic sea ice decline attribution



Dr. Ronald F. Tuttle

PhD, Nuclear Engineering, University of Missouri

Associate Professor of Engineering Physics

Most Notable Publications

Kohles, Sean S., Barki, Anum, Kendricks Kimberly D., and **Tuttle, Ronald F.**, "Biomechanical Analysis of Pack Load Influences on Gait Signatures Derived From Gröbner Basis Theory," *Journal of Forensic Biomechanics*, 5:1, 14 October 2014.

Kendricks, Kimberly D., **Ronald F. Tuttle**, and Adam M. Fullenkamp, "Inverse Kinematic Analysis with Groebner Basis Theory for Arm Swing Movement in the Gait Cycle," *submitted to the Journal of Biometrics*, March 2010.

David McNeill, Susan Duncan, Amy Franklin, James Goss, Irene Kimbara, Fey Parrill, Haleema Welji, Lei Chen, Mary Harper, Francis Quek, Travis Rose, and **Ronald Tuttle**, "Mind-Merging," Morsella, E. (Ed.), *Expressing Oneself / Expressing One's Self: Communication, Language, Cognition, and Identity*, London, Taylor and Francis, 9 November 2007.

Lei Chen, R. Travis Rose, Ying Qiao, Irene Kimbara, Fey Parrill, Haleema Welji, Tony Xu Han, Jilin Tu, Zhongqiang Huang, Mary Harper, Francis Quek, Yingen Xiong, David McNeill, **Ronald Tuttle**, and Thomas Huang, "VACE Multimodal Meeting Corpus," *Machine Learning for Multimodal Interaction*, Steve Renals and Samy Bengio (Eds), 40-51, Springer-Verlag, 2006.



Research Interest Areas

Nuclear and em phenomenologies and biometrics; Collection instrumentation for IR data--radiometric and spectrometric processing and analysis; Passive ranging techniques; Advancement of MASINT techniques for detection and identification of underground facilities, WMDs, and IEDs; Prediction of plutonium production using advanced unit operations algorithms using bio environ sensors; Characterization of the optical parameters for nuclear and IR sensors for UAV and satellite applications; Development of algorithms for video analysis and content extraction for overt and covert surveillance systems; Advanced concepts for 3-D immersive environments using virtual spaces and serious gaming.



Dr. Gaiven Varshney

PhD, Applied Chemistry, Z. H. College of Engineering and Technology, AMU, India

Research Assistant Professor of Nuclear Engineering

Most Notable Publications

G. Varshney, J. Cezeaux, and J.C. Petrosky, "Investigation of Fissile Materials Collected from a Non-Critical Nuclear Explosion Site using Non-destructive Analytical Techniques," *Journal of Radioanalytical and Nuclear Chemistry*, 318 (1) 505-513, 2018.

G. Varshney, D.M. Kempisty, S.R. Kanel, E.S. Demessie, R.S. Varma, M. Nadagouda, A. Agrawal, and V. Varshney, "A Nanoscale TiO₂ films and their Application in Remediation of Organic Pollutants," *Coordination Chemistry Reviews*, 306, 43-64, 2016.

C. Varshney, G. Varshney, H.S. Rathore, K. Ishratullah, and S.C. Mojumdar, "Synthesis, Characterization, Fungicidal and Bacterial Activity of Metal diethyldithiocarbamate Fungicides," *Journal of Thermal Analysis and Calorimetry*, 94 (1), 75-81, 2008.

G. Varshney, H.S. Rathore, S.C. Mojumdar, M.T. Saleh, "Synthesis, Characterization and Fungicidal activity of Zinc Diethyldithiocarbamate and Phosphate," *Journal of Thermal Analysis and Calorimetry*, Vol. 90 (3), 681-686, 2007.

G. Varshney, H.S. Rathore, K. Ishratullah, "Assessment of the Movement of some Dithiocarbamate Fungicides by Soil Thin-Layer Chromatography," *Indian Journal of Chemical Technology*, 14 (2), 400, 2007.

Significant Accomplishments

- Member of AFIT Nuclear Event Analysis and Testing Center for Specialized Research (NEAT CSR).



Research Interest Areas

- Radiation detection
- Investigation of post-detonation debris using various microscopic and spectroscopic characterization techniques
- Characterization of semiconductors and nanomaterials
- Wastewater treatment
- Environmental remediation



Dr. David E. Weeks

PhD, Physics, University of Arkansas

Professor of Physics

Most Notable Publications

A.R. Sharma and **D.E. Weeks**, "Interatomic Potentials for Ground and Excited States of Ar + He," *J. Chem. Phys.* 149 (2018) 194302.

A.R. Sharma and **D.E. Weeks**, "Excited Interatomic Potential Energy Surfaces of Rb + He that Correlate with Rb Terms 52S through 72S," *Phys. Chem. Chem. Phys.* 20 (2018) 29274-29284.

L.A. Blank, A.R. Sharma, and **D.E. Weeks**, "Influence of Basis-Set Size on the X 2S_{1/2}, A 2P_{1/2}, A 2P_{3/2}, and B 2S_{1/2} Potential-Energy Curves, A2P_{3/2} Vibrational Energies, and D1 and D2 Line Shapes of Rb+He," *Phys. Rev. A*, 97 (2018) 032705.

D.J. Emmons, **D.E. Weeks**, B. Eshel, and G.P. Perram, "Metastable Ar(1s₅) Density Dependence on Pressure and Argon-Helium mixture in a High Pressure Radio Frequency Dielectric Barrier Discharge," *J. Appl. Phys.*, 123 (2018) 043304.

C.D. Lewis and **D.E. Weeks**, "Theoretical Cross Sections of the Inelastic Fine Structure Transition M(2P_{1/2}) + Ng → M(2P_{3/2}) + Ng for M = K, Rb, and Cs, and Ng = He, Ne, and Ar," *J. Phys. Chem. A*, 121 (2017) 3351.



Research Interest Areas

- Atomic and Molecular Physics
- Laser Modeling and Simulation
- Quantum Information
- Computer Graphics
- Mathematical Physics
- Condensed Matter Physics



Dr. Paul J. Wolf

PhD, Physics, Air Force Institute of Technology

Associate Dean for Academic Affairs

Professor of Physics

Most Notable Publications

P.J. Wolf, "The Plasma Properties of Laser Ablated SiO₂," *J. Appl. Phys.* 72, 1280 (1992).

J.J. Kester, **P.J. Wolf**, and W.R. White, "Second Harmonic Generation in Planar Waveguides of Doped Silica," *Opt. Lett.* 17, 1779 (1992).

P.J. Wolf, "Investigations on the Expansion Dynamics of Ge Atoms Produced from Laser-Ablated GeO₂," *Applied Physics A*, 62, 553 (1996).

R.S. Pope, **P.J. Wolf**, and G.P. Perram, "Line Broadening in the A-band of O₂ by Molecular Perturbers," *J. Quant. Spectrosc. Radiat. Transfer*, 64, 363 (2000).

R.S. Pope and **P.J. Wolf**, "Noble Gas Broadening of the Fundamental Band of Nitric Oxide," *J. Mol. Spectrosc.*, Sept 2001.

J. Holtgrave and P.J. Wolf, "Pressure broadening and line shifting of atomic strontium 5s2 1S0 → 5s5p 3P1 and 5s5p 3P0,1,2 → 5s6s 3S1 absorption transitions induced by noble-gas collisions," *Phys. Rev A*, 72, 012711 (2005).

Significant Accomplishments

- Higher Learning Commission Peer Reviewer



Research Interest Areas

- Atomic and molecular spectroscopy
- Foundations of quantum mechanics
- Philosophy of science
- Existential-threat analyses



Dr. Alan V. Lair

PhD, Mathematics, Texas Tech University

Department Head, Mathematics and Statistics

Most Notable Publications

A. V. Lair and A. W. Shaker, "Classical and weak solutions of a singular semilinear elliptic problem", *Journal of Mathematical Analysis and Applications* 211 (1997), 371-385.

A. V. Lair, "A necessary and sufficient condition for existence of large solutions to semilinear elliptic equations", *Journal of Mathematical Analysis and Applications* 240 (1999), 205-218.

A. V. Lair and A. W. Wood, "Existence of entire large positive solutions of semilinear elliptic systems", *Journal of Differential Equations* 164 (2000), 380-394.

A. V. Lair, "Entire large solutions to semilinear elliptic systems", *Journal of Mathematical Analysis and Applications* 382 (2011), 324-333.

A. V. Lair and A. Mohammed, "Entire large solutions to elliptic equations of power non-linearities with variable exponents", *Advanced Nonlinear Studies* 13 (2013), 699-719.



Research Interest Areas

- Nonlinear Diffusion
- Boundary Blowup Solutions of Semilinear Elliptic Equations



Dr. Benjamin F. Akers

PhD, Mathematics, University of Wisconsin-Madison Associate

Professor of Mathematics

Most Notable Publications

B.F. Akers, D.M. Ambrose, and D.W. Sulon, "Periodic traveling interfacial hydroelastic waves with or without mass." *Zeitschrift für angewandte Mathematik und Physik (ZAMP)*, 68:141, (2017).

D. Morrill and **B. Akers**, "High Energy Laser Propagation: Environmental Effects", *Imaging and Applied Optics*, PW1D.4, (2017).

B. Akers and J. Reeger, "Three dimensional overturned traveling water waves", *Wave Motion*, 68, 210-217 (2017).

J.R. Fee, J.C. Petrosky and **B. Akers**, "Re-establishing an Air Burst EMP Simulation Capability", *Journal of Radiation Research and Engineering*, 34:12, 53-60 (2016).

B. Akers, D.M. Ambrose, K. Pond, and J.D. Wright, "Overturned internal capillary-gravity waves." *Eur. J. Mech.-B/Fluids*. 46, 181-189 (2016).

B. Akers, HOPS Short Course: Traveling water waves. *London Mathematical Society Lecture Notes Series*. 426, 19-29 (2016).

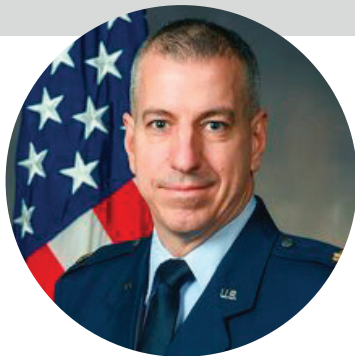
Selected Honors & Awards

- ENC Instructor of the Quarter (2011, 2012, 2013, 2015, 2016).
- SOCHE Excellence in Teaching (2012).
- Ohio Magazine Excellence in Education (2013).



Research Interest Areas

- Approximate models in nonlinear wave problems
- Traveling and solitary waves
- The existence and stability of coherent structures in nonlinear wave equations
- Perturbation methods for eigenvalue problems
- Numerical analysis
- Fluid dynamics
- Nonlinear optics



Maj Timothy S. Anderson

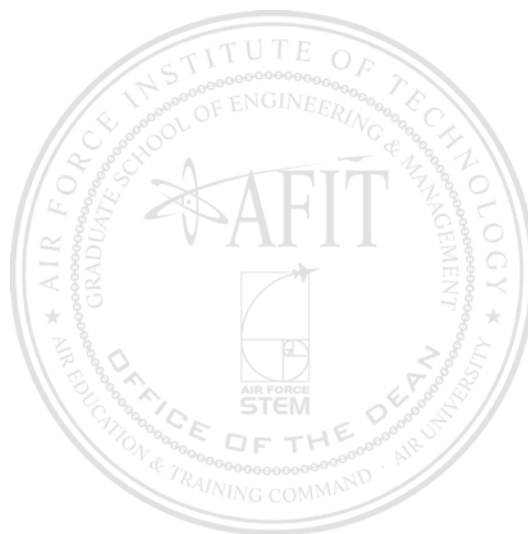
PhD, Applied Mathematics, Air Force Institute of Technology

Assistant Professor of Statistics



Research Interest Areas

- Uncertainty Estimation
- Computational Statistics
- Bayesian Analysis





Dr. William P. Baker

PhD, Applied Mathematics, Northwestern University

Associate Professor of Mathematics

Most Notable Publications

Rutledge JL, **Baker WP**. "Unsteady Effects on the Experimental Determination of Overall Effectiveness". ASME. *Turbo Expo: Power for Land, Sea, and Air*, Volume 5B: Heat Transfer ():V05BT13A006. doi:10.1115/GT2018-75846

Easterday, O., Palazotto, A., **Baker, W.**, and Branam, R., "Damping Properties of Coatings at Elevated Temperatures," *Surface and Coatings Technology*, Vol. 321, pp. 186–199, 2017.

"Stochastic Real-Time Optimal Control for Bearing-Only Trajectory Planning", Ross, S.M., Cobb, R.G., Baker, **W.P.**, *International Journal of Micro Air Vehicles* 6(1):1-28, March 2014.

"Optimal Control of a Librating Electrodynamics Tether Performing a Multi-revolution Orbit Change", Robert Stevens, **William Baker**, *Journal of Guidance Control and Dynamics* 32(5):1497-1507, August 2009.

"A variable stiffness device selection and design tool for lightly damped structures", M.F. Winthrop, **W.P. Baker**, R.G. Cobb, *Journal of Sound and Vibration* 287(4-5):667-682, November 2005.

Ross, S.M., Cobb, R.G., **Baker, W.P.**, and Harmon, F., "Implementation lessons and pitfalls for real-time optimal control with stochastic systems," *Journal of Optimal Control Applications and Methods*, Vol. 36, No. 2, pp. 198-217, Mar 2015.



Research Interest Areas

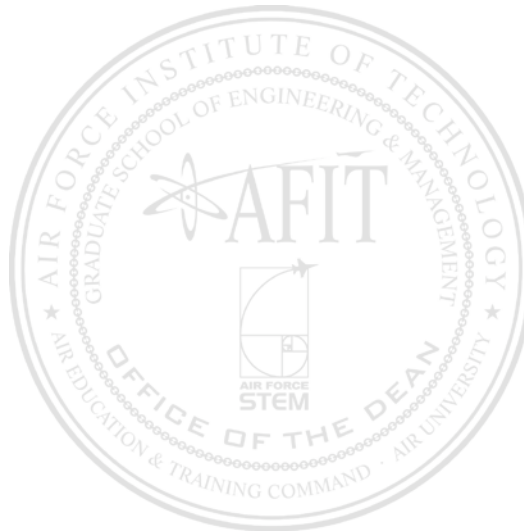
- Asymptotic and Perturbation Methods
- Wave Propagation and Scattering Theory
- Optimal Control Theory
- Thermal Dynamics of high speed wear events
- Vibrational dynamics of thermal loaded materials



Maj Eric L. Brooks

PhD, Applied Mathematics, Air Force Institute of Technology

Assistant Professor of Statistics





Dr. Dursun A. Bulutoglu

PhD, Statistics, University of California, Berkeley, California

Associate Professor of Statistics

Most Notable Publications

D.A. Bulutoglu and C.S. Cheng “Hidden Projection Properties of Some Nonregular Fractional Factorial Designs and Their Applications” *The Annals of Statistics* 31, 1012-1026, (2003).

D.A. Bulutoglu and C.S. Cheng “Construction of E(s₂)-optimal Supersaturated Designs” *The Annals of Statistics* 32, 1662-1678, (2004).

G. Roelke, R. Baldwin and **D.A. Bulutoglu** “Analytical Models for the Performance of Von Neumann Multiplexing” *IEEE Transactions on Nanotechnology* 6, 2007.

K.J. Ryan and **D.A. Bulutoglu** “E(s₂)-optimal Supersaturated Designs with Good Minimax Properties” *Journal of Statistical Planning and Inference* 137, 2250-2262, 2007.

D.A. Bulutoglu “Cyclically Generated Supersaturated Designs” *Journal of Statistical Planning and Inference* 137, 2413-2428, 2007.

D.A. Bulutoglu and F. Margot “Classification of Orthogonal Arrays by Integer Programming” *Journal of Statistical Planning and Inference* 138, 654-666, 2008.



Research Interest Areas

- Design of Experiments
- Discrete Optimization
- Combinatorial Optimization



Dr. Matthew Fickus

PhD, Mathematics, University of Maryland

Professor of Mathematics

Most Notable Publications

M. Fickus, J. Jasper, D. G. Mixon, "Packings in real projective spaces," *SIAM J. Appl. Algebra Geom.* 2 (2018) 377-409.

M. Fickus, J. Jasper, D. G. Mixon, J. D. Peterson, C.E. Watson, "Equiangular tight frames with centroidal symmetry," *Appl. Comput. Harmon. Anal.* 44 (2018) 476-496.

M. Fickus, J. Jasper, D. G. Mixon, J. D. Peterson, "Tremain equiangular tight frames," *J. Combin. Theory Ser. A.* 153 (2018) 54-66.

M. Fickus, D. G. Mixon, J. Jasper, "Equiangular tight frames from hyperovals," *IEEE Trans. Inform. Theory.* 62 (2016) 5225-5236.

A. S. Bandeira, **M. Fickus**, D. G. Mixon, J. Moreira, "Derandomizing restricted isometries via the Legendre symbol," *Constr. Approx.* 43 (2016) 409-424.

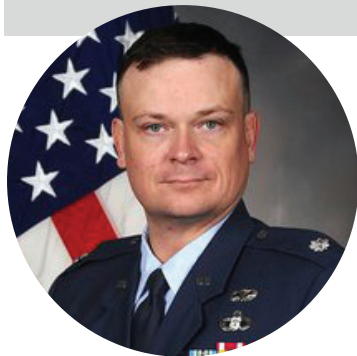
Selected Honors & Awards

- Department of Mathematics & Statistics
Instructor of the Year (2016 & 2017).



Research Interest Areas

- Applied harmonic analysis, including applications of frame theory
- Compressed sensing and wavelets to problems of waveform design for radar and wireless communication
- Coding theory
- Quantum information theory



Lt Col Andrew J. Geyer

PhD, Applied Mathematics (Statistics), Air Force Institute of Technology

Deputy Department Head, Mathematics & Statistics

Assistant Professor of Statistics

Most Notable Publications

A.J. Geyer, D.A. Bulutoglu and S.J. Rosenberg. "The LP Relaxation Orthogonal Array Polytope and its Permutation Symmetries." *Journal of Combinatorial Mathematics and Combinatorial Computing*, Vol. 91, November 2014, pp. 165-176.

B.E. Haac, C. Varela, J. Tomlinson, **A.J. Geyer**, B. Cairns B, A.G. Charles. "The Utility of the Kampala Trauma Score as a Triage Tool in a Sub Saharan African Trauma Cohort." *World Journal of Surgery*. 2015 Feb; 39(2): 356-62.

J.R. Gallaher, B.E. Haac, **A.J. Geyer**, C. Mabedi, B.A. Cairns, A.G. Charles. "Injury Characteristics and Outcomes in Elderly Trauma Patients in Sub-Saharan Africa." *World Journal of Surgery*. 2016, 40: 2650. doi:10.1007/s00268-016-3622-y.

A.J. Geyer, S.N. Hall and J.T. Moore. "Operations-Focused Optimized Theater Weather Sensing Strategies." *Military Operations Research*. Vol. 21, No. 3, 2016, doi 10.5711/1082598321351, pp. 51-71.

B.E. Haac, J.R. Gallaher, C. Mabedi, **A.J. Geyer** and A.G. Charles. "Task-Shifting: The Use of Laypersons for Acquisition of Vital Signs Data for Clinical Decision Making in the Emergency Room Following Traumatic Injury". *World Journal of Surgery*. 18 July 2017. 41: 3066. <https://doi.org/10.1007/s00268-017-4121-5>

Selected Honors & Awards

- Vice Chair, Committee on Probability & Statistics, American Meteorology Society



Research Interest Areas

- Design and Analysis of Experiments
- Integer Programming
- Multivariate Statistics
- Machine Learning



Lt Col Robert B. Hartlage

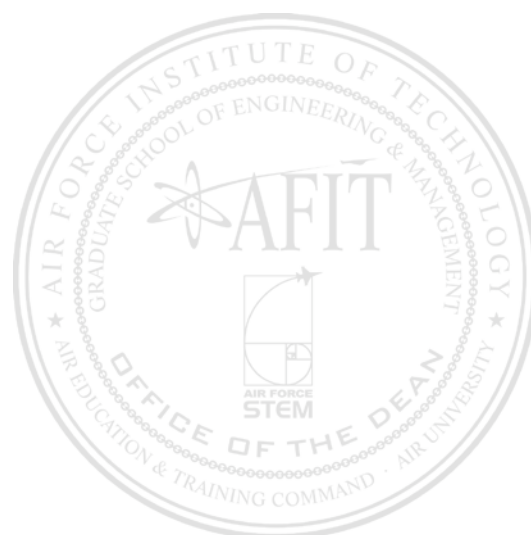
PhD, Operations Research, Air Force Institute of Technology

Assistant Professor of Statistics



Research Interest Areas

- Metaheuristics
- Network Optimization
- Applications in Transportation & Communication





Lt Col Jeremy D. Jordan

PhD, Operations Research, Air Force Institute of Technology

Assistant Professor of Statistics

Most Notable Publications

Dillenburg, S.P., **Jordan, J.D.**, and Cochran, J.K. "Pareto-Optimality for Lethality and Collateral Risk in the Airstrike Multi-Objective Problem". *Journal of the Operational Research Society*. Accepted for publication, to appear.

Jordan, J.D. and Weir, J.D. (2018), "Average Longest Path and Minimum Cost Network Flows with Multiple-Criteria Weights". *Electronic Notes in Discrete Mathematics*. Volume 69, Pages 181-188.

Ko, S.S., Ozer, M., Toroslu, I. H., Davulcu, H., and **Jordan, J.D.** (2018). "Triadic co-clustering of users, issues and sentiments in political tweets". *Expert Systems with Applications*, 100, 79-94. DOI:10.1016/j.eswa.2018.01.043.

Lyons, J.B., **Jordan, J.D.**, Faas, P.D., and Swindler, S.D. (2011). "Organizational development goes digital: Applying simulation to organizational change". *Journal of Change Management*: Vol. 11, Issue 2, pp 207-221.

Jordan, J.D., Melouk, S.H., and Perry, M.B. (2008). "Optimizing Football Game Play Calling". *Journal of Quantitative Analysis in Sports*: Vol. 5: Iss. 2, Article 2.

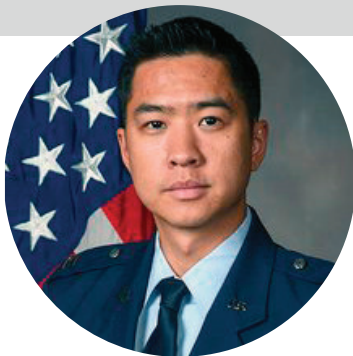
Selected Honors & Awards

- United States Air Force (USAF) Field Grade Officer Analyst of the Year (2015).
- Air Force Material Command (AFMC) Field Grade Officer Analyst of the Year (2015).



Research Interest Areas

- Networks
- Combinatorial optimization
- Applied statistics
- Decision analysis



Capt Tony Liu

PhD, Applied Mathematics, Arizona State University

Assistant Professor of Mathematics

Most Notable Publications

Liu, T., & Pond, K. (2016). "Modeling and estimating continuous Improvised Explosive Device supply chain behavior." *The Journal of Defense Modeling and Simulation*, 13(1), 67-75.

Selected Honors & Awards

- NSF Research Training Group Fellow, Arizona State University 2016-2019



Research Interest Areas

- Numerical Analysis
- Computational Methods
- Approximation Theory
- RBF Methods



Dr. Amy L. Magnus

PhD, Electrical Engineering, Air Force Institute of Technology

Research Assistant Professor of Mathematics

Director, Quantum Autonomy Research Group

Most Notable Publications

B. Ulicny, K. Baclawski, & **A. L. Magnus**, "New metrics for newsblog mining," in *Proceedings of SPIE, Data Mining, Intrusion Detection, Information Assurance and Data Networks Security*, 6570, (Orlando FL), April 2007.

A. L. Magnus & M. E. Oxley, "Information forensics and the art of inquiry," in *Proceedings of SPIE, Intelligent Computing: Theory and Applications IV*, 6229, (Orlando FL), April 2006.

A. L. Magnus & M. E. Oxley, "Techniques for evaluating classifiers in application," in *Proceedings of SPIE, Intelligent Computing: Theory and Applications II*, 5421, (Orlando FL), April 2004.

A. L. Magnus & M. E. Oxley, "Expert classifiers and the ordered veracity experience response (OVER) curve," in *Proceedings of SPIE, Applications and Science of Neural Networks, Fuzzy Systems, & Evolutionary Computation VI*, 5200, (San Diego CA), August 2003.

A. L. Magnus & M. E. Oxley, "Artificial symbols and the essence of intelligent computing," in *Proceedings of SPIE, Intelligent Computing: Theory and Applications*, 5103, (Orlando FL), April 2003.

A. L. Magnus & M. E. Oxley, "Arrogance in classification," in *Proceedings of the 2003 IEEE Aerospace Conference*, 5, pp. 2037–2048, (Big Sky MT), March 2003.



Research Interest Areas

- Distributed intelligence
- Constraint programming learning theory
- Information fusion
- Artificial intelligence
- Machine learning
- Biometrics



Maj Dana F. Morrill

PhD, Applied Mathematics, Air Force Institute of Technology

Assistant Professor

Most Notable Publications

Journal Articles:

Hill, R. R., Ahner, D. K., **Morrill, D. F.**, Talafuse, T. P., & Bestard, J. J. "Applying statistical engineering to the development of a ballistic impact ash model." *Quality Engineering* 29.2 (2017): 181-189.

Conference Proceedings:

Morrill, Dana & Benjamin Akers. "High Energy Laser Propagation: Environmental Effects." Propagation through and Characterization of Atmospheric and Oceanic Phenomena. *Optical Society of America*, 2017.

Refereed Conference Proceedings:

Morrill, Dana & Benjamin Akers. "High Energy Laser Propagation: Environmental Effects." Propagation through and Characterization of Atmospheric and Oceanic Phenomena. *Optical Society of America*, 2018.

Morrill, Dana & Benjamin Akers. "High Energy Laser Propagation: Modeling Scintillation Effects." Propagation through and Characterization of Atmospheric and Oceanic Phenomena. *Optical Society of America*, 2019.



Research Interest Areas

- Numerical solutions to differential equations
- Fluid dynamics
- Numerical linear algebra



Lt Col Beau A. Nunnally

PhD, Applied Mathematics, Air Force Institute of Technology

Assistant Professor of Statistics

Most Notable Publications

Nunnally, Beau A., "Statistical Inference to Evaluate and Compare the Performance of Correlated Multi-State Classification Systems" (2018). *Theses and Dissertations*. 1914. <https://scholar.afit.edu/etd/1914>

Nunnally, Beau A., "Using Multiattribute Utility Copulas in Support of UAV Search and Destroy Operations" (2012). *Theses and Dissertations*. 1228. <https://scholar.afit.edu/etd/1228>



Research Interest Areas

- Response Surface Methodologies
- Applications in Biostatistics
- Design of Experiments
- Linear and Non-Linear Regression
- Statistical Simulation



Dr. Mark E. Oxley

PhD, Mathematics, North Carolina State University

Professor of Mathematics

Most Notable Publications

D.W. Ruck, S.K. Rogers, M. Kabrisky, **M.E. Oxley**, "The multilayer perceptron as an approximation to a Bayes optimal discriminant function", *IEEE transactions on Neural Networks* 1 (4), pp 296-298, 1990. Cited 846 times as of 11 Sept 2018, cited 46 times in 2018; Source: Google Scholar.

C.M. Schubert Kabban, S. N. Thorsen, **M. E. Oxley**, "The ROC manifold for classification systems", *Pattern Recognition* 44 (2), pp 350-362, 2011. Cited 26 times as of 6 Sept 2018; Source: Google Scholar.

A.V. Lair, **M. E. Oxley**, "A Necessary and Sufficient Condition for Global Existence for a degenerate parabolic boundary value problem", *Journal of Mathematical Analysis and Applications* 221 (1), 338-349, 1998. Cited 26 times as of 6 Sept 2018; Source: Google Scholar.

S. N. Thorsen, **M.E. Oxley**, "A Description of Competing Fusion Systems", *Information Fusion* 9 (4), 346-360, 2006. Cited 14 times as of 11 Sept 2018; Source: Google Scholar.

Mark E. Oxley and Bruce W. Suter, "The Zak Transform", *Book chapter in Transforms and Applications Handbook, 3rd Edition*, Alexander Poularikas (editor), Taylor & Francis, 2010. Handbook cited 879 times as of 11 Sept 2018; Source: Google Scholar.

Selected Honors & Awards

- The Gage H. Crocker Outstanding Professor Award, 2003

Significant Accomplishments

- Claudia V. Kropas-Hughes, Steven K. Rogers, Mark E. Oxley, Matthew Kabrisky, Autoassociative-Heteroassociative Neural Network, Patent no. US 6,401,082, 4 Jun 2002.



Research Interest Areas

- Partial differential equations (free and moving boundary value problems, finite-time extinction problems, differential equations in Banach spaces, reaction-diffusion equations)
- Applied analysis (functional analysis, optimization, wavelet analysis, category theory).
- Information fusion (classifier fusion, sensor fusion, evaluation of fusion techniques, receiver operating characteristic curves, manifolds, and analysis).



Dr. Christine Schubert Kabban

PhD, Applied Mathematics, Air Force Institute of Technology

Professor of Statistics

Most Notable Publications

Schubert Kabban, C., Uber, R., Lin, K., Lin, B., Bhuiyan, Md.Y., Giurgiutiu, V. "Uncertainty Evaluation in the Design of Structural Health Monitoring Systems for Damage Detection". *Aerospace Journal* 5(2): 45, 2018. DOI:10.3390/aerospace5020045.

Mohd-Zaid, F., **Schubert Kabban, C.M.**, Deckro, R.F. "A Test on the L-moments of the Degree Distribution of a Barabási-Albert Network for Detecting Nodal and Edge Degradation". *Journal of Complex Networks* 6(1): 24-53, Feb 2018. DOI:10.1093/comnet/cnx020.

Grap, M.J., Munro, C.L., **Schubert, C.M.**, Wetzel, P.A., Burk, R.S., Pepperl, A., Lucas, V. "Lack of Association of High Backrest With Sacral Tissue Changes in Adults Receiving Mechanically Ventilation". *American Journal of Critical Care* 27(2): 104-113, Mar 2018. DOI:10.4037/ajcc2018419.

Hefron, R., Borghetti, B.J., Christensen, J.C., **Schubert Kabban, C.M.** "Deep long short-term memory structures model temporal dependencies improving cognitive workload estimation". *Pattern Recognition Letters (IEEE)*, 94(15): 96-104, July 2017. DOI:10.1016/j.patrec.2017.05.020.

Brandt, Y., Currier, L., Plante, T.W., **Schubert Kabban, C.M.**, Tvaryanas, A.P. "A Randomized Controlled Trial of Core Strengthening Exercises in Helicopter Crewmembers with Low Back Pain". *Aerospace Medicine and Human Performance* 86(10): 889-894, 2015.

Selected Honors & Awards

- 2018 Southwestern Ohio Council for Higher Education (SOCHE) Faculty Excellence Award



Research Interest Areas

- ROC curves
- Performance of Classification and Detection Methods
- Biostatistics
- Nonparametrics
- Regression Modeling
- Statistical Simulation
- Information Fusion and Big Data
- Epidemiology
- Structural Health Monitoring
- Feature Extraction
- Design of Experiments
- Categorical Data Analysis



Capt Jonathan S. Turner

PhD, Applied Mathematics (Statistics), Air Force Institute of Technology

Assistant Professor

Selected Honors & Awards

- Air Force Commendation Medal
- Air Force Achievement Medal
- Global War on Terrorism Medal



Research Interest Areas

- Combinatorics
- Design of Experiments
- Difference Sets
- Multiplier Theory
- Optimization (Deterministic and Heuristic)
- Response Surface
- Simulation (Agent Based)



Dr. Edward White

PhD, Statistics, Texas A&M University

Professor of Statistics

Most Notable Publications

“Unmasking Cost Growth Behavior: A Longitudinal Study”, *Defense Acquisition Research Journal* 25(1), 30-51, Cory D’Amico, **Edward White**, Jonathan Ritschel, and Scott Kozlak, 2018.

“Comparison of Body Composition Metrics for United States Air Force Airmen”, *Military Medicine* 183(3-4), e201–e207, J.R. Griffith, **Edward D. White**, R. David Fass, and Brandon M. Lucas, 2018. <https://doi.org/10.1093/milmed/usx053>

“Wavelet ANOVA Bisection Method for Identifying Simulation Model Bias”, *Simulation Modelling Practice and Theory* 80, 66-74, Andrew Atkinson, Raymond Hill, Joseph Pignatiello Jr., G. Geoffrey Vining, **Edward White**, Eric Chicken, 2018.

“Model Validation of Functional Responses Across Experimental Regions Using Functional Regression Extensions to the CORA Objective Rating System”, *Journal of Verification, Validation and Uncertainty Quantification* 2(4), 041004-041004-9, Scott M. Storm, Raymond R. Hill, Joseph J. Pignatiello, G. Geoffrey Vining and **Edward D. White**, 2017. doi:10.1115/1.4039303

“Forecasting U.S. Army Enlistment Contract Production in Complex Geographical Marketing Areas”, *Journal of Defense Analytics and Logistics* 1(1), 69-87, Joshua L. McDonald, **Edward D. White**, Raymond R. Hill, and Christian Pardo, 2017. <https://doi.org/10.1108/JDAL-03-2017-0001>

Selected Honors & Awards

- Dr. Leslie M. Norton Teaching Excellence Award (2016, 2017).
-
- Southwestern Ohio Council for Higher Education (SOCHE) Faculty Excellence Award winner (2016).



Research Interest Areas

- Design of Experiments
- Biostatistics
- Growth Curves
- Linear and Nonlinear Regression
- Categorical Data Analysis
- Log-Linear Models
- Statistical Simulation
- Response Surface Modeling



Dr. Aihua Wood

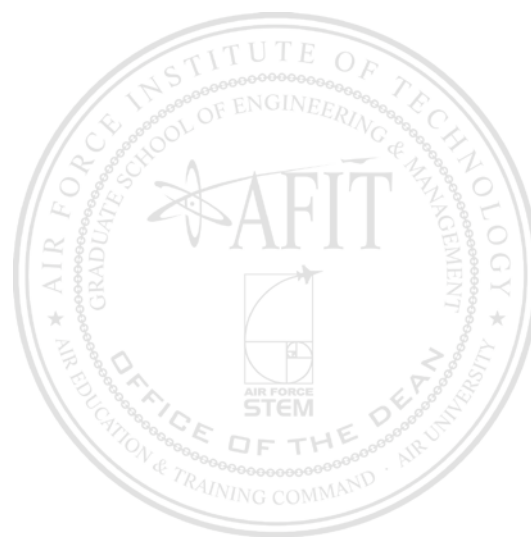
PhD, Mathematics, University of Connecticut

Professor of Mathematics



Research Interest Areas

- Partial differential equations
- Electromagnetic wave propagation
- Rarefied gas dynamics





Dr. Joseph J. Pignatiello

PhD, Industrial and Systems Engineering, Ohio State University

Department Head, Operational Sciences

Professor of Operations Research

Most Notable Publications

Atkinson, Andrew D., Hill, Raymond R., **Pignatiello, Joseph J., Jr.**, White, Edward D., Chicken, Eric, and Vining, Geoffrey, G., "Wavelet ANOVA Bisection Method for Identifying Simulation Model Bias," *Simulation Modeling Practice and Theory*, Vol. 80, pp. 66-74, 2018.

Atkinson, Andrew D., Hill, Raymond R., **Pignatiello, Joseph J., Jr.**, Vining, G. Geoffrey, White, Edward, D., "Dynamic Model Validation Metric Based on Wavelet Thresholded Signals", *Journal of Verification, Validation and Uncertainty Quantification*, Vol. 2, No. 2, pp. 021002-1-021002-10, 2017.

Storm Scott, Hill, Raymond R., **Pignatiello, Joseph J., Jr.**, White Edward, D., and Vining, Geoffrey G., "F-Statistic for Model Validation over Experimental Regions Using Least Squares Response Surfaces," *International Journal of Experimental Design and Process Optimisation*, Vol. 5, No. 3, pp. 133-150, 2017.

Atkinson, Andrew D., Hill, Raymond R., **Pignatiello, Joseph J., Jr.**, White, Edward D., Chicken, Eric, and Vining, Geoffrey, G., "Wavelet ANOVA Approach to Model Validation," *Simulation Modeling Practice and Theory*, Vol. 78, pp. 18-27, 2017.

Storm, Scott M., Hill, Raymond R., **Pignatiello, Joseph J., Jr.**, White, Edward, A. and Vining, Geoffrey, G., "Model Validation of Functional Responses Across Experimental Regions Using Functional Regression Extensions to the CORA Objective Rating System," *Journal of Verification, Validation and Uncertainty Quantification*, Vol. 2, No. 4, pp. 041004-1:9, 2017.

Selected Honors & Awards

- 2013 Fellow, Institute of Industrial and Systems Engineers: In recognition for professional leadership and outstanding contributions to industrial engineering.
- 2006 Fellow, American Society for Quality: For outstanding leadership in the field of quality engineering as an educator; for innovative and significant research contributions in statistical process control and experiment design; and for distinguished editorial service to the quality profession.



Research Interest Areas

- Statistical Process Monitoring
- Change-Point Models
- Design and Analysis of Experiments
- Reliability
- Statistical Data Analysis
- Robust Design
- Six Sigma Methods



Dr. Darryl K. Ahner, P.E.

PhD, Systems Engineering (Operations Research), Boston University

Director, Scientific Test and Analysis Techniques Center of Excellence

Professor of Operations Research

Most Notable Publications

Ahner, D.K., and *Parson, C., "Optimal Multi-stage Allocation of Weapons to Targets using Adaptive Dynamic Programming," *Optimization Letters*, 9(8), 2015. DOI: <https://doi.org/10.1016/j.ejor.2016.04.017>.

Ahner, D. and McCarthy, A. "Response Surface Modeling of Precision Guided Fragmentation Munitions," *Journal of Defense Modeling and Simulation*, <https://journals.sagepub.com/doi/pdf/10.1177/1548512918811138>, 2018.

Keith, A., **Ahner, D.**, and Hill, R., "An order-based method for robust queue inference with stochastic arrival and departure times," *Computers and Industrial Engineering*, 128, 711-726, 2019.

Kline, A., **Ahner, D.**, and Lunday, B., "Real time Heuristic Algorithms for the Static Weapon Target Assignment Problem," *Journal of Heuristics*, 25(3), 377-397, 2019.

Kline, A., **Ahner, D.**, and Hill, R., "The Weapon Target Assignment Problem," *Computers and Operations Research*, 105, 226-236, 2019.

Selected Honors & Awards

- Affiliate Society Council of Dayton Outstanding Engineers & Scientists. 2017
- E. Grosvenor Plowman Award for Best Paper at Council of Supply Chain Management Professionals Global Conference. 2014
- 2012 Colonel Charles A. Stone Award (AFIT mission impact). 2012
- Legion of Merit for Analysis. 2008

Significant Accomplishments

- Program and Curriculum Chair, Data Analytics. 2019 - present
- Vice President, Secretary of the Society, Military Operations Research Society. 2016-2017
- Vice President for Professional Development, Military Operations Research Society. 2015-2016



Research Interest Areas

Probabilistic Operations Research Applications to include: Optimization of Stochastic Models, Simulation Modeling, Dynamic Programming – sequential decision making under uncertainty, Test & Evaluation, Software Testing, Information Theory, and Military Operations Research Applications



Lt Col Jason R. Anderson

PhD, Business Administration, Saint Louis University

Assistant Professor of Logistics and Supply Chain Management

Most Notable Publications

Anderson, J. R., Ogden, J. D., Cunningham, W. A., & Schubert-Kabban, C. (2017). "An exploratory study of hours of service and its safety impact on motorists." *Transport Policy*, 53, 161-174.

Anderson, Jason, William Cunningham, and Seong-Jong Joo. "Examining the Economic Impacts of the Increased Fuel Efficiency Standards on State Gas-Tax Revenues." *Journal of Accounting & Finance* (2158-3625) 18.6 (2018).

Yacan Wang, **Jason Anderson**, Seong-Jong Joo and Joseph R. Huscroft. "The Leniency of Return Policy and Consumers' Repurchase Intention in online retailing." *Industrial Management & Data Systems* 635502 Oct (2019).

Selected Honors & Awards

- AFIT Centennial Mentor of the Year, 2019
- MOAA (MILITARY OFFICERS ASSOCIATION OF AMERICA) Operational Sciences Faculty Winner, 2019
- AFIT ENS SOCHE Award Winner, 2018
- AFIT ENS Professor of the Year, 2018
- ASAM Professor of the Year, 2017
- The Air Force Historical Foundation Bryce Poe II Award: Anderson, Jason R. (2013), "Drawing the Red Line: The Cost Benefit Analysis on Larger Life Rafts"



Research Interest Areas

- Transportation
- Logistics Management
- Inventory
- Sourcing
- Operations Management
- Supply chain resilience
- Simulation



Maj Timothy W. Breitbach

PhD, Engineering Systems, Massachusetts Institute of Technology

Assistant Professor of Logistics and Supply Chain Management

Most Notable Publications

Breitbach, T., Johnson, A., Weir, J., & Brown, G. (2014). "Afghanistan Air Cargo Routing: A Systems Approach." *IEE Annual Conference*. Proceedings, Norcross, 53-61.

Selected Honors & Awards

- The Major General Hugh J Knerr Exceptional Author Award, Field Grade Officer Category, The Exceptional Release
- Professor of the Year, Advanced School of Air Mobility (ASAM) 2017-18 (Selected by students)



Research Interest Areas

- Supply chain finance
- Humanitarian logistics and the role of supply chains in international development
- Supply chain resilience
- Supply chain applications of blockchain technology



Dr. Frank W. Ciarallo

PhD, Industrial Administration, Carnegie Mellon University

Associate Professor of Logistics & Supply Chain Management

Most Notable Publications

B. Fouts, J. Serres, R. Hill, **F.W. Ciarallo**, (2018) "Application Development for Optimizing Patient Placement on Aeromedical Evacuation Flights: Proof-of-Concept", *Air Force Research Lab, 711th Human Performance Wing, Technical Report*, Report Number AFRL-SA-WP-SR-2018-001, <https://apps.dtic.mil/docs/citations/AD1045050>

F.W. Ciarallo, K.K. Ward, R.R. Hill, (2017) "Modeling Airline Boarding for Improved Efficiency and Passenger Experience", *Proceedings of the 2017 Industrial and Systems Engineering Conference*, Pittsburgh, PA, 1900-1905, <https://search.proquest.com/docview/1951119310>

A. Lowas, **F.W. Ciarallo**, (2016) "Reliability and operations: Keys to lumpy aircraft spare parts demands", *Journal of Air Transport Management*, 50(1), 30-40, <https://doi.org/10.1016/j.jairtraman.2015.09.004>

F.W. Ciarallo, S. Niranjana, N. Brown, (2016) "A Salt Inventory Management Strategy for Winter Maintenance", *Operations and Supply Chain Management: An International Journal*, 9(1), 31-49, <http://doi.org/10.31387/oscm0230159>

M.J. Bova, **F.W. Ciarallo**, R.R. Hill, (2016) "Development of an Agent-Based Model for the Secondary Threat Resulting from a Ballistic Impact Event", *Journal of Simulation*, 10(1), 24-35, [doi:10.1057/jos.2015.1](https://doi.org/10.1057/jos.2015.1)

Selected Honors & Awards

- 2013 Faculty Award for Excellence in Service, College of Engineering & Computer Science, Wright State University
- 2012 Moving Spirit Award, Institute for Operations Research and the Management Sciences (INFORMS)

Significant Accomplishments

- Co-Editor, Journal of Defense Analytics & Logistics, 2019



Research Interest Areas

Strategies for Centralization of Stock in Pharmaceutical Distribution Networks, Study of Aircraft Component Failures Leading to Lumpy Spare Part Demands, Two-Echelon Inventory Systems with Transshipment and Quantity Discounts, Warehouse Picking Operations including Picker Congestion, Evaluating Airline Boarding Strategies for Passenger Aircraft, Evaluating Block Chain Capabilities to Fulfill Information Needs of the Healthcare System, Modeling Situation Awareness of Agents Navigating on a Network with Imperfect Information, Helper Objectives in Multiobjectivization for Job Shop Scheduling.



Dr. Lance E. Champagne

PhD, Operations Research, Air Force Institute of Technology

Assistant Professor of Operations Research

Most Notable Publications

Champagne, L. E. and R. R. Hill, October 2009. "A Simulation Validation Method Based on Bootstrapping Applied to an Agent-Based Model of the Bay of Biscay Historical Scenario". *Journal of Defense Modeling and Simulation: Applications, Methodology, Technology* Vol. 6, No. 4, 201-212.

Hill, R. R., R. G. Carl, **L. E. Champagne**. 2006. "Using Agent Simulation Methods to Examine and Investigate Search Theory Against a Historical Case Study". *Journal of Simulation*, Vol. 1, No. 1, 29-38.

Hill, R. R., **L. E. Champagne**, and J. C. Price. 2004. "Using Agent-Based Simulation and Game Theory to Examine the WWII Bay of Biscay U-Boat Campaign". *Journal of Defense Modeling and Simulation*, Vol. 1, No. 2, pp. 99-109.



Research Interest Areas

- Agent-based and discrete event simulation
- Applied and multivariate statistics



Lt Col Bruce A. Cox

PhD, Industrial Engineering, Georgia Institute of Technology

Assistant Professor of Operations Research

Most Notable Publications

Cox, B., Juditsky, A., and Nemirovski, A. "Dual subgradient algorithms for large-scale nonsmooth learning problems" *Mathematical Programming Series B*, 148:1-2 (2014) <https://doi.org/10.1007/s10107-013-0725-1>

Cox, B., Juditsky, A., and Nemirovski, A. "Decomposition Techniques for Bilinear Saddle Point Problems and Variational Inequalities with Affine Monotone Operators" *Journal of Optimization Theory and Applications* - February 2017, Volume 172, Issue 2, pp 402–435 <https://doi.org/10.1007/s10957-016-0949-3>

Selected Honors & Awards

- Bronze Star



Research Interest Areas

- Large Scale Optimization
- Heuristic Search
- Neural Networks
- Resilient and Robust Supply Chain Network Design
- Optimal Location



Dr. William A. Cunningham III

PhD, Economics, University of Arkansas

Professor of Logistics and Supply Chain Management

Most Notable Publications

Cunningham, W. A. "Examining the Economic Impacts of the Increased Fuel Efficiency Standards on State Gas-Tax Revenues", (with Jason Anderson, and Seong Joo), accepted in *Journal of Accounting and Finance*, to be published in volume 18(6), 2018.

Cunningham, W. A. "An exploratory study of hours of service and its safety impact on motorists", (with Anderson, J. R*, Ogden, J. D., & Schubert-Kabban, C.) *Transport Policy*, 2017, 53, 161-174.

Cunningham, W. A. "Managing hub and Spoke Networks: A Military Case Comparing Time and Cost", (with Joseph Skipper, Christopher Boone, and Raymond Hill), *Journal of Global Business and Technology*, Vol 12 No. 1, Spring 2016, pp. 33-47.



Research Interest Areas

- Strategic Mobility
- Cost/Benefit Analysis
- Econometric Modelling
- Costing
- Privatization and A-76 Studies
- Modal Choice Network Analysis
- Location Analysis
- Supply Chain Management
- RFID



Dr. Richard F. Deckro

Doctorate of Business Administration, Decision Science, Kent State University

Distinguished Professor of Operations Research

Joint Warfare Analysis Center Chair of Applied Operations Research

Director, Future Operations Investigation Laboratory (FOIL)

Most Notable Publications

William N. Caballero, Brian J. Lunday & **Richard F. Deckro** "Leveraging Behavioral Game Theory to Inform Military Operations Planning", forthcoming in *Military Operations Research*.

Jared K. Nystrom, Matthew J. Robbins, **Richard F. Deckro**, & James F. Morris, "Simulating Attacker and Defender Strategies within a Dynamic Game on Network Topology", *Journal of Simulation*, Vol. 12, No 4, 2018, pages 307 – 331.

J. Todd Hamill, **Richard F. Deckro**, Robert F. Mills, & James W. Chrissis, "Reach-Based Assessment of Position", *Military Operations Research*, Vol. 13, No 4, (2008), pp. 59-78. (2008 INFORMS MAS Koopman Award).

J. Todd Hamill, **Richard F. Deckro** & John M. Kloeber, Jr "Evaluating information Assurance Strategies", *Decision Support Systems*, Vol. 39 No.3, Pages 463-484.

Victor D. Wiley, **Richard F. Deckro**, & Jack A. Jackson, "Optimization Analysis for Design and Planning of Multi-Project Programs", *European Journal of Operational Research*, Vol 107 No.2, 1998, Pages 492-506.

Selected Honors & Awards

- 2017 J. Steinhardt Prize Military Applications Society, INFORMS
- Named 1st Editor Emeritus, Military Operations Research
- 2016 Fellow, Military Operations Research Society
- Air Force Analyst Lifetime Achievement Award, 2009
- Clayton J. Thomas Award, Military Operations Research Society, 2009

Significant Accomplishments

- US Panel Member - Systems Analysis and Studies Panel, NATO Science and Technology Organization, (Dec. 2016- present)
- Member, 2019 NATO OR&A Conference Programme Committee



Research Interest Areas

- Information operations
- Irregular warfare
- Counterterrorism
- Social network modeling and analysis
- Applied mathematical programming and optimization

- Project and program management
- Campaign modeling
- Scheduling
- Network models
- Multi-criteria decision making
- Decision analysis



Lt Col John M. Dickens

PhD, Logistics Systems, University of North Texas

Assistant Professor of Logistics and Supply Chain Management

Most Notable Publications

- Glassburner et al., Theory of Paradox Within Service-Dominant Logic, Service Science, June 2018.
- **J. Dickens**, The Exceptional Release, 24-29, Spring 2013.

Selected Honors & Awards

- ENS 2018 Professor of the Year



Research Interest Areas

- Supply chain resilience
- Logistics service quality
- Value creation
- Value co-production and supply chain analytics



Dr. Mark A. Gallagher

PhD, Operations Research, Air Force Institute of Technology

Professor of Practice in Operations Research

Most Notable Publications

Gallagher, Mark A., Kenneth W. Bauer Jr, and Peter S. Maybeck. "Initial data truncation for univariate output of discrete-event simulations using the Kalman filter." *Management Science* 42, no. 4 (1996): 559-575. <https://doi.org/10.1287/mnsc.42.4.559>

Gallagher, Mark A., and David A. Lee. "Final-Cost Estimates for Research & Development Programs Conditioned on Realized Costs." *Military Operations Research* 2, no. 2 (1996): 51-65.

Gallagher, Mark A., and Elizabeth J. Kelly. "A new methodology for military force structure analysis." *Operations research* 39, no. 6 (1991): 877-885. <https://doi.org/10.1287/opre.39.6.877>

Gallagher, Mark A., and Albert H. Moore. "Robust minimum-distance estimation using the 3-parameter Weibull distribution." *Reliability, IEEE Transactions on* 39, no. 5 (1990): 575-580. DOI: 10.1109/24.61314

Lee, David A., Michael R. Hogue, and Mark A. Gallagher. "Determining a budget profile from a R&D cost estimate." *The Journal of Cost Analysis* 14, no. 2 (1997): 29-41. <https://doi.org/10.1080/08823871.1997.10462311>

Selected Honors & Awards

- Meritorious Senior Career Professional – Presidential Rank Award (2018)
- Fellow of Society, Military Operations Research Society, 2014
- Clayton J. Thomas Award, Military Operations Research Society, 2013
- Rist Prize, Military Operations Research Society, 2002 & 2003
- Barchi Prize, Military Operations Research Society, 1990 & 1995

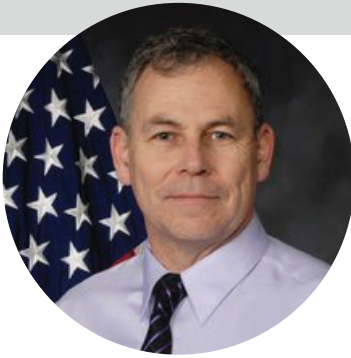
Significant Accomplishments

- Chair of the Board, Snyder-Robinson Foundation, 2019-present
- Council Member, Military and Security Society, 2019-present
- INFORMS Prize Committee Chair, Institute for Operations Research and Management Sciences (INFORMS), 2019-2020
- Vice President for Society Services, Military Operations Research Society, 2009-2010



Research Interest Areas

- Military force structure analysis
- Model resolution
- Bayesian analysis



Dr. Raymond R. Hill Jr.

PhD, Industrial and Systems Engineering, Ohio State University

Professor of Operations Research

Most Notable Publications

Hill, R. R. and Pohl, E. A. May 2018. "A Structural Taxonomy for Metaheuristic Optimization Search Methods". Accepted for publication in *International Journal of Metaheuristics*, IJMHEUR-171712.

Lessin, A, B. J. Lunday, and **R. R. Hill**. October 2018. "A Bilevel Exposure-oriented Sensor Location Problem for Border Security". *Computers and Operations Research*, Vol. 98, No. 1, pp: 56-68.

Hill, R. R., Ahner, D. K., Dillard, D. and D. C. Montgomery. April 2018. "Examining Potential Reductions in Wind Tunnel Testing Requirements". Accepted for publication by *Quality and Reliability Engineering International*, QRE-17-0545.

Storm, S. M., **Hill, R. R.**, Pignatiello, J. J., White, E. A. and Vining, G. G. December 2017. "Model Validation of Functional Responses Across Experimental Regions Using Functional Regression Extensions to the CORA Objective Rating System". *Journal of Verification, Validation and Uncertainty Quantification*, Vol. 2, Issue 4, pp: 041004-1:9.

Schofield, J. A., Zens, C. L., **Hill, R. R.**, and Robbins, M. J. March 2018. "Utilizing Reliability Modeling to Analyze United States Air Force Officer Retention". *Computers & Industrial Engineering*, Vol. 117, pp. 171-180.

Selected Honors & Awards

- Air Force Outstanding Science and Engineering Educator Award (2016)
- Affiliates Societies Council Outstanding Engineer and Scientist's Award (2016)
- AETC Nominee for Air Force Senior Analyst of the Year (2016)



Research Interest Areas

- Applied Statistics
- Mathematical Optimization
- Heuristic Search Methods
- Applied Simulation Modeling/Analysis
- Agent Based Modeling
- Validation



Maj Timothy W. Holzmann

PhD, Industrial Engineering, Clemson University

Assistant Professor of Operations Research

Most Notable Publications

Holzmann, T. and Smith, J.C. "Modeling the Shortest Path Interdiction Problem with Randomized Strategies." *Proceedings of the 2019 IIE Annual Conference*, May 2019, Orlando, FL.

Holzmann, T. and Smith, J.C. "The Shortest Path Interdiction Problem with Arc Improvement Recourse: A Multi-objective Approach." *Naval Research Letters*, 66(3): 230-252, 2019.

Holzmann, T. and Smith, J.C. "Solving discrete multi-objective optimization problems using modified augmented weighted Tchebychev scalarizations." *European Journal of Operations Research*, 271(2): 436-449, 2018.

Holzmann, T. and Cochran, J. "A Stochastic Model to Estimate Joint Fire Fratricide." *Military Operations Research Journal*, 17(2), 2012.

Significant Accomplishments

- Distinguished Graduate, (AFIT) 2009
- Dean's Award (AFIT) 2009



Research Interest Areas

- Network optimization
- Game theory
- Algorithm design
- Optimization under uncertainty



Capt Phillip R. Jenkins

PhD, Operations Research, Air Force Institute of Technology

Assistant Professor of Operations Research

Most Notable Publications

Jenkins, P.R., Robbins, M.J., and Lunday, B.J., "Approximate Dynamic Programming for Military Medical Evacuation Dispatching Policies," *INFORMS Journal on Computing* (In press).

Jenkins, P.R., Lunday, B.J., and Robbins, M.J. "Robust, Multi-Objective Optimization for the Military Medical Evacuation Location-Allocation Problem," *Omega* (In Press). DOI: <https://doi.org/10.1016/j.omega.2019.07.004>.

Robbins, M.J., **Jenkins, P.R.**, Bastian, N.D., and Lunday, B.J., "Approximate Dynamic Programming for the Aeromedical Dispatching Problem: Value Function Approximation Utilizing Multiple Level Aggregation," *Omega* (In press). DOI: <https://doi.org/10.1016/j.omega.2018.12.009>.

Jenkins, P.R., Robbins, M.J., and Lunday, B.J., 2018. "Examining Military Medical Evacuation Dispatching Policies Utilizing a Markov Decision Process Model of a Controlled Queueing System," *Annals of Operations Research*, 271 (2), 641-678. DOI: <https://doi.org/10.1007/s10479-018-2760-z>.

Selected Honors & Awards

- General Omar N. Bradley Research Fellowship in Mathematics, United States Military Academy, 2019
- Seth Bonder Scholarship for Applied Operations Research in Military Applications, Military and Security Society, 2018
- Richard H. Barchi Prize, Military Operations Research Society, 2018

Significant Accomplishments

- Distinguished Graduate, Squadron Officer School 2019
- Distinguished Graduate, M.S. in Operations Research Program (AFIT) 2017



Research Interest Areas

- Dynamic programming
- Approximate dynamic programming
- Markov decision processes
- Stochastic programming
- Applied statistics
- Multi-objective optimization



Dr. Seong-Jong Joo

PhD, Business Administration, Saint Louis University

Professor of Logistics & Supply Chain Management

Most Notable Publications

Joo, S., Min, H., & Smith, C. (2017). "Benchmarking freight rates and procuring cost-attractive transportation services", *The International Journal of Logistics Management*, Vol. 28, No. 1, Pgs. 194-205. DOI: <https://doi.org/10.1108/IJLM-01-2015-0030>

Min, H. & **Joo, S.** (2016). "A comparative performance analysis of airline strategic alliances using data envelopment analysis", *Journal of Air Transport Management*, Vol. 52, pgs. 99-110. DOI: <https://doi.org/10.1016/j.jairtraman.2015.12.003>

San Nicolas-Rocca, T., Schooley, B., & **Joo, S.** (2014). "Design and development of a patient-centered e-health system to improve patient understanding at discharge", *Communications of the Association for Information Systems*, Vol. 34. DOI: <https://doi.org/10.17705/1CAIS.03424>

Joo, S. (2009). "Scheduling preventive maintenance for modular designed components: A dynamic approach", *European Journal of Operational Research*, Vol. 192, No. 2, Pgs. 512-520. DOI: <https://doi.org/10.1016/j.ejor.2007.09.033>

Selected Honors & Awards

- School of Business Outstanding Professor Award, April 21, 2014
- Enterprise Rent-A-Car Student's Choice Award for Outstanding Faculty Member, May 4, 2012
- School of Business Outstanding Professor Award, April 18, 2012



Research Interest Areas

- Supply chain strategies
- Sourcing
- Inventory management
- Transportation
- Survival/event history analysis
- Performance measurement



Lt Col Phillip M. LaCasse

PhD, Industrial & Manufacturing Engineering, University of Wisconsin, Milwaukee

Assistant Professor of Operations Research

Most Notable Publications

P. LaCasse, W. Otieno, and F. Maturana, "A Survey of Feature Set Reduction Approaches for Predictive Analytics Models in the Connected Manufacturing Enterprise," *Appl. Sci.*, vol. 9, no. 5, p. 843, 2019.

P. M. LaCasse, W. Otieno, and F. P. Maturana, "A hierarchical, fuzzy inference approach to data filtration and feature prioritization in the connected manufacturing enterprise," *J. Big Data*, vol. 5, no. 1, p. 45, Dec. 2018.

LaCasse, P., Otieno, W., Vance, G., Maturana, F., and Cvijetinovic, M., "A Defect Prediction Case Study for Printed Circuit Board Assemblies Containing Ball Grid Array Package Types," *Surface Mount Technology Association (SMTA) International 2019*, Rosemont, IL, 22-26 Sept. 2019.

LaCasse, P., Otieno, W., Maturana, F., "Operationalization of Defect Prediction Case Study in a Holonic Manufacturing System," *9th International Conference on industrial Applications of Holonic and Multi-Agent Systems (HoloMAS)*, 2019, Linz, Austria, Aug. 2019.



Research Interest Areas

- Operations research
- Applied statistics
- Smart manufacturing
- Machine learning
- Big data



Dr. Brian J. Lunday

PhD, Industrial & Systems Engineering, Virginia Polytechnic Institute and State University

Associate Professor of Operations Research

Most Notable Publications

Hanks, R. W., **Lunday, B. J.**, & Weir, J. D. (2020) Robust Goal Programming for the Multi-objective Optimization of Data-Driven Problems: A Use Case for the United States Transportation Command's Liner Rate Setting Problem. *Omega*, 90, 101983. Available online at: <https://doi.org/10.1016/j.omega.2018.10.013>.

Caballero, W. N. & **Lunday, B. J.** (2019) Influence Modeling: Mathematical Programming Representations of Persuasion under Either Risk or Uncertainty. *European Journal of Operational Research*, 278 (1), 266-282. Available online at: <https://doi.org/10.1016/j.ejor.2019.04.006>.

Lunday, B. J. & Robbins, M. J. (2019) Collaboratively-developed Vaccine Pricing and Stable Profit Sharing Mechanisms. *Omega*, 84, 102-113. Available online at: <https://doi.org/10.1016/j.omega.2018.04.007>.

Lessin, A. M., **Lunday, B. J.**, & Hill, R. R. (2018) A Bilevel Exposure-oriented Sensor Location Problem for Border Security. *Computers and Operations Research*, 98, 56-68. Available online at: <https://doi.org/10.1016/j.cor.2018.05.017>.

Boardman, N. T., **Lunday, B. J.**, & Robbins, M. J. (2017) Heterogeneous Surface-to-Air Missile Defense Battery Location: A Game Theoretic Approach. *Journal of Heuristics*, 23(6), 417-447. Available online at: <https://doi.org/10.1007/s10732-017-9350-0>.

Selected Honors & Awards

- Professor Ezra Kotcher Award, Wright Memorial Chapter, Air Force Association, 2019
- Lessons Learned Senior Civilian Professional of the Year, United States Air Force, 2018
- Richard H. Barchi Prize, Military Operations Research Society, 2017
- Faculty Excellence Award, Southern Ohio Consortium of Higher Education (SOCHE), 2017
- Outstanding Young Member OR/MS Award, INFORMS Cincinnati-Dayton Chapter, 2016

Significant Accomplishments

- Vice President and President-elect, Military & Security (MAS) Society, Institute for Operations Research and Management Sciences (INFORMS), 2019-2020
- Chair, INFORMS Ad Hoc Committee on Effective Subdivision Practices, Institute for Operations Research and Management Sciences (INFORMS), 2019



Research Interest Areas

- Theoretical developments in math programming
- Game theoretic models
- Algorithmic design for global optimization
- Applications to the areas of network design, network optimization, network interdiction, network restoration, facility/resource location, and resource location/allocation & assignment



Dr. John O. Miller

PhD, Industrial Engineering, Ohio State University

Associate Professor of Operations Research

Most Notable Publications

Weimer, C. W., **Miller, J. O.**, Hill, R. R., Hodson, D. D. "On the Order of Agent Operations for Opinion Dynamic Models." *Journal of Artificial Societies and Social Simulation*, Vol 22 No. 4, October 2019. DOI: 10.18564/jass.4065

Kelleher, C. K., Hill, R. R., Bauer, K. W., **Miller, J. O.** "Using Dynamic Bayesian Networks as Simulation Metamodels Based on Bootstrapping." *Computers & Industrial Engineering*, Vol 115, pp. 595-602, January 2018.

Connors, C.D., **Miller, J.O.**, Lunday, B. "Using Agent-Based Modeling and a Designed Experiment to Simulate and Analyze a New Air-to-Air Missile," *The Journal of Defense Modeling and Simulation: Applications, Methodology, Technology*, Vol 13 No. 3, pp. 321-330, July 2016.

Weimer, C.W., **Miller, J.O.**, Hill, R.R. "Agent-Based Modeling: An Introduction and Primer," *Proceedings of the 2016 Winter Simulation Conference*, Washington D.C. 11-14 Dec 2016, ed. T.M.K. Roeder, P.I. Frazier, R. Szechtman, E. Zhou, T. Huschka, and S.E. Chick, pp. 65-79.

Rodriguez, J., **Miller, J.O.**, Bauer, K.W. Jr., and Yee, F. "Mathematical Description of a Discrete Event Simulation Using Factor Analytic Method," *Journal of the Operational Research Society*, Vol 63 No. 9, pp. 1179-1188, Sep 2012.



Research Interest Areas

- Computer Simulation
- Ranking and Selection
- Agent Based Modeling
- Opinion Dynamics
- Combat Modeling



Dr. Matthew JD Robbins

PhD, Industrial Engineering, University of Illinois

Associate Professor of Operations Research

Most Notable Publications

Rettke, A.J., **Robbins, M.J.**, and Lunday, B.J., 2016. "Approximate Dynamic Programming for the Dispatch of Military Medical Evacuation Assets," *European Journal of Operational Research*, 254 (3), 824-839. DOI: <https://doi.org/10.1016/j.ejor.2016.04.017>.

Robbins, M.J., Jenkins, P.R., Bastian, N.D., and Lunday, B.J., 2018. "Approximate Dynamic Programming for the Aeromedical Dispatching Problem: Value Function Approximation Utilizing Multiple Level Aggregation," *Omega* (forthcoming, accepted 19 Dec 18). (MORS 2018 Barchi Prize Winning Paper.) DOI: <https://doi.org/10.1016/j.omega.2018.12.009>.

Widrick, R.S., Nurre, S.G., and **Robbins, M.J.**, 2018. "Optimal Policies for the Management of an Electric Vehicle Battery Swap Station," *Transportation Science*, 52 (1), 59-79. DOI: <https://doi.org/10.1287/trsc.2016.0676>.

Nystrom, J.K., **Robbins, M.J.**, Deckro, R.F., and Morris, J.F., 2018. "Simulating Attacker and Defender Strategies within a Dynamic Game on Network Topology," *Journal of Simulation*, 12 (4), 307-331. DOI: <https://doi.org/10.1057/s41273-017-0054-0>.

Davis, M.T., **Robbins, M.J.**, and Lunday, B.J., 2017. "Approximate Dynamic Programming for Missile Defense Interceptor Fire Control," *European Journal of Operational Research*, 259 (3), 873-886. DOI: <https://doi.org/10.1016/j.ejor.2016.11.023>.

Selected Honors & Awards

- Richard H. Barchi Prize (Military Operations Research Society) 2018
- Outstanding Young Member Award (INFORMS, Cincinnati-Dayton Chapter) 2014
- Pritsker Doctoral Dissertation Award – First Place (Institute of Industrial Engineers) 2011

Significant Accomplishments

- Associate Editor, Military Operations Research (2019-present)
- Associate Editor, Naval Research Logistics (2019-present)
- President, INFORMS Cincinnati-Dayton Chapter (2019)
- Vice-President, INFORMS Cincinnati-Dayton Chapter (2018)
- Elected Council Member, INFORMS Military and Security Society (2019-2020)



Research Interest Areas

Computational stochastic optimization – the design, development, and testing of approximate dynamic programming and reinforcement learning algorithms that utilize simulation, mathematical programming, and machine learning techniques to solve large-scale sequential decision-making problems under uncertainty; application areas include the dispatch of military medical evacuation assets, the routing of military distribution assets, and the battle management of mobile, autonomous systems.



Maj Thomas P. Talafuse

PhD, Industrial Engineering, University of Arkansas

Deputy Director, Statistical Test & Analysis Techniques Center of Excellence

Assistant Professor of Operations Research

Most Notable Publications

Talafuse, T.P. and Pohl, E.A. "Small Sample Discrete Reliability Growth Modeling Using a Grey Systems Model". *Grey Systems: Theory and Application*, 2018, Vol. 8, No. 3, pp. 246-271.

Talafuse, T.P. and Pohl, E.A. "Small Sample Reliability Growth Modeling Using a Grey Systems Model". *Quality Engineering*, 2017, Vol. 29, No. 3, pp. 455-467.

Ledwith, M.C., Jackson, R.A., Reboulet, A.M., and **Talafuse, T.P.** "Ethics and Education: A Markov Chain Assessment of Civilian Education in Air Force Materiel Command". *International Journal of Responsible Leadership and Ethical Decision-Making*, 2019, Vol. 1, No. 1, pp. 25-37.

Hill, R.R., Ahner, D.K., Morrill, D.F., **Talafuse, T.P.**, and Bestard, "J.J. Applying Statistical Engineering to the Development of a Ballistic Impact Flash Model". *Quality Engineering*, 2017, Vol. 29, No. 2, pp. 181-189.

Talafuse, T.P. and Pohl, E.A. "A Bat Algorithm for the Redundancy Allocation Problem". *Engineering Optimization*, 2016, Vol. 48, No. 5, pp. 900-910.

Selected Honors & Awards

- University of Arkansas Department of Industrial Engineering Graduate Research Award, 2016
- Dr. James T. Moore Graduate Research Prize for Outstanding Thesis (MORS), Air Force Institute of Technology, 2011



Research Interest Areas

- Reliability and reliability growth
- Risk analysis
- Applied statistics
- Engineering optimization



Dr. Jeffery D. Weir

**PhD, Industrial Engineering and Operations Research,
Georgia Institute of Technology**

Associate Head, Operational Sciences

Professor of Operational Sciences

Most Notable Publications

Hanks, R, **Weir, J D**, and Lunday, B, "Robust goal programming using different robustness echelons via norm-based and ellipsoidal uncertainty sets," *European Journal of Operations Research*, Vol 262, no 2, pp 636-646, 2017.

McNabb, M, **Weir, J D**, Hil, R and Hall, S, "Testing local search move operators on the vehicle routing problem with split deliveries and time windows," *Computers & Operations Research*, Vol 56, pp 93-109, 2015.

Cui, C, Wu, T, Hu, M, **Weir, J D**, and Li, X, "Short-term building energy model recommendation system: A meta-learning approach," *Applied Energy*, Vol 172, pp 251-263, 2016.

Hu, M, **Weir, J D**, Wu, T, "Decentralized operation strategies for an integrated building energy system using a memetic algorithm," *European Journal of Operational Research*, Vol 217, no 1, pp 185-197, 2012.

Chambal, S P, **Weir, J D**, Kahraman, Y R, and Gutman, A J "A practical procedure for customizable one-way sensitivity analysis in additive value models," *Decision Analysis*, Vol 8, no 1, pp 251-330, 2011.



Research Interest Areas

- Decision Analysis
- Applied Statistics
- Deterministic Optimization



Lt Col Marcelo Zawadzki

**PhD, Operations Research, Technological Institute of Aeronautics/
London School of Economics and Political Science**

Assistant Professor of Operations Research

Most Notable Publications

Zawadzki, M., Costa, A., Belderrain, M.C.N., Montibeller, G., "Análise de Risco Adversário para alocação de recursos de contraterrorismo", *GESTÃO & PRODUÇÃO* (UFSCAR. IMPRESSO), Vol. 24, pp 450-463, 2017.

Zawadzki, M., Caruzzo, A., Montibeller, G., Belderrain, M.C.N., "Terrorist Attacks in Sporting Events: A Warning to Brazil", *Revista Brasileira de Estudos de Defesa*, Vol. 2, pp. 106-122, 2015.

Caruzzo, A., **Zawadzki, M.**, Belderrain, M.C.N., "Critical Infrastructure Protection: Challenges of the Weather Forecast as a Support Tool for Intelligence Services", *Revista Brasileira de Inteligência*, Vol. 9, pp. 51-63, 2015.



Research Interest Areas

- Risk Analysis
- Decision Analysis
- Problem Structuring Methods



Dr. Michael R. Grimaila, CISM, CISSP

PhD, Computer Engineering, Texas A&M University

Department Head, Systems Engineering & Management

Professor of Systems Engineering

Most Notable Publications

Okolica, J.S., Peterson, G., Mills, R.F., and **Grimaila, M.R.**, "Sequence Pattern Mining with Variables," *IEEE Transactions on Knowledge and Data Engineering*, pp. 1-20, 19 November 2018, DOI: 10.1109/TKDE.2018.2881675.

Hodson, D.D., **Grimaila, M.R.**, Mailloux, L.O., Grimaila, M.R., McLaughlin, C.V., & Baumgartner, G.B., "Modeling quantum optics for quantum key distribution system simulation," *The Journal of Defense Modeling and Simulation: Applications, Methodology, Technology*, January 12, 2017, DOI: 10.1177/1548512916684561, pp. 1-12.

Mailloux, L.O., **Grimaila, M.R.**, Hodson, D.D., McLaughlin, C., & Baumgartner, G., "Modeling, simulation, and performance analysis of decoy state enabled quantum key distribution systems," *Applied Sciences*, 2017, 7(2), 212.

Johnson, J., **Grimaila, M.R.**, Humphries, J., and Baumgartner, G., "An Analysis of Error Reconciliation Protocols used in Quantum Key Distribution Systems," *Journal of Defense Modeling and Simulation: Applications, Methodology, Technology*, Sage Press, DOI: 10.1177/1548512913503418, pp. 1-11, September 2013.

Grimaila, M.R., Myers, J., Mills, R.F., and Peterson, G., "Design and Analysis of a Dynamically Configured Log-based Distributed Security Event Detection Methodology," *The Journal of Defense Modeling and Simulation: Applications, Methodology, Technology*, Sage Press, DOI: 10.1177/1548512911399303, Vol. 9(3), pp. 219-241, 2012.

Selected Honors & Awards

- AFIT Board of Visitors Colonel Charles Stone Award (2012).
- Fellow of the Information System Security Association (2011).
- Senior Member IEEE (2005).

Significant Accomplishments

- Corresponding Editor, Journal of Defense Modeling and Simulation, 2018-Present.
- Editorial Board of Information System Security Association (ISSA) Journal, 2003-Present.
- Assistant Editor, The Defense Cyber Review, Army Cyber Institute, West Point, 2016-Present.



Research Interest Areas

- Civil Defense / CBRNE Response
- Computer and Network Security
- Quantum Networking
- Modeling and Simulation
- Systems Engineering



DEPARTMENT OF SYSTEMS ENGINEERING & MANAGEMENT



Dr. Christopher M. Chini

PhD, Civil Engineering, University of Illinois at Urbana-Champaign

Assistant Professor

Most Notable Publications

Chini, C.M., Djehdian, L.A., Lubega, W.N., and Stillwell, A.S. (2018). "Virtual Water Transfers of the U.S. Electric Grid." *Nature Energy*. 3, 1115-1123. DOI: 10.1038/s41560-018-0266-1

Chini, C.M. and Stillwell, A.S. (2017). "The State of U.S. Urban Water: Data and the Energy-Water Nexus." *Water Resources Research*. 54(3), 1796-1811. DOI: 10.1002/2017WR022265

Chini, C.M., Canning, J.F, Schreiber, K.L., Peschel, J.M., and Stillwell, A.S. (2017) "The Green Experiment: Cities, Green Stormwater Infrastructure, and Sustainability." *Sustainability*, 9(1), 105. DOI: 10.3390/su9010105. (cover article)

Chini, C.M., Konar, M., and Stillwell, A.S. (2017). "Direct and indirect urban water footprints of the United States." *Water Resources Research*, 53(1), 316-327. DOI: 10.1002/2016WR019473

Chini, C.M., Schreiber, K., Barker, Z., and Stillwell, A.S. (2016). "Quantifying Energy and Water Savings in the U.S. Residential Sector." *Environmental Science & Technology*, 50(17), 9003-9012. DOI: 10.1021/acs.est.6b01559

Selected Honors & Awards

- UCOWR Ph.D. Dissertation Award in Water Policy and Socio-Economics, 2019
- ASCE EWRI Conference Student Sustainability Presentation Competition Winner, 2016
- National Science Foundation Graduate Research Fellowship (NSF-GRFP), 2015
- Department of the Army Achievement Medal for Civilian Service, 2013

Significant Accomplishments

- Sustainable Development Solutions Network (2019). The 2019 US Cities Sustainable Development Report. (Contributor)



Research Interest Areas

- Energy and Water Nexus
- Resource Conservation
- Installation Resilience
- Climate Change Impacts on the DOD
- Resilience Planning



Dr. John M. Colombi

PhD, Electrical Engineering, Air Force Institute of Technology

Professor of Systems Engineering

Most Notable Publications

Author or coauthor on over 100 publications

Colombi, J., Buckle, L., Black, J., and S. Nurre (2017). "Optimal Launch Manifesting for Heterogeneous Disaggregated Satellite Constellations," *Journal of Spacecraft and Rockets*, Vol. 54, No. 3 (2017), pp. 582-591. <https://doi.org/10.2514/1.A33796>

Colombi, J., Robbins, M., Burger[#], J. & Weber^E, Y. (2015). "Interface evaluation for open system architectures using multiobjective decision analysis." *Military Operations Research (MOR) Journal* 20(2):55-69.

Hardman, N., Jacques, D. R., **Colombi, J. M.**, Hill^F, R., & Miller^E, J. (2013). "Requirements elicitation through legacy mishap analysis," *American institute of aeronautics and astronautics (AIAA) Journal of Aerospace Information Systems*, 10(3), 105-113.

Ford[#], T. C., **Colombi, J. M.**, Jacques^F, D. R., & Graham^F, S. R. (2009). "A general method of measuring interoperability and describing its impact on operational effectiveness." *Journal of Defense Modeling and Simulation: Applications, Methodology, Technology*, 6(1), 17-32.

Thompson[#], R., **Colombi, J.**, Black^F J. and B. Ayres^F (2015). "Disaggregated Space System Concept Optimization: Model-Based Conceptual Design Methods," *Journal of Systems Engineering* (18) 6, pp 549-675.

Selected Honors & Awards

- 2019: Primary advisor for 173 students on 109 projects; Committee member on 129 more students
- 2019: AFIT Leadership Award – Senior Faculty
- 2018: Senior Member, IEEE
- 2017: ABET Program Evaluator for Systems Engineering
- 2017: Best Paper, IEEE Systems Conference, Montreal, Canada, 24-27 April 2017
- 2015: Southwest Ohio Council for Higher Education (SOCHE) Faculty Excellence Award
- 2015: Department Best Teacher Award; 2012, 2011 Department Educator of the Year
- 2011: Ohio Magazine Excellence in Education

Significant Accomplishments

Served 21 years active duty in the US Air Force (retired LtCol) as a Developmental Engineer, taking a variety of research, engineering and management assignments, including:

- Program Manager, Command and Control (C2) Enterprise;
- Chief Engineer, Airborne Warning and Control System (AWACS) Systems;
- Chief, AWACS Command and Control Programs Integrated Product Team;
- Chief, Defensive Information Operations Research Team, National Security Agency; and
- Communication Systems Engineer, Rome Laboratories



Research Interest Areas

- Model-based Systems Engineering (MBSE) for conceptual trade space exploration
- Autonomous aircraft design and test
- Complex adaptive systems
- Acquisition research
- Human systems integration



DEPARTMENT OF SYSTEMS ENGINEERING & MANAGEMENT



Maj Casey W. Cooper

PhD, University of Oklahoma Health Sciences Center

Assistant Professor of Industrial Hygiene

Most Notable Publications

Cooper, C., Aithinne, K., Floyd, E. Johnson, D. (2019) "A Comparison of Air Sampling Methods for Clostridium difficile Endospore Aerosol." *Aerobiologia*, 35(3): 411-420.

Aithinne, K., **Cooper C.**, Lynch, R., Johnson, D. (2018) "Toilet Plume Aerosol Generation Rate and Environmental Contamination Following Bowl Water Inoculation with Clostridium difficile spore." *American Journal of Infection Control*, 47(5): 515-520.

Cooper, C., Slagley, J., Lohaus J., Escamilla, E., Bliss, C., Semler, D., Felker, D., Smith, D., Ott, D. (2014) "Comparison of High-Volume Air Sampling Equipment for Viral Aerosol Sampling During Emergency Response." *Journal of Emergency Management*, 12(2): 161-170.

Selected Honors & Awards

- Meritorious Service Medal, 2016
- Air Mobility Command, Biomedical Specialist of the Year, 2014
- 19th Medical Group Field Grade Officer of the Year, 2014
- Afghanistan Campaign Medal, 2014



Research Interest Areas

- Biodefense
- CBRN Countermeasures
- Bioaerosols
- Healthcare Acquired Infections
- Environmental Health
- Occupational Health



Lt Col Amy M. Cox

PhD, Systems Engineering, The George Washington University

Assistant Professor of Systems Engineering

Most Notable Publications

Flenar, Wagner, **Cox** and Jacques, "Determining Detectable and Exploitable Aspects of Rogue Small Unmanned Aircraft Systems". *Journal of DoD Research and Engineering* (accepted in 2019).

Selected Honors & Awards

- 2015: Merrit Williamson Best Conference Paper Award, American Society for Engineering Management
- 2012: Outstanding Air Force Program Manager, ACAT III or Equivalent
- 2011: Joint Service Achievement Medal, Achievement
- 2005: Distinguished Graduate, Defense Language Institute (French)

Significant Accomplishments

- Developed prototype degree program for Acquisitions Managers; first two Systems Management students graduated in March 2019
- Brevet, Flight Test Engineer, École du Personnel Navigant d'Essais et de Réception, Istres, FR, Specialization in Rotary Wing Aircraft, July 2006



Research Interest Areas

- User Innovation
- Innovation Portfolio Performance
- System Design and Architecture
- Social Network Analysis
- UAV Flight Test and Performance



DEPARTMENT OF SYSTEMS ENGINEERING & MANAGEMENT



Maj Justin D. Delorit, P.E.

PhD, Civil and Environmental Engineering, University of Wisconsin-Madison

Assistant Professor of Engineering Management

Most Notable Publications

Delorit, J., Parker, D., and Block, P., "An agro-economic approach to framing perennial farm-scale water resource management for water rights markets," *Agricultural Water Management*, 218:68-81, 2019. DOI: <https://doi.org/10.1016/j.agwat.2019.03.029>

Delorit, J. and Block, P., "Water market-scale forecast-informed option contracts." *Journal of Water Resources Planning and Management*, Volume 125, Issue 5, 2019 DOI: [https://doi.org/10.1061/\(ASCE\)WR.1943-5452.0001068](https://doi.org/10.1061/(ASCE)WR.1943-5452.0001068)

Delorit, J. and Block, P., "Promoting competitive water resource use efficiency at the water-market scale: An inter-cooperative demand equilibrium-based approach to water trading." *Water Resources Research*, 54(8), 5394-5421, 2018 DOI: <https://doi.org/10.1029/2017WR022323>

Delorit, J., Gonzalez Ortuya, E. and Block, P., "Evaluation of Model-Based Seasonal Streamflow and Water Allocation Forecasts for the Elqui Valley, Chile." *Hydrol. Earth Syst. Sci.* 21(9): 4711-4725., 2017 DOI: <https://doi.org/10.5194/hess-21-4711-2017>

Delorit, J., Racz L., "Evaluation of Activated Sludge for Biodegradation of Propylene Glycol as an Aircraft Deicing Fluid," *Water Environment Research*, Volume 86, Number 4, April 2014, pp. 366-371(6)

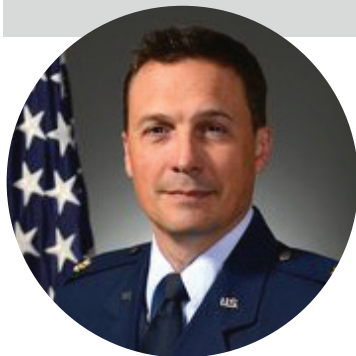
Selected Honors & Awards

- Best Reviewer, Journal of Water Resources Planning and Management, 2018
- Air Force Arthur S. Flemming Award for Basic Science, 2018
- Federal Engineer of the Year, 2018
- University of Wisconsin James R. Villemonte Excellence in Research, 2018
- University of Wisconsin K. Patricia Cross Future Leaders Award, 2018



Research Interest Areas

- Resilient Installations
- Climate change adaptation policy
- Energy-use and economic modelling
- Climate forecasting
- Coupled human-natural systems



Maj Scott T. Drylie

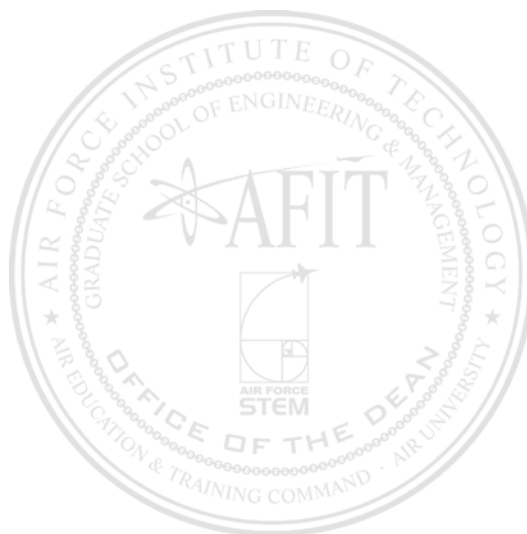
PhD, Economics, George Mason University

Cost Analysis Program Chair



Research Interest Areas

- Economics of Institutions and Constitutions
- History of Thought
- Incentives, Information, and Coordination Issues
- Industrial Psychology
- Game Theory





Dr. John J. Elshaw

PhD, Management, Purdue University

Assistant Professor of Management

Most Notable Publications

Kim, Sungbin, Miller, Michael E., Rusnock, Christina F., & **Elshaw, John J.** (2018). "Spatialized audio improves call sign recognition during multi-aircraft control". *Applied Ergonomics*, 70, pp. 51-58.

Gay, C., Horowitz, B., **Elshaw, J.**, Bobko, P., & Kim, I. (2017). "Operator suspicion and decision responses to cyber-attacks on unmanned ground vehicle systems". *Proceedings of the Human Factors and Ergonomics Society*, Vol 61, Issue 1, pp. 226-230.

Elshaw, John J., Badiru, Adedeji B., & Harris, Sharif F. (2017). "Learning curve analysis in department of defense acquisition programs". *Acquisition Research Program: Creating Synergy for Informed Change* (online publication), 22 November 2017, Naval Postgraduate School.

Elshaw, John J., Fass, Robert D., & Mauntel, Brian R. (2017). "Cognitive Mentorship: Protégé Behavior as a Mediator to Performance". *Journal of Mentoring and Teaching* (In Print).

Elshaw, J. J. "Social Science Measurement (2016)". *Handbook of Measurements: Benchmarks for Systems Accuracy and Precision*, Badiru editions, Taylor and Francis.



Research Interest Areas

- Leadership, Human-Technology interaction (virtual teams, electronic monitoring, distance leadership)
- Learning curves and the impact on acquisition
- Workgroup and team processes within organizations, social networks, organizational climate and culture
- Cross-cultural leadership and communication
- Cognition and emotions
- Motivation (self-regulation, intrinsic versus extrinsic control)
- Human performance
- Organizational trust, performance, and commitment



Maj Ryan D. L. Engle

PhD, Systems Engineering, Air Force Institute of Technology

Assistant Professor of Systems Engineering

Most Notable Publications

Engle, R.D.L. (2018). "A Methodology for Evaluating Relational and NoSQL Databases for Small-Scale Applications." (*Doctoral dissertation*). Air Force Institute of Technology, Wright-Patterson Air Force Base, Ohio.

Engle, R.D., Mailloux, L. O., Grimaila, M. R., Hodson, D. D., McLaughlin, C. V., Baumgartner, G. (2019). "Implementing the decoy state protocol in a practically oriented quantum key distribution system-level model." *The Journal of Defense Modeling and Simulation*. 16(1). 27-44.

Engle, R. D., Hodson, D. D., Mailloux, L. O., Grimaila, M. R., McLaughlin, C. V., & Baumgartner, G. (2019). "A module-based simulation framework to facilitate the modeling of quantum key distribution system post-processing functionalities." *The Journal of Defense Modeling and Simulation*, 16(1), 45-56.

Engle, R. D., Langhals, B. T., Grimaila, M. R., and Hodson, D. D. "Evaluation criteria for selecting (2018). NoSQL databases in a single box environment." *International Journal of Database Management Systems*, 10(4).

Engle, R.D., Langhals, B. T., Grimaila, M. R., and Hodson, D. D. (2018). "The case for NoSQL on a single desktop." *Proceedings of the International Conference on Information and Knowledge Engineering (IKE)*. The Steering Committee of the World Congress in Computer Science, Computer Engineering and Applied Computing (WorldComp).

Selected Honors & Awards

- Tau Beta Pi Engineering Honor Society
- Air Force Commendation Medal with three oak leaf clusters
- Air Force Achievement Medal with one oak leaf cluster
- Afghanistan Campaign Medal with one bronze star
- Global War on Terrorism Medal
- Air and Space Campaign Medal with one bronze star



Research Interest Areas

- Data storage and retrieval systems
- Databases
- Data analytics
- Cyber security
- Modeling and simulation
- Quantum-based communications
- Software-defined radio applications



DEPARTMENT OF SYSTEMS ENGINEERING & MANAGEMENT



Dr. Robert David Fass

PhD, Business Administration, New Mexico State University

Assistant Professor of Systems Integration and Cost Analysis

Most Notable Publications

Griffith, J., White, E., **Fass, R.**, & Lucas, B. (2018). "Comparison of Body Composition Metrics for United States Air Force Airmen". *Military Medicine*, 183(3-4), e201-e207.

Elshaw, J., **Fass, R.**, Mauntel, B. (2018). "Cognitive Mentorship: Protégé Behavior as a Mediator to Performance". *Mentoring & Tutoring: Partnership in Learning*. DOI: 10.1080/13611267.2018.1511951

McGowin, A., Ritschel, J., **Fass, R.**, & Boehmke, B. (2018). "A Text Mining Analysis of Acquisition Reforms and Expert Views," *Defense Acquisition Research Journal*, 25(3), 288-323.

Rosson, J., Rice, M., Lopez, Jr., J., **Fass, R.** (2018). "Incentivizing Cyber Security Investment in the Power Sector Using an Extended Cyber Insurance Framework", To appear in: *Homeland Security Affairs*. (Accepted: May 2018)

Selected Honors & Awards

- Certified Cost Estimator/Analyst, 2015 (International Cost Estimating & Analysis Association, Certificate # 2875)
- Phi Beta Kappa, 1989

Significant Accomplishments

- Delivers graduate education supported by 20-year military career (ret, Lt Col) as a warranted Contracting Officer (64P) in Defense Acquisition
- Thesis chair/committee member on over 50 defense acquisition related research projects since 2008
- Enhanced quantitative rigor of cost program curriculum with existing course enhancements and new courses



Research Interest Areas

Cost Analysis, Decision Making, Risk Analysis, Defense Acquisition System Processes and Policies, Leadership, Organizational Behavior, Organizational Change and Development, Organizational Culture, Motivation, Performance Measurement, Business Strategy, Strategic Alliances, Psychometric Research Methods, Qualitative Research Methods, Inductive Theory Building, Theory Application & Testing, Structural Equation Modeling, Social Network Analysis, Learning Modalities



Dr. Thomas C. Ford

PhD, Systems Engineering, Air Force Institute of Technology

Assistant Professor of Systems Engineering

Most Notable Publications

Thomas C. Ford, John M. Colombi, David R. Jacques and Scott R. Graham, "A General Method of Measuring Interoperability and Describing Its Impact on Operational Effectiveness," *Journal of Defense Modeling and Simulation*. January 1, 2009, 6:17-32. (Invited Paper)

Thomas C. Ford, John M. Colombi, David R. Jacques and Scott R. Graham. "On the Application of Classification Concepts to Systems Engineering Design and Evaluation," *Journal of Systems Engineering*. Vol 12, No. 2, 2009.

Christos Chalyvidis, Jeffrey Ogden, Alan Johnson, John Colombi, **Thomas Ford**. "A Method for Measuring Supply Chain Interoperability," *Supply Chain Forum*. Vol 17, Issue 4, 2016.

Thomas C. Ford, David W. Meyer, John M. Colombi, Brian K. Scheller, Cody G. Palmer. "A Method for Assessing the Time-Variant Value of Multi-Domain Architectures," *Journal of Defense Modeling and Simulation*. Published on-line June 29, 2016.

Torrey Wagner, **Thomas C. Ford**. "DoD Applications of Agile Software Development Methods," *Journal of Defense Research and Engineering*. (Accepted for Publication)

Selected Honors & Awards

- Certified SAFe Agilist (2018), Object Management Group Certified Systems Modeler – Model User (2017), NRO Silver Medal (2012)

Significant Accomplishments

- Delivers graduate education supported by 22-year military career (ret, Lt Col) as Developmental Engineer (62E) in Defense Acquisition
- Teaches online Systems Engineering Masters courses to military and civilian, current and future, Lead- and Chief-Engineers as well as Operators throughout CONUS and OCONUS
- Served on committee for two PhD students, advised or served on committee for 13 MS students performing Air Force-focused research
- Re-designed and modernized SENG520 Systems Engineering Design

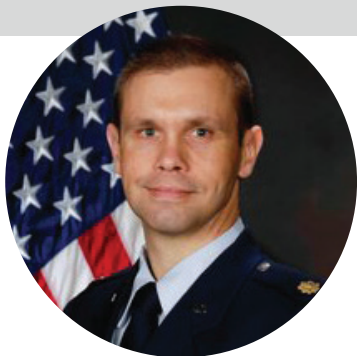


Research Interest Areas

- Model-based Systems Engineering (MBSE)
- System Interoperability
- Modeling and Simulation Systems Design & Modeling
- Agile Software Systems Engineering



DEPARTMENT OF SYSTEMS ENGINEERING & MANAGEMENT



Maj Jason K. Freels

PhD, Systems Engineering, Air Force Institute of Technology

Assistant Professor of Systems Engineering

Most Notable Publications

Freels J. K., Timme, D. A., Pignatiello J. J., Warr R. L., Hill R. R. (2019) "Maximum Likelihood Estimation for the Poly Weibull Distribution", *Quality Engineering*, 545-552.

Munson E. L., Smith C. M., Boehmke B. C., **Freels J. K.** (2019) saotd: Sentiment Analysis of Twitter Data, *Journal of Open Source Software*, 4(34), 764.

Little Z. C., Weir J. D., Hill R. R., Stone B. B., **Freels J. K.** (2018), "Second-order extensions to nearly orthogonal-and-balanced (NOAB) mixed-factor experimental designs", *Journal of Simulation*, 13(3), 226-237.

Collins D. H., **Freels J. K.**, Huzurbazar A. V., Warr R. L., Weaver B. P. (2013) "Accelerated Test Methods for Reliability Prediction," *Journal of Quality Technology*, 45(3), 244-259. Impact Factor: 1.152.

Vandawaker R. M., Jacques D. R., **Freels J. K.**, Ryan E., Huscroft J. (2016) "Health Monitoring Impact on Non-Repairable Component Supply Methods," *Journal of Quality in Maintenance Engineering* 23(1), 82,94.

Selected Honors & Awards

- 2016 Richard H. Barchi Prize - Military Operations Research Society, Recognizing the best paper given at the MORS Symposium
- 2013 Lloyd S. Nelson Award - American Society for Quality, Recognizing the technical paper providing the greatest immediate impact to practitioners



Research Interest Areas

- Data Analytics / Data Science
- Text Mining / Natural Language Processing
- Bayesian Statistical Methods
- System Risk & Reliability Prediction
- Reproducible Research
- System Degradation Modeling



Dr. Mark N. Goltz

PhD, Environmental Engineering and Science, Stanford University

Distinguished Professor Emeritus of Environmental Engineering and Science

Most Notable Publications

Kanel, S. R., H. Misak, D. Nepal, S. Mall, S.W. Brittle, I.E. Sizemore, D. Kempisty, **M.N. Goltz**, "Application of Carbon Nanotube Yarns as a Filter Media to Treat Nitroaromatic-contaminated Water", accepted *New Carbon Materials*, 2015.

Huang, J., J.A. Christ, **M.N. Goltz**, and A.H. Demond, "Modeling NAPL Dissolution from Pendular Rings in Idealized Porous Media", *Water Resources Research*, 51, doi:10.1002/2015WR016924, 2015.

Huang, J. and **M.N. Goltz**, "Semi-Analytical Solutions for Transport in Aquifer and Fractured Clay Matrix System", *Water Resources Research*, 51, 7218-7237, doi: 10.1002/2014WR 016073, 2015.

Kanel, S. R., J. Flory J., A. Meyerhoefer, J.L. Fraley, I.E. Sizemore, and **M.N. Goltz**, "Influence of Natural Organic Matter on Fate and Transport of Silver Nanoparticles in Saturated Porous Media: Laboratory Experiments and Modeling", *Journal of Nanoparticle Research*, 17(3):1-13, 2015.

Powell, C.L., **M.N. Goltz**, and A. Agrawal, "Degradation Kinetics of Chlorinated Aliphatic Hydrocarbons by Methane Oxidizers Naturally-Associated with Wetland Plant Roots", *Journal of Contaminant Hydrology*, 170: 68-75, 2014.

Selected Honors & Awards

- AFIT Distinguished Professor, 2015
- AFIT Graduate School of Engineering and Management Charles P. Brothers Outstanding Volunteer Service Award, 2014
- Fellow, Society of American Military Engineers, 2009



Research Interest Areas

Groundwater contamination remediation technologies, Fate and transport of organic contaminants in the subsurface, Stimulating commercialization of environmental remediation technologies, Mathematical modeling of contaminant transport by groundwater, In situ bioremediation of chlorinated organic compounds in the subsurface, Scaling-up from the laboratory to the field, Physical and chemical water and wastewater treatment technologies, and Environmental modeling.



DEPARTMENT OF SYSTEMS ENGINEERING & MANAGEMENT



Dr. Willie F. Harper Jr.

PhD, Civil and Environmental Engineering, University of California, Berkeley

Professor of Environmental Engineering and Science

Most Notable Publications

Brandon M. Stewart, Michael E. Miller, David M. Kempisty, John Stubbs, and **Willie F. Harper, Jr.** (2018). "Oxidation of Tartrazine with ultraviolet light emitting diodes: pH and duty cycles effects", *Water Science and Technology*, Vol 77 (3), 1651-1659.

Willie F. Harper, Jr., William Flemings, Kandace Bailey, Walter Lee, Daniel Felker, Vicente Gallardo, Matthew Magnuson, and Rebecca Phillips (2017). "Adsorption of malathion onto copper and iron surfaces relevant to water infrastructure". *Journal of American Water Works Association*, Vol 109 (11), E494-E502.

Akihiko Terada, Sho Sugawara, Keisuke Hojo, Yuki Takeuchi, Shohei Riya, **Willie F. Harper Jr.**, Tomoko Yamamoto, Megumi Kuroiwa, Kazuo Isobe, Chie Katsuyama, Yuichi Suwa, Keisuke Koba, and Masaaki Hosomi (2017). "Hybrid nitrous oxide production from partial nitrifying bioreactor: hydroxylamine interactions with nitrite". *Environmental Science and Technology*, Vol. 51(5), 2748-2756.

Robert Scott, Patrick Mudimbi, Michael E. Miller, Matthew Magnuson, Stuart Willison, Rebecca Phillips, **Willie F. Harper, Jr.** (2017). "Advanced oxidation of tartrazine and brilliant blue with pulsed ultraviolet light emitting diodes". *Water Environment Research*, Vol. 89, 24-31.

Daniel Baseley, Luke Wunderlich, Grady Phillips, Kevin Gross, Glen Perram, Stuart Willison, Rebecca Phillips, Matthew Magnuson, Sang Don Lee, **Willie F. Harper, Jr.** (2016). "Hyperspectral analysis for standoff detection of dimethyl methylphosphonate on building materials", *Building and Environment*, Vol. 108, 135-142.

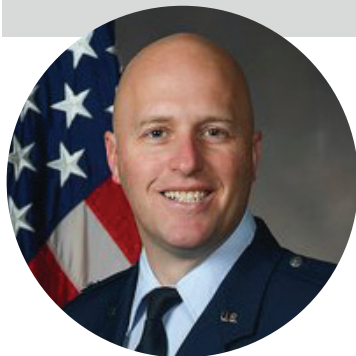
Selected Honors & Awards

- Embassy Science Fellow (Togo), 2017-2018
- John L. McLucas Basic Research Award, 2016



Research Interest Areas

- Water quality, including biological and chemical treatment methods



Lt Col Andrew J. Hoisington

PhD, Environmental Engineering, University of Texas, Austin

Assistant Professor of Systems Engineering

GEM Curriculum Chair

Most Notable Publications

Hoisington AJ, Stearns-Yoder KA, Schuldt SJ, Beemer CJ, Kinney KA, Postolache TT, Lowry CA, Brenner LA. (2019). "Ten questions concerning the built environment and mental health", *Building and Environment*, 155, 58-69.

Sharma A, Richardson M, Cralle L, Stamper C, Maestre JP, Stearns-Yoder K, Bates K, Kinney K, Brenner L, Lowry C, Gilbert J, **Hoisington A**. (2018) "Longitudinal assessment of the influence of lifestyle homogenization on the microbiome in a cohort of United States Air Force Cadets", *Microbiome* 7(70), 1-17.

Brenner LA, **Hoisington AJ**, Stearns KE, Stamper C, Heinz J, Postolache TT, Hoffmire C, Stanislawski M, Lowry CA. (2018). "Military-related exposures, normal physiology, dysbiosis, and disease: the United States-Veteran Microbiome Project (US-VMP)", *Frontiers in Cellular and Infection Microbiology*, 8, 400.

Hemmings SM, Malan-Muller S, van den Huevel LL, Demmitt BA, Smith DG, Bohr AD, Stamper CE, Hyde ER, Morton JT, Marotz CA, Siebler PH, **Hoisington AJ**, Brenner LA, Postolache TT, Dicks LM, McQueen MB, Krauter, KS, Knight R, Seedat S, Lowry CA. (2017). "The microbiome in Posttraumatic Stress Disorder (PTSD) and Trauma-Exposed Controls: An Exploratory Study", *Psychosom Med*, 79(8), 936-946.

Stamper C, **Hoisington A**, Gomez O, Halweg-Edwards A, Smith D, Bates K, Kinney K, Postolache T, Brenner L, Rook G, Lowry C. (2016), "The Microbiome of the Built Environment and Human Behavior: Implications for Emotional Health and Well-Being in Postmodern Western Societies", *International Review of Neurobiology*, 131, 289-323.

Selected Honors & Awards

- Society of American Military Engineers Educator of the Year, United States Air Force Academy Outstanding Academy Educator

Significant Accomplishments

- Led first ever DoD conference on microbiome of the built environment
- Principal Investigator on largest microbiome study to date in DoD
- Leads 20 students/year in master's degree program



Research Interest Areas

- Microbiome of the Built Environment
- Indoor Air Quality
- Microbiome and Mental Health
- Built Environment and Mental Health
- Biofingerprinting



DEPARTMENT OF SYSTEMS ENGINEERING & MANAGEMENT



Dr. David R. Jacques

PhD, Aeronautical Engineering, Air Force Institute of Technology

Professor of Systems Engineering

Most Notable Publications

Vandawaker, R.M., **D. Jacques**, E. Ryan, J. Huscroft and J. Freels. "Health Monitoring Impact on Non-Repairable Component Supply Methods", *Journal of Quality in Maintenance Engineering*, 23 (1), 82-94, 2016.

Humphreys, C., R. Cobb, **D. Jacques** and J. Reeger, "A Hybrid Optimization Technique Applied to the Intermediate-Target Optimal Control Problem", *Global Journal of Technology and Optimization*, Vol. 7, Issue 2, August, 2016.

Vandawaker, R.M., **Jacques, D.R.**, Freels, J.K., "Impact of Prognostic Uncertainty in System Health Monitoring", *International Journal of Prognostic Health Management*, ISSN 2153-2648, 2015 011, May 2015.

Ryan, E., **D. Jacques** and J. Colombi, "An Ontological Framework for Clarifying Flexibility-Related Terminology via Literature Survey", *INCOSE Systems Engineering*, 16(1): 99-110, 2013.

Jacques D. and D. Smith, "A Simplified Building Air Flow Model for Agent Concentration Prediction", *Journal of Occupational and Industrial Hygiene*, Volume 7, Issue 11, 2010.

Selected Honors & Awards

- 2016 – General Bernard Schriever Award for CY 2015



Research Interest Areas

Dr. Jacques is leading research in the area of effective multi-vehicle control for flexible reconnaissance and surveillance operations. As part of this work, he has been utilizing a tailored SE process for rapid conceptualization/design/build/test cycles to enable flight test evaluation of new operational concepts within a 9-12 month cycle time, with this work drawing in students and faculty from multiple departments. He especially enjoys research in the area of optimal design, where system effectiveness is used as the design objective as opposed to lower level subsystem performance measures. He is actively interested in using System Architecture as an analytic basis using methods from graph theory and/or discrete-event simulation.



Lt Col Clay M. Koschnick

PhD, Industrial and Systems Engineering, University of Florida

Assistant Professor of Systems Engineering

Most Notable Publications

Koschnick, Clay and Hartman, Joseph C. (2019). "Using performance-based warranties to influence consumer purchase decisions," *The Engineering Economist*, DOI: 10.1080/0013791X.2019.1642430.

Hines, P.A., Wagner, T.J., **Koschnick, C.M.**, and Schuldt S.J. (2019). "Analyzing the Efficiency of Horizontal Photovoltaic Cells in Various Climate Regions," *Journal of Energy and Natural Resources*, Vol. 8, Issue 1-2, 77-86.

Trudelle, Ryan C., White, Edward D., Ritschel, Jonathan D., **Koschnick, Clay M.**, Lucas, Brandon M. "Modeling Median Will-Cost Estimates for Defense Acquisition Programs". *Journal of Defense Analytics and Logistics*, 2017, Vol. 1, Issue 1, pgs. 19-33.

Trudelle, Ryan C., White, Edward D., **Koschnick, Clay M.**, Ritschel, Jonathan, D., Lucas, Brandon M. "Estimating an Acquisition Program's Likelihood of Staying within Cost and Schedule Bounds". *Defense Acquisition Review Journal*, October 2017, Vol. 24, No. 4, pgs. 600-625.

Kelly, Patrick, Colombi, John M., **Koschnick, Clay M.**, Freels, Jason R. (2019). "Methodology for Including Base Infrastructure in Conceptual Systems Analysis," *87th Military Operations Research Society Symposium*, 17-20 June 2019, USAFA US Air Force Academy, CO, Presentation ID: 43324.

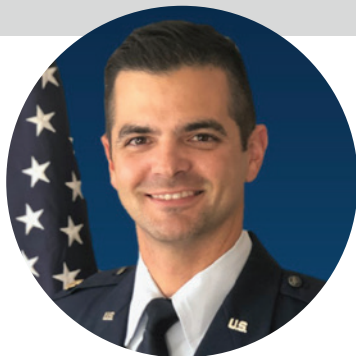


Research Interest Areas

- Engineering Economy
- Decision Analysis
- Econometrics



DEPARTMENT OF SYSTEMS ENGINEERING & MANAGEMENT



Maj Joseph P. Kristbaum

PhD, Human Factors Engineering, Wright State University

Assistant Professor of Systems Engineering

Most Notable Publications

Kristbaum, J., Ciarallo, F.W. "Reducing Preference Bias through Information Presentation Mode: A Supporting Case for Numerical Anchoring". *European Journal of Decision Processes*, to appear August 2020.

Selected Honors & Awards

- Meritorious Service Medal
- Air Force Commendation Medal with oak leaf cluster
- Global War On Terrorism Expeditionary Medal
- Global War on Terrorism Service Medal



Research Interest Areas

- Organizational Behavior
- Judgement and Decision Making
- Optimization
- Human Systems Integration
- Human Systems Modeling



Dr. Brent T. Langhals

PhD, Management Information Systems, University of Arizona

Assistant Professor of Information Resource Management

Most Notable Publications

Beach, P. M.*, Mailloux, L.O., **Langhals, B.T.**, Mills, R.F., (2019). "Analysis of Systems Security Engineering Design Principles for the Development of Secure and Resilient Systems," *IEEE Access*, Vol 7, Issue 1, July 2019.

Beach, P. M.*, **Langhals, B.T.**, Grimaila, M. R., Hodson, D., Engle, R. D. L., "Developing a Methodology for the Identification of Alternative NoSQL Data Models via Observation of Relational Database Usage." *Proceedings of the 18th International Conference on Information and Knowledge Engineering*, Las Vegas, NV, July 29 – August 1, 2019.

Sigala, A.*, **Langhals, B. T.**, Grimaila, M. R., Hodson, D., "USAF Applications of Unmanned Aerial Systems (UAS): A Delphi Study to Examine Current and Future UAS Autonomous Mission Capabilities" *Proceedings of the 44th Dayton-Cincinnati Aerospace Sciences Symposium*, Dayton, OH, March 5, 2019.

Guinn, V. L.*, **Langhals, B. T.**, Elshaw, J. J. (2018). "Evaluating Smartphones for Infrastructure Work Order Management," *International Journal of Interactive Mobile Technologies*, Vol 12, Issue 8, December 2018.

Engle, R.*, **Langhals, B. T.**, Grimaila, M. R., Hodson, D. (2018). "Evaluation Criteria for Selecting NoSQL Databases in a Single-Box Environment." *International Journal of Database Management Systems*, Vol 10, No 4, August 2018.

Selected Honors & Awards

- 2018 – AFIT Sigma Iota Epsilon Instructor of the Year
- 2013 – Department of Systems Engineering and Management Educator of the Year

Significant Accomplishments

- US Patent No. 9,667,947, Issued 30 May 2017 for "Stereoscopic 3-D Presentation for Air Traffic Control Digital Radar Displays" to SMSgt Jason Russi, Dr. Brent Langhals, Dr. Michael Miller, Mr. Eric Heft.



Research Interest Areas

- Data analytics
- Database
- Human-computer interaction
- Systems engineering
- Psychophysiological cues and vigilance



DEPARTMENT OF SYSTEMS ENGINEERING & MANAGEMENT



Dr. David S. Long

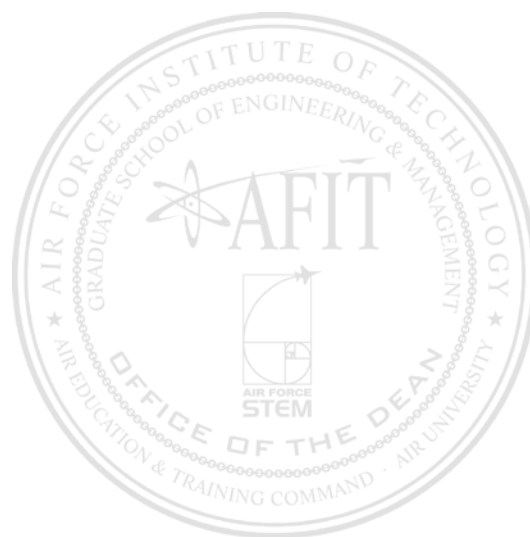
PhD, Engineering Systems with Human Factors, Massachusetts Institute of Technology

Assistant Professor of Systems Engineering



Research Interest Areas

- Systems integration
- System analysis
- Performance analysis
- Human factors application and instruction
- Aircraft maintenance
- Flight test
- System development
- Sub-system development
- System integration
- System maintenance
- Process improvements
- Human factors and integration





Dr. Eric G. Mbonimpa

PhD, Environmental Engineering, Purdue University

Assistant Professor of Environmental Engineering and Science

Most Notable Publications

C. Mukherjee, J. Denney, **E.G. Mbonimpa**, J. Slagley, R. Bhowmik. "A review on municipal solid waste-to-energy trends in the USA." *Renewable and Sustainable Energy Reviews* 119, 2020, 109512 (To appear).

Emery I., D. Kempisty, B. Fain, **E. Mbonimpa**. "Evaluation of treatment options for potable water impacted with perfluorinated alkyl substances using life cycle assessment." *International Journal of Life Cycle Assessment* 24, no. 1 (2019): 117-128.

Mbonimpa E., E. Blatchley, B. Applegate, W. Harper. "Ultraviolet A and B wavelength-dependent inactivation of viruses and bacteria in the water." *Journal of Water and Health* 16, no. 5 (2018): 796-806.

Gautam S., **E. Mbonimpa**, S. Kumar, J. Bonta. "Simulating Runoff from Small Grazed Pasture Watersheds located at North Appalachian Experimental Watershed in Ohio." *Rangeland Ecology & Management* 71(3):363-369. 2018.

Emery I., **E. Mbonimpa**, A. Thal. "Climate-based policies may increase life cycle social costs of vehicle fleet operation." *Energy Policy* 101, 1-9, 2017

Significant Accomplishments

- Patent: US # 9,546,100 B2. Continuous-flow solar ultraviolet disinfection system for drinking water. January 17, 2017. E. R. Blatchley, E. G., Mbonimpa, B. Applegate, B. Vadheim.



Research Interest Areas

- Environmental Sustainability
- Life Cycle Assessment
- Water Quality and Treatment
- Energy Sustainability
- Natural Resource Management
- Contaminants Transport
- Environmental Policy
- Environmental Systems Modeling



DEPARTMENT OF SYSTEMS ENGINEERING & MANAGEMENT



Dr. Michael E. Miller

PhD, Industrial and Systems Engineering, Virginia Tech

Associate Professor of Systems Integration

Most Notable Publications

Kim, S., **Miller, M.E.**, Rusnock, C.F., and Elshaw, J. (2018). "Spatial Audio Improves Call Sign Recognition during Multi-Aircraft Control", *Applied Ergonomics*, 70, 51-58.

Goodman, T.J., **Miller, M.E.**, Rusnock, C.F. and Bindewald, J.M. (2017). "Effects of Agent Timing on the Human-Agent Team", *Cognitive Systems Research*, 46, 40-51.

Watson, M., Rusnock, C.F., Colombi, J.M. and **Miller, M.E.** (2017). "Informing System Design Using Human Performance Modeling", *Systems Engineering*, 20(2), 173-187.

Satava, S.J., Parr, J.C., and **Miller, M.E.** (2019). "A Method for Developing Side Impact Upper Neck Injury Criteria which Compensates for Biomechanical Differences between ATDs and Humans", *IIE Transactions on Occupational Ergonomics and Human Factors* 6(2), 51-63.

Bindewald, J.M., **Miller, M.E.** and Peterson, G.L. (2019). "Creating Effective Automation to Maintain Explicit User Engagement", *International Journal of Human-Computer Interaction*.

Selected Honors & Awards

- Southwestern Ohio Council for Higher Education Faculty Excellence Award, 2017
- Best Paper - Safety, Human Factors and Ergonomics, Industrial and Systems Engineering Research Conference, 2016

Significant Accomplishments

- Sixteen years of industry experience as a systems/human factors engineer in multi-national corporations.
- Contributed to more than 100 issued U.S. Patents in digital imaging, electronic displays, and user interface.
- Inventor of the RGBW pixel format employed by LG Electronics in OLED television.



Research Interest Areas

- Human-Machine Teaming
- Human Systems Integration
- Data Visualization



Dr. Mark G. Reith, CEH, CISSP

PhD, Computer Science, University of Texas at San Antonio

Assistant Professor of Cyber Systems

Most Notable Publications

Flack, N. and **Reith, M.** (2019) "Self-Directed Learning Tools in USAF Multi-Domain Operations Education", *18th European Conference on Cyber Warfare & Security*, Coimbra, Portugal.

Tomcho, L., **Reith, M.**, Long, D., Coggins, M. and Lin, A. (2019) "Applying Game Elements to Cyber eLearning", *14th International Conference on Cyber Warfare & Security*, Stellenbosch, South Africa.

Landon T. and **Reith, M.** (2018). "Engaging Airmen with Cyber Education and Training: Designing a Platform Using Gamification." *22nd Colloquium on Information Systems Security Education*, Washington DC.

Reith, M., Trias, E., Dacus, C., Martin S. and Tomcho L. (2018). "Rethinking USAF Cyber Education and Training." *13th International Conference on Cyber Warfare & Security*, Washington DC.

Reith, M. (2016) "Forging Tomorrow's Air, Space and Cyber War Fighters: Recommendations for Integration and Development", *Air & Space Power Journal*, Winter edition.

Selected Honors & Awards

- Bernard A. Schriever Essay Contest Runner-Up (2018)
- Army Commendation Medal (2018)
- AFIT Team of the Quarter (2017)
- Bernard A. Schriever Essay Contest Winner (2017)

Served in command positions contributing toward:

- 67th Cyberspace Wing rated "Highly Effective" (AFSPC/IG, 2016)
- 690th Network Support Squadron rated "Highly Effective" (67 CW/IG, 2015)
- 67th Cyberspace Wing awarded 2013 Omaha Trophy (USSTRATCOM)
- 67th Cyberspace Wing awarded 2012 General Moorman Award (AFSPC)
- Joint Service Accommodation Medal (2011)
- Afghanistan Campaign Medal (2011)
- AFIT Field Grade Officer of the Quarter (2010)
- Outstanding Contributor Award (peer selection, Squadron Officer School, 2005)
- 6th Air Refueling Wing Company Grade Officer of the Quarter (2001)
- Young AFCEA Member of the Year, featured in Signal Magazine (2001)

Significant Accomplishments

- Featured in Wright-Patterson AFB's *Skywrighter* article "Research Project Evolves into Cyber Education Hub" by Stacy Geiger (2 August 2019).
- Featured in *Airman Magazine* article "Byte-size Learning" by Joseph Eddins (8 May 2018).



Research Interest Areas

- Cyber Education
- Cyber Situational Awareness & Mission Assurance
- Multi-domain Operations
- Cyber Warfare Theory
- Insider Threats
- Engineering Security into Software
- Software Exploitation
- Malicious Code
- Detection and Counter Technologies
- Artificial Intelligence



Dr. Jonathan D. Ritschel

PhD, Economics, George Mason University

Program Chair, Cost Analysis

Assistant Professor of Cost Analysis

Most Notable Publications

D'Amico, C.N., White, E.D., **Ritschel, J.D.**, and Kozlak, S.J. (2018) "Unmasking Cost Growth Behavior: A Longitudinal Study," *Defense Acquisition Research Journal*, 25(1): 30-51.

Trudelle, R.C., White, E.D., **Ritschel, J.D.**, Koschnick, C.M., and Lucas, B.M. (2017). "Modeling Median Will-Cost Estimates for Defense Acquisition Programs," *Journal of Defense Analytics and Logistics*, 1(1): 19-33.

Trudelle, R.C., White, E.D., Koschnick, C.M., **Ritschel, J.D.**, and Lucas, B.M. (2017). "Estimating the Likelihood of a Defense Acquisition Program Staying within Cost and Schedule Bounds," *Defense Acquisition Research Journal*, 24(4): 600-625.

Ritschel, J.D., and Ritschel, T.L. (2017). "Improving Resource Management in the Afghan Air Force," *Air and Space Power Journal*, 31(2): 4-16.

Gardner, N.R., **Ritschel, J.D.**, White, E.D., and Wallen, A.T. (2017). "Forecasting Foreign Exchange Rates for Department of Defense Budgeting," *Journal of Public Procurement*, 17(3), 315-336.

Selected Honors & Awards

- DoD Financial Management Certification, Level 3 (2017)

Significant Accomplishments

- Delivers graduate education supported by 20-year military career (ret. Lt Col) as Cost Analyst (65W) in Defense Acquisition.
- Advised 12 students and served on 36 more committees engaged in relevant defense-sponsored topics.



Research Interest Areas

- Economics
- Cost and schedule analysis
- Public choice
- Operating and support costs
- Effects of acquisition reforms on cost growth in DoD weapon systems
- Research and development cost estimation
- Economic institutional analysis



Maj Steven J. Schuldt, P.E.

PhD, Civil Engineering, University of Illinois at Urbana-Champaign

Assistant Professor of Engineering Management

Most Notable Publications

Schuldt, S., El-Rayes, K., Soylemezoglu, A., and Garfinkle, N. (2019). "Minimizing consequences of explosive attacks on remote construction sites." *Journal of Performance of Constructed Facilities* (to appear).

Schuldt, S., and El-Rayes, K. (2018). "Optimizing the Planning of Remote Construction Sites to Minimize Facility Destruction from Explosive Attacks." *Journal of Construction Engineering and Management*, 144(5), 4018020.

Schuldt, S., and El-Rayes, K. (2017). "Quantifying Blast Effects on Constructed Facilities behind Blast Walls." *Journal of Performance of Constructed Facilities*, 31(4), 4017027.

Hoisington, A., Stearns-Yoder, K., **Schuldt, S.**, Beemer, C., Maestre, J., Kinney, K., Postolache, T., Lowry, C., and Brenner, L. (2019). "Ten questions concerning the built environment and mental health." *Building and Environment*, 155, 58–69.

Janeczko, A., Walters, E. B., **Schuldt, S.**, Magnuson, M, Willison, S., Brown, L., Ruiz, O., Felker, D., and Racz, L. (2014). "Fate of malathion and a phosphonic acid in activated sludge with varying solids retention times." *Water Research*, 57, 127–139.

Selected Honors & Awards

- AFIT Leslie M. Norton Teaching Excellence Award, 2019
- Air Force Major General L. Dean Fox Award, 2018
- Air Education and Training Command Field Grade Officer of the Year, 2018
- National Society of American Military Engineers Sverdrup Medal, 2018
- Air Force Arthur S. Flemming Award for Basic Science, 2017
- Air Force Federal Engineer of the Year, 2017
- Kunsan Air Base Field Grade Officer of the Year, 2017



Research Interest Areas

- Installation Resilience
- Project Management
- Construction Management
- Optimal Resource Utilization
- Sustainability



DEPARTMENT OF SYSTEMS ENGINEERING & MANAGEMENT



Maj John X. Situ

PhD, Systems Engineering & Operations Research, George Mason University

Assistant Professor of Systems Engineering

Most Notable Publications

Situ, John X.; Friend, Mark A.; Bauer, Kenneth W.; Bihl, Trevor J. "Contextual Features and Bayesian Belief Networks for Improved Synthetic Aperture Radar Combat Identification". *Military Operations Research Society Journal*, Vol 21, No 1, 2016.

Selected Honors & Awards

- Meritorious Service Medal
- Air Force Commendation Medal



Research Interest Areas

- Decision Analysis
- Stochastic Optimization
- Meta-heuristics
- Modeling & Simulation
- Dynamic Programming



Dr. Jeremy M. Slagley, CIH, CSP

PhD, Occupational Safety and Health, West Virginia University

Assistant Professor of Industrial Hygiene and Environmental Science

Most Notable Publications

Mukherjee, C., Denney, J., Mbonimpa, E. G., **Slagley, J.**, & Bhowmik, R. (2020). "A review on municipal solid waste-to-energy trends in the USA." *Renewable and Sustainable Energy Reviews*, 119, 109512.

Trawick, J., **Slagley, J.**, and Enginger, E. (2019). "Occupational Noise Dose Reduction via Behavior Modification Using In-Ear Dosimetry among United States Air Force Personnel Exposed to Continuous and Impulse Noise." *Open Journal of Safety Science and Technology*, 9:2, 61-81.

Titus, E., Lemmer, G., **Slagley, J.**, Enginger, R. (2019). "A Review of CBRN Topics Related to Military and Civilian Patient Exposure and Decontamination." *American Journal of Disaster Medicine*, 14(2), 137-149.

Schaal, N., **Slagley, J.**, Richburg, C., Zreiqat, M., & Paschold, H. (2018). "Chemical induced hearing loss in shipyard workers." *Journal of Occupational and Environmental Medicine*, 60(1), e55-e62. JIF: 1.861

Slagley, J.M., Paschold, H., Engler, J. (2017). "Evaluation of Coverall Field Dry Aerosol Decontamination Methods Using a Manikin" *Journal of Occupational and Environmental Hygiene*, 14(7), 502-509. DOI: 10.1080/15459624.2017.1296235. JIF: 1.462

Selected Honors & Awards

- 2018 Southwest Ohio Council for Higher Education (SOCHE) Faculty Excellence
- 2017 AFIT Cat III Civilian of the Quarter
- 2011 Best Journal Publication Award, American Industrial Hygiene Association (AIHA), Engineering Committee

Significant Accomplishments

- ABET Program Evaluator
- Member, Noise Committee, AIHA (2004-present) [Chair 2015-2016; 2018-2019]



Research Interest Areas

- Engineering controls of occupational health hazards
- Exposure assessment strategies
- Hazardous noise
- Aerosols
- CBRN detection and decontamination



Lt Col John E. Stubbs

PhD, Systems Engineering, Air Force Institute of Technology

Deputy Department Head, Systems Engineering and Management

Assistant Professor and Program Chair of Environmental Engineering and Science

Most Notable Publications

Dyson, Sean, Schmidt, Chris, **Stubbs, John**. "A Preliminary Treatment Train Study: Removal of Per-fluorinated Compounds From Post-Emergency Wastewater by Advanced Oxidation Process and Granular Activated Carbon Adsorption". Textbook chapter. CRC Press. 2018.

Dyson, Sean, **Stubbs, John**, Magnuson, Matthew, Mills, Marc. "Removal of Perfluorinated Compounds from Post-Emergency Wastewater by Advanced Oxidation Process and Granular Activated Carbon Adsorption". *2018 International Decontamination Research and Development Conference*, Research Triangle Park, NC, 8-10 May, 2018.

Stewart, Brandon, Miller, Michael E., Kempisty, David, **Stubbs, John**, Harper, Willie. "Oxidation of Tartrazine with Ultraviolet Light Emitting Diodes: pH and Duty Cycle Effects". *Water Science and Technology*, 2018.

Phillips, Rebecca, Magnuson, Matthew, Szabo, Jeff, Hall, John, Mills, Marc, Xing, Yun, Dyson, Sean, **Stubbs, John**, Kempisty, David. "Being Your Own Worst Enemy: Treatment of Perfluorinated Firefighting Foams with Advanced Oxidation & Adsorption", *CBERNe Convergence Congress and Exhibition*, Indianapolis, IN, 2017.

Magnuson, Matthew, Szabo, Jeff, Hall, John, Phillips, Rebecca, Harper, Willie, **Stubbs, John**. "The Science Behind the Scene: Overview of Research to Support CBRN Incident Response & Recovery at EPA National Homeland Security Research Center and US Air Force Institute of Technology", *CBERNe Convergence Congress and Exhibition*, Indianapolis, IN, 2017.



Research Interest Areas

- Physical water treatment processes
- Chemical water treatment processes
- Water treatment trains
- Environmental sustainability

Selected Honors & Awards

- Meritorious Service Medal, 2014

Significant Accomplishments

- Russell, Morgan M., Stubbs, John E., Kempisty, David M., "Water treatment system with ultraviolet LEDs and photo-catalysts". Patent pending, filed February 2018.



Dr. Alfred E. Thal, Jr.

PhD, Environmental Engineering, University of Oklahoma

Associate Professor of Engineering Management

Most Notable Publications

Clayson, D.S., **A.E. Thal, Jr.**, and E.D. White III, "Cost Performance Index Stability in Environmental Remediation Projects," *Journal of Defense Analytics and Logistics* (accepted 30 April 2018).

Alley, S.L., V.V. Valencia, **A.E. Thal, Jr.**, and E.D. White III, "Probabilistic Assessment of Failure for United States Air Force Building Systems," *Journal of Performance of Constructed Facilities*, 2017.

Emery, I., E. Mbonimpa, and **A.E. Thal, Jr.**, "Climate-based Policies May Increase Life-cycle Social Costs of Vehicle Fleet Operation," *Energy Policy*, 2017.

Valencia, V.V., **A.E. Thal, Jr.**, J.M. Colombi, and W.E. Sitzabee, "Infrastructure Decay Modeling With the Input-Output Inoperability Model," *Journal of Risk and Uncertainty in Engineering Systems*, 2015.

Griffin, J.S., **A.E. Thal, Jr.**, and S.E. Leach, "Enhancing Asset Management Through a Better Understanding of Energy Consumption," *International Journal of Strategic Property Mgmt*, 2014.

Nyikos*, D.M., **A.E. Thal, Jr.**, M.J. Hicks, and S.E. Leach, "To LEED or not to LEED: Analysis of Cost Premiums Associated with Sustainable Facility Design," *Engineering Management Journal*, 2012.

Thal, A.E., Jr., and D.E. Shahady, "Innovation in a Military Research Laboratory: An Initial Exploratory Study," *Technology Analysis and Strategic Management*, 2010.

Selected Honors & Awards

- Sigma Iota Epsilon (SIE) Management Instructor of the Year, 2015
- Best Application Paper Award, Western Decision Sciences Institute (WDSI) Annual Meeting, Maui, Hawaii, 31 Mar-3 Apr, 2015
- Best Paper Award in Engineering Economy Track, Industrial and Systems Engineering Research Conference (ISERC), Orlando, Florida, May 19-23, 2012
- Merritt A. Williamson Best Conference Paper Award, American Society of Engineering Management (ASEM), Rogers, Arkansas, October 13-16, 2010



Research Interest Areas

- Engineering management
- Facility/infrastructure management
- Project management
- Risk management
- Economic analysis
- Innovation
- Sustainability
- Process improvement



DEPARTMENT OF SYSTEMS ENGINEERING & MANAGEMENT



Lt Col Torrey J. Wagner

PhD, Electrical Engineering, Air Force Institute of Technology

Assistant Professor of Systems Engineering

Most Notable Publications

T. Wagner, T. Ford, "DoD Applications of Agile Software Systems Engineering Methods", *Journal of Defense Research & Engineering*, Vol. 1, No. 3 (2018).

J. Poole, **T. Wagner**, D. Dudis, "8x Raven-class Small UAS Endurance with an Optimized Hybrid Solid Oxide Fuel Cell & Battery Energy System", *Journal of Defense Research & Engineering*, Vol. 1, No. 2 (2018).

N. Thomsen*, **T. Wagner**, A. Hoisington, S. Schuldt, "A Sustainable Prototype for Renewable Energy: Optimized Prime-Power Generator Solar Array Replacement," *International Journal of Energy Production and Management*, Vol. 4, No. 1 (2019).

D. Chester, **T. Wagner**, D. Dudis, "36% Reduction in Fuel Resupply Using a Hybrid Generator & Battery System for an Austere Location", *Marine Corps Gazette – The Professional Journal of the United States Marine Corps*, Vol. 103, No. 3 (2019).

T. McWhirter*, **T. Wagner**, D. Rizzo, J. Stubbs, J. Williams, "Tracked vehicle physics-based energy modelling and series hybrid system optimization for the Bradley fighting vehicle," *Int'l Journal of Electric & Hybrid Vehicles* (to appear).

Selected Honors & Awards

- 2018 – Edward Hirsch writing competition award, Defense Acquisition University

Significant Accomplishments

- Developed a 3 course graduate Energy Systems Engineering track for the Systems Engineering program (2019)
- Meritorious Service Medal, 3rd oak leaf cluster (2017)
- Defense Meritorious Service Medal (2013)



Research Interest Areas

- Energy Systems Engineering

FACULTY DIRECTORY

DEPARTMENT OF AERONAUTICS & ASTRONAUTICS

Maj Robert Bettinger	7
Maj Brian Bohan	8
Dr. Richard Cobb	9
Dr. Ramana Grandhi	10
Dr. Robert Greendyke	11
Dr. Carl Hartsfield	12
Maj Joshua Hess	13
Lt Col Kirk Johnson	14
Maj Ryan Kemnitz	15
Dr. Andrew Keys	16
Lt Col Jeffrey Komives	17
Dr. Donald Kunz	18
Dr. Bradley Liebst	6
Lt Col Bryan Little	19
Dr. Anthony Palazotto	20
Dr. Marc Polanka	21
Dr. Mark Reeder	22
Dr. Marina Ruggles-Wrenn	23
Lt Col James Rutledge	24
Dr. Fred Schauer	25
Maj Levi Thomas	26
Lt Col Michael Walker	27
Dr. William Wiesel	28
Maj Costantinos Zagaris	29

DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING

Maj David Becker	31
Maj Joan Betances	32
Dr. Brett Borghetti	33
Dr. Stephen Cain	34
Capt Aaron Canciani	35
Dr. Hengky Chandralalim	36
Dr. Peter Collins	37
Lt Col Mark DeYoung	38
Maj Richard Dill	39
Dr. Scott Graham	40
Dr. Sanjeev Gunawardena	41
Maj Nicolas Hamilton	42
Dr. Michael Havrilla	43
Dr. Douglas Hodson	44
Dr. Kenneth Hopkinson	30
Dr. Julie Jackson	45
Lt Col David King	46
Dr. Gary Lamont	47
Maj Tod Laurvick	48
Dr. Robert Leishman	49
Maj James Lievsay	50
Dr. Richard Martin	51
Dr. Laurence Merkle	52
Dr. Robert Mills	53
Dr. Barry Mullins	54
Lt Col George Noel	55
Dr. Scott Nykl	56
Dr. Meir Pachter	57
Dr. Gilbert Peterson	58
Lt Col Patrick Sweeney	59
Dr. Clark Taylor	60
Dr. Michael Temple	61
Dr. Andrew Terzuoli	62

DEPARTMENT OF ENGINEERING PHYSICS

Dr. William Bailey	64
Maj James Bevins	65
Dr. Abigail Bickley	66
Dr. Santasri Bose-Pillai	67
Dr. Larry Burggraf	68
Lt Col Kenneth Burgi	63
Lt Col Samuel Butler	69
Dr. Michael Caylor	70
Dr. Justin Clinton	71
Lt Col Michael Dexter	72
Maj Daniel Emmons	73
Col James Fee	74
Dr. Manuel Ferdinandus	75
Dr. Steven Fiorino	76
Lt Col Anthony Franz	77
Dr. Nancy Giles	78
Dr. Michael Hawks	79
Maj Nicholas Herr	80
Lt Col Edward Hobbs	81
Lt Col Michael Hogsed	82
Dr. Darren Holland	83
CDR Royce James	84
Lt Col Christopher Lenyk	85
Dr. Robert Loper	86
Dr. Kirk Mathews	87
Dr. Michael Marciniaak	88
Dr. John McClory	89
Dr. Jack McCrae	90
Maj Omar Nava	91
Dr. Michael Pak	92
Dr. Anil Patnaik	93
Dr. Glen Perram	94
Dr. James Petrosky	95
Dr. Grady Phillips	96
Dr. Christopher Rice	97
Dr. Heidi Ries	98
Dr. Adib Samin	99
Lt Col Michael Shattan	100
Dr. Bryan Steward	101
Lt Col Robert Tournay	102
Maj Rose Tseng	103
Dr. Ronald Tuttle	104
Dr. Gaiven Varshney	105
Dr. David Weeks	106
Dr. Paul Wolf	107

DEPARTMENT OF MATHEMATICS & STATISTICS

Dr. Benjamin Akers	109
Maj Timothy Anderson	110
Dr. William Baker	111
Maj Eric Brooks	112
Dr. Dursun Bulutoglu	113
Dr. Matthew Fickus	114
Lt Col Andrew Geyer	115
Lt Col Robert Hartlage	116
Lt Col Jeremy Jordan	117
Dr. Alan Lair	108
Capt Tony Liu	118
Dr. Amy Magnus	119
Maj Dana Morrill	120
Lt Col Beau Nunnally	121
Dr. Mark Oxley	122
Dr. Christine Schubert-Kabban	123
Capt Jonathan Turner	124
Dr. Edward White	125
Dr. Aihua Wood	126

DEPARTMENT OF OPERATIONAL SCIENCES

Dr. Darryl Ahner	128
Lt Col Jason Anderson	129
Maj Timothy Breitbach	130
Dr. Frank Ciarallo	131
Dr. Lance Champagne	132
Lt Col Bruce Cox	133
Dr. William Cunningham	134
Dr. Richard Deckro	135
Lt Col John Dickens	136
Dr. Mark Gallagher	137
Dr. Raymond Hill	138
Maj Timothy Holzmann	139
Capt Phillip Jenkins	140
Dr. Seong-Jong Joo	141
Lt Col Phillip LaCasse	142
Dr. Brian Lunday	143
Dr. John Miller	144
Dr. Matthew JD Robbins	145
Dr. Joseph Pignatiello	127
Maj Thomas Talafuse	146
Dr. Jeffery Weir	147
Lt Col Marcelo Zawadzki	148

DEPARTMENT OF SYSTEMS ENGINEERING & MANAGEMENT

Dr. Adedeji Badiru	5
Dr. Christopher Chini	150
Dr. John Colombi	151
Maj Casey Cooper	152
Lt Col Amy Cox	153
Maj Justin Delorit	154
Maj Scott Drylie	155
Dr. John Elshaw	156
Maj Ryan Engle	157
Dr. Robert Fass	158
Dr. Thomas Ford	159
Maj Jason Freels	160
Dr. Mark Goltz	161
Dr. Michael R. Grimaila	149
Dr. Willie Harper	162
Lt Col Andrew Hoisington	163
Dr. David Jacques	164
Lt Col Clay Koschnick	165
Maj Joseph Kristbaum	166
Dr. Brent Langhals	167
Dr. David Long	168
Dr. Eric Mbonimpa	169
Dr. Michael Miller	170
Dr. Mark Reith	171
Dr. Jonathan Ritschel	172
Maj Steven Schuldts	173
Maj John Situ	174
Dr. Jeremy Slagley	175
Lt Col John Stubbs	176
Dr. Alfred Thal	177
Lt Col Torrey Wagner	178

Graduate School faculty directory current as of November 2019. Names appear in alphabetical order by department. Graduate School Dean and Department Head names appear in bold.



Graduate School of Engineering & Management

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