3-2023

The AFIT ENgineer, Volume 5, issue 1

Graduate School of Engineering and Management, Air Force Institute of Technology

AIR FORCE INSTITUTE OF TECHNOLOGY GRADUATE SCHOOL OF ENGINEERING & MANAGEMENT

AFIT ENGINEER

The Graduate School of the U.S. Air Force

March 2023 | Vol. 5, Issue 1

More Than 200 Scholars Earn Diplomas at AFIT 2023 Graduation

By Caroline Clauson
88th Air Base Wing Public Affairs

Over 200 graduates endured years of late nights, long hours, painstaking research and pandemic ups and downs to finally cross the stage and receive their diplomas from the Air Force Institute of Technology's Graduate School of Engineering and Management on March 23 at the National Museum of the U.S. Air Force.

This graduating class includes 172 Department of Defense officers, seven enlisted, 19 civilians, seven defense industry contractors, and two international students from Australia and Israel.

Of the 208 degrees awarded, the Graduate School conferred 203 master's degrees and five doctorate degrees in science, technology, engineering and math fields. One graduate earned dual degrees in data science and operations research. Students represent every branch of the military, with 157 Air Force, 13 Space Force, seven Army, four Marine and one Air National Guard members receiving degrees. Additionally, six graduates from previous quarters returned to walk in the ceremony.

Walter Jones, AFIT's director and chancellor, introduced the ceremony's guest speaker, retired Gen. Lester Lyles, former commander of Air Force Materiel Command at Wright-Patterson Air Force Base.

"Gen. Lyles is someone who I admired and respected for many years and who now has become a dear friend," Jones said. "Given all his important activity, I'm delighted he could find the time to be with us tonight on this very special occasion."

Lyles celebrated the passion that pushed the graduates through their education and challenged them to carry a similar passion for their fields into the next steps they'll take for their nation.

"I'm a lover of technology and a lover of science," Lyles said. "I have been my whole life. And as I look out in the audience, I know all of you exhibit and have expressed passion for science and technology. I love that passion."

Other officials in attendance included Dr. Heidi Ries, AFIT provost and chief academic officer, and Dr. Adedeji Badiru, dean of the Graduate School.

"Communicate," Lyles charged the graduates. "Like great engineers, you know that great communication is more than just transmitting. It's mostly receiving. I'm a big believer in talking less and listening more. But I feel very confident that as you all get into your jobs, careers and whatever you're going to be doing for your country and services, we will hear you by the excellence you're going to demonstrate in the endeavors and technology you're a part of."

U.S. Air Force photo by R.J. Oriez

Retired Air Force Gen. Lester Lyles gives the commencement address at AFIT's 2023 graduation ceremony March 23, 2023, at the National Museum of the Air Force at Wright-Patterson AFB, Ohio.

GRADUATION NEWS

INSIDE THIS ISSUE

Find past issues online at:
www.AFIT.edu/EN/afitengineer

Graduation Week is Full of Outstanding Milestones

Readers, supporters, and observers, it is once again that milestone point in the year when we graduate our largest group of MS and PhD students. As we have done for decades in the past, we produce technically astute thought leaders for the U.S. Air Force, U.S. Space Force, and sister services. Students from allied countries were among this year's group of graduates. No nation can do it all alone in today's highly contested platforms of operation. For this reason, we rely more and more on partnering with allied and friendly countries. Advanced educational exchange is the common thread through which AFIT connects the national defense mission of the United States to the needs of allied countries. I am always delighted to see the diversity of national origins on our graduation stage.

The article on the front cover of this issue contains the production metrics by which we affirm our mission. If you have already quickly scanned through the cover story, please go back and read it again to see the diverse graduating class demographics which impacts AFIT's contribution to our national defense. We are here because of the students. The students come here because we offer what they need to enmesh with the top intellectual and operational priorities of the Air Force. For this reason, we are constantly pushing up the boundary of innovation in our teaching and research missions.

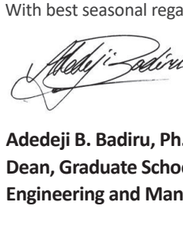
As you read through this newsletter, you will see direct evidence of how we teach what we research and research what we teach. That is the essence of recognizing the 2023 Dean's Distinguished Teaching Professor Awards (shown on page 8). These are men and women with the intellectual boldness and military mindset to dare to go into the classroom with new ideas that challenge the students to the core of their preparedness. Please join me in recognizing and thanking these fantastic faculty members.

I am equally proud of our support staff who move to the instructional frontline to support students' administrative needs and project requirements. Of particular note is the AFIT Model Shop, whose employees consistently produce industry-standard model projects to support our teaching and research mission. The excellence observed in many student projects can be traced to the contributions provided by the AFIT Model Shop. Read about the diverse craftsmanship of the shop's most celebrated projects on pages 10-11.

What happens to our graduates after they depart AFIT and take the next step in their careers? See the summary of post-graduation assignments of our students on page 13. The diversity of post-grad assignments proves that our students are prepared to serve across various platforms of national defense. Kudos to the academic departments that prepare the students for operational versatility. Our research centers also make contributions in preparing our students by providing technical testbeds for turning ideas into practical fruition. In this regard, we are delighted to provide coverage of the directed energy research at AFIT. The Center for Direct Energy (CDE) is the focus on page 16.

As usual, do not hesitate to engage with us and provide feedback. We thrive on working together with our constituents. We are looking forward to hearing from you.

With best seasonal regards,



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

TEACHING WHAT WE RESEARCH. RESEARCHING WHAT WE TEACH.

AFIT ENGINEER
The Source for Air Force Institute of Technology Graduate School News

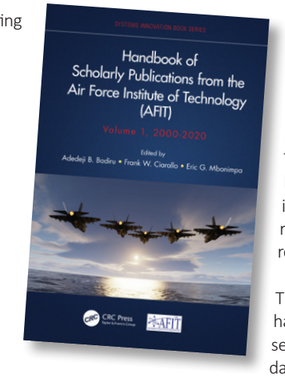
The AFIT Engineer is the official newsletter of the Graduate School of Engineering and Management at the Air Force Institute of Technology. AFIT Engineer is published quarterly for the AFIT community, Air and Space Forces leadership, alumni and external stakeholders.
Approved for public release; distribution unlimited. #88ABW-2023-0463

STAY CONNECTED www.AFIT.edu/EN | www.AFIT.edu/EN/afitengineer

Office of the Dean
Graduate School of Engineering & Management
2950 Hobson Way
Building 640, Room 302B
Wright-Patterson AFB, OH 45433

Graduate School Publishes Unique Handbook of AFIT Scholarly Publications

With an interest in manifesting the philosophy that if it has not been written or documented, it never happened, the Graduate School of Engineering and Management embarked on a two-year project of developing a technical manuscript that represents a collection of selected faculty journal publications over two decades. The result is the Handbook of Scholarly Publication from the Air Force Institute of Technology, Volume I: 2000-2020.

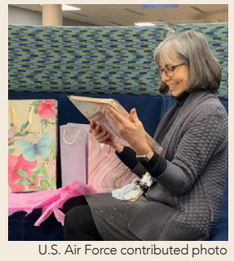


The handbook represents a rare collection of selected journal publications that originated from AFIT between 2000 and 2020. Such publications have influenced science and technology developments that support national defense. The handbook presents a critical mass of intellectual publications with a theme that benefits all spheres of technology, business, industry, government, and the military. The collection is based on previously technically-refereed and published journal articles. This unique collection, never before done by any other institution, is a valuable resource for guiding new research pursuits.

The topics covered in the handbook include cyber security, space technologies, data analytics, human factors, electromagnetics, materials science, optical technologies, and closely-related fields. In her foreword for the handbook, Dr. Heidi Ries, provost and chief academic officer of AFIT, commented that AFIT has a long history of contributions related to radar development, low observable technologies, and communications. She also remarked that the growing importance of successful operations in space is represented in the handbook.

Beloved AFIT Librarian Retires after 20 Years of Air Force Service

Ms. Ilova K. Oyola, librarian at the D'Azzo Research Library, retired from her position on Dec. 30, 2022 after 20 years of service to Air Force libraries. After working as director at the Air Force base libraries at Wright-Patterson AFB and Aviano AFB, Oyola joined the library staff at the Air Force Institute of Technology in December 2013. During her tenure, Oyola helped countless students and faculty with their research as liaison to the engineering physics and mathematics and statistics departments within the Graduate School. She also served as manager of the Ask a Librarian service. Oyola celebrated her retirement with library staff members earlier this month, and was honored with the Air Force Outstanding Civilian Career Service Award.



U.S. Air Force contributed photo

Ms. Ilova Oyola celebrated her retirement from the D'Azzo Research Library at AFIT in December 2022.

DAF Black History Month STEM Achievement Panel Features AFIT Faculty

By Staff Sgt. Spencer Slocum
316th Wing Public Affairs

JOINT BASE ANDREWS, Md. (AFNS)—The Department of the Air Force hosted a Black History Month event at the General Jacob E. Smart Conference Center, Feb. 23. Led by the Black/African American Employment Strategy Team, or BEST, the theme of the event was African American STEM achievements.

The panel began with remarks from Air Force Chief of Staff Gen. CQ Brown, Jr. where he highlighted the significant contributions African Americans have made in fields related to Science, Technology, Engineering, and Mathematics, and the importance of freedom for all to serve in the military.

The day's guest speakers were then invited to share a short background on themselves. Panelists included members such as Maj. Peter Saunders, Air University Department of Engineering Physics at the Air Force Institute of Technology assistant professor of atmospheric science, and Dr. Reginald Turner, Air University School of Systems and Logistics associate dean.

Maj. Peter Saunders

Dr. Reginald Turner

Panel members were also asked about the importance of celebrating Black History Month, what challenges they have faced, ways to overcome barriers and the experiences that exposed them to STEM career fields.

"I had a sixth or seventh grade math teacher who submitted a grant to buy some computers for his class," Turner said. "He got the proposal funded [and bought three basic computers] and I was hooked. At that point, I had to be involved in anything that involved computers."

2023 Distinguished Graduates

The AFIT chancellor is authorized to designate no more than 10 percent of each graduating class as Distinguished Graduates (DG). The criteria for identifying DG achievement encompasses academic scores, the "whole person" concept based on professional qualities, and the recommendation of the department heads to ensure the students are deserving of the honor. The DGs for the class of 2023:

Department of Aeronautics & Astronautics
Capt. Eric Stubblefield
Capt. Andrew Vogel
Capt. Alexandria Connelly

Department of Electrical & Computer Engineering
Capt. Matthew Johnson
Capt. Adam Nasi
Capt. Bret Wagner
MSgt. Michael Ingold

Department of Engineering Physics
Mr. Chandler Moore
2d Lt. David Howe
Capt Evan Threlkeld

Department of Mathematics & Statistics
SSgt. Evan Lake

Department of Operational Sciences
Maj. Olin Kennedy
2d Lt. Caleb Taylor
2d Lt. Nicholas Crino

Department of Systems Engineering & Management
2d Lt. Alexandra Dobranski
MSgt. Jonathan Moroz
Capt. Ryan Register
Capt. Trevor Bills
Capt. Spencer Figge
Capt. Zachary Ryan

2023 Dean's Award Winners

The Dean's Award recognizes the most exceptional master's thesis by a graduating student within each academic department. Award determination is based on the master's thesis reflecting the most exceptional contribution to scientific, management, or engineering knowledge. Each individual was competitively selected by their respective academic department.
The recipients of the 2023 Dean's Award:

Department of Aeronautics & Astronautics
2d Lt. Bailey Hopkins
Faculty advisor: Lt. Col. James Rutledge

Department of Electrical & Computer Engineering
Capt. Matthew Johnson
Faculty advsior: Dr. Michael Havrilla

Department of Engineering Physics
Mr. Timothy Steimle
Faculty advisor: Dr. Darren Holland

Department of Mathematics & Statistics
SSgt. Evan Lake
Faculty advisor: Dr. Matthew Fickus

Department of Operational Sciences
2d Lt. Nicholas Crino
Faculty advisor: Dr. Bruce Cox

Department of Systems Engineering & Management
Capt. Ryan Register, USMC
Faculty advisor: Dr. Willie Harper

U.S. Air Force photos by R.J. Oriez

The 2023 Dean's Award winners pictured with AFIT leadership Dr. Heidi Ries, provost and chief academic officer, Dr. Walter Jones, director and chancellor, and Dr. Adedeji Badiru, dean of the Graduate School of Engineering and Management.

Complete list of AFIT 2023 graduates: https://e.AFIT.edu/FWQQCxZ

AFIT 2023 Chancellor's Award winner, Capt. Matthew Johnson. Pictured from left is Dr. Adedeji Badiru, Dr. Walter Jones, Capt. Johnson, and Dr. Amanda Bullock, Vice President, AFIT Foundation.

Chancellor's Award Winner

From the collection of Dean's Award recipients, one overall winner is chosen to receive the Chancellor's Award. The Chancellor's Award is presented to the graduating student who produced the most exceptional master's thesis. The 2023 Chancellor's Award and Russ Prize, sponsored by the AFIT Foundation, was presented to **Capt. Matthew Johnson** (M.S. Electrical Engineering).

AFIT GRADUATION 2023

Students Recognized During Awards Ceremony

The Graduate School of Engineering and Management presented student awards at a ceremony prior to the 2023 commencement. The following students were recognized for their exemplary performance:

Capt. Linda Kuster (M.S. Engineering Management) received the Mervin E. Gross Award for her exceptional academic achievement and high qualities of character, initiative and leadership. The award is named in honor of Brig. Gen. Mervin E. Gross, the institute's first commandant.

Master Sgt. Benjamin Johnis (M.S. Logistics and Supply Chain Management) received the Louis F. Polk Award. The winner of this award exhibits the highest standards of academic and professional accomplishment, and through his or her research, makes a significant contribution toward strengthening the nation's industrial defense base.

Capt. Bret Wagner (M.S. Electrical Engineering) received the Edwin E. Aldrin Sr. Award presented for displaying the most exceptional leadership characteristics while in the graduate program. The award is sponsored by the Wright Memorial Chapter of the Air Force Association and named in honor of Lieutenant Edwin E. Aldrin Sr., a member of the institute's first graduating class in 1920. Upon graduation, he became AFIT's first vice commandant.

Staff Sgt. Evan Lake (M.S. Applied Mathematics) received the Secretary James G. Roche Award for demonstrating exceptional academic achievement through a combination of grade-point average and outstanding research, as well as high qualities of character, initiative, leadership and service. The award is named after Air Force Secretary James G. Roche, whose leadership in 2002 led to the first class of NCOs into the Graduate School of Engineering and Management.

SEE THE COMPLETE LIST OF AWARD CATEGORIES & WINNERS

Visit us online at: https://e.AFIT.edu/398wwV

U.S. Air Force photos by R.J. Oriez

Highlights from the March 23 AFIT Graduation at the National Museum of the U.S. Air Force where over 200 graduates received their diplomas.

BY THE NUMBERS

207 GRADS

172 DEPARTMENT OF DEFENSE OFFICERS

7 USAF ENLISTED MEMBERS

19 CIVILIANS

7 DEFENSE INDUSTRY CONTRACTORS

2 INTERNATIONAL STUDENTS

One graduate earned dual degrees

203 MS

5 PHD

MILITARY BRANCHES REPRESENTED

157 USAF
13 USSF
7 ARMY
4 MARINES
1 AIR NATIONAL GUARD

1000+ Doctoral Degrees Awarded

As AFIT students joined together to celebrate their achievements during March graduation week, the Graduate School of Engineering and Management announced an academic milestone of its own.

"The Graduate School is proud to recognize that it has presided over the conferral of 1000+ doctoral degrees over the last 54 years," said Dr. Adedeji Badiru, dean, AFIT Graduate School of Engineering and Management. "This is a landmark accomplishment for AFIT and I am delighted that we have done it at this critical juncture in the history of AFIT."

In 1964, AFIT received approval from the Secretary of the United States Air Force to pursue an accredited doctoral program. Preliminary doctoral program accreditation was granted in 1965 by the North Central Association for a specialized program in aerospace engineering to educate USAF officers primarily for positions of leadership at USAF research laboratories. By 1969, the first class to include PhD students graduated from AFIT. Maj. Gen. Donald L. Lamberson (then a Lt. Col.) – considered to be the father of lasers in the Air Force – earned a PhD in Aerospace Engineering in 1969 and became one of the first PhD graduates of AFIT.

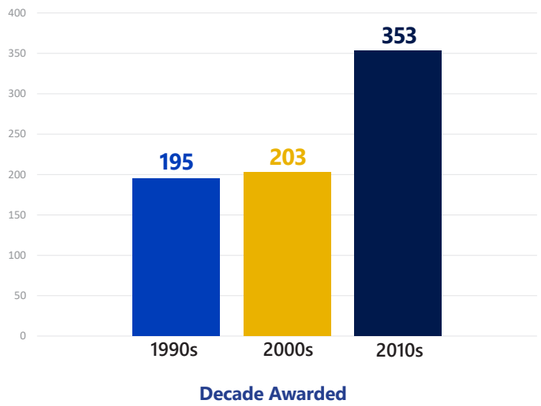
The first major change to AFIT doctoral programs came in 1975, when programs were lengthened to three years and students were expected to complete all academic requirements, including the dissertation, while assigned to AFIT. "In-house doctoral programs led to the development of AFIT's research centers, higher quality research opportunities for all graduate students, and expanded partnerships with AFRL, NASIC, and many others," said Dr. Heidi R. Ries, AFIT provost and chief academic officer.

Early PhD programs at AFIT included aerospace engineering, physics, lasers and optics, and gas dynamics and laser physics. Courses and graduate programs have continued to expand over the years to reflect the changing needs of the USAF and Department of Defense. While AFIT still maintains graduate programs in most of its initial PhD fields of study, computer science, electrical engineering, expanded space programs, and nuclear engineering are just a few of the additional PhD programs currently offered by the Graduate School. In 2023, AFIT offered 14 PhD program choices to enrolled and potential students.

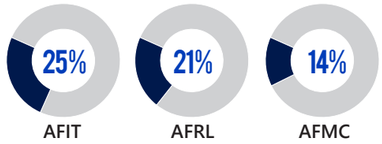
"In 1947, the USAF was born out of an innovative mindset to employ new technology in order to gain the upper hand defending our nation. The USAF today still values this innovative and inventive mindset which has led to over 1000 PhD professional development opportunities for Airmen at the Air Force Institute of Technology," said Col. James Fee, associate dean, Graduate School of Engineering and Management.

By The Numbers

DOCTORAL DEGREES AWARDED AT AFIT



TOP 3 EMPLOYERS of AFIT PhD graduates



PhD data is from 2017–2022

12 INTERNATIONAL OFFICERS have earned PhDs from AFIT and hail from these countries:

Egypt
South Korea
Bahrain
Greece
Taiwan
Pakistan

38%

Percentage of current AFIT Graduate School faculty who received their PhD from AFIT.

Includes military & civilian faculty.

AFIT PhD Timeline

1964
AFIT received approval from the Secretary of the Air Force to pursue an accredited doctoral program.

1965
Preliminary doctoral program accreditation was granted by the North Central Association for a specialized program in aerospace engineering to educate USAF officers.

1969
The first class to include doctoral degree students graduated from AFIT. Maj. Gen. Donald Lamberson – considered to be the father of lasers in the USAF – was one of AFIT's first PhD graduates.

1970
AFIT's doctoral degree program in engineering science received full accreditation at the doctoral level from the North Central Association of Colleges and Secondary Schools NCA.

1975
The doctoral program at AFIT was lengthened to three years, and students were expected to complete all requirements, including the dissertation, while assigned to AFIT.

1987
Dr. Ann Wells is the first female to earn a PhD from AFIT. Wells was an AFIT Physics Department student who completed her dissertation on optical physics.

2014
U.S. Army Master Sgt. Jeffery Morris is the first enlisted student to earn a PhD from AFIT. He completed his doctorate in systems engineering with research focused on quantum cryptography.

2023
AFIT celebrates awarding 1,000+ doctoral degrees over the last 54 years in support of the Department of the Air Force and the Department of Defense.

Dean's Distinguished Teaching Professors

AFIT Graduate School of Engineering and Management

The Graduate School of Engineering and Management is proud to announce the Dean's Distinguished Teaching Professors for the academic year 2022-2023. Two professors were designated from each of the Graduate School's six academic departments as listed below.

Aeronautics & Astronautics

Lt. Col. Darrell Crowe, Ph.D.
Assistant Professor
of Aerospace Engineering

Dr. Carl Hartsfield
Associate Professor
of Aerospace Engineering

Electrical & Computer Engineering

Lt. Col. Wayne Henry, Ph.D.
Assistant Professor
of Computer Engineering

Maj. Timothy Wolfe, Ph.D.
Assistant Professor
of Electrical Engineering

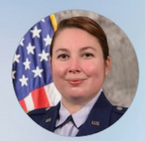
Engineering Physics

Lt. Col. Kyle Fitch, Ph.D.
Assistant Professor
of Atmospheric Science

Maj. Peter Saunders, Ph.D.
Assistant Professor
of Atmospheric Science

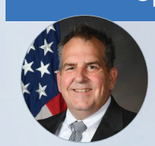
Mathematics & Statistics

Dr. Matthew Fickus
Professor of Mathematics



Maj. Victoria Sieck, Ph.D.
Assistant Professor of Statistics

Operational Sciences



Dr. Lance Champagne
Assistant Professor
of Operations Research

Dr. Bruce Cox
Assistant Professor
of Operations Research

Systems Engineering & Management

Dr. John Colombi
Professor of Systems Engineering

Dr. David Fass
Assistant Professor of Systems
Integration and Cost Analysis

Dean for Research Receives ITEA's Highest Award

International Test and Evaluation Association Recognizes Dr. Darryl Ahner's Distinguished T&E Career

By Jessica Blevins
Air Force Institute of Technology

Dr. Darryl Ahner, dean for research, Air Force Institute of Technology, was awarded the International Test and Evaluation Association's Allen R. Matthews Award.

ITEA exists to advance the field of test and evaluation worldwide in government, industry and academia by developing resources, best practices, networking and learning opportunities. The Matthews Award is the highest award bestowed by the organization and is granted to individuals in recognition of lasting and significant contributions which are in alignment with the mission and purpose of the ITEA as well as the cumulative effect of a distinguished and impactful career in the field of T&E.

ITEA recognizes that in the past 10 years of service to the T&E community, Ahner has impacted the field with founding the Scientific Test and Analysis Techniques Center of Excellence, his mentorship as a professor, and his commitment to the profession. Under Ahner's leadership, the Center saved Department of Defense and Department of Homeland Security organizations over $232 million in costs and trained over 1,000 professionals. Additionally, the Center published 102 best practices and case studies, many of which are publicly available and collectively have been downloaded over 5,000 times per month. Ahner also assisted with the Certified Test and Evaluation Professional credential, developing the framework and contributing numerous questions to the exam.

U.S. Air Force contributed photo

Stephanie Clewer, chair, ITEA Professional Test and Evaluation Awards Committee, presented Dr. Darryl Ahner the International Test and Evaluation Association's Allen R. Matthews Award.

AFIT Associate Dean Selected as Modern-Day Technology Leader

Dr. Reginald Turner, associate dean of the Air Force Institute of Technology's School of Systems and Logistics, was selected to receive the Modern-Day Technology Leader award from Career Communications Group, publisher of *U.S. Black Engineer and Information Technology* magazine. The award is given to recognize men and women who demonstrate outstanding performance in science, technology, engineering, and mathematics. The award was presented at the 37th BEYA STEM Conference in National Harbor, M.D.

Dr. Reginald Turner

Turner, who earned his PhD in Electrical Engineering from AFIT in 2008, is recognized for his effort in founding the first ever Historically Black Colleges and University Digital Literacy Summit sponsored by the Department of the Air Force. Turner pulled together a group of highly skilled and dedicated members from AFIT, the Air Force Research Laboratory, Central State University, and Infinite Management Solutions to hold a two-day summit. Thought leaders, practitioners, students, advocates and other interested parties from the DAF, the HBCU community, and industry were assembled to develop actionable strategies to build STEM capacity and capability at HBCUs, enabling them to be equal partners with the DAF in addressing challenging digital transformation concerns.

READ THE FULL STORY ONLINE

Visit our website at: https://e.AFIT.edu/df76Q1

Faculty Member Nominated for Arthur S. Flemming Award

Dr. Willie F. Harper, Jr., AFIT professor of environmental engineering and science, has been nominated for the 74th Annual Arthur S. Flemming Award. USAF Air Education and Training Command (AETC) has selected Harper to compete in the Applied Science and Engineering Category at the Air Force level for this award.

Dr. Willie Harper, Jr.

This award is sponsored by the Arthur S. Flemming Awards Commission in partnership with the George Washington University. It honors outstanding federal employees who have made significant and extraordinary contributions to the federal government. The award's purpose is fourfold: to recognize outstanding and meritorious achievement while working for the federal government; to encourage the highest standards of performance in the federal service; to enhance appreciation of our form of government and the opportunities and responsibilities it presents; and to attract outstanding individuals to a career in federal service.

Dr. Harper's research has revealed new insights related to the removal of high consequence bio contaminants and toxic chemicals from water. Dr. Harper's career as a faculty member spans 20 years. He has taught a variety of related courses and has executed over $2.5 million dollars in federally-sponsored research grants. His research record includes 80 publications, including 53 peer-reviewed journal articles, and he has been honored with numerous several distinctive awards.

AFIT Model Shop Team Members Recognized for Outstanding Craftsmanship

As part of the March graduation week awards festivities, Dr. Adedeji Badiru, Graduate School of Engineering and Management dean, presented a special recognition to AFIT Model Fabrication Shop team members for their continued support of Graduate School research. Dr. Badiru thanked the team by presenting each member with a certificate of appreciation for outstanding craftsmanship along with a special Graduate School dean's coin.

The AFIT Model Shop began supporting Graduate School research at its current location around 1961. In 2008, Mr. Jan LeValley, former shop supervisor, advanced the capability for complex work with a new team of model makers and high-performance machining technology, such as 4-axis wire EDM and 5-axis milling and waterjet machines. These model makers were hand-picked for their unique abilities to provide specific design and manufacturing solutions as the demand for complex projects increased. In 2016 team member Mr. Brian Crabtree stepped into the role of model shop supervisor. In his supervisory role, Crabtree has led the charge in transforming the shop into a cutting-edge facility capable of state-of-the-art-manufacturing and a "no job too complex or too big/small" mindset. This came in multiple forms, but the most tangible is the upgraded CAD/CAM software packages, advanced inspection equipment, large capacity CNC lathe, CO2/fiber laser cutting machine, and rapid prototype capabilities. These upgrades equate to shorter lead times, superior prototypes, and better quality control leading to high-value testing data for AFIT's research.

Some of the unique and complex projects the team has been tasked with range from CubeSat satellites to highly-intricate Responsive Open-Source Engine (ROSE) impellers, hypersonic missile models, to a practically impossible-to-manufacture pure-tungsten Neutron Collimator. This group of expert craftsmen continues to prove their mettle year after year by providing top-tier design assistance as well as high-quality products in collaboration with Graduate School faculty and students.

The Model Shop team has 110 years of combined experience between its six members. The group's highly collaborative relationship and uncommon gravitas has led to the creation of a sustainable bridge between supporting defense research and a love for the trade.

U.S. Air Force contributed photo

Back row left to right: Brian Crabtree, AFIT Model Shop Supervisor, and Blake Martin. Front row left to right: Chris Harkless, Daniel Ryan, Dr. Adedeji Badiru and Joseph Owings. Not pictured is team member Dean Harshman.

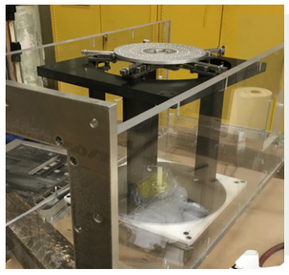
Graduate School students are encouraged to speak to their advisors about how the AFIT Model Shop team may be of help with thesis and dissertation research projects.

CONTACT INFORMATION

EMAIL: ENWMStaff@afit.edu
PHONE: 937-255-2950

Wake Generator

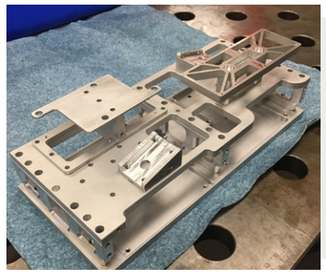
AFIT Department of Aeronautics & Astronautics (Patents Issued)



Manufactured, innovated and assisted in the development of the Wake Generator, adding brand-new technology and capacity to create engine wake signatures in a wind tunnel. Project resulted in patents issued.

Skypad

AFIT Department of Aeronautics & Astronautics, AFIT Center for Space Research & Assurance

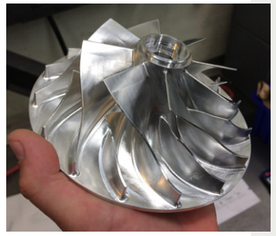


Manufactured test and flight models of Skypad, a cutting-edge idea to trig location real-time on board satellites to reduce downtime and associated costs.

AWARDS & RECOGNITION

Responsive Open-Source Engine (ROSE)

AFIT Department of Aeronautics & Astronautics, Air Force Research Laboratory



ROSE is the first turbine engine designed, assembled, and tested exclusively in-house. This program responds to the Air Force's desire for rapid demonstration of new technologies and faster, less expensive prototypes. This was a first for the AFIT Model Shop. Two additional shops were tasked with this project, but the AFIT Model Shop was the only one to have success machining the turbine.

VIA Multi-Position Seat Device

711th Human Performance Wing (HPW)

Enabled the 711th HPW to test spinal-damage mitigation techniques for pilots by using cadavers on a robust cockpit type seat with camera arm attachments.

AFIT Model Shop Highlighted Projects

DEPARTMENT OF AERONAUTICS & ASTRONAUTICS (ENY)

CubeSat/Grissom
- Assisted ENY with multiple campaigns and types of CubeSat type satellite frames for testing as well as flight models.

Afterburner Rig
- Manufactured rig to allow for expanded research and upgradeable processes.

Spin Rig – (Project for ENY/AFRL)
- Created testing rig for impeller material research at 50,000rpm.

Radial Rotating Detonating Engine
- Provided critical manufacturing solutions for the completion of RRDE.

Cooled Models
- Manufactured mount and testing models for Mach 6+ testing.
- Manufactured throat for Mach 2.5 wind tunnel to run at Mach 4.

Test Specimen Support
- Provided two decades of support for a plethora of test specimen shapes and exotic materials.

Jet Cat
- Designed and manufactured SCRAMJET model for student research.

CMG Project
- Added high quality CMGs to facilitate studies in New Mexico.

Wing Model
- Developed models and innovated a method to have interchangeable wing tips on models to conduct varying pressure tests in low speed wind tunnels.

Space Object Self Tracking Experiment
- Assisted with the design and manufacture of a fully operational SOS tracking experiment flight model.

Leading Edge Wing Research
- Supported students and faculty in ongoing leading edge wing research.

Metal 3D Print Lab Support
- Designed fixtures, parts, and developing sustainable and efficient workflow methods.

Rigidizable Inflatable Get-Away-Special Experiment (RIGEX)
- Manufactured the flight model fixture components for space shuttle Endeavor in 2008.

Missile Models
- Manufactured dozens of Mach 3+ missile models to include some for Mach 5+.

Combustion Rig / Disk Engine – (Project for ENY/Cal Poly College)
- Made engine to such exacting tolerance, it was "too efficient" for full testing.

DEPARTMENT OF SYSTEMS ENGINEERING & MANAGEMENT (ENV)

Exposure Tunnel
- Created exposure tunnel to allow for testing multiple airborne pathogenic scenarios under proper controls.

DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING (ENG)

SHAMU Antenna
- Built mounts and supporting hardware for testing in Nevada.

Lab Support – ENG/ANT Center
- Provided design, manufacturing, and repair of multiple drone and small aircraft projects.

DEPARTMENT OF ENGINEERING PHYSICS (ENP)

Rotating Scatter Mask
- Designed and developed initial test apparatus and improved on it by making it portable.

Saunders Selected as AETC Weather FGO of the Year

Maj. Peter Saunders

Major Peter Saunders was selected as the Air Education and Training Command's Weather Field Grade Officer (FGO) of the Year for 2022. Saunders is an assistant professor of atmospheric science within the Graduate School of Engineering and Management. He will continue to compete at the Air Force level.

"Major Saunders has been absolutely critical to the success of the AFIT atmospheric science program. Students and faculty value his patience and reliability as a teacher, advisor, mentor, and colleague, and rely upon it daily," said Lt. Col. Kyle Fitch, assistant professor of atmospheric science and chair of the atmospheric science curriculum.

For the award cycle of October 2021 through September 2022, Saunders was responsible for obtaining $87k in grants, bolstering the atmospheric science program's research capability for machine learning and modeling studies. He is pioneering global lightning mapper optical energy studies through analysis of regional frequency distribution peaks and applying cutting-edge vector autoregressive moving average modeling to machine learning processes. Additionally, he advised six master's students and served as a PhD committee member for students in the Graduate School's Engineering Physics Department.

"The diversity of research we perform here at AFIT is incredible. In addition to working on studies related to my expertise in weather modeling, I have had the opportunity to broaden my research horizons far beyond what I thought was possible. More importantly, being able to educate students in the field that I love has been such an enriching and amazing experience," said Saunders.

Saunders has served in the Air Force since 2011. He earned his doctoral degree from the University of Utah in Atmospheric Science. Saunders became an AFIT faculty member in 2019 where his research includes furthering the goals of the AFIT Sensor and Scene Emulation Tool (ASSET), to include cloud and lightning climatological data in an effort to create realistic scenes of these phenomena in real time. His research also includes data assimilation of radio occultation observations for use in high-resolution model wind forecasts for the Air Force Technical Applications Center.

READ THE FULL STORY ONLINE

Visit our website at: https://e.AFIT.edu/3gg6p7

AFIT Faculty Patent Licensed for Commercial Use

The Air Force Institute of Technology recently licensed the technology of U.S. Patent No. 9.696.404, titled "Real-time camera tracking system using optical flow feature points," to Tensor Networks located in Sunnyvale, Calif. The patent was awarded to AFIT Department of Aeronautics and Astronautics former faculty members Dr. Jon Black and Dr. Alan Jennings, along with former AFIT graduate student retired Lt. Col. Daniel Doyle, (Ph.D. Aeronautical Engineering, 2013) in July 2017.

"It's always exciting when student and faculty work transitions to industry partners who can leverage our ideas to improve our nation's technology," said Col. Nathan Terry, director, Center for Space Research and Assurance (CSRA) at AFIT.

The patent relies on low-level tracking algorithms to provide new capabilities over existing video processing. This technique is able to identify, magnify, and track moving objects in a video in real-time. By using optical flow, the system tracks general-purpose objects, meaning that extensive training libraries and huge computational and communications resources are not required, yielding a more flexible and adaptable technology applicable to small, portable unmanned systems.

"Leveraging this patent will enable nearly any commercial-grade unmanned system to automatically detect objects in a video frame, zoom-in on those objects, and independently point cameras for tracking, all autonomously and running on single-board-computers that cost less than $1,000," said Dr. Black.

Spacecraft Orbit Determination System Comprising Space-Based Mirror and Optical Sensor Module

U.S. PATENT #: 11,608,195

DATE: March 21, 2023

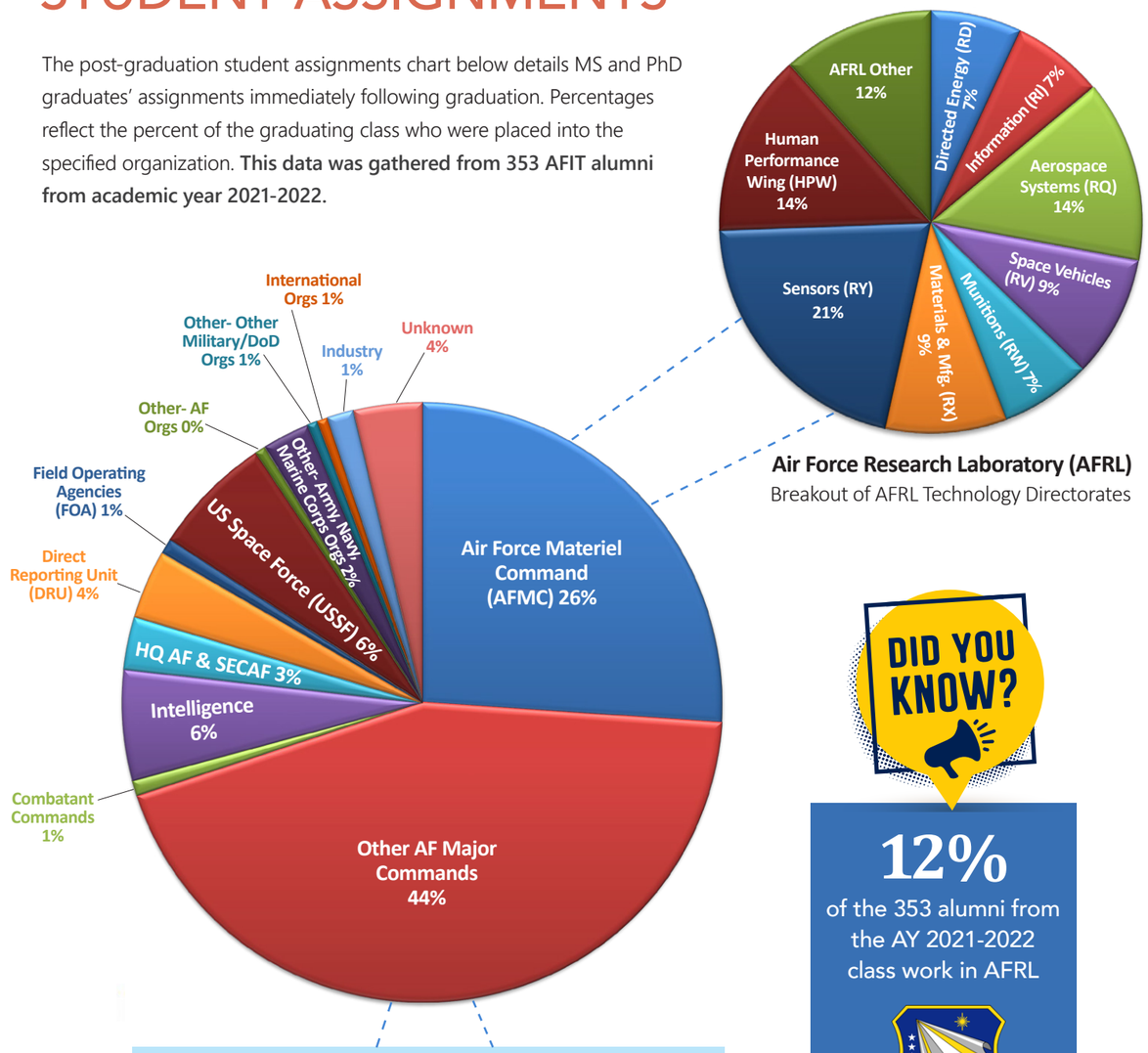
INVENTORS: Lt. Col. Robert A. Bettinger, Daniel M. Dombrowski

ABSTRACT: The present invention relates to a resident space object orbit determination system comprising a high efficiency module for determining a resident space object's orbit and a highly efficient method for determining same. Applicants developed a method and system to determine the orbits of residence space objects including resident space objects that do not reflect energy that is directed at them and/or may be coated to minimize the ability to accurately see such resident space objects. Thus, a method, a module and a system for making such determinations that can easily and inexpensively be added to an early warning reentry system is provided.

LINK: https://image-ppubs.uspto.gov/dirsearch-public/print/downloadPdf/11608195

AY 2021-2022 POST-GRADUATION STUDENT ASSIGNMENTS

The post-graduation student assignments chart below details MS and PhD graduates' assignments immediately following graduation. Percentages reflect the percent of the graduating class who were placed into the specified organization. **This data was gathered from 353 AFIT alumni from academic year 2021-2022.**



Air Force Research Laboratory (AFRL)
Breakout of AFRL Technology Directorates

Breakout of Other AF Major Commands

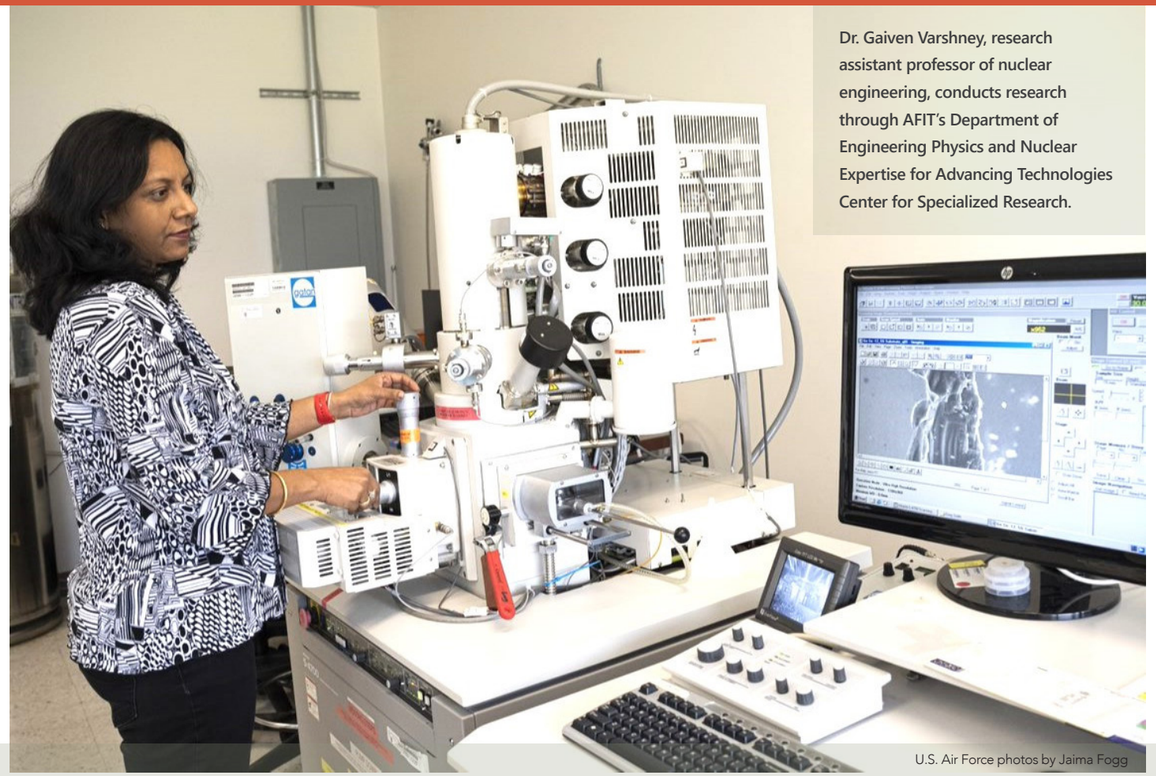
ACC	15%	AFRC	1%	ANG	1%
AETC	59%	AFSOC	1%	PACAF	6%
AFGSC	2%	AMC	14%	USAFE	1%

Other AF MAJCOMs: US Southern Command (USSOUTHCOM) and U.S. Transportation Command (USTRANSCOM) had 0%

12%
of the 353 alumni from the AY 2021-2022 class work in AFRL

Source: AFIT Alumni Affairs and Institutional Advancement Office

Building a RESILIENT WORKFORCE for National Security



Dr. Gaiven Varshney, research assistant professor of nuclear engineering, conducts research through AFIT's Department of Engineering Physics and Nuclear Expertise for Advancing Technologies Center for Specialized Research.

U.S. Air Force photos by Jaima Fogg

> The National Nuclear Forensics Expertise Development program provides critical support to U.S. Homeland Security through the development and maintenance of a continuing national capability to conduct comprehensive and timely forensic analysis of materials that are of national interest.

Joint Efforts in Weapons of Mass Destruction Defense

Dr. Gaiven Varshney

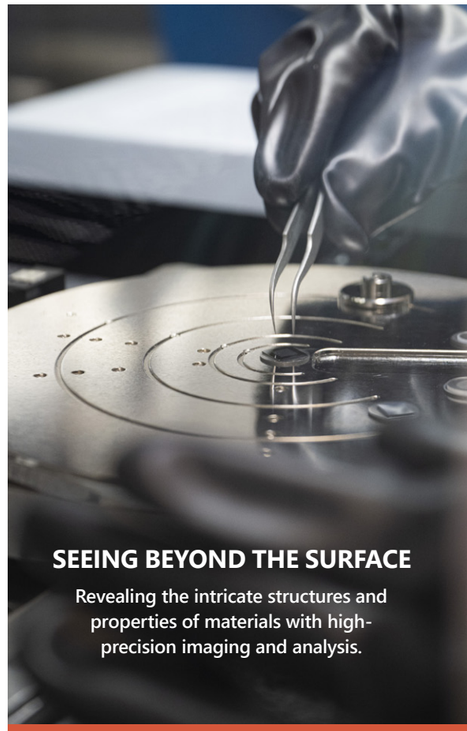
The Air Force Institute of Technology has been providing support to the National Technical Nuclear Forensics Center (NTNFC)* within the U.S. Department of Homeland Security Countering Weapons of Mass Destruction office (DHS CWMD) for more than 10 years. The NTNFC was mandated to enhance the U.S. government's knowledge and capabilities regarding the forensic examination of radiological and nuclear materials. According to the U.S. Department of Homeland Security website, the NTNFC leads the National Nuclear Forensics Expertise Development Program, which is the government's comprehensive effort to grow and sustain the uniquely qualified technical expertise required to execute the nation's nuclear forensics mission.

Dr. Gaiven Varshney, research assistant professor of nuclear engineering, has been a key recipient of the National Nuclear Forensics Expertise Development Program since 2016. "The program provides critical support to U.S. Homeland Security through the development and maintenance of a continuing national capability to conduct comprehensive and timely forensic analysis of materials that are of national interest," said Varshney. AFIT's continued support for the NTNFC has led to a deeper understanding of the forensics research activities associated with nuclear detection and attribution. Since 2008, this research partnership has established increased networking opportunities resulting in expanded knowledge and workforce opportunities, including dozens of capable scientists and four federal civilians, who have contributed to this research at AFIT.

Varshney is an affiliated member of AFIT's Nuclear Expertise for Advancing Technologies (NEAT) Center for Specialized Research and serves as the principal investigator (PI) and Co-PI of multiple research laboratories at AFIT. Through the NEAT Center, her research activities focus on the microstructural and chemical analysis of nuclear debris and trace materials towards better understanding of accident dispersal conditions, process histories, and origins in support of the nuclear forensics mission. "There is continued interest in investigations of actinide-oxides in order to understand their origins and their use in actinide-based detector materials," explained Varshney. Other areas of research Varshney supports include actinide-related research for analysis of environmental effects on nuclear fuels, radiation detection, and characterization of materials.

In addition to her research, Varshney provides expertise and guidance to AFIT students and summer interns conducting research in nuclear engineering. She also contributes to educational materials in her role as co-chair and instructor of the Countering Weapons of Mass Destruction (CWMD) Graduate Certificate Program at AFIT (supported by DHS CWMD office). The CWMD certificate program is designed to enhance the effectiveness of U.S. government personnel, providing a technical foundational knowledge of the current and future chemical, biological, and nuclear threats facing the nation. This program fills the educational needs for DoD personnel requiring an advanced technical understanding of chemical, biological, and nuclear weapon effects on national priorities and military operations. The program consists of courses intended to educate students in the fundamental scientific knowledge necessary for follow-on study of the production, utilization, effects, and mitigation of WMD.

**NTNFC Program has recently been transferred to the National Nuclear Security Administration (NNSA) under the Department of Energy (DOE).*



SEEING BEYOND THE SURFACE

Revealing the intricate structures and properties of materials with high-precision imaging and analysis.

To learn more about the Countering Weapons of Mass Destruction (CWMD) Graduate Certificate Program, view online at: https://e.AFIT.edu/9Y2KK4

Prospective students can apply online at www.AFIT.edu/admissions/AFITapplicationprocess

Directed Energy Research

AFIT Joins the NOAA Federated Aerosol Network via NASIC Collaboration

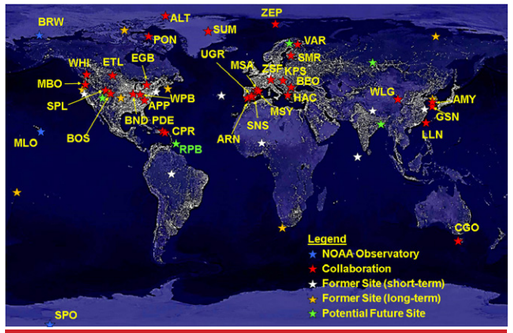
By Dr. Steven Fiorino, Dr. Kevin Keefer, and Ms. Jaclyn Schmidt
Center for Directed Energy
Air Force Institute of Technology

AFIT's Center for Directed Energy (CDE) has been involved in atmospheric aerosol measurements both in the vicinity of its campus at Wright-Patterson AFB, Ohio and off-campus at a variety of climatologically diverse locations across the U.S. to better understand the impacts of aerosol absorption and scattering on directed energy. The center has been committed to advancing and expanding current capabilities to measure atmospheric conditions and incorporate collected data into directed energy performance models as they relate to graduate research. Recent research focus includes quantifying the effects of particulates (aerosols) that are 2.5 microns or less in width, as they reduce visibility and degrade high energy laser performance.

In an effort led by Dr. Steven Fiorino, professor of atmospheric physics and director of AFIT's Center for Directed Energy, and Dr. Kevin Keefer, research assistant professor, atmospheric and aerosol sciences, AFIT-CDE began collaborative discussions with Global Monitoring Laboratory (GML) scientists Patrick Sheridan and Betsy Andrews in 2019 to become a member of the NOAA Federated Aerosol Network (NFAN). Both entities entered into Memorandum of Agreement (MOU) Number GML-AFIT-201 to establish a new NFAN site at WPAFB. This site was listed as operational in January 2022.

NOAA Federated Aerosol Network

The NFAN is a global, 24/7 aerosol monitoring network with a mission of characterizing the means, variability, and trends of climate-forcing properties of different types of aerosols, and to understand the factors that control these properties [1]. The network was created in the 1970's with four baseline observatories (Barrow AK; Mauna Loa Observatory HI; Summit, Greenland; South Pole Observatory) and expanded to 25+ worldwide sites as a partnership between NOAA GML and various research institutes. Long-term measurement of the optical and microphysical properties (e.g., light absorption, scattering, extinction, total number concentration, and particle size distribution) of atmospheric aerosols is a key component of the climate monitoring and research programs of NOAA and its international partners in the NFAN (https://gml.noaa.gov/aero/net/) [2].



Surface aerosol stations in the NOAA Federated Aerosol Network, as of February 2022.

AFIT-CDE Research Initiatives

AFIT has been involved in atmospheric aerosol measurements on campus and at available test ranges on WPAFB over the last few years. AFIT-CDE team members are in charge of operating an all-sky sun-lunar photometer as part of NASA's International Aerosol Robotic Network (https://aeronet.gsfc.nasa.gov/new_web/index.html) located on WPAFB Area B test range, as well as aerosol particle counters and size spectrometers. The data is made available to AFIT graduate research students to address Joint Service directed energy and active/passive sensor capability gaps to characterize atmosphere aerosols and optical effects. AFIT expanded their aerosol measurement capabilities to include standard NFAN equipment along with a continuous light absorption photometer (CLAP), measuring transmission through a filter substrate as sample air is drawn through it. Additionally, AFIT is seeking to tie in their measurements with the NFAN to better leverage the advantages of network operation (i.e., long existing time series, increased spatial coverage, consistent sampling and data processing protocols, etc.). AFIT's goals in making these enhanced long-term capability advancements include the determination of climatological changes in aerosol properties and visibility both in the U.S. and at locations worldwide, the interaction of atmospheric boundary layer constituents and ambient thermodynamic processes, as well as aerosol changes that could affect propagation of electromagnetic radiation, which in turn impacts sensors and directed energy applications such as laser communications [2].

These measurements also facilitate assessments and improvements of global numerical weather models, which is another interest for both AFIT's directed energy performance modeling and NOAA climate modeling. The collaboration to add another site to NFAN is also beneficial for NOAA, as this opportunity provided an economic and efficient way for NOAA to expand global, in-situ aerosol observations.

U.S. Air Force contributed photo

Patrick Sheridan (NOAA GML), Dr. Kevin Keefer (AFIT-CDE), and MSgt. Anthony Erickson (NASIC/GSP) discussing technical aspects of NFAN equipment and data processing during site installation, January 2022.

AIR FORCE IMPACT

AFIT & NASIC Collaboration

After much planning from AFIT-CDE team members, a location on WPAFB was selected based on proximity to known sources of particulates (e.g. car exhaust from nearby traffic) and local climatology (i.e. prevailing winds) to avoid inflated measurements. Another key factor for determining the site location was power source availability. Therefore, the site was designated as best positioned on the Area B test range near the existing sun-lunar-photometer.

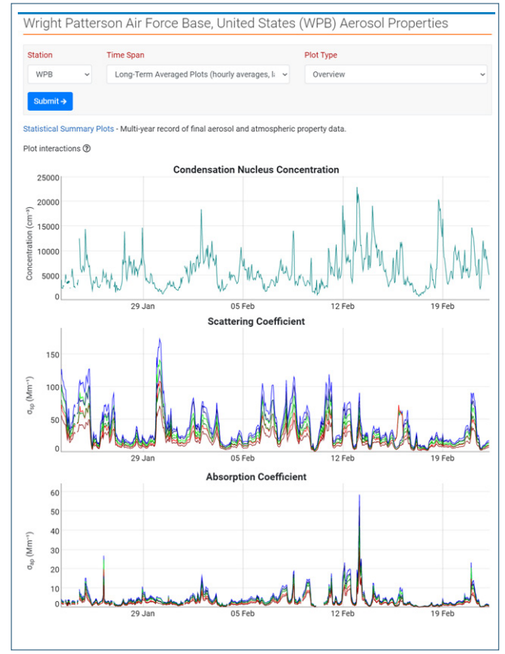
The new station at WPAFB was installed 24-28 January 2022 with the help of Non-commissioned Officers (NCOs) from the Persistent Infrared Analysis Squadron at the National Air and Space Intelligence Center (NASIC). GML scientists, Patrick Sheridan and Betsy Andrews, were present to provide technical support during the installation. AFIT has equipped the site with the latest aerosol instrumentation which characterizes concentrations and optical properties of atmospheric ultra-fine nano-aerosols with diameters smaller than 10nm size though micron-sized aerosols. A sample of NFAN data is seen to the right. More information on NFAN instrumentation, measurements, and data flow can be found at https://gml.noaa.gov/aero/instrumentation/instrum.html.

U.S. Air Force contributed photo

The new station at the Air Force Institute of Technology, WPAFB, Ohio. The inlet heads are at the top of the sampling mast along with a small weather station.

Support from NASIC to install and aid in maintaining the NFAN WPB site is due to the partnership with AFIT under the MOU between NASIC/GSP and AFIT, titled "… DEVELOPMENT OF A FRAMEWORK FOR COORDINATED RESEARCH EFFORTS UTILIZING 9S100 PERSONNEL FROM NASIC." NASIC/GSP and AFIT have many joint research interests which are ripe for collaboration. In addition, NASIC/GSP has assigned to it many Enlisted 9S100 members who have the background to assist in such projects. AFIT, meanwhile, has many useful joint projects and PhD-level researchers, but at times is short the technical manpower to build and deploy all the equipment necessary to perform its research operations.

Past experience has shown that 9S100 personnel loaned by NASIC/GSP to AFIT on an ad-hoc basis have provided value added to AFIT operations, as well as providing substantial education and growth in said personnel's knowledge and capabilities brought back to NASIC. Given the success of these past efforts, it is in the interest of both parties to formalize this agreement and expand the number and frequency of NASIC assigned 9S100 Airmen supporting AFIT endeavors. Responsibilities include the sharing of any data collected as part of joint test or research operations with each organization's personnel as appropriate per appropriate classification guidance.



A sample display of condensation nucleus concentration, scattering and absorption coefficient data from the NFAN WPB site.

VIEW DATA AND LEARN MORE ONLINE

https://gml.noaa.gov/aero/net/wpb.html

REFERENCES:

1. Andrews, E., Sheridan, P. J., Ogren, J. A., Hageman, D., Jefferson, A., Wendell, J., Alástuey, A., Alados-Arboledas, L., Bergin, M., Ealo, M., Hallar, A. G., Hoffer, A., Kalapov, I., Keywood, M., Kim, J., Kim, S., Kolonjari, F., Labuschagne, C., Lin, N., Macdonald, A., Mayol-Bracero, O. L., McCubbin, I. B., Pandolfi, M., Reisen, F., Sharma, S., Sherman, J. P., Sorribas, M., & Sun, J. (2019). Overview of the NOAA/ESRL Federated Aerosol Network, Bulletin of the American Meteorological Society, 100(1), 123-135. Retrieved Oct 28, 2022, from https://journals.ametsoc.org/view/journals/bams/100/1/bams-d-17-0175.1.xml

2. Zeng, X., Sheridan, S., Andrews, E. (2022). "A new site is installed for the NOAA Federated Aerosol Network." Global Monitoring Laboratory News Items (noaa.gov)

AFIT Master's Degree Alum Awarded SPIE's Top Scholarship

By Christine Wydra

In 2022, SPIE awarded $293,000 in education scholarships to 78 outstanding SPIE student members, based on their potential contribution to optics and photonics, or a related discipline. Three University of Central Florida optics and photonics students received scholarships.

CREOL, The College of Optics and Photonics doctoral student **Maj. Matthew Cooper** received the largest and most prestigious SPIE scholarship, the D.J. Lovell Scholarship, named for the radiometry and infrared optics consultant, author of Optical Anecdotes, and SPIE Fellow who died in 1984.

Cooper enlisted in the Air Force when he was 17 years old and is currently an officer in the U.S. Space Force. He received two master's degrees in Electrical Engineering and Aeronautical Engineering from the Air Force Institute of Technology in 2017. He also earned an MBA from the University of South Dakota and his bachelor's in electrical engineering from the Pennsylvania State University. Cooper hopes to teach and continue his research at the Air Force Institute of Technology when he completes his Ph.D. later this year.

His research involves the design and fabrication of novel large-mode-area fibers for high-power fiber lasers, with a focus on optical power delivery spanning different regimes between visible to the infra-red via hollow core fiber. He has authored and co-authored 18 journal and conference publications and is supervised by professors Rodrigo Amezcua Correa and Axel Schülzgen.

> "I am humbled by this scholarship and hope to highlight how fun and interesting optics and photonics can be. My 7-year-old self would be amazed that a job like this exists—that people get paid to tinker in order to innovate."
>
> —Maj. Matthew Cooper
> AFIT Alum

2022 Air Force Civil Engineer Award Winner

AFIT alum **Maj. David A. Kohlhepp** (M.S. Engineering Management, 2017) received the Major General William D. Gilbert Award – Outstanding Performance and Exemplary Service (Officer) as part of the 2022 Air Force Civil Engineer Functional Award.

Chosen by a panel of their peers to compete at the highest levels of Air Force Civil Engineering, the winners, runners-up, and nominees represent the ingenuity, talent, and relentless dedication that is at the core of the Civil Engineering community.

AFIT ALUMNI NEWS BRIEFS

Three Alumni Nominated for Brigadier General Appointment

Secretary of Defense Lloyd J. Austin III announced that the president has made the following nominations:

Air Force Col. Christopher B. Hammond (Master of Cyber Warfare, 2011) nominated for appointment to the grade of brigadier general. Hammond is currently serving as the director, Joint and National Security Council Matters, Deputy Chief of Staff for Operations, Headquarters U.S. Air Force, Pentagon, Washington, D.C. Col. Hammond served as the commander/leader of the USAF Demonstration Squadron "Thunderbirds" for the 2015-2016 demonstration season.

U.S. Air Force photo by Staff Sgt. Mya M. Crosby
Col. Chris Hammond, 8th Fighter Wing commander

Air Force Col. Christopher J. Leonard (M.S. Engineering & Environmental Management, 2000) nominated for appointment to the grade of brigadier general. Leonard is currently serving as the commander, 10th Air Base Wing, U.S. Air Force Academy, Colorado Springs, Colorado.

Col. Christopher Leonard

Air Force Col. Jeffrey A. Phillips (M.S. Information Resource Management, 2003) nominated for appointment to the grade of brigadier general. Phillips is currently serving as the director of staff, Headquarters Air Combat Command, Joint Base Langley-Eustis, Virginia.

Col. Jeffrey Phillips

Alumni Among Finalists for Federal Engineer of the Year

The National Society of Professional Engineers announced the top 10 finalists for the 2023 Federal Engineer of the Year Award including two AFIT alumni from the Graduate School of Engineering and Management's engineering management master's program. The Federal Engineer of the Year Award, sponsored by the Professional Engineers in Government, honors engineers employed by a federal agency that employs at least 50 engineers worldwide.

NSPE™ NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Dustin L. Gooden, P.E.
M.S. Engineering Management, 2017
U.S. Department of the Air Force
U.S. Air Force Headquarters, Pentagon
Washington, D.C.

Air Force Engineer Strategically Improves Basing Policy, Guidance

Gooden, who serves as chief of the Air Force's Basing Corporate Branch, provides military-level strategic basing policy and guidance in support of nearly 160 installations and a $16 billion portfolio. His wide-range analyses of Air Force basing requests further enables defense weapon system beddown and unit-level movement directives. Gooden formerly held operations flight commander and squadron section commander posts at Altus Air Force Base in Oklahoma. While at Altus, he directed a diverse team of military and civilian engineers to facilitate operations, maintenance, and repair of $2 billion in infrastructure — a benchmark achievement that received back-to-back annual accolades from command leadership.

Prior to his service at Altus, Gooden led a team of skilled personnel at Scott Air Force Base in Illinois to develop a new civil engineer work management execution process and scheduling tool. The Air Force Civil Engineer Center immediately recognized the benefits of this new process and coined it a "best practice." Gooden then worked to publish the new process and tool as an Air Force-wide standard operating procedure, a notable accomplishment that has been recognized by the Air Force Institute of Technology and disseminated nationwide.

Capt. Jeneé Jagoda, P.E.
M.S. Engineering Management, 2020, DG
U.S. Department of the Air Force
Air Force Global Strike Command
Ellsworth Air Force Base, South Dakota

Air Force Officer Takes Engineering Lead in Operations, Logistics

Currently serving as engineering flight commander at Ellsworth AFB, Jagoda oversees 35 personnel and an $80 million budget supporting the current B-1B Lancer mission and the future B-21 Raider beddown. To her credit, last year her flight team received accolades for their engineering excellence as a global strike force. In 2021, she deployed to Al Udeid Air Base in Qatar, where she played an integral role in evacuating at-risk Afghan civilians through Operation Allies Refuge. In that capacity, she served as the engineering lead at the Emergency Operations Center, prioritizing work orders and key services to the 14 beddown sites established for the operation. As the base population more than tripled from 8,000 to 27,000 people, Jagoda was instrumental in sustaining facilities and quality of life for the base.

Through her earlier master's degree study at the Air Force Institute of Technology, Jagoda pioneered research on 3D-printed construction in an expeditionary environment. Her thesis has garnered more than 3,500 downloads and has been used by the U.S. Air National Guard and civilian institutions worldwide to shape the continued research, development, and use of 3D printing.

CALENDAR EVENTS

APRIL 2023

AFIT Engineer's Week
17-21 Apr 2023 I AFIT Campus, WPAFB, OH

MAY 2023

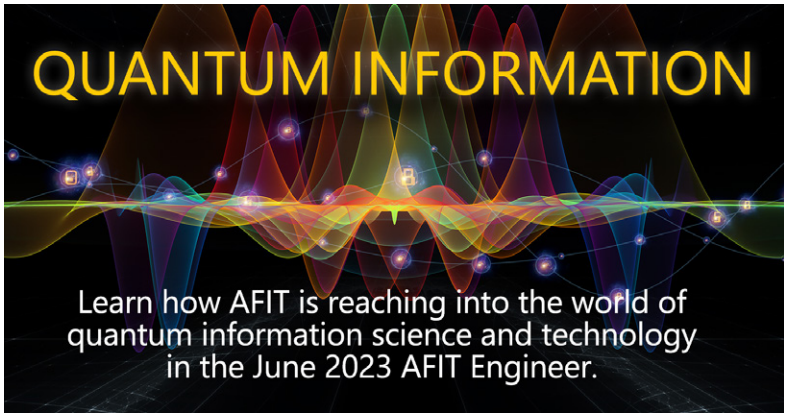
AFIT Graduate School Summer Quarter Registration Opens
01 May 2023 I AFIT Campus, WPAFB, OH

Hypersonics Conference
02-04 May 2023 I Dayton, OH & AFIT Campus, WPAFB, OH

JUNE 2023

AFIT Graduate School Spring Quarter Classes End
02 Jun 2023 I AFIT Campus, WPAFB, OH

AFIT Graduate School Summer Quarter Classes Start
26 Jun 2023 I AFIT Campus, WPAFB, OH



GRADUATE SCHOOL MISSION & VISION

MISSION
To produce outstanding technical leaders in the Department of Defense by providing superior graduate education built on defense-focused research.

VISION
To be internationally recognized as the school of choice in engineering and applied science for defense-focused and research-based graduate education.

AFIT FACULTY SEARCH

To search for AFIT Graduate School faculty members and view their research areas of interest, please visit
www.AFIT.edu/bios

STAY CONNECTED

Graduate School of Engineering & Management
www.AFIT.edu/EN
(937) 255-3025

Office of Research & Outreach
www.AFIT.edu/CZ
research@afit.edu
(937) 255-3633

Office of Alumni Affairs
www.AFIT.edu/ALUMNI
afitalumni@afit.edu

AFIT Engineer Newsletter Archive
www.AFIT.edu/EN/afitengineer

AFIT
AIR FORCE INSTITUTE OF TECHNOLOGY
www.AFIT.edu