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THE GRADUATE SCHOOL OF ENGINEERING AND MANAGEMENT

Air Force Institute of Technology | www.afit.edu/EN/AFITengineer

TRACKING COVID-19

AFIT Students Develop Health Assessment Dashboard to Track COVID-19 Cases Around Military Installations

By Katie Scott Air Force Institute of Technology

Students at the Air Force Institute of Technology rapidly developed a predictive modeling app called COVID-19 Health Assessment Dashboard (CHAD) to provide a centralized location for Air Force leadership to receive up-to-date pandemic information specifically tailored to military installations and the surrounding local areas.

Four operations research graduate students, in response to an AF/A9 request for AFIT support in COVID-19 analysis, developed the dashboard. In less than two weeks, Capt. James Deitschel, Capt. Garrett Alarcon, 1st Lt. Nicholas Forrest, and 1st Lt. Trey Pujats envisioned, constructed, and deployed an online predictive modeling app that provides Air Force leadership situational awareness projections for the number of infected individuals and the impact on local hospitals.

"The objective was to provide Air Force leaders with where, when, and how bad the next hot spot of COVID-19 outbreak will be," said Deitschel. "Users can select any CONUS Air Force installation and an area between 25-100 miles from that installation. Results will include all of the counties within that radius. The dashboard is pulling in realtime data for hospitals, cases, and deaths. It provides charts, maps, and tables with the information of interest."

"The CHAD project illustrates AFIT's capability to apply data science and

analytics to help address important operational and readiness issues," said Dr. Todd Stewart, AFIT director and chancellor. "Our number one priority at AFIT is to be relevant and responsive to the Air and Space Forces in all we do... teaching, research and consulting. The CHAD is a great example of putting that priority into practice."

The "AFITeers" as the students became known, continue to improve CHAD by incorporating data and projections for OCONUS bases and MAJCOMs. CHAD now provides summaries for all installations and facilities across the Department of Defense, stateside and overseas.

CONTINUED ON PAGE 5

Service Branch:	Welcome MAJCOM Summary Inter	national/National Summary Current	Local Health Local Health P	rojections			
WHS -	89,319	+ 1242	12		79 %		
CONUS or OCONUS: CONUS	Total Confirmed Cases	New Confirmed Cases	Total Confirmed Case	is per 1,000	Estimated Loc	al Hospital Bed Uti	lization
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	Local Impact Map		Local County Stat	istics			
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			DC	District of Columbia [7]	601723	9199	

A screenshot from the AFIT COVID-19 Health Assessment Dashboard displays snapshots of current local health status and graphs for cases/fatalities over time with the option to toggle between a three day moving average, cumulative, or growth rates. The customizable dashboard allows the user to filter by base, local area radius, and choose county or state level output.

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FROM THE DEAN'S DESK

Graduate School Classes Transition to Distance Learning Mode During COVID-19 Lockdown

In the prevailing COVID-19 era, the most appropriate message for this page is how we, as members of the AFIT workforce, are coping with the ongoing lockdown, exercising resilience, and moving forward with the Air Force mission at hand. Following the announcement of a statewide lockdown by the Governor of Ohio and a similar lockdown order from the Wright-Patterson AFB Commander, AFIT went into a campus-wide lockdown on Tuesday, March 24. The



Dr. Adedeji Badiru

lockdown process was smoothly executed, instead of the helterskelter jostling that we had feared.

In a collective and cohesive act of resilience and mission-ready response, we resorted to different combinations and permutations of online meeting tools. MS Teams, Pexip, Zoom, Adobe Connect, Canvas, and others became our allies. Everyone at AFIT was placed on 100% telework, except for the mission-essential personnel in critical must-cover areas of the AFIT campus. We hurriedly organized a drive-by graduation event (sans ceremony) for the March 26th graduation schedule. It was a refreshing thing of delight to witness how we organized and reorganized to execute all the functional requirements of that first week of the lockdown.

Once the dust of the initial scrambling settled, we quickly started scheming up how courses in the Spring 2020 Quarter would be delivered under a 100% DL (Distance Learning) mode and format. Everything was choreographed so very well that we have not missed a beat of the mission so far. Creativity and innovation manifested themselves in the various ways that faculty, students, staff, and administrators carried on their respective missions. As it is often

said that "necessity is the mother of invention," we learned that inescapability is the "father of innovation," a concept that I had introduced to my students in Fall 2018 in my course on "Strategic Topics in Defense Innovation." Since we cannot escape the mission, we must innovate to continue the mission. My AFIT team did not disappoint in this regard. Kudos to everyone for the teamwork across the board.

While mentally gallivanting through the mission points of the lockdown, I started ruminating on workforce learning and forgetting curves during the COVID-19 lockdown. The random thoughts that ensued resulted in a literary partnership with retired Colonel Cassie Barlow, former WPAFB Base Commander, to write a workforce-development newspaper article for the IDEAS & VOICES section of the *Dayton Daily News*. The article, "Developing workforce in era of COVID-19," was published on May 15, 2020. A key aspect in the article, which was warmly acclaimed by the newspaper editor, was the idea of not only developing the workforce, but also preserving the workforce in body, spirit, and mission during any period of operational disruption. Such an idea can inform how leaders manage, supervise, mentor, and motivate employees. AFIT has definitely demonstrated this capability during the COVID-19 lockdown.

We all look forward to being back together in person on campus after the waves of coronavirus subside. Please come by to see us then. Meanwhile, please stay connected with us online and in virtual space.

Respectfully,

adire

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

EN OUTREACH

The AFIT ENGINEER is an official publication of the Air Force Institute of Technology, Graduate School of Engineering and Management.



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WINGMANSHIP FOR ALL

By Adedeji B. Badiru Air Force Institute of Technology

The events that have transpired following the death of George Floyd on 25 May have brought to light the long-ignored racial issues in our society. As the flames get further inflamed, none of us can be shielded from the potential disastrous consequences. We all bear the responsibility of exhibiting sensitivity to the racial issues and oppressive practices that exist around us. We are often told "if you see something, say something." In my own message here, I extend that common saying to capture our own attention that "if you feel something, say and do something."

We all feel something as a result of the recent events. The next step is to say and do something about what we see and feel. Keeping quiet means that we concede the issues to someone else to address, which will never lead to the sweeping changes that are needed. We are all equally responsible for solving the long-standing issues of racial and ethnic discrimination. In that respect, not only should we say something about what we see and feel, we must also act to initiate, institute, and sustain the needed changes.



We are the keeper of our brothers and sisters, regardless of race, color, gender, age, ethnic origin, or preferences. For that reason, I am sharing my article "Wingmanship is Everyone's Social Responsibility," previously published in 2007, that addresses how we are all inter-connected and must work together to solve systemic problems that afflict our entire society. May the force that binds us help us to solve the pervasive and debilitating humanrelations problems in our common society.

his Wingman season reminds me of a social issue that has been on my mind for quite some time. The issue relates to the need for everyone to take on the social responsibility for everyone else, particularly the youth. The adage that "it takes a village to raise a child" has never been truer than in the present days of social uncertainties and inequities. Social stability and advancement of our society is everyone's responsibility. We cannot afford to look the other way whenever we notice something that is not right or something that does not bode well for the welfare of the entire society. Social issues we fail to address now may magnify into incidents that could adversely touch everyone in society, directly or indirectly. We owe it to ourselves and our community to actively participate in the resolution of societal ills.

There is so much decadence evolving in society these days. Many of these social issues manifest themselves in the form of criminal activities brought on by feelings of frustration, disenfranchisement, isolation, depression, desperation and hopelessness. When members of our community are noticed to be facing mental stress, financial discomfort, and despondency, it behooves all of us to jump in and offer helping hands. The extension of help can preempt serious decadence so we don't have to deal with the results later on.

It is obvious that prisons have become a huge drain on our society. Whether we want to accept it or not, we all pay for prisons. We pay in terms of loss of human capital, loss of loved ones, and impedance of economic growth. Wouldn't it have been cheaper to institute programs that would preempt criminal tendencies and, consequently, reduce the need for more prisons? For social ills, preemption is far better than incarceration. Programs that help to forestall crime are often cheap, subtle, and innocuous; such as offering social support to the less fortunate, providing a basis for optimism in youth, creating an atmosphere of belonging for everyone, offering encouragement, projecting empathy, and facilitating educational opportunities. For youth, support, discipline, and comfort are as much a responsibility of the parents as they are of everyone in the society.

We are not too far removed from the adverse impacts of juvenile delinquency. Education is one way to advance the society and minimize criminal incidents. As an anecdotal example, there was once a socialite who was solicited to contribute to a program to improve educational programs in a neighboring community. He refused because

If you feel something, say and do something

societal problems later on. If we do not help, minor problems may become big felonious incidents that may come back to touch us in unimaginable ways.

A community may think it is safe by cocooning itself within the walls of its neighborhood. But the reality is that no one can be completely insulated from crimes that occur within society. With freedom of movement and closing of geographical gaps, crime importation and exportation should be a big concern for every one of us. We should all share in the collective responsibility of helping to preempt the evolution of social he claimed the other community should take care of their own problems. Many years later, one of the youths that could have benefited from the proposed educational program turned out to be a member of a gang who happened to operate in the socialite's neighborhood; and in the process murdered the socialite's loved ones. This is a good example of how a helping hand could have preempted later problems.

Think of the alternatives that those who are not educated might embrace later in life. I invite all readers to consider these issues and their ramifications carefully.

AFIT Uses 3D Printing Technology to Develop N95 Face Shields in Response to COVID-19

By Katie Scott Air Force Institute of Technology

The Air Force Institute of Technology's additive manufacturing laboratory has been printing face shield prototypes for the National Air and Space Intelligence Center to extend the longevity of N95 masks. The 88th Medical Group at Wright-Patterson AFB is testing the prototypes to determine if they are approved for use.

The first iteration of the N95 shields were 3D printed flat and then shaped to fit over the N95 mask. The shields are intended to prevent abrasion and keep liquids or particulates away from the mask. The second round of prototypes have been a face shield comprised of a headband with top and bottom structural supports. These hold a thin piece of clear acrylic or similar material to keep particles and fluids away from masks, as well as minimize indirect breathing to one another.

"The team is using a Stratasys Fortus 450, with Ultem 9085 polyetherimide filament. The material provides high strength, flexibility, and chemical stability," said Dr. Carl Hartsfield, assistant professor of aerospace engineering within AFIT's Graduate School of Engineering and Management. "The 88th MDG will test for



A manufactured face structure used for N95 face shield prototype molding.

Courtesy photo

any reaction by the plastics when cleaned with bleach solutions and that either before or after cleaning, the plastics do not cause a skin reaction for the wearer."

"Following material selection, testing, and prototyping efforts with groups around Wright-Patterson AFB, including the National Air and Space Intelligence Center (NASIC) and the 88th MDG, AFIT's additive manufacturing team has their polymer printers running around the clock," said Travis Shelton, research engineer within the Graduate School's Aeronautics and Astronautics department.

AFIT's Graduate School of Engineering and Management has been using additive manufacturing, also known as 3D printing, to digitally fabricate prototype aerospace parts for more than 30 years in support of defense focused graduate research. Using their expertise to design and print N95 mask shields is one way AFIT faculty and staff are supporting efforts to help mitigate and stop the spread of COVID-19.

"Defense resilience, readiness, and responsiveness are essential in periods of exigency. I am delighted that AFIT was able to answer this call to leverage our 3D printing research and development capabilities," said Dr. Adedeji Badiru, dean, Graduate School of Engineering and Management.

3D Printing Technology continued



Initial prototypes that were 3D printed with various material types.



The Air Force Institute of Technology's additive manufacturing laboratory is using 3D printing to develop N95 face shield prototypes to extend the longevity of the masks.

Final requested designs include 3D printed structural components for a full face shield.

Tracking COVID-19 continued from cover

A recent major change includes an FOUO version that provides installations with current HPCON levels, gating criteria, and travel restrictions.

The student's work has been well received by Air Force leadership and their contribution continues to inform policy decisions as part of the Air Force response to the COVID-19 crisis. As such, AF/A9 adopted continued development and support of the tool when the "AFITeers" graduated from AFIT and moved to their next assignments. The impact CHAD is having on senior level policy decisions cannot be understated.

"We have deep respect for the leadership at AFIT and AF/A9 who believed in us and our product, and poured their resources into making this the product it is today," said Alarcon. "Without them, this would not have made it to where it is."

"We are extremely proud of these four recent AFIT graduates and of the faculty who advised them in developing the CHAD," said Stewart. "This is an excellent example of AFIT's capability to prepare its students to help the US Air and Space Forces quickly respond to high-priority requirements, by offering innovative, practical solutions, to help our commanders and other leaders make better-informed decisions."

Major Delorit Accepts 'Fox' Award at AFIT

Major Justin Delorit, Assistant Professor of Engineering Management, was presented with the Major General L. Dean Fox Award, Senior Military Manager category on 9 Jun 2020 by the Air Force Institute of Technology's director and chancellor, Dr. Todd Stewart. Delorit has been part of the Department of Systems Engineering and Management within AFIT's Graduate School of Engineering and Management since 2019. He is also an AFIT alum, earning his master's of science degree in engineering management in 2012.



Courtesy photo Major Justin Delorit (right) accepts the 'Fox' award from Dr. Todd Stewart, director and chancellor of AFIT.

The Maj. Gen. L. Dean Fox Award, more commonly known as the "Fox," is an annual, functional-community award that recognizes the Civil Engineer (CE) career field's most outstanding senior military manager. In other words, it is considered the CE's Field Grade Officer (FGO) of the year award.

Delorit received the award based on career accomplishments performed at Kunsan Air Base, South Korea as the 8th Civil Engineering Squadron Deputy Squadron Commander, and at AFIT. He has published several papers on water scarcity, forecasting and economic adaptation policy. Delorit received the Journal of Water Resources Planning and Management's Best Reviewer Award (2018) and Best Research-oriented Paper (2019). Additionally, he was awarded with the National Society of Professional Engineer's Federal Engineer of the Year Award (2018) and the Air Force's Arthur Flemming Award in the Basic Science category. At the 8th Civil Engineering Squadron, he was responsible for a \$400M⁺ design and construction portfolio and led initiatives to complete ~1000 facility condition assessments.

AFIT Offers Data Analytics Certificate Program

By Katie Scott Air Force Institute of Technology

In an effort to support the U.S. Air and Space Forces becoming a more data-informed organization, the Air Force Institute of Technology has launched a new on-line data analytics certificate program.

"The Air Force is a data-driven organization, which requires technology, process, and people. Attracting and maintaining top talent is quintessential. We must develop talent from within the Air Force, along with seeking support from our partners," said Ms. Eileen Vidrine, Air Force Chief Data Officer. "A graduate certificate in data analytics is a key component in our workforce development approach to improve the Air Force data enterprise and increase data-driven decisions."

"Data quality and integrity are of utmost importance to the mission of the Air Force. Every decision or action is predicated on the availability of data. With data analytics, we can transform data into useful information upon which appropriate decisions can be made," said Dr. Adedeji Badiru, Dean, AFIT Graduate School of Engineering and Management.

To maintain military advantage, the ability to process numerous data points for rapid decision-making is imperative. The National Defense Strategy emphasizes the growing need for personnel with data analytics capabilities, however, few Airmen are taught the skills required to manage and analyze data.

"Effective data analytics can impact both operational effectiveness within the Air Force operational major commands and greatly enhance sustainment and acquisition across the Air Force, especially within the Air Force Materiel Command," said Dr. Darryl Ahner, professor of operations research and chair for the data analytics certificate program.

Developed as a multi-departmental program within AFIT's Graduate School of Engineering and Management, the graduate-level certificate program consists of five 10-week courses completed on-line. Courses focus on the use and understanding of data analysis applications and tools while covering topics such as database design and management, machine learning, statistics, and computer programming.

"This program is unique in that it focuses on the effective use of data analytics across the Air Force and emphasizes application of techniques along with an understanding of those techniques limitations and assumptions," said Ahner.

The data analytics certificate program is open to all active duty and civilian Air and Space Force personnel at no cost. "Students can expect to gain an understanding of applying analysis techniques that, when coupled with their specialty expertise, enhances their capability to provide decision-makers data analysis leading to better policies, processes, and decisions," said Ahner.

More information on the new Certificate in Data Analytics is available on the AFIT website at www.AFIT.edu/EN/allprograms; questions can be emailed to AFITensDataAnalytics@ afit.edu; and prospective students can apply online at www.afit.edu/Admissions/ AFITApplicationProcess.

USSF-7 Mission Successfully Launches AFIT's SkyPad

By Jaclyn Knapp Center for Space Research and Assurance

On Sunday, May 17, the USSF-7 mission successfully launched the Air Force Institute of Technology's SkyPad, a payload aboard the United States Air Force Academy's FalconSat-8 spacecraft bus, which is an experiment hosted on the X-37B Orbital Test Vehicle.

SkyPad's mission is to demonstrate star tracking and high performance on-board processing using commercial cameras and graphic processing units. The GPUs will be reprogrammable on-orbit to enable experimentation in star tracking, image processing, data compression, and orbit determination using software code developed at AFIT.

"The SkyPad payload gave students an invaluable exposure to the pressures and realities of space systems engineering," said Maj. Robert Bettinger, deputy director, AFIT's Center for Space Research and Assurance.

"In less than six months, the team of faculty, staff, and students delivered a space-ready mission ahead of schedule, which stands as a testament to the power of the expertise of AFIT's space vehicle design program," said Bettinger.

The payload employs an experimental suite of components for demonstration in the space environment. This collaboration also provides a platform for graduate research and hands-on education in mission analysis and design, payload hardware and software development, integration and testing and on-orbit experimentation.

For additional information about graduate or post-doctoral degrees in astronautical engineering or space systems, please visit the CSRA website at www.afit.edu/CSRA/, call 937-255-6565 extension 4753 or email Jaclyn.Knapp.ctr@afit.edu.

GRADUATE SCHOOL NEWS

Patent Issued to AFIT Faculty and Staff

AFIT faculty and staff were issued a patent for their Wind Tunnel Wake Generator on 12 May 2020. The named inventors are Carl Pickl, AFIT ORISE Participant, **James L. Rutledge**, AFIT Associate Professor of Aerospace Engineering, **Marc D. Polanka**, AFIT Professor of Aerospace Engineering, **Brian Crabtree** and Christopher Harkless, both employees of the AFIT Model Fabrication Shop.

A wake generator for placement in a wind tunnel between a wind source and a test object includes a first frame member having a first track formed thereon, where the first track has a shape including a first side that is substantially rounded and a second side that is substantially flat. The wake generator may include a mounting plate disposed within a perimeter of the first track, where the mounting plate is rotatable relative to the first frame member about a first axis.



The wake generator may also include a plurality of bars slidably engaged to the mounting plate and structurally configured to traverse along the first track when the mounting plate is rotated about the first axis, where each of the plurality of bars includes a pivotal connection allowing each of the plurality of bars to pivot about the pivotal connection when traversing along the first track.



Provide Comments

The Air Force Institute of Technology (AFIT) is seeking comments from the public as it prepares for its periodic evaluation by its regional accrediting agency, The Higher Learning Commission (HLC). AFIT will host a team representing the Higher Learning Commission for a comprehensive evaluation visit on 19-20 Oct 2020. AFIT has been accredited by the HLC since 1960. The team will review the institution's ongoing ability to meet the Commission's criteria for accreditation.

The public is invited to submit comments regarding AFIT directly to the Commission. Comments must address substantive matters related to the quality of the institution or its academic programs. Comments must be in writing. All comments must be received by 18 Sep 2020.

Submit comments to HLC at hlcommission.org/comment or mail them to the address below:

Public Comment on the Air Force Institute of Technology The Higher Learning Commission 230 South LaSalle St., Suite 7-500 Chicago, IL 60604-1411

AFIT Magnetic Navigation Research Featured by Forbes Online

Major Aaron Canciani, AFIT Autonomy and Navigation Technology Center faculty member and AFIT M.S. and Ph.D. graduate, discussed Magnetic Anomaly Navigation (MAGNAV) research with journalist Eric Tegler. Tegler's article was recently published on Forbes.com.

Canciani is an Assistant Professor of Electrical Engineering at AFIT's Graduate School of Engineering and Management and he has been designing algorithms for MAGNAV technique flight testing for several years.



NOAA National Geophysical Data Cente NOAA's EMAG3 world digital magnetic anomaly map.

"Magnetic navigation has been a bit of a hard sell. It's met with skepticism until I can really [inform] people about the results I've had with it. We're hoping some realistic testing on realistic platforms will open the doors to further research and funding," Canciani commented in the Forbes article.

Read the full article and learn more about how the Air Force is researching MAGNAV and flight testing it on F-16s.



GRADUATE SCHOOL NEWS

AFIT Graduate School Leadership Members Complete AU Professional Innovator Training

By Stacy Burns Air Force Institute of Technology

In August 2019, Air University (AU) signed a two-year contract with Innovatrium—an innovation consulting firm led by University of Michigan faculty members Dr. Jeff DeGraff and Stanley DeGraff—in an effort to develop and boost the innovation culture and competency within AU. The Innovatrium works with many of the Fortune 500 companies on innovation integration via curriculum development, leader development, and providing tailored toolkits.

The resulting AU contract effort through Innovatrium has been named "Project Mercury," and among its various contract deliverables is the execution of five Certified Professional Innovator (CPI) training cohorts which will work real-world AU strategic initiatives. Air University is utilizing CPI training for its faculty members which it believes will be foundational to improving innovation education in the Air Force.

AFIT's Graduate School of Engineering and Management is proud to announce that two members of its leadership team were invited to be part of the first Project Mercury cohort to receive CPI training. Colonel John "Andy" McQuade, Dean of Students, and Dr. Alice "Betsy" Grimes, Director of Faculty Development, joined 33 other participants in the first CPI training session and were named Certified Professional Innovators by the University of Michigan's Ross School of Business on 3 May 2020.

"This was a unique and well-designed program and I am grateful to have been given the opportunity to participate," said Dr. Grimes. "Col McQuade and I appreciated the interaction with other team members at Air University and the synergy of ideas that arose from collaboration." The CPI training is a 90-day, self-paced program that starts with a two-day, in-person jumpstart course that is followed by bi-weekly team teleconferences with a Certified Master Innovator (coach). The in-person course for Project Mercury's first cohort took place at MGMWERX in Montgomery, Alabama.

Following the in-person jumpstart, trainees were organized into six teams that each developed a project which focused on an innovative approach to an existing Air Force issue with the intent to improve some aspect of operations. At the end of 90 days, each team pitched its proof-of-concept to AU senior leaders for implementation consideration. This process not only encourages innovative thinking and strategic planning, but also proposes solutions to real-world problems.

Dr. Grimes and Col McQuade's team created a final product dubbed "Project Quicksilver," which included a proposed center to provide training on innovative thinking and strategies to Air Force members.

"Since taking this course, I have had a more focused and deliberate team-building strategy to ensure there is sufficient representation to drive and encourage innovation. Innovation is needed in the Air Force and Space Force and courses like this help leadership empower people to try, succeed, or fail in environments that reward these behaviors," said Col McQuade.

Future Project Mercury CPI training cohorts will provide additional opportunities for AFIT representatives to take part in this educational experience. Air University's expectation is that individuals who complete the certification process will apply the newly-gained knowledge to innovation efforts within their respective organizations. As a result, Certified Professional Innovators will be a driving force behind the advancement of innovation-focused curricula provided to members of the Air Force and Department of Defense.

INNOVATION EDUCATION

"Since taking this course, I have had a more focused and deliberate team-building strategy to ensure there is sufficient representation to drive and encourage innovation. Innovation is needed in the Air Force and Space Force and courses like this help leadership empower people to try, succeed, or fail in environments that reward these behaviors." — Col John "Andy" McQuade

AFITALUMNI NEWS

AFIT Alum Makes Mark on U.S. Space Force

Captain Deborah Kim, Air Force Institute of Technology 2018 M.S. Cost Analysis graduate, has been named the first U.S. Space Force Company Grade Officer of the

year. Kim—a key member of the Space and Missile Systems Center 2.0 transition team—has been a critical component to continuing SMC's largest re-

organization and transformation in 65 years AND was named the 2019 Cost Analyst of the year leading her team to develop over 20 cost estimates.

"I am extremely humbled to have received the Space Force's first Company Grade Officer of the Year Award. I've been in the Air Force for six years now, and I am so grateful for all of the opportunities it has given me," Kim said. "I've met so many inspiring and dedicated Airmen from all walks of life during my short time in the military, and I'm excited to continue to serve with those I've met along my journey."

The Space and Missile Systems Center (SMC) at Los Angeles Air Force Base recently completed the largest organizational change in it's 65-year history. The transformation, SMC 2.0, was aimed at eliminating layers of bureaucracy to deliver capabilities to the warfighter faster than ever.

Focused on enterprise, partnerships, innovation, culture and speed within the Space enterprise, the result is an exciting paradigm shift in how the center makes decisions and achieves results. SMC is also seeing tremendous benefits from the re-delegation of various areas of authority and processes

implementations that enable service members to take smart risks, and move faster...similar to what is seen in commercial industry.

Thousands of Airmen have applied to transfer

to the U.S. Space Force; however, the number of initial billets to onboard personnel from the Air Force was small. Only certain career fields were eligible to transfer. For 1-series career fields, this included 13S, 1C6, 14N 1N0, 1N1, and 1N4. For 6-series career fields, this included 62E and 63A. Although Kim's billet is not eligible to transfer at this time, she is certainly excited about future opportunities as an Air Force officer to support the Space Force.

Kim also expressed appreciation for her time as a graduate student at The Air Force Institute of Technology (AFIT).

"AFIT was one of the most fulfilling experiences I've ever had during my time in the Air Force. I enjoyed my classes, and I loved the journey of defending a thesis," Kim explained. "I made lifelong friends with my classmates at AFIT, and I met mentors and teachers who still give me advice to this day. I'm extremely grateful for my time at AFIT, and I wholeheartedly believe that it helped me develop skills to make me a better officer and leader."

AFIT Alumni Named Award Winners

AETC CGO OF THE YEAR

AFIT alum **Captain Dustin Gooden**, 97th Civil Engineer Squadron operations flight commander, recently won the Air Education and Training Command's (AETC) Company Grade Officer of the Year award for 2019. Gooden graduated from AFIT in 2017 with an M.S. degree in Engineering Management.

SAF/FM CGO OF THE QUARTER

Captain Emily Angell (M.S. Cost Analysis, 2019, DG) was selected as the Company Grade Officer of the Quarter for SAF/FM). Angell works as a Cost Analyst for the AF Cost Analysis Agency (AFCAA).

WOMEN IN ENGINEERING AWARD WINNER

Congratulations to AFIT alum **Ms. Felicia Harlow**, Air Force Research Laboratory Sensors Directorate senior security research engineer, who was selected by the Institute of Electrical and Electronics Engineers (IEEE) Dayton Section to receive the 2020 IEEE Dayton Section Women in Engineering (WIE) Award. Ms. Harlow received a M.S. degree in Computer Engineering from AFIT in 2005.

Alumni Nominated for Maj Gen

Secretary of Defense Dr. Mark T. Esper announced on 11 May 20 that the president made the following nominations:





Air Force Brig. Gen. Case A. Cunningham (M.S. Strategic Leadership, 2006, DG) nominated appointment to the rank of major general. Cunningham is currently serving as the deputy director, operations. L3. Headquarters U.S.

operations, J-3, Headquarters U.S. Indo-Pacific Command, Camp H. M. Smith, Hawaii.

Air Force Brig. Gen. Philip A. Garrant (M.S. Systems Engineering, 2004) nominated for appointment to the rank of major general. Garrant is currently serving as the program executive, programs and integration, Missile Defense Agency, Redstone Arsenal, Alabama.





AFIT GRADS HONORED

Graduate School of Engineering and Management Awards 236 Master's and Doctoral STEM Degrees

By Katie Scott Air Force Institute of Technology

The Air Force Institute of Technology's Graduate School of Engineering and Management awarded 229 master's degrees and seven doctorate degrees in science, technology, engineering and math fields. Two graduate students received dual master's degrees. Due to concerns of COVID-19, a commencement ceremony was not held.

The graduating class included 195 Air Force officers, four Air Force non-commissioned officers, seven Army officers, four Marine Corps officers, 14 civilians, and seven defense contractors. The school also graduated three international students from Australia and Brazil.

Gen. John "Jay" Raymond, the first Chief of Space Operations, U.S. Space Force was to be the commencement speaker. In a recorded video, Raymond addressed the students saying, "Despite the ongoing challenges we face due to the coronavirus, I want to send a sincere and heartfelt congratulations to each of you for completing your advanced degrees and being part of our newest graduating class from the Air Force Institute of Technology."

"During this time of uncertainty, one thing remains absolutely certain – our mission to protect and defend the air and space domains remains unchanged. As AFIT graduates, many of you will go on to support our critical missions with innovative ideas to maintain air and space superiority for our nation and that



Second Lt. Nathan Barker, left, was presented his diploma at an AFIT "drive-thru" as part of his out processing. Approximately 200 students received diplomas at "drive-thru" events on campus. The remainder of the students received their diploma in the mail.

Courtesy photos

of our allies. I look forward to your leadership, your ingenuity, and the opportunity to serve at your side," said Raymond.

Lt. Gen. James Hecker, Commander and President of Air University, congratulated the graduating class in a recorded video saying, "You went through a lot of hard work...but it is worth it. Now you are an AFIT graduate and that means something."

"The AFIT diploma each graduate will receive signifies both completion of all academic requirements for award of the degree and equally important demonstrates the values, character and professional qualities we require of all AFIT graduates," said AFIT's Director and Chancellor, Dr. Todd Stewart.

AFIT's Graduate School of Engineering and Management is a research-based institution offering graduate programs leading to



Master of Science and Doctor of Philosophy degrees in engineering, applied science and selected areas of management. The school's mission is to provide high-quality graduate education programs and engage in research activities that enable the Air Force to maintain its scientific and technological dominance.



COMPLETE LIST OF 2020 GRADS https://bit.ly/AFIT2020GraduatesList



GRADUATION VIDEO MESSAGES https://bit.ly/AFIT2020GraduationMessages

Congratulations **AFIT 2020** 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 associated with DG. The DGs for the class of 2020 were:

2d Lt Jinan Andrews (M.S. Systems Engineering)

2d Lt Aaron Bauer (M.S. Aeronautical Engineering)

Maj Marc Blair, U.S. Marine Corps (M.S. Environmental Engineering & Science and M.S. Industrial Hygiene)

Maj Brian Boardman (M.S. Applied Mathematics)

Capt James Boettiger, Royal Australian Air Force (M.S. Electrical Engineering)

Capt Adam Brubakken (M.S. Logistics & Supply Chain Management)

1st Lt Peter Calhoun (M.S. Operations Research)

2d Lt David Crow (M.S. Computer Science)

Capt Nathaniel Flack (M.S. Cyber Operations)

1st Lt Dakotah Hogan (M.S. Cost Analysis)

Mr. Lansing Horan (M.S. Nuclear Engineering)

Capt Brandon Hufstetler (M.S. Operations Research)

Capt Jeneé Jagoda (M.S. Engineering Management)

Capt Michelle Kanipe (M.S. Atmospheric Sciences)

Capt Yousuke Matsui (M.S. Electrical Engineering)

2d Lt Lucas Mireles (M.S. Computer Engineering)

2d Lt Youngjun Park (M.S. Cyber Operations)

Ms. Elizabeth Pickering (M.S. Aeronautical Engineering)

2d Lt Brandon Pierce (M.S. Applied Physics)

2d Lt Bennett Staton (M.S. Aeronautical Engineering)

Maj Nathan Thomsen (M.S. Engineering Management)

1st Lt Taylor Whitney (M.S. Applied Physics)



Courtesy photo

Taylor Flaxington, AFIT 2020 M.S. graduate, is the first AFIT student to have an all-female thesis team.

First AFIT Graduate to Have All-female Thesis Team

By Kathleen Scott Air Force Institute of Technology

Taylor Flaxington was one of 229 students to complete her master's degree from the Air Force Institute of Technology's Graduate School of Engineering Management in March 2020. But she was the first AFIT student to have an all-female thesis team.

As an Air Force civilian employee, Flaxington attended AFIT through the PALACE Acquire program to study systems engineering.

Flaxington's research focused on characterizing the communication networks technical organizations rely on to carry out their mission. Knowing where information does or does not flow can guide efforts to improve organizational performance.

Flaxington chose to attend AFIT because of the defense-focused degree and research programs. "It was a different opportunity to get your master's but still be in an Air Force environment and directly applying your education to Air Force needs," she said.



AFIT Graduate School of Engineering and Management 2020 Graduation Awards

The Lt Col Charles P. Brothers, Jr. Outstanding Volunteer Service Award went to Mr. Jeffery Sitler from the Engineering Physics

Department. This award recognizes an AFIT faculty or staff member who has established a record of sustained, significant volunteer service to organizations both on-base and in the local communities. At the time of his death, Lt Col Brothers was serving on the faculty of the Electrical and Computer Engineering Department. He believed that by donating one's time and talents to the community, an individual truly demonstrates the qualities of character, integrity, and team spirit. We honor Lt Col Brothers' spirit of service through this award.

The Dayton Area Chapter of the **Military Officers Association** of America (MOAA) sponsored the MOAA Outstanding Military Professor Award won by Lt Col Andrew Hoisington, Assistant Professor and Engineering Management Program Manager in the Systems Engineering and Management Department. MOAA is the nation's largest veteran's organization of retired, former, and currently serving uniformed officers. The Outstanding Military Professor Award is given in recognition of the military professor who has demonstrated excellence in teaching, research, and service.

In August 2002, under the leadership of Air Force Secretary James G. Roche, AFIT enrolled its first class of 16 non-commissioned officers into the Graduate School of Engineering and Management, and subsequently created a specific award to honor the top enlisted student. **The Secretary James G. Roche Award** is presented to the graduating enlisted student who has demonstrated 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 2020 winner was **MSgt John Johnson** (M.S. Cost Analysis).

The Lieutenant Edwin E. Aldrin, Sr. Award is sponsored by the Wright Memorial Chapter of the Air Force Association and is named in honor of Lieutenant Edwin E. Aldrin, Sr.; a member of the institute's first graduating class of 1920, who upon graduation became AFIT's first Vice Commandant. This award recognizes the student who has displayed the most exceptional leadership characteristics while in the graduate program. The 2020 award winner was Capt Joanna Williams (M.S. Atmospheric Sciences). and recognizes the student who has made an advanced contribution in their professional field. The winner of this award has exhibited the highest standards of academic and professional accomplishment, and through their research made a significant contribution toward strengthening the nation's industrial defense base. The 2020 award winner was **2d Lt Aaron Bauer (M.S. Aeronautical Engineering)**.

The Mervin E. Gross Award is presented to the graduating student who has demonstrated exceptional academic achievement and high qualities of character, initiative, and leadership while in a master's graduate program. Named in honor of Brigadier General Mervin E. Gross who, following World War II, was responsible for reorganizing the Air Corps Engineering School as the Air Force Institute of Technology. The 2020 award winner was Capt Jeneé Jagoda (M.S. Engineering Management).

Awards Selected by Students

The Ivan B. Thompson Award recognizes the member of the graduating class who has shown exceptional service to the class, school, community, and Air Force. The 2020 winner was 2d Lt Sharee Acosta (M.S. Electrical Engineering).

Lt Col Robert Tournay, Assistant Professor of Atmospheric Science within the Department of Engineering Physics won the Dr. Leslie M. Norton Teaching Excellence Award. This award is given to a faculty member in honor of commitment and service to the graduating class.

The 2020 Student of the Year winners were selected by AFIT leadership for their academic accomplishments, leadership, and community contributions. These are truly peer awards. The Company Grade Officer of the Year was Capt Nathaniel Flack (M.S. Cyber Operations); Field Grade Officer of the Year was Maj Richard Danaher (M.S. Operations Research); Non-Commissioned Officer of the Year was MSgt John Johnson (M.S. Cost Analysis); International Student of the Year was Capt Daniel Cherobini from Brazil (M.S. Logistics & Supply Chain Management); and the Civilian Student of the Year was Ms. Elizabeth Pickering (M.S. Aeronautical Engineering).

The Beta Chapter of the Sigma lota Epsilon Professional Management Fraternity awarded the Dr. Anthony D'Angelo Award for Student Leadership to 2d Lt Kaitlyn Barry (M.S. Engineering Management). This award recognizes the Sigma lota Epsilon student who demonstrated excellent leadership and teamwork.

Maj Justin Delorit, Assistant Professor of Engineering Management within the Department of Systems Engineering and Management received the Beta Chapter of the Sigma Iota Epsilon Management Professor of the Year Award for outstanding contributions to the understanding of management sciences.

The Delta Xi Chapter of Eta Kappa Nu, a professional engineering honor society, sponsored the Electrical and Computer Engineering Faculty Member of the Year Award which was given to Maj J. Addison Betances, Assistant Professor within the Electrical and Computer Engineering Department.

The Ohio Eta Chapter of Tau Beta Pi, The National Engineering Honor Society, sponsored two awards. **The Tau Beta Pi Thesis Award** recognizes the master's student whose thesis was judged to make a significant contribution to the engineering community. The 2020 winner was **Ms. Elizabeth Pickering** (M.S. Aeronautical Engineering). The Tau Beta Pi Thesis Advisor Award was given to Lt Col Jeff Komives, Assistant Professor of Aerospace Engineering within the Aeronautics and Astronautics Department, for his outstanding support to students during the thesis process.

Sigma Gamma Tau, the honor society for Aerospace Engineering seeks to identify and recognize achievement and excellence in the Aerospace field. The Sigma Gamma Tau Award winner was Ms. Elizabeth Pickering (M.S. Aeronautical Engineering).

Dean's Award Selected by Each Academic Department

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.

Electrical and Computer Engineering Department – 2d Lt Michael Sherburne (M.S. Electrical Engineering)

From the Engineering Physics Department – 2d Lt Alexander Boeckenstedt (M.S. Applied Physics)

From the Operational Sciences Department – 2d Lt Nicholas Forrest (M.S. Operations Research)

From the Systems Engineering and Management Department – Ms. Megan Steele (M.S. Environmental Engineering & Science and M.S. Industrial Hygiene)

From the Aeronautics and Astronautics Department – 2d Lt J. Luke Hill (M.S. Aeronautical Engineering)



Courtesy photo

Dr. Todd Stewart, AFIT Director and Chancellor, presents the Chancellor's Award to 2d Lt Alexander Boeckenstedt (M.S. Applied Physics) during a "drive-thru" outprocessing event on 3 April 2020.

2020 Chancellor's Award

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 2020 Chancellor's Award and Russ Prize went to 2d Lt Alexander Boeckenstedt (M.S. Applied Physics).

AFIT Grads Accept Association and Society Awards

The Dayton Chapter of the International Society of Logistics sponsored the Jerome G. Peppers Jr., Outstanding Student Award. This award is given to a member of each graduating class whose academic record and research contributions to the field of logistics are judged to be superior. The 2020 winner was Mr. Zachary Shannon (M.S. Logistics & Supply Chain Management).

The Dayton/Miami Valley Chapter of the Project Management Institute sponsored the Dr. Martin D. Martin and Dr. John Adams Thesis Award given to the author of the thesis that best addresses a project management topic and is judged to be an outstanding research effort in terms of its contribution to the project management body of knowledge. The 2020 winner was MSgt Eric Plack (M.S. Cost Analysis).

The Dr. James T. Moore Graduate Research Prize, sponsored by the Military Operations Research Society, is named after Dr. Moore who served for 21 years at AFIT as a Professor and head of the Department of Operational Sciences. This award is given to the author of a thesis judged to demonstrate the best application of operations research methodology or theory development to a military problem. The 2020 winner was Capt Brandon Hufstetler (M.S. Operations Research).

The Kittyhawk Chapter of the International Association of Old Crows, sponsored two academic research excellence awards. The Academic Research Excellence Award in Electronic Defense recognized the thesis judged to make the most significant contribution in the area of electronic defense. The 2020 winner was Capt Trent Wargo (M.S. Electrical Engineering). The Academic Research Excellence Award in Information Superiority recognized the thesis judged to make the most significant contribution in the area of information security and information operations. The 2020 winner was 2d Lt Youngjun Park (M.S. Cyber Operations).

Two separate awards are given to students performing research in technical disciplines related to the Measurement and Signature Intelligence (MASINT). The first award is sponsored by the MASINT Committee, a technical coordination office within the Defense Intelligence Agency (DIA) with government representatives from the intelligence community and the Department of Defense. The Center for Technical Intelligence Studies and Research Outstanding Thesis Award (MASINT Committee Award of Academic Excellence) is given to the author of a master's thesis judged to make the best overall contribution to the field of measurement and signature intelligence. The 2020 winner was LTC Jason Wood, USA (M.S. Nuclear Engineering). The Advanced Technical Intelligence (ATIA) Association Outstanding Student Award is given to a graduating student who demonstrates the highest overall level of performance while pursing academic work in the field of measurement and signature intelligence. The 2020 winner was Capt Jerrod Kempf (M.S. Electrical Engineering).

The Alpha Chapter of the American Nuclear Society (ANS) sponsored the ANS Thesis Award. This award is given to the author of a thesis judged to make the most significant contribution to the field of nuclear engineering and physics. The 2020 winner was 1st Lt Daniel Gum (M.S. Nuclear Engineering).



Courtesy photo

Col Andy McQuade, Graduate School of Engineering and Management's Dean of Students, presented 2d Lt Liberty Shockley (M.S. Astronautical Engineering) with the Navigation Research Excellence Award during a "drive-thru" out-processing on 3 Apr 2020. Sponsored by the Dayton Section of the Institute of Navigation, this award is given to the author of a master's thesis reflecting the most exceptional research contribution to scientific or engineering knowledge in the navigation area.

The Dayton-Cincinnati Section of the American Institute of Aeronautics and Astronautics (AIAA) sponsored the AIAA Graduate Student Award for Service Excellence to recognize a graduating master's student from AFIT for outstanding service to the aerospace profession in general, and the Dayton-Cincinnati Section of AIAA in specific. The 2020 winner was Ms. Elizabeth Pickering (M.S. Aeronautical Engineering).

The Air Force Historical Foundation's General Bryce Poe II Award is given to a student or group of students whose thesis contributes to an understanding of the historical factors affecting an Air Force or Department of Defense problem, event, or process. The 2020 winner was **Capt Scott Guerin (M.S. Engineering Management)**.

The Society of American Military Engineers (SAME) Kittyhawk Chapter sponsored the SAME Award. This award is given to the student in the engineering and environmental management program who demonstrates superior scholarship, outstanding leadership, character, and initiative. The 2020 winner was Capt Jeneé Jagoda (M.S. Engineering Management).

ASSOCIATION AND SOCIETY AWARDS CONTINUED

The Society of American Military Engineers (SAME) Kittyhawk Chapter also sponsored the Office of the Air Force Civil Engineer, George K. Dimitroff Award. This award is presented annually to the author of the thesis judged to have made the most significant contribution to the Air Force civil engineering career field. The 2020 winner was Capt Scott Guerin (M.S. Engineering Management).

The U.S. Cyber Command sponsored the

Cyberspace Research Excellence Award given to the student whose master's level research is judged the best in advancing Air Force capabilities in cyberspace. The 2020 winner was Capt Yousuke Matsui (M.S. Electrical Engineering).

The Dayton Section of the Institute of Navigation sponsored the Navigation Research Excellence Award given to the author of a master's thesis reflecting the most exceptional research contribution to scientific or engineering knowledge in the navigation area. The 2020 winner was 2d Lt Liberty Shockley (M.S. Astronautical Engineering).

The Greater Dayton Chapter of the International Cost Estimating and Analysis Association (ICEAA), sponsored the ICEAA Thesis Award. This award is presented to the author of the thesis which best qualifies both as an outstanding research effort and as a significant contribution to the development and/ or application of cost analysis or cost accounting. The 2020 winner was 1st Lt Dakota Hogan (M.S. Cost Analysis).

The International Society for Optics and Photonics (SPIE), presented the Excellence in Optics and Photonics Research Award. This award for excellence in optics and photonics research recognizes the best light-based thesis of a graduating master's student. The 2020 winner was FLTLT James Boettiger, Royal Australian Air Force (M.S. Electrical Engineering).

Advanced Study of Air Mobility Class of 2020 Graduates

By Master Sgt. Ashley Hyatt U.S. Air Force Expeditionary Center

Sixteen U.S. Air Force officers graduated from the Advanced Study of Air Mobility (ASAM) program 5 June 2020, at the U.S. Air Force Expeditionary Center on Joint Base McGuire-Dix-Lakehurst, New Jersey.

ASAM is an 11-month education program that a select group of Air Mobility Command officers are able to attend based on their record of accomplishments, academic skills and leadership potential. Upon graduation, students are awarded a Master of Science degree in Operations Management with a focus in Logistics by the Air Force Institute of Technology. ASAM's mission is to cultivate a core of mobility experts to advise combatant commanders and lead the Air Mobility Command in the future.

Due to the COVID-19 pandemic, guest speaker U.S. Army Gen. Stephen R. Lyons, U.S. Transportation Command commander, was unable to attend the ceremony, but provided a video with remarks where he expressed the importance of the students' hard work.

"As a result of your hard work over the last year, you are now among the most sought after experts in the joint mobility enterprise," said Lyons. "I am excited about the positive impacts you will have on the joint force as you apply the tools acquired in this academic setting with your passion for lifelong continued learning and leadership development."

The director and chancellor of the Air Force Institute of Technology, Dr. Todd I. Stewart, also provided a video of encouragement to the graduating class.

"What is truly important is not what you have learned at ASAM, but what you will do with what you have learned throughout the balance of your military career," said Stewart. "I'm confident that your AFIT graduate program and the other components of the ASAM program have prepared you very well to make important contributions to our Air Force, our new Space Force, the other services, the joint commands, defense agencies, our allies and partners, and ultimately to our national security."



The Advanced Study of Air Mobility (ASAM) class of 2020 at the U.S. Air Force Expeditionary Center on Joint Base McGuire-Dix-Lakehurst, New Jersey.

U.S. Air Force photo by Tech. Sgt. Ashley Hyatt

UPCOMING EVENTS

JULY 2020

AFIT Graduate School Summer Quarter Classes Begin AFIT Campus, WPAFB, OH | 13 Jul 2020

AUGUST 2020

AFIT Graduate School Fall Quarter Registration Opens AFIT Campus, WPAFB, OH I 17 Aug 2020

> Air Force IT and Cyber Conference (AFITC) Montgomery, AL I 24-26 Aug 2020

SEPTEMBER 2020

AFA 2020 Air, Space & Cyber Conference National Harbor, MD | 14-16 Sep 2020

AFIT Graduate School Summer Quarter Classes End AFIT Campus, WPAFB, OH I 18 Sep 2020

OCTOBER 2020

AFIT Graduate School Summer Graduation Degree Conferral (No Ceremony) AFIT Campus, WPAFB, OH | 01 Oct 2020

> AFIT Graduate School Fall Quarter Classes Begin AFIT Campus, WPAFB, OH | 01 Oct 2020





AFIT FACULTY SEARCH



To search for AFIT Graduate School faculty members and view their online bios, please visit us at www.afit.edu/BIOS

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