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THE GRADUATE SCHOOL OF ENGINEERING AND MANAGEMENT

AFIT ENGINEER

Air Force Institute of Technology

AFIT Welcomes New Chief Academic Officer

By **Katie Scott**
Air Force Institute of Technology

Dr. Heidi R. Ries has been selected as the Air Force Institute of Technology’s Chief Academic Officer charged with overseeing and ensuring the highest standards of academic quality in both graduate and professional continuing education instruction and research.

In this role, Ries has direct oversight for achieving and sustaining institute and program accreditation; the faculty promotion and tenure process; development of new, distinctive and innovative academic programs; and long-range planning for sustaining and improving academic program quality.

“Dr. Heidi Ries was selected as the best-qualified candidate from a field of exceptionally qualified applicants identified through a national search,” said Dr. Todd Stewart, AFIT Director and Chancellor.

“Dr. Ries will provide the strong, visionary academic leadership that AFIT needs to better support the US Air and Space Forces today and in the future.”

— Dr. Todd Stewart
AFIT Director and Chancellor



U.S. Air Force photo

Dr. Heidi Ries has been selected as AFIT’s Chief Academic Officer.

Ries is also a professor of physics within AFIT’s Graduate School of Engineering and Management, where she served as dean for research prior to appointment as AFIT’s Chief Academic Officer.

“AFIT’s STEM workforce development offerings, defense-focused technical innovations, and external partnerships have grown significantly in recent years, and I am very excited about the opportunity to further enhance AFIT’s support to national defense imperatives,” said Ries.

Before joining AFIT in 1999, Ries served as professor of physics and director of the Center for Materials Research at Norfolk State University in Norfolk, VA. She earned her Doctor of Philosophy in Applied Physics from Old Dominion University, Virginia, with dissertation research conducted at NASA Langley Research Center.

Ries volunteers as the past chair of the Board of Trustees for the Engineering and Science Foundation of Dayton, and as a member of the Martin University Board of Trustees. She is a

member of the Team Chair Corps of the Higher Learning Commission, and serves as a reviewer for the National Science Foundation and advisor for various university’s initiatives.

In 2011, Ries was the Air Force’s civilian winner of the DoD Women’s History Month Science, Technology, Engineering and Math Role Model Award. The same year she was also the Air Force winner of the National Latina Distinguished Service Award. The *Dayton Daily News* recognized Ries as one of the region’s Ten Top Women in 2009.

AFIT is the Air Force’s leader for advanced, multi-disciplinary academic education, as well as its institution for technical professional continuing education. A component of Air University and Air Education and Training Command, AFIT is committed to providing innovative, defense-focused graduate education and related research, and operationally-relevant professional continuing education, to sustain the technological supremacy of America’s air, space, and cyber forces. Since 2008, AFIT has been designated as the Air Force’s Cyber Technical Center of Excellence.

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www.afit.edu/EN/afitengineer



DIGITAL ENGINEERING

Read about Digital Engineering for the AF Mission and AFIT’s new Digital Literacy webpage inside.

AFIT in a Unique Position to Continue Providing Advanced Education to USAF and USSF

Welcome to our first 2021 issue of the *AFIT Engineer*, which continues to thrive in information sharing and knowledge transfer about the latest happenings in the Graduate School of Engineering and Management. As in the past editions, this issue of the newsletter is designed to be your information companion as you seek to know more and share more about the education, research, and service missions of the Air Force Institute of Technology (AFIT).

As we have been reminded again and again, innovation is

what can separate a leading nation from other nations. Education is the foundation for innovation. As such, we are in a unique position to continue to provide advanced education not only to the US Air Force (USAF), but also to the US Space Force (USSF), the newest spoke in our national defense system. The thematic focus of this issue of the *AFIT Engineer* is Digital Engineering. AFIT provides education, research, and consultation on digital engineering as you can see on the following pages. I do not want to steal the thunder of the newsletter. Please read on to

bear witness to the good things going on at AFIT.

Our faculty teams are the avenues for executing our research-informed education mission. In this issue we recognize the exceptional performers among us. The award winners profiled on the next pages represent just a selection of the excellent faculty of the Graduate School of Engineering and Management. There are more to come in future award and recognition programs.

As shown on the front page, please join me in welcoming Dr. Heidi Ries to her new leadership position at the Chief Academic Officer for AFIT. Her legendary and broad institutional perspectives and articulate capabilities will serve the whole of AFIT well. Greater things are on the horizon for the academic advancement of AFIT.

Respectfully,




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

“Innovation is what can separate a leading nation from other nations. Education is the foundation for innovation.”

— Dr. Adedeji Badiru
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.

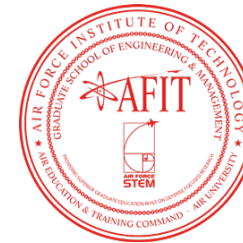


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Dean's Distinguished Teaching Professors

AFIT Graduate School of Engineering and Management



The Graduate School of Engineering and Management is proud to announce the Academic Year 2020-2021 Dean's Distinguished Teaching Professors. These outstanding faculty have continually promoted our commitment to excellence in teaching. Two professors were designated from each of the Graduate School's six academic departments as listed below.



Aeronautics & Astronautics



Lt Col James Rutledge
Associate Professor of
Aeronautical Engineering



Dr. Mark Reeder
Professor of Aerospace Engineering

Electrical & Computer Engineering



Dr. Hengky Chandralalim
Assistant Professor of
Electrical Engineering



Dr. Scott Nykl
Associate Professor of
Computer Science

Engineering Physics



Dr. Anil Patnaik
Associate Professor of Physics



Maj James Bevins
Assistant Professor of
Nuclear Engineering

Mathematics & Statistics



Dr. Benjamin Akers
Professor of Mathematics



Dr. Christine Schubert Kabban
Professor of Statistics

Operational Sciences



Dr. Raymond Hill
Professor of Operations Research



Dr. Brian Lunday
Professor of Operations Research

Systems Engineering & Management



Maj Justin Delorit
Assistant Professor of
Engineering Management



Dr. Jonathan "Dan" Ritschel
Assistant Professor of Cost Analysis

GSEM Presents Annual Awards

The Air Force Institute of Technology's Graduate School of Engineering and Management hosted their annual awards ceremony on January 22 honoring faculty and staff for outstanding performance in 2020. "The GSEM award winners demonstrate how we all come together from different angles to make AFIT a great place," said Dr. Adedeji Badiru, dean of the graduate school.

Col James Fee, associate dean of the graduate school, remarked on the challenges the faculty and staff faced in 2020, including moving more than 100 in-resident courses to distance learning due to the COVID-19 pandemic. "I want to acknowledge all of the hard work and thank you," Fee said. "Despite all of that, we still saw teaching excellence and people not letting that get in the way."

The winners of the 2020 GSEM Annual Awards are shown below.



U.S. Air Force photos



Outstanding Staff Member Award
Ms. Alicia Sprinkle, Training Administrator, Department of Electrical and Computer Engineering



Early Career Achievement Award
Maj Robert Bettinger, Assistant Professor of Astronautical Engineering and Deputy Director, Center for Space Research and Assurance, Department of Aeronautics and Astronautics



Advising and Mentoring Award
Dr. Scott Graham, Associate Professor of Computer Engineering, Department of Electrical and Computer Engineering



Faculty Research Award
Lt Col James Rutledge, Associate Professor of Aerospace Engineering and Senior Military Faculty, Department of Aeronautics and Astronautics



Faculty Service Award
Dr. Marc Polanka, Professor of Aerospace Engineering, Department of Aeronautics and Astronautics



Teaching Award
Maj Joshua Hess, Assistant Professor of Aeronautical Engineering, Department of Aeronautics and Astronautics

AETC's Educator of the Year 2020 Award Winners Announced

Congratulations to the Graduate School of Engineering & Management's **Major James E. Bevins** who has been chosen to receive the Air Education and Training Command's (AETC) Educator of the Year Award for 2020. The AETC award recognizes officer, enlisted and civilian faculty members who excelled at Teaching Excellence, Scholarship of Discovery—Creating Knowledge, Scholarship of Integration—Connecting Knowledge, Scholarship of Application—Using Knowledge.



Major James Bevins has been an Assistant Professor of Nuclear Engineering in the Engineering Physics Department since 2017. In 2018, he was selected as the Air Force Technical Applications Endowed Term Chair for Nuclear Treaty Monitoring.

SOCHE Announces 2020-2021 Excellence Awards Honorees

Two AFIT Graduate School of Engineering & Management faculty members and two staff members have been chosen by the Southwestern Ohio Council for Higher Education (SOCHE) as excellence award winners for the 2020-2021 academic year.



The honorees are **Major Levi Thomas** (Assistant Professor of Aerospace Engineering), **Dr. Hengky Chandralim** (Assistant Professor of Electrical Engineering), **Ms. Alissa Mason** (Business Manager, Department of Systems Engineering & Management), and **Ms. Nell Easterday** (Budget Analyst, Graduate School of Engineering & Management).

SOCHE will honor 48 Excellence Award recipients from across 21 member institutions throughout the 2020-21 academic school year. SOCHE is the regional leader for higher collaboration, engaging with colleges, universities, and industry to transform the economy through the education and employment of nearly 200,000 students in Southwest Ohio. Read the full article online here: <https://www.afit.edu/news.cfm?article=0361400D>

AFIT OAY Award Winners

Congratulations to the following GSEM personnel who have been selected at the AFIT-level to compete in the 2020 AU Annual Outstanding Airman of the Year (OAY) Awards. Good luck to the award winners as they compete at the next level.

FGO: **Maj James Bevins** (Department of Engineering Physics)
Civ Cat I: **Ms. Ruth Randall** (ENWL)
Civ Cat II: **Ms. Molly M. Ward** (ENRS)
Civ Cat IV: **Dr. Bradley J. Ayres** (Department of Aeronautics & Astronautics)

Chancellor's Awards for Excellence

The winners of the 2020 Chancellor's Awards for Excellence (AFIT-level annual awards) were announced on 18 Feb 2021. These awards recognize excellence in innovation, leadership, mentorship, and serving as a wingman to others. Congratulations to all AFIT winners listed below.



Chancellor's Exceptional Wingman Award: The award recognizes an Airman who has exemplified what it means to be an exceptional wingman, while at AFIT. The award recognizes teamwork, service before self, and our Air Force culture of respect, caring for, trust in, and supporting one another, while accomplishing the mission. This award encompasses volunteerism, mentorship, and other support systems required to exemplify the tenets of the Airman's Creed.

Jr. Faculty: **Capt Benjamin R. Fonte** (Civil Engineer School)

Chancellor's Innovation Excellence Award: This award recognizes the Airmen who have exemplified the Air Force goal of innovation while at AFIT. The award celebrates "outside-the-box" thinking that promotes innovation, creativity, and forward-thinking by our students and educators.

Jr. Faculty: **Capt Sean A. Mochocki** (School of Systems & Logistics)

Sr. Faculty: **Richard N. Kappel** (Civil Engineer School)

Team: **Online Systems Engineering Team** (Graduate School of Engineering & Management, Department of Systems Engineering & Management)

Chancellor's Leadership Excellence Award: This award recognizes the Airmen who have distinguished themselves above their peers as being exceptional leaders across an organization. The award seeks to reach beyond the traditional military leadership structure and recognizes Airmen who have led beyond their assigned team.

Jr. Faculty: **Maj Justin D. Delorit** (Graduate School of Engineering & Management, Department of Systems Engineering & Management)

Sr. Faculty: **Lt Col Christian E. Randall** (School of Systems & Logistics)

Jr. Staff: **Lt Kasey N. Stout** (Civilian Institution Programs)

Sr. Staff: **Tammy Bugher** (School of Systems & Logistics)

Chancellor's Mentorship Excellence Award: This award recognizes the Airmen who have demonstrated strong mentorship to peers, leaders, and followers while at AFIT. The transformational leadership of these Airmen led to the inspirational motivation of others.

Faculty: **Tay W. Johannes** (Civil Engineer School)

Staff: **Alicia P. Sprinkle** (Graduate School of Engineering & Management, Department of Electrical & Computer Engineering)

Civilian Returns to AFIT for PhD in Astronautical Engineering

By Jaclyn Knapp
Air Force Institute of Technology

Air Force civilian employee Thomas Fay chose the Air Force Institute of Technology to complete his graduate and doctoral education because of its unique position as an Air Force graduate research institute.

“AFIT offered me the opportunity to advance my personal technical knowledge, gain hands-on research experience and then provide that expertise back to the Department of Defense while maintaining my current job,” said Fay, Astronautical Engineering doctoral student.

“The school’s convenient location near my office and the DoD sponsored tuition offered to Air Force civilian students made the decision even easier,” said Fay.

Fay completed his Master of Science in Space Systems at AFIT in 2018. He returned to AFIT to pursue his doctorate in Astronautical Engineering so he could expand upon his MS research, and to maintain a consistent learning experience with faculty and resources that were already familiar to him.

“I strongly recommend civilian students attend AFIT! AFIT offers a number of unique benefits, including the opportunity to grow professional networks by studying side-by-side with our military counterparts, and the ability to tailor an academic program around issues of relevance to the DoD,” said Fay.

“These opportunities can enable significant career growth and development. AFIT is also easily the most convenient option due to the number of tuition-funded programs available to civilian employees, as well as its location for Wright-Patterson AFB personnel,” said Fay.

One program available to DoD civilians interested in attending AFIT is the Civilian Developmental Education program. CDE provides education and leadership opportunities that will prepare Air Force civilians to successfully meet challenges across a wide range of operations and missions. The 2022 application window for CDE is open to Feb 26.



Air Force civilian employee Thomas Fay completed his Master of Science in Space Systems at AFIT in 2018. He returned to AFIT to pursue his doctorate in Astronautical Engineering to expand upon his MS research, and to maintain a consistent learning experience.

“CDE is an amazing program, and helps provide a critical means for making AFIT truly a ‘Total Force’ institution. Our civilian students are key asset to the ongoing defense-focused research that sets AFIT apart from its peer universities, and constitute an invaluable part of our space-related education and research programs,” said Maj. Robert Bettinger, deputy director of AFIT’s Center for Space Research and Assurance.

For up-to-date CDE information, visit the Civilian Force Development page on myPers from a common access card-enabled computer or select “Civilian Employee” from the myPers dropdown menu and search “developmental education.” Required documents, application instructions, a list of CDE opportunities and other criteria are available on the page. Additional information can also be found at: <https://www.afpc.af.mil/Force-Development/Civilian-Developmental-Education/>

The Air Force Institute of Technology, located at Wright-Patterson AFB, is the Air Force’s graduate school of engineering and the student’s first choice for advanced academic education and career-long professional continuing education.

“I strongly recommend civilian students attend the Air Force Institute of Technology. AFIT offers a number of unique benefits, including the opportunity to grow professional networks by studying side-by-side with our military counterparts, and the ability to tailor an academic program around issues of relevance to the DoD.”

— Thomas Fay, Air Force civilian employee

MORE INFORMATION



For additional information about graduate or post-doctoral degrees in astronautical engineering or space systems, contact AFIT’s Center for Space Research and Assurance:



<https://www.afit.edu/CSRA/>



937-255-6565 ext. 4753



jaclyn.knapp.ctr@afit.edu

Airmen Become Guardians in Transfer to USSF

AFIT Chancellor and Director Todd Stewart and AFIT Graduate School of Engineering & Management Dean of Students Col Andy McQuade made history on Feb. 2, 2021 as they presided over AFIT’s second-annual U.S. Space Force (USSF) transfer ceremony.

A group of 64 students from both AFIT’s Graduate School of Engineering & Management and from Civilian Institutions took the ceremonial oaths in person and virtually to mark their transfer from the Air Force to the Space Force. Thirty-two AFIT personnel attended the socially-distanced swearing in ceremony in person and 32 AFIT personnel attended virtually.



U.S. Air Force photos

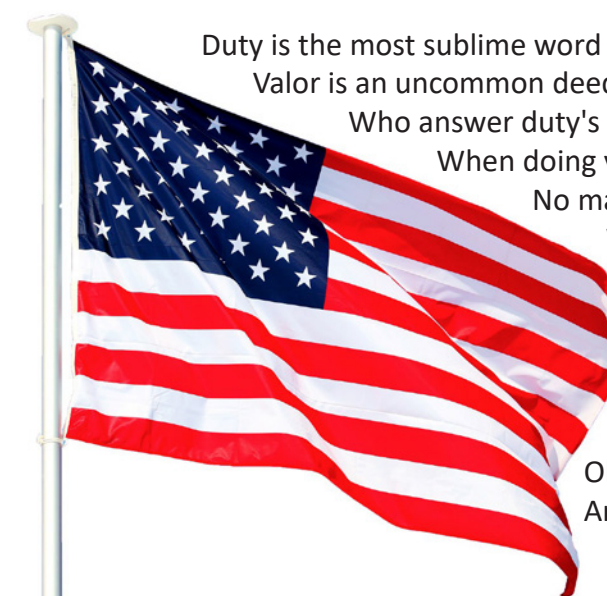


Top left to right: Students take the oath in person at AFIT to mark their transfer from the Air Force to the Space Force.

AFIT Chancellor & Director Todd Stewart welcomes students to the 2021 transfer ceremony.

Bottom left: Remarks are given virtually by Gen. John W. Raymond, Chief of Space Operations, United States Space Force.

Tribute to Duty



Duty is the most sublime word in the affairs of the free;
 Valor is an uncommon deed by those standing their post;
 Who answer duty's call when it matters the most
 When doing your duty you can never do more;
 No matter the circumstances and risks that are in store
 While doing your duty can be tedious and even hard;
 Just remember! Doing your duty is its own reward
 Airmen, sailors, soldiers, national guard, and marines;
 Make national service a part of their dreams
 And parents can take pride who raise their children well;
 As can children who diligently answer the school bell
 Obey the law, respect neighbors, and be informed to vote;
 And when singing the national anthem, reflect on every note.

Poem by Dr. Jan P. Muczyk, 2021

For the Air Force Institute of Technology

DIGITAL ENGINEERING

IS FOUNDATIONAL FOR THE AIR FORCE MISSION



By Adedeji Badiru
Graduate School of Engineering and Management
Air Force Institute of Technology

Unlike buzzwords of the past, digital engineering is not a fad. The proof for this can be easily seen, observed, and felt in our present-day operating environment (see Badiru, 2019). The ongoing wave of artificial intelligence products, tools, and techniques are being facilitated by the unprecedented digital platforms for everything we do. The smartphones we carry around with us demonstrate how our communication modes have been transformed on a rapid scale by digital platforms.

There is no turning back. Digital engineering will continue to revolutionize operations in all aspects of our lives. Digital engineering will continue to advance how we do everything in business, education, industry, government, and the military. Any entity that is sluggish in embracing digital engineering will be left behind, cannot participate fully in emerging technological advancements, and cannot claim to be on the leading edge of anything.

Motivational Examples from the Business World

Observable pieces of evidence of my assertion above can be seen in the business world (Ademola, 2020). A quick research revealed that in 2010, the world's most valuable companies by market share capitalization were ExxonMobil (\$314.62B), PetroChina (\$270.89B), Apple (\$259.22B), Petrobras (\$220.62B), ICBC (\$213.36B), Microsoft (\$210.67B), China Mobile (\$205.34B), Berkshire Hathaway (\$204.79B), China Construction Bank (\$202.99B), and BHP Billiton (\$196.87B). By 2020, by virtue of leveraging emerging digital technologies, the leading and most capitalized companies in the world are listed as follows:

1. **Apple** (\$1.98T), not the one you buy in the grocery stores
2. **Microsoft** (\$1.59T), ubiquitous in everything we do nowadays
3. **Amazon** (\$1.577T), purchase platform for every consumer product
4. **Alphabet** (\$999.57B), parent company of Google
5. **Alibaba** (\$795.40B), not the one from the Arabian nights (Homework: look this up online)

6. **Facebook** (\$746.10B), in your face everyday
7. **Tencent Holdings** (\$646.79B), Chinese multinational technology conglomerate
8. **Berkshire Hathaway** (\$509.47B), Warren Buffet's group of companies
9. **Visa** (\$425.51B), the card company you love to flash in the store
10. **TSMC** (\$420.44B), Taiwan Semiconductor Manufacturing Company

The above list shows that whoever controls the digital realm will control the business world. The point is that companies we never heard about in 2010 are now in the group of top companies controlling world business market capitalization.

In the above regard, digital engineering in defense operations needs our urgent and collective attention. This is an urgent call for action to embrace digital engineering in all forms of our defense operations. If the business testimony above piques your interest, please come on board to join our digital campaign.

So, What is Digital Engineering, By the Way?

In the context of what we do at AFIT, to collaborate on digital engineering, we must all have a common understanding of what it entails. For our common understanding, digital engineering is the combined art and science of creating, capturing, designing, evaluating, justifying, and integrating data using digital (i.e., electronic) tools and processes. This requires the humans in the loop of the process to also have a digital mindset. A digital tool that is devoid of the digital readiness of humans will be for naught. So, workforce development along the digital spectrum is essential for sustainable success.

With its education mission, AFIT is most suited to leading digital efforts for the US Air Force. Digital engineering will require new and novel methods, systems-based processes, and appropriately-customized tools. The emerging methodology of Blockchain is something we need to embrace rapidly. If we are serious about digital engineering, we must fundamentally change the way we think, design, evaluate, justify, integrate, manage, monitor, and control operations. All AFIT schools are collaboratively ready to help with this digital challenge.

An AFIT Case Example

As a case example, I remember when I assumed the Dean's position at AFIT in 2013 and I immediately mandated that we would convert to electronic theses and dissertations. Several commented that it was not possible based on the archaic database systems available to us at that time. I insisted that we must proceed so that we could chart a new process of conducting our intellectual activities. We decided to bite the bullet and we implemented electronic theses and dissertations, for which our students and faculty are forever grateful. We have elevated our game since then and we now have a functioning process for electronic theses and dissertations. We have "elevated our game" since then and we have continued to embrace continuous improvement opportunities. Based on this case example, we should get into the uncharted paths of digital engineering and take the lead where our operating authority and administrative empowerment can allow us.

Indeed, digital engineering promises to revolutionize operations that had, hitherto, been tackled with analog processes. The US Air Force now has a digital engineering roadmap. In July 2018, the Department of Defense (DoD) released its Digital Engineering Strategy for the purpose of promoting the use of digital representations of systems and components and using digital artifacts to design and sustain national defense systems. The pursuit of this strategy is now spreading rapidly throughout all the arms (no pun intended) of the Department of Defense. Fortunately, we, here at AFIT, are already aligned with the game. We hosted a well-received digital engineering symposium as long ago as 30-31 October 2017. So, we are well-positioned and prepared to offer workshops, credit courses, certificates, training

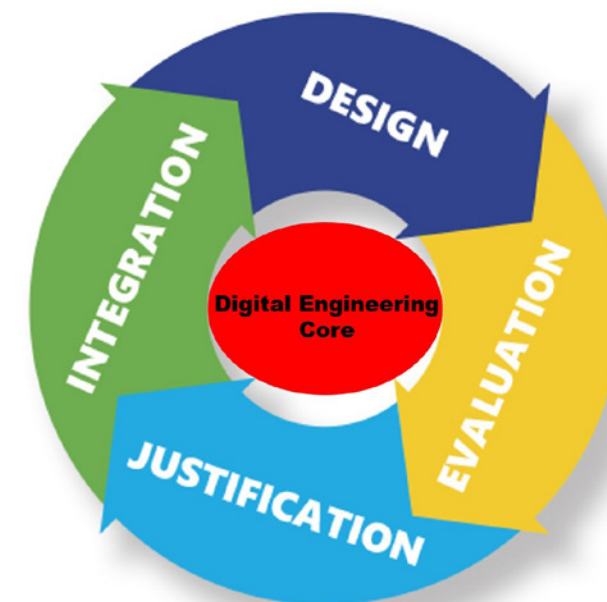


Figure 1. Application of the DEJI Systems Model® to Digital Engineering Implementation

sessions, and research on the multitude of topics embedded within digital engineering. This we can do through partnerships and collaborations with like-focused organizations and individuals, but from a System of Systems perspective. A systems framework can ensure that all the parts are operating in consonance such that the output of the overall system would be higher than the mere sum of the individual outputs of the disjointed subsystems. In this regard, integration of efforts is the key to success (see Figure 1).

Space-based Digital Engineering Application Platform

As a Systems Engineer, I have been advocating how we can leverage the digital revolution to foster international collaboration in the pursuit of World peace. Over the years, much has been done by the US Institute of Peace in Washington, DC about how to leverage the capabilities of STEM players to develop strategies for pursuing World peace. I recall a key extract from a proposal that I submitted to the Institute of Peace in 1993: "The premise of this proposal is that industrial cooperation can serve as a driver for World peace because of the mutual dependency that can result from such cooperation." A mutual dependency rather than a mutually-assured destruction may help all of us to confront, tackle, and trump the grand challenges of the world, as published by the National Academy of Engineering in 2008 (NAE, 2008).

Based on the emergence of digital engineering with potential applications of additive manufacturing (3D printing) on the International Space Station, we can influence the world positively from way above the Earth. Coincidentally, advanced research in 3D printing for space applications is one of AFIT's present capabilities. The International Space Station has demonstrated the possibility of collaborating nations working "peacefully" way up there. With the spread of digital engineering, we learn new space-based disposition towards pursuing sustainable peace down here on Earth and advancing technologies that remedy environmental disasters around our world. Yes, the floating international space station can be a movable platform for world-peace collaboration. Time and research must be invested now. Meanwhile, we can explore an implementation of digital engineering along the systems engineering framework presented in the figure below.

AFIT has formed a specialized working group on Digital Engineering. The group will be chaired by Mr. Richard Sugarman from the School of Systems and Logistics and co-chaired by Dr. Amy Cox from the Graduate School Department of Systems Engineering and Management. Members are drawn from across AFIT's schools. The group will serve as the conduit for formulating and articulating AFIT's knowledge base of digital engineering to support enterprises across the Air Force.

My advocacy in this article can be actualized through a cohesive teamwork, under which I define TEAM as "Together Expressly Achieves More." Let's all practice this axiom in our pursuit of digital engineering along the structure framework of the DEJI Systems Model® of Digital Engineering Design, Evaluation, Justification, and Integration (presented in Figure 1).

Deinceps transeamus!

Reference:

- InAdemola, Boye (2020), "Emerging Technologies: A Focus on Blockchain," Online Webinar by KPMG Nigeria, Nigerian Academy of Engineering, Lagos, Nigeria, December 3, 2020.
- Badiru, Adedeji (2019), "Digital Engineering on a Space Platform," **AFIT Engineer**, December 2019, p.2.
- NAE (2008), **14 Grand Challenges for Engineering**, National Academy of Engineering (NAE), Washington, DC, 2008.

Digital Literacy Education



Digital literacy education at AFIT focuses primarily on the areas of digital engineering, digital acquisition, and data science. The most recent National Defense Strategy and National Defense Authorization Acts describe the need for the Department of Defense to modernize analytical and decision-support processes to execute the national defense mission more efficiently and effectively. This requires an increase in the digital literacy of our Airmen and Guardians.

AFIT is a leader in providing graduate and continuing education, research, and consulting in competencies to improve digital literacy. Visit the website to find a list of primary graduate programs, continuing education curriculums, short courses and workshops, and research centers that support this directive.

Click to learn more @ www.afit.edu/diglit

EDUCATION



- ✓ Digital literacy education at AFIT focuses primarily on the areas of digital engineering, digital acquisition, and data science.
- ✓ Technology tools are commonplace to enhance learning and digital literacy.
- ✓ Forty-five graduate degrees and certificates are offered in STEM fields.
- ✓ Continuing education courses address numerous aspects of digital acquisition and data science.
- ✓ Workshops and webinars complement formal education courses, addressing cutting-edge digital topics such as Model-Based Systems Engineering, Agile Software Development, Dev*Ops, Cloud Services, and Data Analytics.

RESEARCH



- ✓ AFIT conducts research through both its teaching schools and specialized centers.
- ✓ Sponsored graduate research in digital literacy subjects such as artificial intelligence, human-machine systems, and data science complements degree programs.
- ✓ Continuing education digital literacy research focuses on identifying and assessing new digital processes in the acquisitions and logistics arenas.
- ✓ Faculty research ensures courses are constantly refreshed with the latest digital trends and needs of the Air Force. Supplemental education resources are also found or produced, vetted and provided to students.
- ✓ DoD and Air Force Centers of Excellence and research centers conduct specialized research in critical fields to advance the use of technology, such as Operational Analysis, Technical Intelligence, and Space Research and Assurance.

CONSULTING



- ✓ Customer-specific technical consulting is available to support organization or process improvements.
- ✓ Faculty and research centers provide tailored consulting and workshops to address real-time technology and information issues.
- ✓ Principle customers are AFRL project teams, acquisition and sustainment program offices, depot maintenance organizations, test organizations, and operational logistics squadrons.

DR. GLADYS B. WEST

Dr. Gladys B. West was born in Sutherland, Virginia, in 1930. After graduating at the top of her high school class, she attended Virginia State College (now University), where she majored in mathematics. Upon her graduation with a Bachelor of Science degree in 1952, Dr. West taught mathematics at schools in Sussex County until 1954, when she decided to pursue her Master of Science in Mathematics, full-time, at Virginia State College.

After completing her graduate degree in 1955, West worked again as a teacher for a short time in Martinsville, Virginia. Dr. West was hired the following year as a mathematician at the U.S. Naval Weapons Laboratory (NWL) in Dahlgren, Virginia, where she first worked with the Naval Ordnance Research Calculator (NORC), to verify calculations for range tables associated with various Navy weapon systems. In 1962, she joined the Scientific Programming & Analysis Branch in the Computation Division at Dahlgren, where she served on a five-member team that programmed the NORC for Project 29V, a path-breaking astronomical study that established the regularity of the motion of Pluto relative to Neptune, based on 5 billion arithmetic calculations that consumed 100 hours of computing time. Based on the programming team's Project 29V work, the Department of the Navy gave the team an "Award of Merit for Group Achievement" in December 1964.

Thereafter, Dr. West worked on precise calculation of satellite orbits using the NWL's more advanced Stretch (IBM 7030) computer. Using complex algorithms to account for variations in gravitational, tidal, and other forces that distorted Earth's shape, she programmed the computer to deliver increasingly refined calculations for an extremely accurate geodetic Earth model, a geoid, optimized for what eventually became the Global Positioning System (GPS) orbit. Without that model, and regular updates thereto, the extraordinary positioning, navigation and timing accuracy of GPS would be impossible to achieve.

While working on geoid calculations at Dahlgren, West earned a Master of Arts in Public Administration degree, in 1973, from the University of Oklahoma. In 1975, one year after NWL was renamed the Naval Surface Warfare Center (NSWC), Gladys West became project manager for the Geodynamics Experimental Ocean Satellite, or GEOS-3, which confirmed conceptually that satellite radar altimeters could be employed for ocean geodesy measurements and resulted in the acquisition of a significant set of data. Then, in 1978, as project manager for SEASAT, West oversaw development of the first satellite capable of remotely sensing oceans, which resulted in further refinement of altitude variations. That led, in 1984, to geodetic data collection from the Geodetic Satellite, or GEOSAT, which enabled all the military services to create computer simulations of Earth's surface for cutting-edge applications. In June 1986, West published a guide, titled "Data Processing System Specifications for the GEOSAT Satellite Radar Altimeter," that explained how to calculate the accuracy of geoid heights using GEOSAT data.

Throughout her 42-year career at Dahlgren's NWL and NSWC, mathematician Gladys West used her computer programming skills to continually improve location accuracy for Department of Defense purposes. During those years she also found time to serve on Dahlgren's school board and lead the Dahlgren Toastmistress Club. She retired in 1998 and, in 2000, earned a Doctor of Philosophy degree in Public Administration from Virginia Polytechnic Institute and State University. Since her retirement, Dr. West has worked tirelessly to mentor youngsters, emphasizing the importance of learning science, technology, engineering and mathematics (STEM); she has volunteered regularly to speak at local elementary schools. On 21 February 2018, the Virginia General Assembly recognized her "analytical skill and her ability to accurately calculate complex mathematical figures," which enabled her to make "valuable contributions to the development of the Global Positioning System."



U.S. Air Force photo by Adrian Cadiz

Dr. Gladys West was inducted into the Air Force Space and Missile Pioneers Hall of Fame during a ceremony in her honor at the Pentagon in Washington, D.C., Dec. 6, 2018. West was among the so-called "Hidden Figures" part of the team who did computing for the U.S. military in the era before electronic systems.

The Air Force Space and Missile Pioneers Award pays tribute to the leaders of the early years of the Air Force space program, as well as the subsequent innovators whose vision and perseverance overcame the obstacles of the unknown, those who transformed the cutting edge of technology into operational systems, and those who dedicated their lives to exploring space in support of our national security concerns.

LASTING LEGACY

In 2020, Air War College launched the West Space Seminar (named after Dr. Gladys B. West) to be presented at the strategic level of instruction. Students accepted into the seminar will explore space power concepts, as well as foundations of strategy, national strategic decision making, global security and warfighting.

"The Gladys West Space Seminar is the first AWC seminar intentionally focused on pursuing strategic thought through a space power lens (opposed to the air power lens of traditional AWC seminars)," said Lt. Col. James Roberts, seminar student. "Gladys West, inducted in the USAF Hall of Fame in 2018, is honored in our seminar name for her pathfinding work early in the Space Age ... much like we are pathfinding in our new Service, the US Space Force. This seminar is one of the first steps in deliberately educating future space-minded senior leaders in strategic space issues."

AFIT Alum Stands Out as Engineer and Leader

By Jeanne Dailey
Air Force Research Laboratory

MAUI, Hawaii (AFRL)—Air Force Research Laboratory aerospace engineer Capt. Tara Crouch (M.S. Aeronautical Engineering, 2019) joined the military because she wanted to work for an organization that has a higher goal than profit.

“I appreciate that the military takes a holistic view of the person’s value-added performance and does not depend directly on the tangible dollar value you provide to the DOD,” Crouch explained.

Crouch is assigned to the AFRL Directed Energy Directorate’s Air Force Maui and Optical Supercomputing site where she is a program manager for one of the five Department of Defense High Performance Computing Centers.

“The element of my job that I love the most is that you have the freedom to build the success of your program as large as you can imagine,” Crouch said. “With the development and transition of technology from the labs to operations, the success of the project largely depends on the stakeholders you bring to the table, investors who dedicate resources to your project, and results you can produce to impact the national science and technology priorities.”

She further explains that the Maui High Performance Computing Center (MHPCC) has established itself as the vanguard for Digital Engineering in the Pacific Theater due to a grassroots movement of “pitching” capabilities to customers that are geographically located near the site.

“Our impact in the Digital Engineering technology sphere is as large as we make it.”

Crouch grew up in Chicago, and attended Iowa State University where she was in the Air Force Reserve Officer Training Corps (AFROTC). In 2019, she graduated from the Air Force Institute of Technology with a Master of Science Degree in Aeronautical Engineering. While at Iowa State, Crouch met her future husband Capt. Samuel Crouch who was also an aerospace engineering student and in the AFROTC program.

“Sam was my physics lab partner and he would give me rides home on his orange motorcycle,” Crouch said. “Being a joint spouse, or military couple, can add complexities to any career. However, one of the major positives of this is you



“The decision to transfer to the Space Force was an easy decision for me because I followed the technology I have a passion for advancing. I feel with my academic background, I will be able to make the largest impact in space technology.”

— Capt Tara Crouch, AFRL Aerospace Engineer

Courtesy photo

Air Force Research Laboratory engineer Capt. Tara Crouch (M.S. Aeronautical Engineering, 2019) with AFRL’s Maui Space Surveillance Complex in the background. The MSSC, located on Maui’s Haleakala Summit, is home to the DOD’s largest optical telescope, the 3.6-meter Advanced Electro-Optical System.

inherently understand the military language and culture. Luckily, our journey is made easier by our circumstances: same service and same career field. As we progress through our careers, I am sure there will be more challenges.”

On Feb. 1, Crouch and her husband transferred from the U.S. Air Force to the U.S. Space Force in a ceremony conducted at the site’s telescope center on Maui’s Haleakala Summit.

“The decision to transfer to the Space Force was an easy decision for me because I followed the technology I have a passion for advancing,” she said. “I feel with my academic background, I will be able to make the largest impact in space technology.”

“Capt. Crouch stands out as a driven engineer and leader,” said Lt. Col. Scott Pierce (M.S. Electrical Engineering, 2008 and former faculty member), her boss and director of the MHPCC. “Her energy to meet DOD technical needs

encourages her team to perform at their best. I expect to see Tara make big waves in the Space Force through some combination of acquisition jiu-jitsu, operational focus, and sheer willpower. From day one, managing the site’s largest program, she has improved our ability to deliver new capabilities to Joint forces and the DOD High Performance Computing enterprise. I’m grateful that Tara would spend her time and effort in our nation’s service and encourage others to follow her lead.”

March is set aside as Women’s History Month, and Crouch shares her thoughts on challenges women find as they maneuver through their careers. “Women in the work force often find themselves confronting the Double Bind phenomena,” Crouch said. “In academic literature, the Double Bind phenomena describes the difficulty women face in finding the balance between nice and assertive. Women who are too nice can be labeled as pushovers, and women who are too assertive can be viewed unfavorably.”

Military women face the same challenges she goes on to explain.

“Military women are not exempt from these phenomena. My advice to women thinking of joining the military is to find the other women in your organization and help each other out. Make a seat at the table and always remember to give due credit to each other, encourage one another to apply for career advancing opportunities, and support each other in the day-to-day operations. We can be each other’s strongest advocates.”

Crouch talks about two career highlights, one as an advocate for women in the Air Force and the other, an opportunity to pursue her zeal of the French language.

“In 2020, I attended Squadron Officer School at Maxwell AFB, Alabama and through Air University I got connected to the Women’s Initiative Team,” she said. “This team’s initiative recently changed the hair standards for women in the Air Force and the Space Force (#freethebun!). Although I was not working on that initiative, I got the opportunity to work an effort that provides funding for women to ship their breastmilk home while on a temporary duty assignment.”

Crouch said she has been an active member of the Air Force’s Language Enabled Airman Program (LEAP), and is thankful the Space Force will continue to foster language skills.

“I have been studying French since high school and I never wanted to give it up,” Crouch explains. “Fortunately, the Air Force provides so many excellent opportunities

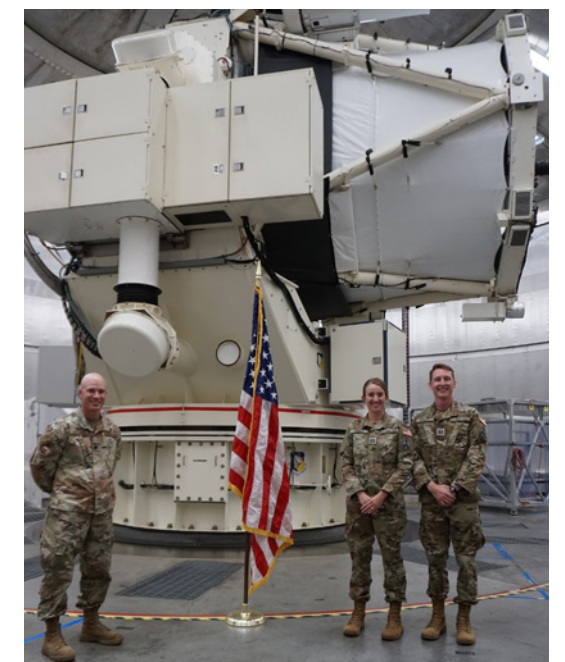
to continue your language education. Once COVID restrictions are lifted I am hoping to head to Senegal on a Language Intensive Training Event the military offers to learn about a culture in a way that can only be gained through immersion.”

In her leisure time, Crouch likes to read and sets reading goals each year through a diverse reading list that expands her knowledge and gives her a worldview she believes.

“Last year two books really captured my attention,” she said. “The first book was ‘The Old Man and the Sea’ by Ernest Hemingway, and it fundamentally changed my perspective on perseverance when the situation seems unlikely to change. The second book that resonated with me was ‘White Fragility’ by Robin DiAngelo. This book helped me identify where white fragility has been present in my life and gave me the language and perspective to grow in a more compassionate way.”

In addition to a rewarding job supporting the operational Air and Space Forces, Crouch finds enjoyment in the location of her work.

“Living in Maui has been a dream assignment,” she said. “Maui, and Hawaii as a whole, is so much more than just a vacation destination. Hawaii has a fascinating and rich history that is unique in comparison to other states. I find a similarity between the community focus in Maui that is also present in the Midwest where I am from. This sense of community has been particularly comforting during the pandemic when we are so far away from our own families.”



Courtesy photo

Air Force Research Laboratory aerospace engineer Capt. Tara Crouch (M.S. Aeronautical Engineering, 2019) with her husband Capt. Samuel Crouch (M.S. Aeronautical Engineering, 2019) join Lt. Col. John Zingarelli (PhD Electrical Engineering, 2013 and M.S. Electro-Optics, 2005), AFRL Det. 15 commander, following their induction into the U.S. Space Force in a ceremony held Feb. 1 at the Air Force Maui Optical and Supercomputing site.

“My advice to women thinking of joining the military is to find the other women in your organization and help each other out. Make a seat at the table and always remember to give due credit to each other, encourage one another to apply for career advancing opportunities, and support each other in the day-to-day operations. We can be each other’s strongest advocates.”

— Capt Tara Crouch, AFRL aerospace engineer



Alum Named PTDO Under Secretary of the Navy

Acting Secretary of the Navy (SECNAV) Thomas Harker has designated James F. “Hondo” Geurts as Performing the Duties of Under Secretary of the Navy Feb. 4.

Prior to this selection, Geurts served as the 8th Assistant Secretary of the Navy for Research, Development and Acquisition (ASN RD&A), from December 2017 to January 2021. As ASN RD&A, he served as the Navy’s acquisition executive, with oversight of an annual budget in excess of \$100 billion and responsible for equipping Sailors and Marines with platforms, systems and technologies around the globe in defense of the nation.

“I’ve worked with Hondo for a number of years and know he will bring a wealth of insight and leadership derived from 34 years of DoD experience to this position,” said Harker. “His stellar knowledge of acquisition efforts, experience driving positive change, and commitment to naval innovation will be a strong asset in this position, where he will continue to reinforce a clear understanding of the needs, requirements and capabilities of our Navy and Marine Corps.”

In performing the duties of the Under Secretary of the Navy, in addition to serving as the deputy and principal assistant to the SECNAV,



AFIT alum Col James F. “Hondo” Geurts, USAF, Ret (M.S. Electrical Engineering, 1992, DG) was named Acting Under Secretary of the Navy.

Geurts will serve as the Chief Operating Officer and Chief Management Officer for the DoN. Additionally, he will oversee intelligence activities, intelligence-related activities, special access programs, critical infrastructure, and sensitive activities within the department.

“Having supported the military, both in and out of uniform, for the majority of my life, I know that when we are empowered and focused on the mission we can accomplish amazing things,” said Geurts. “I look forward to continuing to work with a great team of professionals as we spearhead efforts in support of the finest Navy and Marine Corps in the world.”

Mr. Geurts previously served as the Acquisition Executive, U.S. Special Operations Command (USSOCOM), at MacDill Air Force Base (AFB), Florida, where he was responsible for all special operations forces acquisition, technology and

logistics. Prior to being selected for Senior Executive Service, Geurts began his career as an Air Force officer. He served as an acquisition program manager with engineering and program management leadership positions in numerous weapon systems, including intercontinental ballistic missiles, surveillance platforms, tactical fighter aircraft, advanced avionics systems, stealth cruise missiles, training systems and manned and unmanned special operations aircraft.

He has over 30 years of joint acquisition experience and served in all levels of acquisition leadership positions including Acquisition Executive, Program Executive Officer and Program Manager of Major Defense Acquisition Programs.

Geurts is a distinguished 1987 Reserve Officers’ Training Corps graduate from Lehigh University where he received a Bachelor of Science in Electrical Engineering. He holds a Master of Science in Electrical Engineering from Air Force Institute of Technology, Wright-Patterson AFB and in National Security Resourcing from Industrial College of the Armed Forces, National Defense University, Washington, D.C. Geurts also attended executive leadership and international studies programs at Harvard Kennedy School and George Washington Elliot School.

This article first appeared on www.Navy.mil.

Alum and AFRL Engineer Award Winner Proclaims a First for the U.S. Space Force

**By Jeanne Dailey
Air Force Research Laboratory**

Air Force Research Laboratory senior engineer Dr. Odell Reynolds (PhD Electrical Engineering, 1996 and M.S. Electrical Engineering, 1993) received the 2019 Harold Brown award from Dr. Richard Joseph, the Chief Scientist of the Air Force, in a ceremony held on Dec. 16, 2020 at AFRL’s Starfire Optical Range (SOR) located on Kirtland Air Force Base.

The Harold Brown award, named for the former Secretary of the Air Force, is the most prestigious science and technology award in the U.S. Air Force, and is presented annually to a scientist or engineer who uses scientific research to solve a problem critical to the needs of the Air Force.

“The Air Force has many good people doing lots of good work, but in our evaluation your achievements have risen to the top,” Joseph told Reynolds. “I congratulate you on your initiative and capabilities – things don’t get done unless there is someone who is leading the way and you have done that. As we move

to the U.S. Space Force, we have enormous challenges, and we need the science and tools you provide us.”

“Engineers take all the cool stuff and make it work,” said Reynolds on accepting the trophy. “I am honored to work with a great AFRL government and contractor team. I thank them for carrying the heavy load.”

The Harold Brown award recognizes Reynolds for leading a \$15 million project and a 30-member test team that enabled a three-time increase in low-Earth orbit imaging during the dark hours.

As reflected in his nomination, “[Reynolds] guided the full-dark imaging project through system readiness and concept design review, meeting six technical performance measures for the U.S. Space Command and proving 24/7 tactical space situational awareness viable.”

Reynolds holds several jobs at the SOR. He is a principle investigator for the 24/7 Space Domain Awareness project and lead engineer and senior test director at the site.



U.S. Air Force photo

AFIT alum and Air Force Research Laboratory engineer Dr. Odell Reynolds speaks at the ceremony where Dr. Richard Joseph, Chief Scientist of the Air Force, presented him the 2019 Harold Brown Award.

His formal education began with a Bachelor of Science Degree in Electrical Engineering from North Dakota State University located in Fargo, North Dakota. He followed this with a Master’s Degree and Ph.D. in Electrical Engineering, both from the Air Force Institute of Technology on Wright Patterson AFB, Ohio. Reynolds had a successful career as an Air Force officer before joining AFRL as a civil servant.

2021 Dean’s Distinguished Guest Speaker Series: Dr. Michele Gaudreault

USSF DEPUTY CHIEF SCIENTIST AND AFIT ALUM TALKS S&T’S ROLE IN SPACE

AFIT alum Dr. Michele Gaudreault returned to campus on Feb. 11 as part of the Graduate School of Engineering and Management’s Dean’s Distinguished Speaker series. Her talk focused on the role of science and technology within the U.S. Space Force and the U.S. Space Operations Command.

As the deputy chief scientist for the USSF, Gaudreault influences future space capabilities by promoting basic and advanced research efforts to develop critical new technologies; efforts she also worked as the chief of technology assessments for the AF Space Command.

“I expect AFIT definitely to play an integral role in our S&T,” said Gaudreault. “We need you to educate our space professionals, develop the minds for AFRL and the broader S&T community, and you are already doing a lot of collaborative R&D within DoD and outreach to and collaboration with partner academic institutions.”

Gaudreault earned her master’s and doctorate degrees in aeronautical engineering from AFIT in 1988 and 1993 respectively. As an AFIT faculty member, she was a key player in the transition of the Systems Acquisition School to the main AFIT campus and the subsequent stand-up of the Department of Systems Acquisition, while also serving as an adjunct professor within the Graduate School’s Department of Aeronautics and Astronautics.

Gaudreault has had a very distinguished technical career with significant contributions to the nation’s space enterprise. She served as a NASA Test Director during the construction and acceptance testing of the Space Shuttle orbiter Atlantis and the modification of the orbiter Columbia. She led the Vibrations Branch in the Structures Division of the Wright Laboratories (now the Air Force Research Laboratory) and directed the research and development grants for Pacific Rim countries as the first chief scientist of the Asian Office of Aerospace Research and Development.

ALUMNI NEWS BRIEFS

ALUM SELECTED FOR DAWN-ED PROGRAM

Capt. Joseph Ellis, an Air Force Research Laboratory Sensors Directorate executive officer and AFIT alum (M.S. Electrical Engineering, 2018), was selected for the 2021 Developing the Airmen We Need-Education (DAWN-ED) Program.

The DAWN-ED program sponsors 15 Air Force and Space Force officers to earn advanced degrees from their university of choice to help meet the future technological needs of the U.S. military. This program is a full-time assignment for the officers who were selected and will begin fall of 2021.

ALUM WINS CONTEST THAT SENDS DONATION TO ALMA MATER

AFIT alum **Capt Shayla Redmond** (M.S. Systems Engineering, 2016) won a social media sweepstakes hosted by iHeartMedia’s “HBCU Homecoming Celebration on iHeartRadio” enabling

her to pick her undergraduate alma mater Tuskegee University as the recipient of a \$30,000 donation. Tuskegee University will receive the donation to support students in its aerospace engineering program.

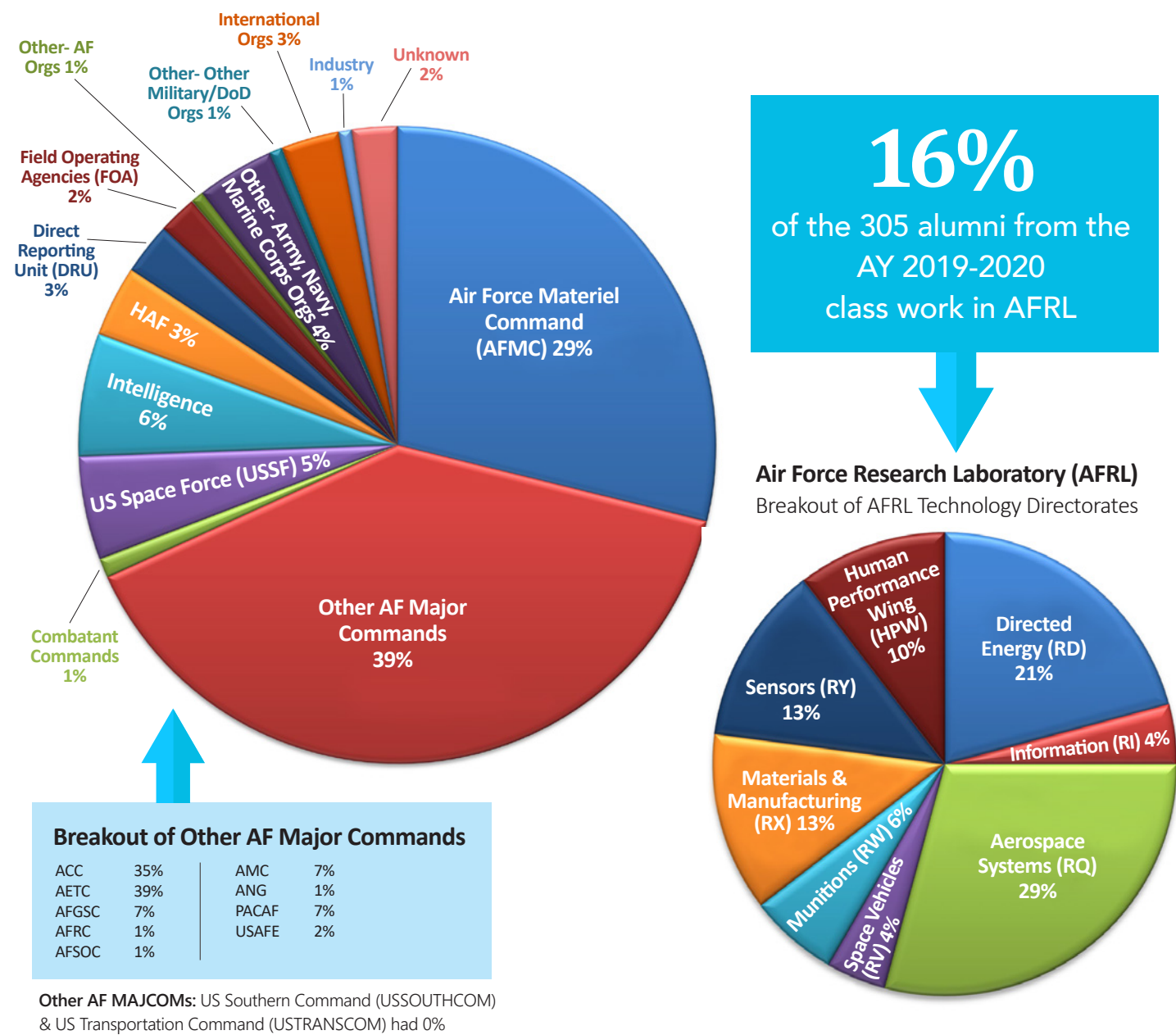
TWO ALUMNI PROMOTED TO MAJOR GENERAL

Brig. Gen. Thomas E. Kunkel (M.S. Strategic Leadership, 2006) has been appointed to the grade of major general. Kunkel is currently serving as the deputy director, Operations, Operations Team Five, National Joint Operations and Intelligence Center, J-3, Joint Staff, Pentagon, Washington, District of Columbia.

Brig. Gen. Adrian L. Spain (M.S. Systems Engineering, 2007) has been appointed to the grade of major general. Spain is currently serving as the director, plans, programs and analyses, Headquarters U.S. Air Forces in Europe and U.S. Air Forces Africa, Ramstein Air Base, Germany.

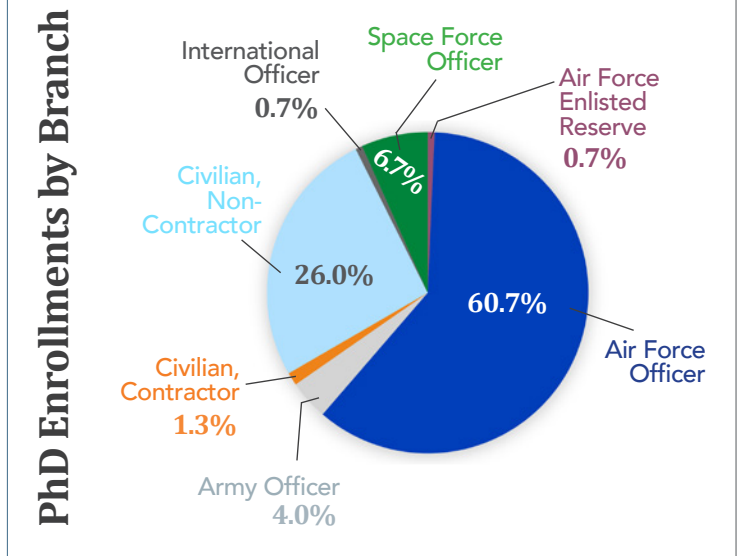
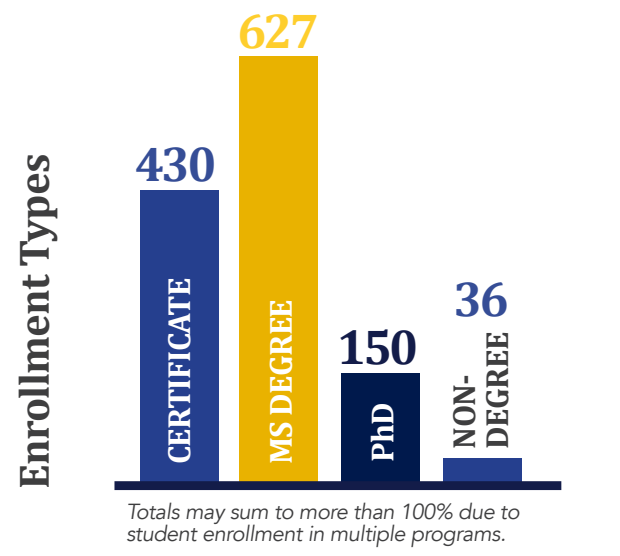
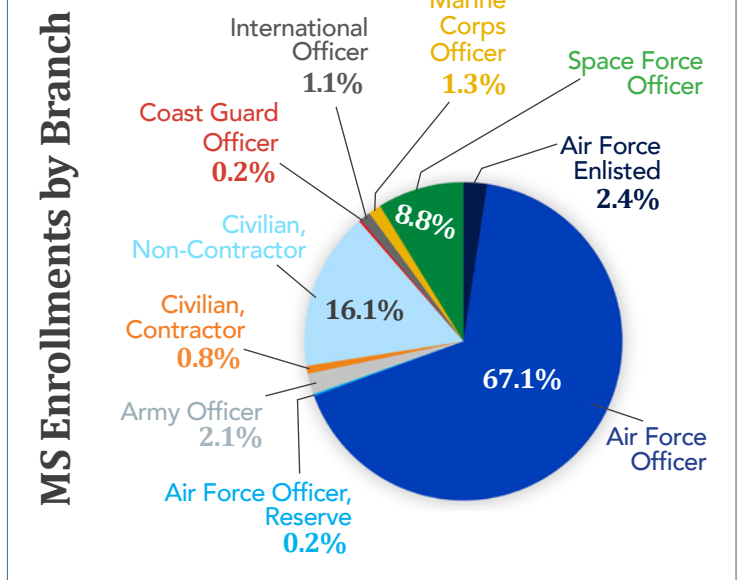
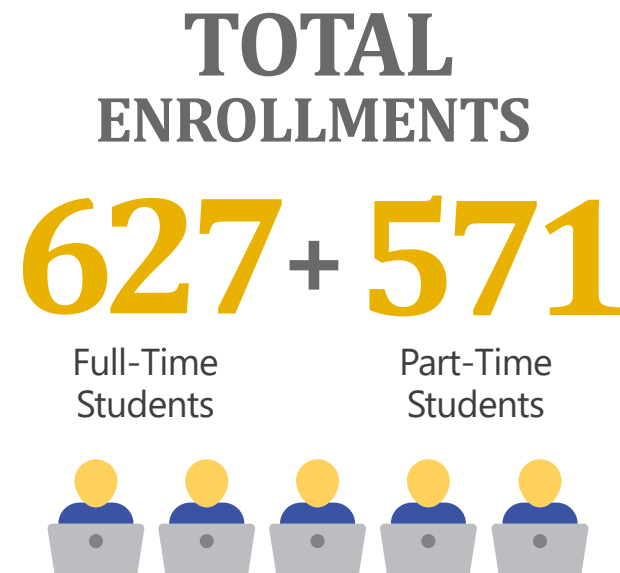
AY 2019-2020 POST-GRADUATION STUDENT ASSIGNMENTS

The post-graduation student assignments chart 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 305 AFIT alumni from academic year 2019-2020.



Source: AFIT Alumni Affairs and Institutional Advancement Office

GSEM WINTER 2021 ENROLLMENTS



AFIT Campus Wright-Patterson AFB
AFIT campus spans 8 buildings across 35 acres located on WPAFB with the Air Force Research Laboratory (AFRL) and the National Air and Space Intelligence Center (NASIC).

AFIT GRADUATE SCHOOL EXTERNAL SPONSOR FUNDING

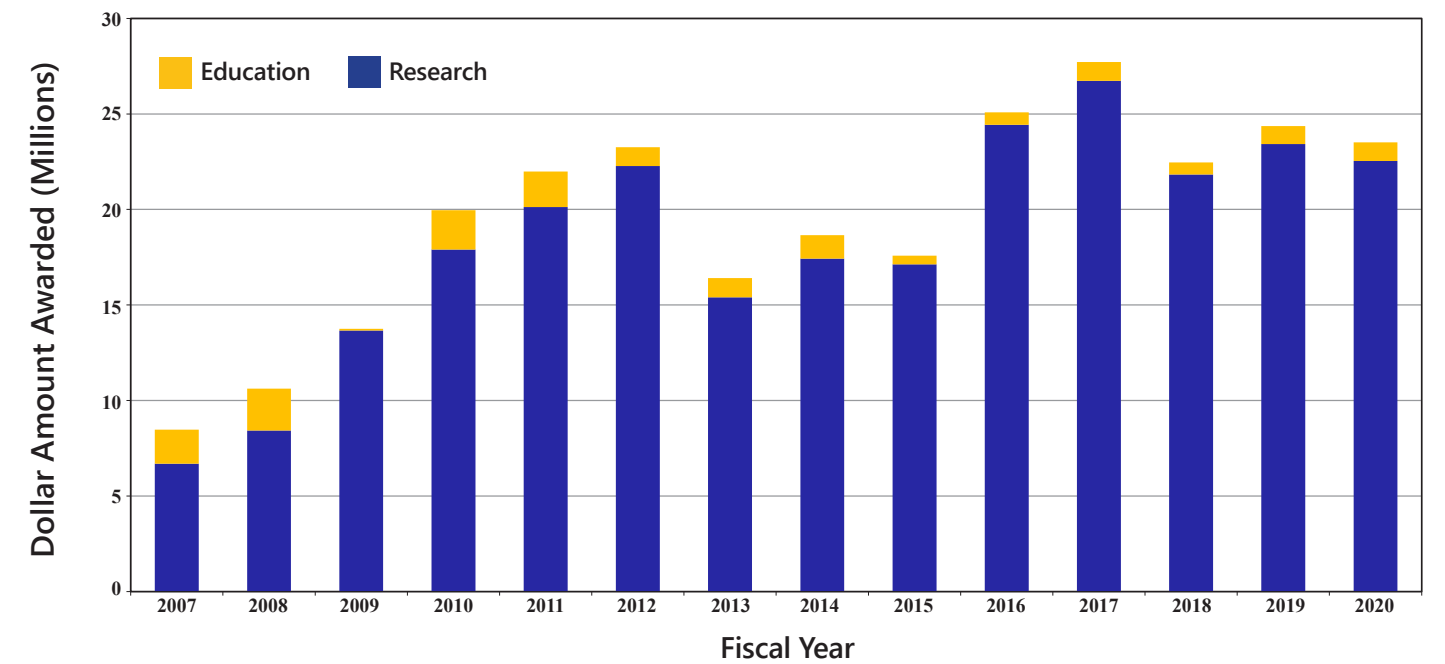
Many of the Graduate School of Engineering and Management's theses and research projects completed under faculty supervision are funded in part by other Air Force, DoD and government units and agencies. Often, this funding results from collaboration between faculty and thesis sponsors and occurs when the research project can be leveraged by the purchase of equipment or services not otherwise available. The table directly below summarizes external funding awards for FY20 while the bar chart at the top of the next page shows new funding received per fiscal year from FY07-FY20. The pie charts at the bottom of the next page show the breakdown of FY20 external awards by sponsor with a more specific breakdown by AFRL Technology Directorates.

FY20 EXTERNAL FUNDING AWARDS

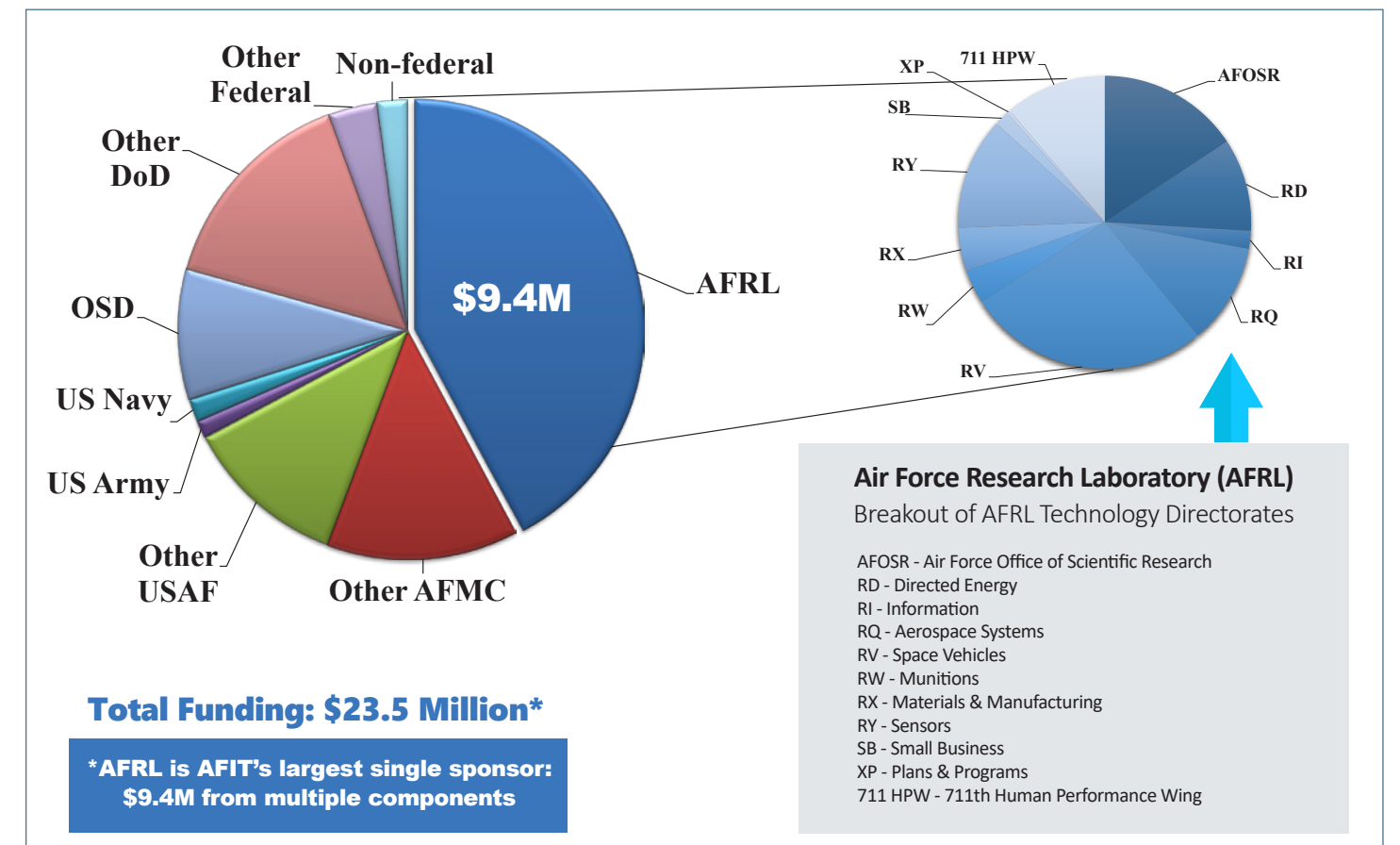
DEPARTMENTS	Newly Awarded Research Projects		Newly Awarded Education Projects		Total FY20 Newly Awarded Projects	
	#	\$k	#	\$k	#	\$k
Mathematics & Statistics (ENC)	5	213	0	0	5	213
Electrical & Computer Engineering (ENG)	50	4,834	2	160	52	4,994
Engineering Physics (ENP)	55	5,824	2	410	57	6,234
Research & Sponsored Programs (ENR)	0	0	1	7	1	7
Operational Sciences (ENS)	26	6,490	4	76	30	6,566
Systems Engineering & Management (ENV)	16	1,235	3	295	19	1,530
Aeronautics & Astronautics (ENY)	74	3,944	1	24	75	3,968
TOTAL	226	22,540	13	972	239	23,512

RESEARCH CENTERS	#	\$k	#	\$k	#	\$k
Autonomy and Navigation Technology (ANT)	26	3,144	3	260	29	3,404
Center for Cyberspace Research (CCR)	6	684	0	0	6	684
Center for Directed Energy (CDE)	18	2,305	1	110	19	2,415
Center for Operational Analysis (COA)	6	1,944	0	0	6	1,944
Center for Space Research and Assurance (CSRA)	37	2,581	0	0	37	2,581
Center for Technical Intel Studies & Research (CTISR)	17	2,319	0	0	17	2,319
Nuclear Expertise for Advancing Technologies (NEAT)	7	190	0	0	7	190
TOTAL	117	13,167	4	370	121	13,537

NEW FUNDING RECEIVED PER FISCAL YEAR



FY20 EXTERNAL AWARDS BY SPONSOR



CALENDAR EVENTS

MARCH 2021

AFIT Graduate School Awards & Commencement Ceremonies

AFIT Campus, WPAFB, OH & Live-streamed on YouTube | 25 Mar 2021

AFIT Graduate School Spring Quarter Classes Begin

AFIT Campus, WPAFB, OH | 29 Mar 2021

MAY 2021

AFIT Graduate School Summer Quarter Registration Begins

AFIT Campus, WPAFB, OH | 03 May 2021

JUNE 2021

AFIT Graduate School Spring Quarter Classes End

AFIT Campus, WPAFB, OH | 04 Jun 2021

AFIT Graduate School Spring Graduation (No Ceremony)

AFIT Campus, WPAFB, OH | 17 Jun 2021

AFIT Graduate School Summer Quarter Classes Begin

AFIT Campus, WPAFB, OH | 28 Jun 2021



AFIT FACULTY SEARCH



To search for AFIT Graduate School faculty members and view their research areas of interest, please visit

www.afit.edu/BIOS

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2021 Virtual Awards and Commencement Ceremony



Commencement Speaker
General John "Jay" Raymond,
Chief of Space Operations,
United States Space Force

Awards Ceremony - 25 March 9AM EST
<https://www.youtube.com/watch?v=p5nSMm-GcQE>

Graduation Ceremony - 25 March 5PM EST
<https://www.youtube.com/watch?v=CzJcp8LbDjl>

