

Since 1984, ARDI has stood steadfast in its mission to support academic excellence at the United States Air Force Academy.



ARDI Professors Dr. Sally Baron & Gary Payton watch the first contact with USAFA's FalconSAT-6



ARDI Pres. Mick Erdle honoring Dr. Sally Baron at ARDI New York event.



Supt., Lt. Gen. Silveria & Dean, Brig. Gen. Armacost with Mick Erdle at ARDI sponsored event to recognize academically outstanding cadets



ARDI Pres. Mick Erdle during radio interview with Jesse Kurtz during AF vs. Florida Atlantic Football game.

NOTABLE HIGHLIGHTS



MAN'S FLIGHT
THROUGH LIFE
IS SUSTAINED
BY THE POWER
OF HIS
KNOWLEDGE

ARDI has supported the Air Force Academy in many ways over the past twelve months. Below are the notable 2018 highlights:

- Contributed over **\$1,000,000.00** to further academic excellence at the United States Air Force Academy.
- Funded the salaries, and managed the annual contracts, for six ARDI Distinguished Visiting Professors.
- ARDI Distinguished Visiting Professors increased the margin of excellence at USAFA in the following disciplines:

- | | | |
|-------------------------|-------------|-----------------------------|
| ◇ Aerospace Engineering | ◇ English | ◇ Astronautical Engineering |
| ◇ Management | ◇ Economics | ◇ Arabic Studies |
| ◇ Philosophy | ◇ Ethics | |

ENDOWED CHAIR HIGHLIGHTS

Brig. Gen. Robert F. McDermott Chair in Academic Excellence

The Brigadier General Robert F. McDermott Chair for Academic Excellence fund was established in 1989 to promote academic excellence at the United States Air Force Academy. The 2017-2018 budget approved by the ARDI board allowed for funding to be used in the general areas of faculty development, visiting speakers and educational experts, cadet international travel for research, and the annual research awards and ceremony.

The following is a listing of specific opportunities supported by ARDI during the 2017-2018 academic year (for the full report please see our website):

USAFA Annual Research Awards and Ceremony:

The Research Awards Ceremony is an annual event recognizing the research achievements of USAFA's top cadets and faculty. McDermott funds four research awards as well as providing support for the reception following the ceremony.



Faculty Development/ New Faculty Orientation

The McDermott Chair continued to support the comprehensive faculty development program, particularly the new faculty orientation sessions in January and July.

Faculty Development Offsite Conference

As a part of the ongoing transformation of the USAFA core curriculum, a faculty conference on developing critical thinking and communication skills within academic majors was held May, 2018 in Breckenridge, CO.

Visiting Speakers and Educators

The Center for Educational Innovation continues to look for opportunities to bring educational experts to the Academy. This year the fund partnered with the Academy Scholars Program to bring in two guest speakers and workshop facilitators.

International Cadet Travel for Research:

The McDermott fund also supported cadet international travel for research. Several projects were identified that provided exceptional opportunities for cadets.

- A summer research and cultural emersion trip to Uganda and Rwanda were partially supported by McDermott funds (\$5000).
- McDermott funding (\$15,000) allowed four cadets to travel to La Selva Biological Station in Costa Rica to assist with established research projects, or conduct independent research.
- Cadet Richard King was supported by McDermott funds (\$2,000) for his research project at the Joint Air Power Competence Centre (JAPCC) in Kalkar, Germany.
- Cadet Kathleen Kohler was supported by McDermott funds (\$3,000) for her research project on the life and works of Samuel Beckett. She traveled to the EU and Britain to examine works in specialized libraries.



Dr. Sally Baron

(2nd semester – '17-'18) Holland H. Coors Chair in Education Technology

(1st semester – '18-'19) Philip J. Erdle Chair in Engineering Science



I mentored seniors in the Astronautics Capstone class “FalconSAT”, the US Air Force Academy's small satellite engineering program where cadets are involved in designing, building and launching small satellites. FalconSAT-6 is a microsatellite developed by the Academy cadets and sponsored by the USAF Research Laboratory (AFRL). The main experiment aboard FalconSAT-6 is a multi-mode flight experiment designed to prove the effectiveness of multiple thrust modes. (After a four-year delay, FalconSAT-6 was launched on a SpaceX rocket on December 3rd, 2018.)

In my “Management and Command” class, I engaged The Honorable Sue Payton, former Assistant Secretary of the Air Force for Acquisition. Mrs. Payton led the team that selected the KC-X, the Air Force’s newest tanker. The case was complicated, involving difficulties with technologies, politics and management, and as the KC-X is still not active in the Air Force, it presents the cadets a problem to decipher, that has yet to be resolved.

I also worked on the ABET accreditation (Accreditation Board for Engineering and Technology) for the Academy’s Systems Engineering program. My research identified and compared all US universities that offer an SE program similar to USAFA. I ultimately recommended that this course was essential for USAFA to retain for the Systems Engineering degree.

I personally developed and taught “Critical Decisions in Space”. Cadets studied decisions made with positive outcomes, such as the lunar program, and those with tragic outcomes, such as the Challenger Launch decision. The class challenged cadets to contemplate decision points effecting future space activities in both government and commercial operations.

Dr. Marc Dippold

Maj. Gen. William A. Anders Chair in the Economics of the Defense Industrial Base

I was responsible for curriculum development and presentation of capstone economics and managerial economics courses for the U.S. Air Force Academy. The ultimate goal is to help cadets cultivate their critical and creative thinking to make better leadership decisions and provide an appreciation and understanding of defense economics and applied economic research to facilitate the application of economic principles, analysis and assessments to relevant and pressing issues facing the national security, national defense and civilian domains.



My primary approach to ensure cadet engagement, comprehension and retention is the use of current and relevant case studies that are derived from the recurring Defense Science Board Surprise Studies such as offensive space, unmanned airlift, early weapons of mass destruction (WMD) proliferation detection, ballistic and cruise missile defense, and counterintelligence. One of the personal highlights for this academic year was mentoring and supporting 20 cadet project teams to explore and conduct in-depth research on a broad range of defense economic topics and industries. The cadets ultimately developed/delivered excellent team project presentations on their findings and conclusions. These applied economic projects reinforce my commitment to the premise that as future officers of the United States Air Force, cadets should have an understanding of economics as applied in the “real” world, which will ultimately make them better decision makers and leaders.

Dr. John Pletcher
Brig. Gen. Philip J. Erdle Chair in Engineering Science

For the aircraft design project in the Spring of 2018, I lead two teams working on a project to create a small, man portable UAV (about 2-3 ft. wingspan) with a max altitude of 10,000 ft. and an endurance of at least an hour for over the hill reconnaissance. The UAV had to be hand launched and able to survive a hard landing. The requirement that made this design unique is that it had to have a minimum number of parts all of which could be made in the field using existing additive manufacturing machines. My two teams developed their designs, found appropriate high strength materials, ran ground tests, and flew their designs.



Hisham Khalek
ARDI Chair in Arabic Studies



During the past two semesters I taught and course directed seven Arabic classes. I published an audio DVD for intermediate Arabic. I wrote four chapters of my forthcoming textbook for advanced level Arabic and wrote a research paper on teaching of language and culture. I was fortunate enough to lead a team of five cadets on a two-week cultural immersion trip to United Arab Emirates and Jordan. I hosted visiting cadets and officers from UAE, Jordan, Egypt, Oman, Tunisia, and Morocco in my classes. I also hosted a visiting professor and administrators from AALIM Arabic institute in Morocco and attended the Middle East Studies Association Conference.

Dr. Paul Macdonald
The William Lyon Chair in Professional Ethics

During the 2017-2018 academic year, I continued to engage in greatly rewarding work in the Department of Philosophy, drawing on my experience and training in the areas of philosophy, theology, and religious studies. In addition to teaching multiple sections of the department's required course, Ethics (including an Academy Scholars' section of Ethics in the fall), I taught a new, very successful course in the spring, "Philosophy and Animals," in which the cadets and I explored important issues concerning the nature of animal minds and the ethical treatment of animals. I continued to supervise the Academy's Religion Studies Minor, advising cadets on the minor and tracking their progress within it. Moreover, I continued to lead a monthly philosophy of religion reading group that faculty both inside and outside the Philosophy Department (and USAFA) attended. In terms of broader service to the Academy, I served on the review committee for USAFA's Religious Respect Training Program and continued serving on The Human Condition, Cultures, and Societies institutional outcome team. Finally, in terms of my own professional life, I continued publishing articles in philosophy of religion and developing a book-length project in philosophy of religion on the problem of evil.



Gary Payton
General Bernard A. Schriever Chair in Space Systems Engineering



In the fall semester, I mentored 12 cadets in systems engineering for the FalconSat program, the capstone class for cadets in their final year who major in Astronautical Engineering. I also taught one section (22 cadets) in Astronautical Engineering 310, the core curriculum Astro course. During the spring semester I taught 17 cadets in Astronautical Engineering 335, Human Spaceflight. This course teaches the history, program objectives, design requirements, and costs of flying Americans in space. I also continued to mentor 12 cadets in the FalconSat program during the spring semester.

Dr. Steven Olsen-Smith
(1st semester –'18-'19) Holland H. Coors Chair in Education Technology

In fall 2018, I taught courses in literature and composition and in digital approaches to literature. Cadets in these courses studied Mary Shelley's *Frankenstein*, Herman Melville's *Moby-Dick*, and Stephen Crane's *The Red Badge of Courage* through traditional means as well as with electronic text analysis tools and approaches. With Dr. Bill Newmiller of DFENG, I involved cadets in the process of editing an electronic edition of Crane's Civil War novel, which is scheduled for completion next year. Separately, I continued to coordinate the web project *Melville's Marginalia Online*, and wrote for publication, an essay: "Almost Unknown to the General Reader": Biographical and Conceptual Contexts for Melville's Marginalia in Thomas Warton's *The History of English Poetry*." I am currently serving on a committee in DFENG charged with the task of developing a capstone independent study requirement for majors in English and Fine Arts.



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