

## CWMD Faculty

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## The Graduate School of Engineering and Management

The Air Force Institute of Technology (AFIT), located at Wright-Patterson AFB (Dayton, Ohio), is the Air Force's premier institution of graduate and continuing education in science, engineering, and advanced technology. A component of Air University, the institute provides responsive graduate education, research, and consulting programs to keep the Air Force and DoD on the leading edge of technology and management.

The Graduate School of Engineering and Management (EN) provides advanced scientific, technological, and technological management education in an Air Force research and development environment.

## Civilian Graduate Education Opportunities at AFIT

AFIT M.S. and Ph.D. degree programs are open to U.S. citizens who meet entrance requirements:

[www.afit.edu/en/admissions](http://www.afit.edu/en/admissions).

For more information concerning application, admission, and financial opportunities, visit :

[www.afit.edu/en/students/prospective.cfm](http://www.afit.edu/en/students/prospective.cfm).

Civilians interested in attending AFIT should pursue scholarship opportunities through DAGSI, SMART, NDSEG, NSF, or other vehicles.

## Research Assistants and Co-ops

ENP offers engineering co-op and research assistant opportunities for both undergraduate and graduate students interested in working on a diverse set of DoD-centric research efforts. These opportunities can occur at any time during the academic year, or summer, or both. Research Assistants are hired via SOCHE ([www.soche.org](http://www.soche.org)) or as overhire government civilians.

Inquiries relative to co-op and intern opportunities should be directed to Nancy C. Giles, Ph.D., [nancy.giles@afit.edu](mailto:nancy.giles@afit.edu), (937) 255-3636, x4601.



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

## Department of Engineering Physics

## Combating Weapons of Mass Destruction



[www.afit.edu/en/enp](http://www.afit.edu/en/enp)

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## Program Overview

**The Combating Weapons of Mass Destruction (CWMD) Programs** offered within the Department of Engineering Physics offers curricula focused on the education and development of a cadre to support the needs of the DoD and numerous federal agencies. Recent world events have demonstrated a compelling need to augment and develop the next generation of CWMD professionals. Two curricula are offered. These include: 1) the CWMD Certificate Program and 2) a Professional Science Master's (PMS) program in CWMD.



LTC Eugene Sheely  
CWMD Program Chair  
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- **CWMD Certificate:** The certificate program is a grouping of academic courses, the content of which provides a knowledge base and entry level skillset to work in a chosen field. The CWMD certificate is a 10-week educational program targeting the technical aspects of CWMD. This program provides the fundamental biology, chemistry, and physics necessary for the follow-on study of the production, utilization, effects, and mitigation of WMD. Four courses (16 credit hours) make up the academic core of the CWMD certificate. Three of the courses focus on the three WMD technologies: biological, chemical, and nuclear. The fourth course is a practicum and serves to unify the specific technologies into the broader category of CWMD. Example practicum topics may include risk analysis or mass casualty medical care.
- **CWMD (M.S.):** This degree is executed as a PSM degree. This degree is intended to be multidisciplinary and allow for multiple foci, specializations, and teaming with external partners. Graduates of this program work as a WMD professional in government service or the private sector and not academia. This degree program provides a working knowledge of the three broad areas of WMD and focuses a specialization in one. Curriculum may vary from student to student based on the skillset possessed and the professional expectations and degree goals of the student. Students gain a base of knowledge in each subset of WMD: chemical, nuclear, and biological, and then focus their efforts in one subset area. Certificate programs are often leveraged to enhance the skillset of the individual, either pre- or post-graduation. PSM degrees level traditional academic content, encourage group projects within the curriculum and with external partners, and expect the student to demonstrate the ability to conduct independent research.

## Program Options

### Graduate Certificate Program (GSP)

The GSP is one academic quarter (10 weeks) in length. Following the successful completion of all course requirements, an AFIT certificate in CWMD technology is awarded. The focus of the GSP is on education (i.e., not training) in the technical aspects of CWMD technology at the graduate level.

The GSP is designed to meet the educational needs of a person assigned to a WMD-related position who lacks the requisite technical background. Students will take a four-course curricula sequence, including:

- Nuclear Weapon Technology
- Chemical Weapon Technology
- Biological Weapon Technology
- CWMD Practicum

### M.S. Degrees (18 months)

The M.S. (CbtWMD) program is a six-quarter degree program. Graduates of the program will establish a broad base of knowledge in all areas of CbtWMD. Students will complete the curricular core for the CWMD GSP and then focus their curriculum in one of the three weapon technologies: chemical, nuclear, or biological, in preparation for the execution of a research project in that specific area of specialization during the fifth quarter. During the final quarter, students participate in a capstone course and group presentations.

Example curricular offerings include:

- Radiation Health Physics
- Environmental Monitoring
- Kinetics of Fast Reactions
- Atmospheric Transport
- Nuclear Instrumentation
- Biotechnology
- Risk Modeling and Analysis

### Recent CbtWMD Research Threads

- Anthrax Inactivation
- Using Spider Webs as Detectors
- Nanomaterial Toxicity Analysis
- Response Integration
- Shelter in Place Analysis
- Cardiac Effects of Sarin
- Nuclear Weapons Yield Determination
- Nuclear Forensics
- Radiation Detection Integration
- Active Interrogation of CBRN

## AFIT/ENP Centers of Specialized Research



**The Center for Directed Energy (CDE)** focuses and leverages ENP's leadership in directed education, research, and innovation since the envisioning of high energy lasers as weapons systems. CDE is established as a cross-disciplinary center focused on education, consulting, advising, and conducting sponsored research supporting the development and evolution of directed energy enabling technologies. The focus of CDE is threefold:

- **Research:** CDE research is focused on solving DoD research problems related to directed energy related technologies and DoD applications of directed energy in the battlespace.
- **Education:** Pre-service and in-service short courses are offered to support the DoD directed energy cadre. Co-ops and internships within CDE introduce directed energy STEM to a new cadre of scientists and engineers.
- **Innovation:** CDE strives to contribute to the DoD directed energy community through robust research solutions and delivery of products addressing critical needs.  
**CDE Director: Salvatore J. Cusumano, Ph.D.; salvatore.cusumano@afit.edu**

**The Center for MASINT Studies and Research (CMSR)** is focused on the research and educational needs of the U.S. intelligence community. Research areas cover the six disciplines of MASINT plus advanced biometrics for human ID. Educational programs range from seminars to courses.



Research focuses on applications for the national and tactical intelligence users. CMSR has an active, interdisciplinary research portfolio of projects addressing intelligence community requirements. Current research projects include efforts related to laser intelligence, counter-denial and deception, bomb detonation characterization, advanced biometrics, ISR space methodologies, and the ARTEMIS hyperspectral sensor.

To best accomplish this work, the CMSR has established teaming arrangements both within AFIT and with external organizations; federal organizations, such as NASIC, NRO, DIA, JIEDDO, NPS, NSA, and AFRL; and academic institutions, such as NPS, WSU, VA Tech, NMSU, University of Missouri, and Utah State University. **POC: Ronald F. Tuttle, Ph.D., CMSR Director; ronald.tuttle@afit.edu**