

AAMP-EM

ADVANCING ARMY MODERNIZATION PRIORITIES - ENERGETICS MATERIALS

A key partnership between Purdue and the Army Research Lab is helping to maintain the military's superior technological capabilities and address readiness gaps that affect national security and defense.

Research related to energetic materials—explosives, propellants and pyrotechnics—is essential to the U.S. Department of Defense's modernization priorities.

The Advancing Army Modernization Priorities—Energetic Materials (AAMP-EM) Cooperative Agreement between the Purdue Energetics Research Center (PERC) and DEVCOM Army Research Laboratory (ARL) responds to this need with a comprehensive research agenda that targets every aspect of the U.S. energetic materials enterprise—from synthesizing molecules all the way to manufacturing munitions.

KEY RESEARCH FOCUS AREAS

- Synthesis and formulation of energetic materials
- Machine learning and computer modeling
- 3D printing and additive manufacturing
- Combustion
- Fuels and propellants
- Smart armor and blast effects
- Sustainability and lifecycle assessment
- Training and workforce development



(RIGHT) Static rocket fire test performed by Adranos, Inc. (Purdue University/Chad Kirkland)

(ABOVE) High-speed infrared image of a hypergolic propellant. (Purdue University/P.V. Ramachandran)

45
**PURDUE FACULTY
AND STAFF**

39
**ARMY RESEARCH
LAB STAFF**

190+
STUDENTS
Postdocs, PhDs, graduate
and undergraduate





AAMP-UP '22 students and mentors in front of the VOSS Model in Discovery Park at Purdue University. (Purdue University/Dave Mason, ISPhotographic)

ADVANCING ARMY MODERNIZATION PRIORITIES UNDERGRADUATE PROGRAM

A key component of AAMP-EM is the Advancing Army Modernization Priorities – Undergraduate Program (AAMP-UP). AAMP-UP is an 11-week summer research program that provides an immersive, experiential environment for undergraduates to collaborate with energetic materials experts. The goal of the AAMP-UP program is to introduce students to energetics materials research and establish a “talent pipeline” for engineering graduate programs and national research laboratories.

Two cohorts of undergraduate students from 15 colleges across the nation have completed the AAMP-UP program. The first cohort included 25 participants, and the second cohort increased to 40 participants. Student majors ranged from aeronautics & astronautics to mechanical engineering and chemistry.

ABOUT THE PURDUE ENERGETICS RESEARCH CENTER (PERC)

PERC brings together researchers from across disciplines to focus on comprehensive energetics materials research, spanning molecules to munitions. PERC addresses existing and emerging challenges related to civilian and military infrastructure, commerce and aviation security. It also supports the U.S. need for more stable, less sensitive and more easily processed energetic materials (propellants, pyrotechnics and explosives). PERC has enjoyed partnerships with nearly every agency within the U.S. defense sector.

“ Being able to meet professionals and hear how our work will directly benefit society has been a really great part of the program and working with the ARL.”



John Lannamorelli
Aeronautical & Astronautical Engineering, Purdue University, AAMP-UP '21

“ AAMP-UP inspired me to want to go to graduate school. Before the program, I thought I was interested in only teaching and would probably dislike research. As the weeks went by the opposite proved to be true—research is indeed something I would like to do in the future.”



Naomi Serban
Chemical Engineering, University of Illinois at Chicago, AAMP-UP '21

