

ADVANCING

PURDUE'S WORLD-LEADING HYPERSONICS PROGRAM

Purdue's hypersonics expertise, facilities and developing workforce can help to advance U.S. national security and competitiveness.

Innovation in hypersonics, which can aid warfighters, is a priority for our nation. As our defense programs continue working to fly faster and farther, Purdue's hypersonics expertise and capabilities can help to advance these technologies.

WORLD-RENOUNDED EXPERTISE

Purdue's hypersonics capabilities are some of the most comprehensive in the nation, with more than 40 world-renowned experts in navigation, aerodynamics, aerothermal effects, propulsion, autonomy, system engineering, high-temperature materials and manufacturing.

TRAINING TOMORROW'S EXPERTS

- Substantial pool of cleared and U.S. Citizen faculty, staff and graduate students to help transition technologies from the lab bench to flight systems
- Purdue hypersonics graduates are broadly placed in industry, government and academia. Under the guidance of expert researchers, more than 100 undergraduate and graduate students design, test and evaluate equipment in real world conditions.

(RIGHT) A student works with Purdue's Mach 6 quiet wind tunnel. A larger Mach 8 wind tunnel will be part of the new Hypersonics and Applied Research Facility, currently under construction. (Purdue University/John Underwood)



(ABOVE) Hypersonic vehicle illustration (Purdue University/Second Bay Studios)

#4

GRADUATE
ENGINEERING

#9

CYBERSECURITY

5

CONSECUTIVE YEARS

TOP 10

MOST INNOVATIVE
UNIVERSITY

U.S. News & World Report
2022 Best Colleges guidebook

STATE-OF-THE-ART FACILITIES AND CAPABILITIES

Purdue's hypersonics facilities include several wind tunnels that recreate different scenarios such as spacecraft re-entry or missile flight through the atmosphere, as well as replicating unique engine conditions for extremely high-speed propulsion.

BOEING/AFOSR MACH 6 Quiet Tunnel

The largest quiet (low disturbance) hypersonic wind tunnel in the world, capable of producing atmospheric disturbance conditions at Mach 6, helping researchers to design advanced aircraft, spacecraft and missiles.

Hypersonics and Applied Research Facility (HARF)

This 65,000-square-foot, \$42 million facility opened in Spring 2023. It is home to two state-of-the-art hypersonic wind tunnels and the Hypersonics Advanced Manufacturing Technology Center (below).

- Mach 8 quiet wind tunnel under development with a 2-ft. test section.
- The HYPULSE reflected shock/expansion tunnel, which uses shock-heated gas to recreate the temperatures and velocities of hypersonic flight — to Mach 25 and beyond.

Hypersonics Advanced Manufacturing Technology Center (HAMTC)

- Single location for partners, including GE, Dynetics, Lockheed Martin, Aerojet Rocketdyne, Boeing and small businesses, to advance innovations.
- Only center in the nation with a vertically integrated supply chain enabling design, manufacturing, joining and testing of hypersonic components and sub-systems that would reduce the time and cost necessary for development.
- Provides innovations in high-temperature materials, additive manufacturing and critical joining technologies to support hypersonic requirements.

High Speed Propulsion Laboratory

(RIGHT) Rendering of the High-Speed Propulsion Laboratory.
(American Structurepoint/Courtesy of Purdue University)

A \$73M laboratory that will feature new testing capabilities for hypersonics and rocket and gas turbine engine technologies.

- Will provide testing capabilities at the extreme pressure and temperature conditions experienced in actual hypersonic flight.
- Will be available to a broad set of researchers interested in working with Purdue to test their equipment.

Hypersonics Ground Test Center

A planned first-of-its-kind in the U.S. facility hosted at Purdue to test hypersonic technologies.

- Could provide hypersonic testing streams reaching speeds up to Mach 7.5 — more than 5,000 mph.
- The center is expected to help the U.S. leapfrog research progress of peer adversaries.
- Rolls-Royce North America is the first aerospace industry member of a consortium that will manage the HGTC.

