Perform research in a unique combination of wind tunnels ranging from low speed to hypersonic, or Mach 5.

**Hypersonic Capabilities**
Faculty expertise in computations, experiments and theory related to hypersonic flight.

**Research Focus Areas**
- Dynamics and Control
- Fluid Dynamics
- Solid Mechanics
- Thermosciences

**Degrees**
- PhD Aerospace Engineering
- MS Aerospace Engineering
- ME Aerospace Systems

**Program Ranking**
27 aerospace engineering graduate programs (U.S. News & World Report 2022)

"This is a great opportunity for students to get hands on experience building a spacecraft and running a space mission. Everyone is so involved and gets to see every step of the way."
- Tanner Campbell, PhD student

**Funding Options Throughout Degree Lifecycle**

**Application Deadlines**
- Fall: January 1
- Spring: June 1

**Contacts**
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Faculty Expertise

Eric A. Butcher – ebutcher@arizona.edu  
spacecraft GNC - astrodynamics - nonlinear dynamics, vibration and control - stability, control and estimation in periodic, delayed and fractional systems

Cho Lik Chan – choli@arizona.edu  
heat transfer - materials processing - boundary elements methods

Stuart A. Craig – sacraig@arizona.edu  
aerodynamics - stability and laminar turbulent transition of supersonic and hypersonic boundary layers - experimental fluid mechanics - hydrodynamic stability

Eniko T. Enikov – enikov@arizona.edu  
dynamics of charged particles and macro-ions - control of processes driven by electrostatic forces - neural-network-based self-learning methods for control of human-machine interfaces

Hermann Fasel – faselh@arizona.edu  
computational fluid dynamics - hydrodynamic stability - laminar turbulent transition - hypersonic flows - hypersonic flows - flow control - nonlinear dynamics - aerodynamics - UAVs - flight experiments - autonomous flight

Barry D. Ganaopol – ganaapol@cowboy.ame.arizona.edu  
radiation and particle transport theory - applied mathematics - satellite remote sensing

David Hahn – dwahn@arizona.edu  
thermal sciences - laser-based diagnostics - renewable energy - combustion - biophotonics - laser-material interactions - plasma-material interactions

Kyle Hanquist – hanquist@arizona.edu  
hypersonics - nonequilibrium flows - molecular gas dynamics - computational fluid dynamics - low-temperature plasmas - rarefied gas and optimization

Qing Hao – qinghao@arizona.edu  
heat transport inside lithium-ion batteries - high-power electronics - thermal insulation - materials - thermoelectrics - measurement and applications of graphene and other two-dimensional materials

Kavan Hazeli – hazeli@arizona.edu  
materials design - human-centered design - mechanical behavior of materials - multi-functional materials - failure analysis - fatigue - thermo-mechanical properties - biomaterials design and characterization

Jeffrey W. Jacobs – jwjacobs@arizona.edu  
experimental fluid dynamics - hydrodynamic instabilities, including Richtmyer Meshkov and Rayleigh-Taylor instabilities - turbulent mixing

Peiwen ‘Perry’ Li – peiwen@arizona.edu  
renewable energy - heat mass transfer in gas turbines and HVAC systems - electrolyzers - energy-water nexus - fuel cells - hydrogen storage and generation - energy and power systems

Jesse Little – jesselittle@arizona.edu  
active flow control - boundary layer separation - plasma actuators - shock boundary layer interaction - unsteady aerodynamics - vortex body interaction - wind tunnel testing and experimentation

Erdogan Madenci – madenci@arizona.edu  
prediction of deformation and failure modes in metallic and composite materials - characterization of mechanical properties of materials

Farzad Mashayek – mashayek@arizona.edu  
turbulent reacting flow - plasma flow - electrostatic atomization - solid ion batteries - computational methods - machine learning applications

Samy Missoum – smissoum@arizona.edu  
design optimization - probabilistic design, reliability and risk assessment - vibrations - advanced finite element modeling

Bernard Parent – bparent@arizona.edu  
reactive flows - reentry flows - plasma- assisted combustion - plasma-based fuel reforming - plasma aerodynamics - computational fluid dynamics - scramjets - lightning

Hossein Rastgoftar – hrastgoftar@arizona.edu  
decision-making under uncertainty - human-robotic interaction - swarm robotics - system autonomy - UAS traffic management - intelligent transportation - formal specification and verification - finite-state abstraction of dynamical systems

Sergey Shkarayev – svs@arizona.edu  
aerodynamics - fluid-structure interactions - unmanned aerial vehicles

Jekan Thanga – jekan@arizona.edu  
space robotics - CubeSats and sensor networks - machine learning applied to dynamics and control of swarms - small satellite propulsion - autonomous systems - power and thermal systems

Xiaoyi Wu – xwu@arizona.edu  
tissue engineering - biomechanics - biomaterials and computational biomaterials

Israel Wyganski – vwyg@arizona.edu  
aerodynamics related to fixed-wing and rotary aircraft - control of separation - high-lift devices - drag reduction - aeroacoustics, particularly jet noise, cavity noise and screech

Vitaliy Yurkiv – vyurkiv@arizona.edu  
multi-physics modeling and machine learning calculation of energy storage and conversion technologies - ab initio density functional theory calculations - phase-field modeling - thermal measurements of rechargeable batteries - thermal runaway assessment in electric vehicles

Olesya Zhupanska – oiz@arizona.edu  
micromechanics of composites - structural composites in extreme environments - low velocity impact of composites - PDE-constrained optimization with applications to mechanics - contact mechanics

Yitshak Zohar – zohar@arizona.edu  
biomicrofluidics and microscale manipulation of biospecies, such as proteins, cells and tissues in microfluid systems

Having these researchers, pillars in their fields, under the same roof gives our department an edge in being able to bridge gaps in knowledge and best prepare our faculty and students to solve problems.

- Alex Craig, assistant professor