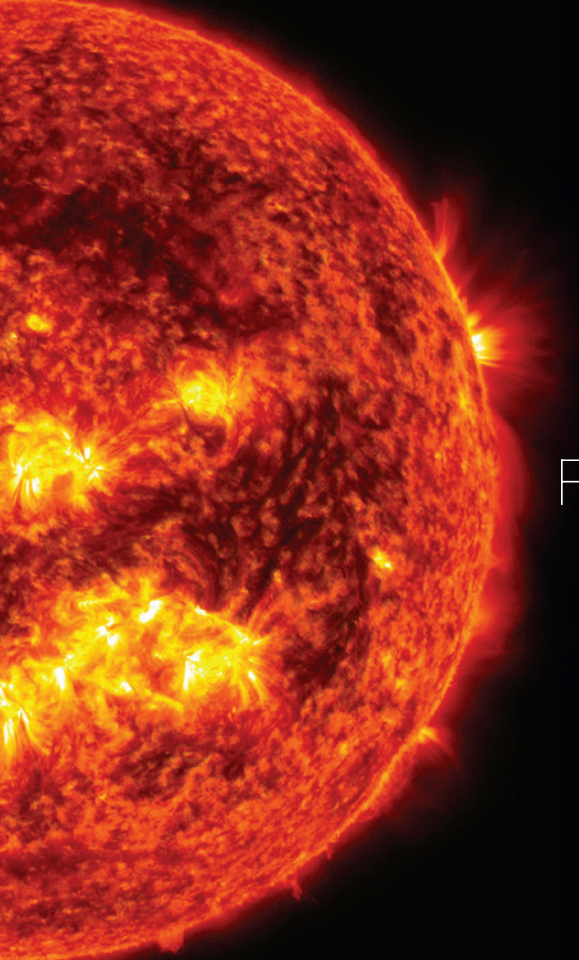

POWERING RESEARCH FOR ALABAMA'S FUTURE

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THE UNIVERSITY OF ALABAMA IN HUNTSVILLE®

THE UNIVERSITY OF ALABAMA IN HUNTSVILLE

(UAH) is engaged in the pursuit of new knowledge and the creative application of that knowledge to solve critical challenges in the national interest. Solutions to these challenges are derived through scientific, engineering, and mathematical activities at the highest level, and at the forefront of our knowledge.

UAH provides a robust and collaborative research environment, involving other universities, non-profits, government, and the private sector. Challenges we confront require expertise that is not located in any single place; therefore, collaboration is imperative.

During the past five years, UAH has performed $639 million in contracts and grants, and the university has awarded more than 3,100 graduate degrees. Innovations from UAH have resulted in more than 493 invention disclosures and $3.1M in royalty revenue over the last 10 years.

UAH's research leadership and robust academic programs help build – and more importantly help maintain – a strong and educated workforce who bring value to our society. Our best minds are applied to our hardest problems, to hone the skills and grow the capability of the workforce.

THE COVER IMAGE WAS CAPTURED BY NASA'S SOLAR DYNAMICS OBSERVATORY ON JUNE 20, 2013, SHOWING THE BRIGHT LIGHT OF A SOLAR FLARE ON THE SUN. CREDIT: NASA/SDO

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FEDERALLY FINANCED R&D RANKINGS

SOURCE: National Science Foundation

8TH
Aerospace | Aeronautical | Astronautical Engineering

10TH
Computer & Information Sciences

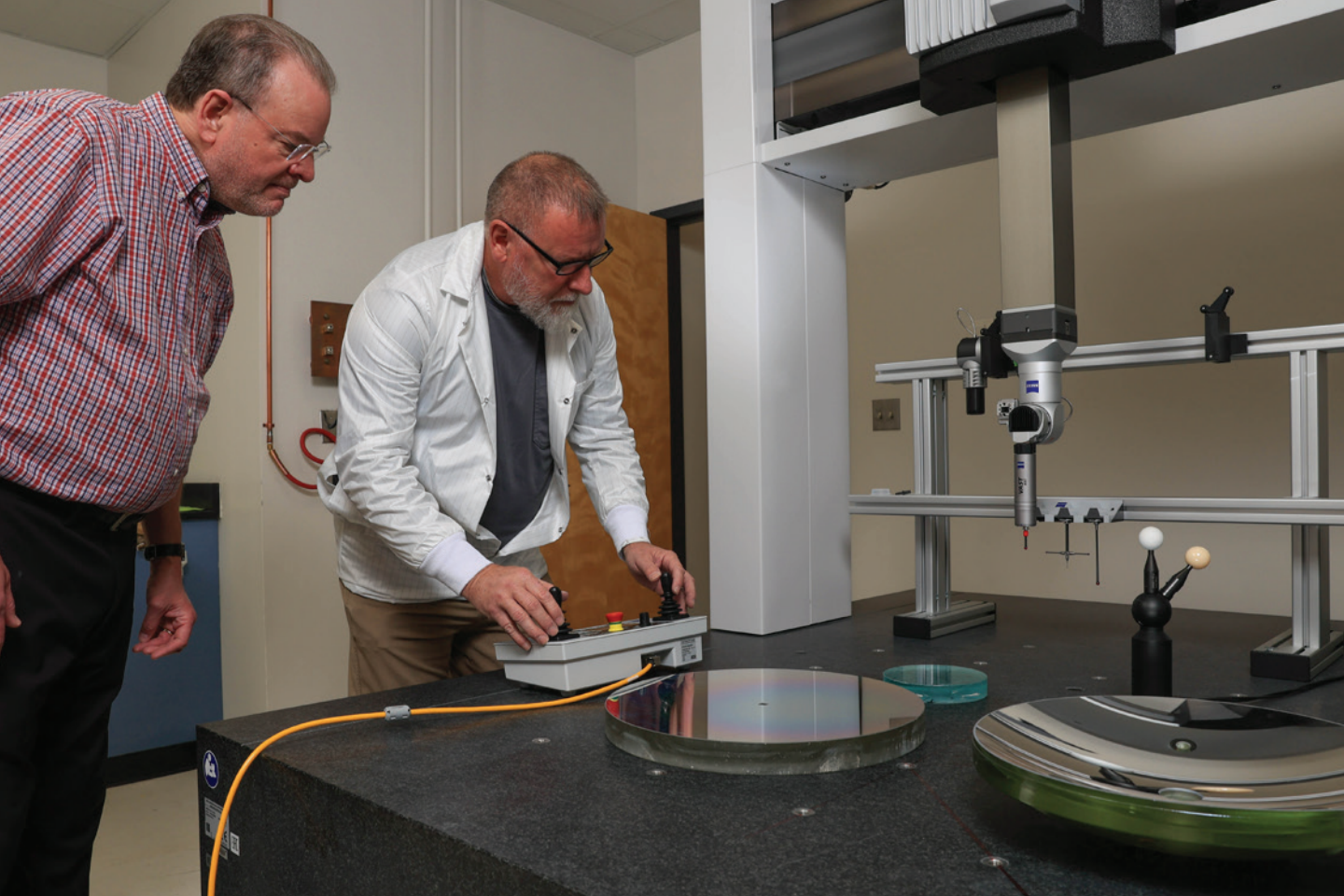
10TH
Atmospheric Science & Meteorology

10TH
Astronomy & Astrophysics

24TH
Industrial & Manufacturing Engineering

UAH IS A RESEARCH-INTENSIVE UNIVERSITY RANKING IN THE TOP TEN FOR FEDERALLY FUNDED RESEARCH EXPENDITURES IN FOUR CRITICAL RESEARCH AREAS

- UAH research funding for FY 2023 - $163.4M.
- UAH ranks 13TH in the United States as measured by NASA funded research and 22ND in the nation as measured by Department of Defense-funded research, in recent NSF rankings.



CENTER FOR APPLIED OPTICS

The Center for Applied Optics (CAO) advances optical science and engineering research and development in support of high-technology educational, industrial, and government interests and requirements.

The CAO provides optical and optomechanical design and analysis, optical fabrication including diamond turning and both standard and CNC polishing, optical metrology, holography, and testing and prototyping state-of-the-art optical components and systems.

The CAO is also home to UAH's Nano and Micro Devices Center (NMDC). The NMDC is a national user facility that specializes in leading technology and innovation on a broad range of nano- and micro-projects. World-class facilities coupled with excellent faculty allow cutting-edge research and the development of devices and components that require nano- and micro-fabrication.

Center researchers are exploring unique applications of optics for numerous space, military, and industrial uses. Experienced research personnel and extensive laboratory resources make the CAO uniquely qualified to perform state-of-the-art research.

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CENTER FOR CYBERSECURITY RESEARCH AND EDUCATION

UAH's Center for Cybersecurity Research and Education (CCRE) offers an interdisciplinary approach to defending networks, data, and computer operating systems from adversarial attacks. In addition to providing educational opportunities such as camps and scholarships, the CCRE also engages in cutting-edge research on a wide variety of cybersecurity-related topics, including identity management, supply chain security, intrusion detection, vulnerability analysis, medical device security, and digital forensics.

The center has faculty members from Computer Science, Electrical and Computer Engineering, the College of Business, and the Psychology Department.

AREA OF RESEARCH

- Modeling and Simulation
- Vulnerability Analysis
- Social Engineering
- Insider Threat
- Identity Management
- Metrics
- Trustworthy Systems
- Policy Development
- Supply Chain Security
- Risk Management
- Medical Device Security
- Automotive System Security
- Safety Systems (rail, unmanned)
- SCADA/ICS
- Digital Forensics
- Intrusion Detection
- FISMA Compliance
- Privacy
- Situational Awareness

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MAX
Mobile Alabama X-band

EARTH SYSTEM SCIENCE CENTER

The Earth System Science Center (ESSC) was created to encourage interdisciplinary study of the Earth as an integrated system across traditional boundaries. It has a diverse scientific staff, including atmospheric scientists, biologists, geologists, engineers, mathematicians, and computer scientists.

The ESSC is involved in several areas of Earth system research focusing on the basic science of the Earth-atmosphere system. Scientists are involved in the evaluation of global-scale climate models, regional studies of the coupled atmosphere/ocean/ice systems, regional severe weather detection and prediction, measuring the local and global impact of the aerosols and pollutants, detecting lightning from space, and the general development of remotely sensed databases.

A cross-cutting strength of ESSC scientists is the application of remote-sensing data, both space and ground-based, to the myriad of questions related to the Earth system. Much of the research of this center is done through on-site collaboration with NASA and the National Weather Service.

Severe Weather Institute – Radar and Lightning Laboratories (SWIRLL) is a core research facility that houses UAH's Atmospheric Science Department as well as Earth System Science Center staff and students who are involved in research on severe and hazardous weather, radar meteorology, lightning meteorology, lightning physics, and air quality.

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I2C

INVENTION TO INNOVATION CENTER (I²C)

I²C serves as a regional initiative that fosters, promotes, and accelerates the commercialization of technology-based ventures through incubation, co-working, mentorship, funding, and strategic support Our three-pronged mission focuses on stimulating growth of new and existing science and engineering high-tech companies, catalyzing formation of a resilient entrepreneurial ecosystem in the Northern Alabama and South-Central Tennessee regions, and building partnerships with various entrepreneurial ecosystems and hubs to create pathways that empower, ignite, and motivate the community to make ideas happen.

I²C focusses on the powerful collaboration of resources aimed at accelerating entrepreneurship through expertise, training, and mentorship to the regional workforce, entrepreneurs, companies, and local communities. Furthermore, I²C serves as the focal point for incubation, education, and support for entrepreneurs across the 15-county region in Northern Alabama and South-Central Tennessee including Blount, Colbert, Cullman, DeKalb, Etowah, Franklin, Giles, Jackson, Lauderdale, Lawrence, Limestone, Lincoln, Marshall, Madison, and Morgan counties.

The I²C 45,000 sq. ft space combines three interconnected elements: shared workspace, co-working community, and collaborative co-creation. The I²C is open to anyone looking to learn about entrepreneurship, explore a technology based venture, participate in I²C events, and be a part of the I²C entrepreneurial community.

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INFORMATION TECHNOLOGY AND SYSTEMS CENTER

The Information Technology and Systems Center (ITSC) conducts multidisciplinary research in many facets of information technology, systems engineering, and modeling and simulation. Basic and applied research is performed to develop new techniques and systems that ultimately solve real-world problems by the transfer of innovative technologies and knowledge. Students, faculty, and research scientists are involved in all aspects of the center. ITSC serves as the focal point for UAH research endeavors for information technology and modeling, and provides leadership in applications of information technology and modeling and simulation for multiple disciplines and computational environments.

The center is actively involved in local, state, regional, national, and international technologies and modeling activities, and serves as a catalyst for innovative pursuits in information technology. In support of these activities, the center is currently performing research and development in the areas of data mining and knowledge discovery, distributed information systems, cybersecurity, modeling and simulation, systems engineering, and information system interoperability.

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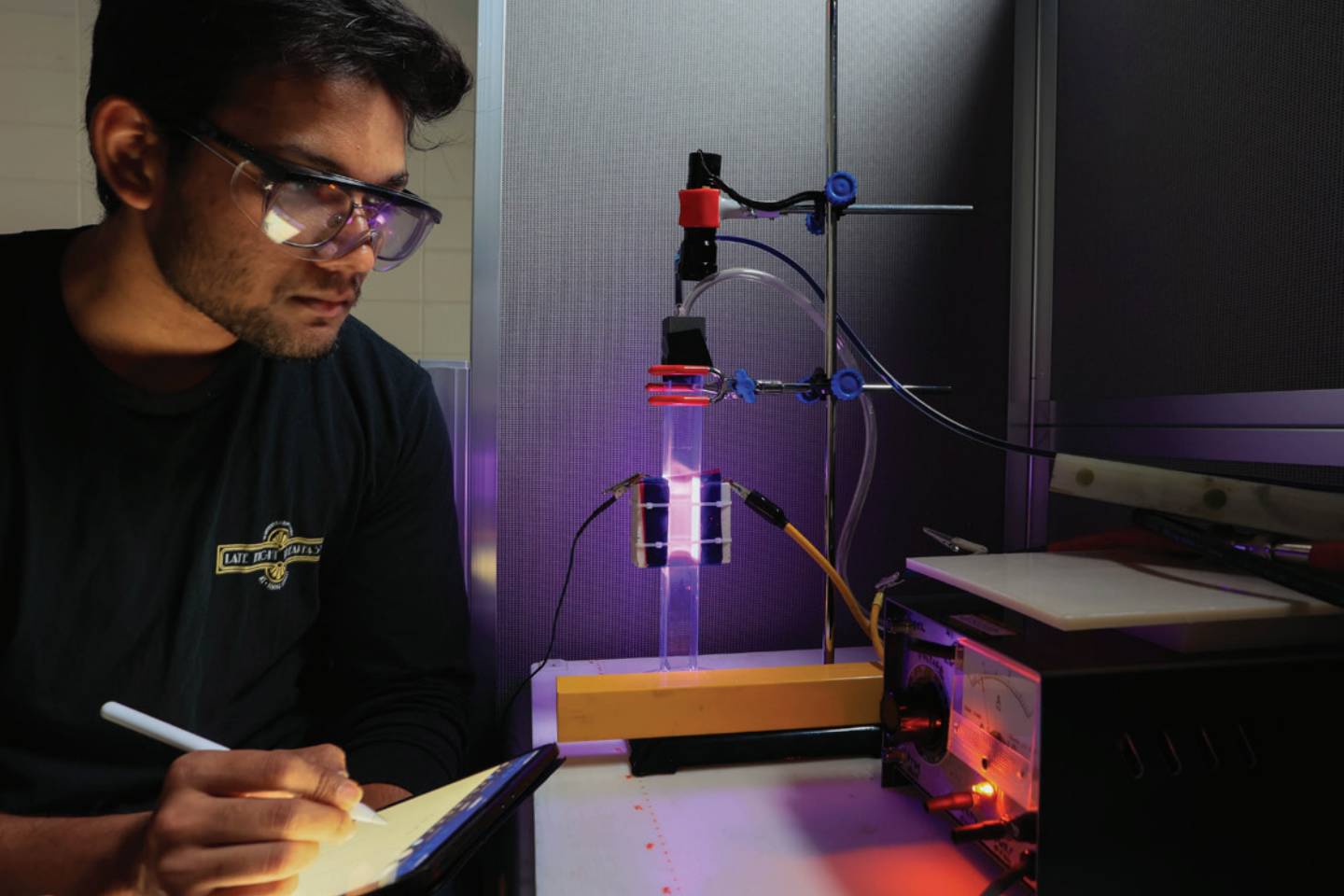

PROPULSION RESEARCH CENTER

The Propulsion Research Center (PRC) mentors students and also conducts research and provides detailed assessments of liquid, solid, electric, and air-breathing propulsion devices – including cryogenic propellants. The PRC maintains a propulsion test facility on campus and offers numerous partnership opportunities with industry.

The core competencies of the center include:

LIQUID PROPULSION

- Combustion Instability
- Advanced Diagnostics
- Injector Design/Analysis/Testing

ELECTRIC PROPULSION

- Plasma Modeling
- Plume Characterization

AIR BREATHING PROPULSION

- Supersonic Wind Tunnel
- Tubing Blade Heat Transfer

SOLID PROPULSION

- Burning Rate Determination
- Propellant Mixing

NUMERICAL ANALYSIS

AEROSPACE VEHICLE DESIGN

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CAP 1000 LBS
ABELL-HOWE
BUDGIT
1 TON

RESEARCH INSTITUTE

Established in 1961, the UAH Research Institute carries out applied research and engineering programs, principally to meet the needs of Department of Defense customers, but with significant related work for NASA and private industry. Some Research Institute efforts are carried out in cooperation with customers, both on-site and at government laboratories.

The Institute staff has expertise in covering the life cycle of aerospace and defense systems. These include systems engineering and project management, technical risk assessment, software engineering, reliability and physics of failure, and modeling of business processes, including supply chains. In addition, the Research Institute staff has expertise in the development and management of international projects and in organizational design and the management of technical professionals. The Institute operates the Aerophysics Research Center for studying the interactions of a vehicle with its environment at high velocity and has the capability to measure high velocity impact phenomena. The Reliability and Failure Analysis Laboratory contains a wide variety of test equipment for the evaluation of materials and structures.

The Charger 1 facility is a state-of-the-art pulsed power facility currently being assembled at a laboratory at UAH, in collaboration with NASA Marshall Space Flight Center and The Boeing Company.

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ROTORCRAFT SYSTEMS ENGINEERING AND SIMULATION CENTER

The Rotorcraft Systems Engineering and Simulation Center (RSESC) is a multifaceted research center focused on applied engineering and systems engineering techniques to enhance success for government and industry rotorcraft partners. RSESC brings proven, unparalleled capabilities in systems engineering, design and system analysis, rapid prototyping, integration, and fabrication. RSESC skills include system design and development, analysis in computational fluid dynamics and mechanical fields, reverse engineering, data analysis, trade studies, systems engineering, systems integration, material science, non-destructive testing, independent verification, analysis and review, and manual development for government systems. RSESC has proven experience with retrofits, upgrades, reverse engineering, and miniaturizations to improve systems to meet emerging requirements, address obsolescence, or save on overall life-cycle costs.

RSESC was established as an initiative among the Program Executive Office – Aviation, Aviation and Missile Research and Development and Engineering Center and UAH. Capabilities have expanded to include NASA flight hardware design, qualification, and fabrication as well as the design, analysis, and fabrication of unmanned aerial systems.

In addition to rotorcraft, RSESC personnel have a long track record of supporting industry and government organizations in space mission analysis and the design, qualification, and fabrication of spacecraft- and aircraft-mounted payload systems.

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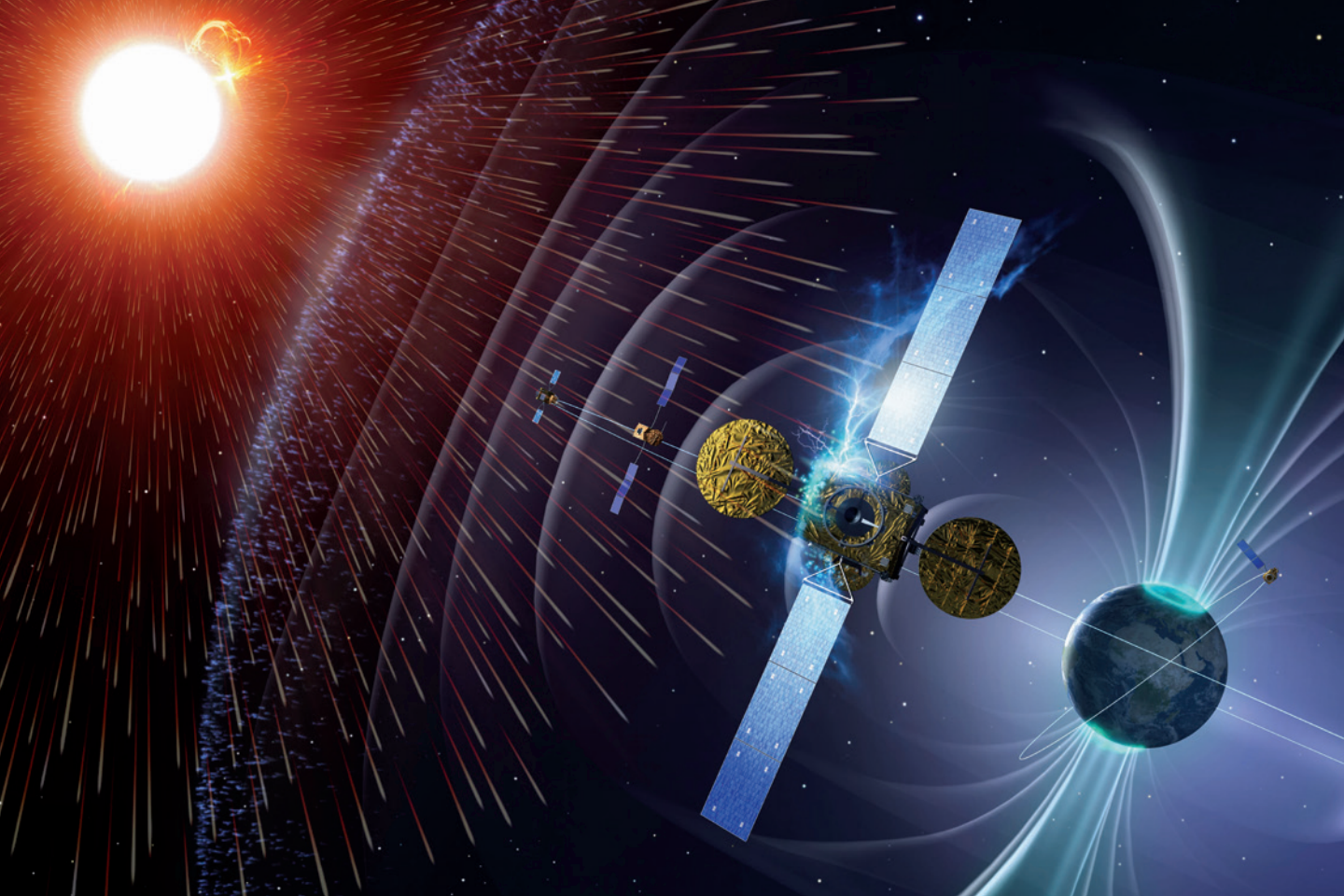

CENTER FOR SPACE PLASMA AND AERONOMIC RESEARCH

The Center for Space Plasma and Aeronomic Research (CSPAR) is dedicated to fostering excellence in research and graduate education on the role plasmas play in stars, in space, and in planetary atmospheres. Center researchers are especially interested in the coupling between the sun (our closest star), the near-Earth magnetic environment, and Earth's upper atmosphere and ionosphere. CSPAR scientists are pursuing these goals with NASA scientists through advanced theory, comprehensive modeling, and instrument development programs for both remote sensing and in-situ observations.

AREAS OF RESEARCH

- Cosmic Ray Astronomy
- Gamma Ray Astronomy
- Space Plasma Physics
- Gravitational Physics
- Optical Remote Sensing
- Pulsed Power Plasmas
- Magnetospheric Physics
- High-Energy Plasma Space Propulsion
- Low-Energy Plasma Dynamics
- Lonospheric Physics
- Auroral Physics
- X-Ray Astronomy

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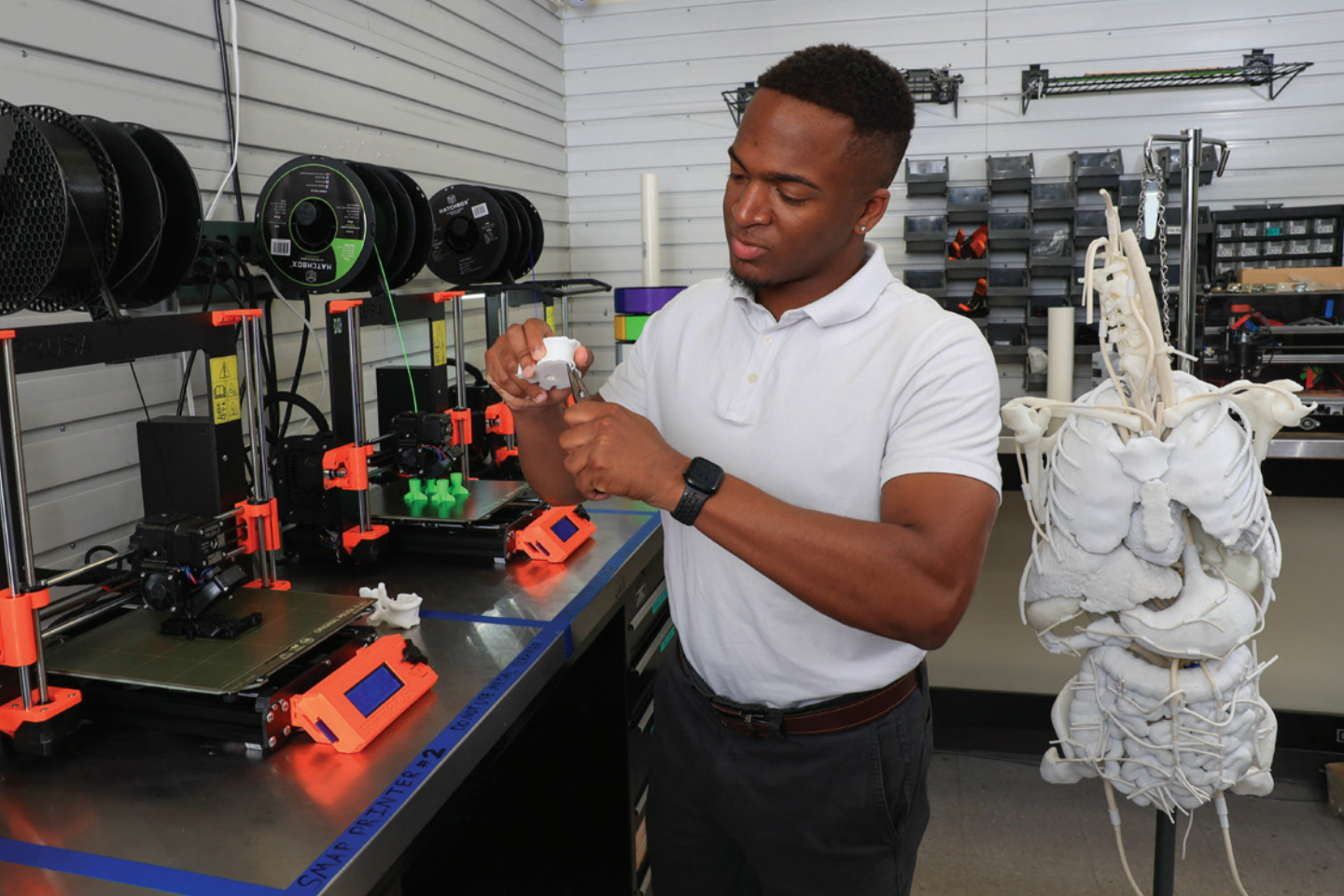
SWAP PRINTER #2

SYSTEMS MANAGEMENT AND PRODUCTION CENTER

The Systems Management and Production (SMAP) Center provides expertise, leadership, and support to the U.S. Army, NASA, other government agencies and private sector organizations. The Center provides the Army and other agencies with knowledge to resolve current issues and serves as a critical link in workforce development through programs like Students Working with the Army in Parallel and its engineering and computer science incubators. The Center carries out these activities by providing on-site, applied research for partners at Redstone Arsenal and other locations.

The center's STEM Projects Advancing Relevance and Confidence in the Classroom Lab brings education, government, industry, and students together to educate and inspire the next generation of STEM professionals.

AREAS OF RESEARCH

- Workforce Development
- Engineering Management Training and Support
- Engineering Research, Design, and Analysis
- Logistics Support
- Threat Evaluation and Sensors Systems
- Web-Based and Database Application Development
- Photorealistic 3D Modeling, Visualization, and Animation
- Unmanned Systems Integration
- Military Testing and Logistics Support

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htc

COLLEGE OF ARTS, HUMANITIES, AND SOCIAL SCIENCES

In this diverse college, scholarship comes in two forms: research and artistic/creative achievement. Our performing artists present artworks, music concerts, and theatrical productions locally, nationally, and internationally. Like the arts everywhere, these are funded largely by community-based patrons of the arts. Research projects in the humanities – and some in the arts and social sciences – are frequently conducted with aid from the UAH Humanities Center. With funding through the National Endowment for the Humanities, as well as public, corporate, and private donations, the UAH Humanities Center is now in its 25th year, operating three separate endowments. The Center funds faculty research and research-related travel all over the world. During the academic year, the Center funded 32 different research projects among 23 members of our faculty. Finally, our social scientists have been funded by grants from the National Science Foundation and regularly pursue funding for joint projects with colleagues in the Colleges of Engineering, Science, Education, Nursing, and Business, as well as with community agencies.

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BONDS
10-YR T-NOTE
1-MONTH T-BILL
1-YR T-BILL
2-YR T-NOTE
30-YR T-BOND
3-MONTH T-BILL
5-YR T-NOTE
6-MONTH T-BILL
WORLD NEWS
NYSE MOST ACTIVE
NYSE LOSERS
NASDAQ MOST ACTIVE
NASDAQ LOSERS

COLLEGE OF BUSINESS

The College of Business strives to meet education needs by being a superior center for research in business. Teaching is enhanced by conducting research in our disciplines and by interacting with business and government. These organizations provide a rich source of applications that introduce us to interesting research ideas. Our faculty has the distinctive capability to publish high-quality basic and applied research in their respective disciplines and in the management of technology.

CENTERS AND LABS

- **Management of Science & Technology**
  This Center conducts research to develop new techniques in the management of science and technology.
- **Management & Economic Research**
  This Center serves business and industry through consultative assistance, training programs, and research, and by disseminating economic information.
- **Integrated Enterprise Lab**
  The Integrated Enterprise Laboratory serves business and industry through consultative assistance, training programs and research, systems analysis, and redesign and data manipulation.

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UAH

COLLEGE OF EDUCATION, SPORT, AND HUMAN SCIENCES

The College of Education comprises two academic departments – the Department of Curriculum and Instruction, and the Department of Kinesiology. The Department of Curriculum and Instruction focuses on collaborative, early elementary, English Speakers of Other Languages (ESOL), and secondary teacher preparation, while the Department of Kinesiology focuses on exercise science and preparing physical education teachers.

The UAH Early Learning Center, an outreach and service unit of the college, provides inclusive early childhood education for children from ages 9 months to 6 years in developmentally appropriate classrooms. The UAH Rise School provides the highest quality of early childhood education services to children with developmental disabilities and children without disabilities. This program provides children 9 months up to 6 years of age with a firm foundation for their next educational experience. Children are grouped according to their age and individual needs in an integrated environment tailored to a diverse range of abilities.

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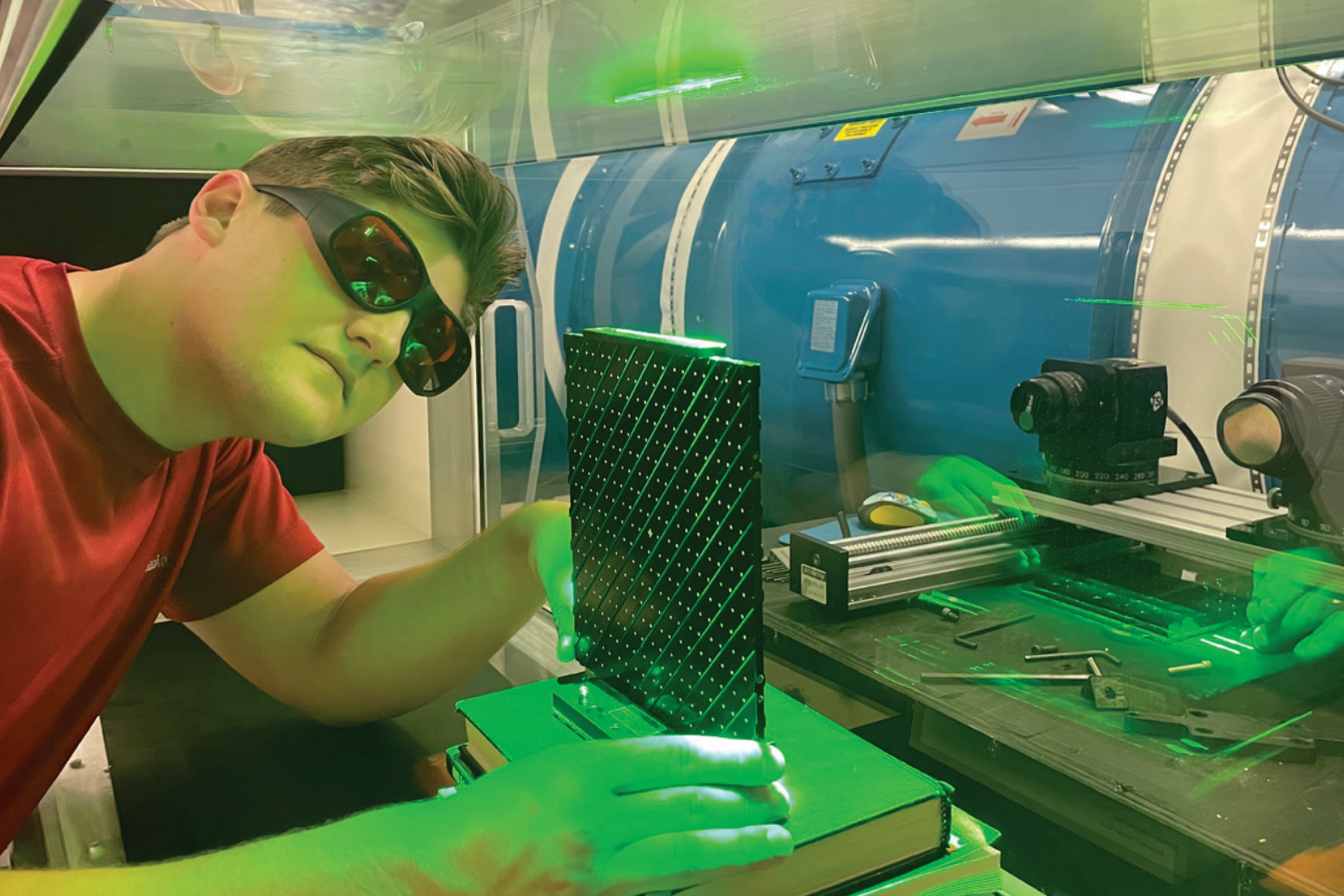

COLLEGE OF ENGINEERING

Three of UAH's College of Engineering research disciplines rank in the top 50 in the nation in federal research funding, according to the National Science Foundation.

- Aeronautical/Astronautical Engineering (6th)
- Mechanical Engineering (26th)
- Electrical Engineering (49th)

Research carried out by the College's faculty is often coordinated with several research centers on campus, including the following:

- Autonomous Tracking Optical Measurement Lab
- Electronics Manufacturing Systems Lab
- High-Performance Technical Computing System
- Real-Time Physiological Monitoring Lab
- Heat Transfer and Two-Phase Flow Lab
- Center for Applied Optics
- Propulsion Research Center
- Charger-1 Pulsed Power Generator
- Structural Composites Lab
- Transport Properties Measurement Lab
- Catalysis and Reaction Engineering
- Laser Diagnostic Lab for Hypergolic Combustion

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COLLEGE OF NURSING

Research within the College of Nursing is focused on developing innovations in health-care delivery and bio-behavioral interventions to improve health.

Several programs of research involve interdisciplinary research and technology: development of decision-support software to improve patient and organizational outcomes; use of mobile apps to improve collaboration of health-care professionals in specialty practice such as transplantation; patient-centered health information technology to improve management of asthma; research and development to change subglottic secretion volume and viscosity, reducing the risks for ventilator-associated pneumonia; occupational stress monitoring using wireless body sensors; and best practices in simulation technology for nursing education.

Additional programs of research include a focus on bio-behavioral aspects of health care including the beliefs about birthing practices by intrapartum nurses, environmental exposure of pregnant women to formaldehyde, understanding the cultural aspects of using smokeless tobacco, improving adherence to medications and appointments by patients with chronic illnesses, and using interventions to reduce the incidence of overweight and obesity among children.

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S.C.I.E.N.C.E

COLLEGE OF SCIENCE

Our faculty actively investigate a stunning array of topics, from climate change to extremophiles to theoretical physics. The College's departments receive hundreds of research grants each year and are affiliated with such research centers as the Center for Space Plasma and Aeronomic Research, the Earth System Science Center, the Information Technology Systems Center, and the Institute for Science Education. Collaborative research is conducted with agencies such as NASA, the National Weather Service, and the HudsonAlpha Institute for Biotechnology.

AREAS OF RESEARCH

- Severe Weather
- GIS and Satellite Remote Sensing
- Climate
- Biochemistry
- Genetics
- Molecular Biology
- Organic Chemistry
- Physical Chemistry
- Materials Science
- Computer Security
- High-Performance Computing and Networking
- Visualization and Graphics
- Nuclear and Particle Astrophysics
- Solar Physics
- Optics and Photonics
- Heliosphere
- Gamma-Ray Bursts
- Cosmic Rays

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