

UNIVERSITY CONSORTIUM FOR APPLIED HYPERSONICS

FALL FORUM AGENDA

2022



Schedule

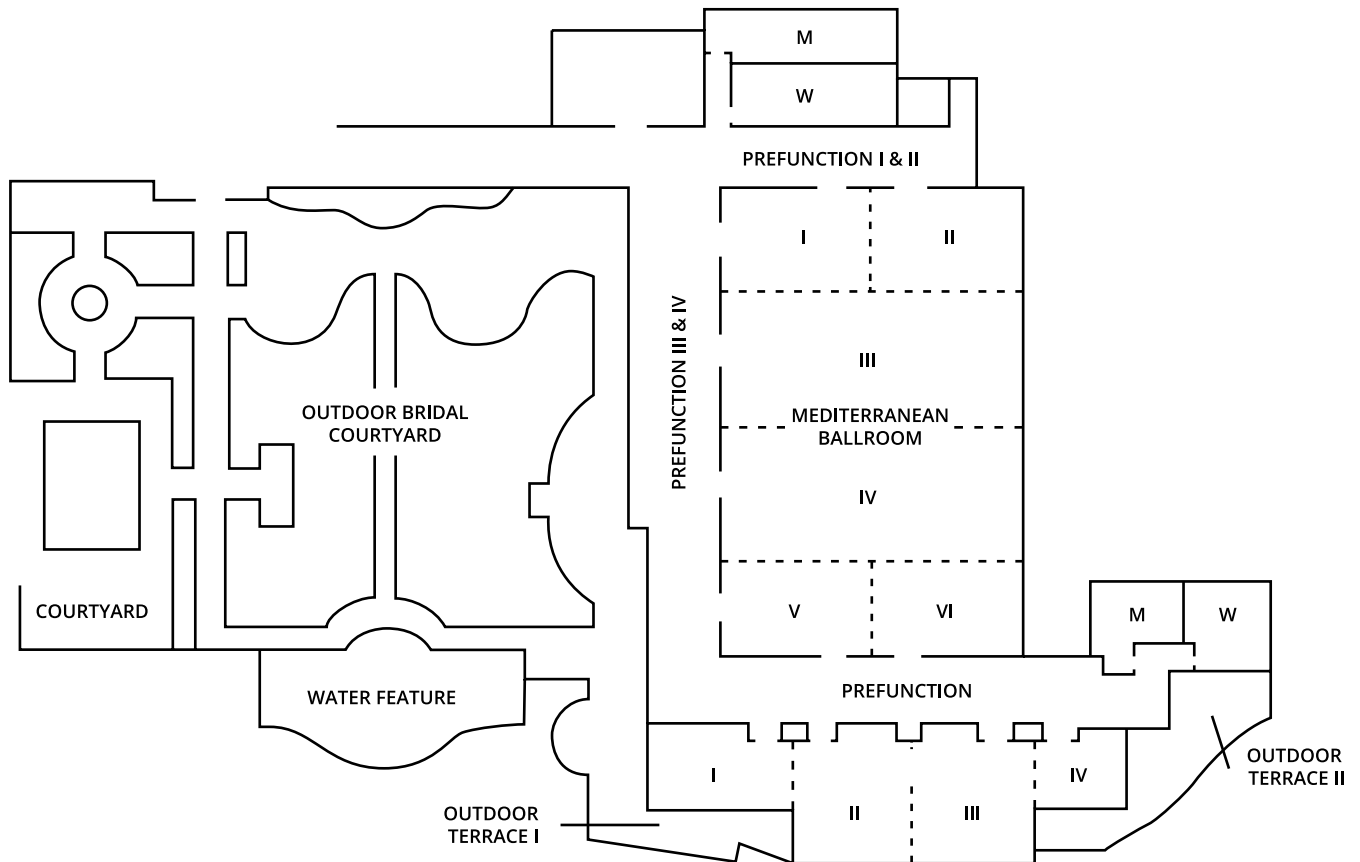
TUESDAY | September 20, 2022

7:30–8:15 a.m.	Check-in and continental breakfast
8:15–8:30 a.m.	Welcome/meeting information <i>Dr. Rodney Bowersox</i>
8:30–9 a.m.	Opening remarks <i>Dr. Steven Wax</i>
9–9:45 a.m.	Keynote: “How Technology, Research and Workforce Enable Advanced Capabilities” <i>Marcia Holmes</i>
9:45–10:30 a.m.	Summarizing Joint Hypersonic Transition Office (JHTO) existing research overview <i>Dr. Matthew Magill</i>
10:30–11 a.m.	BREAK
11 a.m.–12:30 p.m.	Introduce new solicitation topics <i>Dr. Joshua Johnson</i>
12:30–2 p.m.	LUNCH (hosted by UCAH)
2–2:30 p.m.	JHTO’s next phase of technology transition <i>Dr. Sarah Armstrong</i>
2:30–3:30 p.m.	Technology transfer panel — case studies from hypersonic efforts <i>Dr. Erica Corral (moderator), Dr. Graham Candler, Kurt Chankaya, Dr. Teresa Clement, Dr. James LaManna</i>
3:30–5 p.m.	Reception and student poster sessions

WEDNESDAY | September 21, 2022

7:30–8:15 a.m.	Check-in and continental breakfast
8:15–8:45 a.m.	Keynote: “The Hypersonic Workforce Challenge” <i>Dr. Bindu Nair</i>
8:45–9:15 a.m.	Strategies applied for a technical workforce <i>Dr. Bryan Woosley</i>
9:15–9:45 a.m.	JHTO workforce development overview, statistics and accomplishments <i>Dr. Lori Stiglitz</i>
9:45–10:30 a.m.	BREAK
10:30–11:30 a.m.	Meeting the workforce challenge across the hypersonic community panel <i>Dr. John Schmisser (moderator), Dr. Mark Gragston, Dr. Heather Kostak-Teplicek, Lauren Lester, Dr. Thomas McManus, Zachary Priessman, Allison Rzepka</i>
11:30 a.m.–12:30 p.m.	Bringing department-wide efforts under one direction for the nation panel <i>Dr. Lori Stiglitz (moderator), Dr. Thomas Corke, Mary Jo Long-Davis, Dr. Scott McEntire, Michael McKenna</i>
12:30–1:30 p.m.	LUNCH (hosted by UCAH)
1:30–3:30 p.m.	Highlights from UCAH 2020-2021 Research (selected briefs) <i>Dr. Rodney Bowersox and Dan Marren (moderators), Dr. Kareem Ahmed, Dr. Luca Maddalena, Dr. Ellen Mazumdar, Dr. Samy Missoum, Dr. Jonathan Rogers, Dr. Uday Kumar</i>
3:30–4:15 p.m.	Solicitation feedback and questions <i>Dr. Joshua Johnson</i>
4:15–4:45 p.m.	Protecting critical information in UCAH <i>Paul Green</i>
5–6 p.m.	Reception and student poster sessions

Meeting Space and Wifi Information



Hotel WiFi: UCAH Fall Forum
Password: UCAH_2022

PROTECTION of INFORMATION

Attendees have a personal responsibility to protect and refrain from distributing Controlled Unclassified Information, the International Traffic in Arms Regulations and military-critical data discussed and presented at this forum.

Electronics will be allowed during the forum, but will need to be silenced and their use minimized. Laptops and tablets may not be open during CUI sessions.

Your registration and security approval are for your participation only.

SPEAKERS AND PANEL SESSIONS



Dr. Sarah Armstrong

*Director of Joint Hypersonics Transition Office (JHTO) Systems Engineering Field Activity
Office of the Under Secretary of Defense for Research and Engineering (OUSD(R&E))*

Dr. Sarah Armstrong received her bachelor's degree in electrical engineering from Purdue University in 2001, a master's degree in electrical engineering from Vanderbilt University in 2007 and a doctoral degree in electrical engineering from Vanderbilt University in 2011. Her doctoral research was focused on exploring single-event effects (ionizing radiation) in high-speed communications devices. Early in her career, Armstrong worked as a failure analysis engineer and a radiation-hardened analog integrated circuit designer, and she also managed efforts related to lifecycle support of radiation-hardened microelectronics in hardened systems. As the deterrence and defense systems customer advocate, she led customer management teams for a portfolio of 100+ work years in support of strategic systems hardware efforts and developed strategies and vision aligning to command strategic plans. She worked closely with the U.S. Air Force and the Missile Defense Agency to find affordable solutions to issues common across the strategic enterprise. Recently, she established a project management branch focused on nuclear modernization and trusted microelectronics.



Dr. Rodney Bowersox

Associate Dean for Research, Director, Texas A&M National Aerothermochemistry and Hypersonic Laboratory, Professor, Aerospace Engineering, Holder, Ford Motor Co. Design Professorship I, Regents Professor

Dr. Rodney Bowersox is the associate dean for research and Ford I Professor of aerospace engineering at Texas A&M University. He received his bachelor's, master's and doctoral degrees in aerospace engineering from Virginia Polytechnic Institute and State University in 1988, 1990 and 1992, respectively. His research and teaching are focused on theoretical and experimental hypersonic viscous flows, scramjet flows, aerothermochemistry, non-equilibrium gas dynamics and wind tunnel design. He founded and directs the Texas A&M National Aerothermochemistry and Hypersonics Laboratory. His research program is sponsored primarily by the Air Force, Army, Department of Defense (DOD), NASA, Navy and private industry. Bowersox is a DOD Vannevar Bush Faculty Fellow (2017-22). He is a fellow of the American Society of Mechanical Engineers (ASME) and the American Institute of Aeronautics and Astronautics (AIAA).



Paul Green, Special Agent

Counterintelligence and Security Integration, Office of the Under Secretary of Defense for Research and Engineering, Science and Technology Program Protection

Paul Green has worked with the DOD for over 20 years, focusing on counterintelligence issues affecting cleared contractors and cleared universities.



Marcia Holmes

Deputy Director for Hypersonics, Directed Energy, Space and Rapid Acquisition

Marcia Holmes was appointed to the senior executive service in August 2019 and serves as the deputy director for Hypersonics, Directed Energy, Space and Rapid Acquisition in the Office of the Assistant Secretary of the Army (Acquisition, Logistics and Technology) department, Redstone Arsenal, Alabama. In this position, Holmes supports the Army Rapid Capabilities and Critical Technologies Office to rapidly and efficiently research, develop, prototype, test, evaluate, procure and field critical enabling technologies and capabilities, including long-range hypersonic weapon systems, high-energy lasers, cyber solutions and other innovative concepts that address near-term and mid-term threats, consistent with the Army's modernization priorities. Prior to her current position, Holmes served as the deputy director in the Combat Capabilities Development Command Aviation and Missile Center System Simulation, Software and Integration Directorate. From 2013-16, Holmes served as the chief engineer in the Program Executive Office Missiles and Space. In this position, she held technical oversight and authority for 31 major defense programs spanning eight critical Army project offices across all phases of the acquisition lifecycle.



Dr. Joshua Johnson

Hypersonic S&T Integrating Integrated Product Team (IIPT) Lead at the OUSD(R&E) JHTO

Dr. Joshua Johnson is the Hypersonic S&T IIPT lead at the OUSD (R&E) JHTO. He has been working for the Johns Hopkins Applied Physics Laboratory for 13 years and has been on detail to the Pentagon and Mark Center for nine years supporting multiple offices, including the Conventional Prompt Strike program, the principal director for Hypersonics Office and now JHTO since its inception. He co-led the development of the DOD Hypersonics S&T Strategy. He completed his undergraduate degree at the University of Notre Dame in aerospace engineering. He received his master's and doctoral degrees in aerospace engineering from the University of Maryland at College Park studying lunar and Mars return hypersonic re-entry vehicles and trajectory performance.



Dr. Matthew Magill

Deputy Director of the JHTO

Dr. Matthew Magill is currently the deputy director of the JHTO and has a background in electrical engineering and control systems. He received his master's and doctoral degrees from the University of Illinois at Urbana-Champaign in electrical engineering with a focus in electric machines, power electronics and electrical power systems. He has been with Sandia National Laboratories since 2015 and has experience in flight vehicle navigation, guidance and control; power system design and analysis; large multidomain simulations; and actuator design for thrust vector control systems.



Dr. Bindu Nair

Director of Basic Research, Office of the Secretary of Defense

Dr. Bindu Nair is the director for basic research within the Office of the Secretary of Defense (OSD). In this role, she is responsible for oversight and coordination of the department's \$2.5 billion investment in basic science. She previously served as the deputy director of OSD's Human Performance, Training and Biosystems Directorate. Prior to OSD, Nair worked for the Department of the Army with oversight responsibilities over the science and technology program in power and energy. She has worked in the DOD laboratory system at Natick Soldier Research, Development and Engineering Center as well as in private industry at Foster Miller. Her research expertise is in the field of materials science and engineering, including

nanomaterials, polymers and organic electronic materials. She has published primarily in membrane and materials development fields and holds patents in fuel cell technologies. Nair holds a bachelor's degree from the University of Florida and a doctoral degree from the Massachusetts Institute of Technology in materials science and engineering.



Dr. Lori Stiglitz

Workforce Development Lead, JHTO Systems Engineering Field Activity

Dr. Lori Stiglitz is the workforce development lead for the JHTO, Systems Engineering Field Activity (SEFA) based at Naval Surface Warfare Center, Crane Division (NSWC Crane). She is dedicated to growing and training the present and future hypersonics workforce with strategies that will build a continuous pipeline of available manpower for all levels of research and development and for industry and DOD hypersonic careers. Her focused concentration is on building bridges of success in science, technology, engineering and math (STEM) for K-12, university students and researchers, and active employees from trades through engineering and science experts.

Stiglitz has led multiple education districts as superintendent with a focus on her expertise in STEM expansion, educational law and finance, leading 300+ staff members in training and development. She was the national education director for STEM SeaPerch Robotics with the Office of Naval Research (ONR) SeaPerch and the Association of Unmanned Vehicle Systems International (AUVSI).



Dr. Steven G. Wax

Principal Deputy, Deputy Chief Technology Officer for Science and Technology (PD, DCTO (S&T))

Dr. Steven G. Wax is the principal deputy, director of defense research and engineering for research and technology and the acting director of defense research and engineering for research and technology in the (OUSD(R&E)) at the Pentagon. He is responsible for championing the DOD Science and Technology (S&T) Enterprise, including establishing and implementing the S&T strategic vision and DOD imperatives by identifying strategic investment areas and influencing the DOD-wide S&T Strategy and Planning Guidance across the department's laboratories. Wax provides oversight of the S&T workforce and laboratory infrastructure policy, including for federally funded research and development centers and

university-affiliated research centers, thereby strengthening U.S. technological superiority with world-class defense laboratories, workforce and technologies. Wax is the OUSD(R&E) lead for maintaining technology advantage, through which he establishes policy and implements technology and program protection methodologies. He also oversees a broad portfolio of S&T programs, including Basic Research Program, Small Business Innovative Research and Small Business Technology Transfer, the Manufacturing Innovation Institutes, DOD Manufacturing Technology Program and Microelectronics programs.



Dr. Bryan Woosley

University Liaison, NSWC Crane

Dr. Bryan Woosley is the university liaison at NSWC Crane and serves as the site coordinator for the Naval Research Enterprise Internship Program and the Science, Mathematics and Research for Transformation (SMART) Scholarship. He is also the naval engineering education consortium director for NSWC Crane. Prior to his civilian scientist career, Woosley was a high school science teacher and coach, college professor, scientific instrument field engineer and analytical chemist. He has a bachelor's degree in science education specializing in chemistry from Western

Carolina University, a master's degree in applied management from Indiana Wesleyan University and a doctoral degree in analytical chemistry from the University of Georgia. In addition to his Navy civilian career, Woosley is a retired U.S. Navy Reserve engineering duty officer. As a naval officer, he supported the ONR Naval Research Laboratory and ONR's STEM outreach program for 20+ years.

Panel: Technology Transfer - Case Studies from Hypersonic Efforts



Dr. Graham Candler

Russell J. Penrose and McKnight Presidential Endowed Chair of Aerospace Engineering and Mechanics, University of Minnesota

Dr. Graham Candler is the Russell J. Penrose and McKnight Presidential Endowed Chair of Aerospace Engineering and Mechanics at the University of Minnesota. He uses computational methods to study high-speed flight with application to future hypersonic flight systems and the entry of spacecraft into planetary atmospheres. Candler and his research collaborators have developed computational methods and codes that are widely used for the design and analysis of future hypersonic flight

systems. Recently, his work has focused on the development of high-accuracy simulation methods for the exploration of hypersonic flight system design space. His work has been published extensively in the areas of computational methods, high-temperature gas dynamics, boundary layer laminar to turbulent transition and validation of computational simulations with hypersonic wind tunnel data. He is a fellow of the AIAA and a member of the National Academy of Engineering (NAE). Candler received his undergraduate degree from McGill University and his graduate degrees in aeronautics and astronautics from Stanford University.



Dr. Erica Corral

Moderator, Associate Professor and Distinguished Scholar of Materials Science and Engineering, High-Temperature Ceramics Manufacturing and Integration Laboratory, University of Arizona

Dr. Erica L. Corral is an associate professor and distinguished scholar of materials science and engineering at the University of Arizona. She focuses on advancing the fundamental understanding of high-temperature materials for use in hypersonic applications. Corral's postdoctoral training was conducted at Sandia National Laboratories in the Ceramic Processing and Inorganic Materials Department in Albuquerque, New Mexico. Her doctoral degree in materials science and her bachelor's degree in metallurgical and materials engineering were obtained from William Marsh Rice University and The University of Texas at El Paso, respectively. She also holds the title and honor of distinguished scholar as an outstanding mid-career faculty member who is a leading expert in her field and a highly valued contributor to teaching, research and outreach priorities set out by the University of Arizona. Corral has over 20 years of experience in the subject matter of manufacturing ultra-high temperature ceramics and their behavior under high enthalpy flow environments relevant to hypersonics. She also serves on the leadership team of UCAH and contributes her technical expertise on the UCAH Interim Governance Board as co-director and on the Consortium Engagement Board focusing on industry engagement and technology transition.



Kurt Chankaya

Lockheed Martin Fellow for Weapon Integration

Kurt Chankaya has over 35 years of experience in the U.S. aerospace industry, working on programs such as the F-16, the National Aerospace Plane (X-30), the Japanese F-2 and the F-35 at Lockheed Martin. He is the Lockheed Martin Fellow for Weapon Integration, where he leads various projects and applied research into weapon integration in the Advanced Development Programs called the Skunk Works®. He has been awarded six patents and has a bachelor's degree in mechanical engineering from Lehigh University and a master's degree in aeronautical engineering from Princeton University.



Dr. Teresa Clement

Strategic Technology Teaming and Transitions Lead, Raytheon Technologies

Dr. Teresa Clement has a doctoral degree in materials science engineering of nanomaterials. She has spent 15 years at Raytheon Technologies, and as Raytheon Missiles & Defense's (RMD) teaming and transitions lead, she proactively shapes teaming opportunities to address technology needs and fill capability gaps in RMD's future technologies roadmaps. Her team supports the development of new technology capabilities, specifically by partnering with customers and peers in the defense industrial base on strategic technology projects aimed at tech transition and insertion into Raytheon's products. Clement fosters collaborative innovation and believes teaming and transition can come from anywhere — from defense-related incubators and startup companies via small business innovative research to the DOD Manufacturing Technology enterprise and other advanced manufacturing innovation institutes, especially including teaming in applied technology consortia like UCAH.



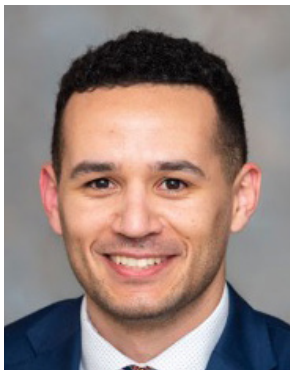
Dr. James LaManna

Senior Manager, Research and Development, Technical Fellow, Northrop Grumman

Dr. James LaManna is a Northrop Grumman technical fellow, a subject matter expert in materials and processes (M&P) for aerospace applications and a developer of high-temperature composite materials. He has supported many programs for both NASA and the DOD over the years. Notably, he was the chief M&P engineer overseeing all materials selected for the NASA Orion launch abort system attitude control motor. He is currently the senior manager of research and development for Northrop Grumman's Propulsion Systems and Controls facility in Elkton, Maryland. LaManna

holds bachelor's, master's and doctoral degrees in materials science and engineering from the University of Tennessee, Knoxville.

Panel: Meeting the Workforce Challenge Across the Hypersonic Community



Dr. Mark Gragston

Assistant Professor, University of Tennessee Space Institute (UTSI)

Dr. Mark Gragston is an assistant professor at the UTSI. His research focuses on the application and development of aerodynamic measurement technology for use in high-speed flow measurement and characterization. He joined the faculty at UTSI in 2018 to aid in the development of laser and optical diagnostics capabilities for the hypersonic research efforts of the UTSI High-Speed Original Research and Innovation Zone (HORIZON) research group. He has worked collaboratively with several aerospace research entities, such as the Air Force Research Laboratory (AFRL), CUBRC

and NASA. During his doctoral studies, Gragston was awarded a Tennessee Space Grant Consortium Graduate Fellowship, a Best Student Paper Award in Aerodynamic Measurement Technology at AIAA SciTech 2018 and two provisional U.S. patents related to imaging and laser diagnostics. He also was awarded Air Force Office of Scientific Research (AFOSR) summer faculty fellowships for 2020 and 2021 for work related to laser diagnostics.



Dr. Heather Kostak-Teplicek

Aeronautical Engineer, Lockheed Martin Skunk Works®

Dr. Heather Kostak-Teplicek is an aeronautical engineer at Lockheed Martin Skunk Works®. She previously interned with the Johns Hopkins Applied Physics Laboratory, the AFRL and Lockheed Martin Missiles and Fire Control. Her graduate background was in experimental hypersonic testing and flight test for the Boundary Layer Transition and Boundary Layer Turbulence experiments. Kostak-Teplicek earned her bachelor's, master's and doctoral degrees in aerospace engineering from Texas A&M.



Lauren Lester

Graduate Student, University of Tennessee Space Institute

Lauren Lester is a graduate research assistant and current doctoral student in the HORIZON research group at UTSI. She received her bachelor's degree in mechanical engineering from the University of Tennessee, Knoxville, in December 2018, where she served on the WomEngineering Leadership Council as a student representative for the Department of Mechanical, Aerospace and Biomedical Engineering and was the president of the AIAA Knoxville chapter for the 2016-17 academic year. During her time at UTSI, Lester has utilized an extensive array of diagnostic techniques in the UTSI TALon wind tunnels focusing on diagnostic scale up to larger facilities and weather effects research. She is currently completing work on shock wave-boundary layer interactions through the support of ONR with the assistance of her advisor, Dr. Phillip Kreth.



Dr. Tom McManus

Research Mechanical Engineer, Air Force Research Laboratory

Dr. Tom McManus received bachelor's degrees in physics from DePaul University and aerospace engineering from Illinois Institute of Technology. He received a doctoral degree in mechanical engineering from Ohio State University focusing on advanced laser diagnostics development in the area of turbulent combustion. Afterward, he was a National Research Council Postdoctoral Fellow with the AFRL at the Wright Patterson Air Force Base. That led to his current full-time position as a research mechanical engineer with the AFRL at Arnold Air Force Base. He has been at this current position for nearly a year and a half, and his research focuses on advanced optical and laser-based diagnostics in the area of hypersonic aerodynamics and propulsion.



Zachary Priessman

Senior, The Pennsylvania State University

Zachary Preissman is a fourth-year aerospace engineering student at The Pennsylvania State University and is minoring in Spanish and engineering leadership development. He is from Bucks County, Pennsylvania. Last year, he was elected president of Sigma Gamma Tau, the national aerospace engineering honor society, for the 2022-23 academic year. He has a passion for aerospace and chose the major due to the endless possibilities for growth in the industry. He wants to be a catalyst for the next generation of space exploration and development.



Allison Rzepka

Doctoral Student, University of Illinois-Urbana Champaign

Allison Rzepka is a graduate research assistant and a third-year doctoral student at the University of Illinois-Urbana Champaign, where she is part of the Computational Kinetics Group and the Center for Hypersonics and Entry System Studies. Her research focus is computational modeling of composite materials under hypersonic conditions. She also serves as co-director of the UCAH student association.



Dr. John Schmisser

Moderator, Executive Director, University of Tennessee- Space Institute

Dr. John Schmisser became the executive director of UTSI in August 2022. Prior to his appointment, he served as the H.H. Arnold Chair and B.H. Goethert Professor in the University of Tennessee, Knoxville, Department of Mechanical, Aerospace and Biomedical Engineering since 2014. During that time, he taught and led research at the UTSI. Prior to joining the faculty, Schmisser was the chief of the Energy, Power and Propulsion Sciences Division and program manager for AFOSR. During his tenure at AFOSR, Schmisser initiated and led a national strategic research plan that has guided the research efforts of multiple federal agencies and championed the transition of basic research capabilities that have advanced flagship national hypersonics technology programs and transformed test and evaluation capabilities. He envisioned the Hypersonic International Flight Research Experimentation (HIFiRE) program, which unified the efforts of AFRL, NASA and the Australian Defence Science and Technology Organisation (DSTO) to advance fundamental hypersonic science and technology via flight research. He is active within the professional community, including having served as chair of the AIAA Fluid Dynamics Technical Committee and a NATO Science and Technology Organization working group. Schmisser earned his bachelor's degree in 1990 and his master's degree in 1992 in aerospace engineering from The University of Texas at Austin and his doctoral degree in 1997 in aeronautics and astronautics from Purdue University. He is a fellow of AIAA (2012) and AFRL (2013) and is the 2008 recipient of the Air Force Science and Engineering Award in Research Management.

Panel: Bringing Department-wide Efforts Under One Direction for the Nation



Dr. Thomas Corke

Clark Chair Professor in Engineering at University of Notre Dame, Director, Hypersonic Systems Initiative

Dr. Thomas Corke joined the University of Notre Dame in 1999 and is the Clark Chair Professor of Engineering. He is the founding director of the Notre Dame Center for Flow Physics and Control. His research experience is unusually diverse, ranging from hydrodynamic stability and transition to turbulence and fully turbulent flows. It involves an equally diverse range of flow fields, including boundary layers, wakes and jets. This has been applied to an exceedingly broad range of applications, including aerodynamic performance enhancement, flight control, the internal flow of gas-turbine engines, acoustic noise control and wind flows around buildings and structures. He has extensive experimental experience over the full range of Mach numbers from incompressible to hypersonic. His research also includes computational fluid dynamics, especially regarding acoustic receptivity and in support of his pioneering research on dielectric barrier discharge plasma actuators. His research has made him a highly sought speaker for specialist conferences and industry.



Mary Jo Long-Davis

Deputy Project Manager, NASA's Hypersonic Technology Project

Mary Jo Long-Davis has worked for 33 years at the NASA Glenn Research Center. She received a bachelor's degree and master's degree in mechanical engineering from the University of Akron. She was hired as a research engineer into the Inlet and Nozzle Technology Development branch in 1989 to perform primarily experimental work. From 1996 to 2006, she served as a project manager in support of the Aeronautics Research Mission Directorate (including the High-Speed Research Program, the Ultra-Efficient Engine Technology Program and the Fundamental Aeronautics-Supersonics Project). She served for 14 years as the chief of the Inlet and Nozzle Branch within the Aeropropulsion Division from 2006-20 and has been serving as the deputy project manager for NASA's Hypersonic Technology Project since August 2020. She is an associate fellow of AIAA. She is proud to have received NASA's Outstanding Leadership Medal, an Exceptional Achievement Medal, the Glenn Federal Women's Program Award for contributions to the advancement of women and an AIAA Special Service Award.



Dr. R. Scott McEntire

Deputy Director of the Integrated Military Systems Center, Senior Manager of the Pathfinder Technologies group, Sandia National Laboratories

Dr. R. Scott McEntire is currently a deputy director of the Integrated Military Systems Center and the senior manager of the Pathfinder Technologies group at Sandia National Laboratories. In these roles, he leads teams to develop autonomous hypersonic systems, navigation, guidance and controls technologies, reinforcement learning applications for military systems, automated target recognition approaches and precision geolocation methods. McEntire has a doctoral degree from the University of New Mexico in mechanical engineering and was formerly a National Security Fellow at the Harvard Kennedy School for the 2015-16 academic year. He has 20 years of experience in weapons systems. Prior to joining the Harvard Kennedy School, he managed the fuzing and instrumentation technologies department at Sandia National Laboratories. This department improved national security by ensuring research, development and delivery of robust fuzing, firing and instrumentation technologies for both conventional and nuclear weapon systems.



Michael McKenna

Systems Engineer, Missile Defense Agency

Michael McKenna works at the Missile Defense Agency in the directorate for Systems Survivability Engineering, focusing on the coordination and delivery of learning opportunities in the fields of natural and human-made radiation and its impact on system performance. McKenna also serves as a co-lead on the Strategic Radiation Hardened Electronic Council Workforce Development Working Group, where he works to extend educational opportunities to the larger community and foster relationships to collaboratively address knowledge gaps. McKenna's passion to make educational material more accessible to those entering the field stems from the lack of material available to him when he first joined the field in 2019.



Dr. Lori Stiglitz

Moderator, Workforce Development Lead, JHTO Systems Engineering Field Activity

Dr. Lori Stiglitz is the workforce development lead for the JHTO, SEFA based at NSWC Crane. She is dedicated to growing and training the present and future hypersonics workforce with strategies that will build a continuous pipeline of available manpower for all levels of research, development, and for industry and DOD hypersonic careers. Her focused concentration is on building bridges of success in STEM for K-12, university students and researchers, and active employees from trades through engineering and science experts. Stiglitz has led multiple education districts as

superintendent with a focus on her expertise in STEM expansion, educational law and finance, leading 300+ staff in training and development. She was the national education director for STEM SeaPerch Robotics with ONR SeaPerch and the AUVSI.

Session: Highlights from UCAH 2020-2021 Research (Selected Briefs)



Dr. Kareem Ahmed

Professor, University of Central Florida

Research Title: High-Performance Solid-Fuels for Hypersonic Air Breathing Propulsion

Dr. Kareem Ahmed is a professor at the University of Central Florida (UCF) and a faculty member of both the Center for Advanced Turbomachinery and Energy Research and the Florida Center for Advanced Aero-Propulsion. Before joining UCF, he was a faculty member at Old Dominion University and Florida State University. Prior to that, he was a senior aerospace/thermo engineer at Pratt & Whitney Military

Engines working on advanced engine programs and technologies for the F-35 Lightning II and F-22 Raptor. At UCF, Ahmed leads creative and technologically crucial research in advanced propulsion and energy research focusing on hypersonic and supersonic turbulent reacting flows, deflagrations and detonations, high-speed compressible turbulent flows and advanced laser optical diagnostics. He has authored over 230 scholarly articles leading a large research group (26 students/post-docs) and graduated 62 students. He has received multiple awards, including an American Chemical Society Doctoral New Investigator grant, a Combustion Institute Distinguished Paper, a UCF Reach for the Stars Award, an NAE 2021 U.S. Frontiers of Engineering member, an AIAA associate fellowship, an AFOSR fellowship and an ONR fellowship.



Dr. Rodney Bowersox

Moderator, Associate Dean for Research, Ford I Professor of Aerospace Engineering, Texas A&M

Dr. Rodney Bowersox is the associate dean for research and Ford I Professor of aerospace engineering at Texas A&M. He received his bachelor's, master's and doctoral degrees in aerospace engineering from Virginia Polytechnic Institute and State University in 1988, 1990 and 1992, respectively. His research and teaching are focused on theoretical and experimental hypersonic viscous flows, scramjet flows, aerothermochemistry, non-equilibrium gas dynamics and wind tunnel design. He founded and directs the Texas A&M National Aerothermochemistry and Hypersonics Laboratory. His research program is sponsored primarily by the Air Force, Army, DOD, NASA, Navy and private industry. Bowersox is a DOD Vannevar Bush Faculty Fellow (2017-22) and a fellow of ASME and AIAA.



Dr. H.S. Uday Kumar

Associate Dean for Graduate Programs, Research and Faculty, Roy J. Carver Professor of Mechanical Engineering at University of Iowa

Research Title: Energetic materials selection and micro-structural design for robust performance under damage scenarios

Dr. H.S. Uday Kumar is the Roy J. Carver Professor of Mechanical Engineering and the associate dean for graduate programs, research and faculty at the University of Iowa. His research focus is on modeling and simulating a wide range of moving boundary problems in thermomechanical systems, ranging from phase change thermal storage, biomedical applications involving cardiovascular and gastrointestinal mechanics, energetic material dynamics in propulsion and munitions, and multiphase flows at all speeds. He has published over 150 journal articles in various topic areas of biomedical and mechanical engineering. He has been supported by grants from the NSF, the Whitaker Foundation, the National Institutes of Health, Veterans Affairs' Office of Research and Development and multiple concurrent grants from various DOD agencies.



Dr. Luca Maddalena

Professor at University of Texas at Arlington and Director, Aerodynamics Research Center (ARC)

Research Title: Experimental and Numerical Investigation of Directed Energy Radiation Interactions for Hypersonic Applications

Dr. Luca Maddalena is a professor of aerospace engineering and the director of ARC. He is responsible for research operations in the center's low-speed wind tunnel, transonic Ludwig tube tunnel, supersonic blow-down tunnel, detonation-driven shock tunnel and the 1.6-milliwatt arc jet facility, as well as pulsed and continuous detonation wave engine test cells. His research, primarily experimental, focuses on fundamental investigations of mixing and combustion in turbulent supersonic flows and their application to hypersonic airbreathing propulsion, reusable thermal protection systems and thermal management for sustained hypersonic flight, advanced laser-based diagnostics applied to arc-jet flows and directed energy for counter hypersonics. Maddalena is a fellow of the Royal Aeronautical Society and an associate fellow of the AIAA. Maddalena has received his laurea degree (Italian post-secondary academic degree) in aerospace engineering from the Polytechnic University of Milan, Italy, and his doctoral degree in aerospace engineering from Virginia Tech.



Dan Marren

*Moderator, JHTO Lead for University Engagement and Workforce Development
Independent Contractor, Scientific Research Corporation*

Dan Marren is an independent contractor employed through the Scientific Research Corporation for the Test Resource Management Center. He advises on hypersonic test challenges and helps develop workforce development strategies for the organization. He is currently assigned to the director of defense research and engineering at JHTO, where he leads university engagement and workforce development strategies. Most recently, he has been leading the formation of UCAH.



Dr. Ellen Mazumdar

*Assistant Professor, Woodruff School of Mechanical Engineering at Georgia
Institute of Technology*

Research Title: Improving Radome Material Testing and Creating Mid-IR Calibrating Windows for Hypersonic Vehicle Applications

Dr. Ellen Mazumdar joined the Woodruff School of Mechanical Engineering at Georgia Tech in 2019. Her research group currently focuses on developing new sensor systems and diagnostic techniques for robotic, biomedical, combustion, fluid and hypersonic applications. Her group studies these physical phenomena using interdisciplinary tools including magnetostatics, spectroscopy, ultra-fast laser optics, digital holography, stochastic system identification, machine learning and mechatronics. Her previous experience includes a postdoctoral research position at the Engineering Sciences Center at Sandia National Laboratories in Albuquerque, New Mexico.



Dr. Samy Missoum

Professor, Aerospace and Mechanical Engineering Department, University of Arizona

Research Title: A Multifidelity Approach for the Construction of Surrogate Aerodynamic Databases

Dr. Samy Missoum is a professor in the aerospace and mechanical engineering department at the University of Arizona, where he leads the Computational Optimal Design of Engineering Systems Laboratory. He obtained his doctoral degree in mechanical engineering from the National Institute of Applied Sciences in Toulouse, France, in 1999, and was a post-doctoral research associate at Virginia Tech from 1999 to 2002. He is an expert in computational design optimization and probabilistic design. His main research area is the development of methods for the design optimization and uncertainty quantification of complex nonlinear systems. He served as an associate editor for the ASME Journal of Mechanical Design and is an associate fellow of AIAA.



Dr. Jonathan Rogers

Lockheed Martin Associate Professor of Avionics Integration at Georgia Institute of Technology

Research Title: Fault tolerant Adaptive Control for Hypersonic Vehicles

Dr. Jonathan Rogers is an associate professor in the Guggenheim School of Aerospace Engineering. Prior to his appointment in the school of aerospace engineering, Rogers served as a faculty member in the School of Mechanical Engineering at Georgia Tech and the Department of Aerospace Engineering at Texas A&M. Rogers is director of the Aerial Robotics and Experimental Autonomy Lab at Georgia Tech where his group conducts research in applied dynamics, controls, robotics and autonomy. Through a combination of theoretical and applied research, Rogers has developed groundbreaking new technologies in a variety of areas from rotorcraft and smart weapons to stochastic optimal control. He is the recipient of the NSF CAREER Award and the Lockheed Martin Inspirational Young Faculty Award. His work has been featured by MIT Technology Review, Engadget, BBC news, and IEEE Spectrum.

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