



U.S. AIR FORCE SCIENCE AND TECHNOLOGY 2030

January 18, 2018 - 2101 Constitution Ave. NW, Washington, DC 20418

1230 – 1235 Auditorium opens and attendees take their seats

1235 – 1245 Welcome and Opening Remarks

Dr. Dan Mote, President of the National Academy of Engineering (NAE)

1245 – 1255 Introduction of Plenary Session

Maj. Gen. William T. Cooley, Commander, Air Force Research Laboratory

1255 – 1310 Hon. Paul Kaminski, CEO of Technovation, Inc.

"How S&T (Built on the Von Karman Foundation) Enabled the Offset 2 Strategy"

1310 – 1330 Prof. Jennifer A. Lewis, Harvard University

"3D Multi-Material Additive Manufacturing"

1330 – 1340 Break

1340 – 1350 Introduction of the Keynote Speaker

Gen. Stephen W. Wilson, Vice Chief of Staff of the U.S. Air Force

1350 – 1410 Keynote Speaker

The Honorable Heather Wilson, Secretary of the United States Air Force

1410 – 1425 Question and Answer Forum

1425 – 1430 Closing Comments

Maj. Gen. William T. Cooley, Commander, Air Force Research Laboratory

1430 – 1530 Social Hour

HEATHER WILSON is the 24th Secretary of the Air Force and is responsible for the affairs of the Department of the Air Force, including the organizing, training and equipping and providing for the welfare of 660,000 active-duty, Guard, Reserve, and civilian forces as well as their families. She oversees the Air Force's annual budget of more than \$132 billion and directs strategy and policy development, risk management, weapons acquisition, technology investments and human resource management across a global enterprise. Wilson has more than 35 years of professional experience in a range of leadership and management roles in the military, higher education, government and private industry. Before assuming her current position, Wilson was president of the South Dakota School of Mines & Technology, an engineering and science research university. From 1998 to 2009, Wilson was a member of the U.S. House of Representatives, where she served on the House Armed Services Committee, the House Permanent Select Committee on Intelligence and the House Energy and Commerce Committee. Before being elected to Congress, Wilson was a cabinet secretary in New Mexico's state government responsible for foster care, adoption, juvenile delinquency, children's mental health and early childhood education. From 1989 to 1991, Wilson served on the National Security Council staff as director for defense policy and arms control for President George H.W. Bush during the fall of the Berlin Wall and the collapse of the Warsaw Pact. From 1991 to 1995, and again from 2009 to 2013, Wilson was in the private sector. In 1991 she founded Keystone International, Inc., a company that did business development and program planning work for defense and scientific industry. She served as a senior advisor to several national laboratories on matters related to nuclear weapons, non-proliferation, arms control verification, intelligence and the defense industrial base. Wilson also served on the boards of two publicly traded corporations as well as numerous advisory and non-profit boards. Wilson was an Air Force officer from 1982 to 1989. She graduated from the U.S. Air Force Academy in the third class to include women, and earned her master's and doctorate degrees as a Rhodes Scholar at Oxford University in England. Wilson was a collegiate rower at Oxford and is an instrument-rated private pilot.

GEN. STEPHEN W. "SEVE" WILSON is Vice Chief of Staff of the U.S. Air Force, Arlington, Va. As Vice Chief, he presides over the Air Staff and serves as a member of the Joint Chiefs of Staff Requirements Oversight Council and Deputy Advisory Working Group. He assists the Chief of Staff with organizing, training, and equipping of 660,000 active-duty, Guard, Reserve and civilian forces serving in the United States and overseas. Gen. Wilson received his commission from Texas A&M University in 1981. He's had multiple flying tours, and led bomber, intelligence, surveillance and reconnaissance, mobility, aeromedical evacuation and airborne command and control operations supporting operations Iraqi Freedom, Enduring Freedom and Combined Joint Task Force-Horn of Africa. General Wilson has also held numerous command positions, including the Joint Functional Component Commander for Global Strike and Air Force Global Strike Command. General Wilson is a command pilot with more than 4,500 flying hours and 680 combat hours. Prior to his current assignment, the general was Deputy Commander, U.S. Strategic Command, Offutt Air Force Base, Nebraska.

C.D. MOTE, JR. is president of the National Academy of Engineering and Regents' Professor on leave from the University of Maryland, College Park. Dr. Mote is a native Californian who earned his BS, MS, and PhD degrees at the University of California, Berkeley in mechanical engineering between 1959 and 1963. After a postdoctoral year in England and three years as an assistant professor at the Carnegie Institute of Technology in Pittsburgh, he returned to Berkeley to join the faculty in mechanical engineering for the next 31 years. Fifty-eight PhD students earned their degrees under his mentorship. In 1998 Dr. Mote was recruited to the presidency of the University of Maryland, College Park, a position he held until 2010 when he was appointed Regents' Professor. His goal for the university was to elevate its self-expectation of achievement and its national and global positions through proactive initiatives. During his tenure the number of Academy members on the faculty tripled, three Nobel laureates were recognized, and an accredited school of public health and a new department of bioengineering were created. The NAE elected him to membership in 1988 and to the positions of Councillor (2002–2008), Treasurer (2009–2013), and President

for a six-year term beginning July 1, 2013. He has served on the NRC Governing Board Executive Committee since 2009. Dr. Mote's recognitions include the NAE Founders Award, the American Society of Mechanical Engineers Medal, and the Humboldt Prize of the Federal Republic of Germany. He is an honorary fellow of the American Society of Mechanical Engineers, honorary member of the American Society for Engineering Education, and fellow of the American Academy of Arts and Sciences, American Academy of Mechanics, Acoustical Society of America, and American Association for the Advancement of Science. He holds four honorary doctorates and three honorary professorships. Dr. Mote was elected to the Chinese Academy of Engineering in 2015 and as an honorary academician of the Academia Sinica, Taiwan in 2016. As president of the NAE Dr. Mote is committed to ensuring highly competitive talent in the US engineering workforce, facilitating public understanding of engineering, demonstrating how engineering creates a better quality of life and engaging the academy in global engineering issues in support of national interests.

JENNIFER A. LEWIS is the Hansjörg Wyss Professor of Biologically Inspired Engineering at the Harvard John A. Paulson School of Engineering and Applied Sciences. She is also a Core Faculty Member at the Wyss Institute for Biologically Inspired Engineering at Harvard. She earned a Sc.D. in Ceramic Science from the Massachusetts Institute of Technology. She has received numerous distinctions, including the NSF Presidential Faculty Fellow Award, the Brunauer Award from the American Ceramic Society, the Langmuir Lecture Award from the American Chemical Society and the Materials Research Society Medal. She is a Fellow of the American Ceramic Society, the American Physical Society, the Materials Research Society, and the American Academy of Arts and Sciences. She serves on the Editorial Advisory Boards of Advanced Functional Materials and Soft Matter. She has authored 120 papers and holds eight patents. Jennifer has made pioneering contributions to the directed assembly of soft functional materials. Her work integrates materials synthesis, complex fluids, microfluidics, and robotic assembly to design and pattern functional materials with controlled composition and architecture on multiple length scales (~100 nm - 1 mm). These novel materials may find potential application as printed electronics, waveguides, and 3D scaffolds and microvascular architectures for cell culture and tissue engineering. To date, Jennifer and her team have developed new classes of concentrated colloidal, fugitive organic, polymer, hydrogel, and sol-gel inks for pen-on-paper, inkjet, roll-to-roll and 3D printing. To expedite the transformation of 3D printing from a prototyping to a manufacturing platform, her team has recently demonstrated high throughput printing of multiple materials via multinozzle arrays. Given the broad applications of this research, Jennifer's work crosses into many areas of translational research, including Adaptive Material Technologies, Bioinspired Robotics, Biomimetic Microsystems, Anticipatory Medical & Cellular Devices and Programmable Nanomaterials. Additionally, she has been actively engaged in Science, Technology, Engineering, and Mathematics (STEM) education and outreach for nearly two decades.

The Honorable **PAUL G. KAMINSKI** is Chairman and CEO of Technovation, Inc., a small consulting company dedicated to fostering innovation, and to the development of business and investment strategies related to the application of advanced technology in the aerospace and defense sectors. Dr. Kaminski served as the Under Secretary of Defense for Acquisition and Technology from October 3, 1994 to May 16, 1997. His government experience includes a 20-year career as an officer in the U.S. Air Force, Director for Low Observables Technology, with responsibility for overseeing the development, production and fielding of major "stealth" systems (e.g., F-117, B-2), and the initial development of a National Reconnaissance Office space system and related sensor technology. He has served as a consultant and advisor to a wide variety of government agencies, including the MIT Lincoln Laboratory, and as chairman, director or trustee of several defense and technology oriented companies. Dr. Kaminski has served on several advisory boards including the President's Intelligence Advisory Board, the Director of National Intelligence Senior Advisory Group, and the National Academies Air Force Studies Board. He is a Director of MITRE, Bay Microsystems, CoVant Technologies, LGS Innovations, the Johns Hopkins Applied Physics Lab, and the USAF Academy Endowment. He is a member of the National Academy of Engineering and has received several

awards including the National Medal of Technology, Department of Defense Medal for Distinguished Public Service, Legion of Merit with Oak Leaf Cluster, Air Force Academy 2002 Distinguished Graduate Award, and the SPIE Lifetime Achievement award, and the Air Force Systems Command Scientific Achievement Award. He has been recognized as a Pioneer of National Reconnaissance and a Pioneer of Stealth.

MAJ. GEN. WILLIAM T. COOLEY is the Commander, Air Force Research Laboratory, Wright-Patterson Air Force Base, Ohio. He is responsible for managing a \$2.5 billion Air Force science and technology program and an additional \$2.3 billion in externally funded research and development. He is also responsible for leading a government workforce of approximately 6,000 people in the laboratory's nine component technology directorates and the 711th Human Performance Wing. General Cooley entered the Air Force in 1988 through the ROTC program after graduating from Rensselaer Polytechnic Institute with a degree in mechanical engineering. He entered active duty in January 1990 after completing a master's degree from the University of New Mexico, and went on to earn a Doctorate of Philosophy in engineering physics from the Air Force Institute of Technology. General Cooley served in a variety of technical management, leadership and staff positions including commanding at the group and wing level. His assignments include Director, Global Positioning Systems (GPS) Directorate, Space and Missile Systems Center, Air Force Space Command; Commander, Phillips Research Site and Materiel Wing Director, Space Vehicles Directorate, Air Force Research Laboratory; System Program Director for operational command and control programs; Program Manager, Air Force Distributed Common Ground System; Defense Sector Program Manager, Office of Security Cooperation-Afghanistan, Kabul; Program Element Monitor for Military Satellite Communications, and staff officer at the Warrior Preparation Center, Einsiedlerhof Air Station, Germany. Prior to assuming command, he was the Program Executive for Programs and Integration, Missile Defense Agency, Redstone Arsenal, Alabama.

About the Air Force Studies Board

Since 1996, the Air Force Studies Board (AFSB) has served as a convening venue for the discussion of a diverse set of topics of importance to the U.S. Air Force. In collaboration with Air Force leadership, the board develops various program activities related to the development and application of science and technology within the Air Force. These activities involve convening leading experts to participate in consensus studies, workshops, roundtables and expert meetings. Recently, these studies have addressed strategic topics on experimentation and prototyping, defending against hypersonic weapons, and assuring the future scientific and technical qualifications of Air Force acquisition personnel. Learn more about the AFSB at nas.edu/afsb.

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