2025 Annual AsMA & UHMS Plenary Lectures

70th Louis H. Bauer Lecture

Jeffrey R. Davis, M.D., MS

"Open Innovation at NASA: Good Ideas Can Come from Anywhere"

Dr. Davis has served aviation and space medicine for 20+ years. He is board certified in aerospace medicine and has served in the following roles: Branch Chief of Medical Operations at NASA; Corporate Medical Director of American Airlines; Professor and Residency Director of Aerospace Medicine at the University of Texas Medical Branch; and as Director of Space and Life Sciences at the NASA Johnson Space Center. He has served as the Chair of the American Board of Preventive Medicine. His awards include an Outstanding Leadership Medal and Silver Snoopy at NASA, and the Louis H. Bauer Founders Award from the Aerospace Medical Association.

Eric P. Kindwall Memorial Lecture

Shai Efrati, M.D.

"The Sagol Center for Hyperbaric Medicine: Experience with Treating Israel Defense Forces (IDF) Soldiers"

Dr. Shai Efrati is a professor at Tel Aviv University's Sackler School of Medicine and the Sagol School of Neuroscience. He also serves as the director of the Sagol Center for Hyperbaric Medicine and Research at Shamir Medical Center in Israel, where he leads the world's largest hyperbaric treatment center, treating over 350 patients daily.

11th Eugen G. Reinartz Memorial Lecture

Mark N. Sirangelo, Ph.D.

"Commercial Space, Human Spaceflight, the ISS, and the U.S. Return to the Moon"

Dr. Mark N. Sirangelo currently is the Scholar in Residence for Space, Aerospace and Engineering at University of Colorado. He is also on the Tuskegee University Aerospace Advisory Board and is a visiting professor at Syracuse's Maxwell School of Citizenship and Public Affairs. He has over a two-decade industry executive career. In addition to academia, he provides industry advisory and board services through his company QuanStar Advisors, LLC. He holds Bachelor of Science, Master in Business Administration, and Doctorate degrees and has served as a U.S. Army officer.

In the space industry, Dr. Sirangelo was the founding executive and head of Sierra Nevada Space Systems for over ten years until 2018. Previously, he was the Chairman and Chief Executive Officer of SpaceDev, a publicly traded commercial space company that he grew from an early stage until its merger with Sierra Nevada Corporation. SpaceDev and SNC had many space firsts, including being on the inaugural winning X-Prize team and the design, build, launch, and operation of the first small satellites. He was a founding member and past Chairman of the Commercial Spaceflight Federation, which currently represents more than eighty-five space organizations. He has been inducted as a Fellow of the American Institute of Aeronautics and Astronautics and served on the executive board of the Aerospace Industries Association.

Dr. Sirangelo served for 3 years as the Chief Innovation Officer of the State of Colorado, a cabinet-level position. He is the most recent past Chairman of the U.S. Department of Defense's Defense Innovation Board, which provides advice to the office of the Secretary of Defense, and the founding and past Chair of the DoD's Space Advisory Committee. Previously, he completed an assignment as Special Assistant to the NASA Administrator helping to develop NASA's return to the Moon.

Dr. Sirangelo and his organizations have been recognized with numerous corporate and personal awards. These include being inducted into the Space Foundation's and NASA's Technology Hall of Fame, the World's Top 10 Innovative Space Companies by Fast Company, being named Manufacturer Builder of the Year by *ColoradoBiz* magazine, Best Place to Work by the *Denver Business Journal*, *Inc.* Magazine's top 200 companies, Defense Industry's Fast Track 50, Deloitte's Fast Track 500, and selected as a finalist in Ernst & Young's Entrepreneur of the Year.

Christian J. Lambertsen Memorial Lecture

Chris Lemons

"Last Breath - Reasoning with LIfe and Death at the Bottom of the North Sea"

Chris has been a commercial diver and supervisor for over 18 years, and currently specializes in deep sea saturation diving, operating almost exclusively in the oil and gas industry.

This highly specialized form of diving involves living in the claustrophobic confines of a decompression chamber for up to 28 days at a time, commuting daily to the seabed in a diving bell, and working at depths of up to 900 ft for 6 hours at a time.

In September of 2012, a freak failure of the dynamic positioning system of the vessel he was working under resulted in the umbilical which provides him with breathing gas, light, and heat being severed completely. He was left on the seabed, in complete darkness 300 ft below the surface, with only the 5 minutes of breathing gas he carried in the emergency tanks on his back, and no way to protect himself from the freezing temperatures.

It took his heroic rescuers over 40 minutes to come back and fetch him, and his miraculous survival story has baffled experts ever since. His extraordinary story was subsequently immortalized in the hit Netflix/BBC documentary 'Last Breath,' a version of which was developed into a Hollywood movie starring Woody Harrelson, Simu Liu, and Finn Cole and was released in February 2025.

Harry G. Armstrong/George B. Hart Memorial Lecture

Joseph Dervay, M.D., MPH, MMS; Richard Moon, M.D., CM, FRCPC, FACP, FCCP; Michael Gernhardt, Ph.D.; Jon Clark, M.D., MPH; and Mitch Garber, M.D., MPH, MSME

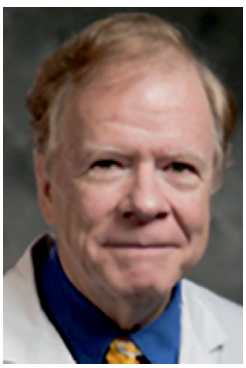
Panel: "Pressure Perils from Undersea to Outer Space"

Dr. Joseph Dervay is currently a flight surgeon at the NASA Johnson Space Center, having served there over 27 years. Completing undergraduate studies at Cornell University and a Doctor of Medicine at Syracuse-Upstate Medical Center, he then trained to become a Navy Flight Surgeon, serving aboard the aircraft carrier USS *John F. Kennedy*.

Dr. Dervay has served as crew surgeon for a multitude of missions, encompassing Space Shuttle, long-duration International Space Station, and Commercial Crew, including support of the 2020 NASA/SpaceX Demo-2 test flight as the first Commercial Crew mission. His roles have included work in Russia at the Star City Cosmonaut training center and support of crewmembers during Soyuz launch and landing activities in Kazakhstan.

Dr. Dervay has completed an Emergency Medicine Residency in Washington, DC, at The George Washington University and both a Space Medicine Fellowship and Aerospace Medicine Residency at the University of Texas Medical Branch at Galveston/NASA and Hyperbaric Medicine training at the University of Texas Health Science Center in Houston. He is board certified in Emergency, Aerospace, and Undersea and Hyperbaric Medicine.

In addition to wide-ranging operational duties, Dr. Dervay has contributed to a wide range of research and development efforts in Aerospace Medicine, becoming one of the world experts in EVA physiology and prebreathe protocol development and authoring widely read book chapters and original publications on EVA medicine and physiology. A Fellow of AsMA, he served as President in 2023-2024 and was inducted into the International Academy of Aviation & Space Medicine.



Dr. Richard Moon earned B.Sc. and M.D. degrees at McGill University. He trained in internal medicine and biomedical engineering at the University of Toronto, then in pulmonary and critical care medicine, followed by anesthesiology at Duke University. He joined the Duke University faculty in 1983. He is Professor of Anesthesiology, Professor of Medicine, and Medical Director of the Duke Center for Hyperbaric Medicine & Environmental Physiology. His research has included physiology of immersion and predictors of arterial PCO_2 during underwater exercise. He has been particularly interested in causes and prevention of immersion pulmonary edema, use of an experimental breathing gas (perfluoromethane) to decrease decompression requirements after heliox dives, mechanisms of death during triathlons, causes of perioperative opioid-induced respiratory depression, and improved monitoring techniques for monitoring patients to detect it. His awards include the Mentorship Award from the AMA-Women Physicians Congress Physician Mentor Recognition Program, Leonard Palumbo Jr, M.D., Faculty Achievement Award for compassionate patient care and excellence in the teaching and mentoring of young physicians, Duke awards for Excellence in Medical Student Education, and two awards as Duke Anesthesiology Teacher of the Year.

Dr. Michael Gernhardt is a veteran NASA astronaut, engineer, and scientist with a career spanning ocean engineering, human physiology, and spaceflight systems. He holds a B.S. in Physics from Vanderbilt University and both an M.S. and Ph.D. in Bioengineering from the University of Pennsylvania, where he developed a novel decompression model based on tissue bubble dynamics. While earning his doctorate, he worked as a commercial deep-sea diver and project engineer logging over 700 dives in challenging environments, including saturation and mixed-gas operations. During this time, he contributed to the development of new decompression tables and technologies for subsea applications.

Dr. Gernhardt later became Vice President of Special Projects at Oceaneering International and in 1988 founded Oceaneering Space Systems to transfer subsea technology to the space program. Selected as a NASA astronaut in 1992, he flew four space shuttle missions—STS-69, STS-83, STS-94, and STS-104—logging more than 43 days in space and conducting four spacewalks totaling over 23 hours. He was the first astronaut to perform an EVA from the International Space Station (ISS).

Dr. Gernhardt has led numerous NASA initiatives, including the Prebreathe Reduction Program, which developed safer, more efficient EVA protocols critical to ISS construction. He also contributed to the design of EVA tools, portable life support systems, nitrox diving protocols, and four generations of pressurized rovers as well as serving in technical roles, including Capsule Commander (CAPCOM) at Mission Control, flight software tester, and project lead for the EVA Physiology, Systems, and Performance Project. He conceived and led the NEEMO undersea analog missions and co-led Desert RATS and Pavilion Lake projects simulating planetary exploration. His honors include four NASA Space Flight Medals, two Exceptional Service Medals, the NASA Exceptional Achievement Medal, and the NASA Distinguished Service Medal. Currently he is a senior director at Blue Origin.

Jonathan Clark is an adjunct Associate Professor of Neurology and Space Medicine at Baylor College of Medicine. He served 26 years on active duty with the U.S. Navy, and qualified as a Naval Flight Officer, Naval Flight Surgeon, Navy Diver, U.S. Army parachutist, and Special Forces Military Freefall Parachutist. His as-

signments included heading a research centrifuge facility and the Neurology and Hyperbaric Medicine divisions at the Naval Aerospace Medical Institute, where he treated diving and altitude decompression sickness and studied divers exposed to high intensity sonar. During Operation Desert Storm he was the 3rd Marine Air Wing Special Projects Officer responsible for Chem/Bio Defense Plan and the Sustained Operations Plan. He flew combat medical evacuation missions and was in the first air element into Kuwait City with the Marine Corps. He ran the aeromedical department at Marine Aviation Weapons & Tactics Squadron One and participated in Marine Recon and ANGLICO team HAHO and HALO jumps.

Dr. Clark worked at NASA from 1997 to 2005, was a Space Shuttle Crew Surgeon on six shuttle missions, Chief of the Medical Operations Branch, and a senior FAA Aeromedical Examiner (AME). He was a Member of the NASA Spacecraft Survival Integrated Investigation Team from 2004 to 2007 and a Member of the NASA Constellation Program EVA Systems Project Office Standing Review Board from 2007 to 2010. He was the Space Medicine Advisor for the National Space Biomedical Research Institute from 2005 to 2017. In 2008 he was an expedition physician supporting the Haughton Mars Project on Devon Island in the high Canadian Arctic. He was Chief Medical Officer for the orbital commercial space company Excalibur Almaz from 2007 to 2012, and Chief Medical Officer for the Inspiration Mars Foundation since 2013. He was Medical Director of the Red Bull Stratos Project, a manned stratospheric balloon freefall parachute flight test program, which on 14 October 2012 successfully accomplished the highest stratospheric freefall parachute jump (highest exit altitude) from 127,852 ft, achieving human supersonic flight (Mach 1.25) without a drogue chute at 843 miles per hour.

In 2012 Dr. Clark joined the StratEx Space Dive project as the lead flight surgeon and medical advisor, and this project culminated in the new high altitude exit freefall record of 135,890 ft and reaching Mach 1.22 at 822 mph in 2014. He currently is a consultant for Virgin Galactic, Heinlein Prize Trust, Paragon Space Development Corp, JAG Human Performance, Space Perspectives, Operator Solutions, and the Foundation for Aerospace Safety and Training. He is board certified in Neurology and Aerospace Medicine and is a Fellow of the Aerospace Medical Association. His professional interests focus on the neurological effects of extreme environments, crew survival, and resilience.

Dr. Mitch Garber is a physician and engineer with over 35 years of military and civilian experience in transportation accident investigation. He was the first (and for 15 years the only) full-time Medical Officer at the U.S. National Transportation Safety Board (NTSB). He has participated in well over 1000 investigations in all transportation modes and has presented testimony to Congress regarding medical issues in transportation accidents. He specializes in the investigation of medical concerns in transportation and other accidents, including the evaluation of pathology, toxicology, human performance, and biomechanics in accident investigation.

Dr. Garber has a B.A. in Psychology/Sociology from Duke University, his M.D. degree from Emory University School of Medicine, an MPH in Occupational and Environmental Medicine from the Harvard University School of Public Health, and an MSME (Master of Science in Mechanical Engineering) from the Georgia Institute of Technology (Georgia Tech).

Dr. Garber has addressed a wide range of medical and human factors issues in all transportation modes, including physical standards, fatigue, perception, medication use, visual impairment, obstructive sleep apnea, substance dependence, injury analysis, egress and evacuation concerns, ergonomics, and the effects of pre-existing disease on transportation operator performance, among others. Additional work specific to aviation has included investigations of hypoxia, spatial disorientation, and visual and vestibular illusions. He has often been called upon to evaluate the potential role of subtle cognitive impairment from a variety of causes in complex transportation accidents. He also has expertise in the optimization of ergonomics for customized office and industrial workstations. He has held a private pilot certification since 1996 and recently retired.

The Bauer Lecture was given on Monday, June 2, at 8:45 a.m. during Opening Ceremonies. Educational Support was provided by KBR.

The Kindwall Lecture was given on Monday, June 2, at 10:00 a.m.

The Reinartz Lecture was given on Tuesday, June 3, at 8:30 a.m. Support was provided by the Eugen Reinartz Memorial Fund.

The Lambertsen Lecture was given on Tuesday, June 3, at 10:30 a.m. Educational support was provided by the Office of Naval Research (ONR).

The Armstrong/Hart Lecture was given on Thursday, June 5, at 8:00 a.m. Eductional support was provided by Environmental Tectonics Corp., the Aerospace Medical Association, and the Undersea and Hyperbaric Medical Society.