

Michael A. Schmidt

Founder, CEO, and Chief Scientific Officer
Sovaris Aerospace

Dr. Michael A. Schmidt is the Founder, CEO, and Chief Scientific Officer of Sovaris Aerospace, a company focused on assessment and solutions (countermeasures) applied to humans in space and extreme environments on Earth. Dr. Schmidt is also co-chair of the Advanced Pattern Analysis & Countermeasures Group. His clinical and research work is focused on a systems engineering approach to complex problems of human performance in extreme conditions. He applies the same complexity models derived from space flight countermeasure development to biomarker discovery, predictive analytics, and personalized medicine paradigms on Earth, using a convergent variables approach.

Dr. Schmidt is co-developer of the personalized medicine program for the Corvette Racing Driver Science program and the 24 Hours of Le Mans racing series, and leads the precision medicine effort for selected teams (drivers, pit crews, etc.) within professional motor sports (NASCAR, etc.). He also directs the molecular profiling and countermeasures efforts for elite athletes ranging from NFL to NBA to Olympic athletes, S.W.A.T, and military Special Forces. Among these, he directed the molecular profiling and countermeasures effort for the Golden State Warriors, during their NBA record-setting 73-9 season in 2015-2016. He also works closely with the Nike Human Performance Division, advising on the molecular profiling & countermeasure efforts for NFL athletes.

These professional human performance efforts include targeted and untargeted integrated omics profiling, combined with molecular network-directed countermeasures. Dr. Schmidt applies these same approaches to work with the commercial space flight sector for orbital and suborbital space flight, as well as with private and government missions directed toward the human habitation of space (Moon, Mars, etc.). Dr. Schmidt has also co-directed a research ascent of [Mount Kilimanjaro](#) (expedition leader, Conrad Anker), studying the effects of altitude, hypobaric hypoxia, & targeted molecular countermeasures. He also led the Sovaris Aerospace selection as a member of the [FAA Center of Excellence for Commercial Space Transportation](#) (COE), and leads the Sovaris/COE ongoing human factors collaboration surrounding establishment of standards, assessment tools, and spaceflight countermeasures.

Dr. Schmidt did his doctoral (Ph.D.) research in Molecular Medicine and Biochemistry within the Life Sciences Division at NASA Ames Research Center (now the [Space Biosciences Division](#)) under NASA Ames' Chief Medical Officer Ralph Pelligra, M.D. His research was focused on human performance and molecular network changes in extreme conditions, such as prolonged hypergravity. In this work, his team (led by Malcolm Cohen, Ph.D., Chief of the

Human Information Processing Research Branch in the Human Factors Research and Technology Division at NASA Ames Research Center), conducted one of only two studies to [expose humans to 22 hours of continuous hypergravity](#) (elevated G forces by centrifugation) on [NASA's large radius, 20G human centrifuge](#).

Dr. Schmidt also did a fellowship at [NASA's Human Systems Integration Division](#), with an emphasis on [physiologic monitoring and countermeasures](#) aimed at raising human performance in extended microgravity, artificial gravity, sleep deprivation, night vision operations, pararescue, high altitude flight, and other stressors encountered in extreme environments. [His subsequent work utilized the NASA 20G long radius \(27.36 ft.\) and short radius \(8.36 ft.\) centrifuge](#) to quantify effects of different G levels, radii, and their resulting gravity gradients on body fluid distribution, cardiovascular regulatory responses, molecular networks, and the effect of lower limb exercise.

For his second doctorate, he received a Ph.D. in Neuroscience from Lancaster University (UK), with a focus on assessment and modification of neurotrophic molecular networks, emphasizing molecular network-directed countermeasures. This work formed the basis for his efforts to discover methods to protect the human brain from the radiation and isolation of deep space, in addition to facilitating neuroplasticity in humans on Earth, such as in combat operations and elite contact sports. This includes brain-focused radiation countermeasures work with elite tactical units. He has done additional studies at the Massachusetts Institute of Technology (data and models; artificial neural networks) and the University of Colorado (metabolomics).

Dr. Schmidt is certified as a Wilderness First Responder (WFR). He is also co-developing the *Spaceflight First Responder* and *Spaceflight Advanced Life Support* training and certification programs (in collaboration with Wilderness Medical Associates). The certifications are based on the principles of wilderness and rescue medicine, with an emphasis on the prevention and identification of medical emergencies, appropriate technology, and risk management in the isolated, austere, and extreme environment of space.

Dr. Schmidt is co-author of the paper, "Personalized Medicine in Human Space Flight: Using Omics Based Analyses to Develop Individualized Countermeasures that Enhance Astronaut Safety and Performance," published in the journal *Metabolomics* in 2013. The paper was featured by Springer Science Media, highlighting the most influential papers of 2013 and 2014.

In 2016 (*Metabolomics*), he co-authored, "Incorporation of Omics Analyses into Artificial Gravity Research for Space Exploration Countermeasure Development," along with Thomas J. Goodwin, Ph.D. (NASA Johnson Space Center) and Ralph Pelligra, M.D., (NASA Ames Research Center). In 2015, he presented an invited lecture at the NASA Human Research Program Integrated

Pathway to Mars Symposium, entitled “Protecting Neural Structures and Cognitive Function during Prolonged Space Flight by Targeting the Brain Derived Neurotrophic Factor Molecular Network.”

As part of the Metabolomics Society Precision Medicine & Pharmacometabolomics Task Group, he was a lead author of “Metabolomics Enables Precision Medicine” (Metabolomics 2016). This paper was the 2017 winner of the Best Review Award in Metabolomics. As part of the Precision Medicine group, he also published a seminal review paper on the use of precision methodologies in metabolomics entitled, “Preanalytical Processing and Biobanking Procedures of Biological Samples for Metabolomics Research” (Clinical Chemistry, 2018).

His textbook chapter, “Pharmacogenomics in Spaceflight: A Foundation of Personalized Medicine in Astronauts,” was published in *The Handbook of Space Pharmaceuticals*, Springer Nature 2019. His paper, “Why Personalized Medicine is the Frontier of Medicine and Performance for Humans in Space,” was published in June 2020 in the journal *New Space*, which is a special issue highlighting the work of the FAA Center of Excellence for Commercial Space Transportation. His paper, “The NASA Twins Study: The Effect of One Year in Space on Long-Chain Fatty Acid Desaturases and Elongases,” was published in April 2020 (*Lifestyle Genomics*).

Dr. Schmidt is a former advisor to the Rocky Mountain Regional Center of Excellence for Biodefense & Emerging Infectious Diseases Research, located at the Infectious Disease Research Complex at Colorado State University. This effort incorporated his work in complex molecular network analytics to develop countermeasures for improving human immune defenses, as a means of combating infectious disease in environments, such as spaceflight, wilderness, combat, conflict zones, and the clinical setting. He is also the author of *Beyond Antibiotics: Strategies for Living in a World of Emerging Infections and Antibiotic Resistant Bacteria*.

Over a ten year period, Dr. Schmidt trained in empathy-centered conflict resolution and mediation, under the late Dr. Marshall Rosenberg and his team (through the Center for Non-Violent Communication). Dr. Rosenberg was considered among the world’s innovators in developing collaborative systems and in resolving conflict in extreme conflict zones. Dr. Rosenberg had mediated in some of the most destabilized parts of the world, including Rwanda, Bosnia, East Timor, Iraq, and South Africa, as well as with organizations in need of dispute resolution. Dr. Schmidt has evolved these empathy-centric methods to support individuals in extreme or challenging performance environments, to build strong cohesive teams, and to facilitate collaboration. Exemplified in these efforts is his work leading the molecular profiling and countermeasure initiative for coach Jock Boyer and the Rwandan National Cycling team, in support of their emergence from the era of the genocide (See: [Rising from Ashes](#)). He is

refining these same methods to develop team cohesion in the isolation, confinement, and other psychological challenges of deep space.

Dr. Schmidt is a professional member of the Special Operations Medical Association, the Aerospace Medical Association (President, Life Sciences and Biomedical Engineering Branch), the Commercial Spaceflight Federation, the Society for Neuroscience, the Metabolomics Society, the Epigenetics Society, and the European Society for Translational Medicine. He is part of the Precision Medicine & Pharmacometabolomics Task Group of the Metabolomics Society. Dr. Schmidt is on the editorial board of the *European Journal of Molecular & Clinical Medicine* and is on the Advisory Board of the European Society for Translational Medicine. He is also on the curriculum development team for the Certification in Nutritional Genomics with the American College of Nutrition. In addition, Dr. Schmidt is the Chair of Medicine and Human Performance for the Geoversity School of Biocultural Leadership.

In 2020, Dr. Schmidt was awarded the Marie Marvingt Award for Excellence and Innovation in Aerospace Medicine by the Aerospace Medical Association. He is also the winner of the 2019 Research and Development Innovation Award from the Life Sciences and Biomedical Engineering Branch of the Aerospace Medical Association.

Dr. Schmidt is experienced in open water/ocean kayaking, alpine mountaineering, and high altitude research. He has also spent 25 years studying Orcas in the wild, which includes documentary film work.

He resides in Boulder, CO.