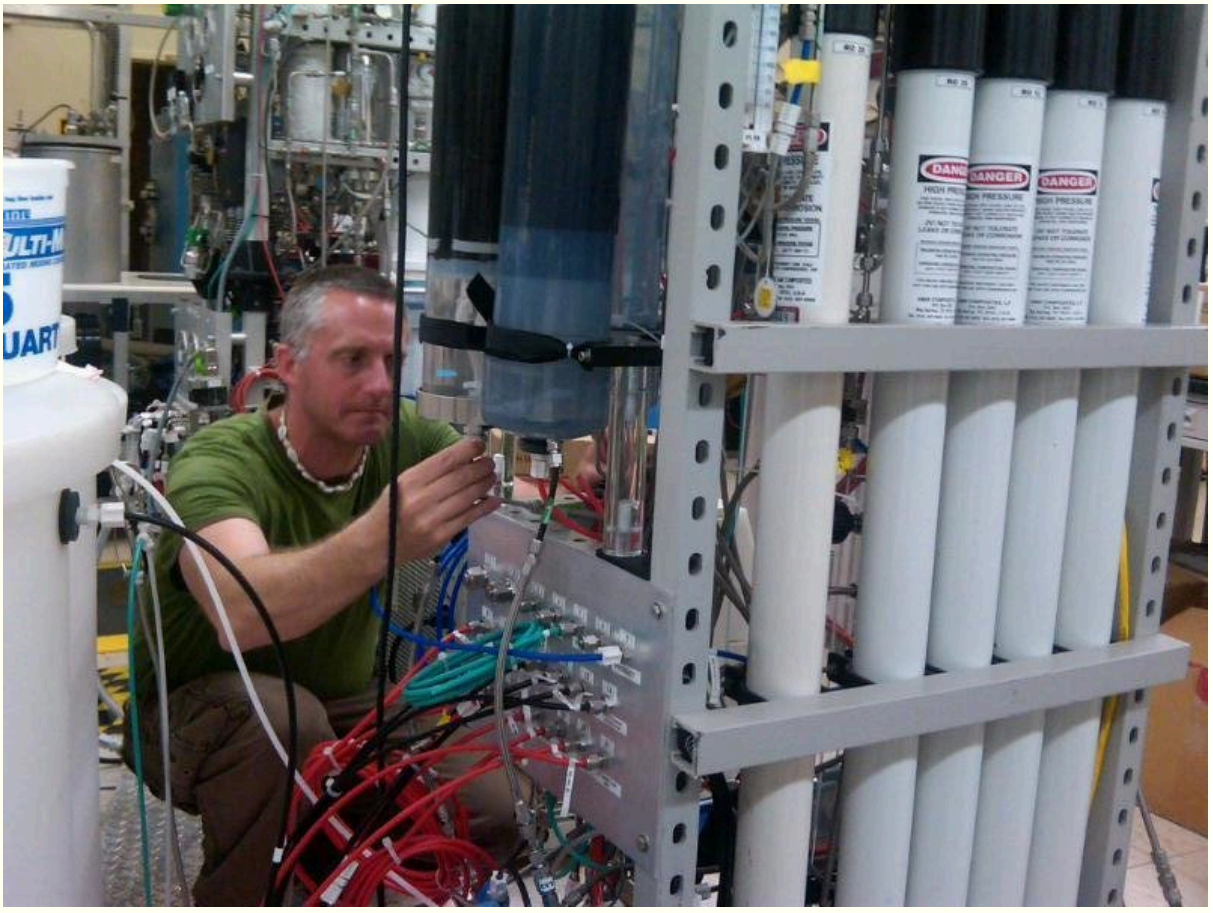
Seminar: Environmental Control and Life Support, the Long View



On 14th of August 14:15-14:45 KTH Space Center hosted its first space seminar of the school year.

This time Dr. Sherwin Gormly came to KTH to explore how we can keep humans alive in the most extreme environments—even on Mars. He spoke about the cutting-edge water recycling and life support systems making it possible, with insights that also have surprising benefits for life back on Earth.

Known as “The Urine King,” Sherwin Gormly is a former NASA researcher with over 30 years of experience developing cutting-edge water recycling systems for space. He is a senior advisor for Swedish company Hydromars and will, amomg other things, be talking about their current development efforts.

If you missed the seminar you can now watch it here !🚀

Environmental Control and Life Support Systems (ECLSS) are essential for sustaining human life beyond Earth’s atmosphere. These integrated systems manage critical functions such as air revitalization, water recovery, and waste recycling within closed habitats. They form the technological backbone for long-duration space missions and provide important models for advancing sustainable resource management on Earth.

In this lecture, Dr. Sherwin Gormly, Senior Advisor on Water ECLSS Engineering at Hydromars, provided a detailed, systems-level perspective on the design and operation of ECLSS. Drawing on decades of experience and data from spaceflight programs, including the International Space Station (ISS), Sherwin explored key engineering aspects such as metabolic mass balancing, system scalability, and the implementation of regenerative water technologies capable of supporting missions ranging from weeks to multiple years.

The talk covered critical trade-offs between expendable and regenerative components, the influence of gravity environments - from microgravity to lunar and Martian gravity - on system performance, and the use of modelingtechniques to optimize life support architectures for future space habitats.

Sherwin also presented Hydromars' current development efforts focused on lightweight, energy-efficient water recycling systems designed to enable continuous human presence in space. This discussion will highlight how advances in ECLSS engineering contribute to the broader goal of sustainable space exploration while inspiring innovation relevant to environmental challenges on Earth.

Sherwin Gormly is a veteran researcher formerly at NASA's Ames Research Center, where he led the NASA Water Recycle Laboratory for five years. With over 30 years of experience in Space Life Support (ECLSS) and regenerative water process research, Sherwin has hands-on expertise in the fabrication and engineering of ECLSS prototypes and flight experiment hardware, including membrane-based solutions for treating wastewater and urine in both microgravity and terrestrial settings.

Sherwin holds a PhD in Civil Engineering (Water Processes), is a Licensed Professional Engineer (PE), and previously served as a USAF Captain and launch officer. He has authored over 40 peer-reviewed publications, and earned the nickname "The Urine King", popularized by Packing for Mars by Mary Roach. He also contributed to NASA's technology innovation efforts, such as "Waterwalls for Life Support" (a 2017 NASA Invention of the Year Honorable Mention).