



MECHANICAL ENGINEERING SEMINAR

Tuesday, December 23, 2025 at 14:30, Lady Davis Building, Auditorium 250

Online: <https://technion.zoom.us/j/97631349012>

Making Large Dimensional Problems Small Again: from Bioinspiration to Robotic Application

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Hosted by: Profs. Alon Wolf and Amir Degani

Motion is all around us. Motion is particularly interesting when it has many degrees of freedom. This talk covers the design, sensing, and planning for snake, multi-agent and modular robot high DOF systems. Thus far, each system requires different fundamentals – geometric mechanics for snake robot locomotion, deferred planning and ergodic search for multi-agent systems, and novel generator and discriminator networks for modular robots – which will be covered in this talk. While no grand unifying theory combines these approaches, they all share one aspect in common: reduce complex high dimensional problems into low dimensional ones. In pursuit of this investigation in reduction, my group has created several embedded systems - actuators and edge sensors - to build and deploy robots that stress-tests the core assumptions in the theory and demonstrates efficacy for applications of national importance. These applications include minimally invasive surgery, urban search and rescue, manufacturing, assembly in low-Earth orbit, maintenance of municipal infrastructure, and agile recycling. This talk will discuss these confined space applications, and if time permits, the six spin off companies, and one manufacturing institute, which my colleagues and I co-founded to commercialize the core technologies covered in this talk.



Bio:

Howie Choset is the Kavčić–Moura Professor of Computer Science at Carnegie Mellon University's Robotics Institute, with joint appointments in Electrical and Computer Engineering, Mechanical Engineering, and Biomedical Engineering. He directs the Biorobotics Lab, where his research focuses on snake robots, medical and trauma robotics, and autonomy for robots operating in confined and unstructured environments. His work bridges foundational robotics theory with fielded and clinical systems addressing national priorities in medicine, manufacturing, search and rescue, infrastructure inspection, and space. This work led to six start-up companies and on federal manufacturing institute started by Choset and his students. Choset has also played a central role in shaping robotics education at Carnegie Mellon through the development of undergraduate programs and research initiatives. He is a Fellow of IEEE, AAAS, and AIAA and a recipient of numerous teaching and research awards recognizing sustained intellectual, educational, and real-world impact.