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iHealthtech
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"Innovating Health"

Distinguished Speaker Seminar Series

Prof Dr Metin Sitti

**President and Professor
Koç University, Turkey**



Wireless milli/microrobots for biomedical applications

7 JUL 2026, TUE, 4 PM - 5 PM

NUS, College of Design and Engineering, Building E7, Level 3, Seminar Room 4

Hosted by: Prof Lim Chwee Teck, iHealthtech Director

Wireless small-scale medical robots have the unique capability of navigating, operating and staying inside hard-to-reach, tight, risky and deep sites inside our body. This talk reports medical applications of our novel milli- and microscale wireless miniature medical devices and robots down to cell size that could achieve various minimally invasive medical functions, such as targeted active drug delivery, neural stimulation, clot opening, liquid biopsy, biofluid pumping, cauterization, and hyperthermia. Due to miniaturization limitations on on-board actuation, powering, sensing, computing and communication, new materials and methods need to be introduced in creating and controlling such robots. Moreover, they need to be tracked under medical imaging modalities, such as ultrasound, fluoroscopy, photoacoustic imaging, and MRI, for their precise and safe operation. 3D microprinting and assembly-based fabrication methods and biocompatible and multifunctional soft composites with embedded micro/nanomaterials are proposed to create novel medical milli/microrobots. Soft-bodied medical miniature robot designs enable active shape programming-based adaptive, multimodal and multifunctional navigation and functions, and safe operation. External physical forces, such as magnetic fields, acoustic waves and light, and physical or chemical (e.g., catalytic) interactions with the operation medium are used to actuate and steer such miniature robots wirelessly as a single robot or robot collectives. These robots are aimed to save lives of more patients by curing diseases not possible or hard to cure and decrease the side effects and invasiveness of disease treatments drastically.

Speaker Biography | Prof. Dr. Metin Sitti is the President and Professor of Koç University in Istanbul, Turkey since fall 2023. Formerly, he was a Director of the Physical Intelligence Department at Max Planck Institute for Intelligent Systems, Germany (2014-2023), Professor at ETH Zurich, Switzerland (2020-2024), Professor at Carnegie Mellon University, USA (2002-2014), and Research Scientist at UC Berkeley, USA (1999-2002). He received his BSc (1992) and MSc (1994) degrees in electrical and electronics engineering from Boğaziçi University, Turkey, and PhD degree in electrical engineering from University of Tokyo, Japan (1999). His research interests include wireless medical devices, small-scale mobile robots, bioinspiration, and physical intelligence. He is a member of National Academy of Engineering (USA), Academy Europea, Max Planck Society, and ELLIS. He is IEEE Fellow and fellow of ECLT. He received the Highly Cited Researcher recognition (since 2021), Frontiers of Science Award (2025), Materials Science Leader Award (since 2023), Breakthrough of the Year Award in the Falling Walls World Science Summit (2020), ERC Advanced Grant (2019), Rahmi Koç Science Medal (2018), SPIE Nanoengineering Pioneer Award (2011), and NSF CAREER Award (2005). He has supervised and mentored over 70 (15 current) PhD students and 80 (8 current) postdocs, where around 70 of his group alumni are professors around the world. He has published 2 books and over 450 journal articles and has over 30 issued patents. He founded Setex Technologies Inc. to commercialize his lab's gecko-inspired microfiber adhesive technology. He is the editor-in-chief of Journal of Micro-Bio Robotics journal and associate editor in Science Advances journal.



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