MECHANICAL & MATERIAL COLLOQUIUM

Monitoring Health with Molecular Sensors

by Andreas T. Güntner
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Molecular sensing technologies that analyze non-conventional biological matrices, such as interstitial fluid, sweat, or breath, with minimal invasiveness offer longitudinal biomarker data and provide insights into physiological and behavioral patterns, even outside of hospital settings. Despite extensive research for several decades, however, only a few molecular sensors are part of today's clinical routine (e.g., continuous glucose monitoring in interstitial fluid or the FeNO breath test for asthma diagnostics). Most never left the scientific laboratories. My presentation will discuss novel processes to design sensor materials and systems that allow a systematic control over sensitivity, selectivity and stability when detecting biomarkers, with particular emphasis on exhaled breath analysis and chemoresistors. Concepts of sensing nanoparticle engineering, molecular filters and separation columns, as well as sensor arrays for accurate multi-tracer quantification will be elaborated. Finally, I will highlight translational efforts touching upon concepts of breath sampling, device integration and clinical studies to demonstrate the impact on human-centered health sensing.

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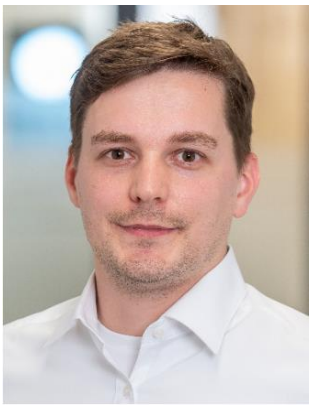

Dr. Andreas Güntner is an Assistant Professor of Molecular Sensing at ETH Zürich, a Research Associate at the University Hospital Zürich and Editor of Sensors and Actuators B: Chemical. Before, he served as CEO and co-founder of Alivion AG that has successfully commercialized a handheld methanol detector with clients in 26 countries in the food, oil & gas, health and transportation industries. In 2022, Andreas returned to academia and founded the Human-centered Sensing Laboratory at ETH Zürich that works on micro/nanosystems and their application as molecular sensors to tackle healthcare and environmental issues. Andreas has published ca. 50 original research articles in leading journals (e.g. Nature Food, Nature Commun., Advanced Materials, Angew. Chemie, Advanced Science) and has been frequently featured by news outlets around the world (100+ since 2016). His scientific and entrepreneurial activities have been recognized by several awards, including ERC Starting Grant, Emerging Technology Award by the Royal Society of Chemistry, Beiersdorf Excellence Award in Product Design and Engineering by the European Fed. Chem. Eng., Association for Aerosol Research (GAeF) PhD Award and the De Vigier Award.

Place:
EC 1113

Time:
2:00-3:15 PM
Oct. 28, 2025

Zoom: https://fiu.zoom.us/j/85124118776?pwd=bugezV8BUyAbTftgU7QyW0OlBpzPPL.1

https://mme.fiu.edu/seminar-schedule

For questions or suggestions, contact Colloquium Organizers Dr. Jiuhua Chen (chenj@fiu.edu) or Dr. Pezhman Mardanpour (pmardanp@fiu.edu)