

The University of Texas at San Antonio

# UTSA Physics and Astronomy

***Friday, March 29, 2024 at 11:00 AM***

## **Development of MEMS Devices from Concept to Market-Ready Product**

***Dr. Rodion Kononchuk***

*A. M. Fitzgerald & Associates*

In this talk, we explore the journey of Microelectromechanical Systems (MEMS) devices from their initial conceptualization to becoming market-ready products. The discussion involves an overview of the innovative concepts that form the foundation of MEMS technology, with an emphasis on the interdisciplinary approach required for their development, involving principles of microfabrication, electronics, and mechanical engineering. Critical steps in the design and development process are described in detail, emphasizing the importance of simulation and modeling for predicting device performance, as well as the iterative nature of design refinement. We delve into the critical role of fabrication techniques, including lithography, etching, deposition, and their nontrivial interplay in realizing complex MEMS structures. The talk further addresses the challenges, such as reliability and functionality in real-world applications and cost. Finally, go-to-market strategies are discussed, demonstrating case studies and lessons learned from the commercialization of MEMS devices. This talk provides valuable insights for researchers, engineers, and entrepreneurs developing MEMS technology.



**Rodion Kononchuk** obtained his Ph.D. in physics at the University of Texas at San Antonio in 2019, where he was working in the group of Prof. A. Chabanov, conducting research on novel microwave and photonic devices. Since then, he has been a postdoc at Wesleyan University in Connecticut, where he has developed noise-resilient inertial sensors with enhanced precision. In 2022, Dr. Kononchuk joined A. M. Fitzgerald & Associates, where he worked as a MEMS developer. A.M. Fitzgerald & Associates provides MEMS development services to industry and serves start-ups and big-tech companies around the globe. Dr. Kononchuk designs prototypes of novel MEMS devices, such as inertial sensors, ultrasonic transducers, and bio-medical sensors, which are then transferred to commercial foundries around the world for large-volume manufacturing.

**Faculty Host: Prof. Andrey Chabanov**