

# Physics, Epitaxy, and Emerging Applications of Ferroelectric Nitride Semiconductors

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<https://utexas.zoom.us/my/xiulingli>

Distinguished Seminar Series Sponsored by the Texas Quantum Institute

Speaker: **Prof. Zetian Mi**

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The incorporation of group IIIB elements such as scandium (Sc) can transform conventional III-nitride semiconductors to be ferroelectric. This new class of ferroelectric nitride semiconductors can be seamlessly integrated with the well-established III-nitride and Si electronics with promising applications in high power, high frequency, high temperature electronics, as well as memory and logic devices. Moreover, ferroelectric ScAlN exhibits significantly enhanced piezoelectric and nonlinear optical response compared to AlN, which makes it attractive for high frequency resonators and filters and nonlinear optical processes. In this talk I will present recent advances of ferroelectric III-nitride semiconductors, including epitaxial growth, the underlying physics of their unusual structural, optical, electrical, and ferroelectric properties, as well as their emerging device applications.



Zetian Mi is a Professor in the Department of Electrical Engineering and Computer Science at the University of Michigan, Ann Arbor. His teaching and research interests are in the areas of semiconductor nanotechnology, optoelectronics, and photonics. Prof. Mi has received the Science and Engineering Award from W. M. Keck Foundation in 2020, the IEEE Photonics Society Distinguished Lecturer Award in 2020, the David E. Liddle Research Excellence Award in 2021, the IEEE Nanotechnology Council Distinguished Lecturer Award in 2023, the ISCS Quantum Devices Award in 2024, and the Rexford E. Hall Innovation Excellence Award in 2024. Prof. Mi currently serves as the Editor-in-Chief of *Progress in Quantum Electronics* and the Serial Editor of *Semiconductors and Semimetals*. He served as the Vice President for Conferences of IEEE Photonics Society from 2022 to 2023. Prof. Mi co-founded NS Nanotech Inc. and NX Fuels Inc. Prof. Mi is a fellow of IEEE, APS, Optica, and SPIE.