

DEPARTMENT OF PHYSICS & ASTRONOMY

Physics & Astronomy Colloquium

Prof. Ryan E. Baumbach

University of California, Santa Cruz, Department of Physics

(Host: Yun Suk Eo)

3:30 - 4:30 p.m. | Tuesday, Feb 10, 2026

Zoom Meeting: <https://texastech.zoom.us/my/yunsukeo>

(passcode: 621827)



Roadmap to Strong Electronic Correlations in f-electron Intermetallics

At the core of research into crystalline inorganic materials is the search for new phenomena that extend our grasp of nature and produce transformative new technologies. During the 20th century, this resulted in dramatic advances that centered on a new quantum understanding of metals, semiconductors, magnetism, superconductivity, and other phenomena. At present, we again find ourselves in the midst of a second quantum revolution where electrons are being trained to do new tricks: e.g., in anomalous correlated electron metals, unconventional superconductors, and materials with topologically protected electronic states. In this talk I will examine the factors that produce these behaviors, and will offer a phenomenological map that my group has developed to guide exploration of strongly correlated f-electron materials. At the same time, I will highlight the diverse synthesis methods that are needed to leverage the potential of the entire periodic table. By doing this, I will bring together the critical elements of the field of New Materials Physics, and thereby describe my perspective on how to develop the next generation of materials for society.



TEXAS TECH
College of Arts & Sciences