

# Translational AI Center (TrAC) Seminar

## Fall 2022

**Matthew Panthani**

**November 11 at 12:00 noon (US Central Time)**

**Physical location: 2206 Student Innovation Center**

**Zoom: <https://iastate.zoom.us/j/92178103551?pwd=dINCa2l0ckVBTEVyR1JEN2Y3b21XQT09>**

### **Design of Novel Nanomaterials using Artificial Intelligence**

#### **Abstract**

New electronic and photonic materials are being sought for continued advancement of sensing, telecommunication, and computing platforms. The materials that have conventionally been used in these technologies have tradeoffs between performance, energy efficiency, and sustainability. Nanomaterials offer an additional lever for tuning materials properties, offering potential for that are no longer bound to these tradeoffs. However, designing novel nanomaterials is challenging due to having properties that are very sensitive to small changes in size, surface chemistry, and defects. I will present my group's recent work in synthesizing nanostructured materials for applications such as solar energy, computing, and photon sensing. I will also discuss how our team is trying to use artificial intelligence to expedite the design of new materials and deepen understanding of structure-property relationships in novel materials by addressing theory/modeling, experimental design, and materials characterization.

#### **Short Bio**

Matthew G. Panthani is an Associate Professor and the Herbert L. Stiles Faculty Fellow in the Department of Chemical and Biological Engineering at Iowa State University. He received a B.S. in Chemical Engineering at Case Western Reserve University and a Ph.D. in Chemical Engineering at the University of Texas at Austin under the direction of Prof. Brian A. Korgel. Prior to joining the faculty at Iowa State, he was a postdoctoral research associate in Dmitri Talapin's research group at University of Chicago. His research group focuses on synthesizing new inorganic and hybrid organic-inorganic materials with tailored properties for optoelectronic applications such as solar cells, next-generation computing, and telecommunications technologies. He has received the Air Force Office of Scientific Research Young Investigator Award (2017), the National Science Foundation Early CAREER Development Award (2019), and the Mid-career Achievement in Research Award from ISU College of Engineering (2022). His research group has been supported by the AFOSR, Department of Energy, National Science Foundation, and Army Research Office. He has published more than 40 peer-reviewed journal articles, holds four U.S. patents, and has started one company. Currently, he and his group are focused on designing and creating novel materials and devices for faster, energy-efficient computing technologies.