Ann Greenaway is in her 2nd year as a Director’s Postdoctoral Research Fellow at the National Renewable Energy Laboratory in Golden, Colorado. Her talk will include an overview of current research at NREL as well as her own research.

**Combinatorial Synthesis of a New II-IV-N₂ Compound: MgSnN₂**

Nitridés with novel compositions are an emerging research topic in basic energy science, with potential applications in optoelectronics, catalysis, and magnetism. Ternary and multinary semiconductors are underexplored and have unique properties, such as transitions between cation ordered and disordered structures, that may enable manipulation of materials properties at a single composition. We report on the combinatorial co-sputtering of MgSnN₂, a new II-IV-N₂ compound with a theoretical bandgap of 2.3 eV, which may be tunable through cation disorder. In addition to the expected disordered wurtzite phase, a metastable rocksalt phase is observed at low synthesis temperatures. Spectroscopic ellipsometry reveals an optical absorption onset around 2 eV for the wurtzite phase, suggesting bandgap tuning via cation disorder. Finally, we demonstrate epitaxial growth on GaN via combinatorial co-sputtering. This comprehensive study shows that MgSnN₂ will be an excellent candidate material for both fundamental exploration of novel nitride properties as well as for optoelectronic device applications.