

**Understanding undergraduate student engagement using skin sensors and eye-tracking approaches: Applications in the geosciences**

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**Abstract:** The field of discipline based education research (DBER) seeks to understand how people think and learn within a disciplinary context. Geoscience education research (GER), a sub-field of DBER, is a growing area where the research community has defined several grand challenges (St. John et al., 2018). The presented research will include a focus on two of these areas, the cognitive and affective domains and their interaction, while applying cutting-edge technologies (e.g., eye-tracking and skin conductance) that measure student psychomotor responses during a variety of interventions. These techniques have been well established in cognitive psychology and the learning sciences, but have infrequently been applied to addressing questions about how students think and learn in the geosciences. As such, this presentation will apply these tools to measure students' engagement and attention when exposed to different classroom teaching approaches, technologies, and visualizations aimed to support student learning, problem solving, and skill development in the geosciences. The results of this work provide insights about how these research tools can be used to address pertinent learning and communication challenges in the geosciences.

**Friday,**  
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**11:15 AM - 12:05 PM**

**Watt**  
**Auditorium**  
**OR**  
**Zoom**

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**Bio:** McNeal is Molette Endowed Professor in the Department of Geosciences at Auburn University. She is the Associate Dept. Chair in Geology and leads the Discipline Based Education Research (DBER) Initiative in the College. She teaches undergraduate and graduate courses in Earth System Science, Climate Change, and Science Communication. She is the lead PI on Auburn's first NSF NRT Traineeship which focuses on interdisciplinary approaches to graduate training around climate resilience. She conducts research in the field of geoscience education/geocognition and uses mixed methods research (e.g., qualitative and quantitative approaches) to investigate geoscience teaching and learning challenges in formal and informal settings. She focuses her work on climate change communication, earth system thinking and learning, research based learning approaches, and broadening participation in the geosciences. She has been funded by numerous external funding agencies with over \$25M secured over her career and 65+ peer-reviewed publications. She currently has seven graduate students, of which several have been recipients of the NSF GRFP award. She has served as external evaluator on NSF CCLI, S-STEM, and REU projects and has served as consultant/advisory board member on several additional NSF projects. She has been the Editor of Research for the Journal of Geoscience Education, President of the National Association of Geoscience Teacher's Geoscience Education Division, and has served as a panelist on several federal proposal review panels.

