Bleker Wins Award for Extraordinary Professional Promise

Carissa Bleker was awarded the 2020 University of Tennessee Chancellor’s Award for Extraordinary Professional Promise in Research. A member of the Langston Lab for the last four years, she has made seminal advancements in several computer science and data science domains. Diverse and notable examples include:

- **Graph Theoretical Thresholding.** The goal of thresholding is to discover important and often latent big-data relationships. Bleker has developed suites of novel spectral and combinatorial algorithms well suited to this task, and helped match them to different types of high throughput data. Her approach eliminates much of the guesswork previously used.

- **Analysis of Magnetoencephalography Data.** Neural activity in the brain produces electrical signals and an orthogonally oriented magnetic field. Magnetoencephalographic sensors can measure minute changes in this field’s strength and direction, and can therefore help record and interpret neural activity. Bleker has devised methods that construct sensor graphs of the brain, and that associate brain signal characteristics with behavioral and psychological phenotypes. This work is unlike any that has been done before. Its implications for human health are manifest.

- **Core Protein Identification.** A core protein is one that plays a major structural or functional role in a large molecular complex of which it is part. Focusing on *Escherichia coli*, Bleker has developed new, data-driven methods that can determine the core proteins of each bacterial phylotype. These results have numerous potential applications in both clinical and agricultural settings.