

# **Understanding the Cone of Uncertainty: Non-expert interpretations of hurricane forecast uncertainty visualizations**

**Ian T. Ruginski**

Department of Psychology, University of Utah

**Alexander P. Boone**

Department of Psychological and Brain Sciences, University of California Santa Barbara

**Lace M.k. Padilla**

Department of Psychology, University of Utah

**Mary Hegarty**

Department of Psychological and Brain Sciences, University of California Santa Barbara

**William B. Thompson**

School of Computing, University of Utah

**Donald H. House**

School of Computing, University of Clemson

**Sarah H. Creem-Regehr**

Department of Psychology, University of Utah

**Abstract:** Uncertainty represented in visualizations is often ignored or misunderstood by the non-expert user. The National Hurricane Center displays hurricane forecasts using a track forecast cone, depicting the expected track of the storm and the uncertainty in the forecast. Our goal was to test whether different graphical displays of a hurricane forecast containing uncertainty would influence a decision about storm characteristics.

Participants viewed one of five different visualization types. Three varied the currently used forecast cone, one presented a track with no uncertainty, and one presented an ensemble of multiple possible hurricane tracks. Results show that individuals make different decisions using uncertainty visualizations with different visual properties, demonstrating that basic visual properties must be considered in visualization design and communication.