RISE Talks Series

Who?   Chris Casement, Ph.D.

What?   Prior Elicitation via a Rorschach-Style Graphical
                Procedure

When?   12:00-1:00 on Thursday, November 8th

Where?   Hall of Sciences, Room 326

Prior specification is fundamental to the Bayesian paradigm. Informative priors allow analysts to inject expert opinion directly into the modeling process. However, such priors can strongly influence an analysis, so using them demands a principled approach to prior specification. This approach is prior elicitation, which refers to the process of quantifying an expert's belief into a probability distribution. Common elicitation schemes ask experts to quantify their beliefs in the form of two or more distribution summaries, such as means, modes, or percentiles, which are then converted into the standard parameters of a given family. While software exists that assists experts in the process, it is still often difficult for experts to reliably quantify distribution summaries, and eliciting a prior distribution that accurately reflects expert opinion remains a challenging process.

Drawing from recent developments in the statistical graphics and information visualization communities, I present a novel graphical strategy for prior elicitation (along with a web-based Shiny implementation of the procedure) that functions without the expert needing to explicitly quantify their beliefs. Instead, they move through a series of lineup-style tests where they are tasked with selecting datasets they believe to be most likely from a collection of candidate datasets. The algorithm then converts these specifications into a prior on the parameter of interest. To illustrate the method's ability to accurately quantify expert opinion, I consider the elicitation of a prior for a population proportion.

Chris Casement is a Norma Gilbert Assistant Professor of Mathematics at Drew University. His research interests include Bayesian methods for data analysis (particularly for prior elicitation), as well as computational statistics and statistics education.