



# ELECTRICAL ENGINEERING

COLORADO SCHOOL OF MINES

## Spring 2017 Colloquium Series

**Tuesday, February 14, 2017**

**1:30-2:00 pm – Meet and Greet –BB340**

**2:00-3:00 – Seminar Talk – GC Metals Hall**



Dr. Paul Constantine, Ben L. Fryrear Assistant Professor of Applied Math and Statistics, Colorado School of Mines.

### ***Active Subspaces: Emerging Ideas for Dimension Reduction in Highly Parameterized Models***

#### **Abstract:**

Scientists and engineers use computer simulations to study relationships between a physical model's input parameters and its output predictions. However, thorough parameter studies---e.g., constructing response surfaces, optimizing, or averaging---are challenging, if not impossible, when the simulation is expensive and the model has several inputs. To enable studies in these instances, the engineer may attempt to reduce the dimension of the model's input parameter space. Active subspaces are part of an emerging set of subspace-based dimension reduction tools that identify important directions in the input parameter space. I will describe methods for discovering a model's active subspace and propose strategies for exploiting the reduced dimension to enable otherwise infeasible parameter studies. For more information, see [activesubspaces.org](http://activesubspaces.org)

#### **Bio:**

Paul G. Constantine is the Ben L. Fryrear Assistant Professor of Applied Mathematics and Statistics at Colorado School of Mines. He received his Ph.D. from Stanford's Institute for Computational and Mathematical Engineering and spent two years as the John von Neumann Fellow at the Sandia National Laboratories' Computer Science Research Institute. His research interests include uncertainty quantification and dimension reduction for large-scale computer simulations. For more information, visit [inside.mines.edu/~pconstan](http://inside.mines.edu/~pconstan)