

**Kevin D. Hall**  
**National Institutes of Health**

**Title:**

The Calculus of Calories: Mathematical Modeling of Body Weight Dynamics

**Abstract:**

I will describe how mathematical models can be used to investigate human metabolism and provide a quantitative framework for integration of metabolic and body composition data. Several such models have recently been developed by my group to make quantitative predictions about how diet perturbations result in adaptations of energy expenditure and metabolic fuel selection. I will show that our models accurately predict body weight and composition changes during controlled feeding experiments and help us understand the underlying dynamics of energy imbalance. The models can be used to help design and interpret clinical research studies, help set individual weight loss goals and track adherence to lifestyle interventions, and evaluate potential effects of population level interventions targeted to address the obesity epidemic.