1135-92-81 **John C Lang*** (jclang@ucla.edu), **Hans De Sterck** and **Daniel M Abrams**. *The statistical mechanics of human weight change.*

Over the past 35 years there has been a near doubling in the worldwide prevalence of obesity. However, the processes that determine the changing shape of Body Mass Index (BMI) distributions in high-income societies are not well understood. By compiling and analyzing the largest data set so far of year-over-year BMI changes, we find that the distribution of human BMIs is intrinsically dynamic and is determined by a balance between deterministic drift towards a natural set point and diffusion resulting from random fluctuations in, e.g., diet and physical activity. We formulate a stochastic mathematical model for BMI dynamics, deriving a theoretical shape for the BMI distribution and offering a mechanism to explain the ongoing right-skewed broadening of BMI distributions over time. The model also provides new quantitative support for the hypothesis that peer-to-peer social influence plays a measurable role in BMI dynamics. Implications for public health interventions are discussed. (Received July 24, 2017)