

**Second Irvine-Pittsburgh-Princeton Conference on the  
Mathematical and Conceptual Foundations of Physics**

University of California, Irvine

20 – 21 March 2014

Social and Behavioral Sciences Gateway (SBSG) 1517

**Conference Program**

**Thursday 20 March**

**8:30am. Breakfast**

**9:00am. Introductory Remarks**

**9:10am. Tom Pashby (Pittsburgh), “Temporally Extended Quantum Theory”**

**9:55am. Michael Miller (Pittsburgh), “Haag’s Theorem and Successful Applications of Scattering Theory”**

**10:40am. Coffee Break**

**11:00am. Thomas Barrett (Princeton), “Spacetime Structure”**

**11:45am. Sam Fletcher (UC Irvine), “On the Reduction of General Relativity to Newtonian Gravitation”**

**12:30pm. Lunch**

**2:00pm. Thomas Moller-Nielsen (Oxford), “On the Invariance Principle”**

**2:45pm. Marina Baldissera (Pittsburgh), “Idealization of Scales of Motion in Models of Atmospheric Dynamics”**

**3:30pm. Coffee Break**

**4:00pm. Joshua Luczak (Western), “Toy Models: What They Are, What They’re Not, and What They’re Good For”**

**4:45pm. Break**

**5:00pm. Keynote Address: Charlotte Werndl (LSE), “Justifying Typicality Measures of Boltzmannian Statistical Mechanics and Dynamical Systems”**

**Friday 21 March**

**8:30am. Breakfast**

**9:00am. John Dougherty (UC San Diego), “Problems with Justifying Typicality Measures”**

**9:45am. Ben Feintzeig (UC Irvine), “The Geometry of the Gauge Argument”**

**10:30am. Coffee Break**

**11:00am. Sarita Rosenstock (UC Irvine), "Holonomies, Fiber Bundles, and the Interpretation of Gauge Theories"**

**11:45am. Robbie Hirsch (Princeton), "Some remarks on metaphysical interpretations of gauge theories, or: why I don't understand fiber bundle substantivalism and gauge relationalism"**

**12:30pm. End of Conference**

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### **Abstract for Keynote Address**

**"Justifying Typicality Measures of Boltzmannian Statistical Mechanics and Dynamical Systems"**

Charlotte Werndl

Department of Philosophy, Logic and Scientific Method

London School of Economics

A popular view in contemporary Boltzmannian statistical mechanics is to interpret the measures as typicality measures. In measure-theoretic dynamical systems theory measures can similarly be interpreted as typicality measures. However, a justification why these measures are a good choice of typicality measures is missing, and the paper attempts to fill this gap. The paper first argues that Pitowsky's (2012) justification of typicality measures does not fit the bill. Then a first proposal of how to justify typicality measures is presented. The main premises are that typicality measures are invariant and are related to the initial probability distribution of interest (which are translation-continuous or translation-close). The conclusion are theorems which show that, under some additional reasonable assumptions about the possible initial probability distributions of interest, the standard measures of statistical mechanics and dynamical systems theory are typicality measures. There may be other typicality measures, but they will agree about judgements of typicality. If the assumptions about the possible initial probability distributions of interest are relaxed, one obtains that a measure that is absolutely continuous with respect to the standard measure of statistical mechanics or dynamical systems theory is the typicality measures. Finally, it is also proven that if systems are ergodic or epsilon-ergodic, there are uniqueness results about typicality measures.