



**CENTER FOR PHILOSOPHY AND THE NATURAL SCIENCES**  
CALIFORNIA STATE UNIVERSITY, SACRAMENTO • 6000 J STREET • SACRAMENTO, CA 95819-6033  
TEL 916-278-4535 • FAX 916-278-5364 • WWW.CSUS.EDU/CPNS

**MICHAEL EPPERSON**  
**DIRECTOR**

**PHONE • 916-278-4535**  
**EMAIL • EPPERSON@CSUS.EDU**

## Foundations of Relational Realism

### Logical Causality, Intrinsic Decoherence, and a Category-Theoretic Mereotopological Model of Quantum Spacetime

Sponsored by **THE FETZER-FRANKLIN FUND**



#### Workshop #1

July 19-20, 2010

Orcas Island, Washington State, USA

Philip Stamp:	Dept. of Physics, University of British Columbia / PITI
Stuart Kauffman:	Complex Systems Center, University of Vermont
Elias Zafiris:	Dept. of Mathematics, University of Athens
Karim Bschrir:	Dept. of Philosophy, Swiss Federal Institute of Technology
Timothy Eastman:	Plasmas International
Michael Epperson:	Dept. of Philosophy & College of Natural Sciences & Mathematics, Director, CPNS, California State University

#### Meeting Overview:

This is the first principals meeting for the Foundations of Relational Realism research project exploring the phenomenon of logical causality in quantum mechanics and its implications for complex adaptive systems. Specifically, we will: 1) examine the role of local-global internal relation by logical implication in quantum mechanics and its exemplification in the phenomena of environmental and ‘intrinsic’ decoherence; 2) examine a category-theoretic / sheaf-theoretic quantum formalism as a means of rigorously defining and describing these local-global internal relations in quantum mechanics; 3) explore the application of the above to Stu Kauffman’s concept of the ‘adjacent possible’ and its function in complex adaptive systems. Although the explorations undertaken at this workshop will fall within the general context of our “Foundations of Relational Realism” research project ([www.csus.edu/cpns/](http://www.csus.edu/cpns/)) they will not be limited to the concerns of the latter; our goal, rather, is to gain new insights, via the expertise of the workshop’s participants, into the questions with which our project is concerned.

Schedule:

We will be working in the Victorian Room at the hotel. An LCD projector and screen will be available. The format of the workshop will be presentations followed by free-form discussion. The schedule is flexible and can be adjusted as needed.

<b>Sunday August 18:</b>	7:00 pm	Dinner (location TBD)
<b>Monday August 19:</b>	8:00 am	Breakfast (New Leaf Café at the hotel. They open at 8 am.)
	9:00	<i>Michael Epperson</i> : Project overview; logical implication and the internal relation of the local to the global in quantum mechanical predication
		Discussion
		<i>Stu Kauffman</i> : Connections of the above to his conception of 'acausal changes' and 'adjacent possibles' in the Open Universe.
		Discussion
	12:00	Lunch
	1:30	<i>Philip Stamp</i> : Recent developments in quantum decoherence—the major concerns and the philosophical implications; overview of the 'intrinsic decoherence' experimental component of our project
		Discussion
	4:30	We need to vacate the Victorian Room at 4:30, but can continue our discussions elsewhere—i.e., over some drinks at the bar. Or we can adjourn for some free time with the wives before dinner.
	7:00-ish	Dinner (location TBD)
<b>Tuesday August 20:</b>	8:30 am	Breakfast (New Leaf Café)
	9:30	<i>Elias Zafiris</i> : The application of category and sheaf theory to quantum mechanics, toward a formal mathematical description of local-global internal relations in quantum decoherence; the relevance of the sheaf theoretic formalism to complexity theory
		Discussion
	12:00	Lunch
	1:30	Discussion
		<i>Tim Eastman</i> : Publication plan; goals for 2010-11
	5:00	We're done.
	7:00-ish	Dinner (location TBD)