



Institute for Pure and Applied Mathematics
University of California, Los Angeles
presents a program in

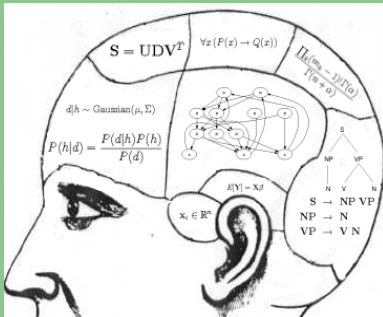
Probabilistic Models of Cognition: The Mathematics of Mind

January 24 - 28, 2005

Organizers:

Alan Yuille (UCLA, Dept. of Statistics and Psychology)
Josh Tenenbaum (MIT, Dept. of Brain and Cognitive Sciences)

Scientific Overview:



The workshop brings together leaders from Cognitive Science and experts from Computer Science, Mathematics and Statistics, who are interested in making bridges to Cognitive Science. The workshop is motivated by recent advances that offer the promise of modeling human cognition mathematically. These advances have occurred largely because powerful mathematical and computational tools developed for designing artificial systems are beginning to make an impact on theoretical and empirical work in Cognitive Science. In turn, Cognitive Science offers an enormous range of complex problems that challenge and test these theories. The intention of the workshop is to stress themes and tools that are common to all aspects of Cognitive Science rather than concentrating on any specific area. The IPAM workshop will be the first meeting that brings together experts from across the major areas of cognitive

science - including vision, memory, reasoning, learning, planning, and language - to discuss these new approaches and their potential to provide a unifying and rigorous theoretical framework for the field.

The main theoretical theme of the workshop is modeling cognitive abilities as sophisticated forms of probabilistic inference. The approach is "sophisticated" in at least two respects. First, the knowledge and beliefs of cognitive agents are modeled using sophisticated probability distributions defined over structured relational systems, such as graphs and generative grammars. Second, the learning and reasoning processes of cognitive agents are modeled using advanced techniques from statistical estimation, optimal control, statistical physics, stochastic differential equations, and other areas of applied mathematics.

Speakers:

Adam Albright (MIT)
John Anderson (Carnegie Mellon University)
Nick Chater (University of Warwick)
Patricia Cheng (UCLA)
Aaron Courville (Carnegie Mellon University)
David Danks (Carnegie Mellon University)
Peter Dayan (Gatsby)
Jacob Feldman (Rutgers University)
Alison Gopnik (UC Berkeley)
Tom Griffiths (Brown University)
David Huber (Univ. of Maryland)
Frank Keller (University of Edinburgh)
Dan Kersten (University of Minnesota)

Michael Lee (University of Adelaide)
Chris Manning (Stanford University)
Eric Mjolsness (UC Irvine)
Rajesh Rao (University of Washington)
Stuart Russell (UC Berkeley)
Paul Schrater (University of Minnesota)
Rich Shiffrin (University of Indiana)
Brian Stankiewicz (University of Texas, Austin)
Mark Steyvers (UC Irvine)
Josh Tenenbaum (MIT)
Emanuel Todorov (UCSD)
Daniel Wolpert (Sobell Dept. of Motor Neuroscience)
Alan Yuille (UCLA)

Participation:

The program is open to the entire mathematical and scientific communities. Please visit our website for more information, including an online registration form and an application for support at: <http://www.ipam.ucla.edu/programs/cog2005>. Encouraging the careers of women and minority mathematicians and scientists is an important component of IPAM's mission and we welcome their applications.

Please visit our website at

<http://www.ipam.ucla.edu/programs/cog2005>

or email questions to cog2005@ipam.ucla.edu