Gatsby Program in Theoretical Neuroscience

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Gatsby Program in Theoretical Neuroscience
Edmond and Lily Safra Center for Brain Sciences
Hebrew University of Jerusalem

Background:

The last two decades have witnessed the development and rapid growth of theoretical and computational neuroscience as a multi-disciplinary field at the forefront of brain science. The goals of this field span a broad range of activities including the development and application of new tools of analysis of experimental data about brain structure and function, mathematical modeling and computer simulations of the activity of neurons, synapses and neuronal networks, development of theories of coding and decoding of information in neuronal circuits, exploration of neural theories of cognitive functions, and modeling mechanisms underlying brain dysfunction in neurological and psychiatric disorders. For recent reviews of the field see articles in *Current Opinion in Neurobiology* Volume 25, Pages 1-236 (April 2014).

The field strives to develop close collaboration with experimentalists to ensure that models are constrained by real data about brain and behavior, and to guide hypothesis driven experimental paradigms. In addition, the field is enriched by fruitful cross-interactions with theoretical physics, dynamics, statistics and computer science. With the recent emergence of powerful neurotechnologies, and the transformation of the neuroscience into a data rich field, the need for theories, model and computational techniques is rapidly growing and so are the challenges facing theoretical and computational neuroscience.

The Gatsby Charitable Foundation’s pioneering investment in theoretical and computational neuroscience began in the 1990s with the establishment of the Gatsby Computational Neuroscience Unit at University College London. Subsequently, the Foundation has expanded its investment by creating a Tri-Center allegiance, between the Gatsby Unit at UCL, London, the Center for Theoretical Neuroscience, at Columbia University, New York, and the Gatsby Program in Theoretical Neuroscience, at The Edmond and Lily Safra Center for Brain Science (formerly, the Interdisciplinary Center for Neural Computation (ICNC)), Hebrew University of Jerusalem. Over the last five years the three centers have organized joint meetings, programs of research, and student exchanges, and sponsored close collaborations with experimentalists at each location and across the three universities. Dr. Sarah Caddick, the Neuroscience Advisor to the Foundation, has served as mentor and advisor to the Tri-Center program since its inception in 2010.

About the Program:
The Gatsby Program in Theoretical Neuroscience at ELSC supports research in theoretical and computational neuroscience at the Hebrew University. The Program provides doctoral and postdoctoral fellowships, and sponsors conferences and visitors. Preference is given to students and postdocs who perform collaborative research mentored jointly by theorists and experimentalists. A priority area for the Program is sponsoring activities that strengthen the ties between this Program and the two partner centers: the Gatsby Unit for Computational Neuroscience (UCL, London) and the Center for Theoretical Neuroscience (Columbia University, NY). These activities include joint meetings, exchange of students, postdocs and faculty, and collaborative research. For more information, please contact Haim Sompolinsky (Program Director), haim@fiz.huji.ac.il, or Irit Dagan (Program Administrator), irit.dagan1@mail.huji.ac.il.

Gatsby Fellows Program

In addition to regular postdoctoral fellowships, the program provides special fellowships for outstanding junior researchers at their senior postdoctoral level working on theoretical and computational neuroscience at the Hebrew University. Fellows are admitted to the Program based on their credentials and are free to choose their research agenda and their host lab in the course of their first semester in residence. In addition to upgraded salaries and housing support, Fellows receive modest research funds aimed primarily for travel to other labs or conferences. Fellows are expected to actively participate in initiatives that strengthen Tri-Center interactions.

Applications

Candidates for postdoctoral fellowships and applicants for the Fellows Program are invited to send their CV and research statement, and to arrange for three letters of reference to be sent to Haim Sompolinsky: haim@fiz.huji.ac.il.

Theoretical Neuroscience at the Hebrew University

- Haim Sompolinsky, Program Director (Physics, ELSC)
- Yoram Burak (Physics, ELSC)
- Yonatan Loewenstein (Cognition, Neurobiology, ELSC)
- Idan Segev (Neurobiology, ELSC)
- Naftali Tishby (Computer Science, ELSC)
- Daphna Weinshall (Computer Science)
- Yair Weiss (Computer Science, ELSC)

Artist-in-Residence Program

The newly established program, made possible by a generous personal gift from Dr. Sarah Caddick http://www.sarahjcaddick.com/, is designed to create an opportunity for artists and theoretical neuroscientists to explore together new forms of expressions of their respective insights about brain structure and dynamics, and neural computations such as perceptions, emotions, memory and creativity.

The program funds one or more artists in part-time or full-time residence at one or more of the three Centers, to develop creative works in response to the scientific study of computational neuroscience. Funds will be used primarily for the purpose of paying for the artists? stipends, artistic materials, and travel and subsistence between the Centers. The artists will be invited and encouraged to participate in the Tri-Center annual meetings of the three Centers; the program will pay the travel expenses associated with this participation.
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