

CGEC

**The Center for Genomic Experimentation &
Computation**

**First Annual Alpha Project Research Symposium
“Predicting the Quantitative Behavior of the
Yeast Response to Mating Pheromone”**

**Hewlett Packard Auditorium
306 Soda Hall
University of California, Berkeley
Berkeley, CA 94720**

Sponsored by:

- The Molecular Sciences Institute
- Center for Genomic Experimentation & Computation**
- UC Berkeley Center for Intelligent Systems
- UC Berkeley Electrical Engineering & Computer Science Department

<http://www.molsci.org/alpha/symposium>

*** a National Human Genome Research Institute “Center of Excellence in Genomic Sciences”*

First Annual Alpha Project Research Symposium – December 13, 2002

About The Alpha Project

The overall goal of the Alpha Project is to gain the ability to predict the quantitative behavior of a eukaryotic regulatory network in individual cells over time and in response to defined perturbations. The project will consist of combined experimental and computational work on a well-studied eukaryotic regulatory system, the G-protein receptor-coupled signal transduction pathway that governs the response of haploid MATa *S. cerevisiae* to the mating pheromone, a factor. This signal transduction pathway is prototypical of similar regulatory networks that govern response to extracellular stimuli in higher eukaryotes. To accomplish this goal, we will need to both deploy classical methods in new combinations and develop new methods. The experimental and computational methods applied and developed during the course of this project, and the combined approach by which we will employ them, will be sufficiently paradigmatic to be applied to numerous other processes in other organisms.

Although this project is not hypothesis-directed per se, research toward its goal is informed by a number of questions whose answers are important to understand how genome-encoded products work together to produce biological functions. These include, but are not limited to: 1) the extent and importance of cell-to-cell variation in behavior among members of genetically identical populations; 2) the importance of quantitative and dynamic behavior in explaining biological phenomena; 3) the means cells use to control such behavior; 4) the extent to which signal transduction pathways work to amplify weak signals or produce all-or-nothing output in response to a threshold concentration or in individual cells; 5) the utility of extending the range of scorable and selectable phenotypes to include quantitative and dynamic effects. These questions will be addressed by the Alpha Project, some at a relatively early phase of the project, and answers to them will constitute significant scientific findings in their own right.

The Alpha Project is the flagship activity of the Center for Genomic Experimentation and Computation (CGEC). The CGEC was created to pursue interdisciplinary projects that will enable broad understanding of cellular and organismic behavior and to work towards making predictive models of biological systems by combining experimentation and computation. In 2002, the National Human Genome Research Institute (NHGRI) of the National Institutes of Health designated the CGEC as a *Center of Excellence in Genomic Sciences*.

Alpha Project research in the CGEC is located at the following institutions:

- The Molecular Sciences Institute
- California Institute of Technology
- Massachusetts Institute of Technology
- Pacific Northwest National Laboratory
- University of California, Berkeley

For more information about the Alpha Project: <http://www.molsci.org/alpha>

About the Annual Alpha Project Research Symposia

The Center for Genomic Experimentation and Computation (CGEC) plans to sponsor annual research symposia. The goal of the first CGEC symposium is to present the work of the researchers involved in the Alpha Project to one another, to interested scientists and to members of the public. Future annual symposia will highlight topics that need to be addressed in order for the goal of prediction of the behavior of biological systems to be realized, including new simulation methods and emerging technologies for generating the required experimental data.

Registration

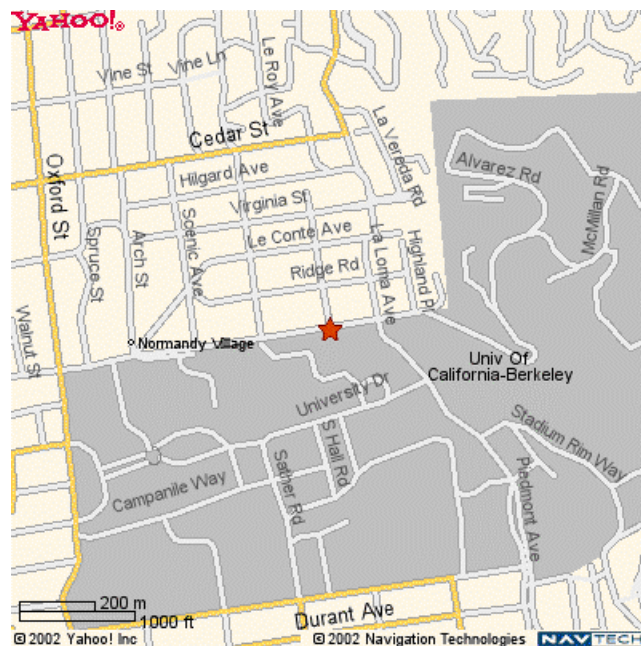
Attendance at the symposium is free and open to the public. Seating is limited and registration is encouraged. Email name and contact information to Ms. Dawn Warfield at dwarfield@molsci.org or call 1-510-981-8743.

Reception

Following the symposium, all participants and guests are invited to a reception at the Molecular Sciences Institute from 6:00 pm – 8:00 pm. Directions to the Reception can be found at: <http://www.molsci.org/alpha/symposium/MSIDirections.htm>

Getting to the Symposium

Soda Hall is located on the University of California – Berkeley campus. Detailed directions can be found at: <http://www.molsci.org/alpha/symposium/AlphaDirections.htm>



Web site for additional information

<http://www.molsci.org/alpha/symposium>

December 13, 2002

10:00 am - 10:15 am Registration and Coffee

10:15 am - 10:30 am *Systems Biology and an Engineering Agenda*
Shankar Sastry
Chair, Department of Electrical Engineering & Computer Sciences
University of California, Berkeley

10:30 am - 11:00 am *Origins, Overview, and Possible Outcomes of the Alpha Project*
Roger Brent
President and Research Director
The Molecular Sciences Institute

11:00 am - 12:00 pm **KEYNOTE ADDRESS**
Pondering Pathways: The Power and Limits of Genetics
Ira Herskowitz
Professor, Department of Biopharmaceutical Sciences
University of California, San Francisco

12:00 pm - 12:45 pm Lunch Break

12:45 pm - 1:30 pm *Physiology and Cell Biology of Pheromone Response*
Alejandro Colman-Lerner
Research Fellow
The Molecular Sciences Institute

1:30 pm - 2:15 pm *Simulation of Intracellular Events*
Larry Lok
Research Fellow
The Molecular Sciences Institute

2:15 pm - 3:00 pm *Pushing the Limits for Protein Characterization by Mass Spectrometry,
and the Alpha Project Context*
Richard Smith
Batelle Fellow
Pacific Northwest National Laboratory

3:00 pm - 3:15 pm Coffee Break

3:15 pm - 4:00 pm *New Methods to Detect and Quantify Small Numbers of Epitopes*
Ian Burbulis
Research Fellow
The Molecular Sciences Institute

- 4:00 pm - 4:45 pm *Bridging Paradigm Gaps Between Biology and Engineering*
Shuki Bruck
Gordon and Betty Moore Professor of Computation and Neural
Systems and Electrical Engineering
California Institute of Technology
- 4:45 pm - 5:30 pm *Understanding and Engineering Biology*
Drew Endy
Fellow, Department of Biology and Division of Bioengineering
Massachusetts Institute of Technology
- 6:00 pm - 8:00 pm** **Reception**
Molecular Sciences Institute
2168 Shattuck Avenue, Floor 2
Downtown Berkeley, CA