The Center for Biology and Society at Arizona State University
and the Institute for Systems Biology present:

“What’s New about Systems Biology?”
An ISHPSSB off-year workshop
August 16th & August 17th, 2012

All sessions will be held in the Discovery Room of the Seattle Biomedical Research Institute
307 Westlake Ave North, Suite 500, Seattle, WA 98109 (206) 256-7200

Biographical Details:

Marta Bertolaso
University Campus Bio-Medico of Rome, Italy
Marta Bertolaso is an Assistant Professor of Philosophy of Science at the University Campus Bio-Medico of Rome, Italy where she teaches Philosophy of Science for Bio-Engineering majors. She is spending the fall term as visiting fellow at the University of Pittsburgh Center of History and Philosophy of Science. Dr. Bertolaso earned her first degree in Biological Sciences, later receiving a PhD in the Philosophy of Biology. While her initial work was research molecular biology, her current focus is on the philosophy of science where she studies the Epistemology of Biology with a specific focus on cancer research. More specifically, her work examines the relationships between contingency, hierarchy and causal complexity in the study of cancer, seeking to understand how features of organizational levels are structured. She has published several articles on both biology and the Philosophy of Life Sciences in international scientific and philosophy journals, and she has recently published her first book in Italian, "Il Cancro come questione. Modelli interpretativi e presupposti epistemologici" ("Cancer as a question. Interpretative models and their epistemological assumptions"). She is a member of national and international societies of history and Philosophy of Science and of Life Sciences.

Tobias Breidenmoser
University of Rostock
I am working as a PhD student at the Chair of Systems Biology and Bioinformatics of the University of Rostock in an interdisciplinary project on philosophy of systems biology. Educated in philosophy, especially philosophy of science, I am now in a research environment together with scientists and able to analyze and participate in actual scientific practice. My current work is especially on models and mechanisms in systems biology, which I hope to connect to contemporary philosophical discussions. The conference would be very interesting and helpful for me to both understand systems biology better and searching for more connections to philosophy of science.

Lynn Chien-Hui Chiu
University of Missouri-Columbia
My name is Lynn Chien-Hui Chiu. I am a doctoral candidate in philosophy at University of Missouri-Columbia, studying conceptual issues concerning individual-environment and individual-population relations. My background includes a bachelor of science in Life Sciences, a master of science in psychology (focus: cognition and perception), and a master of arts in analytic philosophy. Previously, I've
done research in population genetics, visual illusions, and evolutionary economics. Currently, I am working at the intersection of philosophy of science, biology, cognitive science, and social sciences to understand and clarify the explanatory role and ontological nature of the "ecological niche" as used in ecology and evolutionary biology, ecological psychology, and the entrepreneur-opportunity relation in entrepreneurship studies, and to study the evolution of the ecological niche through individual activity ("niche construction").

Here's a bit of history that explains my motivations. In my sophomore year, I was impressed with the conceptual issues underlying cell-extracellular matrix Interactions in cancer. The nature of cancerous cells are sometimes external, a result of malfunction in intercellular communications via the extracellular matrix, and the "societal" hypothesis that the default state of cells may be proliferation instead of quiescence has paradigm-shifting implications on the nature of molecular and cellular equilibrium states. Similar issues arise in the context of organism-environment relations in perception. J. J. Gibson's ecological approach of perception coined the term "affordance" to describe the ecological niche of the perceiving and acting organism. But whether "affordance" is a property of the individual, the environment, or the paired system is still an ongoing debate. My current path in philosophy was chosen to help me and others understand the conceptual foundations of individual-environment systems. That is why this workshop is essential to my work and why I wish to engage with a wide range of scholars by presenting my current research here.

Josephine Donaghy
University of Exeter

I am a second year PhD student based at EGENIS at the University of Exeter working on the history and philosophy of systems biology. I am being supervised by Dr Sabina Leonelli and Professor John Dupré and am funded by a three year Arts and Humanities Research Council Scholarship. As part of my research I frequently attend the research seminars held by the philosophy of biology and systems biology research groups in the university. I have also presented my work in this area at interdisciplinary conferences such as, Philosophy of Biology in the UK, Oxford, April 2012. I am aiming to submit work in this area for publication in autumn 2012.

My work focuses on questions related to mathematical models of metabolism and the variety of molecular data types which relate to metabolic systems. I am interested in the historical trajectories of mathematical models and data sets: What enables these components of research to be productively integrated? And, what is and is not transformed during this process of integration? Two categories of data are standardly used to build mathematical models of metabolism. Stoichiometric data about the structural relations of a system, these are frequently taken to be static during the time scale of interest. Kinetic data about context dependent reaction rates, which are dynamic during the time scale of interest. How have discrepancies in the availability of these different data types affected the epistemic trajectory of work on the systems biology of metabolism? How do diversifying high-through put data types relate to these two categories?

I am keen to come and participate in the ISHPSSB off year workshop, ‘What’s New about Systems Biology?’ I aim to engage rigorously with current scientific material and philosophical perspectives. This workshop will give me a unique opportunity to come and share my work and receive challenging and stimulating feedback from an interdisciplinary group of experts. It will also enable me to get a broader perspective on the field of systems biology and its implications for issues in philosophy of science, and help me situate my work amongst this. Additionally, I hope that my work will make an engaging contribution to the workshop, and look forward to critical discussion with other participants. My institution will not be able to provide me with funding for this workshop. I will require travel support funding in order to attend.
Sara Green  
_Aarhus University_  
I am a Danish PhD student with a background in both philosophy and biology. I am working on a project with the title “Understanding (the study of) complex living systems”. The dual meaning of the title reflects a two-sided interest in how to understand living systems but also in understanding the meta-level of how this understanding is gained. My project has a special focus on systems biology. This is where, as I see it, the most substantial shifts in perspective on how to understand living systems are currently happening. It is however difficult to determine whether systems biology is as new and revolutionary as it has been argued. Understanding scientific reasoning and epistemological commitments in systems biology requires an understanding of the scientific practice but also of the historical roots of the new approach. Thus, to answer the questions I raise in my project it is necessary to transcend my disciplinary background and interact with practicing scientists and historians of science. The workshop in Seattle addresses these issues while bringing young researchers with a mixed background and shared interests together. To participate in the workshop would thus be of great benefit for my project, and I hope to get the chance to contribute with a philosophical analysis of the implications of engineering approaches in systems biology.  
In 2011 I presented the preliminary results of my project at the SPSP conference in Exeter; the ESF workshop on “Philosophy of Systems Biology” in Aarhus, and at the EPSA meeting in Athens. In April-May I have been a visiting scholar at University of Sydney, where I collaborated with Maureen O’Malley and participated in the workshop “Integration in Biology and Biomedicine”. I am a part of the project group of Philosophy of Contemporary Science in Practice with Hanne Andersen as principle investigator. I collaborate with Olaf Wolkenhauer, professor in systems biology at Rostock University, and we will jointly present a paper on the historical background of systems biology at the HSS meeting in San Diego, November, 2012.

Fridolin Gross  
_European School of Molecular Medicine_  
I studied Physics, Mathematics and Philosophy at Humboldt University of Berlin and at the University of Leipzig. In my masters thesis I generated and analyzed mathematical models describing the dynamics of immune cell populations. Since 2009 I have been a student in the interdisciplinary PhD program "Life Sciences: Foundations & Ethics" at the European School of Molecular Medicine (SEMM) in Milan, Italy. In my thesis I deal with the philosophical foundations of systems biology. Aside from that I work in a group of systems biology at the Firc Institute of Molecular Oncology (IFOM), which is located on the same campus. For this group I am analyzing quantitative single cell experiments and developing mathematical models to describe particular features of the cell cycle in yeast.  
In my opinion bringing together scientists, philosophers, and historians in a workshop on systems biology is a great idea. I think I could benefit a lot from this encounter since the topic and the guiding questions proposed for the individual sessions perfectly fit with the project of my PhD thesis. Especially in systems biology, philosophical discussions risk to become purely academic when they detach too much from scientific practice. My background that is both in science and in philosophy might enable me to make a valuable contribution to this workshop.

Christopher Lyons  
_Texas A&M_  
I received my B.A. in History and Philosophy of Science and B.S. in Microbiology from the University of Pittsburgh in 2010 and joined the Department of Plant Pathology and Microbiology at Texas A&M University as a PhD student the following fall. I found my home in Prof. Scholthof’s laboratory and was
pleased to discover that she would allow me to continue to explore my aspirations in both science and its history.
We are currently self-proclaimed nascent practitioners of systems biology attempting to integrate classical molecular biology, more specifically—molecular virology, within the broader implications presented by the field of systems biology. As if this were not challenging enough, we are additionally attempting to facilitate the development of a second plant model species, *Brachypodium distachyon*, as a supportive facsimile, as well as, an extension of the Arabidopsis research paradigm. We are likewise investigating the historical implications of the establishment of this new model, under a paradigm-wide systems biology approach, in comparison to the reduction-driven institution of Arabidopsis as the model plant (no more). This workshop sounds like the perfect start to that exploration and my future dissertation—where I aim to bridge the gap between model biology and its history.

**Karl S. Matlin, Ph.D.**
*University of Chicago*

"Karl Matlin is a cell biologist with a longstanding interest in the history and philosophy of cell and molecular biology. He received his Ph.D. from Rockefeller University and did postdoctoral work at the European Molecular Biology Laboratory in Heidelberg, Germany. He is currently Professor of Surgery at the University of Chicago and a member of the Committee on Conceptual and Historical Studies of Science. Matlin's laboratory work focuses on the role of cell-matrix interactions in epithelial cell polarization. He has published two historical perspectives in Nature Reviews: Molecular and Cell Biology on the demonstration and elaboration of the signal hypothesis in the 1970s and 1980s, and is currently working on a book focused on epistemic strategies in cell and molecular biology."

**Michel Morange, Ph.D.**
*University Paris 6, Ecole Normale Superiéure*
Michel Morange was trained in biochemistry and molecular biology at the Pasteur Institute in Paris, where he obtained his PhD in 1978. He then turned to cell biology, and entered into François Jacob's lab in the same Institute. He is Professor in Biology at the University Paris 6 and at the Ecole normale supérieure. Michel Morange also received in parallel a formation in history and philosophy of sciences (PhD in 1978). He is the Director of the Centre Cavaillès for History and philosophy of sciences at the Ecole normale supérieure (USR 3308, CNRS). His main interest is the history of the transformations of biology during the 20th century.

**Stuart Newfeld, Ph.D.**
*Arizona State University*
I have been at ASU since 1997 and am now Professor and Faculty Leader in the Section of Cellular and Molecular Biosciences in the School of Life Sciences. My goal is to uncover molecular mechanisms of cell-to-cell signaling in embryonic development and cancer. I employ the sophisticated molecular and genetic tools of the fruit fly system and state-of-the-art informatics approaches to characterize TGF-β signaling pathways. Our focus is on understanding three specific aspects: mechanisms of TGF-β signal transduction by Smads, characterizing new roles for TGF-β proteins in development/homeostasis and C) gene discovery in TGF-β signaling.
Veli-Pekka Parkkinen

*University of Oslo*

I am a PhD student in philosophy, working as a PhD fellow researcher in NOS-HS research project 'Philosophical Foundations for Systems Biology' (PsBio) at the University of Oslo. I received a master's degree in philosophy at the University of Jyväskylä, Finland in 2008, where I wrote my graduate thesis on macrolevel causation and causal explanation in the social sciences. After that I've been studying issues pertinent to philosophy of biology, and the relations of life sciences and social sciences. My PhD research project concerns the understanding of genetic causation and explanation, with special emphasis given to the question of how systems biology may change the way that genes are conceptualized as a locus of biological explanation. I wish to attend the ASU-ISB workshop in order to contribute and receive feedback from a mixed audience of scientists and philosophers – an opportunity that does not arise that often in my home institution – and to establish contacts to international research communities in relevant fields.

Eve A. Roberts, M.D., M.A., FRCPC

*Dalhousie University*

I am an academic physician, researcher and educator, recognized internationally for my expertise in hepatology, specifically children’s liver diseases and Wilson disease, a genetic disorder of copper handling in the liver. I was educated at Bryn Mawr College, the Johns Hopkins University School of Medicine, and Dalhousie University, and I trained in hepatology with Dame Sheila Sherlock at the Royal Free Hospital in London. I joined the staff of the Hospital for Sick Children in 1984 as a translational clinician-scientist and developed an innovative paediatric hepatology programme there. I was appointed Senior Scientist in the Hospital for Sick Children Research Institute in 1990 and Professor of Paediatrics, Medicine and Pharmacology at the University of Toronto in 1998. I was the clinician on the Toronto team which identified the gene abnormal in Wilson disease (*ATP7B*). I have written extensively about liver disease in children, including both innovative clinical research and authoritative textbook chapters. My basic research dealt with pharmacological and toxicological issues relating to the liver, and I have examined Wilson disease conceived as an endogenous toxicological disorder of the liver. In 2008 I received the Gold Medal of the Canadian Liver Foundation, awarded in collaboration with the Canadian Association for the Study of the Liver.

Approximately 10 years ago I began to develop in collaboration with my colleague, Dr. Bibudhendra Sarkar, an eminent inorganic biochemist, a subdiscipline of proteomics which we called ‘metalloproteomics’ as a new strategy for research relevant, first of all, to Wilson disease. Our publications are some of the very first in this field. I recognized key theoretical issues relating to systems biology through our research and appreciated that they required a ‘philosophical toolbox’ for analysis. I am currently a doctoral candidate in Philosophy of Biology at Dalhousie University where my doctoral research examines methodological and epistemological problems inherent in systems biology research. Clearly, I wish to attend this workshop because it is immediately relevant to my current research.