

May 2016 Complexity Community Sharing Session

11 May 2016 (Wed) 11:00am-01:00pm

Seminar Room 102

(opposite Learning Hub), Blk 1 Innovation Centre, Level 1
16 Nanyang Drive, Singapore 637722



Dr. Ruud Brands

Inmate Immune System in Health and Disease

Since 1990 Ruud is involved in applied science and translational medicine projects all targeted to improve quality of life for patients affected by serious- and often life-threatening inflammatory diseases. These diseases often demonstrate remarkable resemblances in response outcome, although the clinical phenotype seems different. Having tools available that would decipher the basics of these diseases to enable prediction of how these diseases may or may not develop in each of us would be a powerful asset.

Both the innate and the adapted immune system have powerful surveillance properties to safeguard us from disease during most of our "healthy" lifetime. Frequently we are being challenged by extraneous bacterial or viral insults or challenging ourselves by bad lifestyle habits. All of these have adverse effects on our health, something we often neglect until it is too late. Can we on a personal level predict how we will respond to such challenges? We will study this via an in-silico model built from clinical datasets that simulate the immune system's responses to certain disease-threats. In particular, we focus on the reactions of a specific protein that serves as a gatekeeper of the immune system. Through this I hope to give you a flavour of what we plan to do at the Complexity Institute with respect to seemingly very different diseases like diabetes, rheumatoid arthritis, Alzheimer. They may end up not being very different after all.

Biography: Dr. Ruud Brands is a molecular cell biologist specializing in Cellular protein trafficking, targeting and functioning in health & disease conditions. He graduated from University of Utrecht and currently is a visiting Senior Research Fellow associated to the Complexity Institute NTU. He joined an initiative of Prof Peter Sloot aiming to decipher the complexity of the innate immune system.

Ruud held several positions in the field of cell biology and oncology at Stanford University (Palo Alto, CA) & the Netherlands Cancer Institute. He did the R&D of the first (licensed) cell culture derived influenza vaccine at Dept. of Biotechnology, Solvay Pharmaceuticals. He was a co-founder of PharmaAware in 2000 and developing alkaline phosphatase for septic shock treatment. In 2005 Alloksys Life Sciences & in 2013 AMRIF were founded to further develop the rescuing alkaline phosphatase (RESCAP) platform for acute and chronic unmet medical need disease management.



Dr. Felix B Valenzuela

A Network Approach to the Characterization of Aging in an Elderly Cohort

In this talk I will describe a network-oriented approach to the characterization of the various manifestations of human aging and their various interrelationships, as obtained from a large-scale study of a cohort of Singaporean elderly people. Human aging is multifaceted, spanning various domains, from low-level metabolic and physiological aspects, up to cognitive, psychological and social ones, and thus a network-theoretic approach is a natural choice in doing a holistic analysis.

Firstly, I will highlight an approach which will allow us to resolve the interrelationships between variables characterizing the members of the elderly cohort, and then cluster these into natural groups. Looking at these groups may be able to offer suggestions on how the various domains which together constitute human aging are interrelated. Secondly, I will examine various approaches in finding a reduced group of variables which will allow us to characterize the elderly cohort without losing much accuracy as compared to the full variable set. This is desirable from a practical standpoint and will require less time and resources to gather. Finally I will offer some possible ways by which the discussed approach can be used, on one hand not only for characterization but also for classification of aging, and on the other to illuminate other fields.

Biography: Dr. Jesus Felix Valenzuela is a Scientist at the Institute of High Performance Computing. Prior to this, he was an Assistant Professor at the National Institute of Physics of the University of the Philippines, from which he received his Ph.D. in Physics. His current research interests lie in complex network-theoretic approaches to elucidating various systems, with an emphasis on biological, metabolic and immunological systems on one hand, and roads and supply chain networks on the other. Currently his research work focuses on the applications of network theory to the various aspects of human aging.

Organized by: Complexity Institute