

Workshop: Combining machine learning, instrumentation, and immunology to enhance vaccine development

September 17, 2009, Limassol, Cyprus (ICANN 2009 conference)

Vaccine development is a complex task that covering a large combinatorial space of components that need to be combined into vaccine formulations. The effectiveness of vaccines is diminished because of variability of pathogens and variability of immune systems in humans. Finding best combinations for vaccine formulation requires a significant amount of experimentation and advanced high-throughput instrumentation/biotechnology that provide targets for vaccine formulation. Machine learning plays an important role in selection of suitable targets (molecules that are combined into vaccines) and reducing the number of necessary experiments over the large combinatorial space of possible formulations.

This workshop will be a meeting place of vaccinologists, instrumentation biotechnologists, and machine learning/computational science experts. The main theme is the discussion on combination of basic science, instrumentation, and computer science for the advancement of discovery rate of targets and design of successful vaccines. While machine learning has been very useful in supporting research in immunology and early target discovery, there is still a wide gap between our ability to determine targets of immune responses, and identification of subsets of such targets that are suitable for vaccine formulations. The combination of advanced technologies can address these issues, but requires multidisciplinary approaches and interaction of experts working in these relevant but diverse fields.

Aim: Meeting of vaccinologists, biotechnologists/engineers and computer science to identify key issues for helping advance vaccine research by combining basic science, instrumentation, and computer science.

Audience: biomedical researchers, instrumentation technologists, and computer scientists, interested in vaccine development applications

Program:

Convenor: Vladimir Brusic

Session 1

Introduction to vaccine discovery: TBA (15 min)

High-throughput instrumentation for vaccine research: TBA (15 min)

Introduction to machine learning: TBA (15 min)

Prediction of targets of neutralizing antibodies: TBA (15 min)

Break

Session 2

Prediction of T-cell epitopes: TBA (15 min)

Optimization of vaccine formulation: TBA (15 min)

Round table: improving vaccine discovery through technology merging (30 min)

Session 3

Announcement of the winners of the MLI competition and handing the prizes