



Join Keystone Symposia  
for the 2016 conference on:

# Systems Immunology: From Molecular Networks to Human Biology

January 10–14, 2016

Big Sky Resort | Big Sky, Montana | USA

Scientific Organizers:

Ronald N. Germain, Aviv Regev, Nir Hacohen and Dana Pe'er

*This meeting will place emphasis on understanding how biological function emerges from the interaction of multiple components in networks and pathways, on the construction of quantitative models that permit predictions about systems behavior that can be tested experimentally, and on identification of reliable biomarkers and insight into disease pathogenesis that can be acquired from deep analysis of large-scale, multi-parameter data collection in humans.*

Session Topics:

- Immunoreceptor Signaling I: Receptors and Pathways
- Immunoreceptor Signaling II: New Methods for Probing Cell Signaling
- Modeling Signaling Pathways and Transcriptional Networks
- Cellular Communication, Migration and Dynamics I & II
- Systems Analysis of Cancer and Model Organisms
- Human Systems Immunology I: Data Collection Methods and Analytical Technology
- Human Systems Immunology II: Biomarkers, Models and the Microbiome



Submitting an abstract is a great way of participating in the conference through poster presentation and possible selection for a short talk.

Scholarship & Discounted Abstract Deadline: **Sep 21, 2015**

Abstract Deadline: **Oct 20, 2015**

Discounted Registration Deadline: **Nov 10, 2015**

For additional details, visit [www.keystonesymposia.org/16A1](http://www.keystonesymposia.org/16A1).

**KEYSTONE SYMPOSIA™**  
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# KEYSTONE SYMPOSIA

on Molecular and Cellular Biology

## Systems Immunology: From Molecular Networks to Human Biology (A1)

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### SUNDAY, JANUARY 10

#### Arrival and Registration

### MONDAY, JANUARY 11

#### Welcome and Keynote Address

\***Ronald N. Germain**, NIAID, National Institutes of Health, USA

**Nir Hacohen**, Massachusetts General Hospital, USA  
*Genes, Networks and Variations of the Immune Response*

#### Immunoreceptor Signaling I: Receptors and Pathways

\***Grégoire Altan-Bonnet**, NCI, National Institutes of Health, USA

**Smita Krishnaswamy**, Yale School of Medicine, USA  
*Tracking the Impact of Immunotherapy Across the Phenotypic Landscape*

**Suzanne Gaudet**, Dana-Farber Cancer Institute/Harvard Medical School, USA  
*NF-kappaB Signaling Dynamics and the Control of Transcription and Cell Fate*

**Bridget S. Wilson**, University of New Mexico Health Science Center, USA  
*Short Talk: Dynamic Interactions of Pre-BCR Homodimers Provide Finely-Tuned Tonic Signals for Survival*

#### Publishing Forum

\***Angela Colmone**, Science Immunology, USA

\***Craig Mak**, Cell Press, USA

\***Thomas Lemberger**, Molecular Systems Biology, Germany

\***Corinne Williams**, Journal of Clinical Investigation, JCI Insight, USA

#### Workshop 1: Signaling

**Mary H. Young**, Celgene, USA  
*T Cell Receptor Signaling and Toll-Like Receptor Signaling Converge to Amplify T Cell Responses*

**Arnon Arazi**, Broad Institute, USA  
*Th17 Differentiation is an Emergent Collective Behavior, Driven by Cellular Heterogeneity*

\***Rachel A. Gottschalk**, NIAID, National Institutes of Health, USA  
*Contextual Control of TLR-Induced Responses by Divergent Signaling Thresholds*

**Michael J.T. Stubbington**, European Bioinformatics Institute, UK  
*Simultaneously Inferring T Cell Fate and Clonality from Single Cell Transcriptomes*

**Wenji Ma**, Columbia University, USA  
*Single Cell and Bulk Transcriptome Analysis Reveals Differentiation Mechanism of Human Dendritic Cell*

**Ricardo Noel Ramirez**, University of California, Irvine, USA  
*High-Resolution Epigenomic Analysis of Human Myeloid Differentiation Reveals Temporal and Cell-Specific Patterns of the Immune Regulatory Network*

**Miri Adler**, Weizmann Institute of Science, Israel  
*Cell Circuits for Tissue Homeostasis*

#### Immunoreceptor Signaling II: New Methods for Probing Cell Signaling

\***Nir Hacohen**, Massachusetts General Hospital, USA

**Veit Hornung**, Ludwig-Maximilians-University Munich, Germany  
*CRISPR/Cas Approaches to Analysis of Immune Cell Signaling*

**Bernard Malissen**, Centre d'Immunologie de Marseille-Luminy, France  
*Engineered Systems for Analysis of Signaling Pathways in Primary Lymphocytes Using Quantitative Proteomics*

**Iain D.C. Fraser**, NIAID, National Institutes of Health, USA  
*Interrogating Immune Signaling Systems with High-Throughput/High-Content Screening*

**Felix Meissner**, Max Planck Institute of Biochemistry, Germany  
*Short Talk: Proteome Atlas of Circulating Human Immune Cells Reveals Intercellular Communication Structures*

#### Poster Session 1

### TUESDAY, JANUARY 12

#### Modeling Signaling Pathways and Transcriptional Networks

\***Dana Pe'er**, Memorial Sloan Kettering Cancer Center, USA

**Alan Aderem**, Center for Infectious Disease Research, USA  
*Dissecting the Innate Immune System Using Tools of Systems Biology*

**Aviv Regev**, Massachusetts Institute of Technology/Broad Institute, USA  
*Signaling Networks in Th17 CD4 T Cells*

**Harinder Singh**, Cincinnati Children's Hospital Medical Center, USA  
*Gene Regulatory Networks Orchestrating Cell Fate Dynamics of Activated B Cells*

**Ellen V. Rothenberg**, California Institute of Technology, USA  
*Transcriptional Networks in Developing Lymphocytes*

**Aaron J. Arvey**, Gilead, USA  
*Short Talk: Genetic and Epigenetic Variation in the Lineage Specification of Regulatory T Cells*

**Vladimir Litvak**, Sanofi US, USA  
*Short Talk: Decoding Transcriptional and Epigenetic Regulatory Networks in Macrophages*

#### Workshop 2: Human Systems Immunology

**Lisa Marie Kronstad**, Stanford University, USA  
*Human Natural Killer Cell Sensing of Influenza A Viruses*

**John P. Barton**, University of California, Riverside, USA  
*Intra-Host HIV Evolution to Evade Cellular Immunity is Predictable*

\***Brittany A. Goods**, Massachusetts Institute of Technology, USA  
*Functional Inflammatory Profiles Distinguish Myelin-Reactive T Cells from Patients with Multiple Sclerosis*

**Andrew Fiore-Gartland**, Fred Hutchinson Cancer Research Institute, USA  
*Modular Cytokine Analysis Reveals Innate Correlates of Influenza Outcome in a Multicenter Study*

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**Ning Jenny Jiang**, University of Texas at Austin, USA

*Accurate and High-Coverage Immune Repertoire Sequencing Reveals Characteristics of Antibody Repertoire Diversification in Young Children*

**Irit Gat-Viks**, Tel-Aviv University, Israel

*Modeling the Genetic and Immunological Basis of in vivo Phenotypes*

### Single Cell Analysis Modeling I

\***Aviv Regev**, Massachusetts Institute of Technology/Broad Institute, USA

**Ronald N. Germain**, NIAID, National Institutes of Health, USA

*Imaging Immunity: Creating a Quantitative Spatiotemporal Understanding of Host Defense*

**Catherine A. Blish**, Stanford University School of Medicine, USA

*Defining Protective Immunologic Signatures*

**Michael Meyer-Hermann**, Helmholtz Centre for Infection Research, Germany

*Germinal Centres in vivo and in silico*

**Kelly Wen Li Chen**, Massachusetts Institute of Technology, USA

*Short Talk: Investigation of Cytokine-Mediated Intercellular Crosstalk in Normal and Inflammatory Conditions*

### Poster Session 2

### WEDNESDAY, JANUARY 13

#### Single Cell Analysis Modeling II

\***Ronald N. Germain**, NIAID, National Institutes of Health, USA

**Dana Pe'er**, Memorial Sloan Kettering Cancer Center, USA

*Modeling Cellular Responses*

**Sarah Teichmann**, Wellcome Sanger Institute, UK

*Understanding Cellular Heterogeneity*

**Grégoire Altan-Bonnet**, NCI, National Institutes of Health, USA

*Modeling the Spatio-Temporal Heterogeneity of Cell-to-Cell Communications*

**Martin Meier-Schellersheim**, NIAID, National Institutes of Health, USA

*Computational Modelling Elucidates How MAPK Crosstalk Regulates Sensitivity of Macrophages Toward TLR4 Stimulation*

**Sayak Mukherjee**, Ohio State University, USA

*Short Talk: Reconstruction of Single Cell Signaling Trajectories using Snapshot Cytometry Data*

#### Systems Analysis of Cancer and Model Organisms

\***Suzanne Gaudet**, Dana-Farber Cancer Institute/Harvard Medical School, USA

**Andrea Califano**, Columbia University, USA

*Systematic Elucidation of Druggable Dependencies in Human Malignancies: A New Take on Precision Medicine*

**Kathryn Miller-Jensen**, Yale University, USA

*Discovering Macrophage Paracrine Signaling Networks from Single-Cell Data*

**Catherine A.A. Beauchemin**, Ryerson University, Canada

*Modelling Viral Infection in vivo and in vitro*

**Edward S. Lee**, University of Glasgow, UK

*Short Talk: Novel Computational Approaches to TCR Repertoire Analysis*

### Poster Session 3

### THURSDAY, JANUARY 14

#### Human Systems Immunology: Methods

\***David Furman**, Stanford University, USA

**Damien Chaussabel**, Sidra Medical and Research Center, Qatar  
*Systems Approaches to Health Maintenance and Immunological Knowledge Discovery*

**Alexandra-Chloé Villani**, Broad Institute of MIT and Harvard, USA

*Short Talk: Talk Title to be Announced*

**Linas Mazutis**, Vilnius University, Lithuania

*Short Talk: Barcoding and Sequencing Thousands of Individual Cells using Droplet Microfluidics*

**Matthew H. Spitzer**, Stanford University, USA

*Modeling Systems-Wide Immunity Reveals Coordinated Responses in Health and Cancer*

**John Tsang**, NIAID, National Institutes of Health, USA

*From Single Cells to Networks to Human Populations: Assessing and Utilizing Heterogeneity of the Immune System*

**Ayelet Alpert**, Technion-Israel Institute of Technology, Israel

*Short Talk: Baseline Matters: The Effect of Initial Immune State on Outcome of Septic Patients*

#### Workshop 3: Methodological Advances in Systems Immunology

\***Matthew H. Spitzer**, Stanford University, USA

**Nathan Paul Manes**, National Institutes of Health, USA

*Targeted Proteomics-Driven Computational Modeling of the Chemotaxis and Toll-like Receptor Signaling Pathways in Macrophages*

**Andriy Morgun**, Oregon State University, USA

*Transkingdom Networks as a Model of Host-Microbiota Interactions*

**Denis Schapiro**, University of Zurich, Switzerland

*Imaging Mass Cytometry Reveals Neighboring Cell Interactions Amongst the Heterogeneity of Breast Cancer*

**Brian Kidd**, Icahn School of Medicine at Mount Sinai, USA

*Mapping the Effects of Drugs on the Immune System*

**Nienke Moret**, Harvard University, USA

*Controlling Regulatory T Cell Heterogeneity by Chemical Modification of Signaling Pathways*

#### Human Systems Immunology: Biomedical Applications

**Yasmine Belkaid**, NIAID, National Institutes of Health, USA

*Long-term Consequences of Infection for Tissue Immunity and Metabolism*

\***Anne O'Garra**, Francis Crick Institute, UK

*Systems Studies of Human Immune Responses to Infection*

**Arup K. Chakraborty**, Massachusetts Institute of Technology, USA

*How to Hit HIV Where it Hurts by Integrating Sequencing, Statistical Inference, Mechanistic Models and Human Data*

#### Meeting Wrap-Up: Outcomes and Future Directions (Organizers)

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**FRIDAY, JANUARY 15**

**Departure**