



# Translational Systems Immunology

January 28–February 1, 2018 | Cliff Lodge | Snowbird, Utah | USA

## Scientific Organizers:

**Sally John**, Biogen, USA

**Soumya Raychaudhuri**, Brigham and Women's Hospital, Harvard Medical School, USA

**Michael Vincent**, Pfizer Inc., USA

**Mark M. Davis**, Stanford University, USA

*Advances in large-scale data acquisition, immune phenotyping and computational biology are transforming immunology research and allowing unprecedented insights into the networks, pathways and systems that influence human health and disease. This conference will cover the exciting technology advances that are enhancing our ability to elucidate human immune function and networks as well as practical applications in drug and biomarker discovery and patient stratification. The meeting begins with a look at progress in human genetics and the use of sequencing to assign functional mutations to rare human immune phenotypes. The impact of common variants on immune function requires larger sample sizes, and speakers will cover how genome-wide high-throughput genomics in combination with detailed phenotyping and physiologically relevant perturbations are providing foundational data sets that allow an unbiased view of immune function in cells and tissues. Also discussed will be emerging computational and analytical methods that enable integration and interpretation of high-content molecular data. The meeting will then move on to look at the application of these technological advances, expanding investigation to study the immune response in tissues and organs to enable a deeper understanding of interaction between immune and non-immune cells and their respective roles in disease states. Critical to clinical progress is the translation of systems immunology research into novel therapies and diagnostic or prognostic tests. Sessions themed around infectious disease and vaccine development advances in immune-oncology and patient stratification in complex disease and treatment response aim to provide depth from foundational science to clinical translation. Finally, a key goal is fostering collaboration across disciplines and the development of novel ideas. The meeting will be relevant for immunologists, computational biologists and clinicians with an interest in molecular characterization of the immune system.*

## Session Topics:

- Human Phenotypic Validation via Rare Genetic Mutations
- Workshop 1: Friendly Debate
- Genetics and Epigenetics Variation in Human Immune Traits
- Advancing our Understanding of Immune Cell Repertoires
- Integrative Analysis, Dynamic Networks and Systems Immunology
- Systems Immunology at the Tissue Level
- Human Immune Response to Infectious Disease
- Immuno-Oncology from Basic Science to Clinical Practice
- Workshop 2: CyTOF
- Clinical Immunoprofiling and Patient Stratification

**Scholarship Application & Discounted Abstract Deadline: October 2, 2017**

**Abstract Deadline: October 31, 2017**

**Discounted Registration Deadline: November 30, 2017**



Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted. Submitting an abstract is an excellent opportunity to gain exposure for your work. Abstracts submitted by the abstract deadline will also be considered for short talks on the program.

Upper image of group A streptococcus bacteria on human neutrophil courtesy of the National Institute of Allergy and Infectious Diseases, NIH

Meeting Hashtag: #KSsysimm

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# KEYSTONE SYMPOSIA

on Molecular and Cellular Biology

## Translational Systems Immunology (A9)

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Sponsored by AbbVie Inc., Biogen, Bioverativ Therapeutics, Merck & Co., Inc. and Theravance Biopharma

Abstract & Scholarship Deadline: October 2, 2017 / Abstract Deadline: October 31, 2017 / Discounted Registration Deadline: December 1, 2017

### SUNDAY, JANUARY 28

#### Arrival and Registration

### MONDAY, JANUARY 29

#### Welcome and Keynote Address

\*Sally John, Biogen, USA

Sarah Teichmann, Wellcome Trust Sanger Institute, UK  
*Immunogenomics One Cell at a Time*

#### Human Phenotypic Validation via Rare Genetic Mutations

\*Sally John, Biogen, USA

Danish Saleheen, University of Pennsylvania, USA  
*Human Knockout Program*

Helen C. Su, NIAID, National Institutes of Health, USA  
*Elucidating Molecular Mechanisms of a Novel Inherited Immunodeficiency-Immunodysregulation Disorder*

Hakon Hakonarson, Children's Hospital of Philadelphia, USA  
*Exome Sequencing to Diagnosis and Treat Pediatric Immune Disease*

Cecilia Dominguez Conde, CeMM/LBI-RUD, Austria  
*Short Talk: Insights into DOCK2 Deficiency through the Analysis of Protein Interactions*

Michael P. O'Connell, NIAID, National Institutes of Health, USA  
*Short Talk: EXTL1- and NDST2-mediated Regulation of Allergic Disease*

#### Workshop 1: Translation from Mice to Man: Friendly Debate

\*Michael Vincent, Pfizer Inc., USA

\*Mark M. Davis, Stanford University, USA

Jeffrey Barrett, Wellcome Trust Sanger Institute, UK  
*Using Human Genetics for Target Discovery in Inflammatory Bowel Disease*

Richard M. Siegel, NIAMS, National Institutes of Health, USA  
*A Systems Approach to Defining Contributions of TNF-Family Cytokines to Autoimmune Disease Susceptibility Reveals a Protective Role for TL1A/TNFSF15 in IBD*

Adam Laing, King's College London, UK  
*Immune Parameters Are Constrained within a Multidimensional Shape that Describes Immune Competence*

#### Genetics and Epigenetics Variation in Human Immune Traits

\*Sally John, Biogen, USA

Julian C. Knight, University of Oxford, UK  
*Genetic and Epigenetic Modulators of Monocyte Activation in Health and Disease*

Anjana Rao, La Jolla Institute for Allergy and Immunology, USA  
*Transcriptional and Epigenetic Regulation in Cancer and Cancer Immunotherapy*

Nicole Soranzo, Wellcome Trust Sanger Institute, UK  
*Human Genetic Variation of Hematological Parameters*

Dafni Glinos, Wellcome Trust Sanger Institute, UK

*Short Talk: Genetic Effects on Transcriptional Variation of Human T Regulatory Cells*

#### Poster Session 1

### TUESDAY, JANUARY 30

#### Advancing our Understanding of Immune Cell Repertoires

\*Michael Vincent, Pfizer Inc., USA

Aleksandra Walczak, École Normale Supérieure, France  
*Diversity of Immune Receptor Repertoires*

Mark M. Davis, Stanford University, USA  
*T-Cell Repertoires and How to Read Them*

Harlan Robins, Fred Hutchinson Cancer Research Center, USA  
*Reading the Cellular Adaptive Immune System to Diagnose Disease*

George Georgiou, University of Texas at Austin, USA  
*The Human Serological and BCR Antibody Repertoires in Cancer, Autoimmunity or following Vaccination*

Nathaniel D. Chu, Massachusetts Institute of Technology, USA  
*Short Talk: Longitudinal Immunosequencing in Healthy Individuals Reveals Persistent T Cell Receptors Rich in Public Receptors*

Scott Nicholas Furlan, Seattle Children's Research Institute, USA  
*Short Talk: Dissecting the Mechanics of T Cell Alloproliferation*

#### Integrative Analysis, Dynamic Networks and Systems Immunology

\*Soumya Raychaudhuri, Brigham and Women's Hospital, Harvard Medical School, USA

Kasper Lage, Massachusetts General Hospital, USA  
*Human Gene and Protein Networks Perturbed by Genetics to Identify Therapeutics*

Manolis Kellis, Massachusetts Institute of Technology, Broad Institute, USA  
*Talk Title to be Announced*

Shai S. Shen-Orr, Technion, Israel  
*Connect the Dots – An Integrative Cell-Centered View of Immunity*

Jiyang Yu, St. Jude Children's Research Hospital, USA  
*Short Talk: NetBID, a Novel Systems Biology Approach, Identifies Hippo Signaling as a "Hidden" Driver Selectively Programming CD8 $\alpha$ + Dendritic Cell Activity*

#### Poster Session 2

### WEDNESDAY, JANUARY 31

#### Systems Immunology at the Tissue Level

\*Nicole Soranzo, Wellcome Trust Sanger Institute, UK

Betty Diamond, Feinstein Institute for Medical Research, USA  
*Deconstructing Lupus Nephritis through a Single Analysis of Immune Cells in the Kidney*

Soumya Raychaudhuri, Brigham and Women's Hospital, Harvard Medical School, USA  
*Single Cell Sequencing in Rheumatoid Synovial Tissue*

Carolyn B. Coyne, University of Pittsburgh, USA  
*Immunology of the Human Placenta*

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**Elham Azizi**, Memorial Sloan Kettering Cancer Center, USA  
*Computational Approaches to Understanding Cellular Heterogeneity in the Tumor-Immune Microenvironment*

**Zoltan Maliga**, Harvard Medical School, USA  
*Short Talk: Deep Immunophenotyping of Idiopathic and ICI-Induced Skin Disease with Cyclic Immunofluorescence Microscopy*

**Michelle Miron**, Columbia University, USA  
*Short Talk: Human Lymph Nodes Maintain Resident Memory T Cells with High Proliferative Capacity and Clonal Diversity*

### Human Immune Response to Infectious Disease

\***Mark M. Davis**, Stanford University, USA

**Bali Pulendran**, Stanford University School of Medicine, USA  
*Microbiome and B Cell Responses*

**Purvesh Khatri**, Stanford University, USA  
*Adventures of a "Data Parasite": Translational Medicine using Heterogeneous Public Data*

**Máté Manczinger**, MTA Szegedi Biológiai Kutatóközpont, Hungary  
*Short Talk: Pathogen Diversity Drives the Evolution of Promiscuous Peptide Binding of Human MHC-II Alleles*

**Susanna S. Ng**, QIMR Berghofer Medical Research Institute, Australia  
*Short Talk: Identifying Novel Immune Checkpoint Molecules that can be Targeted to Improve CD4+ T Helper Cell Function during Chronic Infection*

### Poster Session 3

### THURSDAY, FEBRUARY 1

#### Immuno-Oncology from Basic Science to Clinical Practice

\***Kasper Lage**, Massachusetts General Hospital, USA

**Shannon J. Turley**, Genentech, Inc., USA  
*Leukocyte Function and Positioning in Diverse Stromal Niches*

**Alexandra Snyder**, Adaptive Biotechnologies, USA  
*T Cell Receptor Sequencing (TCR) in Immuno-Oncology: Systemic, Intratumoral and Antigen-Specific Immunity*

**Cassian Yee**, University of Texas MD Anderson Cancer Center, USA  
*Terminators: No Fate but What You Make*

**Wendy Broom**, Genocea Biosciences, USA  
*Neoantigen Identification using ATLAS Across Multiple Tumor Types Highlights Limitations of Prediction Algorithms*

**Pauline L. Gonnord**, INSERM UMR1043, France  
*Short Talk: High-Dimensional Immunophenotyping of Chronic Lymphocytic Leukemia (CLL) Patients Reveals Remodeling of the CD8+ T Cell Compartment by Tumor Progression and Predicts Need for Therapy*

**Daniel Wells**, Parker Institute for Cancer Immunotherapy, USA  
*Short Talk: Genetic Mechanisms of Immune Evasion in Colorectal Cancer*

**Mazlina Ismail**, University College London, UK  
*Short Talk: Characterising the T Cell Receptor Repertoire of Patients with Non-small-cell Lung Cancer (NSCLC) within the Lung TRACERx Study*

### Workshop 2: CyTOF Change to Human Immunoprofiling

\***Soumya Raychaudhuri**, Brigham and Women's Hospital, Harvard Medical School, USA

**Petter Brodin**, Karolinska Institutet, Sweden  
*Convergence of Immune Systems in Diverse Newborn Children during the First Months of Life*

**Jean-Louis Palgen**, CEA, France  
*Prime and Boost Vaccination Elicit a Distinct Innate Myeloid Cell Immune Response*

**Luis Miguel Franco**, National Institutes of Health, USA  
*Immune Regulation by Glucocorticoids Can Be Linked to Cell-Lineage-Specific Transcriptional Responses*

**Oisin Huhn**, University of Cambridge, UK  
*Characterizing the Architecture of the Decidual Natural Killer Cell Niche using Time of Flight Mass Cytometry*

**Ainhoa Perez-Diez**, NIAID, National Institutes of Health, USA  
*Antibody Profiling Identifies a Strong and Widespread Auto-Immune Response in Idiopathic CD4 Lymphopenic Patients*

**Arnon Arazi**, Broad Institute, USA  
*Beyond Clustering: Using scRNA-seq Data to Generate Quantitative, Testable Models of Human Disease*

**Ning Jiang**, University of Texas at Austin, USA  
*High-Throughput Detection of T Cell Antigen Reactivity at Single T Cell Level using de novo Generated DNA-Linked MHC Tetramers*

### Clinical Immunoprofiling and Patient Stratification

\***David M. Sansom**, University College London Medical School, UK

**Holden T. Maecker**, Stanford School of Medicine, USA  
*Comprehensive Immune Profiling and Functional Analysis of Human Aging / Response to Therapy*

**Sally John**, Biogen, USA  
*A Network Approach to Understanding the Role of the Immune System in Neurodegenerative Disease*

**Sathya Baarathi Shanthi Ravichandran**, Indian Institute of Science, India  
*Short Talk: Identification of a Robust Blood-Based Biomarker Signature for Chronic Systemic Inflammation through a Meta-Analysis of Disease Networks*

**Maria Gutierrez-Arcelus**, Harvard Medical School, USA  
*Short Talk: Cis Regulatory Variation Determines Time Dependent Allelic Expression of HLA-DQB1 during T Cell Activation*

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

### FRIDAY, FEBRUARY 2

### Departure