MONDAY, JANUARY 17
Arrival and Registration

TUESDAY, JANUARY 18
Welcoming Remarks (J4)
Kanta Subbarao, WHO Collaborating Centre for Reference and Research on Influenza, Australia

Beyond Acute Disease: Consequences of Respiratory Virus Infections (J4)
*Pablo Penaloza-MacMaster, Northwestern University, USA
Jie Sun, University of Virginia, USA
Andrew E. Vaughan, University of Pennsylvania, USA
Italo A. Castro, Washington University School of Medicine, USA
Sydney R. Stein, National Institutes of Health, USA
Carolina B. López, Washington University School of Medicine, USA
Jessica Rubens, Johns Hopkins Bloomberg School of Public Health, USA

Inflammation and Innate Immunity in Viral Infections (J3)
*Daniel Blanco-Melo, Fred Hutchinson Cancer Research Center, USA
Siddharth Balachandran, Fox Chase Cancer Center, USA
Lisa P. Daley-Bauer, Emory University, USA
Catherine A. Blish, Stanford University School of Medicine, USA
Ferrin Antony, Auburn University, USA
Justin J. Frere, NYU Langone, USA

Workshop 1: SARS-CoV-2/COVID-19 (J4)
*Matthew Frieman, University of Maryland, USA
Matthew Gartner, Peter Doherty Institute for Infection and Immunity, Australia
Margaret Mills, University of Washington, USA
Lauren B. Rodda, University of Washington, USA
Michael G. Joyce, Henry M. Jackson Foundation / Walter Reed Army Institute of Research, USA

Workshop 1: Innate Immunity in Viral Infections (J3)
*Sammy Bedoui, University of Melbourne, Australia
Adriana Forero, Ohio State University, USA
Chiara E. Geyer, Amsterdam UMC, Netherlands

KEYSTONE SYMPOSIA
on Molecular and Cellular Biology

Respiratory Viruses: New Frontiers (J4)
Scientific Organizers: Kanta Subbarao and Carolina B. López
Supported by the Directors' Fund

Viral Immunity: Basic Mechanisms and Therapeutic Applications (J3)
Scientific Organizers: Katherine Kedzierska and Paul G. Thomas
January 17-20, 2022 • Keystone Resort • Keystone, CO, USA
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For the most up-to-date details, visit https://www.keystonesymposia.org.
Immunity and Respiratory Viruses: Good and (Bad)

Christine Nelson, NIAID, National Institutes of Health, USA
Opposing Effects of IL-10 and IFNγ During SARS-CoV-2 Infection in Non-Human Primates

Fabian Pott, Charité Universitätsmedizin Berlin, Germany
Single-Cell Analysis of Arthritogenic Alphavirus-Infected Human Synovial Fibroblasts Uncovers a Switch from Induction to Repression of Innate Immunity in Infected Cells

Ashley Zani, Ohio State University, USA
Gasdermin D Deficiency Limits the Severity of Influenza in Mice

Viral Immunity: Basic Mechanisms and Therapeutic Applications (J3)

Katelyn M. Gostic, University of Chicago, USA
*Interferon-Independent Pan-Antiviral Immune Response
Short Talk: The ELF1 Transcription Factor Mediates an
Keaton M. Crosse, New York University, USA
*Interferon-Independent Pan-Antiviral Immune Response

Scott E. Evans, University of Texas MD Anderson Cancer Center, USA
*Human Immunity in Blood and Tissues (J3)

Katharine Kedzierska, University of Melbourne, Australia
CD8+ T Cell Immunity in Viral Infection and Vaccination

Donna L. Farber, Columbia University Medical Center, USA
Anti-Viral Immunity in Human Tissues

Robert Mettelman, St Jude Children’s Research Hospital, USA
Short Talk: Defining Cellular Correlates of Protection to Influenza Virus Across Human Cohorts

Julia Niessl, Karolinska Institutet, Sweden
Short Talk: Functional Tissue-Resident Memory CD8+ T Cells Specific for SARS-CoV-2 Reside in Unexposed Oropharyngeal Lymphoid Tissue

Workshop 2: Transmission (J4)

*Anice Lowen, Emory University School of Medicine, USA

Emily Bruce, University of Vermont, USA
Measuring Infectious SARS-CoV-2 in Clinical Samples Reveals Higher Viral Titer: RNA Ratio for Delta and Epsilon vs Alpha Variants

Chris Brooke, University of Illinois at Urbana-Champaign, USA
Longitudinal Sampling of SARS-CoV-2 Infection Reveals Substantial Heterogeneity in Infectious Virus Shedding and Effects of Variants and Vaccination

Vineet D. Menachery, University of Texas Medical Branch, USA
Nucleocapsid Mutations in SARS-CoV-2 Variants Augment Pathogenesis and Transmission

Frances K. Shepherd, University of Minnesota, USA
Unraveling Paramyxovirus Transmission Among Natural Hosts with the “Dirty Mouse” Model System

Andrea French, University of Pittsburgh, USA
Secondary Infection with Streptococcus Pneumoniae Decreases Influenza Virus Replication and Severe Disease is Linked to Reduced Airborne Transmission
**Workshop 2: Adaptive Immunity in Viral Infections (J3)**

- **Oanh Nguyen**, University of Melbourne, Australia
  - Targeted Mutagenesis Provides Molecular Insight Into Key Changes in the Hemagglutinin Gene that Impacted Transmission of Human H3N2 Influenza A Virus in Swine

- **Nicole C. Rockey**, University of Pittsburgh, USA
  - Pre-existing Heterosubtypic Immunity Provides a Barrier to Airborne Transmission of Influenza Viruses

**Viral Immunity: Basic Mechanisms and Therapeutic Applications (J3)**

Scientific Organizers: Katherine Kedzierska and Paul G. Thomas

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**KEystone Symposia**

**Respiratory Viruses: New Frontiers (J4)**

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**Novel Insights into Respiratory Virus Biology (J4)**

*Seema Lakdawala*, University of Pittsburgh School of Medicine, USA
- Monitoring Antibody Responses to Influenza and Coronaviruses using Electron Microscopy

*Andrew B. Ward*, The Scripps Research Institute, USA
- Short Talk: Profiling Memory B Cell Antibody Repertoires to Human Metapneumovirus F Glycoprotein in its Prefusion Conformation

*Chelsea M. Crooks*, University of Wisconsin-Madison, USA
- Short Talk: Comparison of Infection Dynamics and Antibody Responses to Conserved Head and Stem Epitopes on HA

*Ryan A. Langlois*, University of Minnesota, USA
- Virus-Cell Interactions in vivo

**T Cells, B Cells and their Receptors (J3)**

*Anastasia Minervina*, St. Jude Children’s Research Hospital/IBCh RAS, Moscow, Russia, USA
- Short Talk: Comparison of Infection Dynamics and Antibody Responses to Conserved Head and Stem Epitopes on HA

Daniel F. Luque Duque*, University of Leeds, UK
- Stochastic Modelling of TCR-Epitope Recognition in the Context of Cross-Reactivity

Mikhail Pogorelyy*, St. Jude Children's Research Hospital, USA
- Prediction of Immunodominant CD4+ SARS-CoV-2 Epitopes with TCR repertoire Sequencing Data

Katherine G. Nabel*, Harvard Medical School, USA
- Structural Basis for Continued Antibody Evasion by the SARS-CoV-2 Receptor-Binding Domain

Ida E M Uddback*, University of Copenhagen, Denmark
- Resident Memory CD8+ T Cells in the Respiratory Tract Limits Transmission of Viruses

David LV Bauer*, Francis Crick Institute, UK
- Close Encounters of the Third Kind: Comparison of Vaccine-Boosted vs. Delta Infection-Boosted Immunity to SARS-CoV-2 Variants of Concern

Galit Alter*, MIT and Harvard University, USA
- Systems Serology to Characterize Antibody Responses

Alina Baum*, Regeneron Pharmaceuticals, USA
- Antibodies to Respiratory Viruses—Successes and Challenges

J D. Bloom*, Fred Hutchinson Cancer Research Center, USA
- Interpreting the Evolution of SARS-CoV-2

Garrett Rappazzo*, Adimab LLC, USA
- Short Talk: Profiling Memory B Cell Antibody Repertoires to Human Metapneumovirus F Glycoprotein in its Prefusion Conformation

Chelsea M. Crooks**, University of Wisconsin-Madison, USA
- Short Talk: Comparison of Infection Dynamics and Antibody Repertoire in Rhesus Macaques with Serial Flavivirus Exposures

**Poster Session 2**

**THURSDAY, JANUARY 20**

**Translational and Developmental Aspects of Antibodies (Joint)**

*Ali H. Ellebedy*, Washington University School of Medicine, USA
- Short Talk: A Comprehensive Analysis of Defective Influenza A Viruses Using Artificial Libraries

**Christopher Chiu**, Imperial College London, UK
- Lessons from Human Challenge Infection with Respiratory Viruses

Anice Lowen*, Emory University School of Medicine, USA
- Short Talk: Influenza A Virus Reassortment in Swine Produces Spatially Heterogenous Within-Host Viral Populations

**Alistair B. Russell**, University of California, San Diego, USA
- Short Talk: The Coordinated B and T Cell Response in Influenza Vaccination

Carolien van de Sandt*, University of Melbourne at the Peter Doherty Institute, Australia
- Short Talk: Molecular and Functional Mechanisms Underlying Age-Related Changes in Influenza Virus-Specific CD8+ T Cells Across Human Lifespan

Davide Angeletti*, University of Gothenburg, Sweden
- Short Talk: Single-Cell BCR and Transcriptome Analysis After Influenza Infection Reveals Spatiotemporal Dynamics of Antigen-Specific B Cells

**JOSHUA D. POWELL**, USDA-ARS, USA
- Targeted Mutagenesis Provides Molecular Insight Into Key Changes in the Hemagglutinin Gene that Impacted Transmission of Human H3N2 Influenza A Virus in Swine

**NICOLE C. ROCKEY**, University of Pittsburgh, USA
- Pre-existing Heterosubtypic Immunity Provides a Barrier to Airborne Transmission of Influenza Viruses

**J. SCOTT HALE**, University of Utah, USA
- De Novo Methylation Enforces Long-Term Lineage-Specific Programming of T Follicular Helper and T Helper 1 Memory Cells

**MICHAEL A. FARRAR**, University of Minnesota, USA
- Interferon Gene-Signature Tregs in Viral Infection

**Julianna Han**, The Scripps Research, USA
- A Chimeric HA UVIV Elicits Multi-Pronged Polyclonal Antibody Responses to Conserved Head and Stem Epitopes on HA

**Daniel F. Luque Duque**, University of Leeds, UK
- Stochastic Modelling of TCR-Epitope Recognition in the Context of Cross-Reactivity

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Kali Florence Crofts, Wake Forest School of Medicine, USA
Short Talk: Analysis of R848 as an Adjuvant to Improve Inactivated Influenza Vaccine Immunogenicity in Elderly Nonhuman Primates

Prevention and Treatment Strategies: Vaccines and Antivirals (J4)
*Niranjan Kanesa-thasan, Icosavax, Inc., USA
Nevan J. Krogan, University of California, San Francisco, USA
Host Factors as Antiviral Targets
Mary A. Marovich, NIAID, National Institutes of Health, USA
Talk Title to be Announced

Kanta Subbarao, WHO Collaborating Centre for Reference and Research on Influenza, Australia
Strategies to Improve Seasonal and Pandemic Influenza Vaccines
Kena Swanson, Pfizer Inc., USA
RSV Vaccines – Lessons Learned from the COVID-19 Experience with Respect to Pediatric Vaccines
Yaniv Erlich, Eleven Therapeutics, UK
Short Talk: Genome Wide Screen of SARS-CoV-2 Identifies Hyper-Potent siRNAs as Self-Administered Nasal Prophylactics

Novel Approaches to Anti-Viral Vaccines (J3)
*Galit Alter, MIT and Harvard University, USA
Florian Krammer, Icahn School of Medicine at Mount Sinai, USA
Targets for Broadly Protective Influenza Virus Vaccines
Andrea J. Sant, University of Rochester Medical Center, USA
Influenza Specific CD4 T Cell Responses to Vaccination and Infection
Gary J. Nabel, Sanofi, USA
Innovation in Antibody Structure and Design
Stacey Lynne Schultz-Cherry, St. Jude Children's Research Hospital, USA
Vaccinating Vulnerable Populations

Meeting Wrap-Up: Outcomes and Future Directions (J4)
Carolina B. López, Washington University School of Medicine, USA

Meeting Wrap-Up: Outcomes and Future Directions (Organizers) (J3)
Paul G. Thomas, St. Jude Children's Research Hospital, USA

FRIDAY, JANUARY 21
Departure