



**Stanford**  
**MEDICINE**

Institute for Immunity,  
Transplantation and Infection



ITI and Center for Human Systems  
Immunology (Gates) at Stanford:

# **Human Immune Monitoring Technology and Bioinformatics Conference**

**MAY 2-3, 2019**

**Berg Hall, Li Ka Shing, Stanford University**

# Thursday, May 2

## **07:30–08:30 BREAKFAST**

08:30–08:45 Welcome & Opening Remarks

Lynda Stuart, MD, PhD, Bill and Melinda Gates Foundation

Mark M. Davis, PhD, Bali Pulendran, PhD, Catherine Blish, MD, PhD, Purvesh Khatri, PhD, Stanford

## **Session Chair: Bali Pulendran, PhD**

08:50–09:15 Bruce Walker, MD, Ragon Institute of MGH, MIT and Harvard

*Prospects for a T-Cell Mediated Functional Cure of HIV Infection*

09:20–09:45 Justin Sonnenburg, PhD, Stanford

*Establishing the Diet-Microbiome-Immune Axis in Humans*

09:50–10:15 Carolyn Bertozzi, PhD, Stanford

*Chemical Technologies for Infectious Disease Diagnostics*

10:20–10:45 Olivier Gevaert, PhD, Stanford

*Multi-Scale Modeling to Study Complex Diseases*

## **10:50–11:05 COFFEE BREAK**

11:05–11:30 Nima Aghaeepour, PhD, Stanford

*Multimomics Analysis of Term and Preterm Human Pregnancy*

11:35–12:00 Petter Brodin, MD, PhD, Karolinska Institute

*Shaping of Human Immune Systems by Environmental Factors Early in Life*

12:05–12:30 Nathan Price, PhD, Institute for Systems Biology, Seattle

*Longitudinal Multi-omic Profiling for Thousands of People*

## **12:30–01:15 LUNCH & POSTER VIEWING**

## **Session Chair: Purvesh Khatri, PhD**

01:15–01:40 Mike Snyder, PhD, Stanford

*Big Data and Health*

01:45–02:10 Joel Dudley, PhD, Icahn School of Medicine of Mount Sinai

*Moving from Precision Medicine to Next Generation Healthcare*

02:15–02:40 William Shih, PhD, Harvard

*HiFi Molecular Transmission via Crisscross Cooperativity*

02:45–03:10 X. Shirley Liu, PhD, Dana-Farber Cancer Institute

*Hidden Immunology Signals in Tumor RNA-seq*

## **03:10–03:30 COFFEE BREAK & POSTER VIEWING**

03:30–03:55 Crystal Mackall, MD, Stanford

*Engineering T Cells for Cancer Therapy*

04:00–04:25 Evan Newell, PhD, Fred Hutchinson Cancer Research Center

*Decomposing Disease Associated T cell Responses Using Mass Cytometry*

04:30–04:55 Ami Bhatt, MD, PhD, Stanford

*Genomic Approaches to Decipher Microbial Contributions to Health and Disease*

05:00–05:25 Soumya Raychaudhuri, MD, Harvard Broad Institute

*Defining the Architecture of Rheumatoid Arthritis at the Single Cell Level*

## **05:30–06:30 RECEPTION AND POSTER SESSION**

# Friday, May 3

## 08:00–08:30 BREAKFAST

**Session Chair: Mark M. Davis, PhD**

08:30–08:55 Hal Drakesmith, University of Oxford, MRC Weatherall Institute  
*Iron Powers Adaptive Immunity: Implications for Vaccinations*

09:00–09:25 Sarah Fortune, MD, Harvard  
*Single Cell RNAseq Analysis of TB Granulomas: Defining Therapeutic Challenges*

09:30–09:55 Yueh-hsiu Chien, PhD, Stanford  
*A Multi-Cohort Study of the Immune Factors Associated with M. Tuberculosis Infection Outcomes*

10:00–10:25 H. Tom Soh, PhD, Stanford  
*Multiplexed Protein Measurements with High Sensitivity and Resolution*

## 10:25–10:40 COFFEE BREAK & POSTER VIEWING

10:40–11:05 Mark M. Davis, PhD  
*Tools for T cells*

11:10–11:35 Nir Yosef, PhD, UC Berkley  
*Metabolic Modeling with Single-Cell RNA-Seq Reveals Actionable Targets in Autoimmunity*

11:40–12:05 Rhiju Das, PhD, Stanford  
*Inexpensive Diagnostics for Ratiometric Gene Signatures through Designer Riboswitches*

## 12:10–01:10 LUNCH

**Session Chair: Catherine Blish, MD, PhD**

01:10–01:35 Andrea Radtke, PhD, NIH  
*Advanced Optical Imaging Approaches to Understand Human Immunity in a Tissue Context*

01:40–02:05 Garry Nolan, PhD, Stanford  
*Pathology from the Molecular Scale on Up*

02:10–02:35 William Greenleaf, PhD, Stanford  
*Integrative, Multiomic, Single-Cell Dissection of Mixed-Phenotype Acute Leukemia.*

02:40–03:05 Manu Prakash, PhD, Stanford  
*Octo-pi: Open Reconfigurable High-Throughput Imaging Platforms for Field Diagnosis of Infectious Disease*

## 03:10–03:25 COFFEE BREAK

03:25–03:50 Elizabeth Egan, MD, PhD, Stanford  
*New Approaches to Discover Host Erythrocyte Factors for Malaria*

03:55- 04:20 Kari Nadeau, MD, PhD, Stanford  
*Studying Immunological Mechanisms to Try to End Food Allergy*

04:25–04:50 Rosa Bacchetta, MD, Stanford  
*New Approaches to Dissect Immune Dysregulation in Children with Genetic Immune Diseases*

04:55- 05:20 Steven Deeks, MD, UCSF  
*Towards a HIV Cure: Untangling the Immunology of HIV Persistence during Antiretroviral Therapy*

05:25- 05:30 Closing Remarks, Mark M. Davis, PhD, Stanford

# Posters

**1. “Predicting CD19- relapse following CAR T cell therapy in acute lymphoblastic leukemia”**

Pablo Domizi<sup>1</sup>, Astraea Jager<sup>1</sup>, Jolanda Sarno<sup>1</sup>, Elena Sotillo<sup>2</sup>, David Barrett<sup>3</sup> and Kara Davis<sup>1</sup>

**2. CyTOF staining compatible with inactivation of high-consequence pathogens**

Nilanjan Mukherjee<sup>1</sup>, Han Chen<sup>1</sup>, Zach Bjornson<sup>1,2</sup>, Richard S. Bennett<sup>3</sup>, Krisztina B. Janosko<sup>3</sup>, Bonnie Dighero-Kemp<sup>3</sup>, James Logue<sup>3</sup>, Peter Jahrling<sup>3,4</sup>, Lisa Hensley<sup>3</sup>, David R. McIlwain<sup>1</sup>, Garry P. Nolan<sup>1</sup>

**3. Mechanisms driving altered V $\delta$ 2+  $\gamma\delta$  T unction during recurrent malaria infection**

Kathleen Dantzler<sup>1</sup>, Sandy Klemm<sup>1</sup>, Rafael Polidoro<sup>2,3</sup>, Aditya Rao<sup>1</sup>, Mai Dvorak<sup>1</sup>, John Rek<sup>4</sup>, Moses Kamya<sup>5</sup>, Peggie Cheung<sup>1</sup>, Alex Kuo<sup>1</sup>, Grant Dorsey<sup>6</sup>, Margaret Feeney<sup>6</sup>, Purvesh Khatri<sup>1</sup>, Will Greenleaf<sup>1</sup>, Judy Lieberman<sup>2</sup>, Prasanna Jagannathan<sup>1</sup>

**4. Identification of a CAR T-cell population associated with enduring complete response in lymphoma patients**

Zinaida Good<sup>1,2,\*</sup>, Jay Y. Spiegel<sup>1,2,\*</sup>, Bitu Sahaf<sup>1,2</sup>, Meena B. Malipatlolla<sup>1,2</sup>, Anita Wong<sup>1,2</sup>, Fang Wu<sup>1,2</sup>, David Miklos<sup>1,2,§</sup>, Crystal L. Mackall<sup>1-3,§</sup>

**5. Altered function of CMV-responsive T cells after solid organ transplantation**

Lauren E Higdon<sup>1</sup>, Steven Schaffert<sup>2</sup>, Naresha Saligrama<sup>3</sup>, Mark M Davis<sup>2,3</sup>, Purvesh Khatri<sup>2,4</sup>, Jonathan S Maltzman<sup>1,5</sup>

**6. Immune Profiling of Vaccine-Specific Responses in Elderly Adults using CyTOF**

Sangeeta Kowli<sup>1</sup>, Christine MD Lingblom<sup>1</sup>, Nithya Swaminathan<sup>2</sup>, Holden T Maecker<sup>1</sup>, Stacie L Lambert<sup>2</sup>.

**7. Immunologic profiles defining clinical states in malaria.**

Maureen Ty<sup>1</sup>, Lauren De La Parte<sup>1</sup>, Rek John<sup>2</sup>, Richard Kajubi<sup>2</sup>, Moses Kamya<sup>3</sup>, Holden Maecker<sup>1</sup>, Margaret Feeney<sup>4</sup>, Grant Dorsey<sup>4</sup>, Michelle Boyle<sup>5</sup>, Bali Pulendran<sup>1</sup>, Prasanna Jagannathan<sup>1</sup>

**8. Peripheral Immune Profile Changes among Patients with Inflammatory Bowel Disease in the Perioperative Period**

Kristen Rumer MD/PhD<sup>1, 2</sup>, Cindy Kin MD<sup>2</sup>, Elizabeth Shelton<sup>2</sup>, Andrew Shelton MD<sup>2</sup>, Margaret Folk-Tolbert<sup>2</sup>, Natalie Kirilcuk MD<sup>2</sup>, Arden Morris MD<sup>2</sup>, Brooke Gurland MD<sup>2</sup>, Xiaoyuan Han PhD<sup>1</sup>, Ina Steltzer PhD<sup>1</sup>, Ed Giano PhD<sup>1</sup>, Kaz Ando MD/PhD<sup>1</sup>, Karen Wong DO<sup>1</sup>, Eileen Tsai<sup>1</sup>, Martha Tingle<sup>1</sup>, Beata Warrington<sup>1</sup>, Nima Agheepour PhD<sup>1</sup>, Brice Gaudilliere MD/PhD<sup>1</sup>

**9. Cellular correlates of protective immunity to malaria in pregnancy**

Lauren De La Parte, Maureen Ty, Abel Kakuru, Moses Kamya, Margaret Feeney, Grant Dorsey, Prasanna Jagannathan

**10. Engineering upconverting nanoparticles as biocompatible mechanical force sensors for applications to immune synapse imaging**

Claire A. McLellan<sup>1</sup>, Alice Lay<sup>2</sup>, Chris Siefe<sup>1</sup>, Stefan Fischer<sup>1</sup>, Miriam B. Goodman<sup>3</sup>, Jennifer Dionne<sup>1</sup>

**11. Towards Rapid, Accurate Bacterial Blood Steam Infection Identification and Antibiotic Susceptibility Testing With Acoustic Bioprinting, Raman Scattering, and Machine Learning**

Loza Tadesse<sup>1</sup>, Fareeha Safir<sup>2</sup>, Chi-Sing Ho<sup>3,4</sup>, Neal Jean<sup>5,6</sup>, Amr A. E. Saleh<sup>3</sup>, Kaymar Firouzi<sup>6</sup>, Catherine A. Hogan<sup>7</sup>, Stefanie S. Jeffrey<sup>8</sup>, Mark Holodniy<sup>9</sup>, Niaz Banaei<sup>7,9</sup>, Stefano Ermon<sup>3</sup>, Butrus (Pierre) Khuri-Yakub<sup>6</sup>, and Jennifer Dionne<sup>4</sup>

# Posters

- 12. TCR-Fetch: A Novel Computational Approach for Understanding the Human T-cell Response to Influenza Vaccination**  
Vishnu Shankar<sup>1,2</sup>, Shin-Heng Chiou<sup>2</sup>, Naresha Saligrama<sup>3</sup>, Lisa Wagar<sup>3</sup>, Jacob Glanville<sup>2,4</sup>, Scott Boyd<sup>4</sup>, and Mark M. Davis<sup>2,3,5</sup>
- 13. A robust host-based gene expression signature that differentiates malaria from other febrile infections.**  
Aditya M. Rao<sup>1,2</sup> Purvesh Khatri<sup>1,3</sup>
- 14. Harmonization and Comparison of scRNA-seq from Blood and CSF in Multiple Sclerosis Patients and Controls**  
Chenling A. Xu<sup>1</sup>, David Schafflick<sup>2</sup>, Michael Cole<sup>1,4</sup>, Nir Yosef<sup>1,5,6</sup>, and Gerd Meyer zu Horste<sup>2,3</sup>
- 15. Increased Chromatin Modification Variability and Expression in Immune Cells Characterize the Epigenome in Older Males**  
Author List: Kelly J. McGill<sup>1,2</sup>, Peggy Cheung<sup>1,3</sup>, Francesco Vallania<sup>1,4</sup>, Alex J. Kuo<sup>1,3</sup>, Sarah E. Chang<sup>1,3</sup>, Mai Dvorak<sup>1,3</sup>, Cornelia L. Decker<sup>5</sup>, Mark M. Davis<sup>1,6,7</sup>, Paul J. Utz<sup>1,3</sup>, Purvesh Khatri<sup>1,4\*</sup>
- 16. Multiomics analysis in single cells**  
Margaret Nakamoto<sup>1</sup>, Gretchen Lam<sup>1</sup>, Hye-Won Song<sup>1</sup>, Christina Chang<sup>1</sup>
- 17. MSKC: A Stanford Biofacility at the Intersection of Medicine, Engineering, and Chemistry**  
Daniel Fernandez and Corey Liu
- 18. Multi-omic profiling of asthma using high-throughput sequencing**  
Gopal Krishna R Dhondalay<sup>1</sup>, Bryan Bunning<sup>1</sup>, Rebecca N. Bauer<sup>2</sup>, Elliot S. Barnathan<sup>3</sup>, Christopher Maniscalco<sup>4</sup>, Frédéric Baribaud<sup>3</sup>, Kari Nadeau<sup>1</sup>, Sandra Andorf<sup>1\*</sup>
- 19. TIGIT is upregulated by HIV infection and marks a responsive natural killer cell subset**  
Elena Vendrame<sup>1</sup>, Christof Seiler<sup>2</sup>, Thanmayi Ranganath<sup>1</sup>, Susan P. Holmes<sup>2</sup>, Michel Roger<sup>3</sup>, and Catherine A. Blish<sup>1</sup>
- 20. Longitudinal multi-omics profiling in response to acute exercise in healthy and prediabetic individuals**  
Si Wu<sup>1</sup>, Kevin Contrepolis<sup>1</sup>, Kegan Moneghetti<sup>2</sup>, Sara Ahadi<sup>2</sup>; Daniel Hornburg<sup>1</sup>; Eric Wei<sup>1</sup>; Ming-Shian Tsai<sup>1</sup>; Jeffrey W Christle<sup>2</sup>; Francois Haddad<sup>2</sup>; Michael Snyder<sup>1</sup>
- 21. Charge-altering releasable transporters enable genetic and phenotypic manipulation of resting primary human natural killer cells**  
Aaron J. Wilk<sup>1,2</sup>, Nancy L. Benner<sup>3</sup>, Paul A. Wender<sup>3</sup>, and Catherine A. Blish<sup>2,4</sup>
- 22. Prospective multi-site validation of 11-gene host response signature for influenza diagnosis**  
Simone A Thair<sup>1</sup>, Steven Schaffert<sup>1</sup>, Maryam Shojaei<sup>2</sup>, Timothy E Sweeney<sup>1&3</sup>, Benjamin Tang<sup>2</sup>, Purvesh Khatri<sup>1</sup>
- 23. Modeling adaptive immunity with tonsil organoids**  
Lisa E. Wagar<sup>1</sup>, Ameen Salahudeen<sup>2</sup>, Christian M. Constantz<sup>3</sup>, Michael M. Lyons<sup>1</sup>, Vamsee Mallajosyula<sup>3</sup>, Julia Z. Adamska<sup>4</sup>, Lisa K. Blum<sup>4</sup>, Fan Yang<sup>5</sup>, Katherine J. L. Jackson<sup>6</sup>, Katharina Röltgen<sup>5</sup>, Krishna M. Roskin<sup>7,8</sup>, Gregory B. Hammer<sup>9</sup>, Peter S. Kim<sup>10</sup>, William H. Robinson<sup>4</sup>, Scott D. Boyd<sup>5</sup>, Calvin J. Kuo<sup>2</sup>, & Mark M. Davis<sup>1,3,11</sup>



# Posters

**24. SIMON, an automated machine learning system reveals immune signatures of influenza vaccine responses**

Adriana Tomic<sup>1</sup>, Ivan Tomic<sup>2</sup>, Yael Rosenberg-Hasson<sup>3</sup>, Cornelia L. Dekker<sup>4</sup>, Holden Maecker<sup>3</sup> and Mark M. Davis<sup>1,5,6</sup>

**25. Increased monocyte count as a cellular biomarker for poor outcomes in fibrotic Diseases: a retrospective, multicentre cohort study**

Madeleine Scott, BA,<sup>1,2</sup> Katie Quinn, PhD, <sup>2</sup> Qin Li, PhD<sup>3</sup>, Robert Carroll, PhD,<sup>4</sup> Hayley Warsinske, PhD,<sup>1,2</sup> Francesco Vallania, PhD,<sup>1,2</sup> Shirley Chen,<sup>1,2</sup> Mary A Carns, MS,<sup>5</sup> Kathleen Aren, MPH, CHES,<sup>5</sup> Jiehuan Sun PhD<sup>7</sup>, Kimberly Koloms, MS,<sup>5</sup> Jungwha Lee, PhD,<sup>5</sup> Jessika Baral,<sup>1</sup> Jonathan Kropski, MD,<sup>6</sup> Hongyu Zhao PhD<sup>7</sup>, Erica Herzog PhD<sup>3</sup>, Fernando Martinez, MD, MS,<sup>8</sup> Bethany B. Moore, PhD<sup>8</sup>, Monique Hinchcliff, MD, MS,<sup>5</sup> Joshua Denny MD, MS,<sup>4</sup> Naftali Kaminski, MD<sup>3</sup>, Jose Herazo-Maya, MD <sup>3</sup>, Nigam H. Shah MBBS, PhD,<sup>2\*</sup> Purvesh Khatri, PhD<sup>1,2\*,§</sup>

**26. A year-long immune profile of the systemic response in acute stroke survivors**

Amy S. Tsai<sup>1</sup>, Kacey Berry<sup>2,3</sup>, Maxime M. Beneyto, MD<sup>1</sup>, Dyani Gaudilliere, DMD, MPH<sup>4</sup>, Edward A. Ganio, PhD<sup>1</sup>, Anthony Culos<sup>1</sup>, Mohammad S. Ghaemi<sup>1</sup>, Benjamin Choisy, MD<sup>1</sup>, Karim Djebali, DMD<sup>1</sup>, Jakob F. Einhaus<sup>1</sup>, Basile Bertrand<sup>1</sup>, Athena Tanada<sup>1</sup>, Natalie Stanley, PhD<sup>1</sup>, Ramin Fallahzadeh, PhD<sup>1</sup>, Quentin Baca, MD, PhD<sup>1</sup>, Lisa N. Quach<sup>2,3</sup>, Elizabeth Osborn<sup>2,3</sup>, Lauren Drag, PhD<sup>3</sup>, Maarten G. Lansberg, MD, PhD<sup>2,3</sup>, Martin S. Angst, MD<sup>1</sup>, Brice Gaudilliere, MD, PhD<sup>1</sup>, \*, Marion S. Buckwalter, MD, PhD<sup>2,3,5,\*</sup>, Nima Aghaepour, PhD<sup>1,\*</sup>

**27. Tonsil cultures as a model system: understanding the human T cell response to influenza vaccination**

Lauren Jatt<sup>1,4</sup>, Lisa Wagar<sup>1</sup>, Ameen Salahudeen<sup>2</sup>, Christian Constantz<sup>1</sup>, Vamsee Mallajosyula<sup>1</sup>, Julia Adamska<sup>2</sup>, Lisa Blum<sup>2</sup>, William Robinson<sup>2</sup>, Calvin Kuo<sup>2</sup>, Gregory Hammer<sup>2</sup>, Scott Boyd<sup>3</sup>, Mark Davis<sup>1,2</sup>

**28. EpiAtlas, the repository of single-cell human epigenetic profiles**

Michele Donato<sup>1</sup>, Laurynas Kalesinskas<sup>1,2</sup>, Steven Schaffert<sup>1</sup>, Rohit Vashisht<sup>1</sup>, Ananth Ganesan<sup>3</sup>, Alex Kuo<sup>4</sup>, Peggie Cheung<sup>4</sup>, Mai Dvorak<sup>4</sup>, Sarah Chang<sup>4</sup>, Mariko Foecke<sup>4</sup>, Paul J Utz<sup>4</sup>, Purvesh Khatri<sup>1,2,\*</sup>.

**29. Pollution-associated Exposure Signature Predicts Blood Pressure in Teenagers**

Authors: Mary Prunicki, PhD, MD<sup>1</sup>, Francois Haddad, MD<sup>2</sup>, Nicholas Cauwenberghs, PhD<sup>3</sup> and Kari Nadeau, MD, PhD<sup>1</sup>

**30. From T cell receptor to antigen; Systems approaches to discovering T cell antigen(s) in neurological diseases**

Naresha Saligrama, Fan Zhao, Michael J Sikora, William S Serratelli, Ricardo A Fernandes, David M Louis, Winnie Yao, Xuhuai Ji, Juliana Idoyaga, Vinit B. Mahajan, Lars M Steinmetz, Yueh-Hsiu Chien, Stephen L Hauser, Jorge R Oksenberg, Christopher K Garcia, and Mark M Davis

**31. Pollution-associated Exposure Signature Predicts Blood Pressure in Teenagers**

Authors: Mary Prunicki, PhD, MD<sup>1</sup>, Francois Haddad, MD<sup>2</sup>, Nicholas Cauwenberghs, PhD<sup>3</sup> and Kari Nadeau, MD, PhD<sup>1</sup>

**32. Learning Post Translational Modifications in Latent Tuberculosis from Single Cells**

Rohit Vashisht<sup>1,2</sup>, Michele Donato<sup>1,2</sup>, Larry Kalesinskas<sup>1,2</sup>, Ananthakrishnan Ganesan<sup>1,2</sup>, Alex J. Kuo<sup>1,3</sup>, Peggie Cheung<sup>1,3</sup>, Maricko Foecke<sup>1,3</sup>, Mai Dvorak<sup>1,3</sup>, Thomas J Scriba<sup>4</sup>, Paul J. Utz<sup>1,3</sup> and Purvesh Khatri<sup>1,2\*</sup>

# Posters

- 33. Activation of self- and neoantigen-specific tumor infiltrating T cells by polymeric nanoparticles**  
Qian Yin<sup>1</sup>, Wong Yu<sup>2,3</sup>, Caitlin L. Grzeskowiak<sup>4</sup>, Huang Huang<sup>5</sup>, Jing Guo<sup>2</sup>, Feng Wang<sup>5</sup>, Liang Chen<sup>1</sup>, Fan Zhao<sup>2</sup>, Yueh-Hsiu Chien<sup>1,2</sup>, Calvin J. Kuo<sup>4</sup>, Mark M Davis<sup>1,2,5\*</sup>
- 34. Toward a ratiometric point-of-care diagnostic test for active Tuberculosis: the potential of ribo-switches**  
Ferial Melaine<sup>1</sup>, Kevin Shih<sup>1</sup>, Ann Kladwang<sup>1</sup>, Nicholas Allen<sup>1</sup> and Rhiju Das<sup>1</sup>
- 35. Molecular identity of type 1 regulatory T cells designed for clinical use**  
Alma-Martina Cepika<sup>1</sup>, Pauline Chen<sup>1</sup>, Brandon Cieniewicz<sup>1</sup>, Jeffrey Mao-Hwa Liu<sup>1</sup>, Molly Javier Uyeda<sup>1,2</sup>, Rosa Bacchetta<sup>1</sup>, Maria Grazia Roncarolo<sup>1,2</sup>
- 36. Identifying Transcription Factors Controlling Type 1 Regulatory T Cell Fate**  
Molly Javier Uyeda<sup>1,2</sup>, Brandon Cieniewicz<sup>1,2</sup>, Pauline Chen<sup>1,2</sup>, Alma-Martina Cepika<sup>1,2</sup>, Maria Grazia Roncarolo<sup>1,2</sup>
- 37. Protein- and sequencing-based parallel single-cell approaches to immune profiling of asthma-specific cell subtypes and gene expression biomarkers.**  
Xuhuai Ji<sup>\*</sup>, Igor Goncharov<sup>\*</sup>, Swati Acharya<sup>†</sup>, Miao Zhao<sup>\*</sup>, Molly Miranda<sup>\*</sup>, Shu-Chen Lyu<sup>†</sup>, Kari Christine Nadeau<sup>†</sup>, and Holden Terry Maecker<sup>\*</sup>
- 38. Strain bias inhibits influenza vaccination responses**  
Vamsee Mallajosyula<sup>1</sup>, Cornelia L. Dekker<sup>2</sup>, Holden T. Maecker<sup>3</sup>, Mark M. Davis<sup>1,4,5</sup>
- 39. Incorporated nonmolecular nodes for elucidation of causal molecular networks**  
Karen Sachs<sup>1,2,3</sup>, Maxwell Gold<sup>1</sup>, Divya Ramamoorthy<sup>1,2</sup>, Johnathan Li<sup>1,2</sup>, Julianne Jorgensen<sup>4</sup>, Keith Van Haren<sup>4</sup>, Garry P. Nolan<sup>4</sup>, Zohar Sachs, and Ernest Fraenkel<sup>1,2</sup>.
- 40. Explored function of the C16orf58 gene relative to the development of Cancer**  
Aayan Patel
- 41. 2D and 3D spatial analysis of immune cell populations in human tissues using advanced imaging techniques**  
Rochelle Shih<sup>1</sup>, Andrea J. Radtke<sup>1</sup>, Evelyn Kandov<sup>1</sup>, Peter A. Szabo<sup>2</sup>, Anita Gola<sup>1</sup>, Weizhe Li<sup>1</sup>, Juraj Kabat<sup>3</sup>, Jonathan M. Hernandez<sup>4</sup>, Donna L. Farber<sup>2</sup>, Ronald N. Germain<sup>1</sup>
- 42. Characterization and deep spatial profiling of the mammalian immune system using a highly multiplexed optical imaging approach**  
Evelyn Kandov<sup>1</sup>, Rochelle Shih<sup>1</sup>, Nishant Thakur<sup>1</sup>, Ziv Rafael Yaniv<sup>2</sup>, Bradley Lowekamp<sup>2</sup>, David T. Chen<sup>2</sup>, Juraj Kabat<sup>3</sup>, Peter A. Szabo<sup>4</sup>, Weizhe Li<sup>1</sup>, Jonathan M. Hernandez<sup>5</sup>, Donna L. Farber<sup>4</sup>, Ronald N. Germain<sup>1,\*</sup>, Andrea J. Radtke<sup>1,\*</sup>
- 43. AutoGate facilitates Analysis of High Dimensional Flow Cytometry & CyTOF Data**  
Stephen Meehan<sup>1</sup>, Darya Orlova<sup>1</sup>, Wayne Moore<sup>1</sup>, David Parks<sup>1</sup>, Connor Meehan<sup>2</sup>, Guenther Walther<sup>3</sup>, Justin Youngyunpipatkul<sup>1</sup>, Paul A. Raju<sup>1</sup> and Leonore Herzenberg<sup>1</sup>