STOCHASTICITY AND CONTROL OF IMMUNE REPETORIES

Jerusalem 18-23.6.2017

Program
Joint conference of the Israel Institute for Advanced Studies and the Israel Science Foundation

Batsheva de Rothschild Seminar on

STOCHASTICITY AND CONTROL OF IMMUNE REPERTOIRES

Program
<table>
<thead>
<tr>
<th>Time</th>
<th>Sunday</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
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<tbody>
<tr>
<td>9:00</td>
<td>Daniel Douek (NIH)</td>
<td>Yanay Ofran (BIU)</td>
<td>Martin Flajnik (U. of Maryland)</td>
<td>Johannes Textor (Radboud University)</td>
<td>Thomas Höfer (dkfz Heidelberg)</td>
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<td>10:00</td>
<td>Felix Breder and Jamie Scott (Simon Fraser University, Canada)</td>
<td>Mikhail Shugay (Russian Academy of Sciences)</td>
<td>Sarah Cobey (University of Chicago)</td>
<td>Ronald B Gartenhaus (U. of Maryland)</td>
<td>Kim Jacobson (Monash University)</td>
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<td>11:30</td>
<td>Coffee break</td>
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<td>12:10</td>
<td>Marie-Paule Lefranc (University of Montpellier)</td>
<td>Andrea Pagnani (Politecnico di Torino)</td>
<td>David Klatzmann (Pierre and Marie Curie)</td>
<td>Paul G. Thomas (St. Jude Children’s Hospital)</td>
<td>Tomer Hertz (BGU)</td>
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<tr>
<td>12:40</td>
<td>Registration + light lunch</td>
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<td>13:30</td>
<td>Opening words: Gur Yaari (BIU)</td>
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<td>14:00</td>
<td>Scott Boyd (Stanford)</td>
<td>Tutorial: Repertoire analysis (Jason Vanderheiden)</td>
<td>Tutorial: Mathematical models of the immune system (Rob de Boer)</td>
<td>Tutorial: Mathematical models of the immune system (Haralampos Hatzikirou)</td>
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<td>15:00</td>
<td>Steven Kleinstein (Yale)</td>
<td>Coffee break</td>
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<td>16:00</td>
<td>Phil Hodgkin (Walter and Eliza Hall Institute of Medical Health)</td>
<td>Yossafat Greiff (ETH)</td>
<td>Deborah Dunn Walters (U. of Surrey)</td>
<td>Yoram Louzoun (BIU)</td>
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<td>17:00</td>
<td>Keynote speaker: Yoram Louzoun (BIU)</td>
<td>Coffee break</td>
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<tr>
<td>18:00</td>
<td>Keynote speaker: Michael Levitt (Stanford University)</td>
<td>Poster session with snacks</td>
<td>Jiri Nevo (TAU)</td>
<td>Keynote speaker:</td>
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<td>19:00</td>
<td>Social Dinner</td>
<td>Dinner on your own</td>
<td>Dinner on your own</td>
<td>Dinner at mishkanot sha’ananim</td>
<td>Social drinks</td>
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</table>
DAY 1: Sunday 18.6

12:10 – 13:30  Registration & light lunch
13:45 – 14:00  Opening words
               Gur Yaari, Faculty of Engineering, Bar Ilan University

Session 1:   Chair: Steven Kleinstein

14:00 – 14:30  Signaling and Selection in the Germinal Center
               Mark Shlomchik, University of Pittsburgh School of Medicine

14:30 – 15:00  B cell Repertoire Responses in Vaccination
               and Infection
               Scott D Boyd, Stanford University

15:00 – 15:30  Coffee Break  🍵

SESSION 2:   Chair: Nir Friedman

15:30 – 16:00  Analysis of B Cell Antibody Repertoires from
               Next-Generation Sequencing in Multiple Sclerosis
               Other Diseases
               Steven H. Kleinstein, Yale School of Medicine

16:00 – 16:30  Updating Ideas About the Evolution of Life
               Irun Cohen, Weizmann Institute of Science

16:30 – 17:00  T cells Go Public: The Organization of
               T Lymphocyte Repertoires in Health and Disease
               Nir Friedman, Weizmann Institute of Science
17:00 – 17:30  Coffee Break  

17:30 – 18:30  Keynote Speaker:  
A Stochastic Caclus for T and B Lymphocyte  
Regulation and Control  
Phil Hodgkin, Walter and Eliza Hall Institute of Medical Health  

18:30 – 21:00  Social Dinner  

DAY 2: Monday 19.6  

Session 3:  Chair: Sol Efroni  

9:00 – 9:30  Predicting Who Does and Who Does Not Become Infected with HIV  
Daniel Douek, National Institutes of Health  

9:30 – 10:30  Creating Value from Antibody/B-cell and T-cell Repertoire Data: the AIRR Community Initiative  
Felix Breden and Jamie Scott, Simon Fraser University  

10:30 – 11:10  Coffee Break  

Session 4:  Chair: Gur Yaari  

11:10 – 11:40  IMGT®: Immunoinformatics Bridges for The Adaptive Immune Responses  
Marie-Paule Lefranc, Montpellier University and CNRS  

11:40 - 12:10  Repertoire Development: It May Be Stochastic, But Nothing Is Left to Chance!  
Andrew Collins, University of New South Wales
12:10 – 12:40  Characterizing Full-length Germline Immunoglobulin Heavy Chain Locus Haplotypes and Variable Gene Diversity in Human Populations
Corey T. Watson, University of Louisville School of Medicine

12:40 – 14:00  Lunch

14:00 – 15:45  Tutorial: Repertoire Analysis
Jason Vander Heiden, Yale School of Medicine

15:45 – 16:15  Coffee Break

Session 5: Chair: Uri Hershberg

16:15 – 16:35  Quantifying the balance of predetermination and stochasticity in the diversity of immune repertoires
Victor Greiff, ETH

16:35 – 16:55  Individualized Immunoglobulin Germline Database Production in Multiple Species
Martin Corcoran, Karolinska Institute

16:55 – 17:15  Using next generation sequencing data to predict antibody-antigen binding sites in celiac disease
Moriah Gidoni, Bar Ilan University

17:15 – 17:35  Insights into immune system development and function from mouse T cell repertoires
Yuval Elhanati, Princeton University

17:35 – 17:55  What’s Your (“favorite”) Antibody?
Yariv Wine, Tel Aviv University

18:00 – 20:00  Poster session with snacks
DAY 3: Tuesday 20.6

Session 6:  
9:00 – 9:30  
*All Models Are Wrong, Some Are Useful: Designing Antibodies Based on Inaccurate Models*  
Yanay Ofran, Bar Ilan University

9:30 – 10:00  
*Inferring Population Frequency and Dynamics of T-cells Specific to Common and Rare Antigens from Immune Repertoire Sequencing Data*  
Mikhail Shugay, Institute of Bioorganic Chemistry RAS

10:00 – 10:30  
*Are Human TSCM Cell Dynamics in Vivo Compatible with Long-lived Immunological Memory and Stemness?*  
Becca Asquith, Imperial College

10:30 – 11:10  
Coffee Break

Session 7:  
Chair: Yanay Ofran

11:10 – 11:40  
*Maximum-entropy Description of Repertoire Sequencing Data*  
Andrea Pagnani, Politecnico di Torino

11:40 – 12:10  
*Generation, Selection and Maturation of Healthy Immune Repertoires*  
Thierry Mora, Ecole normale supérieure

12:10 – 12:40  
*Regular Administration, Stochastic Response: Affinity Maturation to Protein Antigens*  
Thomas B. Kepler, Boston University School of Medicine
12:40 – 14:00  Lunch

14:00 – 16:00  Tutorial:
Inferring cellular dynamics from labeling data
Rob de Boer, Utrecht University

15:45 – 16:15  Coffee Break  ☕️

Session 8:
Chair: Uri Hershberg

16:15 – 16:45  B cell Selection in Development, What Does Repertoire Tell Us?
Deborah Dunn-Walters, University of Surrey

16:45 – 17:15  Exploring Antibody Recognition Using High Throughput Binding Data
Michal Or-Guil, Humboldt University

17:15 – 17:45  Gene-Specific Substitution Profiles Describe the Types and Frequencies of Amino Acid Changes during Antibody Somatic Hypermutation
Chaim A Schramm, National Institutes of Health

17:45 – 18:15  Coffee Break  ☕️

Session 9:
Chair: Gur Yaari

18:15 – 18:35  Ecological Regulation of Immune Self-Tolerance
Uri Nevo, Sackler School of Medicine
18:35 – 18:55  Exploiting functional B cell repertoire convergence to determine vaccination elicited B cell receptor sequences in silico
Jean-Philippe Bürckert, Luxembourg Institute of Health

18:55 – 19:15  Molecular determinants of antibody promiscuous binding modes during B-cell differentiation
Franca Fratemali, King’s College London

19:15 – 19:35  Novel Calcium Dependent Mechanisms of NF-κB activation in T cell tolerance and immunity
Corbett Berry, Drexel University

DAY 4: Wednesday 21.6

Session 10:  Chair: Bartlomiej Swiatczak

9:00 – 9:30  The Abrahamic Nature of Shark Antigen Receptors
Martin Flajnik, University of Maryland School of Medicine

9:30 – 10:00  Three time scales in the coevolution of influenza and human immunity
Sarah Cobey, University of Chicago

10:00 – 10:30  Following the T cell Repertoire During the Development of Breast Cancer in Mice
Sol Efroni, Bar-Ilan University Systems Biomedicine

10:30 – 11:10  Coffee Break 🍵
Session 11: Chair: Michal Or-Guil

11:10 – 11:40 Navigating the Diversity of Regulatory T cell TCR Repertoire
David Klatzmann, Pierre and Marie Curie University

11:40 – 12:10 Clonal Evolution of Human Memory B cell Responses
Hedda Wardemann, German Cancer Research Center

12:10 – 12:40 Clone Size Distributions of The Human Naive T cell Repertoire
Rob de Boer, Utrecht University

12:40 – 14:00 Lunch

14:00 – 20:00 Tour of the old city and Via Dolorosa

20:00 – 22:00 Dinner at Mishkanot Sha’ananim

DAY 5: Thursday 22.6

Session 12: Chair: Yoram Louzoun

9:00 – 9:30 How T cell cross-reactivity helps the immune system learn self-nonself discrimination
Johannes Textor, Radboud University Medical Centre

9:30 – 10:00 MNKs Switch the Cellular Translatome by Regulating elF4E1-elF4E3 Activity
Ronald B Gartenhaus, University of Maryland Medical School
10:00 – 10:30  High Resolution Longitudinal Immune Profiling Reveals Immunosenescence Dynamics and an Attractor State
Shai Shen-Orr, Technion - Israel Institute of Technology

10:30 – 11:10  Coffee Break  ☕️

Session 13:  Chair: Shai Shen-or

11:10 – 11:40  TCR Repertoire Features That Define Specificity in Pathogens and Tumors
Paul G. Thomas, St. Jude Children’s Research Hospital

11:40 – 12:10  Immune Stimulation of Hematopoietic Stem Cells
Roi Gazit, Ben-Gurion University of the Negev

12:10 – 12:40  Data, Data, Everywhere – Embracing the Insights of Complexity to Find Coherence in Big Data
Kenneth Buetow, Arizona State University

12:40 – 14:00  Lunch

14:00 – 15:45  Tutorial:
Multiscale modeling in multicellular systems
Haralampos Hatzikirou, Helmholtz Centre for Infection Research

15:45 – 16:00  Coffee Break  ☕️
Session 14: Chair: Ron Gartenhaus

16:00 – 16:30  Structural Diversity Narrowing Leads to Repertoire overlap in Population
Yoram Louzoun, Bar Ilan University

16:30 – 17:00  GARDing the secretory pathway via Golgi quality control
Yifat Merbl, Weizmann Institute of Science

17:00 – 17:30  The Individual and Population Genetics of Protective Anti-influenza HA Antibody Responses
Wayne A. Marasco, Dana-Farber Cancer Institute

17:30 – 18:00  Coffee Break

18:00 – 19:00  Keynote Speaker:
Hybrid Multiscale Models for Simulating Functional Motion in Macromolecular Complexes
Michael Levitt, Stanford University

19:00 – 22:00  Social Drinks
DAY 6: Friday 23.6

Session 15: Chair: Tomer Hertz

9:00 – 9:30  Inferring the Dynamics and Topology of Immune Cell Differentiation Pathways
            Thomas Höfer, German Cancer Research Center

9:30 – 10:00 The Role of Histone-moifying Complexes in Regulating B cell Programs to Infection
            Kim Jacobson, Monash University

10:00 – 10:30 A Single Molecule View of Immune Cell Activation
                Eilon Sherman, The Hebrew University of Jerusalem

10:30 – 11:10 Coffee Break

Session 16: Chair: Kim Jacobson

11:10 – 11:40 Effects of Immune History on Immune Responses to Influenza Vaccines
                Tomer Hertz, Ben-Gurion University of the Negev

11:40 – 12:10 Relationships and Transitions Between B and Plasma cell Populations in SLE Patients Differ from Those in Healthy Controls
                Ramit Mehr, Bar-Ilan University

12:10 – 12:40 Closing remarks: What shall we ask next in the study of immunobiology?
                Uri Hershberg, Drexel University