



STOCHASTICITY AND CONTROL  
OF IMMUNE REPERTOIRES

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



	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	
9:00-9:30		Daniel Douek (NIH)	Yanay Ofran (BIU)	Martin Flajnik (U. of Maryland)	Johannes Textor (Radboud University)	Thomas Höfer (dkfz Heidelberg)	
9:30-10:00		Felix Breden and Jamie Scott (Simon Fraser University, Canada)	Mikhail Shugay (Russian Academy of Sciences)	Sarah Cobey (University of Chicago)	Ronald B Gartenhaus (U. of Maryland)	Kim Jacobson (Monash University)	
10:00-10:30			Becca Asquith (Imperial College)	Sol Efroni (BIU)	Shai Shen Orr (Technion)	Eilon Sherman (HUJI)	
10:30-11:10		Coffee break	Coffee break	Coffee break	Coffee break	Coffee break	
11:10-11:40		Marie-Paule Lefranc (University of Montpellier)	Andrea Pagnani (Politecnico di Torino)	David Klitzmann (Pierre and Marie Curie)	Paul G. Thomas (St. Jude Children's Hospital)	Tomer Hertz (BGU)	
11:40-12:10		Andrew Collins (New South Wales)	Thierry Mora (ENS)	Hedda Wardemann (dkfz Heidelberg)	Roi Gazit (BGU)	Ramit Mehr (BIU)	
12:10-12:40	Registration + light lunch	Corey Watson (University of Louisville)	Tom Kepler (BU)	Rob de Boer (Utrecht)	Ken Buetow (Arizona State University)	<b>Closing remarks:</b> Uri Hershberg (Drexel)	
12:40-13:30		Lunch	Lunch	Lunch	Lunch		
13:30-13:45							
13:45-14:00	Opening words: Gur Yaari (BIU)						
14:00-14:30	Mark Shlomchik (UPitt)						
14:30-15:00	Scott Boyd (Stanford)	<b>Tutorial:</b> Repertoire analysis (Jason Vanderheiden)	<b>Tutorial:</b> Mathematical models of the immune system (Rob de Boer)		<b>Tutorial:</b> Mathematical models of the immune system (Haralampos Hatzikirou)		
15:00-15:30	Coffee break						
15:30-16:00	Steven Kleinstein (Yale)	Coffee break	Coffee break		Coffee break		
16:00-16:30	Irun Cohen (Weizmann)	Victor Greiff (ETH)	Deborah Dunn Walters (U. of Surrey)	Tour of the old city and via dolorosa	Yoram Louzoun (BIU)		
16:30-17:00	Nir Friedman (Weizmann)	Martin Corcoran (Karolinska Institute)	Michal Or Guil (Humboldt)		Yifat Merbi (Weizmann)		
17:00-17:30	Coffee break	Moriah Gidoni (BIU)	Chaim Schramm (NIH)		Wayne Marasco (Dana Farber)		
17:30-18:00	Yariv Wine (TAU)						
18:00-18:30	<b>Keynote speaker:</b> Phil Hodgkin (Walter and Eliza Hall Institute of Medical Health)		Coffee break			Coffee break	
18:30-19:00		Poster session with snacks	Uri Nevo (TAU)			<b>Keynote speaker:</b> Michael Levitt (Stanford University)	
19:00-19:30	Social Dinner		Franca Fraternali (King's College)				
19:30-20:00			Corbett Berry (Drexel University)				
20:00-23:59		Dinner on your own	Dinner on your own	Dinner at mishkanot sha'ananim	Social drinks		

## 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:** Chair: Andrew Collins

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 coverage 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 Fraternali, King's College London
- 19:15 – 19:35      **Novel Calcium Dependent Mechanisms of NF- $\kappa$ B activation in T cell tolerance and immunity**  
Corbett Berry, Drexel University

## DAY 4: Wednesday 21.6

- Session 10:**      Chair: Bartłomiej 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 eIF4E1-eIF4E3 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

