

The 27th Advanced School in Life Sciences

# *EpiSyStem*: Stem Cell Epigenetics

Different aspects of epigenetic regulation and  
systems biology in stem cells & differentiation

*including the ISSCR 2022 Jerusalem International Symposium*



**27-31 March 2022**

**General Director:** Roger Kornberg (Stanford University)

**Director:** Eran Meshorer (The Hebrew University of Jerusalem)

**Organizer:** Eitan Segev (EpiSyStem Manager, The Hebrew University of Jerusalem)

The Israel Institute for Advanced Studies  
Edmond J. Safra Campus, Givat Ram,  
The Hebrew University of Jerusalem

## **Sunday, 27 March**

Feldman bldg. Edmond J. Safra Campus, Givat Ram, Jerusalem

09:00-09:30 Registration

09:30-09:35 Greetings by **Yitzhak Hen** (IIAS Director)

09:35-09:40 Welcoming remarks

09:40-10:30 **Roger Kornberg** (Stanford University): Keynote lecture

10:35-10:50 Coffee break

### **Session 1: Epigenetics, chromatin & RNA I** Chair: **Oren Ram**

10:50-11:40 **Alexander van Oudenaarden** (Hubrecht Institute): Chromatin profiling in single cells

11:40-12:30 **Amos Tanay** (Weizmann Institute of Science): Epigenetics mechanisms and the gap between differentiation and commitment during mouse gastrulation

12:30-13:20 **Yael Mandel-Gutfreund** (Technion): A novel role for lncRNA-mediated regulatory circuits in human pluripotency

13:20-14:30 Lunch break

### **Session 2: Epigenetics, chromatin & RNA II** Chair: **Yehudit Bergman**

14:30-15:20 **Geneviève Almouzni** (Institut Curie): Chromatin dynamics and cell fate from a histone variant view point

15:20-16:10 **Eran Meshorer** (The Hebrew University of Jerusalem): CAPRIN1 links pluripotency with RNA metabolism

16:10-16:40 Coffee break

16:40-17:30 **Omri Wurtzel** (Tel Aviv University): m6A is required for resolving progenitor identity during planarian stem cell differentiation

17:30 Reception

## **Monday, 28 March**

Feldman bldg. Edmond J. Safra Campus, Givat Ram, Jerusalem

### **Session 3: Stem cell technologies** Chair: **Omri Wurtzel**

- 09:00-09:50 **Giuseppe Testa** (University of Milan): Brain organoid based neurodevelopmental disease modelling at high resolution
- 09:50-10:40 **Oren Ram** (The Hebrew University of Jerusalem): CloneSeq: Highly Sensitive Single-cell Based Platform for Comprehensive Characterization of 3D cultured cells
- 10:40-11:10 Coffee break
- 11:10-12:00 **Efrat Shema** (Weizmann Institute of Science): Single-molecule epigenetics: illuminating the histone code for cancer research and diagnostics
- 12:00-12:50 **Gilles Brocart** (Diagenode): Parallel between a product development in a commercial RnD and the Diagenode's DPLX ncRNA-seq technology
- 12:50-14:00 Lunch break

### **Session 4: Neural mechanisms** Chair: **Efrat Shema**

- 14:00-14:50 **Jovica Ninkovic** (Helmholtz Zentrum München): Understanding Glial Plasticity for Successful Repair
- 14:50-15:40 **Ramon Birnbaum** (Ben-Gurion University of the Negev): The role of gene regulatory networks in neuronal progenitors
- 15:40-16:10 Coffee break
- 16:10-17:00 **Magdalena Götz** (Helmholtz Zentrum München): Novel mechanisms of neurogenesis and neural repair

## **Tuesday, 29 March**

Feldman bldg. Edmond J. Safra Campus, Givat Ram, Jerusalem

### **Session 5: Epigenetics and regulation of gene expression**

Chair: **Ramon Birnbaum**

09:00-09:50 **Maria Elena Torres-Padilla** (Helmholtz Zentrum München): Epigenetic mechanisms of cellular plasticity

09:50-10:40 **Yehudit Bergman** (The Hebrew University of Jerusalem): Epigenetic programming of cell fate decisions; lessons from the immune and intestinal systems

10:40-11:10 Coffee break

11:10-12:00 **Michiel Vermeulen** (Radboud University): Deciphering gene expression regulation in health and disease using integrative omics approaches

12:00-12:50 **Howard Cedar** (The Hebrew University of Jerusalem): Mapping the epigenetic flowchart of development

12:50-14:00 Lunch break & Poster session

Afternoon Old City Tour and Dinner



**PROGRAM OUTLINE** (As of March 22, 2022)

**ALL TIMINGS ARE GMT+2 (Jerusalem Time)**

**WEDNESDAY, MARCH 30, 2022**

Weiss Auditorium, Edmond J. Safra Campus, Givat Ram, Jerusalem

07:30 Registration opens

09:00 OPENING REMARKS

**Eran Meshorer**, The Hebrew University of Jerusalem, Israel

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**09:05 – 11:00 Session 1: EPIGENETIC REGULATION AND CHROMATIN**

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**Chairs:** Ruth Ashery-Padan, Tel-Aviv University & **Eran Meshorer**, Hebrew University

09:05 EPIGENETIC MECHANISMS IN DEVELOPMENT AND DISEASE

**Alex Meissner**, MPI, Germany

09:30 THE HISTONE VARIANT H3.3 IS REQUIRED FOR TRIM28 DEPENDENT SILENCING IN MOUSE EMBRYONIC STEM CELLS

**Sharon Schlesinger**, The Hebrew University of Jerusalem, Israel

09:45 INTEGRATED MULTI-OMICS ANALYSES REVEAL POLYCOMB REPRESSIVE COMPLEX 2 RESTRICTS NAIVE HUMAN PLURIPOTENT STEM CELL TO TROPHOBLAST FATE INDUCTION

**Peter Rugg-Gunn**, Babraham Institute, UK

09:55 REGENERATION AND LONG-TERM CHANGES IN STEM-CELL DNA METHYLATION

**Yehudit Bergman**, The Hebrew University of Jerusalem, Israel

10:10 HISTONE H3 VARIANTS ON THE MOVE

**Geneviève Almouzni**, Institut Curie, France

10:35 EPIGENETIC MECHANISMS OF CELLULAR PLASTICITY

**Maria-Elena Torres-Padilla**, Helmholtz Center Munich, Germany

11:00 *Refreshment Break*

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**11:20 – 13:10 Session 2: DISEASE MODELING**

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**Chairs:** Chaya Kalcheim, Hebrew University & **Eldad Tzahor**, Weizmann Institute

11:20 NOVEL MECHANISMS OF NEUROGENESIS AND NEURAL REPAIR

**Magdalena Götz**, Helmholtz Center Munich, Germany

11:45 LEGACY OF A DYING CELL

**Yaron Fuchs**, Technion – Israel Institute of Technology, Israel



**WEDNESDAY, MARCH 30, 2022 (cont)**

Weiss Auditorium, Edmond J. Safra Campus, Givat Ram, Jerusalem

- 12:00 USING PATIENT-DERIVED NEURONS TO STUDY THE MECHANISMS UNDERLYING FUNCTIONAL CHANGES IN NEURODEVELOPMENTAL AND NEUROPSYCHIATRIC DISORDERS  
**Shani Stern**, University of Haifa, *Israel*
- 12:15 MODELING NUCLEAR ENVELOPATHIES CAUSED BY LAP1 AND NUP214 MUTATIONS USING HPSCS  
**Achia Urbach**, Bar-Ilan University, *Israel*
- 12:30 PATIENT-SPECIFIC HESC-DERIVED COLON ORGANOIDs CAN PREDICT DISEASE SEVERITY  
**Dalit Ben-Yosef**, Ichilov Hospital/Tel Aviv University, *Israel*
- 12:45 STEMNESS IN HEALTHY AND INJURED BRAIN-LESSONS FROM COMPARATIVE ANALYSIS OF GLIOSIS  
**Jovica Ninkovic**, LMU Munich and Helmholtz Center Munich, *Germany*
- 13:10 *Lunch Break*

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**14:10 – 15:35 Session 3: ADULT STEM CELL & STEM CELL NICHES**

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**Chairs:** **Karina Yaniv**, Weizmann Institute & **Naomi Habib**, Hebrew University

- 14:10 STEM CELL CLONALITY AND THE NICHE  
**Leonard I. Zon**, Boston Children's Hospital and Harvard University, *USA*
- 14:35 EYES OPEN ON STEM CELL LOCATION, SIGNATURE & NICHE  
**Ruby Shalom-F Feuerstein**, Technion – Israel Institute of Technology, *Israel*
- 14:50 TELOCYTES SUPPORT COLORECTAL CANCER PROGRESSION  
**Michal Shoshkes Carmel**, The Hebrew University of Jerusalem, *Israel*
- 15:00 IMMUNE STIMULATION FOR HEMATOPOIETIC STEM CELLS  
**Roi Gazit**, Ben Gurion University of the Negev, *Israel*
- 15:15 CIRCADIAN REGULATION OF HEMATOPOIETIC STEM CELLS BY LIGHT AND DARKNESS ONSET  
**Tsvee Lapidot**, Weizmann Institute of Science, *Israel*
- 15:30 **Poster Teasers**
- HISTONE EXCHANGE SENSOR REVEALS VARIANT AND CHAPERONE SPECIFIC DYNAMICS IN MOUSE EMBRYONIC STEM CELLS  
**Marko Dunjic**, Weizmann Institute of Science, *Israel*



**WEDNESDAY, MARCH 30, 2022 (cont)**

Weiss Auditorium, Edmond J. Safra Campus, Givat Ram, Jerusalem

SYMMETRIC INHERITANCE OF PARENTAL HISTONES GOVERNS EPIGENOME MAINTENANCE, GENOME FUNCTION AND CELL FATE

**Alva Biran**, University of Copenhagen, *Denmark*

DECOY HOST CELL ACE2 RECEPTOR AND INTERRUPTION OF NON-STRUCTURAL PROTEINS OF VOCS AGAINST SARS-COV-2 INFECTION IN HUMAN LUNG ORGANOID

**Haibo Zhang**, University of Toronto, *Canada*

DEVELOPMENT OF SPERMATOGENESIS IN A NOVEL TESTIS-ON-A-CHIP USING TESTICULAR CELLS OF IMMATURE MICE.

**Mahmoud Huleihel**, Ben-Gurion University of the Negev, *Israel*

15:35 *Refreshment Break*

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**16:00 – 17:50 Session 4: PLURIPOTENCY, REPROGRAMMING and EARLY DEVELOPMENT I**

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**Chairs:** **Varda Rotter**, Weizmann Institute & **Gad Vatine**, Ben-Gurion University

16:00 CHALLENGING PLASTICITY AND FORCING FATE: SINGLE-CELL ANALYSES OF BIDIRECTIONAL REPROGRAMMING ROUTES BETWEEN PLURIPOTENT AND EXTRA-EMBRYONIC ENDODERM STATES

**Anna-Katerina Hadjantonakis**, Memorial Sloan Kettering Cancer Center, *USA*

16:25 COMPARATIVE PARALLEL MULTI-OMICS ANALYSIS OF CELL UNDERGOING REPROGRAMMING TO PLURIPOTENT AND TROPHODERM STATES

**Yossi Buganim**, The Hebrew University of Jerusalem, *Israel*

16:40 CAPRIN1 LINKS EMBRYONIC STEM CELL DIFFERENTIATION WITH RNA METABOLISM

**Juliane O. Viegas**, The Hebrew University of Jerusalem, *Israel*

16:50 DIFFERENTIATION SHIFTS FROM A REVERSIBLE TO AN IRREVERSIBLE HETEROCHROMATIN STATE AT THE DM1 LOCUS

**Rachel Eiges**, Share Zedek Medical Center, *Israel*

17:05 DIVERGENCE AND CONVERGENCE OF MORPHOGENETIC PATHS IN EMBRYO-LIKE MODELS

**Iftach Nachman**, Tel Aviv University, *Israel*

17:20 HETEROCHROMATIN FORMATION AND NUCLEAR COMPARTMENTALIZATION BY THE LNCRNA XIST

**Kathrin Plath**, UCLA, *USA*

17:45 **Poster Teasers (4)**

GENERATION AND CHARACTERIZATION OF TRIPLOID HUMAN EMBRYONIC STEM CELLS

Guy Haim, The Hebrew University of Jerusalem, *Israel*





### WEDNESDAY, MARCH 30, 2022 (cont)

Weiss Auditorium, Edmond J. Safra Campus, Givat Ram, Jerusalem

HIGH RESOLUTION SINGLE-CELL TRANSCRIPTOMIC MAP OF EARLY HUMAN EMBRYONIC NEURODEVELOPMENT

**Miri Danan-Gotthold**, Karolinska Institute, *Sweden*

THE ROLE OF TELOCYTES IN THE HAIR FOLLICLE STEM CELL NICHE

**Marco Canella**, The Hebrew University of Jerusalem, *Israel*

SAFETY AND EFFICACY OF FIRST-IN-HUMAN INTRATHECAL TRANSPLANTATION OF HUMAN ASTROCYTES (ASTRORX) DERIVED FROM EMBRYONIC STEM CELLS IN ALS PATIENTS: FROM BENCH TO BEDSIDE

**Michal Izrael**, Kadimastem, *Israel*

17:50 *Poster Session with light dinner & drinks*

20:00 *Closing of the day*

### THURSDAY, MARCH 31, 2022

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#### 09:00 – 11:00 Session 5: PLURIPOTENCY, REPROGRAMMING, AND EARLY DEVELOPMENT II

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**Chair: Adi Kimchi**, Weizmann Institute & **Nissim Benvenisty**, Hebrew University

09:00 RIBOSOMAL PROFILING IN SINGLE CELLS

**Alexander van Oudenaarden**, Hubrecht Institute, *The Netherlands*

09:25 IN-VITRO CELLULAR REPROGRAMMING TO MODEL GONAD DEVELOPMENT AND ITS DISORDERS

**Nitzan Gonen**, Bar-Ilan University, *Israel*

09:40 UNDERSTANDING HUMAN REPROGRAMMING: A JOURNEY FROM EPIBLAST AND TROPHOBLAST INTO IBLASTOIDS

**Jose Polo**, Monash University, *Australia*

10:05 EX UTERO MAMMALIAN EMBRYOGENESIS: FROM STEM CELLS TO ORGANS

**Jacob Hanna**, Weizmann Institute of Science, *Israel*

10:20 MODELING MAMMALIAN GASTRULATION AT SINGLE EMBRYO AND SINGLE-CELL RESOLUTION

**Yonatan Stelzer**, Weizmann Institute of Science, *Israel*

10:35 TRANSCRIPTION/EPIGENETIC REGULATION OF ENHANCER REWIRING DURING EARLY ESC DIFFERENTIATION

**Robert Blelloch**, University of California in San Francisco, *USA*

11:00 *Refreshment Break*





## THURSDAY, MARCH 31, 2022 (cont)

Weiss Auditorium, Edmond J. Safra Campus, Givat Ram, Jerusalem

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### 11:20 – 13:05 Session 6: STEM CELL TECHNOLOGIES & TISSUE ENGINEERING

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**Chairs:** *Yechiel Elkabetz, Max Planck Institute & Daphna Nachmani, Hebrew University*

- 11:20 DECIPHERING GENE EXPRESSION REGULATION IN DEVELOPMENT AND DISEASE USING INTEGRATIVE OMICS APPROACHES  
**Michiel Vermeulen**, Radboud University, *The Netherlands*
- 11:45 THE ELECTRO-MITOCHONDRIAL COUPLING OF A MICROPHYSIOLOGICAL HUMAN HEART  
**Yaakov Nahmias**, The Hebrew University of Jerusalem, *Israel*
- 12:00 ENGINEERING PERSONALIZED TISSUE IMPLANTS  
**Tal Dvir**, Tel Aviv University, *Israel*
- 12:15 ANALYSIS OF HAPLOINSUFFICIENCY DISORDERS IN HUMAN EMBRYONIC STEM CELLS  
**Roni Sarel-Gallily**, The Hebrew University of Jerusalem, *Israel*
- 12:25 CLONESEQ: HIGHLY SENSITIVE SINGLE-CELL BASED PLATFORM FOR COMPREHENSIVE CHARACTERIZATION OF 3D CULTURED CELLS  
**Oren Ram**, The Hebrew University of Jerusalem, *Israel*
- 12:40 DERIVATION OF INTERMEDIATE PLURIPOTENT STEM CELLS AMENABLE TO PRIMORDIAL GERM CELL SPECIFICATION  
**Jun Wu**, UT Southwestern, *USA*
- 13:05 *Lunch Break*

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### 14:00 – 15:50 Session 7: ORGANOIDS

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**Chairs:** *Dafna Benayahu, Tel-Aviv University & Nadav Sharon, Technion*

- 14:00 IMPROVING THE FIDELITY OF ORGANOIDS TO MODEL HUMAN BRAIN DEVELOPMENT AND DISEASE  
**Arnold Kriegstein**, University of California in San Francisco, *USA*
- 14:25 NOTCH ACTIVATION DURING EARLY MESODERM INDUCTION MODULATES EMERGENCE OF THE T/NK CELL LINEAGE FROM HUMAN IPSCS  
**Gustavo Mostoslavsky**, Boston University, *USA*
- 14:35 RECONSTRUCTING HUMAN ORGANOID DEVELOPMENT WITH SINGLE-CELL TECHNOLOGIES  
**Barbara Treutlein**, ETH Zurich, *Switzerland*
- 15:00 BUILDING BRAIN CELLULAR COMPLEXITY USING STEM-CELL BASED ORGANOID TECHNOLOGY  
**Abed Manssour**, The Hebrew University of Jerusalem, *Israel*



**THURSDAY, MARCH 31, 2022 (cont)**

Weiss Auditorium, Edmond J. Safra Campus, Givat Ram, Jerusalem

- 15:15 STEM CELL ISOLATION AND TRANSPLANTATION IN HEXACORALLIANS; TOWARD CELL-THERAPY FOR CORALS  
**Benyamin Rosental**, Ben Gurion University of the Negev, *Israel*
- 15:25 CHARTING THE ENVIRONMENTAL AND GENETIC CAUSES OF NEURODEVELOPMENTAL VULNERABILITIES BY HIGH RESOLUTION ORGANOID MODELLING  
**Giuseppe Testa**, IEO Milano, *Italy*
- 15:50 *Refreshment Break*

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**16:10 – 18:00 Session 8: CLINICAL APPLICATIONS**

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**Chairs:** **Benjamin Dekel**, Sheba Medical Center & **Chaya Brodie**, Bar-Ilan University

- 16:10 HUMAN EMBRYONIC STEM CELLS – FROM THE RESEARCH LABORATORY TO RETINAL CLINICAL TRANSPLANTATION  
**Benjamin Reubinoff**, Hadassah Medical Center, *Israel*
- 16:25 BIOPRINTING VASCULARIZED TISSUE CONSTRUCTS  
**Shulamit Levenberg**, Technion – Israel Institute of Technology, *Israel*
- 16:40 HUMAN FETAL KIDNEY ORGANOID ENRICHED FOR NOTCH DEPENDENT EARLY EPITHELIAL DIFFERENTIATION  
**Michael Namestnikov**, Sheba Medical Center / Tel Aviv University, *Israel*
- 16:50 ORGAN-ON-A-CHIP AS A NEW TOOL FOR STUDYING HUMAN PHYSIOLOGY  
**Ben Maoz**, Tel Aviv University, *Israel*
- 17:00 SINGLE CELL PROFILING OF XENOGRAFT MOUSE MODELS REVEALS BONE MARROW STEM CELL NICHE REMODELING UPON ACUTE MYELOID LEUKEMIA  
**Karin Prummel**, EMBL, *Germany*
- 17:10 GENOME EDITING FOR BETTER CARDIOMYOCYTE THERAPY  
**Charles Murry**, University of Washington & Sana Biotechnology, *USA*
- 17:35 USING STEM CELLS TO MAKE PANCREATIC ISLETS  
**Douglas A. Melton**, Harvard University, *USA*
- 18:00 *Closing Remarks*