

The 28th Advanced School in Life Sciences: Novel roles for RNA in Biology and Therapy

*Including the Israeli RNA Society meeting
in memory of Prof. Yossi Sperling*

23-27 October 2022

General Director:

Roger Kornberg (Stanford University)

Director:

Ruth Sperling (The Hebrew University of Jerusalem)

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

Sunday, 23 October

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

09:00-09:30 Registration

09:30-09:40 Welcoming remarks

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

10:30-11:00 Coffee break

Session I: Pre-mRNA splicing and alternative splicing 1

Chair: Gil Ast (Tel Aviv University)

11:00-12:00 **Adrian Krainer** (CSHL): Pre-mRNA Splicing: History and Basic Aspects

12:00-13:00 **Maria Carmo-Fonseca** (University of Lisbon): The spatial organization of splicing in the cell nucleus

13:00-14:05 Lunch break

Session II: Pre-mRNA splicing and alternative splicing 2

Chair: Adrian Krainer (Cold Spring Harbour Laboratories)

14:05-14:30 **Maria Carmo Fonseca** (University of Lisbon) Kinetics of co-transcriptional pre-mRNA splicing

14:30-15:20 **Yaron Shav-Tal** (Bar-Ilan University): Dynamics of nucleo-cytoplasmic mRNA transport

15:20-15:50 Coffee break

15:50-16:40 **Gil Ast** (Tel Aviv University): How 3D genome organization directs alternative splicing

16:40-17:30 **Ruth Sperling** (The Hebrew University of Jerusalem): Quality control mechanism of alternative splicing within the endogenous spliceosome

17:30 Reception in the IIAS lobby

Monday, 24 October

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

08:55-09:00 Greetings by Yitzhak Hen, Director of the IIAS

Session III: Alternative Splicing regulation in therapy

Chair: Maria Carmo Fonseca (University of Lisbon)

09:00-09:50 **Adrian Krainer** (Cold Spring Harbor Laboratories): Spinraza: Antisense Splicing Modulation from Bench to Bedside: the development and impact of Spinraza

09:50-10:15 **Adrian Krainer** (Cold Spring Harbor Laboratories): Antisense Therapy for Histone H3.3 K27M Diffuse Midline Glioma

10:15-10:45 Coffee break

10:45-11:35 **Batsheva Kerem** (The Hebrew University of Jerusalem): Antisense Oligonucleotide for splicing modulation – a novel therapeutic approach for cystic fibrosis patients”

11:35-12:25 **Rotem Karni** (The Hebrew University of Jerusalem): RBFOX2 modulates a metastatic signature of alternative splicing in pancreatic cancer

12:25-13:35 Lunch

Session IV: RNA modifications and regulation of gene expression

Chair: Yehuda Tzfati (The Hebrew University of Jerusalem)

13:35-14:25 **Gidi Rehavi** (Sheba Medical Center & Tel Aviv University): Epitranscriptomics – from basic research to therapeutic interventions

14:25-15:15 **Erez Levanon** (Bar-Ilan University): Landscape of adenosine-to-inosine RNA recoding across human tissues

15:15-15:45 Coffee break

15:45-17:00 Meetings with speakers

18:00 Participants' Dinner at Ima Restaurant (55 Ha-Rav Shmuel Barukh Street, Jerusalem)

Tuesday, 25 October

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

Session V: Gene expression regulation in health and disease

Chair: Maayan Salton (The Hebrew University of Jerusalem)

09:00-09:50 **Chonghui Cheng** (Baylor College of Medicine): Alternative RNA splicing in development and cancer

09:50-10:40 **Lynne Maquat** (University of Rochester Medical Center): Nonsense-mediated mRNA decay (NMD) in health and disease

10:40-11:10 Coffee break

Session VI: Translation regulation in health and disease

Chair: Yoav Arava (Technion)

11:10-12:00 **Ada Yonath** (Weizmann Institute of Science): Origin of life: From peptide bond formation to the creation of the ribosome

12:00-12:25 **Ada Yonath** (Weizmann Institute of Science): Ribosomes involvement in genetic diseases

12:25-13:25 Lunch break

13:25-14:15 **Michal Shapira** (Ben-Gurion University of the Negev): Developmental program of gene expression without transcriptional control in *Leishmania*

14:15-15:05 **Noam Stern-Ginossar** (Weizmann Institute of Science): mRNA translation - a tug of war during viral infection

15:05-15:15 Coffee break

15:15-16:15 Flash talks and poster session

16:15 Tour of the Israel Museum

Wednesday, 26 October

Auditorium of the Edmond & Lily Safra Center for Brain Sciences

Israeli RNA Society Meeting: The Uncharted World of RNA, in memory of Prof. Yossi Sperling [Click here for more details](#)

09:00-09:30 Reception and exhibition

Session 1

09:30-09:45 Opening remarks

Chair: Raymond Kaempfer

09:50-10:15 **Lynne Elizabeth Maquat** (University of Rochester Medical Center):
Hyperactivated NMD in Fragile X Syndrome

10:15-10:30 **Aldema Sas-Chen** (Tel Aviv University): When the heat is on – turn up
the Ac(4C): Potential roles for RNA acetylation in thermostability

10:30-10:45 **Dan Bar-Yaakov** (Ben-Gurion University of the Negev): When we can't
trust bacterial DNA: The role of mRNA editing in bacteria

10:45-11:00 **Raphael Benhamou** (The Hebrew University of Jerusalem):
Development of Small Molecules Targeting Disease Associated RNAs

11:00-11:25 Coffee break

Session 2

Chair: Joel Yisraeli

11:25-11:40 **Sahar Melamed** (The Hebrew University of Jerusalem): Intricate
Networks of Small RNA-Mediated Regulation in Bacteria and Bacterial
Interactions

11:40-11:55 **Asaf Bester** (Technion): The oncogenic lncRNA CYTOR is a regulator of
epigenetic and DNA genome integrity

11:55-12:10 **Isana Veksler-Lubinsky** (Ben-Gurion University of the Negev):
Annotation of isomiR dynamics across *Caenorhabditis elegans*
developmental stages

12:10-12:25 **Boris Slobodin** (Technion): The little secrets of viral 5'UTRs of
SARS-CoV-2

Chair: Maayan Salton

12:25-12:50 **Chonghui Cheng** (Baylor College of Medicine): LINE-derived cryptic splicing repressed by RBPs promotes interferon immune response via dsRNA formation

12:50-14:45 Lunch, poster session, and exhibition

Session 3: Parallel sessions x3

Parallel session #1: Pre-mRNA processing and modifications - Faculty Lounge

Chair: Martin Mikl

14:45-14:57 **Yuval Malka** (Netherlands Cancer Institute): Alternative cleavage and polyadenylation generates downstream uncapped RNA isoforms with translation potential [Zoom]

14:57-15:09 **Gal Haimovich** (Weizmann Institute of Science): Global analysis and physiological consequences of tunneling nanotube-mediated intercellular mRNA transfer in mammalian cells

15:09-15:21 **Hadas Biran** (Technion): SPIRAL: Significant Process InfeRence ALgorithm for single cell RNA-sequencing and spatial transcriptomics

15:21-15:33 **Roni Cohen-Fultheim** (Bar-Ilan University): A-to-I RNA editing contributes to the onset of autoimmune disorders

15:33-15:45 **Eden Engal** (The Hebrew University of Jerusalem): SMCHD1 Regulation of Alternative Splicing and its Role in FSHD2 Development

15:45-15:57 **Anna Uzonyi** (Weizmann Institute of Science): Exon-intron architecture determines mRNA stability by dictating m6A deposition

15:57-16:09 **Adi Avram-Shperling** (Bar-Ilan University): Expression of heterologous ADAR enzymes in yeast indicates editing activity is affected by temperature, and identifies the mdADAR1 as a hyper transcriptome diversifier

Parallel session #2: RNA-based regulation - Seminar Room

Chair: Ayala Shiber

- 14:45-14:57 **Yonatan Chemla** (MIT): Deciphering mRNA initiation modes of operons for improved genetic design
- 14:57-15:09 **Anan Tarabeih** (Tel Aviv University): How RNA Polymerase II pairs the splice sites
- 15:09-15:21 **Raneem Nashef** (The Hebrew University of Jerusalem): Revealing the role of RNA-RNA interactions upon bacteriophage infection
- 15:21-15:33 **Yehuda Danino** (Weizmann Institute of Science): RNA G-quadruplex structures regulate stress granule dynamics
- 15:33-15:45 **Omer Goldberger** (The Hebrew University of Jerusalem): Membraneless Organelles and Wisdom of the Crowds: Novel Mechanisms Underlying Gene Regulation in Bacteria
- 15:45-15:57 **Yael Admoni** (The Hebrew University of Jerusalem): MicroRNA complementarity requirements for target recognition in the cnidarian *Nematostella vectensis* support a common evolutionary origin for animal and plant microRNAs
- 15:57-16:09 **Alan Monziani** (Weizmann Institute of Science): A *cis* and *trans*-acting lncRNA affects sn/snoRNAs and histone mRNAs biogenesis

Parallel session #3: RNA and Disease - ELSC

Chair: Daniel Benhalevy

- 14:45-14:57 **Inna Ricardo-Lax** (Rockefeller University): m5C methylation of RNA – Lessons From RNA Viruses
- 14:57-15:09 **Gal Cafri** (Sheba Medical Center): Patient tailored mRNA vaccines induce neoantigen-specific T-cell immunity in metastatic gastrointestinal cancer patients
- 15:09-15:21 **Ran Taube** (Ben-Gurion University of the Negev): Role of long non-coding RNAs (lncRNAs) in HIV latency

- 15:21-15:33 **Nadav Wallis** (The Hebrew University of Jerusalem): Targeting the RNA Binding Protein Igf2bp1 with a small molecule inhibitor: A novel therapy that down-regulates Kras mRNA, protein, and down-stream signaling
- 15:33-15:45 **Lior Fishman** (The Hebrew University of Jerusalem): A systematic characterization of dynamic mRNA regulatory programs at single cell resolution during the maternal-to-zygotic transition of zebrafish embryos
- 15:45-15:57 **Juliane Viegas** (The Hebrew University of Jerusalem): CAPRIN1-XRN2-mediated RNA degradation is required for early embryonic stem cell differentiation
- 15:57-16:09 **Ela Elyada** (The Hebrew University of Jerusalem): Antisense oligonucleotides as a treatment for rare neurodevelopmental disorders caused by mutant HNRNPH2 and mutant PCDH19
- 16:15-16:45 Coffee break and exhibition

Session 4

Chair: Batsheva Kerem

- 16:45-17:10 **Matthias Hentze** (European Molecular Biology Laboratory): Riboregulation of cell metabolism
- 17:10-17:25 Prizes and concluding remarks

Thursday, 27 October

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

Session VII: RNA binding proteins and RNA regulation

Chair: Shulamit Michaeli (Bar-Ilan University)

09:00-09:50 **Matthias Hentze** (European Molecular Biology Laboratory): RBPs: from trans-acting factors of gene expression to regulatory relays in cell biology

09:50-10:40 **Eran Hornstein** (Weizmann Institute of Science): Biomolecular condensates and their implication in human disease

10:40-11:00 Coffee break

11:00-12:00 **Reinhard Lührmann** (Max-Planck-Institute for Biophysical Chemistry): Structural insights into the dynamic assembly pathway and function of the spliceosome

Session VIII: Noncoding RNA in regulation of gene expression

Chair: Lynne Maquat (University of Rochester Medical Center)

12:00-12:50 **Igor Ulitsky** (Weizmann Institute of Science): Long noncoding RNAs

12:50-13:50 Lunch break

13:50-14:40 **Yael Mandel-Gutfreund** (Technion): A novel role for lincRNA in transcriptional regulation

14:40-15:30 **Shulamit Michaeli** (Bar-Ilan University): The special RNA world of trypanosomes; trans-splicing and mitochondrial RNA editing

15:30-15:50 Coffee break

15:50-16:40 **Hanah Margalit** (The Hebrew University of Jerusalem): The multiple facets of regulation by bacterial small RNAs

- 16:40-17:30 **Dudy Tzfati** (The Hebrew University of Jerusalem): Telomerase RNA structure and function
- 17:30 Concluding remarks