

2020 RiboClub Forum Program
RNA Biology and Technology - The Current Pandemic and Beyond
*in Association with the Gairdner Foundation, CSMB,
CIHR Institute of Infection and Immunity and the RNA Collaborative*

September 23-25 – RiboZoom

*Organizing Committee: Jonathan Dinman, Peter Sarnow, Joyce Wilson, Eric Jan, Charles Rice, Daniel Lafontaine,
Maria Duca, Janet Rossant, Brendan Bell, Trushar Patel, Mark A Kay and Sherif Abou Elela
Collaborators: HJ Wieden (CSMB), Danielle Vitali (III, CIHR), Barbara Papadopoulou (CHUQ)*

Wednesday, September 23, 2020 (Day 1)

11:00 – 11:05 **Welcome notes and Announcements**
Sherif Abou Elela, *Université de Sherbrooke, Sherbrooke*

11:05 – 11:25 **Opening Lecture**
Viral subversion of nonsense-mediated mRNA decay
Lynne Maquat, *University of Rochester, Rochester*
Introduction by Janet Rossant, *The Gairdner Foundation*

Session 1: Computational & experimental analysis of RNA viruses' structure and function

Chair: Phillip A Sharp, *MIT, Cambridge*

11:30 – 11:45 **What comparative genomics tell about coronaviruses**
Sasha Gorbalenya, *Leiden University, Leiden*

11:50 – 12:05 **Structured and dynamic viral RNAs in three dimensions: new techniques and more surprises**
Jeffery S. Kieft, *University of Colorado Denver School of Medicine, Denver*

12:10 – 12:25 **Using Conservation to Determine RNA Secondary Structure**
David Mathews, *University of Rochester, Rochester*

12:30 – 12:45 **Specific viral RNA drives the SARS CoV-2 nucleocapsid to phase separate**
Amy Gladfelter, *University of North Carolina, Chapel Hill*

12:50 – 13:05 **Structure of the full SARS-CoV-2 RNA genome in infected cells**
Silvia Rouskin, *Whitehead Institute, Cambridge*

13:10 – 13:25 **Questions and panel discussions**
Moderator: Phillip A. Sharp

13:25 – 14:25 **Lunch Break**

Session 2: RNA virus life cycles

Chair: Joyce Wilson, *University of Saskatchewan, Saskatoon*

14:25 – 14:40 **Terminate or mutate? The fast and promiscuous SARS-CoV-2 viral RNA polymerase complex re-defines our views about antivirals and RNA genome evolution**
Bruno Canard, *LAFMB, Marseille*

14:45 – 15:00 **The membranous replication organelles of positive strand RNA viruses**
Volker Lohmann, *University of Heidelberg, Heidelberg*

15:05 – 15:20 **Visualizing the Translation and Packaging of HIV-1 Full-Length RNA**
Wei-Shau Hu, *NIH/NCI, Frederick*

15:25 – 15:40 **Identification of host proteases required for SARS-CoV-2 Spike-mediated membrane fusion**
Marceline Côté, *University of Ottawa, Ottawa*

15:45 – 16:00 **Host-directed Antiviral Therapy: Use of small molecule modulators of RNA processing to inhibit gene expression and replication of multiple mammalian viruses**
Alan Walter Cochrane, *University Toronto, Toronto*

16:05 – 16:20 **Questions and panel discussion**
Moderator: Joyce Wilson

16:20 – 16:30 **Break**

Students' Poster Promotion: Micro-talks

Student Hosts: Ines Khatir and Tithi Ghosh, *Université de Sherbrooke, Sherbrooke*

- 16:30 – 16:32 **Genome-wide mapping of therapeutically-relevant SARS-CoV-2 RNA structures**
Ilaria Manfredonia, University of Groningen, Groningen
- 16:32 – 16:34 **HIV-1 modulates the availability of host microRNAs to favour the expression of a transcription elongation factor**
Owen R. S. Dunkley, McGill University, Montreal
- 16:34 – 16:36 **Reconstitution of the human tRNA splicing endonuclease complex: insight into the regulation of pre-tRNA cleavage**
Cassandra Hayne, National Institute of Environmental Health Sciences, North Carolina
- 16:36 – 16:38 **The methyltransferase Trm1p influences tRNA processing independent of catalysis**
Jennifer Porat, York University, York
- 16:38 – 16:40 **Effect of cmnm5s2U and its derivatives on tRNA structure and function**
Cynthia D. E. Fonderson, University of Lethbridge, Lethbridge
- 16:40 – 16:42 **Cryo-EM Reveals Conformational Heterogeneity of the SARS-CoV-2 Endoribonuclease Nsp15**
Monica C. Pillon, National Institute of Environmental Health Sciences, North Carolina
- 16:42 – 16:44 **Assessment of Antiviral shRNAs Produced from Type 3 RNA Polymerase III Promoters on HIV-1 Production**
Michelle Chen, McGill University, Montreal
- 16:44 – 16:46 **Identification and characterization of human Dicer partners during infection by Sindbis virus**
Morgane Baldaccini, Université de Strasbourg, Strasbourg
- 16:46 – 16:50 **Transitional break**

Session 3: Transcriptomics of the host and virus

Chair: Eric Jan, *University of British Columbia, Vancouver*

- 16:50 – 17:05 **Leveraging the host response to SARS-CoV-2 to identify effective antivirals**
Benjamin tenOever, *Icahn School of Medicine at Mount Sinai, New York*
- 17:10 – 17:25 **Sequence-based design of small molecules targeting RNA with application to SARS-CoV-2**
Matthew Disney, *The Scripps Research Institute, Jupiter*
- 17:30 – 17:45 **Pervasive generation of non-canonical subgenomic RNAs by SARS-CoV-2**
Jason Nomburg, *Dana-Farber Cancer institute*
- 17:50 – 18:05 **A proposed molecular mechanism for pathogenesis of severe RNA-viral pulmonary infections**
Peter K. Rogan, *Western University, London Ontario*
- 18:10 – 18:25 **Using functional genomics to explore antivirals and antiviral pathways against SARS-CoV-2**
Sara Cherry, *University of Pennsylvania School of Medicine, Philadelphia*
- 18:30 – 18:45 **Questions and panel discussion**
Moderator: Eric Jan

Thursday September 24, 2020 (Day 2)

09: 00 – 10:50 **Poster Session 1**

1. Marilyn Whelan, 2. Owen R. S. Dunkley, 3. Morgane Da Rocha, 4. Joshua King, 5. Morgane Baldaccini, 6. Luís Filipe Zandonadi Guimarães, 7. Banhi Biswas, 8. Ina Puleri O'Carroll, 9. Prakash Chukka, 10. Tamari Chkuaseli, 11. Anu Puri, 12. Simon Boudreault, 13. Haibin Liu, 14. Minseon Kim

11:00 – 11:25 **Keynote**

Animal Models for COVID-19 for Use in Pathogenesis, Vaccine and Therapeutic Studies

Stanley Perlman, *University of Iowa, Iowa*

Introduction by Peter Sarnow, *Stanford University, Stanford*

Session 4: Non-coding RNA tailored drug designs

Chair: Maria Duca, *Université Côte d'Azur, Nice*

11: 30 – 11:45 **Modulating the conformation and function of viral RNA with small molecules**

Amanda Hargrove, *Duke University, Durham*

11:50 – 12:05 **RNA Therapeutics: Informational Drugs as Pandemics Response. Update on Development of Oligonucleotides Cocktail as Prophylactic and Therapeutic for COVID19**

Anastasia Khvorova, *University of Massachusetts, Worcester*

12:10 – 12:25 **LNA-based approach to target a conserved non-coding element in the SARS-CoV-2 genome**

Kotryna Bloznelyte, *University of Cambridge, Cambridge*

12:30 – 12:45 **Questions and panel discussion**

Moderator: Maria Duca

12:50 – 14:05 **Lunch Break**

Session 5: Toolbox for RNA detection and therapy

Chair: Daniel Lafontaine, *Université de Sherbrooke, Sherbrooke*

- 14:05 – 14:20 **COVID-19 viral testing its challenges and opportunities**
Peter Unrau, *Simon Fraser University, Burnaby*
- 14:25 – 14:40 **Towards a rapid at-home test for Covid-19**
Yingfu Li, *McMaster University, Hamilton*
- 14:45 – 15:00 **The SKI complex as a broad-spectrum, host-directed, antiviral drug target**
Matthew Frieman, *University of Maryland at Baltimore*
- 15:05 – 15:20 **Questions and panel discussion**
Moderator: Daniel Lafontaine

Session 6: Impact of RNA modifications on structure and function

Chair: Peter Sarnow, *Stanford University, Stanford*

- 15:20 – 15:35 **Modulation of retrovirus replication by RNA modification reader proteins**
Tao Pan, *University of Chicago, Illinois*
- 15:40 – 15:55 **A role for the RNA modification m6A at the virus-host interface**
Stacy Horner, *Duke University, Durham*
- 16:00 – 16:15 **Dimethylcytosine epitranscriptomic marks on the hepatitis C virus genome modulate replication**
Cara Pager, *State University of New York, Albany*
- 16:20 – 16:35 **A systematic method to quantify the effects of mutations on an antiviral's mode of action**
Catherine Beauchemin, *Ryerson University, Toronto*
- 16:40 – 16:55 **Questions and panel discussion**
Moderator: Peter Sarnow
- 17:20 – 18:30 **Poster Session 2**
15. Ilaria Manfredonia, 16. Matthew J. Szucs, 17. Monica C. Pillon, 18. Rachel A. Jones, 19. Meredith N. Frazier, 20. Benjamin M. Akiyama, 21. Madeline E. Sherlock, 22. Kristi Lee Turton, 23. Sydnee Hope Calhoun, 24. Michelle J. Chen, 25. Farnaz Mansouri-Noori, 26. Shwetha Shivaprasad, 28. Wojciech Kasprzak

Friday September 25, 2020 (Day 3)

09:00 – 10:50 **Poster Session 3**

29. Justin Vigar, 30. Kyla Egerdeen, 31. Kyle A. Piccolo, 32. Cassandra Hayne, 33. Allison M. Porman Swain, 34. Alexandra N. Olson, 35. Jennifer Porat, 36. Preethi Seelam Prabhakar, 37. Cynthia D. E. Fonderson, 38. Sarah Schultz, 39. Fabian Rohden, 40. Mehdi Pirouz, 41. Sethu Pitchiaya, 42. Lin Huang

Session 7: Hijacking translation: The COVID style

Chair: Jon Dinman, *University of Maryland, Baltimore*

11:00 – 11:15 **Structural and functional conservation of the programmed –1 ribosomal frameshift signal of SARS coronavirus 2 (SARS-CoV-2)**

Jon Dinman, *University of Maryland, Baltimore*

11:20 – 11:35 **Manipulation of translation and RNA turnover by coronavirus Nsp1**

Anna-Lena Steckelberg, *University of Colorado, Denver*

11:40 – 11:55 **The short and long-range RNA-RNA Interactome of SARS-CoV-2**

Omer Ziv, *University of Cambridge, Cambridge*

12:00 – 12:15 **Questions and panel discussion**

Moderator: Jon Dinman

12:20 – 13:20 **Lunch Break**

Session 8: Vaccines and Innate Immune Response

Chair: Trushar Patel, *University of Lethbridge, Lethbridge*

13:20 – 13:35 **S1-based SARS-CoV-2 vaccine reduces virus shedding in ferrets**

Darryl Falzarano, *University of Saskatchewan, Saskatoon*

13:40 – 13:55 **Cultural Safety during COVID-19**

Carrie Bourassa, *University of Saskatchewan, Saskatoon*

14:00 – 14:15 **Cellular responses to SARS-CoV-2 infection**

Karen Mossman, *McMaster University, Hamilton*

14:20 – 14:35 **LinearDesign: Efficient Algorithms for Optimized mRNA Sequence Design**
Liang Huang, *Baidu Research USA, Sunnyvale*

14:40 – 14:55 **Questions and panel discussion**
Moderator: *Trushar Patel*

15:00 – 15:30 **Break**

Session 9: RNA based vaccine delivery, developments and challenges

Chair: **Mark Kay**, *Stanford University, Stanford*

15:30 – 15:45 **Antibody responses to SARS-CoV-2**
Florian Krammer, *Icahn School of Medicine at Mount Sinai, New York*

15:50 – 16:05 **Host responses and viral burden during SARS-CoV-2 infection in ferrets differs according to age and sex**
Alyson Kelvin, *Dalhousie University, Halifax*

16:10 – 16:25 **Lipid Nanoparticle Systems for Enabling Gene Therapies**
Pieter Cullis, *University of British Columbia, Vancouver*

16:30 – 16:45 **Questions and panel discussion**
Moderator: *Mark Kay*

16:50 – 17:10 **Break**

17:10 – 17:15 **Presentation of the winner of the best poster by students' representatives**

17:15 – 17:45 **Keynote**
RNA Viruses: A Present and Future Threat to Global Health
Mariano A. Garcia-Blanco, *UTMB, Texas*
Introduction by *Brendan Bell*