

KEYSTONE SYMPOSIA

on Molecular and Cellular Biology

MEETING CHANGE TO VIRTUAL: Precision Engineering of the Genome, Epigenome and Transcriptome (X1)

Scientific Organizers: Charles Gersbach, Rachel E. Haurwitz and Fyodor D. Urnov

Supported by the Directors' Fund

Plant Genome Engineering: From Lab to Field (X2)

Scientific Organizers: Caixia Gao, Daniel F. Voytas and Holger Puchta

March 7-11, 2021 • Whistler Conference Centre • Whistler, BC, Canada

Supported by the Directors' Fund

Scholarship Deadline: November 18, 2020 / Abstract Deadline: December 9, 2020 / Discounted Registration Deadline: January 7, 2021

MONDAY, MARCH 8

Welcome and Keynote Address (8am Denver/Mountain Time Start) (EK24)

***Fyodor D. Urnov**, University of California, Berkeley, USA

Tim W. Yu, Boston Children's Hospital, USA
Developing Custom Genetic Therapies

Welcome and Keynote Address (8am Denver/Mountain Time Start) (EK25)

***Caixia Gao**, Chinese Academy of Sciences, China

***Daniel F. Voytas**, University of Minnesota, USA

***Holger Puchta**, Karlsruhe Institute of Technology, Germany

Pamela C. Ronald, University of California, Davis, USA
Enhancing Food Security through Rice Genetic Improvement

Engineering of Editors and Epi-Editors (8:30am Denver/Mountain Time Start) (EK24)

***Samuel H. Sternberg**, Columbia University, USA

Targeted DNA Integration using CRISPR RNA-Guided Transposases

Cecilia Cotta-Ramusino, Tessera Therapeutics, USA
[NOT AVAILABLE ON DEMAND] New Editing Technologies

***Patrick D. Hsu**, University of California, Berkeley, USA
CRISPR in the Time of COVID

Prashant Mali, University of California, San Diego, USA
[NOT AVAILABLE ON DEMAND] Endogenous RNA Editing Systems

Balint Csorgo, 275.00

Short Talk: A Compact Cascade-Cas3 System for Targeted Genome Engineering and Gene Discovery

Yarui Diao, 275.00

Short Talk: CRISPR-based Multimodal Functional Analysis Reveals the Key Role of Retroviral Sequence LTR7 in Governing Neural Fate Commitment of Human Embryo Development

Plant Genome Editing Tools and Technology Development I (8:40am Denver/Mountain Time Start) (EK25)

***Daniel F. Voytas**, University of Minnesota, USA
Overcoming Bottlenecks in Editing Plant Genomes

Feng Zhang, University of Minnesota, USA
Improving Scalable and Precision Genome Editing in Plants

***Holger Puchta**, Karlsruhe Institute of Technology, Germany
CRISPR/Cas Mediated Plant Chromosome Engineering

Avraham A. Levy, Weizmann Institute of Science, Israel
From a DNA Break to Targeted Recombination between Homologous Chromosomes in Plants

Ayumu Takatsuka, 150.00

Short Talk: MitoTALEN-Mediated Mitochondrial Gene-Knockout Revealed a Cytoplasmic Male Sterility-Causative Gene in Oryza Sativa cv. Tadukan

Shin-ichi Arimura, 275.00

Short Talk: Targeted Base Editing in the Plastid Genome of Arabidopsis thaliana

Career Roundtable (Joint) (12:30pm Denver/Mountain Time Start)

Britt S. Adamson, Princeton University, USA

Rachel E. Haurwitz, Caribou Biosciences, Inc., USA

Steven E. Jacobsen, University of California, Los Angeles, USA

Poster Session 1 (Joint) (1:30pm Denver/Mountain Time Start)

Controlling CRISPR (3pm Denver/Mountain Time Start) (EK24)

***Charles Gersbach**, Duke University, USA

Jacob E. Corn, ETH Zürich, Switzerland
Visible and Invisible HDR in Human Cells

Bas van Steensel, Netherlands Cancer Institute, Netherlands
Multiplexed Probing of the Impact of Chromatin on Cas9-Induced DSB Repair Pathways

Ahmad S. Khalil, Boston University, USA
Design of Eukaryotic Gene Regulatory Circuits

Jennifer E. Phillips-Cremins, University of Pennsylvania, USA
Engineering the Repetitive 3D Genome in Human Disease

Alyna Katti, Weill Cornell Medicine, USA

Short Talk: Strategies to Improve Engineering Cancer Associated SNVs with Base Editing

Daniel M. Sapozhnikov, 150.00

Short Talk: Unraveling the Transcriptional Impact of DNA Demethylation at Specific Promoters by Targeted Steric Blockage of DNA Methyltransferase with CRISPR/dCas9

***Henriette O'Geen**, 275.00

Short Talk: Determinants of Persistence in Epigenetic Editing

Isaac B. Hilton, 275.00

Short Talk: Programmable Human Histone Phosphorylation and Gene Activation using a CRISPR/Cas9-Based Chromatin Kinase

Plant Genome Editing Tools and Technology Development II (3pm Denver/Mountain Time Start) (EK25)

***Steven E. Jacobsen**, University of California, Los Angeles, USA
Epigenetic Editing in Plants

Seiichi Toki, National Agriculture and Food Research Organization, Japan

Plant DNA Repair and Genome Engineering

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Erika Toda, Tokyo Metropolitan University, Japan
An Efficient DNA- and Selectable-Marker-Free Genome-Editing System Using Zygotes in Rice and Its Possible Application to Other Crop Species

***Caixia Gao**, Chinese Academy of Sciences, China
Precise Prime Editing in Plants

Lanqin Xia, Chinese Academy of Agricultural Sciences, China
CRISPR/Cas-Mediated Precision Genome Editing for Crop Improvement

Jian-Kang Zhu, Shanghai Center for Plant Stress Biology, CAS, China
Strategies for Efficient Gene Targeting in Plants

Keishi Osakabe, 275.00
Short Talk: Genome Editing Using the CRISPR Type I-D Nuclease in Plants

TUESDAY, MARCH 9

Therapeutics I: Ex Vivo Editing (8am Denver/Mountain Time Start) (EK24)

***Rachel E. Haurwitz**, Caribou Biosciences, Inc., USA
The Future is Allogeneic - Translating a CRISPR Platform into Gene-Edited Cell Therapies

Matthew Porteus, Stanford University School of Medicine, USA
Genome Editing of Blood Cells to Cure Disease

Chiara Bonini, Vita-Salute San Raffaele University, Italy
T-Cell Gene Editing for Cancer Immunotherapy

***Nicole Gaudelli**, Beam Therapeutics, USA
An Adenine Base Editing Strategy for the Treatment of Sickle Cell Disease by Elimination of the Pathogenic Globin Protein

Delphine Guipouy, 275.00
[NOT AVAILABLE ON DEMAND] Short Talk: Knockout of NKG2A by CRISPR in Human NK Cells Enhance their Cytotoxic Activity Against Solid Tumors

Dimitrios Laurin Wagner, 275.00
Short Talk: Fast and Efficient Generation of TRAC-integrated CAR T Cells without Viruses

Adrian Veres, 150.00
Short Talk: Optimizing Stem Cell Lines for in vitro-derived Beta Cell Therapeutics via Genome-wide CRISPR Knock-out Screening

Sébastien Levesque, CHU de Québec - Université Laval, Canada
Short Talk: Expanding the Scope of Marker-Free Selection for CRISPR-Driven Genome Editing in Human Cells

Application of Genome Editing in Agriculture I (8am Denver/Mountain Time Start) (EK25)

***Zachary Lippman**, Howard Hughes Medical Institute/Cold Spring Harbor Laboratory, USA
Engineering Quantitative Trait Variation for Crop Improvement by Genome Editing

***Jens Boch**, Leibniz Universität Hannover, Germany
Expanding the TALEN Toolbox for Genome Editing

Joyce Van Eck, Boyce Thompson Institute, USA
Exploring Insect Interactions in Physalis Using CRISPR Generated Mutant Lines

Magdy Mahfouz, King Abdullah University of Science and Technology, Saudi Arabia
RNA-Virus Interference via CRISPR-Cas13 Systems

Mariette Andersson, Swedish University of Agricultural Sciences, Sweden
Genome Editing for Improved Potato Traits

Eyal Fridman, 275.00
Short Talk: RECAS9-Mediated QTL Mapping by Mitotic Genome Editing in Cereals

Sergei Svitashv, 275.00
Short Talk: CRISPR-Cas9-mediated 75.5 Mb Inversion in Maize

Trevor Weiss, 150.00
Short Talk: Differential CRISPR/Cas9 Genome Editing Influenced by Epigenetic Factors

Meet the Editors (Joint) (12:30pm Denver/Mountain Time Start)

Roland George Roberts, Public Library of Science, UK

Holger Matthias Breithaupt, EMBO, Germany

Kevin Davies, CRISPR Journal, USA

Bing Yang, Frontiers in Genome Editing, USA

Ruth Zearfoss, Cell Press, USA

Caitlin Karniski, Nature Portfolio, USA

Poster Session 2 (Joint) (1:30pm Denver/Mountain Time Start)

Therapeutics II: In Vivo Editing (3pm Denver/Mountain Time Start) (EK24)

David G. Ousterout, Locus Biosciences, Inc., USA
Development of crPhage to Treat Infections

***Fyodor D. Urnov**, University of California, Berkeley, USA
Towards a CRISPRi/a Therapeutic for Radiation Injury

Aravind Asokan, Duke University, USA
Engineering AAV for Targeted In Vivo Editing

***Ana Moreno Collado**, Navega Therapeutics, USA
Epigenome Regulation for Treatment of Chronic Pain

Chikdu Shivalila, 275.00
Short Talk: A Versatile Platform for ADAR-Mediated RNA Editing in vivo in Preclinical Models

Jia Qi Cheng-Zhang, University of Pittsburgh, USA
Short Talk: Upregulation of Disease Compensatory Gene via CRISPR Activation in Muscular Dystrophy Mice

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Serena Tamura, 150.00

Short Talk: CRISPR Activation to Rescue SCN2A Haploinsufficiency in Autism Spectrum Disorder

Application of Genome Editing in Agriculture II (3pm Denver/Mountain Time Start) (EK25)

***Kan Wang**, Iowa State University, USA

Breeding of a Transformable Model Maize Line for Genome Editing

***Yiping Qi**, University of Maryland, USA

Expanding the Targeting Range of CRISPR in Plants

Tobias Jores, University of Washington, USA

Learning Properties of Regulatory Elements for Future Crop Engineering

William J. Gordon-Kamm, Corteva Agriscience, USA

The Status of Cereal Crop Transformation and Meeting Future Demands for Genome Modification

Tom Adams, Pairwise, USA

How CRISPR Technology Can Help Us All Eat More Fruits and Vegetables

Rammyani Bagchi, 275.00

Short Talk: Use of Polyvalent Guide RNAs for CRISPR Antivirals

Closing Remarks (5:50pm Denver/Mountain Time Start) (EK25)

Caixia Gao, Chinese Academy of Sciences, China

WEDNESDAY, MARCH 10

Delivery (8am Denver/Mountain Time Start) (EK24)

***Daniel J. Siegart**, University of Texas Southwestern Medical Center, USA

Selective ORgan Targeting (SORT): A Synthetic Lipid Nanoparticle (LNP) Strategy for Effective Tissue-Specific Genome Engineering

***Charles Gersbach**, Duke University, USA

In Vivo Editing Approaches for Gene Therapy and Functional Genomics

James Dahlman, Georgia Tech / Emory Medical School, USA

Delivering Gene Editing Components by Testing Thousands of Nanoparticles in vivo

Peter Deng, University of California, Davis, USA

Short Talk: Mesenchymal Stem Cell Delivery for Zinc Finger Proteins in Preclinical Animal Models of Angelman Syndrome

Sean Burns, Intellia Therapeutics, USA

Short Talk: In Vivo Genome Editing of Hematopoietic Stem and Progenitor Cells using Non-viral Delivery of CRISPR/Cas9

Aaron Lin, 275.00

Short Talk: Broadening PAM Recognition of CRISPR-Associated Endonucleases by Protein Recombination

Kiara Berrios, University of Pennsylvania, USA

Short Talk: Controllable Genome Editing with Split-Engineered Base Editors

Kevin Hemphill, 275.00

Short Talk: CRISPR-mediated Transcriptional Activation and Simultaneous Gene Knockout and Activation with Synthetic Guide RNAs

Networking Lounge (Joint) (12pm Denver/Mountain Time Start)

Screening & Single Cell Technologies (3pm Denver/Mountain Time Start) (EK24)

***John G. Doench**, Broad Institute of MIT and Harvard University, USA
Bridging the Variant-to-Function Chasm: Screens with Base Editor Technology

***Britt S. Adamson**, Princeton University, USA
Single Cell Sequencing Technologies

Hyongbum Henry Kim, Yonsei University College of Medicine, South Korea

Predicting the Efficiencies and Outcomes of Genome Editing using Deep Learning

Jonathan S. Weissman, Whitehead Institute, HHMI, and MIT, USA
Genome-Wide Programmable Transcriptional Memory by CRISPR-Based Epigenome Editing

Alberto Ciccia, 275.00

Short Talk: Functional Interrogation of DNA Damage Response Variants with Base Editing Screens

Brian Cosgrove, 275.00

Short Talk: Harnessing Epigenetic Editing Tools to Identify and Modulate Mechanically-Activated Genomic Enhancers

Pratiksha Thakore, 275.00

[NOT AVAILABLE ON DEMAND] *Short Talk: Toward Genome-Scale Single-Cell Screens with Multi-Modal Perturb-Seq*

Sarah Elisabeth Pierce, Stanford University, USA

Short Talk: Spear-ATAC: Pooled, Droplet-Based, Single-Cell Chromatin Accessibility CRISPR Screens

Closing Remarks (5:50pm Denver/Mountain Time Start) (EK24)