**DNA Replication and Recombination**

April 2–6, 2017 | Santa Fe Community Convention Center | Santa Fe, New Mexico | USA

**Scientific Organizers:**

John F.X. Diffley, Cancer Research UK, London Research Institute, UK  
Anja Groth, University of Copenhagen, Denmark  
Scott Keeney, HHMI, Memorial Sloan-Kettering Cancer Center, USA

Joint with the meeting on **Genomic Instability and DNA Repair**

DNA replication and recombination are common to all cells. Errors in these processes lead to many diseases in humans, including cancer, and many fundamental questions are still unresolved. Due to recent technical advances in microscopy and other techniques, these dynamic processes can now be studied in time and space in both prokaryotes and eukaryotes. Moreover, breakthroughs in the biochemical reconstitution of processes in DNA replication and recombination repair as well as single particle electron microscopy promise to reveal new mechanisms at near-atomic resolution; and new DNA sequencing technologies make it possible to study these key processes in great detail. Mechanistic similarities across the three domains of life provide new basic principles while differences identify potential targets for therapeutic intervention. The Keystone Symposia “DNA Replication and Recombination” meeting has historically been one of the premiere meetings in this field and one of the very few that brings together scientists working in replication and recombination across all life forms. Because of the close relationship between DNA replication and recombination and their importance for genome stability, this meeting will be held jointly with the Keystone Symposia meeting on “Genomic Instability and DNA Repair.” Talks at the “DNA Replication and Recombination” meeting will focus on the mechanism and regulation of these processes, with an emphasis on multiple organisms and multiple approaches. Talks in joint sessions will center on the metabolism of stalled replication forks and the importance of chromatin in replication, recombination and genome stability.

**Session Topics:**

- Replication/Repair Structure and Function  
- Starting Recombination  
- Interplay between Chromatin Structure and DNA Replication/Repair (Joint)  
- Regulating Recombination  
- Replication Fork Progression and Restart  
- Replication Initiation Mechanisms  
- Replication Fork Establishment and Replication Coupled Repair (Joint)  
- Finishing Recombination

**Scholarship Application & Discounted Abstract Deadline:** December 5, 2016  
**Abstract Deadline:** January 12, 2017  
**Discounted Registration Deadline:** February 2, 2017

Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted.

Meeting Hashtag: #KSDna  
www.keystonesymposia.org/17Z2

Note: Scholarships are available for graduate students and postdoctoral fellows and are awarded based on the abstract submitted.

Upper image courtesy of: The Web site of the National Cancer Institute (http://www.cancer.gov)
SUNDAY, APRIL 2
Arrival and Registration

MONDAY, APRIL 3

Welcome and Keynote Session (Joint)
*Julia Promisel Cooper, NCI, National Institutes of Health, USA
*Scott Keeney, HHMI/Memorial Sloan Kettering Cancer Center, USA
Tatsuya Hirano, RIKEN, Japan
Johannes C. Walter, Harvard Medical School, USA

Replication/Repair Structure and Function (Z2)
*John F.X. Diffley, Francis Crick Institute, UK
Michael E. O’Donnell, Rockefeller University, USA
Tyler H. Stanage, University of Wisconsin-Madison, USA
Karlene A. Cimprich, USA
Alessandro Costa, Francis Crick Institute, UK
Matthew L. Bochman, Indiana University, USA

Mechanisms of DNA Repair (Z1)
*Timothy C. Humphrey, University of Oxford, UK
Wei Yang, NIDDK, National Institutes of Health, USA
James E. Haber, Brandeis University, USA
James E. Haber, Brandeis University, USA
Joseph J. Loparo, Harvard Medical School, USA
Michael D. Stone, University of California, Santa Cruz, USA
Fena Ochs, University of Copenhagen, Denmark

Workshop 1: Recombination and Repair (Z2)
Tracey E. Beyer, Biotech Research and Innovation Centre, Denmark

Workshop 1: Genome Instability and DNA Repair I (Z1)
*James E. Haber, Brandeis University, USA
Elena Balkanska-Sinclair, Duke University, USA
Michael M. Cox, University of Wisconsin-Madison, USA
Nitika Taneja, NCI, National Institutes of Health, USA
Ryan M. Baxley, University of Minnesota, USA
Michael H. Hauer, Friedrich Miescher Institute for Biomedical Research, Switzerland
Mariano Labrador-San Jose, University of Tennessee, USA

*Session Chair † Invited but not yet accepted. Program current as of June 15, 2019. Program subject to change. Meal formats are based on meeting venue. For the most up-to-date details, visit www.keystonesymposia.org/17Z2 and www.keystonesymposia.org/17Z1.
Mitch McVey, Tufts University, USA
Coordination of ATPase and Polymerase Activities of Drosophila DNA Polymerase Theta during Interstrand Crosslink and Alternative End-Joining Repair of Double-Strand Breaks

Hilda A. Pickett, Children's Medical Research Institute, Australia
BLM and SLX4 Play Opposing Roles in Recombination-Dependent Replication at Human Telomeres

Starting Recombination (Z2)

*Bernard de Massy*, Institut de Génétique Humaine, France
Scott Keeney, HHMI/Memorial Sloan Kettering Cancer Center, USA
Breaking and Chewing DNA during Meiosis

Florence M. Pratto, NIDDK, National Institutes of Health, USA
Linking Replication and Meiotic Recombination Initiation in Mammals

Kara A. Bernstein, University of Pittsburgh School of Medicine, USA
Short Talk: The Function of the Shu Complex and the Rad51 Paralogs in Repair of Replication Intermediate by Promotion of Rad51 Presynaptic Filament Assembly

Maria Jasin, Memorial Sloan Kettering Cancer Center, USA
Protecting the Genome by Homologous Recombination

Sofija Mijic, Institute of Molecular Cancer Research, Switzerland
Short Talk: Replication Fork Reversal Triggers Fork Degradation in BRCA2-Defective Cells

RNA Metabolism and Genome Stability (Z1)

*Hengyao Niu*, Indiana University Bloomington, USA
Vihandha Wickramasinghe, Peter MacCallum Cancer Centre, Australia
Effects of Altered RNA Processing on Genome Stability and the Proteome

Frédéric L. Chedin, University of California, Davis, USA
Short Talk: R-Loop Formation is a Hallmark of Active Early Replication Origins in Mammalian Genomes

Julius Brennecke, IMBA - Institut für Molekulare Biotechnologie GmbH, Austria
An RNA-Based Genome Immune System Safeguards Genome Stability

Eric A. Hunt, New England Biolabs, USA
Short Talk: Prokaryotic Argonautes and their Potential as New Molecular Tools

Alice Meroni, University of Milan, Italy
Short Talk: DNA Polymerase eta Sensitizes Cells to Nucleotide Pool Deprivation in Absence of RNase H

Francesca Storici, Georgia Institute of Technology, USA
Short Talk: Double-Strand Break Repair by Transcript RNA Is Stimulated by Rad52 and Requires Limited End Resection

Poster Session 1

TUESDAY, APRIL 4

Interplay between Chromatin Structure and DNA Replication/Repair (Joint)

*Jennifer A. Cobb*, University of Calgary, Canada
*Anja Groth*, University of Copenhagen, Denmark
Geneviève Almouzni, Centre National de la Recherche Scientifique, France
Shaping Chromatin in the Nucleus, the Bricks and the Architects

Gary Karpen, Lawrence Berkeley National Laboratory, University of California, Berkeley, USA
Regulation of DNA Repair in Heterochromatin and Euchromatin

Francesca Mattiroli, HHMI/Colorado University Boulder, USA
Short Talk: DNA-Mediated Association of Two Histone-Bound CAF-1 Complexes Drives Tetrasome Assembly in the Wake of DNA Replication

Robert A. Martienssen, Cold Spring Harbor Laboratory, USA
RNAi Promotes Heterochromatic Silencing through Replication-Coupled Release of RNA Polymerase II

Bernard de Massy, Institut de Génétique Humaine, France
The Control of Initiation of Meiotic Recombination by PRDM9

Philipp Oberdoerffer, NCI, National Institutes of Health, USA
Short Talk: Replication Stress Shapes a Protective Chromatin Environment Across Fragile Genomic Regions

Regulating Recombination (Z2)

*Xiaolan Zhao*, Memorial Sloan Kettering Cancer Center, USA
Lorraine S. Symington, Columbia University, USA
DNA End Resection and Repair Pathway Choice

Jennifer A. Cobb, University of Calgary, Canada
Nej1 Regulates Repair Pathway Choice by Inhibiting Dna2-Sgs1 Mediated Resection

Aurele Piazza, University of California, Davis, USA
Short Talk: Multi-Invasions Are Recombination Byproducts that Induce Chromosomal Rearrangements

Eric C. Greene, Columbia University, USA
Single-Molecule Studies of Recombination Pathways

Sneha Saxena, Indian Institute of Science, India
Short Talk: RAD51 Paralog XRCC2 Suppresses Pathological Replication Fork Progression

Cell Cycle Regulation of DNA Damage Response (Z1)

*Frédéric L. Chedin*, University of California, Davis, USA
Tanya T. Paull, University of Texas at Austin, USA
Double-Strand Break Repair Factors and R-Loop-Mediated Genomic Instability

* Session Chair † Invited but not yet accepted  Program current as of June 15, 2019. Program subject to change. Meal formats are based on meeting venue. For the most up-to-date details, visit www.keystonesymposia.org/17Z2 and www.keystonesymposia.org/17Z1.
David Cortez, Vanderbilt University School of Medicine, USA
Regulation of Replication Fork Stability by Single-Stranded DNA Binding Proteins

Kyle M. Miller, USA
Chromatin Regulation of the DNA Damage Response

Michael P. Sheetz, Mechanobiology Institute, National University of Singapore, Singapore
Short Talk: DNA Damage Causes Rapid Accumulation of Phosphoinositides to Recruit ATR but not ATM

Linda J. Kenney, National University of Singapore, Singapore
Short Talk: Salmonella Typhimurium forms Biofilms on Solid Tumors

**WEDNESDAY, APRIL 5**

**Poster Session 2**

**Replication Fork Progression and Restart (Z2)**

Anne D. Donaldson, University of Aberdeen, UK
Imaging Individual Replisomes Reveals Independence and Decoupling of Polymerases During Replication

Anja Groth, University of Copenhagen, Denmark
Chromatin Replication and Epigenome Maintenance

Alvberto Ciccio, Columbia University, USA
Short Talk: Restoration of Fork Stability in BRCA1- and BRCA2-Deficient Cells

Xiaolan Zhao, Memorial Sloan Kettering Cancer Center, USA
Smc5/6-Mediated Control of Recombinational Repair is Critical for Genome Duplication

Adavitha Madireddy, Albert Einstein Collge of Medicine, USA
Short Talk: FANC2 Facilitates DNA Replication through Common Fragile Sites

Joseph L. Stodola, Washington University School of Medicine, USA
Short Talk: Kinetic Analysis of Lagging Strand Replication and Okazaki Fragment Maturation

Joseph Yeeles, MRC Laboratory of Molecular Biology, UK
Short Talk: How the Eukaryotic Replisome Responds to DNA Damage in the Leading- and Lagging-Strand Templates

**Nuclear Dynamics and Genome Stability (Z1)**

Arnab Ray Chaudhuri, Erasmus University Medical Center, Netherlands

Marco F. Foiani, Instituto FIRC di Oncologia Molecolare, Italy
An Integrated ATR, ATM and mTOR-Mechanical Network Controlling Nuclear Plasticity and Cell Migration

Angela Taddei, Institut Curie, France
Nuclear Organization and Chromatin Status Modulate Homologous Recombination Efficiency and Outcome

Irene Chiolo, University of Southern California, USA
Short Talk: Highways for Repair: Nuclear Myosins and Actin Filaments Relocalize Heterochromatic DNA Breaks to the Nuclear Periphery

Martin W. Hetzer, The Salk Institute, USA
How the Nuclear Membrane Controls Genome Function

Emmanuelle Fabre, Hopital St Louis, France
Short Talk: DNA Damage Increases Chromatin Stiffening in Budding Yeast

Neil T. Umbreit, Dana-Farber Cancer Institute, USA
Short Talk: Chromosome Bridge Resolution Requires Mechanical Forces from Actin-Based Contractility

Peter Ly, University of California San Diego, USA
Short Talk: Mitotic Errors Promote Chromosome Shattering and DNA Break Repair by Non-Homologous End Joining

**Poster Session 3**

**Replication Initiation Mechanisms (Z2)**

Kenneth J. Marians, Memorial Sloan Kettering Cancer Center, USA
Mechanism and Timing of Mcm2-7 Ring Closure During Origin Licensing

Stephen D. Bell, Indiana University, USA
DNA Replication in the Archaea

Heath Murray, Newcastle University, UK
Short Talk: A New Bacterial Replication Origin Element Specifies Single-Strand Initiator Binding

Anne D. Donaldson, University of Aberdeen, UK
The Conserved Role of Rif1 as a Substrate-Targeting Subunit of Protein Phosphatase 1

Dominik Boos, University of Duisburg-Essen, Germany
Short Talk: MTBP Is an Essential Replication Initiation Factor with Vertebrate-Specific and Std7-Like Features

**DNA Repair and Human Diseases (Z1)**

Hilda A. Pickett, Children's Medical Research Institute, Australia

Agnel Sfeir, New York University School of Medicine, USA
Single-Molecule Analysis of mtDNA Replication Uncovers the Basis of the Common Deletion

Cecilia Cotta-Ramusino, Editas Medicine, USA
Short Talk: CRISPR/Cas9-Induced DNA Lesions at an Endogenous Locus

Simon J. Boulton, London Research Institute, Clare Hall Laboratories, UK
Mechanistic Insights into Telomere Dysfunction Disorders
THURSDAY, APRIL 6

**Replication Fork Establishment and Replication-Coupled Repair (Joint)**

*Jeanneine Gerhardt*, Weill Cornell Medicine, USA  
*Karlene A. Cimprich*, USA  
*James M. Berger*, Johns Hopkins University School of Medicine, USA  
*Agata Smogorzewska*, Rockefeller University, USA  
*Eric J. Brown*, Perelman School of Medicine, University of Pennsylvania, USA  
*André Nussenzweig*, NCI, National Institutes of Health, USA  
*Helle D. Ulrich*, Institute of Molecular Biology, Germany  
*Stephanie Koundrioukoff*, Institute Gustave Roussy, France

**Workshop 2: Replication (Z2)**

*Linda B. Bloom*, University of Florida, USA  
*Christopher Sansam*, Oklahoma Medical Research Foundation, USA  
*Boris Pfander*, Max Planck Institute of Biochemistry, Germany  
*Hasan Yardimci*, Francis Crick Institute, UK  
*Jon Baxter*, University of Sussex, UK  
*Ivan Psakhye*, IFOM, FIRC Institute of Molecular Oncology, Italy  
*DDK-Mediated Regulation of the deSUMOylating Enzyme Ulp2 Facilitates DNA Replication Initiation*

**Workshop 2: Genome Instability and DNA Repair II (Z1)**

*Maria P. Sheetz*, Mechanobiology Institute, National University of Singapore, Singapore  
*Katharina Schlacher*, MD Anderson Cancer Center, USA  
*Kristijan Ramadan*, University of Oxford, UK  
*Jason Sheltzer*, Cold Spring Harbor Laboratory, USA  
*Manuel Stucki*, University of Zurich, Switzerland  
*Maria Teresa Teixeira*, CNRS – UMR 8226, France  
*Stephen C. Kowalczykowski*, University of California, Davis, USA  
*Catherine H. Freudenreich*, Tufts University, USA  
*Catherine H. Freudenreich*, Tufts University, USA  
*Muwen Kong*, University of Pittsburgh, USA  
*Muwen Kong*, University of Pittsburgh, USA  
*Maria Jasin*, Memorial Sloan Kettering Cancer Center, USA  
*Stephen C. Kowalczykowski*, University of California, Davis, USA  
*Petr Cejka*, University of Zurich, Switzerland  
*Maria Jasin*, Memorial Sloan Kettering Cancer Center, USA  
*Stephen C. Kowalczykowski*, University of California, Davis, USA  
*Petr Cejka*, University of Zurich, Switzerland

**Wrapping Up – Outcomes**
Ralph Scully, Beth Israel Deaconess Medical Center, USA
Short Talk: Microhomology-Mediated Tandem Duplications form at Tus/Ter-Stalled Replication Forks in BRCA1 Mutant Cells

Stephen C. West, Francis Crick Institute, UK
Unresolved Recombination Intermediates as a Source of DNA Breaks and Chromosome Aberration

Telomeres and Centromeres (Z1)