Announcing Keystone Symposia’s 2015 conference on:

DNA Replication and Recombination

joint with the meeting on: Genomic Instability and DNA Repair

March 1–6, 2015
Whistler Conference Centre
British Columbia, Canada

Scientific Organizers:
Simon J. Boulton, Karlene A. Cimprich and Stephen D. Bell

DNA replication is a fundamental process for all cells and as such is subject to exquisite cell cycle control and integration with other key cellular processes. Although recent advances have improved our understanding of a number of the key steps and transactions that govern DNA replication and recombination, our knowledge of the pathways that coordinate replication and repair remains incomplete.

Session Topics:
• Initiation and/or Helicase Activation
• Structural and Single Molecule Analysis of Replication/Repair
• Recombination Repair (Joint)
• Repair/Replication Interface
• Interface between Chromatin and Genome Maintenance (Joint)
• DSB Repair Metabolism
• Replication-Coupled Repair
• Regulation of DSB Repair

plus two workshops with short talks chosen from abstracts

Discounted Abstract/Scholarship Deadline: Nov 5, 2014
Abstract Deadline: Dec 4, 2014
Discounted Registration Deadline: Jan 7, 2015

To see the full program and for additional details, visit www.keystonesymposia.org/15X3.
**SUNDAY, MARCH 1**

Arrival and Registration

**MONDAY, MARCH 2**

**Keynote Session (Joint)**
- **Simon J. Boulton**, London Research Institute, Clare Hall Laboratories, UK
- **Daniel Durocher**, Lunenfeld-Tanenbaum Research Institute, Canada
- **Stephen P. Jackson**, University of Cambridge, UK

**Assembly and Disassembly of Protein Complexes at Sites of DNA Damage**
- **John F.X. Diffley**, Francis Crick Institute, UK

**Right Place, Right Time: Eukaryotic DNA Replication Mechanism and Regulation**
- **Initiation and/or Helicase Activation (X3)**
  - **Simon J. Boulton**, London Research Institute, Clare Hall Laboratories, UK
  - **Stephen D. Bell**, Indiana University, USA
  - **Archaeal DNA Replication Initiator Proteins**
  - **Daniel Duzdevich**, Columbia University, USA
  - **Short Talk: The Dynamics of Eukaryotic Replication Initiation: Origin Specificity, Licensing and Firing at the Single-Molecule Level**
  - **Michael E. O’Donnell**, Rockefeller University, USA
  - **Architecture and Function of the Eukaryotic Replisome**
  - **James M. Berger**, Johns Hopkins University School of Medicine, USA
  - **Bending, Twisting, Popping: Protein and Nucleic-Acid Remodeling by ATP-Dependent Machines and Switches**
  - **Aline C. Simon**, University of Cambridge, UK
  - **Short Talk: Structure of Human Cdc45 and its Interactions within the CMG Helicase Complex**

**Animal Models and Syndromes (X4)**
- **André Nussenzweig**, NCI, National Institutes of Health, USA
- **Maria Jasins**, Memorial Sloan Kettering Cancer Center, USA
- **Regulation of Homologous Recombination in Vertebrates**
- **Jos Jonkers**, Netherlands Cancer Institute, Netherlands
- **BRCA1 Deficiency in Pre-Clinical Models**
- **Agata Smogorzewska**, Rockefeller University, USA
- **Molecular Genetics of Fanconi Anemia**
- **Bing Xia**, Rutgers Cancer Institute of New Jersey, USA
- **Functional and Mutational Landscape of BRCA1 for Homology-Directed Repair and Drug Resistance**
- **Uri Tabori**, Hospital for Sick Children, Canada
- **Short Talk: Combined Hereditary and Somatic Mutations of Replication Error Repair Result in Rapid Onset of Ultra-Hypermutated Cancers**

**Workshop 1: DNA Repair and Genome Editing (X4)**
- **Maria Jasins**, Memorial Sloan Kettering Cancer Center, USA
- **Integrate-Mediated Spacer Acquisition during CRISPR–Cas Adaptive Immunity**
- **Cecilia Cotta-Ramusino**, Editas Medicine, USA
- **Gene Targeting of the HBB Locus by Crispr/Cas9 to Investigate Repair Pathway Choice in Response to Different Types of DNA Lesions**
- **Jordan B. Pinder**, Dalhousie University, Canada
- **Enhancing Efficiency of Cas9-Stimulated Homology-Directed Repair**
- **Megan van-Overbeek**, Canbou Biosciences, Inc., USA
- **Methods to Enhance Homology-Directed Repair at CRISPR-Cas9 Induced Double-Strand Breaks**
- **Jeremy M. Stark**, Beckman Research Institute of the City of Hope, USA
- **DNA Damage Response Factors from Diverse Pathways, Including DNA Crosslink Repair, Mediate Alternative End Joining**
- **Bernard S. Lopez**, Institut Gustave Roussy, France
- **The Joining of Distal Double-Strand Breaks Favors Complex Alternative End-Joining Rearrangements; Impact of the Cohesin Complex on the Joining of Distant Double Strand Ends**
- **Evi Soutoglou**, Institute of Genetics and Molecular and Cellular Biology, France
- **Double Strand Break Repair within Heterochromatin, Revealed with the CRISPR/Cas9 System**
- **Structural and Single-Molecule Analysis of Replication/Repair (X3)**
  - **Alessandro Costa**, Francis Crick Institute, UK
  - **Antoine M. van Oijen**, University of Wollongong, Australia
  - **Single-Molecule Studies of DNA Replication: The Plasticity of the Replisome**
  - **Thomas A. Steitz**, Howard Hughes Medical Institute, Yale University, USA
  - **The Macromolecular Replicating Machinery of Bacteria: Structural Insights into the Replisome**
  - **Franziska Bleichert**, Johns Hopkins University School of Medicine, USA
  - **Short Talk: Structural Investigations of the Eukaryotic Origin Recognition Complex**
  - **Stephen C. Kowalczykowski**, University of California, Davis, USA
  - **Visualizing Recombination and Replication on Single Molecules of DNA**
Telomeres, Aging and Stem Cells (X4)

*Agata Smogorzewska*, Rockefeller University, USA

**Titia de Lange**, Rockefeller University, USA
The LINC Complex Mediates 53BP1-Driven DSB Mobility and Non-Homologous End Joining

**Emmanuelle Passegué**, Columbia University, USA
DNA Repair in Stem Cells

**Jan Karlseder**, The Salk Institute for Biological Studies, USA
Cell Death during Crisis Is Mediated by Mitotic Telomere Deprotection

**Madalena Tarsounas**, University of Oxford, UK
Short Talk: BRCA2 Prevents G-Quadruplex-Induced Replication Stress and Chromosomal Breakage

TUESDAY, MARCH 3

Recombination Repair (Joint)

*John H.J. Petrini*, Memorial Sloan-Kettering Cancer Center, USA
Dissecting the Roles and Regulation of Nucleases Involved in ICL Repair

**Daniel Durocher**, Lunenfeld-Tanenbaum Research Institute, Canada
Cell Cycle Regulation of DNA Double-Strand Break Repair

**Simon J. Boulton**, London Research Institute, Clare Hall Laboratories, UK
Rad51 Paralogs Remodel Pre-Synaptic Rad51 Filaments to Stimulate Homologous Recombination

**Stephen C. West**, Francis Crick Institute, UK
Defective DNA Strand Break Repair and Links to Genome Instability and Cancer

**Kata Sárió**, University of Copenhagen, Denmark
Short Talk: In vitro Reconstitution of Anaphase Bridge Decatenation Pathways

**Ralph Scully**, Beth Israel Deaconess Medical Center, USA
Short Talk: Recombination Control at Tus/Ter-Stalled Mammalian Replication Forks: The Good, the Bad and the Ugly

Workshop 1 (X3)

*Alessandro Vindigni*, St. Louis University, USA

**Jacques Côté**, Laval University Cancer Research Center, Canada
Dynamic Acetylation of PCNA Sliding Surface Differentially Regulates Distinct DNA Polymerases to Promote Genome Stability

**Anne D. Donaldson**, University of Aberdeen, UK
Replication-Coupled PCNA Unloading by the Elg1 Complex Requires Okazaki Fragment Ligation

**Bojk A. Berghuis**, Delft University of Technology, Netherlands
Strand Separation Suffices to Establish a Long-Lived, Foolproof DNA-Protein Lock at the Tus-Ter Replication Fork Barrier

Claus Storgaard Sørensen, University of Copenhagen, Denmark
A Novel Mechanism Linking CDC6 Protein Stability, DNA Replication and Genome Integrity

Nynke H. Dekker, Delft University of Technology, Netherlands
Dynamics of Replication Stoichiometry and Termination Studied at the Single Cell Level

Daniel L. Kaplan, Florida State University College of Medicine, USA
The Dbl4-Cdc7 Kinase Promotes Mcm2-7 Ring Opening to Allow for Single-Stranded DNA Extrusion and Helicase Assembly

Samuel D. Dick, Cancer Research UK-London Research Institute, UK
Structural Basis for Activation of Cdc7 Kinase and its Substrate Recognition

Dirk Remus, Memorial Sloan-Kettering Cancer Center, USA
Mcm2-7 Double Hexamer Mobility Allows Redistribution of Replication Origins by Elongating RNA Polymerase

Repair/Replication Interface (X3)

*Wolf-Dietrich Heyer*, University of California, Davis, USA

**Karlene A. Cimprich**, Stanford University, USA
Mechanisms for the Maintenance of Genome Stability

**Houra Merrikh**, Vanderbilt University, USA
Direct Visualization of DNA Replication Conflicts in the Bacterial Cell

**Jade Wang**, University of Wisconsin-Madison, USA
Interplay between Transcription and Replication Machineries

**Francesca Storici**, Georgia Institute of Technology, USA
Short Talk: Double-Strand Break Repair with Transcript RNA

Mitotic Progression and DNA Damage (X4)

*Stephen J. Elledge*, Harvard Medical School, USA

**David Pellman**, Dana-Farber Cancer Institute, USA
Chromothripsis and other Complex Chromosomal Rearrangements from an Error in Mitosis

**Peter Campbell**, Wellcome Trust Sanger Institute, UK
Interrogating the Architecture of Cancer Genomes

**Jiri Lukas**, Novo Nordisk Foundation Center for Protein Research, Denmark
Limits and Thresholds of Repair Pathway Choices during the Cell Cycle

**A. John Callegari**, Memorial Sloan Kettering Cancer Center, USA
Short Talk: Mutagenic Translesion Polymerases Are Required to Replicate Damaged DNA after the G2/M Checkpoint

Poster Session 2

WEDNESDAY, MARCH 4
Interface between Chromatin and Genome Maintenance (Joint)

*Jiri Lukas*, Novo Nordisk Foundation Center for Protein Research, Denmark

**Roger Greenberg**, University of Pennsylvania, USA

*Impact of DNA Damage Responses on Higher Order Chromatin Structure*

**Anja Groth**, University of Copenhagen, Denmark

**Chromatin Replication and Epigenome Maintenance**

**Iestyn Whitehouse**, Memorial Sloan Kettering Cancer Center, USA

*Chromatin Assembly and Lagging Strand Synthesis*

**Michelle Debatisse**, Institut Curie, France

*Respective Roles of Replication and Transcription in Common Fragile Site Instability*

**Caroline B. Stæmme**, Biotech Research and Innovation Centre, Denmark

*Short Talk: MCM2 Mimics Nucleosomal DNA to Chaperone Canonical and Variant Histones H3-H4*

**Sophie E. Polo**, Paris Diderot University, France

*Short Talk: New Insights into Epigenome Maintenance in Response to DNA Damage by Real-Time Tracking of Histone Dynamics in Human Cells*

Workshop 2: Late-Breaking Research (X4)

**J. Ross Chapman**, University of Oxford, UK

**Raphael Ceccaldi**, Dana-Farber Cancer Institute, USA

*Homologous Recombination (HR)-Deficient Tumors Are Hyper-Dependent on POLQ-Mediated Repair*

**Pedro A. Mateos-Gomez**, New York University, USA

*Mammalian Polymerase Theta Promotes Alternative-NHEJ and Suppresses Recombination*

**Saskia Hoffmann**, University of Copenhagen, Denmark

*TRAIP Is a new PCNA Ubiquitin Ligase in the DNA Damage Response*

**Michael Huen**, University of Hong Kong, Hong Kong

*A PCNA Clamp Unloader at Stressed Replication Forks*

**Kyle M. Miller**, USA

*Screen Identifies Role for Bromodomain Chromatin Reader Proteins in the DNA Damage Response*

**Stephan Uphoff**, University of Oxford, UK

*Stochastic Activation of a DNA Damage Response by a Single Repair Event*

**Laura W. Dillon**, NHLBI, National Institutes of Health, USA

*Extrachromosomal microDNAs in Vertebrate Tissues Arise from Areas with Active Chromatin Marks and High Exon Density by Mismatch Repair and Other Repair Pathways*

**Markus Löbrich**, Darmstadt University of Technology, Germany

*Nek1 Phosphorylates Rad54 to Promote Homologous Recombination*

Double-Strand Break Repair Metabolism (X3)

*John Rouse*, University of Dundee, UK

**Dale B. Wigley**, Institute of Cancer Research, UK

*Structural Insights into Double-Strand Break Processing by AddAB*

**John H.J. Petrini**, Memorial Sloan-Kettering Cancer Center, USA

*ATM Independent Functions of the Mre11 Complex*

**Gaelle Legube**, Center for Integrative Biology, France

*Functions of chromatin during DNA Double-Strand break repair*

**Irene Chiolo**, University of Southern California, USA

*Short Talk: Heterochromatic Breaks Move to the Nuclear Periphery to Complete Recombinational Repair*

Genome Integrity in the Immune System (X4)

*Alberto Martin*, University of Toronto, Canada

**André Nussenzweig**, NCI, National Institutes of Health, USA

*DNA-Damage-Induced Differentiation of Leukaemic Cells as an Anti-Cancer Barrier*

**Frederick W. Alt**, Boston Children's Hospital, USA

*Convergent Sense/Antisense Transcription at Intragenic Super-Enhancers Targets AID-Initiated Genomic Instability*

**Shan Zha**, Columbia University Medical Center, USA

*Short Talk: DNA-PKcs Phosphorylation as the Molecular Switch for End-Processing and End-Ligation during NHEJ*

**Jeremy A. Daniel**, University of Copenhagen, Denmark

*Short Talk: A PTIP-PA1 Subcomplex Promotes Transcription for IgH End-Processing and End-Ligation during NHEJ*

**Jeremy A. Daniel**, University of Copenhagen, Denmark

*Short Talk: A PTIP-PA1 Subcomplex Promotes Transcription for IgH Class-Switching Independently from the associated MLL3-MLL4 Methyltransferase Complex*

Poster Session 3

THURSDAY, MARCH 5

Replication Coupled Repair (X3)

*Stephen D. Bell*, Indiana University, USA

**Kenneth J. Marians**, Memorial Sloan Kettering Cancer Center, USA

*Replication Restart and Lesion Bypass*

**Johnes A. Walter**, Harvard Medical School, USA

*The Mechanism of Vertebrate Replication Termination*

**Johnne Murray**, University of Sussex, UK

*Recombination-Dependent Replication Restart Generates Chromosome Rearrangements*

**Philippe Pasero**, Institute of Human Genetics, France

*The HIV Restriction Factor SAMHD1 Processes Stalled Replication Forks*

**Alessandro Vindigni**, St. Louis University, USA

*Short Talk: Distinct Roles of Human Nucleases in Replication Stress Response*

**Alessandro Costa**, Francis Crick Institute, UK

*Short Talk: A Reverse Sewing Machine in the Eukaryotic Replisome*
**DNA Repair Pathway Decisions (X4)**

*Roger Greenberg*, University of Pennsylvania, USA

*Lorraine S. Symington*, Columbia University, USA

Sae2 Promotes DNA Damage Resistance by Removing the Mre11-Rad50-Xrs2 Complex from DNA and Attenuating Rad53 Signaling

**Gregory Ira**, Baylor College of Medicine, USA

*Mus81 Mediates a Switch from Error-Prone to High-Fidelity DNA Synthesis at Broken Replication Forks*

**James E. Haber**, Brandeis University, USA

*Short Talk: Chromosome Architecture and Repair of Broken Chromosomes*

**Stephen J. Elledge**, Harvard Medical School, USA

*A New Role for Ubiquitination in Genomic Stability through RFWD3 Synthetase*

**Dipanjan Chowdhury**, Dana-Farber Cancer Institute, Harvard Medical School, USA

*Short Talk: Dephosphorylation a "Priming Event" in Repair of DNA Double Strand Breaks*

**Sven Rottenberg**, University of Bern, Switzerland

*Short Talk: REV7 Counteracts DNA Double-Strand Break Resection and its Loss causes PARP Inhibitor Resistance of BRCA1-Deficient Mammary Tumors*

**Fabrizio d'Adda di Fagagna**, IFOM, The FIRC Institute of Molecular Oncology, Italy

*Short Talk: The Role of Non Coding RNA in the Control of DNA Damage Response*

**Workshop 2 (X3)**

*Neil Hunter*, University of California, Davis, USA

**Gongshi Bai**, Cornell University, USA

*Studying DNA Replication Regulation in a Defective Replication Helicase Mouse Cancer Model*

**Fay A. Cooper**, Institute of Genetics and Molecular Medicine, University of Edinburgh, UK

*Human Mutations in ORC1 Disrupt Embryonic Growth in Zebrafish and Mice*

**Luis Ignacio Toledo**, NNF Center for Protein Research, University of Copenhagen, Denmark

*Mechanistic Framework of the Boundary between Replication Stress and Genome Disintegration*

**George Chung**, University of British Columbia, Canada

*The Molecular Identification of a Gene which Controls the Meiotic Recombination Landscape in Caenorhabditis elegans*

**George-Lucian Moldovan**, Pennsylvania State College of Medicine, USA

*The Role of Mono-ADP-Ribosylation in DNA Repair*

**Niek van Wietmarschen**, NCI, National Institutes of Health, USA

*Defined Recombination Hotspots in Bloom Syndrome Cells*

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**Regulation of DSB Repair (X3)**

*Johanne Murray*, University of Sussex, UK

**Wolf-Dietrich Heyer**, University of California, Davis, USA

*Mechanisms and Regulation of Homologous Recombination*

**Scott Keeney**, HHMI/Memorial Sloan Kettering Cancer Center, USA

*Mechanism and Regulation of Meiotic Recombination Initiation*

**Neil Hunter**, University of California, Davis, USA

*Local and Global Regulation of Meiotic Prophase by Post-Translational Protein Modification*

**Transcription, Ribonucleotides and Genome Integrity (X4)**

*Fabrizio d'Adda di Fagagna*, IFOM, The FIRC Institute of Molecular Oncology, Italy

**Andrés Aguilera**, University of Seville, CABIMER, Spain

*Connecting R-Loop- and Transcription-Mediated Genome Instability with Chromatin Reorganization and Replication Stress*

**Josef Jiricny**, University of Zurich, Switzerland

*Ribonucleotides Misincorporated into DNA Act as Strand-Discrimination Signals in Eukaryotic Mismatch Repair*

**Jesper Q. Svejstrup**, Francis Crick Institute, UK

*Transcription Stress-Induced Genome Instability*

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**Meeting Wrap-Up: Outcomes and Future Directions (Organizers) (X3)**

**Meeting Wrap-Up: Outcomes and Future Directions (Organizers) (X4)**

**FRIDAY, MARCH 6**

Departure