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MOLECULAR BIOLOGY PROGRAM

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Dirk Remus, PhD

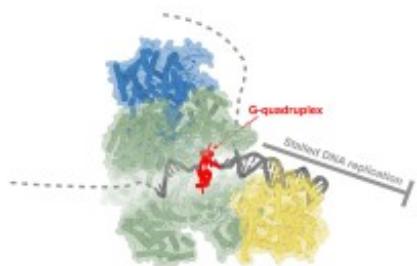
Our lab studies the mechanism of eukaryotic chromosome replication. Chromosomes are the carriers of the genetic and epigenetic information and faithful chromosome replication is of fundamental importance for genome maintenance during normal cell proliferation. We employ fully reconstituted yeast and human DNA replication systems to investigate the structure and biochemical mechanism of the eukaryotic replication machinery. A particular focus of the lab is to elucidate the molecular consequences of replication stress, which encompasses conditions that impede the normal progression of replication forks, and which is a major driver of cancer-associated genome instability. Through this approach, we aim to understand how faithful and efficient

chromosomal DNA replication is achieved under normal conditions and, conversely, how the replication machinery is affected by and overcomes the diverse array of physical obstacles encountered on the chromosomal template. Ultimately, our work aims to uncover novel cancer therapeutic targets to control the dysregulated proliferation of cancer cells.

[View Lab Overview](https://www.mskcc.org/research/ski/labs/dirk-remus/overview) (<https://www.mskcc.org/research/ski/labs/dirk-remus/overview>)



Featured News



[Cryo-Electron Microscopy Reveals Hidden Mechanics of DNA Replication,](#)

Sheds New Light on Cancer Target

MSK researchers shed new light on G-quadruplexes, a type of secondary DNA structure that has attracted attention as a potential therapeutic target in cancer.



SKI Scientists Determine Structure of a DNA Damage 'First Responder'

The results of this collaborative project overturn some conventional wisdom about how the DNA repair process works.



At Work: Molecular Biologist Dirk Remus

Molecular biologist Dirk Remus studies how cells normally copy their DNA to better understand how the process goes wrong in cancer.

Publications Highlights

[G-quadruplex-stalled eukaryotic replisome structure reveals helical inchworm DNA translocation. Batra S, Allwein B, Kumar C, Devbhandari S, Brüning JG, Bahng S, Lee CM, Marians KJ, Hite RK, Remus D. Science. 2025 Mar 7;387\(6738\):eadt1978. doi: 10.1126/science.adt1978. Epub 2025 Mar 7.](#)

[Looping out of control: R-loops in transcription-replication conflict. Kumar C, Remus D. Chromosoma. 2024. 133\(1\):37-56. Doi: 10.1007/s00412-023-00804-8. PMCID: PMC10771546.](#)

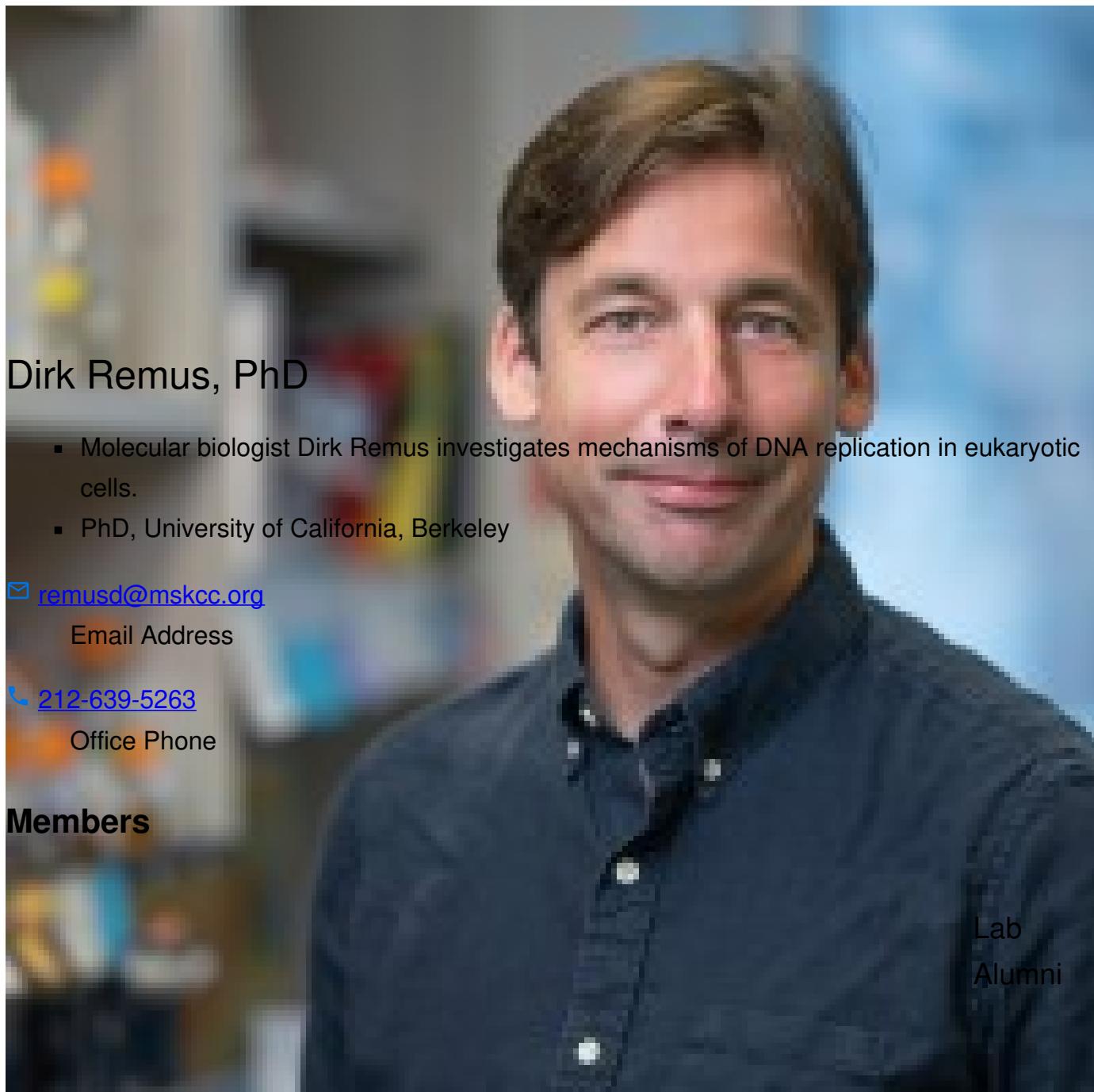
[Multistep loading of a DNA sliding clamp onto DNA by replication factor C. Schrecker M, Castaneda JC, Devbhandari S, Kumar C, Remus D, Hite RK. eLife. 2022 Aug 8;11:e78253. doi: 10.7554/eLife.78253.](#)

[CMG helicase activity on G4-containing DNA templates. Batra S, Devbhandari S, Remus D. Methods Enzymol. 2022;672:233-260. doi: 10.1016/bs.mie.2022.02.020. Epub 2022 Mar 25.](#)

[Yeast ORC sumoylation status fine-tunes origin licensing. Regan-Mochrie G, Hoggard T, Bhagwat N, Lynch G, Hunter N, Remus D, Fox CA, Zhao X. Genes Dev. 2022 Aug 4. doi: 10.1101/gad.349610.122. Online ahead of print.](#)

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People



Dirk Remus, PhD

- Molecular biologist Dirk Remus investigates mechanisms of DNA replication in eukaryotic cells.
- PhD, University of California, Berkeley

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Members

Lab
Alumni



Charanya Kumar
Postdoctoral Associate



Sahil Batra
Research Scholar

Lab Affiliations

Achievements

- Louis V. Gerstner, Jr. Young Investigator Award, Memorial Sloan Kettering Cancer Center (2011)



Sumedha Dahal
Research Scholar



Eleanor Smith
BCMB Graduate Student



Lucia Wang
GSK Graduate Student



Wen-Hao Wang
Research Technician

▪ Long-Term Fellow, EMBO (2006)

Open Positions

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To learn more about compensation and benefits for postdoctoral researchers at MSK, please visit [Resources for Postdocs](#)

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Disclosures

Members of the MSK Community often work with pharmaceutical, device, biotechnology, and life

sciences companies, and other organizations outside of MSK, to find safe and effective cancer treatments, to improve patient care, and to educate the health care community. These activities outside of MSK further our mission, provide productive collaborations, and promote the practical application of scientific discoveries.

MSK requires doctors, faculty members, and leaders to report (“disclose”) the relationships and financial interests they have with external entities. As a commitment to transparency with our community, we make that information available to the public. Not all disclosed interests and relationships present conflicts of interest. MSK reviews all disclosed interests and relationships to assess whether a conflict of interest exists and whether formal COI management is needed.

Dirk Remus discloses the following relationships and financial interests:

- AbCellera Biologics Inc.
Equity
- Advanced Micro Devices, Inc
Equity
- Alphabet Inc
Equity
- Arm Holdings plc
Equity
- Beam Therapeutics
Equity
- CRISPR Therapeutics AG
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- Ginkgo Bioworks, Inc.
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This page and data include information for a specific MSK annual disclosure period (January 1, 2024 through disclosure submission in spring 2025). This data reflects interests that may or may not still exist. This data is updated annually.

Learn more about MSK's COI policies [here](#) . For questions regarding MSK's COI-related policies and procedures, email MSK's Compliance Office at ecoi@mskcc.org .

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