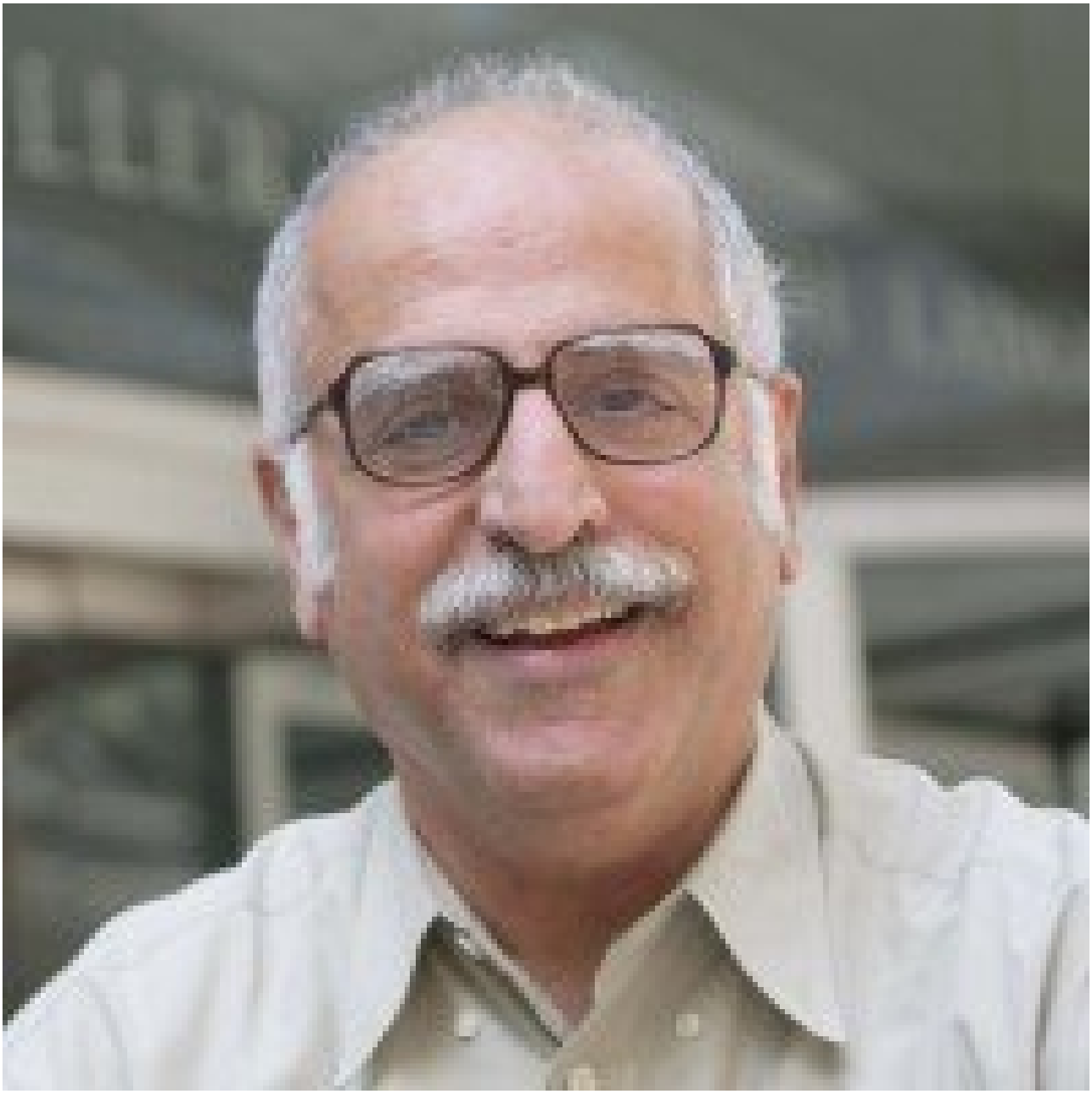
STRUCTURAL BIOLOGY PROGRAM

The Dinshaw Patel Lab



Dinshaw Patel, PhD
Abby Rockefeller Mauze Chair of Experimental Therapeutics

Our group applies structural (cryo-EM, x-ray crystallography and NMR), biochemical and biophysical methods together with functional studies to investigate macromolecular-mediated recognition, regulation and catalysis. The ongoing major projects in the laboratory focus on the structural biology of CRISPR-Cas surveillance complexes and their suppression by anti-CRISPR proteins (in collaboration with Luciano Marraffini, Rockefeller), on Structure Maintenance of Chromosome Smc5/6 (with Xiaolan Zhao, MSKCC) and MRX (with John Petrini, MSKCC) complexes involved in double-strand break and stalled replication fork repair, and on complexes

mediating the meiotic recombination pathway (with Scott Keeney, MSKCC). In addition, research is focused on protein-RNA complexes mediating the piRNA pathway (with Julius Brennecke, IMBA-Austria), on identification and characterization of small molecule inhibitors targeted to proteins of the cGAS-STING pathway and the SARS-CoV-2 family (with Thomas Tuschl, Rockefeller) and those that impact on proteins triggering the onset of acute myeloid leukemia (with Michael Kharas, MSKCC).

Our group retains an interest in the areas of structure-function studies of RNA interference mediated by siRNA pathway, and on post-translation histone and DNA modifications impacting on epigenetic regulation. Additional areas include RNA-mediated events ranging from cofactor recognition by riboswitches, catalysis by ribozymes and protein-RNA recognition events impacting on disease syndromes and the principles underlying the molecular basis of glycosphingolipid and phospholipid binding specificity by lipid transfer proteins.

Meeske, A. J., Jia, N., Cassel, A., Kozlova, A., Liao, J., Wiedman, M., Patel, D. J. & Marraffini, L. A. (2020). Phage-encoded anti-CRISPR enables full escape from type VIA CRISPR-Cas immunity. *Science* 369, 54-59.

Li, W., et al., Gozani, O., Patel, D. J. & Wang, Z. (2021). Molecular basis of nucleosomal H3K36 methylation by NSD methyltransferases. *Nature* 590, 498-503.

Rostol, J.T., Xie, W., Kuryavyi, V., Kao, K., Fromm, R., Patel, D. J. & Marraffini, L. A. (2021). The Card1 nuclease provides bacterial defense during Type III CRISPR immunity. *Nature* 590, 624-629.

Wang, J., Catania, S., Wang, C., de la Cruz, M. J., Rao, B., Madhani, H. & Patel, D. J. (2022). SNF2 ATPase remodels DNA methyltransferase to enable durable epigenetic memory. *Mol. Cell* 82, 1186-1198.

Yu, Y., Li, S., Ser, Z., Kuang, H., Than, T., Guan, D., Zhao, X. & Patel, D. J. Cryo-EM structure of DNA-bound Smc5/6 reveals DNA clamping enabled multi-subunit conformational changes. *Proc. Natl. Acad. Scis. USA* in press.

All Publications >

View Lab Overview (https://www.mskcc.org/research/ski/labs/dinshaw-patel/overview)

Research Projects

- CRISPR-Cas and cGAS-STING Surveillance Pathways
- DNA Double Strand Break Repair Pathways
- Readout of Histone and DNA Epigenetic Marks
- siRNA and piRNA Biogenesis and Silencing
- Molecular Chaperone and Transfer Proteins

View All Projects

Featured News

ANNOUNCEMENT

[MSK Symposium Honors Dinshaw Patel, Titan of Structural Biology]

Scientists came to MSK to celebrate the 75th birthday of a leader in the field of structural biology.

[Linking Histones and Cancer]

Structural biologists at Memorial Sloan Kettering Cancer Center are collaborating with biochemists and cell biologists at The Rockefeller University to study how cells read genetic instructions imprinted on histones, DNA's packaging proteins.

[Dinshaw Patel Elected to the National Academy of Sciences]

Dinshaw J. Patel, a Member in Sloan Kettering Institute's Structural Biology Program and incumbent of the Abby Rockefeller Mauzé Chair in Experimental Therapeutics, was elected to the National Academy of Sciences at its 146th annual meeting in April.

People

Dinshaw Patel, PhD

Abby Rockefeller Mauze Chair of Experimental Therapeutics

- The Patel laboratory studies the structural biology of macromolecular recognition, regulation and catalysis. Ongoing projects include structure-function studies of the CRISPR-Cas and cGAS-STING surveillance pathways, on the role of Structure Maintenance Chromosome complexes in mediating DNA double strand break repair, on the role of histone and DNA methylation in epigenetic regulation and on RNA-mediated processes ranging from riboswitches and ribozymes to those governing siRNA and piRNA pathways.
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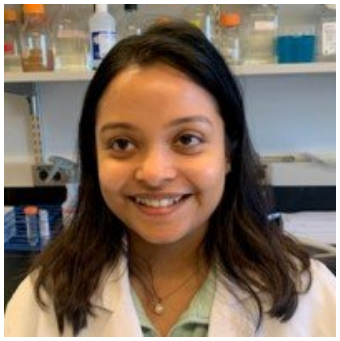
Members

Vitaly V. Kuryavyi
Senior Research Scientist



Puja Majumder
Senior Research Scientist

Arpita Chakravarti
Research Associate

Lab Affiliations

Achievements

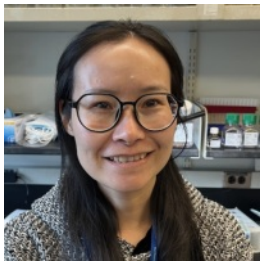
- Jamshetjee N. Tata Fellow (1961-1963)
- AT&T Bell Laboratories

Zhiying Zhang

Research Scholar

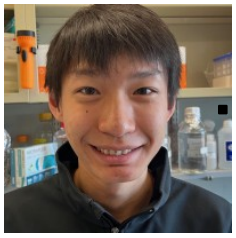
Hansranie Singh

Administrative Assistant



Xiaobin Ling

Research Associate



Chengliang Liu

Graduate Student

- Distinguished Technical Staff Award (1983)
- Abby Rockefeller Mauzé Chair in Experimental Therapeutics, MSKCC (1992-current)
- Distinguished Alumnus Award, New York University (1997)
- Harvey Society, President (1998-1999)

Open Positions

To learn more about available postdoctoral opportunities, please visit our Career Center

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.

Dinshaw Patel discloses the following relationships and financial interests:

- Ankrin Therapeutics
  Intellectual Property Rights
- Beijing Advanced Innovation Center for Structural Biology
  Professional Services and Activities (Uncompensated)
- Center for Life Sciences
  Professional Services and Activities
- Chinese Protein Society Symposium
  Professional Services and Activities (Uncompensated)
- Fudan University
  Professional Services and Activities (Uncompensated)
- Icahn School of Medicine at Mount Sinai
  Professional Services and Activities
- Immunogenesis, Inc.
  Intellectual Property Rights
- Institute of Biophysics, Chinese Academy of Sciences
  Professional Services and Activities
- International Conference on Cellular Dynamics and Chemical Biology
  Professional Services and Activities
- National Institutes of Health (NIH)
  Professional Services and Activities
- New Cornerstone Investigator Program
  Professional Services and Activities
- Peking University
  Professional Services and Activities
- ShanghaiTech University

Professional Services and Activities

- Shenzhen Bay Laboratory

  Professional Services and Activities (Uncompensated)
- Southern University of Science and Technology

  Professional Services and Activities (Uncompensated)
- Takeda Pharmaceuticals

  Intellectual Property Rights
- Westlake University

  Professional Services and Activities

The information published here is a complement to other publicly reported data and is for a specific annual disclosure period. There may be differences between information on this and other public sites as a result of different reporting periods and/or the various ways relationships and financial interests are categorized by organizations that publish such data.

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 .

View all disclosures (https://www.mskcc.org/disclosures)