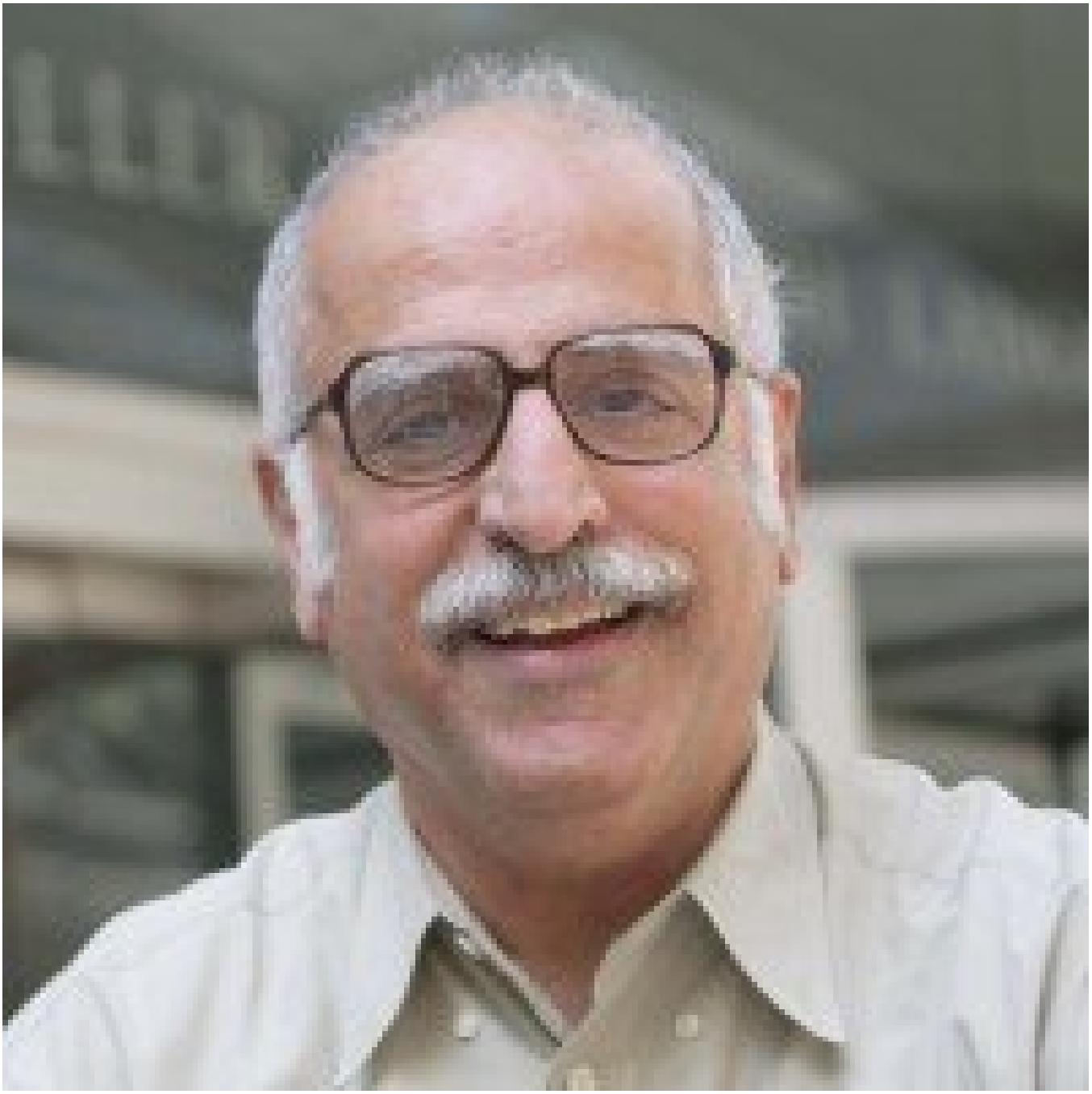
Gerstner Sloan Kettering
Graduate School of Biomedical Sciences

STRUCTURAL BIOLOGY PROGRAM

The Dinshaw Patel Lab

Research



Dinshaw Patel, PhD
Abby Rockefeller Mauze Chair of Experimental Therapeutics

Professor

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 →

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

Professor

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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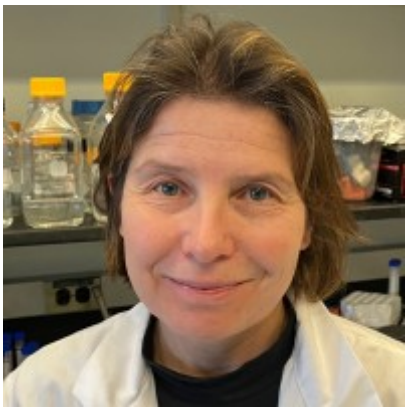
Members

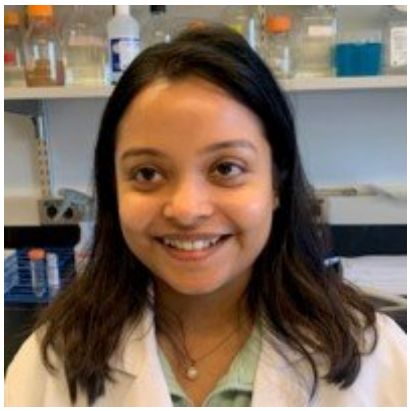


Marianna Teplova

Senior Research Scientist

Vitaly V. Kuryavyi

Senior Research Scientist

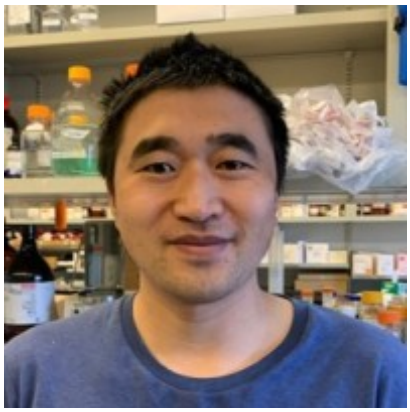


Puja Majumder

Research Scholar

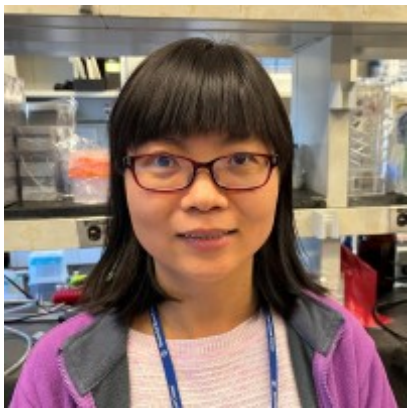
Arpita Chakravarti

Research Scholar



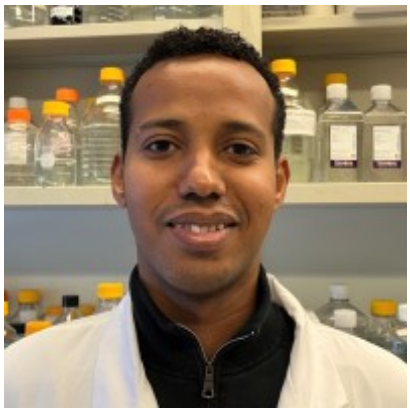
You Yu

Senior Research Scientist



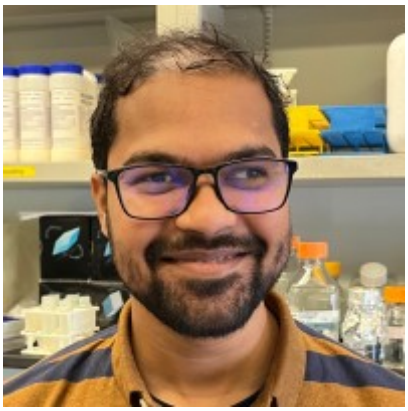
Shuxia Peng

Senior Research Scientist



Ahmad Alsomali

Senior Research Technician



Abhishek Suman

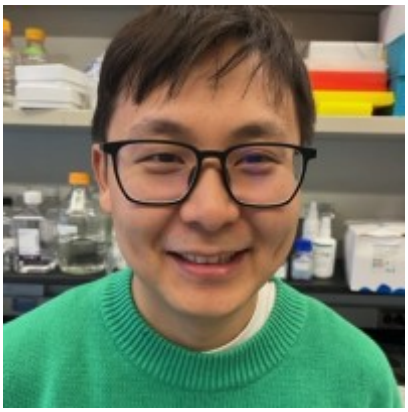
Research Scholar

Deeksha Waghela

Research Scholars

Zhiying Zhang

Research Scholars



Lvqin Zheng

Research Scholars

Lab Affiliations
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Achievements

Jamshetjee N. Tata Fellow (1961-1963)

AT&T Bell Laboratories 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)

Read more
+

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Disclosures

Doctors and faculty members 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.

MSK requires doctors and faculty members 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.

Dinshaw Patel discloses the following relationships and financial interests:

- Ankrin Therapeutics
  - Intellectual Property Rights
- Beijing Frontier Research Center for Biological Structure (FRCBS)
  - Professional Services and Activities
- Center for Life Sciences
  - Professional Services and Activities
- Harbin Institute of Technology, Harbon, China

Professional Services and Activities

Immunogenesis, Inc.

Intellectual Property Rights

Institute Research Biomedicine, Barcelona, Spain

Professional Services and Activities

Southern University of Science and Technology

Professional Services and Activities (Uncompensated)

Takeda Pharmaceuticals

Intellectual Property Rights

Ventus Therapeutics

Professional Services and Activities

The information published here 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, 2022 through disclosure submission in spring 2023). 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 →