

# Department of Biochemistry and Molecular Biophysics

The faculty of the Department of Biochemistry and Molecular Biophysics perform research in a broad spectrum of biomedically relevant areas, including DNA and RNA structure and enzymology; protein folding, misfolding and aggregation; cellular mechanics; membrane receptor-mediated signaling; and hemostasis, thrombosis and vascular biology. The department offers training opportunities at the crossroads of biochemistry, biophysics, systems biology, proteomics, computational science and pharmacological sciences.

The department's approaches to research focus on understanding the energetics, structure and mechanisms of biological processes. Investigators employ a variety of experimental methods (e.g., X-ray crystallography, nuclear magnetic resonance, mass spectrometry, optical spectroscopy, thermodynamics, rapid kinetics) in combination with computational approaches to unravel the molecular underpinnings of processes of relevance to health and disease. Novel single-molecule methods are providing new insight into the molecular details of enzyme mechanisms and macromolecule dynamics. The high-throughput screening of chemical libraries and the use of synthetic medicinal chemistry to develop small-molecule probes of biological systems provide new avenues for translational research and the development of experimental therapeutics.

The faculty in the department organize and teach basic science courses in the medical school curriculum. In the Arts & Sciences curriculum, the faculty teach courses in Nucleic Acids & Protein Biosynthesis (BIOL 5480), Chemistry and Physics of Biomolecules (BIOL 5357), and Macromolecular Interactions (BIOL 5312). The overarching theme of these courses is to understand the principles of the molecular interactions that underlie the biological process of health and disease. Students in the School of Medicine and the School of Arts & Sciences are eligible for these courses and may elect to pursue biomedical research under the direction of our faculty. A full listing of advanced course topics can be found on our website.

Website: <http://biochem.wustl.edu>

## Faculty

### Ben Garcia, PhD

Department Chair

Visit our website for more information about our faculty and their appointments.

## A

### Hema Adhikari, M.S., Ph.D.

Assistant Professor of Biochemistry and Molecular Biophysics (primary appointment)

Master of Science, State University of New York at Buffalo, 2015

Doctor of Philosophy, State University of New York at Buffalo, 2015

## B

### Jacques Ulrich Baenziger, Ph.D., M.D.

Professor Emeritus of Biochemistry and Molecular Biophysics

Bachelor of Arts, New College of Florida, 1969

Doctor of Philosophy, Washington University in St Louis, 1975

Doctor of Medicine, Washington University in St Louis, 1975

### Wayne Morris Barnes, Ph.D.

Associate Professor of Biochemistry and Molecular Biophysics (primary appointment)

Bachelor of Arts, University of California Riverside, 1969

Doctor of Philosophy, University of Wisconsin Madison, 1974

### Shripad Bhagwat

Professor of Biochemistry and Molecular Biophysics

### Melissa Diane Stuchell Brereton, Ph.D.

Instructor in Biochemistry and Molecular Biophysics (primary appointment)

Bachelor of Science, University of Missouri in St Louis, 2001

Doctor of Philosophy, University of Utah, 2006

### Peter M Burgers, M.S., Ph.D.

Professor of Biochemistry and Molecular Biophysics (primary appointment)

Marvin A. Brennecke Professor of Biological Chemistry

Bachelor of Science, Leiden University, 1969

Master of Science, Leiden University, 1972

Doctor of Philosophy, Leiden University, 1977

## C

### Byoungkyu Cho, M.S., Ph.D.

Assistant Professor of Biochemistry and Molecular Biophysics (primary appointment)

Bachelor of Science, Hankuk University of Foreign Studies, 2010

Master of Science, Seoul National University, 2013

Doctor of Philosophy, Seoul National University, null

### John A Cooper, Ph.D., M.D.

Professor of Biochemistry and Molecular Biophysics (primary appointment)

Alan A. and Edith L. Wolff Professorship in Biochemistry and Molecular Biophysics

Professor of Cell Biology and Physiology

Bachelor of Science, Brown University, 1977

Doctor of Medicine, Johns Hopkins University, 1982

Doctor of Philosophy, Johns Hopkins University, 1983

## D

### Gregory DeKoster, Ph.D.

Instructor in Biochemistry and Molecular Biophysics (primary appointment)

Bachelor of Arts, Monmouth University, 1990  
Doctor of Philosophy, University of Iowa, 1997

**Roland Ellwood Dolle, M.S., Ph.D.**

Professor of Biochemistry and Molecular Biophysics (primary appointment)  
Director of the Center for Drug Discovery  
Bachelor of Science, Arizona State University, 1978  
Master of Science, State University of New York, 1980  
Doctor of Philosophy, University of Pennsylvania, 1984

## E

**Elliot L Elson, Ph.D.**

Professor Emeritus of Biochemistry and Molecular Biophysics  
Bachelor of Arts, Harvard University, 1959  
Doctor of Philosophy, Stanford University, 1966

**Ryan Joseph Emenecker, Ph.D.**

Instructor in Biochemistry and Molecular Biophysics (primary appointment)  
Bachelor of Science, University of Minnesota Twin Cities, 2016  
Doctor of Philosophy, Washington University in St Louis, 2021

## F

**Doug E. Frantz, Ph.D.**

Professor of Biochemistry and Molecular Biophysics (primary appointment)  
Vice Chancellor for Innovation and Commercialization  
Bachelor of Science, Stephen F Austin State University, 1994  
Doctor of Philosophy, Texas A&M University, 1998

**Carl Frieden, Ph.D.**

Professor of Biochemistry and Molecular Biophysics (primary appointment)  
Bachelor of Arts, Carleton College, 1951  
Doctor of Philosophy, University of Wisconsin Madison, 1955

## G

**Eric A Galburt, Ph.D.**

Professor of Biochemistry and Molecular Biophysics (primary appointment)  
Bachelor of Science, Brown University, 1997  
Doctor of Philosophy, University of Washington-Seattle Campus, 2002

**Roberto Galletto, M.S., Ph.D.**

Professor of Biochemistry and Molecular Biophysics (primary appointment)  
Master of Science, University of Genova, 1996  
Doctor of Philosophy, University of Texas Galveston, 2002

**Benjamin Aaron Garcia, Ph.D.**

Professor of Biochemistry and Molecular Biophysics (primary appointment)  
Raymond H. Wittcoff Distinguished Professor of Biological Chemistry  
Head of the Department of Biochemistry and Molecular Biophysics  
Doctor of Philosophy, University of Virginia, 2005

**Alireza Ghanbarpour, M.S., Sc.M., Ph.D.**

Assistant Professor of Biochemistry and Molecular Biophysics (primary appointment)

Assistant Professor of Molecular Microbiology  
Assistant Professor of Cell Biology & Physiology  
Bachelor of Science, Shahid Beheshti University, 2012  
Master of Science, Sharif University of Technology, 2014  
Master of Science, Sharif University of Technology, 2014  
Doctor of Philosophy, Michigan State University, 2019

**Yehuda Ginosar, M.D.**

Voluntary Research Professor of Anesthesiology  
Doctor of Medicine, University of London, 1986

**Young Ah Goo, M.S., Ph.D.**

Professor of Biochemistry and Molecular Biophysics (primary appointment)  
Professor of Genetics  
Bachelor of Science, Chonnam National University, 1990  
Master of Science, University of Washington-Seattle Campus, 1994  
Doctor of Philosophy, University of Washington, 2002

**Lina Greenberg, Ph.D.**

Instructor in Biochemistry and Molecular Biophysics (primary appointment)  
Bachelor of Science, Brandeis University, 2004  
Doctor of Philosophy, Tufts University, 2010

**Michael Jonathan Greenberg, Ph.D.**

Associate Professor of Biochemistry and Molecular Biophysics (primary appointment)  
Bachelor of Science, Brandeis University, 2004  
Doctor of Philosophy, Boston University, 2010

## H

**Kathleen Hall, Ph.D.**

Professor of Biochemistry and Molecular Biophysics (primary appointment)  
Bachelor of Science, University of Minnesota, 1974  
Doctor of Philosophy, University of California Berkeley, 1985

**Kristina Harris Petersen, Ph.D.**

Associate Professor of Biochemistry and Molecular Biophysics (Pending Executive Faculty Approval) (primary appointment)  
Assistant Dean for Student Success and Access  
Bachelor of Fine Arts, New York University, 2001  
Doctor of Philosophy, Cardiff University, 2007

**Alexander Steven Holehouse, Ph.D.**

Assistant Professor of Biochemistry and Molecular Biophysics (primary appointment)  
Doctor of Philosophy, Washington University in St Louis, 2017

**William F Holmes, Ph.D.**

Associate Professor Emeritus of Biological Chemistry  
Bachelor of Arts, Princeton University, 1953  
Doctor of Philosophy, University of Pennsylvania, 1960

## I

**Maxenia Garcia Ilagan, Ph.D.**

Associate Professor of Biochemistry and Molecular Biophysics (primary appointment)  
Associate Professor of Developmental Biology  
Doctor of Philosophy, University of Missouri Columbia, 2000

## J

### **James W Janetka, Ph.D.**

Professor of Biochemistry and Molecular Biophysics (primary appointment)  
Professor of Molecular Microbiology  
Bachelor of Science, University of Illinois at Urbana-Champaign, 1990  
Doctor of Philosophy, University of Wisconsin Madison, 1996

## K

### **Yuriy Victorovich Kirichok, M.S., Ph.D.**

Professor of Biochemistry and Molecular Biophysics (primary appointment)  
Master of Science, Moscow Institute of Physics and Technology, 1997  
Doctor of Philosophy, Bogomoletz Institute of Physiology of NAS of Ukraine, 2000

### **Alexander Kozlov, M.S., Ph.D.**

Instructor in Biochemistry and Molecular Biophysics (primary appointment)  
Master of Science, Moscow State University, 1983  
Doctor of Philosophy, Moscow State University, 1994

### **Andrzej Modest Krezel, M.S., Ph.D.**

Associate Professor of Biochemistry and Molecular Biophysics (Pending Executive Faculty Approval) (primary appointment)  
Master of Science, University of Warsaw, 1986  
Doctor of Philosophy, University of Wisconsin Madison, 1991

### **Shivesh Kumar, M.S., Ph.D.**

Assistant Professor of Biochemistry and Molecular Biophysics (primary appointment)  
Master of Science, Jiwaji University, 2004  
Doctor of Philosophy, Jawaharlal Nehru University, 2010

## L

### **Weikai Li, M.S., Ph.D.**

Professor of Biochemistry and Molecular Biophysics (primary appointment)  
Roy and Diana Vagelos Professor of Biochemistry and Molecular Biophysics  
Bachelor of Science, East China University of Science and Technology (#####), 1993  
Master of Science, University of Tennessee, 1998  
Doctor of Philosophy, Yale University, 2004

### **Zongtao Lin, M.S., Ph.D.**

Instructor in Biochemistry and Molecular Biophysics (primary appointment)  
Bachelor of Science, Zhengzhou University (####), 2009  
Master of Science, Peking University (#####), 2012  
Doctor of Philosophy, University of Tennessee, 2017

### **Timothy M Lohman, Ph.D.**

Professor of Biochemistry and Molecular Biophysics (primary appointment)  
Brennecke Professor of Biophysics in Biochemistry and Molecular Biophysics  
Bachelor of Arts, Cornell University, 1973  
Doctor of Philosophy, University of Wisconsin Madison, 1977

## M

### **Garland R Marshall, Ph.D.**

Professor Emeritus of Biochemistry and Molecular Biophysics  
Bachelor of Science, California Institute of Technology (Duplicate of California Institute of Technology), 1962  
Doctor of Philosophy, Rockefeller University, 1966

### **F. Scott Mathews, Ph.D.**

Professor Emeritus of Biochemistry and Molecular Biophysics  
Bachelor of Science, University of California, 1955  
Doctor of Philosophy, University of Minnesota, 1959

## N

### **Natalie Marie Niemi, Ph.D.**

Assistant Professor of Biochemistry and Molecular Biophysics (primary appointment)  
Bachelor of Science, University of Michigan Ann Arbor, 2005  
Doctor of Philosophy, Van Andel Research Institute, 2012

## O

### **Michael D Onken, Ph.D.**

Associate Professor of Biochemistry and Molecular Biophysics (primary appointment)  
Bachelor of Arts, Washington University in St Louis, 1990  
Doctor of Philosophy, Washington University in St Louis, 2000

### **Jeramia Ory, Ph.D.**

Assistant Professor of Biochemistry and Molecular Biophysics (primary appointment)  
Bachelor of Science, University of Nebraska, 1988  
Doctor of Philosophy, University of Minnesota, 1998

## P

### **Jacqueline Pelham, Ph.D.**

Instructor in Biochemistry and Molecular Biophysics (primary appointment)  
Bachelor of Science, Rensselaer Polytechnic Institute, 2016  
Doctor of Philosophy, Rensselaer Polytechnic Institute, 2022

### **Linda J Pike, Ph.D.**

Professor Emeritus of Biochemistry and Molecular Biophysics  
Bachelor of Science, University of Delaware, 1975  
Doctor of Philosophy, Duke University, 1980

## R

### **Janice Lee Robertson, Ph.D.**

Associate Professor of Biochemistry and Molecular Biophysics (primary appointment)

Bachelor of Science, University of Toronto, 2002

Doctor of Philosophy, Cornell University, 2009

**Ana Maria Ruiz Manzano, Ph.D.**

Assistant Professor of Biochemistry and Molecular Biophysics (primary appointment)

Doctor of Philosophy, Universidad Aut6noma de Madrid, 2004

## S

**Andrea Soranno, M.S., Ph.D.**

Associate Professor of Biochemistry and Molecular Biophysics (primary appointment)

Master of Science, University of Milan, 2005

Doctor of Philosophy, University of Milan, 2008

## T

**Eric J Tomko, Ph.D.**

Instructor in Biochemistry and Molecular Biophysics (primary appointment)

Bachelor of Science, University of Missouri Columbia, 2002

Doctor of Philosophy, Washington University in St Louis, 2010

## Y

**Jin Ye, Ph.D.**

Instructor in Biochemistry and Molecular Biophysics (primary appointment)

Doctor of Philosophy, University of Science and Technology of China (#####), 2020

## Z

**Rui Zhang, Ph.D.**

Associate Professor of Biochemistry and Molecular Biophysics (primary appointment)

Bachelor of Science, Nanjing University, 2005

Doctor of Philosophy, Baylor University, 2010

**Mingzhou Zhou, Ph.D.**

Instructor in Biochemistry and Molecular Biophysics (primary appointment)

Bachelor of Science, University of Science and Technology Beijing (###), 2004

Doctor of Philosophy, University of South Florida, 2010

## Research Electives

### Biochemistry and Molecular Biophysics Research Electives

During the fourth year, opportunities exist for many varieties of advanced clinical or research experiences.

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**Wayne M. Barnes, PhD**

McDonnell Sciences Building, 2nd Floor

Phone: 314-362-3351

Inventing a new way to sequence DNA; PCR at one temp; RT-enabled Taq pol

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**Greg Bowman, PhD**

South Building, 2nd Floor

Phone: 314-362-7433

The Bowman lab seeks to understand how protein dynamics gives rise to functional processes like allosteric communication between distant sites and to exploit our insight into this shape-shifting to design new drugs and proteins.

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**Peter M.J. Burgers, PhD**

South Building, 1st Floor

Phone: 314-362-3872

Molecular biology of DNA replication and damage response in yeast and humans

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**John Cooper, MD, PhD**

South Building, 2nd Floor

Phone: 314-362-0287

Molecular mechanisms of cell motility and cytoskeleton assembly

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**Carl Frieden, PhD**

McDonnell Sciences Building, 2nd Floor

Phone: 314-362-3344

Protein folding, aggregation, intrinsically disordered proteins, fluorescence methods, ApoE lipoproteins and Alzheimer's disease

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**Eric A. Galburt, PhD**

McDonnell Sciences Building, 2nd Floor

Phone: 314-362-5201

Biophysical studies of transcription initiation in eukaryotes and mycobacterial tuberculosis

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**Roberto Galletto, PhD**

McDonnell Sciences Building, 2nd Floor

Phone: 314-362-4368

Mechanistic studies of DNA motor proteins

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**Michael Greenberg, PhD**

McDonnell Sciences Building, 2nd Floor

Phone: 314-362-8670

Our lab is focused on cytoskeletal molecular motors in health and disease. We are currently studying the effects of mutations that cause heart disease.

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**Kathleen Hall, PhD**

South Building, 2nd Floor  
Phone: 314-362-4196

We study RNA folding and RNA binding to proteins.

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**Alex Holehouse, PhD**

McDonnell Sciences Building, 2nd Floor  
Phone: 314-273-8371

Understand how function is encoded into disordered sequences using a combination of computational and experimental approaches

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**Jim Janetka, PhD**

Cancer Research Building, 2nd Floor  
Phone: 314-362-0509

Rational structure-based drug design and synthesis for cancer and infectious disease

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**Andrzej Krezel, PhD**

McDonnell Sciences Building, 2nd Floor  
Phone: 314-362-8482

Structural biology of transcriptional regulation in the gastric pathogen *Helicobacter pylori*

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**Weikai Li, PhD**

McDonnell Sciences Building, 2nd Floor  
Phone: 314-362-8687

Structural and biochemical studies of membrane proteins supporting blood coagulation

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**Timothy M. Lohman, PhD**

North Building, 2nd Floor  
Phone: 314-362-4393

Mechanisms of DNA-protein interactions; DNA motor proteins (helicases) and SSB proteins

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**Garland R. Marshall, PhD**

Cancer Research Building, 2nd Floor  
Phone: 314-935-7911

A major focus is molecular recognition: the basis of intermolecular interactions and specificity seen in drug and hormone receptors and in antigen-antibody and substrate-enzyme systems.

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**Linda Pike, PhD**

McDonnell Sciences Building, 2nd Floor  
Phone: 314-362-9502

Our focus is on the mechanisms of action of growth factors and polyphosphoinositide metabolism.

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**Janice Robertson, PhD**

McDonnell Sciences Building, 2nd Floor  
Phone: 314-273-7758

Our goal is to understand how and why membrane proteins fold, form stable complexes, and achieve conformational stability inside of the oil-filled cell membrane.

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**Andrea Soranno, PhD**

South Building, 2nd Floor  
Phone: 314-273-1632

Our main research interests are the physical principles and molecular mechanisms that determine biomolecular function.

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**Rui Zhang, PhD**

McDonnell Sciences Building, 2nd Floor  
Phone: 314-273-1663

We combine single-molecule fluorescence spectroscopy and concepts from polymer physics to investigate intrinsically disordered proteins. We also develop innovative methods to study macromolecular conformations and dynamics within cells and in membraneless organelles.