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 548), 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 (https://biochem.wustl.edu/studentinfo/courses/) can be found on our website.

Website: http://biochem.wustl.edu

Faculty

Ben Garcia, PhD (https://biochem.wustl.edu/faculty/garcia/)
Department Chair

Visit our website for more information about our faculty (http://biochem.wustl.edu/faculty/) and their appointments.

A

Hema Adhikari, M.S., Ph.D.
Assistant Professor of Biochemistry & Molecular Biophysics (primary appointment)
Master of Science, State University of New York at Buffalo, 2011
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

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

John A Cooper, Ph.D., M.D.
Professor of Biochemistry and Molecular Biophysics (primary appointment)
Professor of Cell Biology and Physiology
Alan A. and Edith L. Wolff Professorship in Biochemistry and Molecular Biophysics
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.
Associate Professor of Biochemistry and Molecular Biophysics (primary appointment)

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

F

William A Frazier, Ph.D.
Emeritus Professor of Biochemistry and Molecular Biophysics
Bachelor of Arts, Johns Hopkins University, 1969
Doctor of Philosophy, Washington University in St Louis, 1973

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

Roberto Galletto, M.S., Ph.D.
Associate 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)
Head of the Department of Biochemistry and Molecular Biophysics
Raymond H. Wittcoff Distinguished Professor of Biological Chemistry
Doctor of Philosophy, University of Virginia, 2005

Young Ah Goo, M.S., Ph.D.
Professor of Biochemistry and Molecular Biophysics (primary appointment)
Professor of Genetics
Bachelor of Science, Chonnan National University, 1990
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

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)
Champaign, 1990
Doctor of Philosophy, University of Wisconsin Madison, 1996

K

Yuriy Victorovich Kirichok, M.S., Ph.D.
Professor of Biochemistry and Molecular Biophysics (Pending Executive Faculty Approval) (primary appointment)
Master of Science, Moscow Institute of Physics and Technology, null
Doctor of Philosophy, Bogomoletz Institute of Physiology of NAS of Ukraine, null

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)
Bachelor of Science, East China University of Science and Technology (######), 1993
Master of Science, University of Tennessee, 1998
Doctor of Philosophy, Yale University, 2004

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 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

Joseph B Monahan, Ph.D.
Adjunct Assistant Professor of Biochemistry and Molecular Biophysics
Bachelor of Science, State University of New York at Buffalo, 1977
Doctor of Philosophy, University of South Carolina Columbia, 1983

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

P

Linda J Pike, Ph.D.
Professor of Biochemistry and Molecular Biophysics (primary appointment)
Alumni Endowed Professor 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 Automoma de Madrid, 2004

S

Andrea Soranno, M.S., Ph.D.
Assistant Professor of Biochemistry and Molecular Biophysics (primary appointment)
Master of Science, University of Milan, 2005
Doctor of Philosophy, University of Milan, 2008

W

Gabriel Waksman, M.S., Ph.D.
Adjunct Professor of Biochemistry and Molecular Biophysics
Bachelor of Science, School Not Found, 1979
Master of Science, School Not Found, 1980
Doctor of Philosophy, School Not Found, 1982

Katherine Anne Henzler Wildman, Ph.D.
Adjunct Associate Professor of Biochemistry and Molecular Biophysics
Bachelor of Science, Cornell University, 1998
Doctor of Philosophy, University of Michigan (Duplicate of University of Michigan Ann Arbor), 2003

Z

Rui Zhang, Ph.D.
Assistant 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.

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

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.

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

John Cooper, MD, PhD
South Building, 2nd Floor
Phone: 314-362-0287

Molecular mechanisms of cell motility and cytoskeleton assembly

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

Eric A. Galburt, PhD
McDonnell Sciences Building, 2nd Floor
Phone: 314-362-5201

Biophysical studies of transcription initiation in eukaryotes and mycobacterial tuberculosis

Roberto Galletto, PhD
McDonnell Sciences Building, 2nd Floor
Phone: 314-362-4368

Mechanistic studies of DNA motor proteins

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.

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

We study RNA folding and RNA binding to proteins.

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

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

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

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

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

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

Structural and biochemical studies of membrane proteins supporting blood coagulation

Timothy M. Lohman, PhD
North Building, 2nd Floor
Phone: 314-362-4393

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

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.

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.

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.

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.

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.

Courses

The Department of Biochemistry and Molecular Biophysics also offers courses through the School of Arts & Sciences. For a full listing of courses offered, please visit the university's online course catalog (https://courses.wustl.edu/CourseInfo.aspx?sch=L&dept=L41&crslvl=5:9).

Visit online course listings to view offerings for M15 Biochem (https://courses.wustl.edu/CourseInfo.aspx?sch=M&dept=M15).
