2021 Report

MilliporeSigma Predoctoral Fellowship

in Honor of Dr. Gerty T. Cori

Washington University in St. Louis
School of Medicine

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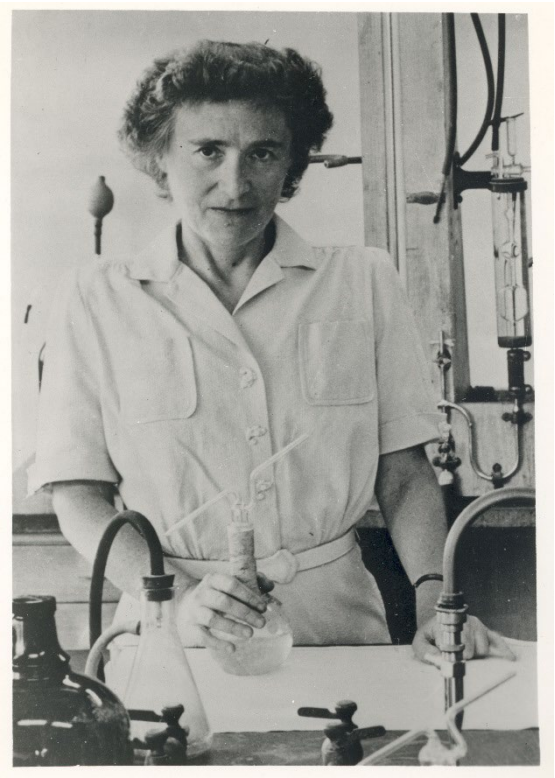


Washington University in St. Louis
SCHOOL OF MEDICINE

Telephone

PROSPECT 1-5750

SIGMA CHEMICAL CO.

3500 DEKALB STREET·····SAINT LOUIS 18, MISSOURI, U. S. A.

T.M. REG. ORGANIC SYNTHESIS AND BIOCHEMICALS

March 5, 1958

Chancellor Ethan A. H. Shepley
Washington University
Lindell and Skinker
Saint Louis, Missouri

Dear Mr. Shepley:

The Sigma Chemical Company of Saint Louis wishes to create one predoctoral fellowship in the Department of Biological Chemistry of the Medical School in memory of Dr. Gerty T. Cori. We should like to have the fellowship designated as the "Sigma Chemical Company Predoctoral Fellowship in Biological Chemistry in Memory of Gerty T. Cori". The naming of the individual in the Graduate School of Arts and Sciences to whom this fellowship will be awarded should rest exclusively with the Department of Biological Chemistry. The fellowship may be given without restriction as to sex or nationality of the recipient. The recipient of the fellowship may be changed at the discretion of the Department.

We shall support this fellowship on an annual basis, but we shall make every reasonable effort to continue such support indefinitely.

The value of this fellowship shall be $3000 annually. The first payment of this sum to Washington University will be made in the first quarter of 1958 for a fellowship to be given after July 1, 1958. There is no requirement that this annual grant or those of future years be expended within any particular time period. On or about January 1st of each calendar year an effort will be made to notify Washington University of the intention of Sigma Chemical Company to pay its annual grant within the first quarter of that calendar year.

It is our intention that the fellowship grant cover (a) the full tuition charges applicable to the candidate named for the award, (b) a stipend to the candidate in an amount to be determined by the Department of Biological Chemistry, with, (c) any balance to be used for departmental expenses and overhead in connection with the fellowship.

Please let us know whether Washington University accepts this gift.

Sincerely yours,

SIGMA CHEMICAL COMPANY

Dan Broida, President

cc: Dr. Carl F. Cori
Dean Oliver H. Lowry
Dr. David H. Brown

ds

MilliporeSigma Predoctoral Fellowship

Fellowship Recipients

The MilliporeSigma Predoctoral Fellowship in Honor of Gerty T. Cori attracts the best and the brightest graduate students into the Biochemistry and Computational and Molecular Biophysics graduate programs. Each year, the fellowship is awarded to one or two incoming graduate students. During the first year of graduate school, recipients receive funds to cover first-year educational and research expenses. In their second year of study, recipients receive funds needed to cover part of their stipends.

Melanie Ernst (2021)

Melanie Ernst is a fourth-year graduate student in the Biochemistry, Biophysics and Structural Biology (BBSB) program. She is completing her Ph.D. thesis work in the laboratory of Dr. Janice Robertson, Associate Professor in the Biochemistry and Molecular Biophysics department, where she uses single-molecule techniques to study the folding of ion channels in membranes.

Melanie joined the BBSB program after receiving a Bachelor of Science in Biological Chemistry from Mannheim University of Applied Sciences in Mannheim, Germany. During her undergraduate studies, Melanie studied red blood cell physiology and the biocompatibility of artificial red blood cells. In her thesis work in Dr. Janice Robertson's lab, Melanie uses single-molecule TIRF microscopy and electrophysiology to study the folding of the bacterial fluoride channel Fluc.

Melanie currently serves as Co-Chair on the Biochemistry and Molecular Biophysics departmental Student Liaison Committee as well as serves as bookkeeper for the Division of Biology and Biomedical Sciences Women in STEM. She is also a cohort liaison for the Continuing Mentoring program with the Young Scientist Program, where she works with other graduate students to mentor high school students in St. Louis.

Matthew Cruz (2021)

Matthew A. Cruz joined the lab of Dr. Gregory Bowman, Associate Professor, in the department of Biochemistry and Molecular Biophysics, where he studies the relationship between an ebolavirus protein's structural dynamics and its function. Through computational and experimental techniques, he is measuring how changes in protein dynamics affect RNA binding. Matthew is applying this research to find drugs that disrupt protein dynamics to combat ebolavirus infections.

Matthew received his B.S. in Biochemistry and Cell Biology from Rice University in 2017. He then joined the Division of Biological and Biomedical Sciences at Washington University in St. Louis as part of the Biochemistry, Biophysics and Structural Biology program.

Fellowship Recipients

Jhullian Alston (2020)

Jhullian Alston (JJ) is a fifth-year graduate student in the Biochemistry, Biophysics, and Structural Biology (BBSB) program. He is working on his PhD thesis jointly between the labs of Dr. Andrea Soranno and Dr. Alex Holehouse, where he combines computational biophysics with single-molecule fluorescence spectroscopy to understand how intrinsically disordered regions within a protein can affect interactions with both proteins and nucleic acids.

Prior to starting his PhD work, Jhullian had a diverse research background. Jhullian joined the BBSB program after earning his BA in Biology from The University of Maryland, Baltimore County where he was a Meyerhoff and MARC Scholar. He studied nerve injury after radical prostatectomy, developing mouse models of prostate cancer, using CRISPR to develop fusion proteins in *Plasmodium falciparum* and *Caenorhabditis elegans*, and investigating the effects of O-GlcNAcylation.

Jhullian studies how intrinsically disordered regions bind and condense nucleic acids, with a focus on how the SARS-CoV-2 nucleocapsid protein, with its several intrinsically disordered regions, mediates SARS-CoV-2 genome compaction.

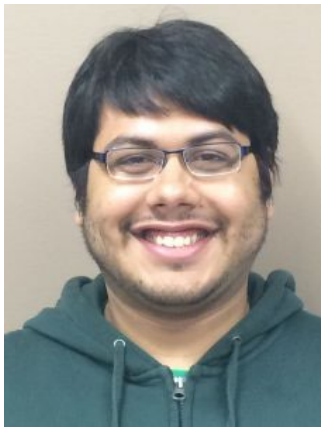
Jasmine Cubuk (2020)

Jasmine is a fifth-year graduate student in the BBSB program. She is doing her PhD thesis work in the lab of Dr. Andrea Soranno, where she studies how sequence composition of intrinsically disordered regions within a protein can affect interactions with both proteins and nucleic acids using single-molecule fluorescence spectroscopy. Jasmine joined the BBSB program after earning her BS from Stockton University in Galloway, New Jersey with a major in biochemistry & molecular biology and a minor in holistic health. Prior to starting her PhD work, Jasmine studied polymer synthesis and how polymer interactions contribute to optimized hydrogel formation.

Since joining the lab of Dr. Andrea Soranno, Assistant Professor in the Biochemistry and Molecular Biophysics department, Jasmine has studied the role that intrinsically disordered sequences play in recruiting nucleic acids to proteins that functionally interact with RNA. Her research centers on understanding the role of positively charged disordered regions in the interaction with RNA. To this end, she uses a combination of single-molecule fluorescence approaches that can capture the structural ensemble of the disordered regions and the extent of the protein-protein and protein-RNA interactions. Intrigued by the serine-arginine enrichment in one of its disordered regions, Jasmine has recently tackled the investigation of the SARS-CoV-2 Nucleocapsid protein. This protein is responsible for the condensation of the viral genome within the SARS-CoV-2 virus.

Jasmine currently serves on the Biochemistry and Molecular Biophysics departmental Student Liaison Committee as well as serves as a student representative for the BBSB program.

Fellowship Recipients



Sukrit Singh (2019)

Sukrit Singh conducted his PhD thesis work in the lab of Dr. Greg Bowman. Sukrit joined this program in the Division of Biology and Biomedical Sciences (DBBS) after earning his BA from Washington University with a double major in chemistry and biology.

Sukrit's thesis, which he defended in August 2020, focused on understanding and exploiting allostery and dynamics in cellular signaling to develop anti-cancer therapeutics. By combining long-timescale molecular dynamics simulations with his CARDS approach to identify correlated motions within proteins, Sukrit extracted the allosteric communication network within the Gαq protein and identified key motions underlying its activation and signaling. Currently, he leverages these insights to design an inhibitor for Gαq.

In the final months of his graduate career, Sukrit worked on the Folding@home effort to study COVID-19, managing the network and communicating the results with the community, which included an interview with the *St. Louis Post-Dispatch*. Currently, he is a postdoctoral research fellow at Memorial Sloan-Kettering Cancer Center.

Catherine Knoverek (2018)

Catherine Knoverek was originally from Downers Grove, Illinois, a suburb of Chicago. She earned her undergraduate degree in Biochemistry from the University of Notre Dame, where she researched protein folding with Dr. Patricia Clark. While in college, Catherine spent a summer at Saint Louis University, where she conducted research with Dr. Yuna Ayala. In the Ayala lab, she studied TDP-43, a protein whose aggregation is a hallmark of ALS.

Catherine chose Washington University for graduate school because she is passionate about research that combines computational and experimental techniques. That, and her interest in protein dynamics, led her to the lab of Dr. Gregory Bowman, where she conducted her PhD thesis work. In her thesis research, Catherine pursued questions involving how mutations interact to affect the biophysical properties of proteins and how those interactions ultimately affect protein evolution.

Fellowship Recipients

Sarem Hailemariam (2016)

Sarem earned her undergraduate degree in Biology from Shaw University in Raleigh, North Carolina. She joined the DBBS at Washington University in St. Louis in 2012 as part of the Molecular Cell Biology program. Sarem has always had scientific interests in mechanisms employed by different organisms to maintain genome integrity. Prior to joining DBBS, Sarem worked on the mammalian DNA replication origin-licensing factor, Cdt1.

Sarem conducted postdoctoral research in the lab of Dr. Peter Burgers, Brennecke Professor of Biological Chemistry in the department of Biochemistry and Molecular Biophysics. In her thesis work, she used *Saccharomyces cerevisiae* as a model organism to understand how different proteins orchestrate the proper sensing and repair of double-stranded DNA breaks. Because repair mechanisms of double-strand breaks are conserved across species, her findings provided insight into how double-stranded breaks are repaired in higher eukaryotes.

She will continue to mentor young students to help cultivate and nourish their excitement about science. Sarem would love to incorporate science education into her future career.

Nicole Fazio (2015)

Nicole graduated from Colorado College in 2013, where she majored in biochemistry. As an undergraduate, Nicole studied fibrinogen, a blood clotting protein that polymerizes to form the structural clot, with Dr. Margaret Daugherty, a former Sigma fellow (1992). She joined Washington University's DBBS in the fall 2015 to pursue graduate research in the computational and molecular biophysics program.

For her thesis research, Nicole worked in the lab of Dr. Timothy Lohman, studying the helicase RecBCD, which mediates double-strand DNA break repair via homologous recombination. She studied how the nuclease domain plays a surprising role in helicase activity, despite its canonical role in DNA degradation.

Currently, Nicole works with Dr. Courtney Reichhardt as a postdoctoral research associate studying the fundamental biophysical principles of biofilm assembly at Washington University. She is looking forward to mentoring new trainees and sharing the excitement of understanding of how biological molecules interact.

MilliporeSigma Predoctoral Fellowship

Fellowship Recipients

McKenna Feltes (2014)

McKenna joined Washington University's DBBS in the fall 2014 to pursue graduate research in the biochemistry program. She attended Drury University, where she earned her BA in biology and chemistry in 2014. As an undergraduate, McKenna studied heparin-protein interactions using capillary electrophoresis and nuclear magnetic resonance spectroscopy.

McKenna performed her thesis work in Dr. Daniel Ory's lab, studying the molecular basis of Niemann-Pick C (NPC) disease and the regulation of the NPC1 and NPC2 genes in cholesterol homeostasis. She is currently a postdoctoral associate in embryology at Carnegie Institute for Science in Baltimore, Maryland.

Melanie Sparks (2013)

Melanie joined Washington University's DBBS in 2013 to pursue graduate research in the biochemistry program. Melanie attended the University of Memphis, where she earned her BS in chemistry in 2013. As an undergraduate, Melanie studied sphingosine kinase 1, an enzyme shown to be critical in cancer and inflammatory diseases.

Melanie worked in the labs of Dr. Roberto Galletto and Dr. Peter Burgers. She used an in vitro DNA replication assay to test the ability of different naturally occurring protein and DNA structural blocks to impede DNA replication and the advantages and disadvantages of using the DNA helicase Pif1 in alleviating these blocks.

Currently, Melanie works in Dr. Roberto Galletto's lab as a postdoctoral research associate studying the opposing roles of DNA compaction and Pif1 helicase activity in regulating mitochondrial DNA replication. Melanie hopes to continue mentoring the next generation of scientists, inspiring them and instilling them with a love of science and discovery.

Fellowship Recipients

Joshua Rackers (2013)

Josh joined Washington University's DBBS in 2013 to pursue graduate research in the computational and molecular biophysics program. He attended Ohio State University, where he earned his BS in physics in 2010. As an undergraduate, Josh studied silicon detector-based positron emission tomography, a type of nuclear medical imaging technique that can produce a three-dimensional image of functional processes in the body.

In 2019, Josh completed his graduate work in the lab of Jay Ponder, PhD, Department of Biochemistry and Molecular Biophysics. This lab's goal is to use basic classical physics to build models of how biological molecules interact. Josh wants to use these models to design medicines that target specific biological molecules. The innovation in his thesis project is to decompose the underlying quantum mechanics that drives atomic interactions into classical physics models that allow accurate simulations of large biological molecules.

In conducting graduate research, Josh's goal was twofold. First, he wanted to do work that advances understanding of how biological molecules interact. Second, he aspired to teach. Josh is certain that using physics to understand biology is the way of the future. Currently, Josh is a Harry S. Truman Fellow at Sandia National Laboratories.

Mariah L. Hoye (2012)

Mariah worked in the laboratory of Timothy Miller, MD, PhD, David Clayson Professor of Neurology. Her thesis work focused on identifying small, regulatory RNAs called microRNAs that are specifically enriched in motor neurons to help inform motor neuron biology and their selective vulnerability in the neurodegenerative disease Amyotrophic Lateral Sclerosis (ALS). This work has uncovered novel determinants of motor neuron identity, as well as a clinically relevant marker of motor neuron disease. Moreover, variants in motor neuron microRNAs may be new genetic risk factors for ALS. Finally, Mariah's work has uncovered a new mechanism of neurodegeneration whereby dysfunctional motor neurons can communicate with surrounding cells through the release of microRNAs.

Mariah defended her thesis in spring of 2018 and moved on to a postdoctoral fellow position in molecular genetics and microbiology at Duke University, where she studies aberrant RNA processing associated with neurodevelopmental disorders. She was awarded a Regeneration Next Postdoctoral Fellowship (2018-2019) and an F32 from NINDS (2019-2022). She thanks the MilliporeSigma fellowship for supporting her training and doctoral work, which has enhanced scientific understanding of ALS pathogenesis, and informed novel motor neuron-specific markers and risk factors for ALS and other motor neuron diseases.

MilliporeSigma Predoctoral Fellowship

Fellowship Recipients

Year	Name	Current Position
2021	Melanie Ernst	Graduate Student, Washington University
2021	Matthew Cruz	Graduate Student, Washington University
2020	Jhullian Alston	Graduate Student, Washington University
2020	Jasmine Cubuk	Graduate Student, Washington University
2019	Sukrit Singh	Postdoctoral research fellow, Memorial Sloan-Kettering Cancer Center
2018	Catherine Knoverek	Biochemist/Biophysicist/Scientist, M6P Therapeutics
2016	Sarem Hailemariam	Platform Development Specialist, Sartorius
2015	Nicole Fazio	Postdoctoral Research Associate, Washington University
2014	McKenna Feltes	Postdoctoral Research Associate, Carnegie Institute for Science
2013	Melanie Sparks	Postdoctoral Research Associate, Washington University
2013	Joshua Rackers	Harry S. Truman Fellow, Sandia National Laboratories
2012	Mariah Hoye	Postdoctoral Fellow, Duke University
2011	John Robinson	Postdoctoral Research Associate, Lab of Jeffrey P. Henderson, Washington University Division of Infectious Diseases
2010	Jayan Rammohan	Postdoctoral Fellow, laboratories of David Ross at NIST and Chris Voigt at MIT
2009	Kirk Hou	Ophthalmology fellow, UCLA
2009	Agata Bielska	Medical Oncologist, Memorial Sloan Kettering Cancer Center
2008	Caroline Maynard	
2007	Alaji Bah	Research Fellow, Hospital for Sick Children, Toronto
2006	Fiorella Ghisays	Research Fellow in the John Petrini Lab, Memorial Sloan-Kettering Cancer Center
2005	Jeffrey Iwig	Associate Director, Discovery at Carmot Therapeutics
2004	Artem Melnykov	Postdoctoral Research Associate, Washington University
2003	Parie Garg	Associate Partner, Health & Life Sciences, Oliver Wyman Group
2002	Eric Welsh	Core Staff Scientist, Moffitt Cancer Center
2001	Reiko Arimoto	DMPK Scientist/Computational ADME, Vertex Pharmaceuticals
2000	Sarah Stuhlsatz-Krouper	Self-employed
1999	Gregory Tochtrop	Associate Professor of Chemistry, Case Western Reserve University
1998	Jeremy Williams	Head of Plant Biotechnology, Bayer Crop Science
1997	Tetsuro Wakatsuki	Chief Scientific Officer, InvivoSciences, Inc.
1996	Reece Hart	Self-employed, San Francisco
1992	Mike Leonis	Medical Director, Children's of Alabama
1992	Michael Kolodney	Associate Professor of Medicine, Virginia Tech Carilion School of Medicine and Research Institute
1992	Margaret Daugherty	Associate Professor and Associate Chair of Chemistry and Biochemistry, Colorado College
1990	Steven Nothwehr	Program Director, National Cancer Institute
1989	Robert Heuckeroth	Pediatric Gastroenterologist, Children's Hospital of Pennsylvania
1988	Robin Levis	Deputy Director, Division of Viral Products, US Food and Drug Administration
1987	Dwight Towler	Vice Chair, Research – Internal Medicine, Professor of Medicine, and Distinguished Chair, UT Southwestern Medical Center
1987	Ursula Bond	Associate Professor - Microbiology, Trinity College-Dublin