

MilliporeSigma Predoctoral Fellowship

in Honor of Dr. Gerty T. Cori

2016 Report



Washington University in St. Louis

SCHOOL OF MEDICINE



2016 Report

MilliporeSigma Predoctoral Fellowship

in Honor of Dr. Gerty T. Cori



MilliporeSigma Fellows, August 2014



Washington
University in St. Louis

SCHOOL OF MEDICINE

SIGMA CHEMICAL Co.

3500 DeKALB STREET.....SAINT LOUIS 18, MISSOURI, U. S. A.



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

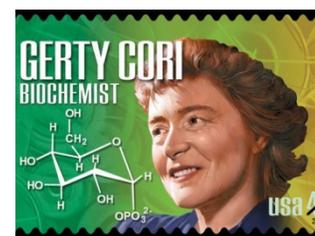
Sarem Hailemariam (2016)



Sarem received her undergraduate degree in Biology from Shaw University in Raleigh, North Carolina. She joined the Division of Biological and Biomedical Sciences 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 is currently working in the lab of Dr. Peter Burgers, Brennecke Professor of Biological Chemistry in the department of Biochemistry and Molecular Biophysics. Using *Saccharomyces cerevisiae* as a model organism, the goal of her thesis work is 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, findings from this study will give 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 career goals.



Nicole Fazio (2015)

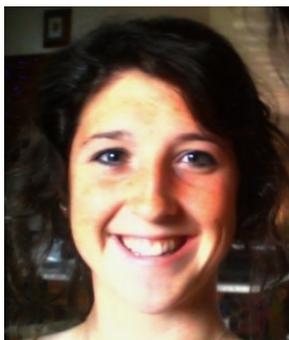


Nicole is a native of Littleton, CO. She attended Colorado College, where she majored in biochemistry and minored in Spanish. As an undergraduate, Nicole studied fibrinogen, a blood clotting protein that polymerizes to form the structural clot with Dr. Margaret Daugherty, a former Sigma fellow (1992). She joined Washington University's Division of Biology and Biomedical Sciences in the fall 2015 to pursue graduate research in the computational and molecular biophysics program.

For her thesis research she is working in the lab of Dr. Timothy Lohman, studying a helicase from Mycobacteria called AdnAB. DNA double strand breaks (DSB) are a threat to genome integrity and cell survival. DSB repair is therefore essential in all organisms. The cell must go through homologous recombination or non-homologous end-joining pathways in order to repair the DSB. Helicase/nucleases are the molecular motors responsible for double strand DNA unwinding and end resection required for the repair of DSBs. Mutations in helicase genes are associated with a multitude of significant human diseases such as Werner syndrome, which results in premature aging and predisposition to cancer.

Fellowship Recipients

McKenna Feltes (2014)



McKenna joined Washington University's Division of Biology and Biomedical Sciences in fall 2014 to pursue graduate research in the biochemistry program. She attended Drury University, where she received her B.A. in biology and chemistry in 2014. As an undergraduate, McKenna studied heparin-protein interactions using capillary electrophoresis- and nuclear magnetic resonance spectroscopy. McKenna is performing her thesis work in Daniel Ory's lab, studying the molecular basis of Niemann-Pick C disease and the regulation of the NPC1 and NPC2 genes in cholesterol homeostasis.

Melanie Sparks (2013)



Melanie is a Third-Year MilliporeSigma Fellow (2013-2015). She joined Washington University's Division of Biology and Biomedical Sciences in 2013 to pursue graduate research in the biochemistry program. Melanie attended the University of Memphis, where she earned her B.S. in chemistry in 2013. As an undergraduate, Melanie studied sphingosine kinase 1, an enzyme shown to be critical in cancer and inflammatory diseases.

Melanie is worked in the lab of Zhongsheng You, Ph.D., Assistant Professor of Cell Biology and Physiology, using a *Xenopus* egg extract system to further interrogate the role of BRCA1 in preventing premature replication has led to a model in which BRCA1



restricts the CDK2 pathway to prevent premature DNA replication origin firing and does so in a checkpoint independent manner.

Following her Ph.D, she would like to stay in the cancer biology and nucleic acid metabolism field and further explore the intricacies of how a cell protects the integrity of its genome and what happens with this fine balance is disrupted. To perform this work, she would like to continue researching in an academic setting, while promoting science education and careers in young scientists.

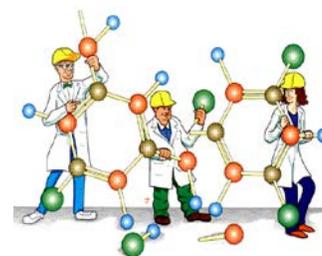
Fellowship Recipients

Joshua Rackers (2013)



Josh is a Third-Year MilliporeSigma Fellow (2013-2015). He joined Washington University's Division of Biology and Biomedical Sciences in 2013 to pursue graduate research in the computational and molecular biophysics program. He attended Ohio State University, where he received his B.S. 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.

Josh is completing his graduate work in the lab of Jay Ponder, PhD, Department of Biochemistry & Molecular Biophysics. The basic goal of the Ponder lab is to use basic physics to understand how biological molecules interact and to use that knowledge to design treatments for disease. Josh's thesis project is to accurately model biological systems using classical physics.



Josh's goal in doing graduate research is twofold. First, he wants to do meaningful research and second, he would like to be able to teach. Josh is certain that using physics to understand biology is the way of the future

Mariah Lawler (2012)



Mariah was a recipient of the 2012 fellowship. She joined Washington University's Division of Biology and Biomedical Sciences in 2012 to pursue graduate research in the biochemistry program.

Mariah is working in the laboratory of Timothy Miller, M.D., Ph.D., Associate Professor of Neurology. Her thesis project focuses on defining cell-type specific miRNAs in amyotrophic lateral sclerosis (ALS). Mariah is using a new method of isolating miRNA from mice that will help to define cell-type specific miRNA expression in both healthy and diseased contexts, which will contribute to our understanding of ALS pathogenesis.

Mariah is keeping an open mind about her future as she gains valuable research experience in her graduate program. She enjoys sharing her love of science with others and plans to incorporate improvement of science education into her career goals.

Fellowship Recipients

John Robinson (2011)



John was the recipient of the 2011-2012 MilliporeSigma Fellowship. He joined Washington University's Division of Biology and Biomedical Sciences in 2011 to pursue graduate research in the biochemistry program.

John is currently working in the laboratory of Dr. Stephen Beverley, Ph.D., the Marvin A. Brennecke Professor and Head of the Department of Molecular Microbiology. He is studying an RNA virus which is present in certain species of *Leishmania* parasites. John helped develop an assay to detect specific inhibitors of viral replication, which he plans to use as a tool to characterize the viral polymerase. John is also working to engineer a version of the virus that can be introduced into new *Leishmania* strains, which will aid our understanding of the interactions that allow the virus to maintain persistent infection.

John will continue to build on his research experience and plans to pursue a career in research either in academia or at a research institute.

Jayan Rammohan (2010)



Jayan was the recipient of the 2010-2012 MilliporeSigma Fellowship. He joined Washington University's Division of Biology and Biomedical Sciences in 2010 to pursue graduate research in the computational and molecular biophysics program.

In the laboratory of Eric Galburt, Ph.D., Assistant Professor of Biochemistry and Molecular Biophysics, Jayan is studying mechanisms of transcription initiation. His focus is on CarD, an essential transcription factor in *Mycobacterium tuberculosis*, the causative agent of tuberculosis, which currently represents a major burden to global health. Jayan has developed a range of assays including stopped-flow fluorescence and nanomanipulation by magnetic tweezers, which enable monitoring of promoter DNA-unwinding by RNA polymerase in real-time.

Jayan plans to use his education and experience to direct a research effort that blends molecular biophysics with instrumentation development. By improving existing methods and creating new tools for studying biological systems, he hopes to address scientific questions that were previously not possible.

Fellowship Recipients

Kirk Hou (2009)



Kirk was the recipient of the 2009-2011 MilliporeSigma Fellowship. He joined Washington University's Medical Scientist Training Program in 2007. Kirk completed his doctoral work in 2013, under the mentorship of Samuel Wickline, M.D., Professor of Medicine, of Physics, of Biomedical Engineering, and of Cell Biology and Physiology. Dr. Wickline is an expert in nanomedicine and nanotechnology, manipulating nanoparticles to deliver a load of therapeutic drugs exactly where needed.

Kirk's research focused on the development of nanoparticles that harness the potential therapeutic benefits of RNA interference technology. Specifically, he studied derivatives of melittin, a component of bee venom. These derivatives are capable of binding siRNAs and can self-assemble into nanoparticles. When combined with targeting factors, nanoparticles can be used to safely deliver siRNAs to specific cells of the body and in turn block communication involved in disease processes. His strategy effectively halted the typical progression of inflammation and joint destruction in this painful condition. Collaborators now are testing Hou's method in mice to treat adult T cell leukemia/lymphoma and acute kidney injury caused by low blood flow. If successful, the same technology potentially could be evaluated in people.

He will go to University of California, Los Angeles, to train in ophthalmology after a year in internal medicine at Barnes-Jewish Hospital.

Fellowship Recipients



| <u>Year</u> | <u>Name</u> | <u>Current Position</u> |
|-------------|-------------------------|---|
| 2016 | Sarem Hailemariam | Graduate student |
| 2015 | Nicole Fazio | Graduate student |
| 2014 | McKenna Feltes | Graduate student |
| 2013 | Melanie Sparks | Graduate student |
| 2013 | Joshua Rackers | Graduate student |
| 2012 | Mariah Lawler | Graduate student |
| 2011 | John Robinson | Graduate student |
| 2010 | Jayan Rammohan | Graduate student |
| 2009 | Kirk Hou | Received PhD in 2013; completing remainder of medical school at Washington University for MD/PhD degree |
| 2009 | Agata Bielska | First year medical resident, New York Presbyterian-Weill Cornell Hospital |
| 2008 | Caroline Maynard | |
| 2007 | Alaji Bah | Research Fellow with Julie Forman-Kay, Hospital for Sick Children, Toronto |
| 2006 | Fiorella Ghisays | Postdoctoral Fellow with John Petrini, Memorial Sloan-Kettering Cancer Center |
| 2005 | Jeffrey Iwig | Scientist at Carmot Therapeutics |
| 2004 | Artem Melnykov | Postdoctoral Assistant with Elliot Elson, Washington University |
| 2003 | Parie Garg | Associate Partner at Oliver Wyman |
| 2002 | Eric Welsh | Core Staff Scientist at Moffitt Cancer Center |
| 2001 | Reiko Arimoto | Computational Chemist, Vertex Pharmaceuticals |
| 2000 | Sarah Stuhlsatz-Krouper | |
| 1999 | Gregory Tochtrop | Associate Professor of Chemistry, Case Western Reserve University |
| 1998 | Jeremy Williams | Director, Pest and Pathogen Control, Monsanto |
| 1997 | Tetsuro Wakatsuki | Chief Scientific Officer, InvivoSciences LLC |
| 1996 | Reece Hart | Research and Engineering Fellow, Invitae |
| 1992 | Mike Leonis | Assistant Professor of Pediatrics, University of Cincinnati |
| 1992 | Michel Kolodney | Associate Professor of Medicine, Virginia Tech Carilion School of Medicine and Research Institute |
| 1992 | Margaret Daugherty | Assistant Professor and Chair of Chemistry and Biochemistry, Colorado College |
| 1990 | Steven Nothwehr | Program Director, National Cancer Institute |
| 1989 | Robert Heuckeroth | Professor of Pediatrics, University of Pennsylvania |
| 1988 | Robin Levis | Deputy Director, Division of Viral Products, US Food and Drug Administration |
| 1987 | Dwight Towler | Professor and Director, Cardiovascular Pathobiology, Sanford-Burnham Medical Research Institute |
| 1987 | Ursula Bond | Associate Professor, Trinity College-Dublin |