

# 15th Annual Postdoctoral Symposium

March 21, 2019

11:00 am – 5:00 pm

Eric P. Newman Education Center

*Sponsored by*

*The Office of the Vice Chancellor for Research*

*The Office of Postdoctoral Affairs*

*The Washington University Postdoctoral Society*



Washington  
University in St. Louis

## **The Office of Postdoctoral Affairs**

**Website:**

**postdoc.wustl.edu**

**email:**

**postdoc@wustl.edu**

**Follow us on Twitter!**



**Postdoc Office:**

**@WUSTLPostdoc**



**Postdoc Society:**

**@WashUWUPS**

**Tweet #WUpostdoc19**



**Washington University in St. Louis**

# Schedule of Events

11:00 am

## Career Forum Roundtables:

EPNEC, Great Rooms

### *The Importance of Postdocs: Our impact in academia and beyond*

Communication:

**Elizabeth Haswell, Ph.D.**

Professor, Biology,  
Washington University  
Co-host of podcast Taproot

Industry/Entrepreneurship:

**Ben Capoccia, Ph.D.**

Associate Director of Research,  
Arch Oncology  
WashU Postdoc Alum

**Christian Harding, Ph.D.**

Cofounder and CEO,  
VaxNewMo  
WashU Postdoc Alum

**Larry Spears, Ph.D.**

Scientific Sales Representative,  
StemCell Technologies  
WashU Postdoc Alum

International Postdoc  
to Faculty Transition:

**Rui Zhang, Ph.D.**

Assistant Professor,  
Biochemistry & Molecular Biophysics  
Washington University

Outreach and Community  
Engagement:

**Brigida Rusconi, Ph.D.**

Research Instructor,  
Big Sister Volunteer  
WashU Postdoc Alum

**Brecca Gaffney, Ph.D.**

Postdoctoral Research Scholar,  
Mission St. Louis Volunteer

T32 Director:

**Leopoldo Cabassa, Ph.D.**

Associate Professor,  
Brown School of Social Work  
WashU PhD Alum

# Schedule of Events

12:45 pm

## **Welcome**

EPNEC, Auditorium

**Jennifer K. Lodge, Ph.D.**

Vice Chancellor for Research Professor,  
Department of Molecular Microbiology

1:00 pm

## **Keynote Address**

**Holden Thorp, Ph.D.**

*The Interplay Between Basic Science and Research  
Commercialization: The Important Role of  
Postdocs*

Provost and Executive Vice Chancellor  
for Academic Affairs

Rita Levi-Montalcini Distinguished University  
Professor

2:15 pm

## **Postdoc Story Tellers:**

**Emmanuel Antwi-Adjei, Ph.D.**

Postdoctoral Research Associate, Biology

**Rebecca Callahan, Ph.D.**

Postdoctoral Research Fellow, Neuroscience

**Carmel Martin-Fairey, Ph.D.**

Postdoc Research Scholar,  
Biology and Ob/Gyn

**Xiaoyu Zhuo, Ph.D.**

Postdoc Research Associate, Genetics

3:10 pm

**Presentation of the Outstanding:  
Faculty Mentor Award Postdoc  
Mentor & Teacher Award**

3:45 pm-5:00 pm

## **Poster Reception and**

## **Postdoc Resource Fair**

**Resource Fair Participants: Pages: 12-25**

**Poster Abstracts: Pages: 27-48**

Even numbered posters manned from 3:45-4:15pm

Odd numbered posters manned from 4:15-4:45pm

*Evaluations will be sent via email we appreciate your feedback.*

# Keynote Speaker:

## Holden Thorp, Ph.D.

---

Holden Thorp, Ph.D., became Provost and Executive Vice Chancellor for Academic Affairs; Rita Levi-Montalcini Distinguished University Professor at Washington University on July 1, 2013. He holds appointments in the Department of Medicine at the School of Medicine as well as in the Department of Chemistry in Arts & Sciences.



Thorp joined the university after spending three decades at the University of North Carolina at Chapel Hill where he served as the 10th chancellor from 2008 through 2013.

Thorp began his academic career at the University of North Carolina at Chapel Hill where he earned a B.S. in chemistry. He received a Ph.D. in Chemistry from the California Institute of Technology and completed post-doctoral work at Yale University. He holds an honorary Doctor of Laws from North Carolina Wesleyan College.

Thorp co-founded Viamet Pharmaceuticals, which developed oteseconazole, now in Phase 3 clinical trials. He is a member of the Board of Directors of Barnes-Jewish Hospital, the Executive Committee of the Board of Trustees of the St. Louis Symphony Orchestra, the Board of Directors of the College Advising Corps, and the Rework America Task Force.

Thorp teaches classes in higher education administration and teamwork in music and science. He is the co-author with Buck Goldstein of *Engines of Innovation and Our Higher Calling: Rebuilding the Partnership Between America and its Colleges and Universities* from UNC Press.

# Career Forum Roundtables

## Communication:

**Elizabeth Haswell, Ph.D., Professor, Biology, Washington University and Co-host of podcast Taproot**



Elizabeth Haswell's research group aims to identify the molecular and cellular mechanisms by which land plants perceive force, with a focus on mechanosensitive ion channels. Their work has been published in Science, PNAS, Development, and Current Biology,

and has been funded by NSF, NIH, NASA, and the Gordon and Betty Moore Foundation. Dr. Haswell was awarded an NSF Early Faculty Career Award in 2012, and in 2016 was named an HHMI-Simons Faculty Scholar. Liz is a Reviewing Editor for The Plant Cell. She is the Research Director of the NSF Science and Technology Center for Engineering Mechanobiology, and serves on the North American Arabidopsis Steering Committee, the Multinational Arabidopsis Steering Committee, and was elected to the AAAS Council in 2018. She is an advocate for science communication and for an academic culture that values sustainability, diversity, and authenticity. She is a co-host of the Taproot podcast, which is now in its third season. [pages.wustl.edu/haswell  
https://plantae.org/podcasts/the-taproot/](https://plantae.org/podcasts/the-taproot/)

## Industry/Entrepreneurship:

**Ben Capoccia, Ph.D., Associate Director of Research, Arch Oncology, WashU Postdoc Alum!**



Ben Capoccia, currently an associate director of research at Arch Oncology, received his Ph.D. from WashU in 2007 from the lab of Dr. Dan Link and went on to do his postdoc in the lab of Dr. Jason Mills. Arch Oncology is a clinical stage immuno-oncology company developing antibodies for the treatment of solid tumors. Anti-CD47 therapies represent a new class of checkpoint inhibitors that bridge the innate and adaptive immune systems to attack cancer and are currently being developed at Arch Oncology.

# Career Forum Roundtables

## Industry/Entrepreneurship (Cont'd):

### **Christian Harding, Ph.D., Cofounder and CEO, VaxNewMo. WashU Postdoc Alum!**



Christian Harding was raised in Spartanburg, South Carolina. He attended the College of Charleston in Charleston, SC and received a B.S. in Biology in 2009. He then went on to study microbial pathogenesis at The Ohio State University and received a Ph.D. in Biomedical Sciences in 2015. Subsequently, he pursued postdoctoral studies at Washington University in St. Louis under the mentorship of Dr. Mario Feldman. About a year and half into his postdoc, Dr. Harding co-founded the company VaxNewMo, an early stage R&D biotech company headquartered in St. Louis. VaxNewMo is developing conjugate vaccines against certain bacteria like *Streptococcus pneumoniae* and *Klebsiella pneumoniae* using its proprietary bioconjugation technology. Currently, Dr. Harding is the CEO of VaxNewMo and oversees the development of VaxNewMo's technology and vaccine candidates. He is the author of 13 manuscripts and two pending patents. In addition, Dr. Harding manages VaxNewMo's fundraising efforts, which total almost \$1.2M. Under his leadership, VaxNewMo has been awarded three Phase I STTR grants, an Arch Grants, and a BioGenerator grant (all non-dilutive funding).

### **Larry Spears, Ph.D., Scientific Sales Rep, StemCell Technologies. WashU Postdoc Alum!**



Larry Spears received his undergrad degree at Fontbonne University. He then got his Ph.D. in Biology at Saint Louis University under the direction of Dr. Jonathan Fisher where he studied the insulin signaling pathway. He did his postdoctoral fellowship under the mentorship of Dr. Clay Semenkovich. His research project focused on the role of lipid metabolism in a variety of different cell types. This research culminated in the awarding of an American Heart Postdoctoral Fellowship. After completing his postdoc, he searched for positions that combined his love of bench research with science communication. This career search led him to his current role as the Midwest Cell Separation Sales Representative for STEMCELL Technologies. This job allows him to work directly with scientists from all direct backgrounds that need cell isolation.

# Career Forum Roundtables

## **International Postdoc to Faculty Transition:**

**Rui Zhang, Ph.D., Assistant Professor, Biochemistry and Molecular Biophysics, Washington University**



Dr. Zhang obtained his B.S. degree in Biochemistry from Nanjing University, China. In year 2010, he obtained his Ph.D. in Structural Biology from Baylor College of Medicine, under the mentorship of Dr. Wah Chiu, one of the pioneers in the cryo-electron microscope (cryo-EM) field. He then continued his postdoctoral study in the cryo-EM field at Lawrence Berkeley National Laboratory and University of California Berkeley, under the mentorship of Dr. Eva Nogales. During his postdoc work he determined the first atomic structure of microtubule by cryo-EM. In year 2016, he joined the faculty in the department of Biochemistry and Molecular Biophysics at Washington University in St. Louis.

## **Outreach and Community Engagement:**

**Brecca Gaffney, Ph.D., Postdoctoral Research Scholar, Program in Physical Therapy, Mission St. Louis Volunteer, Washington University**



Brecca Gaffney, Ph.D. is a mechanical engineer and Postdoctoral Research Scholar in the Program in Physical Therapy at the Washington University School of Medicine in St. Louis. Her research interests involve the use of musculoskeletal modeling to identify potential precursors of movement adaptations to the development of secondary pain conditions. Dr. Gaffney was selected as a 2018 L'Oréal For Women in Science Fellow, which will provide funding for her to pursue the link between chronic hip pain and the development of low back pain by furthering the understanding of the link between abnormal bony geometry, altered neuromuscular control, and change in joint loading. In addition, as part of her fellowship, Dr. Gaffney also partners with the non-profit Mission: St. Louis by serving as a Beyond School mentor, where she works with low-income female high school students in math, science, and reading proficiency.

# Career Forum Roundtables

## Outreach and Community Engagement (Cont'd):

**Brigida Rusconi, Ph.D., Research Instructor, Big Sister volunteer, WashU Postdoc Alum!**



Brigida Rusconi, Ph.D., Instructor in Pediatrics WUSM. I joined WUSM almost 3 years ago as a postdoc. I have always been interested in scientific outreach and mentoring. Over the years I realized that the mentoring skills I had developed in the lab could be applied also outside the academic environment. I decided to become a Big Sister to a teenager.

## T32 Director:

**Leopoldo Cabassa, Ph.D., Associate Professor at WashU, Brown School of Social Work, Washington University PhD Alum**



Leopoldo J. Cabassa's dedication and passion for engaging in health disparities research has been shaped by his social work practice and research experiences in Puerto Rico and the U.S. mainland. His work focuses on improving health and mental health care for underserved communities. His research centers on examining physical and mental health disparities, particularly among racial/ethnic minorities with serious mental illness (e.g., schizophrenia, bipolar disorder, major depression). His research blends quantitative and qualitative methods, community engagement, intervention research and, more recently, implementation science. Dr. Cabassa is the Director of the Brown School's T32 Training Grant: Postdoctoral Training in Mental Health Services Research.

# Postdoc Story Tellers

## **Emmanuel Antwi-Adjei, MD/Ph.D.**

Postdoctoral Research Associate

Biology

*Go Hard or Go Home*

"Go hard or Go home" is a story about a journey in Medicine and Neuroscience. It captures the resilience and courageous attitude of a young scientist. Emmanuel Antwi-Adjei is from Ghana which is located in the Western part of Africa. He has a degree in Medicine from North China University of Science and Technology. In addition to the Medical degree, he also has a Master degree in Integrative Neuroscience and a Ph.D. degree in Neurobiology from the University of Magdeburg and Free University Berlin respectively. He is currently a Postdoctoral research associate in the biology department of Washington University in St. Louis. Dr. Emmanuel is a big fan of museums and contemporary art.

## **Rebecca Callahan, Ph.D.**

Postdoctoral Research Scholar

Neuroscience

*Other Fish in the Sea*

Rebecca Callahan is a scientist born and raised in rural Illinois. She attained a Ph.D. in materials chemistry from the University of Colorado but was seduced away from the central science by the alluring complexity of the brain. Rebecca began working with zebrafish to help uncover the intricate ways neurons in the spinal cord talk to one another to generate body movements. Currently three years into her postdoc studies at Washington University School of Medicine she can't imagine taking any other path to get to where she is.

# Postdoc Story Tellers

## **Carmel Martin-Fairey, Ph.D.**

Postdoctoral Research Scholar

Biology & Ob/Gyn

*Life is a trip Enjoy the journey*

Carmel Martin-Fairey is a native Midwesterner hailing from Cleveland, Ohio. She is a postdoctoral scholar at Washington University working on a collaborative project between the Departments of Obstetrics/Gynecology and Biology. She received dual B.S. degrees in Animal and Poultry Sciences and Business from the illustrious Tuskegee University, Masters of Science in Zoology with a minor in Biotechnology from North Carolina State University, Raleigh, NC and Ph.D. in Behavioral Neuroscience from Michigan State University, East Lansing, MI. My current research aims to determine the roles that both genetic and environmental disruptions of circadian rhythms play in risk of preterm birth.

## **Xiaoyu Zhuo, Ph.D.**

Postdoctoral Research Associate

Genetics

*Find support from your PI to be an independent scientist*

Xiaoyu Zhuo is a postdoc in Ting Wang's lab from the Department of Genetics. He got his Ph.D. from University of Utah working on endogenous retroviruses in mammals. Now he is trying to understand how structural variations affect the epigenetic landscape.

# Resource Fair

**Washington University Postdoctoral Society (WUPS) - Our mission is to support postdocs by providing events to foster career development and a sense of community.**

## **WUPS Executive Council Officers and Members**

The Washington University Postdoctoral Society (WUPS) was established by postdoctoral researchers in 2003. As a postdoc researcher at WashU, you are automatically a member of the postdoc society and have unlimited access to all events and seminars associated with WUPS. The WashU Postdoc Society recognizes that the postdoctoral appointment requires auxiliary and advanced training so that you may have access to a diverse range of career opportunities. In concert with the Office of Postdoctoral Affairs (OPA), WUPS facilitates and addresses postdoc concerns and needs with WashU administrators and faculty. We invite you to join our monthly meetings every first Thursday of the month. Being an active participant of WUPS provides you with the opportunity to meet administrators and faculty, and attend seminars/events that are critical for career advancement and your training experience here at WashU.

Seminars and events we host:

- Academic Career Development
- Immigration and Naturalization
- Cultural Events
- Happy Hours
- Writing Workshops
- Alternative Careers in Science
- Community Events
- Networking with Faculty

**WashU address:** [postdoc.wustl.edu/items/wu-postdoc-society/](http://postdoc.wustl.edu/items/wu-postdoc-society/)

**WUPS email:** [postdocsociety@wustl.edu](mailto:postdocsociety@wustl.edu)

**Twitter:** @WashUWUPS

**Follow us:**  @WUPostdocs

<b>2018/2019 Executive Council Officers:</b>
<b>President:</b> Francisco Victorino, <a href="mailto:ramirezvictorino@wustl.edu">ramirezvictorino@wustl.edu</a>
<b>Vice President:</b> Carissa Dege, <a href="mailto:carissadege@wustl.edu">carissadege@wustl.edu</a>
<b>Secretary:</b> Mohini Sengupta, <a href="mailto:mohini.sengupta@wustl.edu">mohini.sengupta@wustl.edu</a>
<b>Treasurer:</b> Natalia Harasymowicz, <a href="mailto:harasymowiczn@wustl.edu">harasymowiczn@wustl.edu</a>
<b>Outreach Director:</b> Vipul Sharma, <a href="mailto:v.sharma@wustl.edu">v.sharma@wustl.edu</a>
<b>Danforth Representative:</b> Sara Sanders, <a href="mailto:sanders.sara@wustl.edu">sanders.sara@wustl.edu</a>
<b>President Emeritus:</b> Francesca Cignarella, <a href="mailto:cignarella.f@wustl.edu">cignarella.f@wustl.edu</a>

# Resource Fair

## **The Office of Postdoctoral Affairs (OPA)**

We support and advocate for all postdoctoral research associates and scholars at Washington University. We assist in the development and support of a diverse community of postdoctoral researchers. The office provides a wide variety of resources on career and professional development and is a central resource for information regarding all aspects of postdoctoral training. Visit our website [postdoc.wustl.edu](http://postdoc.wustl.edu) for information, resources, and how to contact the office.

## **The Office of the Vice Chancellor for Research (OVCR)**

### **Funding Resources**

The Office of the Vice Chancellor for Research (OVCR) offers a variety of resources to help identify and pursue federal and private sources of funding. A competitive funding environment often requires researchers to be creative in their search for support for their projects. A number of sources that identify and manage new funding opportunities are available to aid Washington University researchers. How to Find Funding [research.wustl.edu/funding](http://research.wustl.edu/funding) provides information about the following:

- **SPIN** provides intuitive and easily customizable access to the most extensive research funding opportunity database. Create customized search notifications in SPIN.
- **Opt-in to Federal Listservs** ([research.wustl.edu/funding](http://research.wustl.edu/funding)) by signing up for the Weekly NIH Guide and NSF Custom News. Additional Federal Funding Information is also available.
- **Seed Funding and Internal Awards** provide funds to support research activities that may lead to extramural funding. (Please note: The majority of the opportunities will apply to faculty level researchers.)
- The OVCR coordinates the Internal Selections Process, competitions in which funders restrict the number of applications per institution. Information about this process (used to select the University's nominees) is available at: <https://research.wustl.edu/funding/internal-selections/>

Contact Catherine Determan to be added to distribution list for Internal Selection announcements.

# Resource Fair

## **OVCR (cont'd)**

The **Research News** listserv is designed to disseminate important research-related information and funding opportunities. Manage your subscription at: [researchnews.wustl.edu](http://researchnews.wustl.edu)

### **Contact information:**

Catherine Determan, Funding Resources Coordinator, [cdeterman@wustl.edu](mailto:cdeterman@wustl.edu) and 314.747.1654

## **Responsible Conduct of Research**

Researchers have important professional and regulatory responsibilities related to the responsible conduct of research (RCR), which is broadly defined as the practice of scholarship and scientific investigation with integrity.

- NIH guidelines for RCR state all undergraduates, graduate students, and postdocs on NIH training grants, career awards, or fellowships are required to receive 8 hours of RCR education.
- NSF guidelines for RCR state all undergraduate, graduate students, and postdocs on any NSF award are required to receive 1 hour of face-to-face education per year, in addition to one-time completion of the online PERCSS curriculum.

## **Program for the Ethical and Responsible Conduct of Science and Scholarship (PERCSS)**

The PERCSS Core Curriculum features eight web-based (Learn@Work) learning modules related to ethics: Introduction to Ethical and Responsible Research; Authorship & Publication; Collaborative Research; Conflict of Interest; Data Ownership, Acquisition, Sharing, & Management; Mentor-Trainee Relationships; Peer Review; Research Integrity. The annual PERCSS Workshop features presentations and faculty-led case study discussions on WashU policies and procedures related to RCR. Anyone engaged in research and interested in RCR at WashU is welcome to attend. It is highly recommended for postdocs, career award recipients, and other junior research team members.

**The PERCSS Workshop is on April 12, pre-register through Learn@Work**

# Resource Fair

## **Becker Medical Library**

Becker Medical Library maintains a world-class collection of information resources, accessible anytime, anywhere. Staff offer expertise in publishing, author analytics and support, grant application and compliance, science communication, plain language review, information retrieval and evaluation, and information management. Classes on these topics and more are offered regularly, and customized presentations are available for departments, groups, or as individual consultations.

The library offers research computing workshops, presented in partnership with the Center for High Performance Computing and the Institute for Informatics. These free trainings (Computing 101, MATLAB, Python, R) provide an introduction to research computing and prepare participants for ongoing learning. Library staff are also nationally recognized leaders in systematic review searches and make a valuable addition to your systematic review team.

The Research Pod on the library's first floor provides access to statistical, research, and presentation software, including Adobe Illustrator, Adobe Photoshop, Adobe Premiere Pro, ArcGIS, EndNote, GraphPad Prism, JMP Pro, Mathematica, MATLAB, Microsoft Office, PyMOL, SAS, and SPSS. Becker Library also licenses select software tools to researchers at a reduced cost, including GraphPad Prism, Ingenuity Pathway Analysis (IPA) with Analysis Match, Lasergene Core Suite, MetaCore, Partek Flow, Partek Genomics Suite, PyMOL, SnapGene, and Spotfire with OmicsOffice. Software trainings are offered periodically.

The library also provides access to Henry Stewart Talks, over 2,000 animated, seminar-style, online lectures narrated by world-leading experts, and the O'Reilly Safari Learning Platform, a collection of over 12,000 full-text electronic books on computing, databases, networking, etc. that is fully searchable - even for snippets of code.

# Resource Fair

## **Biotechnology and Life Sciences Advising Group (BALSA)**

The Biotechnology and Life Sciences Advising Group (BALSA) was founded in December 2010 by a group of biomedical Ph.D. candidates and postdoctoral fellows from Washington University School of Medicine. Its goal is to supplement academic training by providing real-world experience in the science of business and development of transferable professional skills to better prepare members for both academic and non-academic career paths. BALSA further aims to offer a bridge between academia and industry, fostering collaborations between local universities and companies, to strengthen the young but vibrant startup community in St. Louis.

Since its inception, BALSA has grown to encompass approximately 100 active members from WashU, St. Louis University (SLU), and the St. Louis professional community. Consultants come from a myriad of backgrounds including cell biology, neuroscience, immunology, microbiology, genetics and genomics, cancer biology, plant biology, chemistry, engineering, business and law. While members enter with little experience in professional consulting, BALSA harnesses the analytical power of graduate students and postdocs by teaching them to apply the scientific method to business problems to generate innovative, data-driven solutions for clients. Consultants learn the market research skills necessary to deliver these recommendations through teamwork and peer-to-peer mentoring with experienced project managers and advisors. Website: [thebalsagroup.org](http://thebalsagroup.org)



Campfire's mission is to bring out the natural storyteller and public speaker in each of us. We do this through classes, workshops, trainings, and our community Fellows program. Our curriculum and teaching style is different than any out there, focusing on helping you be the speaker you envision and closing the gap between your intention and the impact of your message. Find us at [cmpfr.com](http://cmpfr.com).

# Resource Fair

## **The Career Center**

The Career Center offers a full range of career development support to postdocs transitioning to academic, industry, and other opportunities. We offer individual and group advising, interactive workshop sessions, and employer events. PhD-level career development advisors will help with any stage of career planning and exploration and are available on both the Medical and Danforth campuses. Need help figuring out your career options and goals? Want advice on how to strengthen your job application materials? Hoping to improve your networking, interviewing, and negotiating skills? We can guide you in building the skills needed for your career success through one-on-one and group advising appointments, programs and workshops, and access to digital resources. Postdocs can schedule individual advising appointments and learn about upcoming events at [careercenter.wustl.edu](http://careercenter.wustl.edu).

## **Clinical Research Training Center (CRTC)**

Fostering training and career development, the Clinical Research Training Center (CRTC) is the educational core of the Institute of Clinical and Translational Sciences that provides clinical and translational research training for predoctoral students, house-staff, postdoctoral scholars, fellows, staff, and junior faculty. The CRTC provides a cohesive and supportive infrastructure to foster clinical research training and career development.

Active mentoring, hands-on research experiences and formal didactic programs in clinical research methods leading to a Certificate or Master's Degree in Clinical Investigation are core components of the Center's activities. The CRTC represents a paradigm shift in the approach to clinical research training for Institute of Clinical and Translational Sciences (ICTS) institutional partners by formally integrating dozens of diverse training programs into a single location and administrative umbrella. Website: [crtc.wustl.edu](http://crtc.wustl.edu)

# Resource Fair

## **Connections**

Connections is a student-led initiative that promotes inclusion and encourages its members to explore their diverse identities. We provide a respectful space to learn and discuss diversity topics and generate a sense of community for students of all backgrounds. Our goals are to promote greater diversity in social and professional networks, improve the ability of our members to engage in dialogue on sensitive topics, and learn about other cultures and topics related to diversity and inclusion. By learning how to better communicate on sensitive topics and with people who are different than us, Connections members can make Washington University a more inclusive place for everyone to study and work. Each month we host a module related to one such topic followed by a discussion section where our members can talk about their own personal experiences with it and hear those of others in a safe and inclusive environment. Lunch is always provided at these meetings and students and postdocs are welcome to attend.

## **CNND Blood-Brain Barrier Core**

The primary purpose of the CNND Blood-Brain Barrier Core is to provide WUSM researchers resources for the measurement of permeability in in vitro blood-brain barrier (BBB) models. The core's automated transendothelial electrical resistance (TEER) measurement system allows for rapid, noninvasive, and repeated assessment of various transwell BBB models systems and facilitates medium-throughput screening of pharmaceutical or peptide treatment. The core will provide a center of technical and scientific expertise and training to assist in the design and execution of BBB permeability studies. In addition, the core has expertise with the preparation of in vitro BBB models from both immortalized human and primary murine brain microvascular endothelial cell cultures.

The CNND BBB Core facilities, located in the McDonnell Pediatric Research Building (MPRB) on the Medical School Campus, include automated TEER measurement system, fully equipped laminar flow hood, and short-term CO<sub>2</sub> incubators in a BSL2 lab space.

# Resource Fair

## **Future Educators**

Future Educators is a student-run group of graduate students and postdocs at Washington University in St. Louis who are passionate about teaching and mentorship in the STEM disciplines. We facilitate networking opportunities and meet regularly to discuss education research as well as teaching and mentorship opportunities.

Our vision is to create a community that fosters development of the next generation of STEM educators and mentors. We strive to bring together trainees at Washington University who are passionate about teaching and mentorship and help them achieve their goals in education. Involvement in the group can range from periodic attendance at group events to leadership opportunities.

Website: [futureeducators.wustl.edu/about](http://futureeducators.wustl.edu/about)

Email: [futureeducators.wustl@gmail.com](mailto:futureeducators.wustl@gmail.com) to join our mailing list!

## **InPrint - A scientific editing network**

InPrint is a trainee-run scientific editing network that provides free, confidential editing of scientific communication to the Washington University research community. If you are working on a manuscript or grant and would like constructive feedback to make it more polished, consider submitting your work to us today! We offer free editing of a broad range of communication types (abstracts, manuscripts, grants, posters, dissertations, graphical work, etc.) and also will design scientific schema upon request. Our mission is to improve the quality of scientific communication, encourage discussions among authors during the writing process, and enhance graduate student and postdoctoral communication skills. InPrint also aims to support the professional development of trainees seeking opportunities in science writing or editing by sponsoring communication-related workshops and events. To submit your work and learn about how you can join the editing team!

Website: [inprintscience.wustl.edu](http://inprintscience.wustl.edu)

# Resource Fair

## **Office of Technology Management (OTM)**

The Washington University Office of Technology Management (OTM) assists Washington University in St. Louis faculty in the transfer of technology from the lab to the global marketplace. Located in Cortex, OTM manages a wide variety of intellectual properties arising from research programs throughout Washington University. OTM acts as a resource for faculty in the areas of patent prosecution, material transfer agreements, marketing and licensing. OTM's mission is to pair cutting edge WashU research with expertise and exceptional service in order to create a pipeline of opportunities that can benefit society. Website: [otm.wustl.edu](http://otm.wustl.edu)

## **The Office of the Ombuds**

The Office of the Ombuds provides confidential, impartial, informal, and independent conflict resolution and problem-solving assistance to all university staff, postdoctoral appointees, Graduate School students and faculty. The Ombuds offers a safe place for individuals to voice university-related concerns and review options to manage those concerns. Additionally, the Ombuds serves as a catalyst for change by identifying patterns or trends on campus, offering feedback, and making recommendations about university policy or practice to those who may have the power to affect change.

People visit an Ombuds for many reasons. Some just want someone to listen. Some want someone to serve as an objective sounding board that can help them think through a situation. Some want information about how a university policy or practice applies to them. Some are uncertain about how to navigate a difficult situation. And some have tried other avenues to address their concern but haven't found the help they needed. Whether as a first step, a last resort, or somewhere in between, the Office of the Ombuds is here to help. No problem is too big or too small. Website: [ombuds.wustl.edu](http://ombuds.wustl.edu)

# Resource Fair

## **ProSPER**

Washington University ProSPER (Promoting Science Policy, Education, and Research) is a graduate student organization that helps students explore issues in science policy, advocacy, communication, and outreach. Our mission is to provide trainees with opportunities to apply for fellowships, gain experience planning events, and learn about alternative career options from professionals who work in science policy and communication. We have paired with local and national organizations to advocate for voter engagement and science policy; host a science communication workshop as well as a blog where members can talk about science, research, and policy; arrange visits and networking opportunities for members wanting to pursue alternate career paths in science advocacy; and host public roundtables and forums where experts discuss prominent issues such as vaccines, GMOs, climate change, and the opioid epidemic. There are opportunities within this group for postdocs to gain experience writing for a broad audience through our blog and using their expertise to promote scientific literacy and policy.

# Resource Fair

## Skandalaris Center

The mission of the **Skandalaris Center** is to inspire and develop **Creativity, Innovation, and Entrepreneurship** at Washington University in St. Louis. The center offers a variety of resources and opportunities to different populations on campus, including postdoctoral trainees like you.

The main office of the center is located in the middle of the Danforth campus, offering easy access to Danforth postdocs as a space for connection and event-holding. If you are located in the medical campus, a satellite office in the North building is within walking distance, for convenient meeting arrangements and opportunities to consult with a venture analyst.

In addition to many ad hoc events hosted or promoted by the center to foster innovation and entrepreneurship, there are specific programs designed to encourage involvement of postdocs. **IdeaBounce®** invites you to share ideas you are passionate about, big or small, with other community members from WUSTL and St. Louis; **Expert Hours** bring highly successful people to share their unique career experiences; **Global Impact Award** provides seed funding to early-stage ventures created by anyone within the WUSTL community; **LEAP** (Leadership and Entrepreneurial Acceleration Program) competition provides an interactive education process (and funding!) to allow you to bring amazing scientific projects one step closer to commercialization, without leaving the safety net of your labs. Better yet, just drop by, grab a cup of coffee (and sometimes cookies), and have a stimulating and uninhibiting conversation. Postdocs like you ROCK, and we hope to see you at Skandalaris Center soon! Website: [skandalaris.wustl.edu](http://skandalaris.wustl.edu)

# Resource Fair

## **Leadership and Entrepreneurial Acceleration Program (LEAP)**

The Leadership and Entrepreneurial Acceleration Program (LEAP) provides developmental experience, industry connections, and resources to research teams with the goal of advancing Washington University intellectual property towards commercialization. There are two cycles of LEAP each year. Throughout the program, teams receive mentorship from experts in their fields. At the end of each cycle, teams present to industry-relevant investors and representatives, <http://sites.wustl.edu/skandalaris/2017/05/03/meet-our-spring-2017-leap-inventor-challenge-judges/> and have the potential to win funding (up to \$50k) to help progress their inventions towards commercialization. The program is open to any person/team developing Washington University intellectual property and is built to train researchers to navigate the specialized commercialization considerations relevant to their technical domain. Go to [skandalaris.wustl.edu/funding/leap](http://skandalaris.wustl.edu/funding/leap) for more and to apply!

## **The Teaching Center**

The Teaching Center provides teaching-related support to WUSTL postdocs through a variety of services. We offer disciplinary teaching workshops that are structured around evidence-based pedagogical scholarship. These workshops examine strategies for effective teaching, spark new ideas, and deliver additional resources for teaching in your field. We also host a number of teaching-with-technology training opportunities, as well as job market workshops, which highlight different aspects of job market materials related to teaching including the teaching philosophy statement, the teaching portfolio, and the teaching demo. The Teaching Center staff also conducts confidential teaching observations and feedback on your teaching, which can strengthen your teaching now and help you prepare for a career in academia. In addition, we give individual consultations for a wide variety of teaching concerns like troubleshooting a classroom issue, motivating student learners, and developing active learning strategies. Postdocs may choose to participate in our professional development programs, Preparation in Pedagogy and WU-CIRTL (for postdocs in STEM fields). These programs are excellent teaching-related training opportunities, which also make nice additions to your CV. Finally, we have a number of web resources on teaching and teaching with technology.

Website: [teachingcenter.wustl.edu](http://teachingcenter.wustl.edu)

# Resource Fair

## **University College at Washington University**

Washington University has offered continuing education programs and courses through University College since 1908. Today, University College offers part-time, evening, online, and summer school classes to students who want to earn undergraduate or graduate degrees or certificates in specialized areas of study, or pursue personal enrichment.

Our programs provide adult students the opportunity to experience the excitement of attending and earning a degree or certificate from a world-class research institution.

Post-Doc students can use a tuition benefit to enroll in up to four credits of undergraduate study through University College each semester. Please visit the website for the Office of Postdoctoral Affairs for information about the benefit and links to the forms you need. [postdoc.wustl.edu/policies-benefits](http://postdoc.wustl.edu/policies-benefits)

## **Wellness Connection**

In partnership with Washington University experts, Wellness Connection offers opportunities for employees to improve their physical and emotional wellness. We do this with a specific focus on developing evidence-based programs and making personal connections to provide employees with valuable and fun experiences that improve health status. Our vision is to foster a culture that prioritizes employee health and wellbeing as integral to the mission of teaching, research and patient care. As well as, create an environment where the healthier choice is the easiest choice and employees are empowered to choose wellness. We are aiming to grow engagement from post-doctoral associates with our employee wellness team and in our wellness programs. This event provides us the opportunity to connect with this group in a new way and to better learn about their needs to improve physical and emotional wellness.

# Resource Fair

## **MyWay to Health**

MyWay to Health is an employee wellness program developed by leading experts in health and wellness. Deeply rooted in scientific evidence, expert opinion, and 25 years of research, MyWay to Health provides sound advice, as well as guidance and tips to help you take charge of your well-being.

Our mission is to help individuals champion strengths, overcome barriers, and create supportive networks to improve their health and quality of life. Combining individualized wellness consulting with online tools and educational resources, you will learn to make personalized lifelong changes to your health. MyWay to Health offers three unique opportunities to engage in employee wellness through individualized wellness consulting, an online platform, and wellness workshops.

## **The Young Scientist Program**

The Young Scientist Program aims to attract students to scientific careers and increase the participation of underrepresented groups in science by bringing resources and scientists directly to teachers and students in the St. Louis area. YSP strives to achieve this mission through diversity-focused paid summer research internships, hands-on scientific demonstrations in local classrooms, field trips to Washington University School of Medicine, dissemination of teaching kits containing pre-planned lessons, one-on-one mentoring, and loaning or donating laboratory equipment to classrooms in need.

# Abstracts

**Single cell RNA-sequencing reveals cellular heterogeneity and trajectories of lineage specification during embryonic limb development****Natalie Kelly (1)**

Kelly NH, Huynh NPT, Guilak F

**Biomedical Engineering****Faculty Mentor: Farshid Guilak**

**INTRODUCTION:** Limb development involves a complex sequence of events where a homogeneous limb bud differentiates into the multiple cell types of the limb. A more thorough understanding of the events in joint development may provide insights into methods to enhance regeneration of joint tissues. The goal of this study was to elucidate the transcriptional landscape during limb bud development via single cell RNA-sequencing.

**METHODS:** Murine hind limbs were harvested and digested at 4 time points during development, including formation of the limb bud (E11), cartilaginous condensations (E13), joint cavitation (E15), and joint morphogenesis (E18). Single cell capture and cluster analysis was performed at each time point and across all time points to examine cell types in hind limb tissues.

**RESULTS:** Single cell capture was reliable as demonstrated by a low (1.4%) multiplet rate. Across all time points there were 9,925 cells in 15 clusters, with E11 and E18 clusters generally being more distinct and E13/E15 clusters overlapping. E11 and E18 cells were found at the ends of the cell trajectory, with E13/E15 cells along the middle of the trajectory branches. We identified clusters with known musculoskeletal markers. Cluster 0 expressed the cartilage genes *Col2a1*, *Matn1*, and *Col11a1*. Cluster 6 gene markers included *Col1a1*, *Col6a1*, *Col6a2*, and *Twist2*. Cluster 12 contained cells that were highly specific for *Col10a1* and *Mmp13*, indicating hypertrophic chondrocytes.

**DISCUSSION:** We generated single cell RNA-sequencing data profiling the transcriptional landscape of murine limb development. Cell clusters were biologically relevant and recapitulated the known cell types present in limb development. Future work will determine gene regulatory networks leading to specific cell types.

**Imaging the 3D orientation of single fluorescent probes maps the nanoscale compositional heterogeneity of lipid membranes****Jin Lu (2)**

Lu J, Mazidi H, Zhang O, Ding T, Lew MD

**Chemistry, Fluorescence Microscopy****Faculty Mentor: Matthew Lew**

Cellular membranes are organized into compositional and functional domains on the scale of 10-300 nm. Super-resolution (SR) fluorescence microscopy has been used to resolve these domains by probing the brightness or fluorescence spectrum of lipophilic probes bound to the lipid membrane. Considering the chemical structures and molecular interactions between lipid components and fluorescent probes, we hypothesize that the spatial orientations and rotations of fluorescent probes are sensitive to the lipid nano-environments where the probes bind. In this work, we built an orientation-sensitive microscope (the Tri-spot point spread function), and combined with single-molecule localization microscopy, developed a novel SR imaging technique termed orientation-resolved PAINt (point accumulation for imaging in nanoscale topography) or oPAINt. We used oPAINt to measure both the position and orientation of lipophilic dyes in supported lipid bilayers with varying lipid compositions and cholesterol concentrations. We found Merocyanine 540 and Nile red exhibit characteristic orientations and rotational mobilities that are sensitive to lipid packing and cholesterol level. By recording over  $10^5$  individual fluorescence bursts from many single molecules, we were able to distinguish and map liquid-ordered and liquid-disordered domains with resolution below the diffraction limit in a mixed lipid bilayer. We then applied our technique to image the lipid membrane reorganization by sphingomyelinase. Details on the lipid's structural and compositional changes at the nanoscale were visualized via oPAINt that were impossible to observe using standard SR imaging techniques.

**School discipline, race-gender and STEM Readiness: A hierarchical analysis of the impact of school discipline on math achievement in high school****Habiba Ibrahim (3)**

Ibrahim HA, Johnson O

**Education****Faculty Mentor: Odis Johnson**

While research on school suspensions and its impact on students is not new, scholars have not yet explored whether there is a link between school suspensions and high school students' preparation for STEM majors. Using nationally representative data, this study explored the relationship of suspensions to math outcomes while considering race-gender interactions and school social control. Our findings confirm that both in and out-of-school suspensions significantly lower math achievement in high school even after controlling for a host of individual and school factors. More so, the effect of suspensions on math achievement persists over time. The analysis reveals that suspended students scored lower in math two years after the suspensions occurred after controlling for individual and school characteristics, and prior math achievement. The study also found an overrepresentation of racialized students among those suspended. The paper concludes with a discussion and implications for policies, practice and research.

**DNA damage response in human embryonic stem cells with short telomeres****Alexandre Teixeira Vessoni (4)**

Vessoni AT, Batista LFZ

**Cell and Molecular Biology  
Faculty Mentor: Luis Batista**

Telomeres are repetitive DNA sequences (TTAGGG) located at the end of our chromosomes. Their main functions are to buffer against loss of important genetic information (end-replication problem) and to allow the assembly of shelterin, a multi-protein complex that protects the chromosomes ends from being recognized as DNA breaks. Telomeres gradually become shorter with aging, and upon reaching a dysfunctional length they induce DNA damage responses (DDR). In human fibroblasts, telomere dysfunction induces a permanent G1/S arrest (senescence) via the P53 and the Rb1 pathways. Telomere shortening can be prevented by telomerase, a ribonucleoprotein complex that uses an RNA template to elongate telomeres. Its expression is restricted to a few cell types, such as stem and progenitor cells, and is critical to preserve adult stem cells function and tissue homeostasis. Still, telomerase expression is not enough to prevent aging-induced telomere shortening in several adult stem cells, and how stem cells respond to telomere shortening is not yet fully understood. A better comprehension of this phenomenon may provide new insights into how aging is associated to loss of regenerative potential and tissue dysfunction. In this work, we developed a new model to study the impact of telomere shortening on human stem cells. Using state-of-the-art genome engineering technology, we developed isogenic human embryonic stem cells (hESC) lines knocked out for TP53, RB1, or both, and in which telomerase can be turned ON/OFF at will. We will assess the effect of progressive telomere shortening on DDR, cell fate, gene expression and metabolism of these cells.

**The Ca<sup>2+</sup>-CaMKK2-AMPK Axis Protects Stressed Replication Forks****Shan Li (5)**

Li S, Lavagnino Z, Lemacon D, Kong L, Ustione A, Ng X, Zhang Y, Vindigni A, Piston DW, You Z

**Cell Biology****Faculty Mentor: Zhongsheng You**

Abnormal processing of stressed replication forks by nucleases can cause fork collapse, genomic instability and cell death. Despite its importance, it is poorly understood how the cell properly controls the activity of nucleases to prevent detrimental fork processing. Here we report a novel signaling pathway that controls the activity of exonuclease Exo1 to prevent aberrant fork resection during replication stress. Our results indicate that replication stress elevates intracellular Ca<sup>2+</sup> concentration ([Ca<sup>2+</sup>]<sub>i</sub>), which leads to the activation of CaMKK2 and the downstream kinase AMPK. Following activation, AMPK directly phosphorylates Exo1 at serine 746 to promote 14-3-3 binding and inhibit Exo1 recruitment to stressed replication forks, thereby avoiding unscheduled fork resection. Disruption of this fork protection pathway results in excessive ssDNA, chromosomal instability and hypersensitivity to replication stress inducers. These findings reveal a novel link between [Ca<sup>2+</sup>]<sub>i</sub> and the replication stress response as well as a new function of the Ca<sup>2+</sup>-CaMKK2-AMPK signaling axis in safeguarding fork structure to maintain genome stability.

**Development of a zebrafish chemical screen to identify therapeutic targets for telomere syndromes****Michael Munroe (6)**

Munroe MR, Mokalled MH, Batista LFZ

**Molecular Biology****Faculty Mentor: Luis Batista**

Telomeres are repetitive DNA sequences located at chromosome ends that protect the genome from degradation and damage. Various protein structures, including the telomere reverse transcriptase (TERT), are necessary to help stabilize and elongate telomeres. Loss of TERT, and subsequently telomerase function, results in significant clinical conditions, such as dyskeratosis congenita (DC), a pediatric disorder associated with bone marrow failure (BMF) and premature aging.

Zebrafish (*Danio rerio*) are a unique model organism for the study of disease development and progression, as they allow for observable embryonic development due to external fertilization and transparent embryos. Of interest to our lab, Tert mutant (*tert*<sup>-/-</sup>) zebrafish demonstrate phenotypic abnormalities characteristic of human DC, with high embryonic lethality and severe developmental defects, including cardiac edema, scoliosis, and ultimately, death (<2 weeks).

Given the rapid and observable development of zebrafish embryos, they make an ideal model organism for the testing of chemical compounds *in vivo*. With the deleterious phenotypes observed in second-generation tert mutants, we will perform a chemical screen to identify chemical and pharmacological compounds capable of improving development and survival in *tert*<sup>-/-</sup> zebrafish embryos. Additionally, we will identify the molecular pathways being targeted by successful hits to further characterize the mechanisms underlying telomere-dysfunction induced disease. Together, this work will expand on the current knowledge of telomere-associated diseases, and lead to the development of novel therapeutics for the treatment of conditions such as DC.

**Posttranscriptional modulation of TERC by PAPD5 inhibition rescues hematopoietic development in dyskeratosis congenita****Wilson Fok (7)**

Fok WC, Shukla S, Vessoni AT, Brenner KA, Parker R, Sturgeon CM, Batista LFZ

**Stem Cell Biology****Faculty Mentor: Luis Batista**

Dyskeratosis congenita (DC) is a bone marrow failure syndrome where patients have short telomere lengths and are diagnosed in childhood with a wide range of clinical manifestations, with bone marrow failure being the major cause of death. Reduced TERC (Telomerase RNA Component) levels is one of the causes of DC, causing reduced telomerase activity and short telomeres in patients with mutations in dyskerin (DKC1), which stabilizes TERC. We and others have previously shown that the exosome RNA degradation pathway is responsible for the decay of TERC, and that the inhibition of the non-canonical poly(A) polymerase (PAPD5) or the exosome complex partially rescues TERC levels in DKC1 mutants. However, it remains unknown if the modulation of TERC RNA decay by inhibition of the PAPD5-Exosome pathway would be able to rescue hematopoietic failure in DC. We used isogenic (CRISPR/Cas9-engineered) human embryonic stem cells (hESCs) carrying disease-associated mutations in DKC1 (DKC1\_A353V) to study hematopoietic failure in DC. Our data indicates that TERC levels are increased in DKC1\_A353V hESCs when we silenced either EXOSC3 or PAPD5. Also, deep sequencing confirms that silencing PAPD5 significantly reduces poly-adenylation at both the mature and extended 3'- TERC reads in DKC1\_A353V mutant hESCs. Moreover, these cells have increased telomerase activity and increased telomere length, coupled with reduced DNA damage signaling. Interestingly, inhibition of PAPD5 and not EXOSC3 leads to rescue of definitive hematopoietic output in DKC1\_A353V cells. Inhibition of PAPD5 is maintained in CD34+ cells with an increase in the mature form of non-adenylated TERC. Our data suggests that modulation of PAPD5 activity could be a viable strategy to treat hematopoietic failure in DC patients.

**Consequences of DNMT3A/B modulation in telomere maintenance of dyskeratosis congenita human embryonic stem cells****Ho-Chang Jeong (8)**

Jeong HC, Koh WK, Challen GA, Batista LFZ

**Stem Cell Biology****Faculty Mentors: Luis Batista, Grant Challen**

Dyskeratosis congenita (DC) is a disorder that impairs bone marrow function, caused by mutations in telomerase and telomere stability genes. Thus, either maintenance of telomere length or reactivation of telomerase has been considered as a potential approach to rescue hematopoietic defects observed in DC patients. Interestingly, loss-of-function mutations in the DNA methyltransferase 3A (DNMT3A) were associated with longer telomere lengths in myelodysplastic syndrome patients. The aim of this project, which represents a collaboration between the Challen and Batista Labs at WashU, is to decipher if the modulation of DNMT3 activity could be utilized as a strategy to rescue telomere elongation in settings of DC. For that, we initially generated human embryonic stem cells (hESCs) with silenced expression of both DNMT3A and DNMT3B (shD3A/B). Although telomere length or telomerase activity remained unaltered in shD3A/B hESCs, increased telomerase activity and proliferation were observed in embryoid bodies-derived from shD3A/B hESCs. Additionally, we assessed the possibility of DNMT3 to elongate telomeres in a telomerase-independent manner, through alternative lengthening of telomeres (ALT). In fact, our data indicates that the presence of ALT-associated PML bodies were highly enriched in shD3A/B hESCs. Therefore, our preliminary results implicate that modulation of DNMT3 activity could potentially be used as a strategy to elongate telomeres in DC patients, improving their phenotypes and increasing their lifespan.

**Tumor suppressors p53 and ARF control oncogenic potential of triple-negative breast cancer cells by regulating RNA editing enzyme ADAR1****Che-Pei Kung (9)**

Kung CP, Bross EA, Bramel E, Freeman E, Sabloak T, Kuzmicki CE, Benjamin M, Maggi Jr. LB, Weber JD

**Cancer Research****Faculty Mentor: Jason Weber**

Triple-negative breast cancer (TNBC) accounts for one-fifth of the breast cancer patient population. The heterogeneous nature of TNBC and lack of options for targeted therapy make its treatment a constant challenge. The co-deficiency of tumor suppressors p53 and ARF is a significant genetic signature enriched in TNBC, but it is not yet clear how TNBC is regulated by this genetic alteration. To answer this question, we established p53/ARF-defective murine embryonic fibroblast (MEF) to study the molecular and phenotypic consequences in vitro. Moreover, transgenic mice were generated to investigate the effect of p53/ARF deficiency on mammary tumor development in vivo. Increased transformation capability was observed in p53/ARF-defective cells, and formation of aggressive mammary tumors was also seen in p53/-ARF/- mice. RNA-editing enzyme ADAR1 was identified as a potential mediator for the elevated oncogenic potential. Interestingly, we found that the overexpression of ADAR1 is also prevalent in human TNBC cell lines and patient specimen. Using short hairpin RNA (shRNA) to reduce ADAR1 expression abrogated the oncogenic potential of human TNBC cell lines, while non-TNBC cells are less susceptible. Different levels of RNA editing of known ADAR1 targets were detected in shRNA-treated human TNBC cell lines, suggesting that ADAR1-mediated RNA editing contributes to TNBC pathogenesis. These results indicate critical roles played by the tumor suppressors p53 and ARF in the pathogenesis of TNBC, partially through affecting ADAR1-mediated RNA editing. Further understanding of this pathway could shed light on potential vulnerabilities of TNBC and inform the development of personalized therapies based on patients' genetic signatures.

**How insertions and deletions shaped regulatory network in human evolution****Xiaoyu Zhuo (10)**

Zhuo X, Wang T

**Genetics****Faculty Mentors: Ting Wang, Pamela Madden**

To understand how structural variation (SV) shaped epigenetic landscape in the genome, we identified insertions and deletions (INDELs) from 20bp to 50kb between human and chimpanzee genomes and analyzed how they affected promoter, enhancer and H3 Lys9 trimethylation-mediated (H3K9me3) heterochromatin in induced pluripotent cells (iPSC) and cranial neural crest cells (CNCC). We found the depletion of large INDELs and mobile element insertions (MEIs) in putative conserved promoters and enhancers. However, medium-sized INDELs (from 20bp to 50 bp) are significantly enriched in human-chimpanzee shared promoters; additional examination suggests it might be driven by CpG island expansion/reduction. Surprisingly, we also found that lineage-specific MEIs provided lineage-specific and cell-specific enhancer and promoter. On the other hand, large lineage-specific sequences, regardless of being an insertion or a deletion, are enriched in lineage-specific H3K9me3 regions. Among MEIs, SVA insertions significantly triggered H3K9me3. However, the last 500bp on the 3' end of lineage-specific SVAs are spared with H3K9me3 repression, coincided with the putative enhancer in CNCC. Promoter/enhancer activity of LTR5/SVA is anti-correlated with their age and their H3K9me3 coverage. By examining truncated SVA insertions, we found an NR2F1 binding motif at the core of putative CNCC enhancer peaks. However, not all putative enhancers have the NR2F1 binding signal, indicating other transcription factors may play roles in SVA derived enhancers. Our work for the first time revealed how INDELs affected cis-regulatory elements and identified previously overlooked cis-regulatory elements in the unmappable regions in the human genome. We also demonstrated how H3K9me3 repression change during evolution.

**Ontogeny is a critical determinant of human pluripotent stem cell derived natural killer cell function****Carissa Dege (11)**

Dege CL, Fegan KH, Creamer JP, Berrien-Elliott MM, Luff SA, Kingsley PD, McGrath KE, Fehniger TA, Palis J, Sturgeon CM

**Hematopoiesis****Faculty Mentor: Christopher Sturgeon**

Hematopoietic development during mammalian embryogenesis is comprised of multiple spatio-temporally regulated hematopoietic programs, emerging from hematopoietic stem cell (HSC)-independent and dependent processes.

Interestingly, progenitors of natural killer (NK) cells, but not B or T cells, have been found in the early human yolk sac, suggesting that NK cells may arise from HSC-independent sources. NK cells are innate lymphoid cells that recognize and kill virally infected cells and tumor cells, making them a highly desirable cell-type for adoptive immunotherapy. To bypass donor-related issues, human pluripotent stem cell (hPSC)-derived NK cells offer the possibility of uniform activity in a renewable “off-the-shelf” cell product. As the differentiation of hPSCs recapitulates early developmental processes, we sought to characterize the developmental origin of hPSC-derived NK cells. We have developed a stage-specific hPSC differentiation method that separates CD34+ WNT-independent (WNTi) hematopoietic progenitors that harbor “extra-embryonic-like” hematopoietic potential from CD34+ WNT-dependent (WNTd) erythro-myeloid- (T-)lymphoid “definitive” hematopoietic progenitors. Using this system, we find that CD34+ cells from both populations harbor NK cell potential. Further, WNTi- NK cells are phenotypically distinct, being more granular, with higher CD16 expression, and are biased for cytotoxic degranulation; whereas WNTd-NK cells have lower CD16 expression and are biased for IFN- secretion, upon various stimuli. Collectively, these studies suggest that ontogenic origin is an unexpectedly important consideration in the design of hPSC-derived NK cell-based therapeutics, and raise new questions regarding the potential of early hematopoietic progenitors in the mammalian embryo.

**Batf3-dependent Dendritic Cells are Required to Present Cell-associated Antigen to CD4 T Cells.****Stephen Ferris (12)**

Ferris ST, Durai V, Wu R, Murphy T, Murphy K

**Immunology****Faculty Mentor: Ken Murphy**

Dendritic cells (DCs) are required to prime T cells during an immune response. The dogma in the field is that Batf3-dependent DCs (DC1s) prime CD8 T cells and IRF4-dependent DCs (DC2s) prime CD4 T cells. However, recent studies have shown that DC1s are required for induction of Th1 immune responses and to prime autoreactive CD4 T cells in the NOD mouse model of diabetes. Therefore, this segregation of priming theory is flawed. To further study the contribution of DC1s to CD4 T cell priming, we generated an XCR1-cre mouse and crossed it to the MHC class II floxed mouse to generate MHC class II deficient DC1s. We found that the form of antigen directs the priming of T cells. DC2s are superior at presenting soluble antigen as evidenced by normal CD4 and CD8 OVA specific T cell responses in mice lacking DC1s. However, DC1s are superior at presenting cell-associated antigen as evidenced by a lack of OVA specific CD4 and CD8 T cell priming in mice lacking DC1s. Furthermore, CD4 priming during tumor immune responses is absent when DC1s lack MHC class II. Our findings show that the DC subsets differ in the form of antigen that they present. DC1s present cell-associated material; whereas DC2s present soluble antigen.

**Immunomodulatory role of adiponectin in experimental models of multiple sclerosis****Francesca Cignarella (13)**

Cignarella F, Cantoni C, Salimi H, Klein R, Piccio L

**Neuroimmunology****Faculty Mentor: Laura Piccio**

Multiple sclerosis (MS) can be mimicked by the animal model experimental autoimmune encephalomyelitis (EAE). In both MS and EAE, activation of immune cells against CNS antigens occurs in the periphery as self-reactive lymphocytes are detectable in the blood and gain access to the CNS by crossing the blood brain barrier (BBB) via mechanisms that are still being elucidated. Several studies showed that obesity during childhood/young adulthood confers increased risk of developing MS. Adipose tissue is an active source of cytokines, named adipokines, that regulate metabolic pathways, immune and inflammatory responses. Adiponectin is an adipokine with multiple anti-inflammatory effects which is increased upon calorie restriction, and decreased with obesity. Recent evidence suggests that the BBB is activated as a result of metabolic and inflammatory changes that occur in response to obesity. Adiponectin has been reported to have a variety of protective effects on endothelial function and therefore changes in its serum levels can potentially impact the BBB.

-Administration of adiponectin during EAE inhibited the disease. Furthermore, mice with genetic targeted deletion of adiponectin developed more severe EAE. Adiponectin treatment resulted in down-regulation in the spinal cord of vascular adhesion molecules (ICAM-1 and VCAM-1) associated to the BBB. Using in vitro approaches we observed that endothelial cells and astrocytes (constituents of the BBB) express adiponectin receptor 2 and exposure of an in vitro human BBB model to adiponectin improved barrier integrity and reduced solute diffusion.

-Based on these preliminary findings, we believe that adiponectin exerts neuroprotective effects that control leukocyte entry into the CNS via regulation of BBB permeability.

**Pharmacological Modulation of Cell Junction Molecules in Hydrocephalus****Leandro Castaneyra Ruiz (14)**

Castaneyra Ruiz L, McAllister II JP, Morales DM, Isaacs A, Bubeck-Wardenburg J, Limbrick, Jr. DD

**Neuroscience****Faculty Mentors: David Limbrick, Pat J. McAllister**

The pathogenesis of hydrocephalus (PHH) is not well known, but A Metalloproteinase 10 (ADAM10)-mediated proteolysis of N-cadherin adherens junctions in the ventricular zone (VZ) appears to play a prominent role. ADAM10 can be inhibited by GI254023X. To test the hypothesis that VZ disruption and hydrocephalus can be prevented by inhibition of ADAM10, we have performed in vitro and in vivo experiments on developing ependymal cells and infant ferrets, respectively.

VZ cells were cultured receiving 3 separate treatments: syngeneic blood, syngeneic blood + GI254023X, or DMSO (vehicle control). Twenty-day old ferrets received: intraventricular injections of lysed syngeneic blood to induce PHH, syngeneic blood+GI254023X, or vehicle. Ventriculomegaly and white matter integrity were evaluated with anatomical MRI, diffusion tensor imaging and diffusion basis spectrum imaging. Cell cultures, media, and brain tissue and CSF were evaluated with immunohistochemistry and western blots.

In vitro blood treatment was associated with significant disruption of N-cadherin expression ( $p < 0.05$ ), reduction in the percentage of multiciliated ependymal cells, and increased astroglial activation ( $p < 0.01$ ) compared with controls. ADAM10 inhibition preserved the cytological structure of blood-treated cells, notably N-cadherin expression. Infant ferrets developed PHH within 2-weeks post-blood-induction and exhibited VZ disruption (ependymal denudation, ciliopathy, altered N-cadherin, increased ADAM10 expression, and white matter pathology); 15-day GI254023X treatment prevented ventriculomegaly and VZ disruption.

The results indicate that ADAM10 plays a prominent role in the pathogenesis of PHH and that pharmacological modulation of ADAM10 reduces VZ disruption.

**SIRT1 mediates hypoxic conditioning-induced neurovascular protection in subarachnoid hemorrhage****Deepti Diwan (15)**

Diwan D, Vellimana A, Clarke J, Yuan J, Zhang S, Zipfel G

**Neuroscience****Faculty Mentor: Gregory Zipfel**

Most therapies designed to prevent delayed cerebral ischemia (DCI) after subarachnoid hemorrhage (SAH) have failed, likely due to targeting one element of what has proven to be a multifactorial disease. To address this, we applied a therapeutic strategy with known pleiotropic effects (hypoxic conditioning) to experimental models of SAH. Our past work shows hypoxic conditioning initiated prior to SAH (HPreC) produces robust DCI protection and does so via a molecular cascade involving endothelial nitric oxide synthase (eNOS). Here, we sought to determine whether hypoxic conditioning initiated 3hr after SAH (HPostC) provides similarly robust DCI protection; and if so, whether this protection is mediated via Sirtuin 1 (SIRT1) – a NAD-dependent deacetylase with known regulatory effects on eNOS expression and activity.

Wild-type mice underwent endovascular-perforation SAH or sham surgery. First, mice were treated with HPostC (8% O<sub>2</sub> for 2h) beginning 3hr after SAH and continued daily until animal sacrifice  $\hat{\pm}$  pre-treatment with SIRT1 inhibitor (EX527; 10 mg/kg i.p. QD) or activator (resveratrol; 6 mg/kg). Second, global Sirt1<sup>-/-</sup> mice and Sirt1-Transgenic mice were subjected to SAH or sham surgery. All mice underwent assessment for multiple components of DCI including neurological outcome, middle cerebral artery vasospasm and microvessel thrombosis.

In total, HPostC markedly reduced vasospasm, microvessel thrombi, improved neurological outcome and increased SIRT1 activity after SAH. This protection was blocked in mice pre-treated with EX527, and in global Sirt1<sup>-/-</sup> mic. Moreover, resveratrol treatment as well as Sirt1-Tg mice provided robust DCI protection similar to that seen with HPostC. Indicating SIRT1-targeted therapy as promising new approach to reduce SAH-induced DCI.

**A fully implantable wireless optofluidic nerve cuff system for tether-free optogenetic and pharmacologic manipulation of peripheral nerve****Aaron Mickle (16)**

Mickle A, Zang Y, McIlvried L, Gutruf P, Golden J, Grajales-Reyes J, Rogers J, Gereau R

**Neuroscience****Faculty Mentors: Robert Gereau, Henry Lai**

Optogenetic neuromodulatory techniques offer tremendous potential to elucidate the physiological roles of peripheral sensory neurons. This line of investigation has been limited due to the challenge of delivering light to opsin-expressing cells in freely moving animals. Recent advances in micro-scale light emitting diodes ( $\mu$ LEDs) and wireless powering technologies have allowed for the development of fully-wireless, implantable light-emitting devices to activate opsins in vivo. These devices provide an unprecedented opportunity to selectively manipulate the activity of distinct neuron populations in normally behaving animals while removing experimental artifacts and confounds related to anesthesia and off-target pharmacological effects. Similar wireless devices have been effectively utilized in studies of brain and spinal cord neurons. Here, we present the design and implementation of a fully-wireless, soft nerve cuff device with integrated  $\mu$ LEDs and a microfluidic delivery system, for highly specific light and drug delivery to peripheral nerves. This suite of technologies represents an advance over previous approaches in that it allows for tether-free targeted light delivery to a specific nerve bundle along with local drug delivery. Importantly, the cuff is designed with soft bio-compliant materials and has minimal effect on overall nerve health or function even with chronic implantation. This opto-fluidic cuff will allow for future work discriminating the role of afferent populations in different aspects of nociception and sensory perception, using both optogenetics and local pharmacological approaches.

**Delineating hematogenous routes of CNS entry by encephalitic alphaviruses****Hamid Salimi (17)**

Salimi H, Cain MC, Jiang X, Klimstra WB, Hou J, Miller M, Klein RS

**Neurovirology****Faculty Mentor: Robyn Klein**

Neurotropic alphaviruses including Venezuelan and Western equine encephalitis viruses (VEEV and WEEV) infect the central nervous system (CNS) early during infection. CNS entry occurs in the absence of blood brain barrier (BBB) disruption via unknown mechanisms. Using in vitro and in vivo studies, we demonstrate that alphaviruses are able to infect brain microvascular endothelial cells (BMECs), astrocytes and pericytes; cell types that form the BBB. Additionally, utilizing transmission electron microscopy, we illustrate alphavirus transmigration across BMECs within intracellular vesicles characteristic of caveolae, which was further validated using biochemical approaches, wherein inhibitors of caveolae but not clathrin or micropinocytosis inhibited virus transcytosis in BMECs. These results were further verified using freeze fracture electron microscopy, wherein we identified VEEV particles in colocalization with Cav-1+ vesicles. Consistently, following peripheral infection, Cav-1 deficient mice exhibited reduced VEEV and WEEV titers in the cortex and cerebellum at 1 and 3 dpi, respectively, whereas viral burdens in serum and spleen were unchanged. Together, our results indicate that caveolae mediated transcytosis critically contributes to alphavirus neuroinvasion after peripheral infection.

**Activation of Kappa opioid receptor (KOR) potentiates cold sensation****Manish Kumar Madasu (18)**

Madasu MK, Sheahan TD, Foshage AM, Story GM, McCall JG, Al-Hasani R

**Pain, Opioids and Sensory Systems****Faculty Mentors: Ream Al-Hasani, Jordan G. McCall**

**Introduction:** Cold-evoked pain is commonly associated with peripheral neuropathy, and there is a limited progress in understanding the mechanism of cold pain, and here we are investigating the role of the kappa opioid receptor (KOR) in mediating cold sensation and whether the presence/activation of transient receptor potential ankyrin 1 (TRPA1) channel modulates such an effect.

**Methods:** The cold plate assay was used to measure cold responsivity, C57BL/6 wildtype (WT) mice or TRPA1 KO were treated with U50,488 (U50) (KOR agonist, 5mg/kg i.p) or norbinaltorphimine (norBNI) (KOR antagonist, 10mg/kg i.p) to determine the nocifensive response. RNA in situ hybridization (ISH) fluorescent assay was used to determine the expression of KOR in the dorsal root ganglion (DRG) and its co-localization with TRPA1. Calcium imaging was used to determine the role of TRPA1 in mediating the responses of KOR at the level of dorsal root ganglion.

**Results:** Mice injected with U50 showed significant potentiation in the number of jumps on the cold plate compared to controls at 30C. U50-induced nocifensive responses were attenuated in TRPA1 KO mice and norBNI administered mice. In ISH, the KORs colocalized with the TRPA1 in the DRG. Simultaneous application of MO, and U50 yielded a potentiated Ca<sup>2+</sup> response when compared to the MO treatment, suggesting crosstalk between receptors in the DRG.

**Conclusion:** Activation of KOR potentiated cold sensation maybe via TRPA1 channel. Colocalization of KOR and TRPA1 mediating cold responses in the DRG could potentially unravel the cold hypersensitivity associated with peripheral neuropathies.

**Dissecting molecular and cellular heterogeneity in human iPSC chondrogenesis using single-cell RNA sequencing****Chia-Lung Wu (19)**

Wu CL, Dicks A, Steward N, Guilak F

**Orthopaedic Surgery****Faculty Mentor: Farshid Guilak**

Human induced pluripotent stem cells (hiPSCs) are a promising source for cartilage regeneration. However, current chondrogenic differentiation protocols of hiPSCs often result in heterogeneous cell populations whose identities remain largely unknown. The goal of this study was to examine cellular heterogeneity and differentiation trajectories over the course of hiPSC chondrogenesis using single-cell RNA sequencing (scRNA-seq). hiPSCs were induced into paraxial mesoderm and chondrogenesis in a stepwise manner. Samples of chondrogenic pellets at various timepoints were collected for scRNA-seq. Chondrogenic induction of hiPSCs resulted in chondrocyte-like cells with high levels of SOX9, COL2A1, and ACAN by 14 days post-pellet culture, while chondroprogenitors (CP: COL2A1+ but ACAN<sup>low</sup>) were identified in d7. Differentiation trajectory revealed two major bifurcation events at the CP stage and at d3 pellet. These branched trajectories included cells enriched in either chondrogenic and neurogenic markers such as SOX2, respectively. Interestingly, this SOX2<sup>+</sup> population also expressed high levels of COL2A1 but had low levels of ACAN. It has been reported that COL2A1 is involved in floorplate specification. Indeed, GO analysis of SOX2<sup>+</sup> clusters showed that these cells were enriched with genes related to brain development. Thus, by antagonizing SOX2, the efficiency of hiPSC chondrogenesis may be further optimized. Our findings demonstrate dynamic changes of gene profiles during hiPSC chondrogenesis in vitro and provide important insights into the understanding of cartilage development as well as regeneration.

**CCR2-targeted PET imaging of inflammatory cells in the injured heart****Gyu Seong Heo (20)**

Heo GS, Kopecky B, Sultan D, Feng G, Bajpai G, Zhang X, Luehmann H, Detering L, Lavine KJ, Lavine KJ, Liu Y

**Radiology****Faculty Mentor: Yongjian Liu**

Macrophages in the heart come from differing origins. Various types of heart tissue damages trigger recruitment of CCR2+ blood monocytes which can differentiate into inflammatory cell populations including CCR2+ macrophages. Thus, CCR2+ inflammatory cells are emerging as a new target for the treatment of cardiac inflammation. There is, however, no method available to noninvasively monitor these cells in living organisms. Herein, we demonstrated detection of CCR2+ monocytes and macrophages in the heart via positron emission tomography (PET) using a gallium-68 radiolabeled CCR2 targeting peptide. We evaluated two independent mouse models of heart failure. In a diphtheria toxin (DT)-mediated cardiomyocyte ablation model, PET imaging revealed ca. 7-fold higher radiotracer uptake in the hearts of injured mice compared to the control mice. The targeting specificity was confirmed by lower myocardial radioactivity in DT-treated CCR2 KO mice. Serial PET imaging in an ischemia reperfusion injury model showed strong accumulations of radiotracer in the damaged heart tissues, which were well correlated with time-course change of CCR2+ monocyte and macrophage populations characterized by flow cytometry and histological staining. Translational potential of the PET radiotracer was further evaluated by ex vivo autoradiography in human tissues with ischemic cardiomyopathy indicating its specific binding to human CCR2 with heterogeneous radioactive signals. Translation of these promising preclinical studies into clinical trials may enhance our understanding of CCR2+ inflammatory cell recruitment into human hearts and its implications for diagnosis and treatment of cardiac inflammation.

**Quantification of neuronal loss related to cognitive impairment in mild Alzheimer disease in hippocampal subfields using quantitative gradient recalled echo (qGRE) MRI****Satya V.V.N. Kothapalli (21)**

Kothapalli SVVN, Benzinger TL, Hassenstab J, Goyal MS, Morris JC, Yablonskiy DA

**Radiology****Faculty Mentor: Yablonskiy Dmitry**

Damage of hippocampus leading to cognitive decline is one of the major hallmarks of Alzheimer disease (AD). Differentiating neuronal loss in hippocampal subfields is important as they control different biological functions. In this study, we used MRI-based qGRE technique to evaluate neuronal content (in the remaining after atrophy tissue) of hippocampal subfields in a well-characterized cohort of human subjects recruited from Knight ADRC. Our results showed pronounced left/right asymmetry in the pattern of neuronal damage in mild AD and a significantly stronger (compared to atrophy) correlation between neuronal loss in the remaining tissue of hippocampal subfields and cognitive tests.

**Quantitative imaging of response to docetaxel/carboplatin therapy in TNBC PDX models****Madhusudan Savaikar (22)**

Savaikar MA, Whitehead T, Strong L, Fettig N, Salter A, Wahl R, Li S, Shoghi K

**Radiology****Faculty Mentor: Kooresh Shoghi**

Purpose: To characterize the reproducibility and precision of FDG-PET imaging in quantifying response to docetaxel/carboplatin therapy in patient-derived tumor xenografts (PDX) models of triple negative breast cancer (TNBC).

Methods: PET images were acquired following injection of FDG in tail-vein of TNBC PDX mice at baseline and following administration of docetaxel/carboplatin IP. Tumors were identified by co-registration of PET/CT images and volumes of interest (VOI) were drawn to define the tumor. Liver VOIs were defined as a potential reference region. Different parameters such as SUVmax, SUVmean, and SUVpeak were computed for optimally defined tumor volumes using the classification criteria based on the threshold intensity and using liver uptake as a normalizing factor. The reproducibility, accuracy, and variability of select FDG image metrics were evaluated by Pearson correlation coefficient (PCC), Lin's concordance correlation coefficient (LCC), and bias correction factor (BCF). Using the Bland-Altman (BA) plot, change in FDG-PET uptake was used to assess response to therapy.

Results: The reproducibility of FDG-PET image metrics was characterized. It was observed that the tumor peak  $> 75\%$  provides consistent test-retest and reproducibility results across a range of PDX, as well as in both, solid and necrotic tumors. Variability of optimized FDG-PET image metrics is within 10-12%, significantly lower than change in FDG-PET metrics of response to therapy. The post-treatment SUV measurements in tumors that responded to therapy are outside the 95% confidence limits on BA plot thereby demonstrating the robustness of the optimal image metric in detecting the response to therapy.

Conclusion. FDG-PET imaging can detect response to docetaxel/carboplatin therapy.

# Poster Presenters & Resource Fair

<b>RESOURCE PARTNER</b>	<b>Page</b>
Washington University Postdoctoral Society (WUPS)	12
The Office of Postdoctoral Affairs (OPA)	13
Biotechnology and Life Sciences Advising Group (BALSA)	16
Becker Library	15
Campfire	16
The Career Center	17
Clinical Research Training Center (CRTC)	17
Connections	18
CNND Blood-Brain Barrier Core	18
Funding Resource	13
Future Educators	19
InPrint - A scientific editing network	19
Leadership and Entrepreneurial Acceleration Program (LEAP)	22
Office of Technology Management (OTM)	20
The Office of the Ombuds	20
The Office of Vice Chancellor for Research (OVCR)	13
PERCSS	14
ProSPER	21
Skandalaris Center	22
The Teaching Center	23
University College at Washington University	24
Wellness Connection	24
MyWay to Health	25
The Young Scientist Program	25

## Poster Presenters & Resource Fair

<b>PRESENTER (POSTER #)</b>	<b>Page</b>
Natalie Kelly (1)	27
Jin Lu (2)	28
Habiba Ibrahim (3)	29
Alexandre Teixeira Vessoni (4)	30
Shan Li (5)	31
Michael Munroe (6)	32
Wilson Fok (7)	33
Ho-Chang Jeong (8)	34
Che-Pei Kung (9)	35
Xiaoyu Zhuo (10)	36
Carissa Dege (11)	37
Stephen Ferris (12)	38
Francesca Cignarella (13)	39
Leandro Castaneyra Ruiz (14)	40
Deepti Diwan (15)	41
Aaron Mickle (16)	42
Hamid Salimi (17)	43
Manish Kumar Madasu (18)	44
Chia-Lung Wu (19)	45
Gyu Seong Heo (20)	46
Satya V.V.N. Kothapalli (21)	47
Madhusudan Savaikar (22)	48

# NOTES

# Thank You!

Provost Holden Thorp

Vice Chancellor for Research

Dr. Jennifer Lodge



## Faculty Poster Judges

### Symposium Committee

Dr. Carissa Dege · Dr. Daniel Ferguson · Dr. Reza Ghasemi

Dr. Natalia Harasymowicz · Dr. Rachel Hendrix ·

Dr. Brigida Rusconi · Dr. Mohini Sengupta ·

Dr. Elias Tannous

### Washington University Postdoctoral Society

#### 2018/2019 Executive Council Officers

President: Francisco Victorino, ramirezvictorino@wustl.edu

Vice President: Carissa Dege, carissadege@wustl.edu

Secretary: Mohini Sengupta, mohini.sengupta@wustl.edu

Treasurer: Natalia Harasymowicz, harasymowiczn@wustl.edu

Outreach Director: Vipul Sharma, v.sharma@wustl.edu

Danforth Representative: Sara Sanders, sanders.sara@wustl.edu

President Emeritus: Francesca Cignarella, cignarella.f@wustl.edu

### Office of Postdoctoral Affairs

Dr. Erin Heckler · Dr. John Russell

Paula Williams

**If you do not need your name badge or program,  
please return it to the registration desk for recycling.**

**Thank you!**