

The NICHD Connection

March 2016

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Honoring the Work of Dr. Jennifer Lippincott-Schwartz

Please join *The NICHD Connection* in wishing Dr. Lippincott-Schwartz much success as she expands our NICHD network and transitions her research to the Janelia Research Campus in Ashburn, Virginia. Dr. Lippincott-Schwartz's work has redefined how we look at protein dynamics in the cell. Using cutting-edge, superresolution imaging technology to visualize cellular activity at the nano-scale, her lab has recorded the protein-protein interactions and intricate machinery underlying the complex behaviors of cells.



In honor of her years and extensive work within the NICHD, we asked Dr. Lippincott-Schwartz to share a few of her thoughts on creativity, mentorship, cell biology, scientific rigor, and of course, the parts of NICHD she will miss the most:

What inspired your work on cell biology and cell imaging at the NICHD?

When I was a graduate student at Johns Hopkins University, I viewed cells stained with fluorescent dyes under a microscope for the first time. It was mesmerizing, raising a myriad of questions regarding how intracellular organelles distribute, remain distinct from each other, and cross communicate. I knew then that studying cell organization and dynamics would become my life-long passion. So, upon arriving at NICHD as a postdoc with Richard Klausner, I focused on organelle dynamics, first using conventional imaging tools and later developing new imaging approaches with close colleagues.

The NICHD and Janelia are both powerhouses of creativity in cutting-edge science. In what way do you think creativity has advanced your own lab's research?

Creativity has played a large role in my lab's research, which I've tried to foster, and I enjoy debates and hearing convergent and divergent views. I am open to new ideas, allowing my fellows to try new approaches. Conceptual blending of ideas is common in my group due to our working on diverse systems—from

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Letter from the Editor

On behalf of the NICHD fellows, I wish a fond farewell to Dr. Jennifer Lippincott-Schwartz, as she retires from the NICHD and transitions her work to the Janelia Research Campus (also known as Janelia Farms). Her work is nothing short of inspirational. She pushes the boundaries of live cell imaging, offering a never-before-seen peek into the inner workings of the cell. For a peek into the mind of the scientist, Dr. Lippincott-Schwartz has **graciously offered her thoughts** on several topics important to the fellow population, including creativity, mentorship, and scientific rigor.

Scientific rigor. These two words are something I've always assumed to be "assumed" in science. The idea that experiments should be controlled properly, that all variables should be taken into consideration, and that biological and chemical reagents should be validated seems like a no-brainer. But if you're going to apply for a grant, don't make that assumption! **New NIH guidelines** for grant applications require that applicants address these aspects of scientific rigor directly. To learn more about the new grant guidelines, see our handy **infographic on page 8**.

We also have the latest **NICHD Exchange quarterly meeting recap**, with up-to-date scientific evidence regarding perivable births, several **new fellow introductions**, a fellow and her dog in the **"Life Outside Lab" column**, and many—*many*—**March announcements** and **events**, including the first "Responsible Conduct of Research" training for new postdocs at the end of the month.

Your Editor in Chief,
Shana R. Spindler, PhD

Please send questions and comments to **Shana.Spindler@gmail.com**. We appreciate the feedback!

Honoring the Work of Dr. Jennifer Lippincott-Schwartz (continued from page 1)

miRNA to secretory trafficking to mitochondrial dynamics. My basic philosophy is that it is only by integrating many experimental approaches (e.g., in vitro reconstitution, in situ imaging, and mathematical modeling) that the different levels of cell organization—from molecules, through functional molecular assemblies, to cells—can be integrated into a more complete picture of the cell.

During your years with the NICHD, you mentored many fellows who continued into successful scientific careers—even hosting a researcher who subsequently won the Nobel Prize! What is your mentorship philosophy?

My mentorship philosophy is simple—let fellows develop their own projects rather than dictating a specific line of work. It is only when the fellow feels that he or she “owns” the project that real dedication, determination, and creativity emerge. In developing projects, I think it is important to build on the fellow’s strengths and interests, rather than focusing exclusively on my own specific interests at the time.

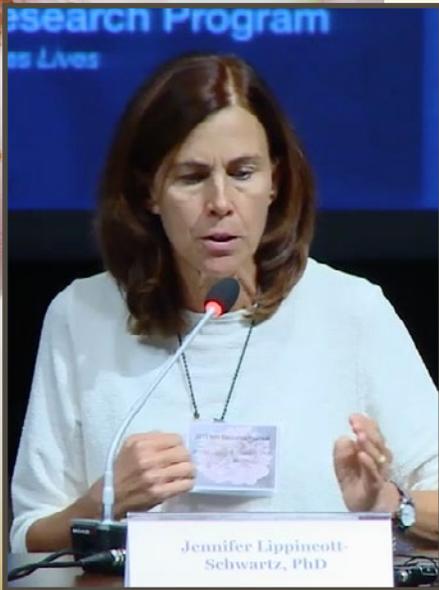
Where do you think your work at the NICHD has had the biggest impact?

My work at NICHD has had the greatest impact in the area of imaging technology. Using GFP chimeras, we were the first to use fluorescence recovery after photobleaching to measure diffusion coefficients in various organelles, including ER, nuclear envelope, cytoplasm and Golgi, demonstrating that proteins in these various compartments have distinct diffusion coefficients and mobile fractions that can be impacted by different cellular conditions. We also developed a photoactivatable version of GFP that “switches-on” in response to UV light. This allowed us to track protein populations throughout the cell. Using the photoactivatable GFPs, we then helped develop the superresolution imaging technique called photoactivated localization microscopy (PALM). This permitted single molecules to be visualized, tracked, and used for imaging cellular structures at a resolution below the diffraction limit of light. My lab has used these and other new imaging tools to address novel questions about cell organization and organelle dynamics.

Where do you see the future of cell imaging?

I see cell imaging continuing to grow into new areas. About 60 years ago, cell biology was a nascent field, whose goal was to define and characterize the basic working parts of cells (including membrane-bound compartments, microtubules, and actin). Having defined the working parts of the cell, cell biology is now addressing the mechanisms underlying the

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Honoring the Work of Dr. Jennifer Lippincott-Schwartz (continued from page 3)

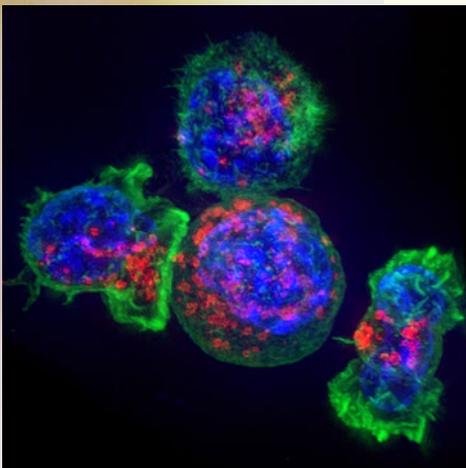
functions of these parts and cell imaging is a key tool in this effort. Remarkable advances in cell imaging that improve both the resolution and speed of imaging are now enabling researchers to study the complex behavior of cells and single molecules in unprecedented detail, paving the way for deeper understanding of the cell's role in development, health, and disease.

What are your thoughts on the importance of scientific rigor and transparency? In your opinion, who suffers most when scientific rigor softens, and who is responsible for ensuring rigor and transparency in research?

I believe scientific rigor and transparency are vital for science to flourish. Everyone suffers when scientific rigor lapses. Researchers suffer because they no longer have confidence in prior work, whose conclusions are what drive new hypotheses and testing. The public suffers because the road from basic research findings to real-world benefits becomes vague and often impassable. Transparency is vital for scientists to replicate and build on each other's work. Real progress in cell biology relies on overlapping and reinforcing data from many perspectives, and it is crucial that this data provide a firm and accessible foundation for all the researchers in the field.

What will you miss the most about your time at the NICHD?

I will miss many things at NICHD, but mostly the colleagues I will be leaving behind. Juan Bonifacino, Gigi Storz, Tracey Rouault, and many others in my Branch have taught me many lessons on how to be a good researcher as well as a respected citizen scientist. I admire their organizational skills, appreciation of excellent science, and raw talent as experimentalists. I am grateful for their support, as well as that of the NICHD leadership, in allowing me to freely explore novel directions of research.



Immunofluorescence image of cytotoxic T cell (left) engaging a cancer cell (round cell, center). Labels: actin (green), lysosomes (red), nuclei (blue)

Image by Alex Ritter, PhD, Lippincott-Schwartz Lab

NICHD Exchange Recap: “Periviable Birth: Causes, Consequences, Counseling, and Management”

By Si Young Lee, PhD

Approximately 131 million births occur each year worldwide, and about 0.5 percent of all births occur before the third trimester of pregnancy. The term periviable birth is used to describe a birth occurring between the start of the 20th week of gestation and the end of the 25th week. Unfortunately, these very early deliveries are a major risk factor for neonatal and infant death. As the survival rate after periviable birth has increased steadily, proper family counseling and adequate management of women with impending periviable birth must be considered.

On February 12, 2016, the quarterly NICHD Exchange Meeting hosted three invited experts in this field to share their opinions and to provide deep insight into the latest issues regarding periviable babies.

Dr. Roberto Romero, chief of the Perinatology Research Branch at Wayne State University and head of the NICHD Program for Perinatal Research and Obstetrics, opened the NICHD Exchange Meeting with his talk “Causes: Intrauterine infection/inflammation as a cause of delivery at periviable gestations.” He started his presentation by explaining why some babies are born so early.

Fundamentally, periviable birth can be the result of spontaneous preterm birth or indicated preterm delivery. In contrast to spontaneous preterm birth, which naturally occurs as a result of intact or ruptured fetal membranes, indicated preterm delivery occurs when labor is initiated by medical

intervention due to dangerous pregnancy complications.

Even though the two conditions are distinguishable, recent observations suggest that there may be overlap between these conditions. For example, a patient with an indicated preterm birth may also be at risk for spontaneous preterm birth.

Dr. Romero’s work in premature labor has focused on the role of infection and inflammation in spontaneous preterm labor and delivery. At least 40 percent of preterm births involve an intrauterine infection. Recent evidence indicates that infection and the inflammation generated by infection are a major cause of a substantial proportion of preterm births. For example, extrauterine maternal infections (e.g., pyelonephritis and pneumonia) have been linked to premature delivery. Dr. Romero concluded his talk by presenting requirements needed to develop and implement tools for understanding the relationship between the intrauterine environment and periviable birth.

The second speaker was Dr. Rose Higgins, program scientist for the NICHD Neonatal Research Network. Dr. Higgins began her talk by describing the history of periviability. In the 1950’s, infants with birth weights less than one kilogram were still classified as stillborn. The one kilogram limit persisted until the widespread use of mechanical ventilation in the late 1960’s. Then, the



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NICHD Exchange Recap (continued from page 5)

wide use of antenatal steroids in the early 1990's increased survival rate after periviable birth. In the last two decades, technological advances in perinatal and neonatal care have improved the survival rate of an infant at 27 weeks gestation, and weighing only two pounds (900 grams), to 90 percent.

One of the most practical pieces of information in Dr. Higgins's talk was her introduction to the NICHD Neonatal Research Network (NRN): Extremely Preterm Birth Outcome Data. The NRN was established in 1986 to improve the care and outcomes of neonates, especially for extremely low birth weight infants in neonatal intensive care units (NICUs). On the NICHD NRN website, you can find the predicted outcomes from a periviable birth by entering the parameters of interest. For example, you can learn about survival and neurodevelopmental risk percentages in periviable births with specific gestations, weights, and interventions used. You can find information about the NICHD Neonatal Research Network (NRN) by visiting the following link (https://www.nichd.nih.gov/about/org/der/branches/ppb/programs/epbo/Pages/epbo_case.aspx).

The last speaker, Dr. Tonse Raju, chief of the NICHD Pregnancy and Perinatology Branch, emphasized the importance of counseling women who may deliver extremely premature infants. Counseling is an important, complex, and sensitive issue. Mutual trust and respect have always played a central role in family

counseling. Importantly, evidence-based counseling approaches should be followed. Unfortunately, not all doctors are trained in how to manage and counsel families facing the birth of a periviable baby.

Dr. Raju explained how doctors should counsel parents properly. For example, when counseling parents, it is recommended to present the data regarding the rate of survival and long-term disabilities separately, because the parents' perspectives and the importance they give to these may be different. He also mentioned that some phrases, such as “doing everything” or “there is nothing we can do,” must be avoided when counseling a family.

Dr. Tonse Raju closed his talk by listing of some the famous people who were born as periviable babies, including Johannes Kepler, Isaac Newton, Stevie Wonder, and Charles Darwin.

When delivery is anticipated near the limit of viability, families and health care teams must prepare the care for periviable birth. This NICHD Exchange meeting provided considerable knowledge about the efficient management of periviable births based in scientific evidence. A clear understanding about what causes periviable birth is necessary both for families and for health care teams. Complex, ethically challenging decisions also need to be made quickly by families and health care teams, based on individual circumstances.

Rigor Now Required in NIH Grant Applications

By Yvette Pittman, PhD

In line with one of NIH's goals of promoting scientific integrity at the highest level, the expectations and formal instructions for grant applications have recently expanded. Starting in January 2016, investigators are now asked to address how they intend to enhance reproducibility of their research findings. Several NIH notices have been published to highlight what applicants need to describe in detail. More specifically, four key areas related to scientific rigor and transparency must be included in your application:

1. The scientific premise forming the basis of the proposed research
2. Rigorous experimental design for valid, robust, and unbiased results
3. Consideration of relevant biological variables
4. Authentication of key biological and/or chemical resources.

For a breakdown of the new grant application requirements, check out the “New Grant Guidelines” infographic by Nichole Swan and Shana Spindler. They have combed the NIH notifications and incorporated the important information for fellows into a simple graphic. These updates apply to research grants, fellowships, and career development awards, and the new forms (version D) must be used for applications due on or after May 25, 2016.

Over the next two months, we will explore each new grant requirement and provide insight into how you can incorporate the additional information into your future NIH grant applications. Remember this is all for a good cause—the advancement of biomedical research and to ensure NIH is funding the best science!

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NEW GRANT GUIDELINES

what you need to know

WHY UPDATE THE GUIDELINES?

The updates focus on four areas deemed important for enhancing rigor and transparency:

1

PREMISE

The scientific premise forming the basis of the proposed research

2

DESIGN

Rigorous experimental design for robust and unbiased results

3

VARIABLES

Consideration of relevant biological variables

4

AUTHENTICATION

Authentication of key biological and/or chemical resources

Send inquiries to
reproducibility@nih.gov

See also NIH Notice NOT-OD-16-011

<http://grants.nih.gov/grants/guide/notice-files/NOT-OD-16-011.html>

WHAT ARE THE UPDATES?

1 UPDATES TO RESEARCH STRATEGY GUIDANCE

The research strategy is where you discuss the significance, innovation, and approach of your research plan. Let's look at an R01, for example:



Introduction to resubmission and revision applications



Specific aims



Research strategy



Commercialization plan



Biographical sketch

The new **research strategy** guidelines require that you:

- State the strengths and weakness of published research or preliminary data crucial to the support of your application
- Describe how your experimental design and methods will achieve robust and unbiased results
- Explain how biological variables, such as sex, are factored into research design and provide justification if only one sex is used

2 NEW ATTACHMENT FOR AUTHENTICATION OF KEY BIOLOGICAL AND/OR CHEMICAL RESOURCES

From now on, you must briefly describe methods to ensure the identity and validity of key biological and/or chemical resources used in the proposed studies.

These include, but are not limited to:



Standard laboratory reagents that are not expected to vary do not need to be included in the plan. Examples are buffers and other common biologicals or chemicals.

- DO NOT** put experimental methods or preliminary data in this section
- DO** focus on authentication and validation of key resources

3 NEW REVIEWER GUIDELINES

Here are the additional criteria the reviewers will be asked to use:

- ➔ Is there a **strong scientific premise** for the project?
- ➔ Have the investigators presented adequate plans to address **relevant biological variables**, such as sex, for studies in vertebrate animals or human subjects?
- ➔ Have the investigators presented strategies to ensure a **robust and unbiased approach**, as appropriate for the work proposed?



Reviewers will also be asked to comment on that new attachment (see Update 2)!

Meet Our New Fellows

Please join *The NICHD Connection* in welcoming the following fellows to the NICHD family:



MARINA VENERO GALANTERNIK

Postdoctoral fellow

Hometown: Lima, Peru but just moved from Kansas City, Missouri

PhD institution: The University of Utah

NICHD mentor: Dr. Brant Weinstein

Area of research: I study the molecular factors and signals that regulate Zebrafish vascular development.



LAURA GORRELL

Graduate student

Hometown: Cockeysville, MD

College: Clemson University, B.S. degrees in Genetics and Bioengineering

PhD institution: Current Graduate Partnerships Program student with NIH and Rensselaer Polytechnic Institute in Biomedical Engineering

NICHD mentor: Dr. Sergey Leikin

Area of research: Use genome editing tools to look at collagen trafficking and secretion in wild type and osteogenesis imperfecta (OI) models.

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Meet Our New Fellows

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RAGHUVVEER KAVARTHAPU

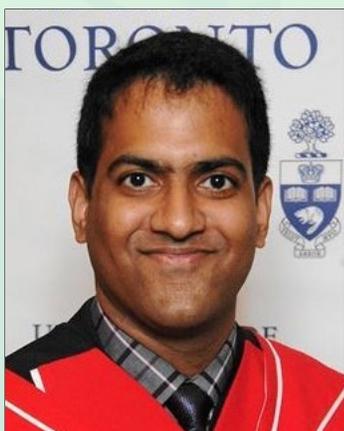
Postdoctoral fellow

Hometown: Hyderabad, India

PhD institution: University of Hyderabad, PhD in Animal Sciences

NICHD mentor: Dr. Maria L Dufau

Area of research: Endocrine-related breast cancer focusing on role of Prolactin hormone and transcriptional regulation of its receptor in breast cancer progression.



VIVEK MAHADEVAN

Postdoctoral fellow

Hometown: Chennai, India

PhD institution: University of Toronto

NICHD mentor: Dr. Christopher McBain

Area of research: I study the molecular rules underlying the circuit integration of distinct hippocampal interneurons, during animal behavior.

If you are new to the NICHD and would like to be introduced in this newsletter, please send your name, home country or state, College/PhD/MD institution, NICHD mentor, and area of research to our Editor, Shana Spindler, at Shana.Spindler@gmail.com.



Life Outside Lab: Snow Day!

Dr. Marina Venero Galanternik (Weinstein lab)
and Punch

“The picture was taken on the morning of the day after the ‘Snowmageddon’ this last February. My dog ‘Punch’ (he is a 7-year-old pug) and I just went for a walk on the snowy roads as the day was so pretty and sunny.”

March Announcements

TWELFTH ANNUAL RETREAT REGISTRATION NOW OPEN!

NICHD fellows are welcome to register for the Twelfth Annual Meeting for Postdoctoral, Clinical, and Visiting Fellows and Graduate Students at <http://retreat.nichd.nih.gov/registration.html>. Several great speakers will join us, including 2015 Nobel Prize winner Dr. Eric Betzig and the creator of PhD Comics, Dr. Jorge Cham! Speaker profiles, meeting agenda, and poster information can be found on the retreat website at <http://retreat.nichd.nih.gov>. If you are interested in covering any part of the meeting for *The NICHD Connection*, please contact our editor Shana Spindler at Shana.Spindler@gmail.com. See you there!

GET THOSE FARE ABSTRACTS IN! DUE MARCH 18

Fellows Award for Research Excellence (FARE) abstracts are due by 5 p.m. on March 18. FARE is a competition to recognize the noteworthy research completed by intramural fellows. Each winner of the FARE competition receives a \$1000 travel stipend to present his or her work at an upcoming scientific meeting, the chance to display a poster at the FARE awards presentation ceremony, and the opportunity to serve as a judge for the following year's FARE competition.

Submit your abstract **online** from February 18 through March 18, 2016. Abstracts will be judged on the basis of scientific merit, originality, experimental design, and overall quality/presentation. Don't miss this opportunity: 25 percent of applicants will receive a travel award! For more information, please visit the FELCOM (Fellows Committee) FARE [website](#).



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March Announcements

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THREE-WEEK GRANT WRITING WORKSHOP—ONLY ONE SLOT LEFT

Are you planning to apply for the K99/R00 Pathway to Independence Award in 2016? The upcoming deadlines are **June 12** and **October 12**, and we have an NIH grant-writing course that's just for you!

In collaboration with three other institutes, we are offering an NIH Grant Writing Course for fellows in May 2016. Led by Dr. Paula Gregory, this three-week course will help students prepare a successful NIH grant proposal, with special emphasis on the career transition "K" grant series. With high reviews from past participants, NHGRI has offered this course for several years, and as a result, many of their fellows have been awarded NIH grants!

In a small-group setting, classes will combine didactic presentations with group discussions, assignments, and proposal writing. A distance learning component will allow students to submit their writing between the in-person meetings, and they will receive edits and feedback.

Please contact Yvette Pittman at pittmanyv@mail.nih.gov, if you are interested.

Below is the schedule for this on-campus workshop:

May 4 (1-4 pm) and May 5 (9-12noon)

May 12 (1-4 pm) and May 13 (9-12noon)

May 18 (1-4 pm) and May 19 (9-12noon)

DO YOU HAVE AN OUTSTANDING MENTOR?

The time has come for you to nominate a fellow or PI for the NICHD Division of Intramural Research 2016 Mentor of the Year awards. This is a wonderful opportunity to recognize an individual whose mentoring has made a difference in your life here at the NIH.

Below is the link to obtain information about the NICHD's two annual Mentor of the Year Awards, one for a fellow and one for an investigator. Please submit your nomination form and 500-word (maximum) narrative electronically to Yvette Pittman (Yvette.Pittman@nih.gov). The submission deadline is **Monday, May 2**. Dr. Pittman is happy to answer any questions you may have about the nomination instructions and selection process.

<https://science.nichd.nih.gov/confluence/display/fellows/Mentor+of+the+Year+Awards+2016>

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March Announcements

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MARK YOUR CALENDARS FOR THE “WRITE WINNING GRANT PROPOSALS” ANNUAL WORKSHOP

Thursday, July 14, 2016
9:00 a.m. – 1:30 p.m.

This workshop will address both practical and conceptual aspects that are important to the proposal writing process. Attendees will receive the “Grant Writer’s Workbook”—an invaluable, up-to-date reference tool for those who intend to write NIH grant proposals. It includes topics from how to prepare a compelling Specific Aims page to insights into which review criteria are most important.

For more information, please contact Yvette Pittman (pittmanyv@mail.nih.gov).

NICHD FELLOWS TO TALK AT NIH SECOND ANNUAL π DAY

In honor of Pi Day on March 14 (3.14), NIH scientists and staff will gather at the Clinical Center (building 10) to “celebrate the intersection between the mathematical and biomedical sciences.” Events include tours of the data center, PiCo lightning talks, posters, seminars, workshops, and more!

Two NICHD fellows, Dr. Alejandro Alvarez-Prats and Dr. Parmit Kumar Singh, will each present a PiCo lightning talk. They will have 3 slides to share 1 idea in 4 minutes. The PiCo lightning talk session will begin at 10a.m. in Lipsett Auditorium. For a full schedule of events, please visit <https://datascience.nih.gov/PiDay2016>.

March Events

FRIDAY, MARCH 11, 10 – 11:30 AM

NICHD Postdoc and Graduate Student Orientation
(For new postdocs and graduate students)
Building 31, room 2A48

Led by the NICHD Office of Education, the orientation will highlight both NICHD and NIH-wide intramural resources for postdoc fellows and graduate students. Topics will include:

- » Career-planning tools
- » Grant opportunities for fellows
- » Ideas for presenting your science locally
- » Core facilities available to you

We will share information about key programs to support your professional development, complementing the mentored experience you will have at the bench. Don't miss this opportunity to meet fellows from other research areas and different buildings on campus. To register, please contact Yvette Pittman (pittmanyv@mail.nih.gov).

MONDAY, MARCH 14, 1:30 – 3 PM

NICHD Pi Day Pie Bake-Off
Building 6100/Room 5A01
1:30 p.m. – Pie entries due (please drop off pies at 6100/5A01)
1:59-3:00 p.m. – Pie judging and pie eating

Pi Day, the annual celebration commemorating the mathematical constant π (pi), is just around the corner. NICHD will mark this significant occasion with a pie bake-off, open to all. Please plan to join us. You don't have to bring a pie to participate—we need eaters, too!

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March Events

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THURSDAY, MARCH 24, 12 – 1 PM

Getting Published: Strategies and Approaches

Led by Dr. Chris McBain, NICHD, Senior Investigator and Editor

Up to 50 participants

For the workshop, topics include:

- » Writing process: making the introduction and discussion stand out while writing compelling titles and abstracts
- » Figures: improving graphics, titles, and legends
- » Submission and editorial processes from a reviewer's perspective
- » Timeframe for publishing, from submission to acceptance
- » Responses to critiques and requests for revisions

To register, please contact Yvette Pittman (pittmanyv@mail.nih.gov).

WEDNESDAY, MARCH 30, 2 – 3:30 PM

Responsible Conduct of Research Training for NEW Postdocs

Discussion of Ethical Research Practices: Making Good Choices

This **mandatory training** is for all postdocs who started after October 1, 2015.

An interactive session that promotes both self-directed and team-based learning required for all new postdoctoral fellows, through the Office of Education. Led by Dr. Gisela Storz, this session will include case studies and reading assignments related to research integrity, and discussions on ways to reduce risk factors.

The session will begin with a brief discussion on pre-assigned reading materials, followed by small-group, team-based learning exercises involving complex cases that promote discussions of either fabrication, falsification, plagiarism, mentoring expectations, and/or trainee responsibilities. The workshop will include good practices of data management and presentation, including lab notebook management—both physical and electronic. For additional details and planned reading assignments, click [here](#) or contact Yvette Pittman (pittmanyv@mail.nih.gov).