Top Five Tips for Getting Grants
By Julian Lui, PhD

ACTIVELY LOOK FOR GRANT OPPORTUNITIES—THERE ARE MORE THAN YOU THOUGHT

The relative lack of (or perceived lack of) eligible funding opportunities can be a major mental obstacle for NICHD fellows. Intramural investigators and trainees are not eligible to apply for most research grants (both R and K programs) funded by the extramural NIH. Many NIH postdoctoral fellows have the impression that they are limited to the Pathway to Independence Award (K99/R00). I think it would be helpful for NICHD fellows to realize that there are many other funding opportunities that may advance their careers.

For example, fellows can look for awards and fellowships provided by professional societies and foundations from their own field. Since my research area is in childhood growth and cartilage development, I have applied for awards provided by the Endocrine Society and American Society of Bone and Mineral Research (ASBMR).

Fellows should feel encouraged to look into different opportunities available in their own discipline. Although the financial support given by these awards is usually less than a K or R grant, they are perhaps less competitive and will provide evidence of your ability to get grants if you win them, which will significantly improve your chance in winning the next one.

FIND MOTIVATION AND BE ENTHUSIASTIC

As said in a sentiment widely attributed to the famous American poet Maya Angelou, “You can only become truly accomplished at something you love.” And while I believe a lot of our fellows love science and doing research, I am not so sure about writing grants. It’s not easy to get motivated to fill out grant applications, especially if you think your job at the NIH is to make scientific discoveries—not ask for money. My experience is that most fellows get discouraged and decide to focus on their bench work rather than thinking about grants, even though getting a grant may be more beneficial to their research career than getting another publication.

Try to look at the big picture. If you are passionate about science and aspire to have your own lab doing research on what you believe truly matters, then writing and submitting grant proposals represents just a small, but important, step toward that ultimate goal. I also think that your passion and enthusiasm (continued on page 3)
Letter from the Editor

As I write my letter this month, I have the PBS special “Cancer: The Emperor of All Maladies” playing in the background. NIH scientists and their projects are peppered throughout the documentary, and decades of research unfold on the screen. I was originally going to focus my letter on the grant-writing theme of this issue, but I can’t help but take this moment to reflect on how biomedical research holds a special place in our society. The most striking example of this is not in the documentary’s compilation of cancer studies, but in the personal stories of those whose lives are affected by the research. While each story’s trajectory is unique, the hope that science brings is unmistakable.

Certain chemical and physical principles are shared among all life, giving the most basic research the potential to touch those suffering from a variety of disorders and diseases. The NICHD stands at a unique intersection between basic science and clinical application. A great example of this cross-section is sure to be seen in the upcoming NICHD Human Placenta Project Meeting. And as for the focus of this month’s newsletter, perhaps by keeping in mind the vital role of biomedical research, grant writing will become a little less tedious and a little more inspirational.

Your Editor in Chief,
Shana R. Spindler, PhD

Please send comments, questions, and ideas to Shana.Spindler@gmail.com.
Top Five Tips for Getting Grants
(continued from page 1)

for your research area will come through in your proposal. If you are not convinced that your research is important and deserves funding, nobody will be.

INCORPORATE PLANNING AND TIME MANAGEMENT
Think ahead and start early. Every so often, I find a funding opportunity only to realize the deadline for submission has passed, or I am no longer eligible because I have been a postdoc for too long. For example, some grants and awards only allow fellows within three years of obtaining their terminal degree (such as a PhD) to apply. If you have been busy doing experiments in your first few years of postdoc and only focused on results and publications, by the time you show interest in writing grants, you are already ineligible for many of them.

Another struggle I usually hear is not having enough time to put together an application. We tend to feel the urgency around our everyday tasks more than something further down the road. Who wants to sit down and write for an hour if the deadline is a month from now and you are eager to get some experiments done to discuss results in lab meeting? But the likelihood is that if you try to cram together a proposal in the last few days, it’s not going to be very good.

My advice is to establish a schedule for how to get the application finished. Set aside some time every day to gather thoughts and write something. Let it be in the morning, before any of your bench work, if that’s when your mind is clear and most productive in writing. Never finish your first draft on the deadline date or the day before to allow ample time for corrections and comments by your colleagues. In addition, the final version of your proposal will probably need at least a week for review and approval from the Scientific Director’s office before actual submission, so plan ahead!

USE NIH RESOURCES TO YOUR BENEFIT
The NICHD Office of Education and the NIH Office of Intramural Training and Education (OITE) frequently provide workshops for fellows to improve their grant writing skills. Don’t pass up these opportunities if you have not already attended at least one. Grant writing is not just any other scientific writing. It requires certain formats and a specific set of writing skills. One of the easiest ways to acquire these skills is to go to grant writing workshops.

Another important training opportunity is to attend mock study sections as a fellow observer. Occasionally, these are held to provide an example of the dynamics of the grant review process from a unique

(continued on page 4)
Top Five Tips for Getting Grants  
(continued from page 3)

perspective and gain insights into the logic and priorities of reviewers.

In addition to attending workshops and study sections, fellows should take advantage of the rich offering of scientific lectures and seminars on the NIH campus. The diversity of lectures will broaden horizons and help generate novel and inspirational ideas.

SHARE WITH PEERS AND MENTORS

When you are finished preparing a manuscript, you usually send it to the co-authors for comments and suggestions, right? The same practice is important for your grant proposal. Your peers and mentor will likely offer useful suggestions to improve your proposal before submission.

If you are in a lab with a tradition to look for outside funding, in my opinion, you and your colleagues are more likely to go to workshops and learn together, help each other out in coming up with ideas, look for funding opportunities, give feedback on proposals, and celebrate each other’s successes. If no one in your lab has applied for outside funding, you have a great opportunity to start the tradition.

GRANT WRITING ARTICLES FROM THE NICHD CONNECTION

Over the past four years, NICHD fellows have contributed many outstanding workshop recaps to The NICHD Connection. We’ve compiled our grant-focused recaps to give you a head start on your proposal writing endeavors:

“How to Make Your Grant Proposal Sellable”  
By Payal Ray, PhD  
August 2014

“NICHD Mock Study Section/Grant Review Recap”  
By Stephanie Cologna, PhD  
November 2013

“Preparing for Your K99/R00 Grant Application Submission”  
By Yvette Pittman, PhD  
October 2013

“Write Winning NIH Grant Proposals”  
By Eva Szarek, PhD, MPM  
August 2013

“Fellows Review the New eRA Commons LikeThis Search Tool”  
By Drs. Kevin Francis, Justyna McIntyre, and Yvette Pittman  
October 2012

“Write Winning NIH Grant Proposals Led by Dr. David C. Morrison”  
By Drs. Stephanie Cologna and Celine Cluzeau  
July 2012

“Navigating the K99 Pathway to Independence”  
By Shana R. Spindler, PhD  
January 2012

“Writing Your Grant Application Workshop Recap”  
By Valerie Virta, PhD  
August 2011

“Recap for the FranklinCovey Writing Advantage Workshop”  
By Shana R. Spindler, PhD  
June 2011
Grant Opportunities for Intramural Fellows
By the NICHD Office of Education

Having trouble finding grant opportunities as an intramural fellow? Explore the list below to jumpstart your grant search. Many discipline-specific societies provide grants too. Remember to browse society pages in your field in addition to the funding opportunities here.

A few important criteria to keep in mind during your grant search include citizenship requirements, intramural fellow eligibility, intellectual property (IP) clauses (your work at NIH is the property of the government and IP cannot be shared without authorization), duration of funding, degree requirements, and time since degree limitations.

NIH-HOSTED GRANTS
The K99/R00 grant provides five years of divided support (up to two years of mentored K99 support and up to three years of independent R00 support) to postdoctoral fellows who have no more than four years of postdoctoral experience.

The PRAT program is a three-year fellowship for citizens or permanent residents of the United States who have, or will have, a doctoral degree and no more than five years of postdoctoral experience.

The Office of Dietary Supplements Research Scholars Program is a one-year scholarship for early career scientists with at least one year of postdoctoral experience, for fellows who study the role of dietary supplements in health promotion and disease prevention.

Intramural AIDS Research Fellowship (IARF): https://www.training.nih.gov/aids_fellowship_home
IARF awards provide one to two years of full stipend support, health insurance, and limited tuition support for NIH Graduate Partnership Program students and intramural NIH postdoctoral trainees whose work directly relates to HIV and AIDS, regardless of citizenship.

NON-NIH GRANTS
The Helen Hay Whitney Foundation: http://www.hhwf.org/HTMLSrc/ResearchFellowships.html
The Helen Hay Whitney Foundation fellowship is a three-year program that supports early postdoctoral trainees (no more than one year of postdoctoral experience) and who have received a PhD degree or MD degree no more than two years or three years, respectively, before the application deadline. Applicants in all areas of basic biomedical sciences are eligible, and U.S. citizenship is not required.

Brain and Behavior Research Foundation: https://bbrfoundation.org/yi
The NARSAD Young Investigator Grant, hosted by the Brain and Behavior Research

(continued on page 6)
Grant Opportunities for Intramural Fellows
(continued from page 5)

Foundation, provides two-year awards to extend research fellowship training, or to begin independent research, of fellows who study serious brain and behavior disorders. U.S. citizenship is not required to apply for the grant.

Jacobs Foundation Research Fellowships:
http://jacobsfoundation.org/what-we-do/research-funding/jacobs-research-fellowship-program
The Jacobs Foundation Research Fellowship is an international, three-year award for early and mid-career researchers focusing on child and youth development. For this grant, a preliminary application package, including a letter from a department head or senior researcher, the candidate’s CV, and a two-page research statement, is required. From preliminary applications, the foundation will ask a portion of candidates to submit a full application.

American Cancer Society:
The American Cancer Society provides three years of fellowship support for postdoctoral researchers in cancer research. Awards include a progressive stipend, a fellowship allowance, and travel money for a scientific meeting in the final year of fellowship.

Life Science Research Foundation:
http://www.lsrf.org/apply
The Life Science Research Foundation offers three-year fellowships to individuals in the life sciences who have had a PhD or MD for no more than five years at the time of application.

Damon Runyon Cancer Research Foundation:
http://www.damonrunyon.org/for_scientists/more/fellowship_award_overview
The Damon Runyon Cancer Research Foundation provides up to four years of fellowship support to researchers who have an MD, PhD, MD/PhD, DDS, or DVM and who have not already accepted a postdoctoral research fellowship award. Applicants must apply under the mentorship of a tenured or tenure-track scientist.

(continued on page 7)
Grant Opportunities for Intramural Fellows
(continued from page 6)

Jane Coffin Childs Memorial Fund for Medical Research:
http://www.jccfund.org/fellowship-information
The Jane Coffin Childs Memorial Fund for Medical Research provides three years
of research support for postdoctoral fellows who have less than one year of
postdoctoral experience or medical doctors who received an MD less than three
years from the time of application deadline. U.S. citizenship is not required.

Bright Focus Foundation:
http://www.brightfocus.org/research/apply/main.html
The Alzheimer’s Disease Research portion of the Bright Focus Foundation offers
a two-year postdoctoral fellowship award for postdocs in their final years of
mentored training. The balance of the award can be transferred to a new position
if the fellow becomes an independent investigator during the award period, as long
as the original specific aims are still addressed.

INTERNATIONAL FELLOWSHIPS
The Japan Society for the Promotion of Science (JSPS) Fellowship:
http://jspsusa.org/wp/fellowship/kaitoku-nih
The NIH-JSPS Intramural Fellowship provides a two-year stipend to Japanese
postdocs to work NIH intramural labs. This fellowship is awarded to about 15
postdocs annually. Applicants must be Japanese citizens or permanent residents of
Japan.

The European Molecular Biology Organization (EMBO) Fellowships:
http://www.embo.org/funding-awards/fellowships/long-term-fellowships
EMBO provides several fellowship options for international exchange throughout
Europe and the world during postdoctoral research, including long-term fellowships
(up to two years), short-term fellowships (up to three months), and advanced
fellowships (additional two years after successful completion of long-term
fellowship).

Alexander von Humboldt Foundation Fellowship:
http://www.humboldt-foundation.de/web/selection-procedure.html
The Humboldt research fellowships allow individuals from all academic disciplines
to work on a research project with a host partner in Germany. The foundation
places heavy emphasis on the applicant’s academic record, rather than project
description, for awarding of the fellowship.

(continued on page 8)
Grant Opportunities for Intramural Fellows
(continued from page 7)

NICHD FELLOWS INTRAMURAL GRANTS SUPPLEMENT (FIGS)
Grant writing is an important skill to develop during your postdoctoral years—why not bank a bonus for doing something you should be doing anyway?

The objective of the FIGS program is to encourage postdoctoral, visiting, and clinical fellows in the Division of Intramural Research to apply for competitive funding from intramural NIH or outside organizations and agencies, in order to develop their skills in grantsmanship, and in support of their career development.

Terms:
The grant for which the fellow applies must be for a competitive award of $30,000 or more.

The fellow must be the primary applicant on the grant application; or, in exceptional cases, the co-investigator.

Awards:
A $250 one-time stipend increase (limited to 2 applications maximum per year), processed at the time of the fellow’s renewal.

For applications that result in an award, the fellow receives a one-time $1,000 stipend increase.

Submissions must be made through the Office of the Scientific Director (OSD) and signed off on by the Scientific Director prior to going forward (see NICHD Grants Administration Policy). The fellow must provide confirmation of receipt of the application by the awarding agency to the Office of Education/OSD/DIR/NICHD.

Note: Trainees on an FTE and those within the Postdoctoral Research Associate Program (PRAT) are subject to different award funding.

For more information, please contact Yvette Pittman (Yvette.Pittman@nih.gov).
Earning Your Stripes as a Scientist-in-Training
By Katie M. Fox
NICHD Mentor: Dr. Ajay B. Chitnis

There is never a single way to study a question, and each method used to come up with an answer will have its own pros and cons—a valuable lesson for a scientist-in-training.

I study the posterior lateral line (PLL) to understand molecular factors in the self-organization of biological systems. Often compared to the mammalian inner ear, the PLL is a sensory system that zebrafish use to sense water movement. This system comes into play in a variety of behaviors, including mating and schooling. Due to its superficial location on the side of the fish, it is an extraordinarily tractable system in which to study cell migration and pattern formation.

The posterior lateral line primordium (PLLp), a small cluster of migrating cells, spearheads early PLL development. Crawling from the developing ear to the tip of the tail, the PLLp deposits rosettes of cells that will develop into the organs of the PLL. These organs, known as neuromasts, contain mechanosensory hair cells. Our lab is interested in how intercellular signaling regulates cell migration and fate determination during the early development of the PLL. In particular, I study how such signals can be regulated by heparan sulfate proteoglycans (HSPGs).

During the 2015 NIH Graduate Student Symposium, I reported that 3-O-sulfation, a very rare and specific modification of the heparan sulfate chain, is activated by Wnt signaling and important for regulation of FGF-mediated neuromast formation. Meanwhile, a loss of syndecan4, one type of HSPG core protein, results in slow PLLp migration, as well as slow neuromast formation. These results indicate that HSPGs are critical for balancing Wnt and FGF signaling within the PLLp, thereby regulating PLL morphogenesis.

However, some of my conclusions are based on phenotypes that I observe after morpholino-mediated knockdown of my target genes. Morpholinos, short antisense sequences that bind to target RNA, are common to zebrafish research because, until recently, it has been difficult to generate targeted mutations. Unfortunately, scientists in the field are learning that morpholinos aren’t nearly as reliable as assumed. Yes, they’re good at knocking down target gene expression, but they also cause off-target effects that can supersede the effects of the gene knockdown.

A number of mutant lines have been generated that do not show a phenotype anywhere close to the morpholino-induced results. Morpholinos seem to be particularly troublesome for PLL research—researchers have shown that multiple morpholinos induce several stereotypical off-target phenotypes. I actually see some of these worrisome

(continued on page 10)
Earning Your Stripes as a Scientist-in-Training
(continued from page 9)

phenotypes in my “morphants.”

But a new era has dawned in zebrafish targeted genome editing with the advent of the CRISPR/Cas9 protocol. The CRISPR/Cas system is a prokaryotic immune response that provides protection from foreign genetic elements. Complementary CRISPR RNAs identify genetic foreign invaders and chop up the sequences with Cas endonucleases.

Researchers have co-opted this system to induce genetic mutations in a variety of eukaryotic model systems, including C. elegans, Drosophila, and zebrafish. We design CRISPR guide RNA to target a gene of interest and, once it binds, Cas9 protein attaches to its binding site on the 3D structure of the CRISPR. The Cas9 creates a double-stranded break in the DNA, and the error-prone system of double-stranded break repair introduces either a deletion or insertion in the gene. The system is incredibly efficient, making targeted zebrafish mutants easier than ever to generate.

At present, many eager zebrafish researchers are making CRISPR mutants, including me. For the past few months, I’ve been injecting CRISPR guide RNAs into zebrafish embryos and screening for germline transmission of the induced mutations. I’m on my way to having several mutant fish lines, including a double mutant.

For now, I’m thinking of my morpholino-based results as preliminary and hoping that I see morpholino-induced phenotypes replicated in my mutants. Even if I don’t, this experience has been an important lesson in how to approach research questions and problem solving as a scientist. It’s worth repeating: there is never a single way to approach a question. And sometimes, when newer technology comes along, a seemingly answered puzzle becomes, once again, a mystery.
Life Outside Lab: Pi Day Celebration

NICHD staff joined together on Friday, March 13, to celebrate an annual Pi Day pie contest. The event was made even more special by the following day’s coincidental line up of 3/14/15 (Pi begins with 3.1415).

This year’s Pi Day pie winners include:
**Best in Show:** Susan Taymans, Cashew cloud
**2nd place:** Debbie Brock, Toll bridge chocolate pie
**3rd place:** Abby Ershow, Blackberry cherry

**Best Presentation:** Cathy Spong, Apple
**Best Crust:** Sarah Glavin, Double crust lemon
**Best Filling:** Katie Rush, Pumpkin
**Most Original:** Sara Churchill, Strawberry and apple pie atop German chocolate cake
**Best Pie Alternative:** Mahua Mukhopadhyay, Japanese-style coconut pie

**People’s Choice (tie):** Susan Taymans and Mahua Mukhopadhyay
Organizers Jessica Wu and Katie Rush

1st: Cashew Cloud, Susan Taymans

2nd: Toll Bridge Chocolate Pie, Debbie Brock

3rd: Blackberry Cherry Cannot-Tell-A-Lie Pie, Abby Ershow

Best presentation: Grandma's apple pie, Cathy Spong

Best crust: Double crust lemon, Sarah Glavin

Best filling: Peace pumpkin pie, Katie Rush

Best pie alternative: Mahua Mukhopadhyay, Japanese-style coconut pie

Proud pecan pie

Strawberry pie

Blueberry custard pie
Blackberry-topped American apple pie

Dream chocolate cream cheese pie

Heavenly coconut cream pie

Famous B pecan pie

Tangy grapefruit tart

Chocolate float mousse pie

Key lime pie

Most original: Sara Churchill, Strawberry and apple pie atop German chocolate cake

Blum’s coffee toffee pie

Winners and judges with Dave Songco, NICHD CIO (third from left)
April Announcements

DR. KEVIN FRANCIS RECEIVES THE DR. NEIL BUIST FOUNDER’S AWARD
Please join The NICHD Connection in congratulating Dr. Kevin Francis, postdoctoral fellow in the Porter lab, on his impressive achievement. His presentation at the 2015 Society for Inherited Metabolic Disorders Annual Meeting in Salt Lake City won best presentation by a trainee among 12 other presentations.

MENTOR OF THE YEAR NOMINATIONS DUE SOON
Do you have an outstanding mentor? The time has come for you to nominate your fellow or PI for the DIR’s 2015 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 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, April 27th. Dr. Pittman will also be 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+2015

SAVE THE DATE: ANNUAL NICHD PI RETREAT, JUNE 3 & 4
Join us for the annual NICHD PI retreat. The event will be held in Lipsett auditorium on Wednesday and Thursday, June 3 and 4. Speakers to include:

Angela Delaney
Tom Dever
Maria Dufau
Dax Hoffman
Jennifer Lippincott-Schwartz
Anil Mukherjee
Tarun Patel (NICHD BSC)

Roberto Romero
Lilianna Solnica-Krezel
(NICHD BSC)
Mark Stopfer
Susan Taylor (NICHD BSC)
Edwina Yeung

(continued on page 15)
April Announcements
(continued from page 14)

NIH-DUKE TRAINING PROGRAM ACCEPTING APPLICATIONS

The 2015-2016 NIH-Duke Training Program in Clinical Research is now accepting applications. Please consider this opportunity, which will allow you to earn a Master’s Degree from Duke University School of Medicine while attending classes on the NIH Campus!

Implemented in 1998, the program is designed primarily for clinical fellows, physicians or dentists already in staff positions, and other health professionals who desire formal training in the quantitative and methodological principles of clinical research. Courses are offered at the NIH Clinical Center in a dedicated FAES classroom via long-distance, videoconference technology. The program is designed for part-time study, allowing the Master’s candidate to integrate the program’s academic training with his or her clinical training, clinical duties, and research. The degree requires 24 credits of graded course work, plus a research project for which 12 credits are earned. The tuition for the 2015-2016 academic year is $780 per credit. Prospective participants should consult with their program directors and division chiefs regarding potential funding sources and support for their matriculation into the program. An advanced degree in a clinical health science and a strong academic and professional background are prerequisites for admission as a degree candidate. The program is open to all qualified NIH employees. All interested parties should please speak with your program director or supervisor before applying.

(continued on page 16)
April Announcements
(continued from page 15)

The application process is entirely online. Please visit the website at http://tpcr.mc.duke.edu to begin your online application and to view additional information such as course descriptions and class schedules. If you have any questions about the program, please feel free to contact Daniel McAnally, Program Analyst, NIH Clinical Center; Office of Clinical Research Training and Medical Education, at daniel.mcanally@nih.gov or Gail Ladd, Program Coordinator, CRTP, Duke University School of Medicine, at gail.ladd@duke.edu.

Enrollment in this program is limited to 30 individuals at the NIH. Again, if you interested, please speak with your program director or supervisor prior to completing the online application. The deadline for completing the application is May 15, 2015. Registration for the fall semester begins July 20, 2015.

See you all on May 1 at the Smithsonian National Museum of the American Indian for our 11th Annual Meeting of Postdoctoral, Clinical and Visiting Fellows, and Graduate Students—reporting a record number of registrations!
April Events

THURSDAY, APRIL 23, 9 AM – 4 PM
20th Annual NIH Take Your Child to Work Day
For registration information, please visit http://takeyourchildtowork.nih.gov.

MONDAY-TUESDAY, APRIL 27-28, 8:30 AM – 5 PM
Human Placenta Project Meeting, April 27-28
Natcher Conference Center, Building 45
For more details and to register, please visit the meeting website.

THURSDAY, APRIL 30, 10 AM – 3:30 PM
Postbac Poster Day
Natcher Conference Center, Bldg 45
More information at https://www.training.nih.gov/postbac_poster_day

Come and support the NICHD fellows! If you wish to be a “best poster” judge, get in touch with Yvette Pittman (Yvette.Pittman@nih.gov).