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The NICHD Connection

June 2012

INSIDE THIS ISSUE

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The 8th Annual NICHD Fellows Retreat: What A Great Experience!

By: Drs. Silviya Zustiak, Lina Gugliotti, Kara Lukasiewicz, and Yvette Pittman

Many NICHD graduate students, postdoctoral and clinical fellows stepped away from their labs to attend this year's retreat. The two-day event began on the evening of May 7th with a poster session. On the NIH campus in building 50, the room was filled with enlightening conversations as fellows exchanged ideas, made the first steps towards scientific collaborations, and gained insights into the cutting-edge research of our institute. As a testament of this positive outcome, one postdoctoral fellow commented that the poster session led to a solution to a major experimental hurdle.

On May 8th, Dr. Constantine Stratakis, the NICHD Scientific Director, welcomed us to the retreat with some encouraging words, assuring us that "the institute is committed to excellence in mentoring fellows." Furthermore, he charged us to be engaged with our mentors as we train to become independent scientists.

Keynote Address: Unraveling Sexual Reproduction

Setting the standard for the compelling scientific talks of the day, **Dr. David Page**, Director of the Whitehead Institute and Professor of Biology at the Massachusetts Institute of Technology, was our keynote speaker. Who would believe that this accomplished professor became fascinated with DNA, the basis of his research, after a summer internship project on chromatic structure at NIH, in the basement of Bldg. 6? For him, he said, this keynote address at the NICHD Fellows Retreat was like a homecoming. Dr. Page gave a fascinating talk entitled "Unraveling Sexual Reproduction: Dimorphism in Genome and Germline." In relating his amazing scientific story, Dr. Page did more than share his results—he taught us. We felt like students again, wishing all of our college professors were like him.

Dr. David Page

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From Microscope to Sketchbook

By Heather Dolan

NICHD's booth at the 2012 USA Science & Engineering Festival depicted the career of a biomedical illustrator and animator

The NICHD's brightly colored, balloon-canopied exhibit easily attracted attendees at the 2nd Annual USA Science & Engineering Festival, held April 28-29 at the Walter E. Washington Convention Center. Intended to get youth (and their parents, too!) excited about science technology, the 2012 festival featured over 3, 000 interactive exhibits, more than 100 stage shows, and 33 author presentations; it attracted 150,000 visitors across three days.

Conceptualized by Yumiko Shepherd and executed by her and members of the Biovisualization Team, the NICHD exhibit booth titled "I ♥ Art" explored the career of biomedical illustrator and animator. In the words of Drew Barry of the Walter and Eliza Hall Institute of Medical Research, biomedical illustrators show "what's happening down at the microscopic level." Barry's work and that of other biomedical artists was incorporated in the booth, including David Goodsell, associate professor in the Department of Molecular Biology at the Scripps Research Institute; Cameron Slayden, director of *Cosmocyte*; Blake Porch, Program Officer at the Howard Hughes Medical Institute; Michele Banks, independent watercolor artist; Janet Iwasa, Lecturer at Harvard Medical School; Gaël McGill, President and CEO of Digizyme; and Matthew Dougherty, staff member at the National Center for Macromolecular Imaging at Baylor College of Medicine.

Not only a decoration, the booth's overhanging balloon represented the structure of a cell's phospholipid membrane. Even transmembrane proteins were included in the form of different-colored balloons. In Shepherd's words, "our booth felt like the inside of a cell, with just enough light filtering through our balloon 'ceiling' to [illuminate] our paper craft table." The craft table is where hundreds of K-12 students flocked to construct their own "brain hats" and *manduca sexta* moths. Designed by Ellen McHenry, the brain hat showed the major hemispherical lobes and could be worn over one's actual brain. In engineering the *manduca sexta* moth, Shepherd used photographs taken by team member Jeremy Swan as a reference. *M. sexta* is a commonly used model organism, particularly in the field of neurobiology, due to its easily accessible nervous system. Together, the booth structure and paper crafts provided attendees

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From Microscope to Sketchbook

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with visual and interactive examples of biomedical illustrations. Also included in the booth was a sampling of biomedical animation. Swan's son was hard at work using the video game *Minecraft* to build aspects of a cell, such as the plasma membrane and nucleus, based on an image provided by NICHD's Jennifer Lippincott-Schwartz.

The NICHD booth "demonstrated that simple analogues for understanding complex ideas, like microscopic cellular structure, exist in the everyday world," said Shepherd. For Swan, the most rewarding aspect of the booth was the opportunity to open up a new career path to kids.

To learn more about NICHD's Biovisualization team, visit **science.nichd.nih.gov/confluence/display/bioviz**. Team members who contributed to the USA Science & Engineering Festival booth were Melissa Sisk and Nichole Jonas. Special thanks go to the following volunteers, who contributed greatly to the booth's success: Ernestine Lenteu, Sabrina Mathenia, Elizabeth Quartey, Faith Summersett-Ringgold, Helen Wan Ching Huang, Cynthia Yuen, Gopalan Soman, and Anastasia Bodnar.

The booth's phospholipid membrane balloon sculpture.

The 8th Annual NICHD Fellows Retreat

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Did you know that sex is almost as old as the Earth? According to Dr. Page, if you define sex as the exchange of genetic information, it was invented by bacteria 3-4 billion years ago. The highest form of sex, the sex chromosomes XX and XY, evolved intp mammals only 200-300 million years ago. Did you know that sex is a defining feature of eukaryotes and that mitosis is different from meiosis? Dr. Page's presentation focused on his work on germ cells sex determination in mice. He specifically talked about meiosis, a special type of cell division necessary for sexual reproduction in eukaryotes, and the role of STRA8 gene on the sex-determining decision. His lab discovered that STRA8 was expressed only in the ovaries, but that it is required for meiotic initiation in the testis. The lab also found that this gene was stimulated by retinoic acid and thus retinoic acid contributed to meiosis in the fetal ovary. However, in the fetal testis, the retinoic acid is degraded by an enzyme and so meiosis is absent. In fact, Dr. Page proved that the common notion that boys are "slower" was true for germ cells in mice, which do not initiate meiosis until puberty. If you studied basic cell biology, you likely learned that oogenesis and meiosis are one and the same. It turns out that the textbooks have it wrong. The highlight of Dr. Page's work has been to completely separate oocyte differentiation from meiosis. He was able to show that oocyte differentiation can occur in the absence of meiotic initiation. Now he is on a quest to determine if STRA8 is a clean gatekeeper to meiosis in mammals. The talk left us confident that we will hear about more ground-breaking discoveries in the area of sexual reproduction from Dr. Page's lab.

New Scientific Perspectives address: Great ape health research

Our other keynote speaker, **Chris Whittier, D.V.M., Ph.D.**, truly merged the science many of us are accustomed to, at our beautiful and exciting venue, the Smithsonian National Zoological Park. In a talk entitled "Advancing Ape Health Research at Smithsonian," Dr. Whittier described work on Gibbon Ape Leukemia Virus, gorilla cardiac disease (yes, gorillas do suffer from heart failure too), and his own Ph.D. mountain gorilla field research and wild gorilla vaccination trials. The three major threats to the mountain gorilla population, all brought about by humans, are: loss of habitat, hunting/poaching, and infectious diseases, a great concern considering the increase in human-gorilla contact due to ecotourism. Dr. Whittier's work focused on improving diagnosis of infectious disease, noninvasive sampling for molecular assays, basic epidemiology, and modeling of disease outbreaks to combat the devastating effects of the disease. Through his work in regions of Central Africa he demonstrated the feasibility of noninvasive sampling coupled with molecular assays by using a portable real time PCR instrument in the field to detect disease. Dr. Whittier ended his talk by describing VaccinApe, a program whereby scientists are attempting to vaccinate both wild and captured apes and chimpanzees against natural disease threats like Ebola and contagious illnesses carried by humans. Last April, the VaccinApe group did the first ever controlled vaccine trial of wild apes; the group vaccinated gorillas against measles virus, which was chosen for its safety having been used for decades in captive gorillas, to help prevent deadly outbreaks like one in Rwanda in the 1980s. The vaccine delivery method for wild gorillas is darting, a process involving tracking the wild gorillas, darting them with vaccine before they flee, with considerable risk for both the darter and the gorilla. Interestingly, Dr. Whittier is considered one of the most, if not the most, experienced gorilla darters in the world. Only through the dedication and hard work of

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people like Chris Whittier can we prevent the extinction of species; we are both the cause and potential "cure" against the manmade threats afflicting these great apes. In the end, it is uncanny how much the National Zoo's work parallels our own at NIH; Dr. Whittier and his colleagues are working towards bettering the health of great apes while we are working to improve human health.

The scientific perspective of NICHD investigators and fellows

Our retreat was filled with talks by intramural researchers, both investigators and fellows. This was a wonderful way to gain insight into the diverse research performed across NICHD. **Dr. Joan Han**, in the Program on Developmental Endocrinology and Genetics, shared her work on how the haploid insufficiency of a brain-derived neurotropic factor, encoded by the BDNF gene, is associated with childhood obesity, decreased pain sensitivity, and social cognitive impairment. **Dr. Ajay Chitnis**, in the Program on Genomics of Differentiation, enlightened us on how his laboratory uses computational models to understand the self-organization of the Zebrafish posterior lateral primordium, as it migrates from the ear to the tip of the tail, periodically depositing neuromasts.

The fellow presentations were given by **Drs. Kandice Fero, Monica Gupta, Yasaman Ardeshirpour, Damian Dalle Nogare, Stephanie Cologna,** and **Fujun Zhou**.

Kandice Fero described the locomotory movement that occurs when larval zebrafish move in response to the stimulus of light. Dr. Fero discovered that despite a lack of eyes, the zebrafish under study were still able to orient themselves towards the light source, due to the deep brain photoreception capabilities of the zebrafish. **Monica Gupta's** work focuses on the phenomenon of autophagy, the process of cells breaking down their own components, and how it is regulated in mouse Bone Marrow Derived Macrophages. She discussed the developmental and functional roles of Interferon Regulatory Factor 8 in stimulated autophagy in dendritic cells and macrophages. **Yasaman Ardeshirpour** works on several clinical and preclinical studies that incorporate in-vivo fluorescence lifetime imaging for monitoring the efficacy of cancer treatment. In her talk she described the targeting of human epidermal growth factor receptor 2 (HER2) using specific biomarkers for this protein. She showed that optical imaging utilizing an affibody can be used to noninvasively monitor changes in HER2 expression in-vivo as a response to treatment. **Damian Dalle Nogare** has been diligently working on the first complete description of the zebrafish lateral line morphogenesis using high resolution time-lapse microscopy. These studies could provide insight into organ formation and developmental processes at the individual cell level. **Stephanie Cologna** described her postdoctoral research project using mass spectrometry-based proteomics to identify differentially expressed proteins involved in the neurodegenerative disorder Niemann-Pick disease, type C1. In addition, she has been working on a novel design of the traditional isobaric tag methods, to allow a large cohort of

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patients to be monitored per experiment. Lastly, **Fujun Zhou's** postdoctoral research objectives focus on the identification of essential domains of the eIF4B gene and its involvement in mRNA-ribosomal complex formation during the initiation phase of protein synthesis. Overall, these six oral presentations were engaging and provided us with a glimpse into the everyday scientific life of our NICHD fellows.

Career Q&A Session

Just above the pandas' home at the zoo, the career Q&A session of our retreat took place, and it was a great success! We had five representatives from different career paths: **Dr. Ronda Rolfes** represented Research-oriented Academic careers, **Dr. Kristofor Langlais** represented Science Policy, **Dr. Irina Ramos** represented Industry, **Dr. Boots Quimby** represented Teaching-oriented Academic careers, and **Dr. Samuel Bish** represented Technology Transfer. All of our career speakers were very enthusiastic about their respective careers and eager to share their professional stories with the fellows.

RONDA ROLFES, PHD, GEORGETOWN UNIVERSITY

Dr. Ronda Rolfes

Curious facts:

- Ronda says she took a traditional career path—Ph.D. at Purdue, postdoc at NIH-NICHD, Assistant and now an Associate Professor at Georgetown University. She has been at Georgetown for 16 years.
- Ronda had both her kids as a pre-tenured faculty member, which she admits was hard in terms of balancing her career and home life. She thinks that having children affects professional men and women differently.

What did fellows ask about?

Q: You mentioned that you have a small lab of 1-2 graduate students and mostly undergraduates. How productive is such a lab group?

A: Quality of people is the key: you can have a productive undergraduate student and an unproductive graduate student. To facilitate the research, I sometimes pair undergraduate researchers with postdocs or graduate students. Ideally, a postdoc should produce 1 paper per year, a graduate student 2-3 papers in 5 years, and undergraduates are expected to contribute 1 figure for a paper.

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Q: You have many different commitments and you have a family. How do you balance your time?

A: I have to be very organized and draw lines such as having strict office hours. I start grant writing in advance but usually 2 weeks prior to the deadline I focus solely on the grant. I have to compromise and accept that I cannot be perfect, so I don't spend all my time on a single task. I try to make a schedule and stick to it. I have learned to read papers fast, to delegate work, and to say "no." It all comes down to efficiency and time management.

Q: What is the frequency of your interaction with students, and do you ever do work in the lab?

A: I wish I could do more lab work but I cannot carve out the time. I do meet with my students on weekly basis to discuss their work. I also have an open-door policy for students from my lab and office hours for students taking my classes.

KRISTOFOR LANGLAIS, PHD, DHHS

Dr. Kris Langlais

Curious facts:

- Kris was the chair for last year's annual fellow Retreat, served on FelCom, wrote for the NIH Catalyst, worked with the National Postdoctoral Association, and co-founded the Science Policy Interest Group, in addition to his postdoctoral lab responsibilities.
- Kris was a high-school science teacher for a year at Okemo Mountain School.

What did fellows ask about?

Q: You work on genetic data sharing policies. Do you think that too many regulations hinder science as well as the ability to launch start-up companies?

A: Not necessarily, but it does involve investment of time and money. For example, you can hire attorneys to do the job for you, or you can familiarize yourself with the regulations in advance.

Q: Although you were involved in a lot of activities as a NICHD postdoc, what would your one piece of golden advice be for postdoc trainees?

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A: As a postdoc, your mission is to obtain training so you can get a job, do what you have to do for yourself. Think of what is takes to obtain your dream job all throughout your postdoc and start as early as possible.

Dr. Irina Ramos

IRINA RAMOS, PHD, MEDIMMUNE

Curious facts:

- Irina's Ph.D. research focused on biochemical studies of β-amyloid proteins involved in Alzheimer's disease. She went to the private sector because she wanted to feel like an engineer again.
- Irina got a rejection from the HR Department at MedImmune initially, because her resume lacked some critical keywords. Instead of accepting "no" as the final answer, she contacted the hiring manager directly, he liked her and she got the job.
- She does not want us to think of ourselves as a CV or resume. We are more than that; it is important for the employer to know us as individuals.

What did fellows ask about?

Q: Should courses at universities be modified to better fit industry requirements?

A: No. It would be difficult to do, because the requirements in various industries are different. In principle, you receive training after you accept the job because even if you know the techniques, you still need to learn the specific practices for your new position. Besides, a broader background gives you an ability to change jobs and grow in your career. It is more important to be a well-rounded person, to be able to work in teams, and to have a pleasant personality.

Q: Would a Ph.D. degree and then a postdoc decrease your chances on the job market, because of the narrow training?

A: Not necessarily. Your set of skills is important but it is not all. You need to build yourself in an upward triangle–while you are specializing in a specific area of work, you need to collect other skills and experiences that highlight your ability to learn and be flexible.

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BOOTS QUIMBY, PHD, UNIVERSITY OF MARYLAND

Curious facts:

» When starting her career, Boots received an offer from the University of Tennessee, but she chose a more teaching-oriented position that was local, due to family constraints and her own personal satisfaction.

» Boots's expertise is in the area of teaching innovation, that is, alternatives to lecturing. She believes that simply lecturing is an inefficient teaching strategy.

Dr. Boots Quimby

What did fellows ask about?

Q: Where is higher education going?

A: MIT and Harvard recently announced a merger to develop free on-line education. I see this as a big step but it is hard to predict if on-line education will completely replace "bricks-and-mortar." One immediate problem is the validity of such on-line degrees. However, I believe that media will become even more important in education and at some point the instructor could become simply a facilitator. In addition, hands-on activities will become more prevalent.

Q: What if classes are too big to use alternative instructional techniques?

A: There are very specific techniques for implementing such methods in big classrooms. To learn more about them, you could go to educational conferences, read educational journals, or contact your respective centers for teaching excellence. In many cases, there are also specific ideas on how to improve the lecture itself.

SAMUEL BISH, PHD, OFFICE OF TECHNOLOGY TRANSFER, OFFICE OF THE DIRECTOR, NIH

Dr. Samuel Bish

Curious facts:

» Samuel found a career in technology transfer while looking for alternatives to bench work. He added that the 99% failure with his experiments, for him, did not justify the 1% success.

» In his current position, Dr. Bish handles a portfolio of over 200 NIH inventions and over 450 patents.

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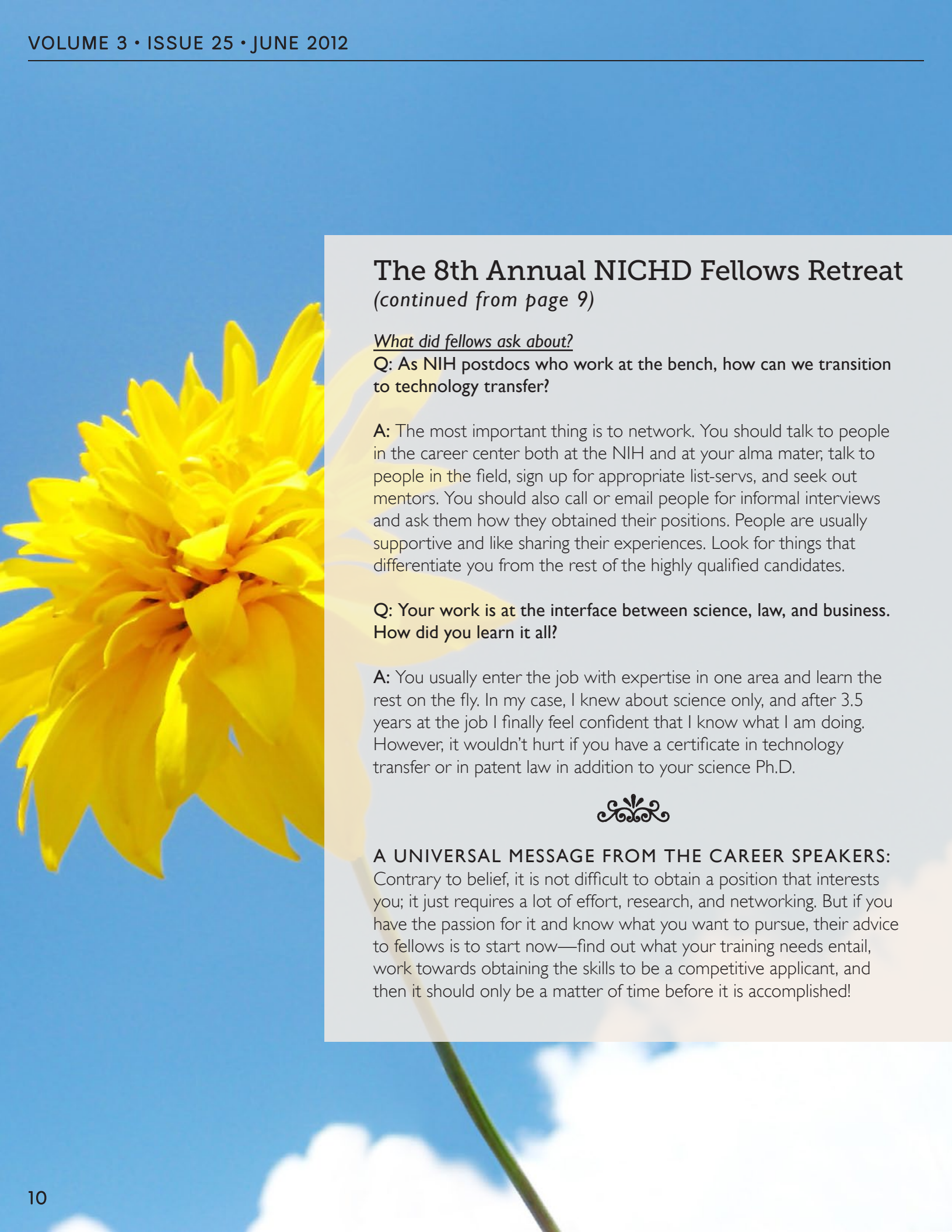

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What did fellows ask about?

Q: As NIH postdocs who work at the bench, how can we transition to technology transfer?

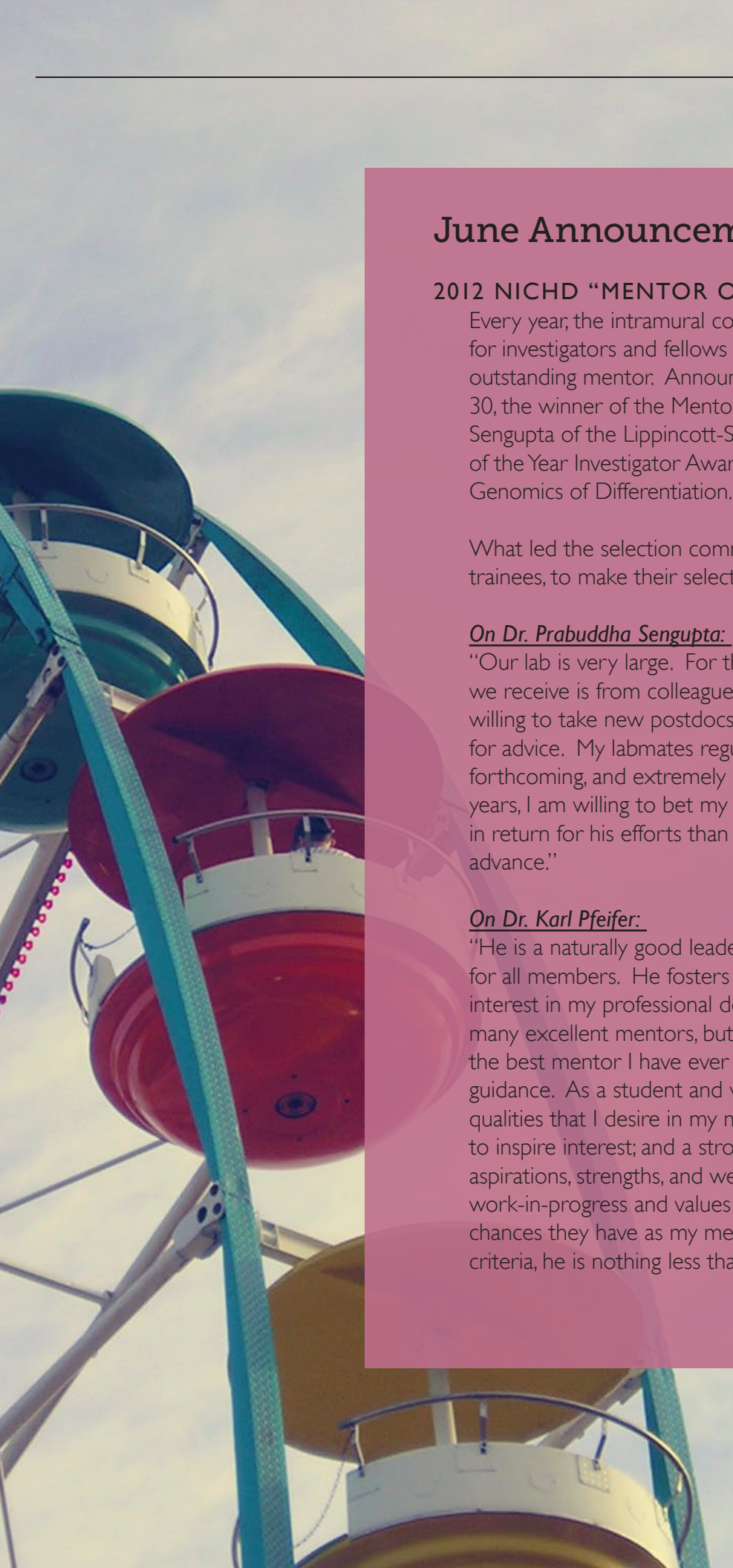
A: The most important thing is to network. You should talk to people in the career center both at the NIH and at your alma mater, talk to people in the field, sign up for appropriate list-servs, and seek out mentors. You should also call or email people for informal interviews and ask them how they obtained their positions. People are usually supportive and like sharing their experiences. Look for things that differentiate you from the rest of the highly qualified candidates.

Q: Your work is at the interface between science, law, and business. How did you learn it all?

A: You usually enter the job with expertise in one area and learn the rest on the fly. In my case, I knew about science only, and after 3.5 years at the job I finally feel confident that I know what I am doing. However, it wouldn't hurt if you have a certificate in technology transfer or in patent law in addition to your science Ph.D.

A UNIVERSAL MESSAGE FROM THE CAREER SPEAKERS:

Contrary to belief, it is not difficult to obtain a position that interests you; it just requires a lot of effort, research, and networking. But if you have the passion for it and know what you want to pursue, their advice to fellows is to start now—find out what your training needs entail, work towards obtaining the skills to be a competitive applicant, and then it should only be a matter of time before it is accomplished!



June Announcements

2012 NICHD "MENTOR OF THE YEAR" ANNOUNCED

Every year, the intramural community submits nomination letters for investigators and fellows who exemplify the characteristics of an outstanding mentor. Announced at this years' Scientific Retreat on May 30, the winner of the Mentor of the Year Fellow Award is Dr. Prabuddha Sengupta of the Lippincott-Schwartz lab, and the winner of the Mentor of the Year Investigator Award is Dr. Karl Pfeifer of the Program in Genomics of Differentiation.

What led the selection committee, comprised entirely of NICHD trainees, to make their selections?

On Dr. Prabuddha Sengupta:

"Our lab is very large. For this reason a crucial part of the mentoring we receive is from colleagues. He stands out in the lab as someone willing to take new postdocs under his wing and he is often sought out for advice. My labmates regularly remark that he is welcoming, caring, forthcoming, and extremely competent. From my observations over the years, I am willing to bet my pipetting arm that he wants nothing more in return for his efforts than to see his colleagues succeed and science advance."

On Dr. Karl Pfeifer:

"He is a naturally good leader who creates a healthy lab environment for all members. He fosters excellent scientific productivity and shows interest in my professional development. Over the years I have had many excellent mentors, but he stands apart. He is unequivocally the best mentor I have ever had and I am privileged to be under his guidance. As a student and veteran mentee, I am acutely aware of the qualities that I desire in my mentors: a commitment to teaching; a drive to inspire interest; and a strong understanding of my personal attributes, aspirations, strengths, and weaknesses. A good mentor sees me as a work-in-progress and values not only the work that I produce but the chances they have as my mentor to positively impact my future. By my criteria, he is nothing less than an exemplary mentor."

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June Announcements

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Left to right: Prabuddha Sengupta, Matthew van Winkle (accepting on behalf of Dr. Pfeifer), Justin Chen, Carla Lopez

Here's a look at all of the "Mentor of the Year" finalist investigator nominees with their nominators:

- **Dr. Tom Sargent,** nominated by postdoctoral fellow, Sheran Law
- **Dr. Jeffrey Baron**, nominated by clinical fellow, Youn Jee
- **Dr. Karl Pfeifer**, nominated by postdoctoral fellow Megan Sampley and postbac fellow Matthew Van Winkle

APPLAUSE TO THE "BEST POSTBAC POSTER AWARD" RECIPIENTS OF NICHD!

Our postbaccalaureate fellows did a great job presenting their posters at the 2012 NIH Research Festival, and three presenters took home the "best poster" award for our institute.

The three winners for 2012 are **Carla Lopez** (the lab of Dr. Chris McBain), **Justin Chen** (the lab of Dr. Heiner Westphal), and **Megan Cermak** (the lab of Dr. Bruce Howard). Congratulations on a job well done!

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June Announcements

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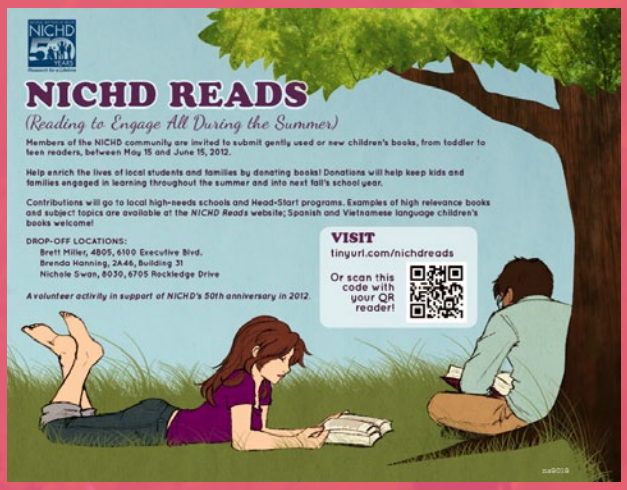
NICHD READS: ENCOURAGING SUMMER READING

In support of the 50th NICHD Anniversary, you can be a part of this volunteer activity by donating new (or gently used) children's books–from toddler to teen readers. We will target our donations to local high-needs schools and Head-Start programs.

Ending June 15, 2012, the three drop-off locations are **Brett Miller**, 4B05, 6100 Executive Blvd., **Brenda Hanning**, 2A46, Bldg 31, and **Nichole Swan**, 8030, 6750 Rockledge Drive.



NICHD 50TH ANNIVERSARY SOUVENIRS AVAILABLE FOR PURCHASE!

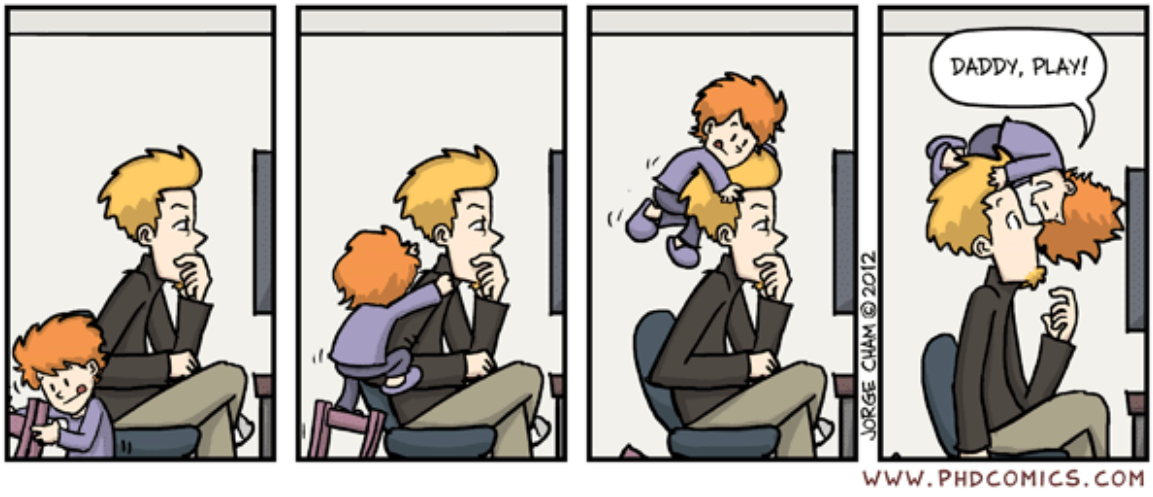
These include the travel mugs ($11), caps ($10), laptop backpacks ($25), and T-shirts ($10). If you wish to purchase any items, please contact **Earl Blansfield** at blansfieldeh@mail.nih.gov by June 15th.

A SUMMER OUTREACH OPPORTUNITY FOR YOU!

The NIH Visitor Center is hosting a series of campus visits that will expose over 1,100 high school students to the many exciting and diverse careers of science. The students are enrolled in either the National Student Leadership Conference on Healthcare and Medicine or Georgetown University's Summer Medical Institute. Between June 26 and August 9, this is an amazing opportunity for you to encourage students to pursue careers in health and medicine while introducing them to the fascinating and important work you do every day at NIH. Morning and afternoon sessions are available. If you are interested, please contact **Tara Mowery** at tm77f@nih.gov for inquires or to register.

Congratulations to Andrea Introini!

Andrea Introini, a member of Dr. Leonid Margolis' lab (Section on Intercellular Interactions), recently traveled to Hamburg for the Joint International Congress of the American Society for Reproductive Immunology (ASRI) and the European Society for Reproductive Immunology (ESRI). There, he received two awards: first prize in the Young Investigators' competition, as well as a prestigious award established by the NIH Office of AIDS Research for the best presentation! Well done, Andrea!



Enjoy your summer, everyone!