Former Fellow Follow-up with Dr. Saravana Murthy

Dr. Saravana Murthy is a senior research scientist at the start-up company Twistnostics. Prior to transitioning to his current position, Dr. Murthy studied mechanisms of stress and tumor metastasis as a visiting fellow from 2008-2010 and a research fellow from 2010-2014 in the laboratory of Dr. Peng Loh. Dr. Murthy has kindly shared his experiences at a start-up company—and the path he took to get there—in a Q&A with The NICHD Connection:

What are your job responsibilities as a senior research scientist at Twistnostics?

Twistnostics is a start-up company, and as a Senior Scientist one has to wear several hats. My main responsibility is in the development of assays for rapid point-of-care diagnostic tests for cancer and infectious diseases. Our company was built on a revolutionary new concept called Twist-Sensor technology; with this sensor, practically any analyte can be detected at single molecule resolution without the need for PCR. Hence, each one of our jobs is to develop this sensor for various applications, be it diagnosis of cancer or point-of-care detection of infectious diseases.

What’s your typical day like?

Each day starts with a briefing of the plans created at the end of the previous day, and every day is different. Usually, half of the day is spent on developing assays in the lab. A sizeable time is spent on brainstorming sessions about designing and building our final product. Our company is small. We are just five full-time employees, hence most of the company-related work is shared among all of us, such as taking care of Good Laboratory Practices (GLP), purchasing, or maintaining the inventory. And, of course, I spend considerable time on meetings, completing assignments, reading the literature, etc.

When did you start thinking about joining a private company?

When I first started my postdoc at NIH, like most other postdocs, I was (continued on page 4)
Letter from the Editor

As I prepared to write my letter for this month, I spent some time browsing previous issues of The NICHD Connection for inspiration. I was greeted by first-person narratives of meaningful moments, helpful advice from former fellows who have “been there, done that,” and pages of insightful research. Within minutes, I was struck by an overwhelming sense of community. On several occasions, I have heard NICHD leadership use the phrase “NICHD family.” I get it. Over the past four and a half years, over 100 NICHD postbacs, graduate students, postdoctoral fellows, clinical fellows, and former fellows have contributed to this newsletter. That is an amazing number of busy people who have made time to share their knowledge. As the name of this publication implies, it’s a worthwhile goal to stay connected.

We make no deviation from that goal with this issue. Dr. Saravana Murthy shares his fascinating career track to entrepreneurship in our “Former Fellow Follow-up” column. If you’re interested in the business side of science, this is a must read, as Dr. Murthy shares many of the NIH resources that he utilized to get where he is today.

Also inside, Dr. Swagata Roychowdhury continues with her series on science careers. This month, she focuses on the purpose of graduate and postdoctoral training and enlists two successful former fellows to share their ideas on the topic. We round out this issue with helpful advice on using 3D printing to liven up your poster by Dr. Răzvan V. Chereji and a recap of the recent postbac orientation, complete with several learning and volunteer opportunities, by Annie Altschul.

Thank you to everyone for helping to make this a great community.

Your Editor in Chief,
Shana R. Spindler, PhD

Please send questions and comments to Shana.Spindler@gmail.com.
Letter to the Editor

Great topic [“What Does a Scientific Career Look Like?”] to focus on and keep going as a series, and that pie chart really connects NICHD trainees to the real world. It’s better than just seeing the trend of US trainees in aggregate. NIH trainees are no different than others when it comes to career paths. Well, I am impressed that 20 percent go on to academic research, which is at least two times better than national trends. But are these independent PIs or trainees doing postdocs elsewhere? That information would be useful.

Dr. Kristofor Langlais, NIH health science policy analyst

IN RESPONSE:
Regarding the alumni data, “academic research” is for all of the research support (non-faculty) positions, and “professorship” refers to fellows who are faculty members for both teaching and/or research-intensive institutions. Lecturers, science teachers, and instructors were placed under science education, whereas the “professorship” category is only for faculty positions—but for various types of institutions, including community colleges and teaching-based and research-intensive universities. The data is from all trainee levels since 2008: postbacs, grad students, postdocs, visiting and clinical fellows.

Dr. Yvette Pittman, Associate Director, NICHD Office of Education
imagining a career in academia and nothing else. When I was in my second year, I experienced a very emotional personal incident and that changed my perspective on life. Then my aspiration was to be an entrepreneur. At that time, my knowledge of entrepreneurship was “zero.” I educated myself about entrepreneurship by talking to entrepreneurs and reading. The turning point came when I joined the “Innovate Program” at Johns Hopkins Carey Business School. There I learned about entrepreneurship “by leaps and bounds.” Also, in the NIH DC I-Corps program I learned the practicalities of entrepreneurship. These two programs taught me what it takes to be an entrepreneur. Given that 90 percent of start-ups fail, one important point I understood was, before I jump into starting my own start-up, I have to join a start-up and help build that company as if it was my own, and then could I fulfill my own aspirations. This would be my best bet to be a successful entrepreneur. Hence, I started looking for a position in start-ups.

How did you find your position with Twistnostics?
I posted my CV to all job sites possible, and many times I had to apply directly to the company website. I was more inclined towards diagnostics-based start-up companies and keenly looking for those companies that successfully went through a fundraising round. The idea is that if a company has successfully raised capital by fundraising rounds, the chances are that they will most likely have positions open immediately or in the near future. And if you follow those companies regularly and apply, you are ahead of the crowd and have a better chance of getting hired. In my case, I was following several companies on LinkedIn, and as soon as I found an opening at Twistnostics that matched my profile I applied immediately. The ad even mentioned “entrepreneurial, can-do attitude” as a job requirement.

Please describe the application/hiring process. Did it take a long time?
I applied to the Twistnostics job ad for Senior Research Scientist directly through LinkedIn. In my resume and in the cover letter I stressed my experience pertaining to the job requirements. I also highlighted my accomplishments at my current and past positions, rather than listing the work and responsibilities. Within a week of my application, I got a response from Twistnostics inviting me for a Skype interview. During the 45-minute Skype interview, I was asked and I shared my translational science experience and my passion for entrepreneurship. I also explained how my experience could benefit the company. Two
weeks after this, I got an invitation for a personal interview. This interview was very casual (even though I dressed very formally), and there I was being educated more about the company and briefed about what my role would be, if hired. At the end of the interview I was offered the position. At the same time I was also offered a staff scientist position at NIH. It was a very tough decision to make. After giving a lot of thought and considering my entrepreneurial aspirations, I chose the senior research scientist position at Twistnostics.

Which skill sets from the lab best apply to becoming a senior research scientist?

Every skill set that I learned in the lab and at NIH I apply at my current position. Here in our company we have to juggle several tasks at a time, and I could do that with ease because of the training I got at NIH, where I was given the opportunity to work on several projects and was taught how to handle multi-tasking efficiently. I can’t give thanks enough to Dr. Peng Loh, my mentor at NIH, for giving me several translational science-based projects, and all of the experimental design and planning for these projects were based on the final applications. These skill sets are helping me tremendously to develop our product. I have to also thank Dr. Niamh Cawley, staff scientist at NIH, for teaching me the knack of setting up a good experimental design. He was instrumental in establishing Good Lab Practices and lab safety in our lab at NIH, and I follow those religiously in our company. Presentation and writing skills are other skill sets that I learned and developed at NIH. These are extremely important arts that a senior scientist should possess.

On your LinkedIn profile, it shows that you have a patent from your time at the NIH. Can you describe the patent process, from identifying a patentable product to receiving the patent?

Any good experiment leading to a new product-by-process or method of production could be patentable. In my case, Dr. Loh identified the patenting potential for a biomarker for metastasis that I discovered at NIH. As soon as all the solid experimental and clinical data were in place for the biomarker, this information was sent to the NIH Office of Technology Transfer (OTT) through NICHD as an Employee Invention Report (or EIR). After a favorable decision process, OTT filed the application for the patent.

What activities or resources at the NIH helped prepare you for your career transition?

The preparation I did for the Three-Minute Talk (TmT) helped me to narrate my research experience in a very short and concise fashion during my interviews. Dr. Yvette Pittman and Brenda Hanning were very conducive for my career transition. All of the courses that I took

(continued on page 6)
Former Fellow Follow-up with Dr. Saravana Murthy
(continued from page 5)

at NIH, such as a biotech course at FAES; training programs for writing, teaching, and mentoring, designing and delivering oral presentations, and leadership and management workshops through the Office of Intramural Training and Education were all very helpful. Several courses in statistics, computer programming, desktop applications, and NIH Library seminars at the Computer Training program (CIT) were very valuable. The NIH DC I-Corp program and seminars at BHI/NIH Consultant Club lead by Dr. Todd Chappell were helpful in shaping me as an entrepreneur.

Do you have any advice for fellows who are thinking about a career like yours?

“An entrepreneur is not a person who starts a company but he is the person who actually solves a problem. It’s all about execution and it is a state of mind. A person who sees a problem is a Human Being; a person who finds a solution is visionary; and the person who goes out and does something about it is an entrepreneur.” These are the words from the great entrepreneur Naveen Jain.

I would say, decide on your career goals as soon as you can, make a solid plan, and stick to it. Paths for accomplishing your goal could/will change, but goals should remain the same. If you want to be an entrepreneur, prepare yourself for a roller coaster ride. Science and business are two entirely different “languages” and you have to master them both. Fellows at NIH are the best at science, but we are seldom taught or even encouraged about business in the lab. So go out, talk and network with people who are entrepreneurs, and you will learn how to apply your science to solve real problems in the world. There are several forums in and around the DC area, such as BioBuzz, Techbreakfast, NIH SBIR meetup, and Biohealth innovation, to name a few. I would highly recommend taking “Innovate” and DC I-Corp programs for a start.

If you have any questions, please feel free to contact Dr. Murthy at sarudna@gmail.com.
What’s the Purpose of Graduate and Postdoctoral Training?

By Swagata Roychowdhury, PhD

An imbalance between the number of biomedical scientists in training and the availability of academic research career opportunities has led to more trainees opting for a career outside academia. Although less than 15 percent of biomedical PhDs move into tenured or tenure-track faculty positions,¹ there has traditionally been an emphasis on training graduates and postdocs for academic research positions.² According to the NIH Biomedical Workforce Working Group, it is essential to broaden both pre- and postdoctoral training to include exposure and preparation for “non-traditional careers.” A major challenge is to encourage discussion and sharing of information on training outcomes and focus on preparing trainees for a larger range of career options. This brief introduction to the topic examines the current state of training, covers several suggested changes to the biomedical workforce “pipeline,” and presents the viewpoints of two successful NICHD alumni on the purpose of graduate and postdoctoral years.

In her keynote address at the 2013 NICHD retreat, Dr. Shirley Tilghman, President of Princeton University, voiced her concerns about the current postdoctoral training process and recommended that major changes must be implemented to alter the culture of biomedical education. She emphasized the role of graduate training as a time of learning, not labor; the need to utilize training grants, rather than research grants, to fund fellowships, and the need to increase stipends and benefits for postdocs. Without these and other changes, uncertainties, lack of funding, and excessive competition are some of the major issues that will affect the future of the biomedical workforce.² ³ As a solution, the NIH Workforce Working Group recommends access to diverse types of training during graduate and postdoctoral years. This additional training may include project management, science education, or science communication, to name a few, which are valuable for both academic and nonacademic career track scientists. The purpose of postdoctoral training must be to ensure that fellows are better aligned with the required skill sets for any career that they opt for in the future, not just an academic track. The in-depth knowledge that we gain can be leveraged

(continued on page 8)
What’s the Purpose of Graduate and Postdoctoral Training?  
(continued from page 7)

towards multiple fields that are available beyond the bench and improve the chances of success in today’s exceptionally competitive job market.

To encourage discussion on this topic, Dr. Kristofor Langlais, a health science policy analyst at the NIH, and Dr. Silviya Zustiak, a tenure-track assistant professor at Parks College of Engineering, Aviation and Technology at Saint Louis University, offer their ideas about graduate and postdoctoral training in a Q&A with The NICHD Connection:

What do you think the purpose of graduate training is?

K.L. The primary purpose of graduate training should be to gain all of the fundamentals that one would need to become an independent practicing scientist: attain an advanced base of knowledge, learn how to develop hypotheses and put together a comprehensive plan to test them, learn how to build a compelling story for presentations and publications, gain insight into the real-world practice of science, and gain technical skill and the ability to innovate to break new ground. At the same time, this is also the time to fail repeatedly and learn the value of failure and persistence. The last year or two of the training should be a time of self-assessment and exploration of how scientists can apply themselves outside of academia, in a supportive and nonjudgmental environment.

S.Z. I would say that the most important part of graduate training is to create independent thinkers and researchers. Undergraduate education gives a broad knowledge base usually imparted through rigorous coursework and guided hands-on labs and activities. Graduate training takes the students to a new level where the broad preparation is funneled into a narrower research topic and the student learns how to apply the acquired knowledge to the advancement of their field.

(continued on page 9)
What’s the Purpose of Graduate and Postdoctoral Training?
(continued from page 8)

What do you think the purpose of postdoctoral training is?

K.L. Postdoctoral training should be thought of as a temporary transition period from day zero. At no time should the trainee ever forget that they are a trainee about to go out into the real world sooner rather than later, and that they are not a lab technician chained to the bench. The trainee is already an accomplished, but not yet independent, scientist with a degree of more focused subject matter expertise and finely honed technical skills. The primary purpose now is to discover and choose a career path and do whatever it takes to identify any gaps that will give the trainee a fighting chance to get a foot in the door for that chosen path. This takes long-term planning. The purpose is also to become an expert in their field.

S.Z. When a graduate trainee decides on a postdoctoral training, he or she should be considering what specific skills and additional knowledge he or she is hoping to acquire. I believe that postdoctoral training is a venue for an independent researcher to learn a complementary skill set or hone his or her existing skills and knowledge so that he or she is prepared to establish an independent line of research if an academic path is pursued. It is also a time when various future career opportunities might be explored.

What sort of support did you receive from a mentor (PI or other) to prepare you for your long-term goals during graduate/postdoctoral training?

K.L. My postdoctoral mentor was very supportive of my long-term plans to move into science policy. She understood that I needed to spend a significant amount of time outside the lab to engage in other types of training and activities that would allow me to be successful in reaching my goals. She understood that scientists could and should break out of the box and apply themselves to any number of other career paths. I was lucky to find such a supportive advisor; and I encourage trainees to ask the potential advisor how they would support a trainee in this way.

S.Z. Both my doctoral and postdoctoral PIs have been very supportive, yet hands-off. I would say that they taught me to believe in myself and to keep

(continued on page 10)
pursuing new challenges. They continue to be supportive of me and my career by showing active interest in my well-being, alerting me to new opportunities, and offering advice when needed. For example, my doctoral advisor recently became the editor of a new book on Neuromethods, and she invited me to submit a chapter.

How does the competitive nature of finding an academic position affect how you view the purpose of graduate or postdoctoral training, if at all?

K.L. I think that training programs should reevaluate their purpose and modify their programs to provide support, education, and resources for trainees to explore and gain skills to allow more flexibility in what they may do with their degree. It is common knowledge that at a minimum only 1 in 10 graduates will end up running their own lab, and that society would greatly benefit from having highly trained scientists placed in nearly all other fields, scientific or not. Basically, the purpose of training programs is to produce highly trained scientists and sprinkle them everywhere throughout society.

S.Z. The competitiveness of acquiring an academic position has affected the way I think about postdoctoral training but not doctoral training. I believe that doctoral graduates are very valuable in industry just as much as they are valued in academia. However, I do believe that postdoctoral training would be more valuable for people interested in academia than in industry. That said, regardless of how competitive the academic market is, I believe that if someone is interested in that career path, he or she should not get discouraged but work harder to achieve his or her career goals. An alternative path can always be chosen along the way, but the probability of success should not in itself deter us from our dreams.

REFERENCES
The Arts: How to Improve Your Poster Using Technology

By Răzvan V. Chereji, PhD

After you've made your vector illustrations and aligned them flawlessly into your poster, you might wonder what else you can do to attract more attention to your work. After all, that's why you go to a conference: you want to entice everybody to stop by your poster to learn about your research results. Recently, I participated in a meeting at Cold Spring Harbor Laboratory. This article is about how I enhanced my poster presentation.

I wanted to add a tablet to the center of my poster, but I couldn't find any reliable way of attaching it to the poster board. I realized that the simplest way would be to design a three-dimensional (3D) tablet frame and print it using the free 3D printing service offered by the NIH library. I used Google SketchUp (http://www.sketchup.com) to create the 3D model (http://3dprint.nih.gov/discover/3dpx-000728), which was easy to learn by watching a few tutorials on YouTube (check out here and here). As my poster was about DNA packaging, I also made a small DNA model (http://3dprint.nih.gov/discover/3dpx-000729), which I attached to the poster to create the illusion of a DNA molecule that pops out of the poster (lower right in poster image).
The Arts: How to Improve Your Poster Using Technology
(continued from page 11)

To highlight my research, I created a small video (https://www.youtube.com/watch?v=cov93yEjIDk) by adding extra frames made using Adobe Illustrator to an existing animation. I displayed the video on the tablet, which attracted a nice audience to my poster.

To learn more about attractive poster ideas or 3D printing, please contact our NICHD Biovisualization experts Jeremy Swan (swanjere@mail.nih.gov) or Nicki Swan (jonasnic@mail.nih.gov).

Here’s a copy of my poster:

This is a QR (Quick Response) code. To utilize this Internet shortcut, all you need is a smart phone with a camera and a QR scanning app (many scanning apps are free). Once you download the scanning app onto your phone, simply follow your particular app’s instructions to “scan” the QR code, and your phone will automatically do as the code instructs, such as taking you to a website, video, or even download another app.
On October 8, NICHD’s postbacs gathered to meet one another and to hear about the various opportunities available to them during their time at the NIH. This article recaps some of the important information from the meeting.

NICHD postbacs are able to shadow physicians in the genetics clinic on Tuesdays, allowing them to review clinical cases and observe patient visits with the genetics team. Postbacs are also able to observe ICU Simulator Rounds, in which a healthcare team responds to various scenarios with the “Sim Man,” or patient simulator. If you’re interested in learning about research outside of your specific field of interest, a class called “Becoming an Effective Scientist” is currently being offered. Speakers from various programs in NICHD share their work during this interactive lecture series. Postbacs are also able to write and submit articles to this newsletter (The NICHD Connection).

In addition, we highlighted a few volunteer opportunities at the NIH for postbacs. Explore INN is one such opportunity in which postbacs can share their passion for science with a small group of children staying at the Children’s Inn by teaching them to do science experiments suited to their age. Learning Ally is another opportunity and involves voice recording science textbooks to be used by visually impaired students and those with other learning disabilities.

And finally, we talked about the various ways through which the NICHD Office of Education and the OITE are able to help postbacs with their future career plans. Career development resources are available throughout the year at the OITE, including career advising and mock interviews. These services and others are also offered specifically to NICHD postbacs through the NICHD Office of Education. The office will also host several programs throughout the year designed to assist postbacs in their career pursuits. For more information about career planning, please visit [https://www.training.nih.gov/trainees/postbacs](https://www.training.nih.gov/trainees/postbacs). If you are interested in any of these opportunities, please contact Annie Altschul (annie.altschul@nih.gov) or Dr. Yvette Pittman (Yvette.Pittman@nih.gov).
November Announcements

SAVE THE DATE: DECEMBER 3, NICHD LEADERSHIP COURSE
LEADERSHIP AND MANAGEMENT COURSE FOR NICHD FELLOWS
Wednesday, December 3, 9 am to 12 noon

David M. Dilts, PhD, MBA, CPA, CMA
Professor of Management at the Oregon Health & Science University (OHSU)

Designed for early career individuals, this half-day, highly interactive course will introduce the essence of leadership and management and discuss how to be both a good manager and a good leader. One key type of management—project management—will be reviewed to show how learning this skill can greatly enhance project success.

The four learning objectives for the course are:
» Understanding the differences between leadership and management
» Understanding the need to lead and manage
» Knowing the difference between a team and a committee
» Identifying the key elements of managing projects in a team environment

We have 30 slots for fellows, and there will be time for you to ask one-on-one questions at the end of the course. Please register with Dr. Yvette Pittman at yvette.pittman@nih.gov.

GET YOUR IMAGE FEATURED ON THE DIR ANNUAL REPORT
The NICHD Division of Intramural Research (DIR) will feature exciting scientific images, from basic and clinical research laboratories, on the cover and web site of the 2014 DIR Annual Report. To submit images for consideration, please email your file to Nicki Swan (jonasnic@mail.nih.gov) or contact her if the file is too large to send by email. All entries are due by December 15, 2014.

STAY CONNECTED! JOIN OUR LINKEDIN GROUP FOR NICHD ALUMNI
The Office of Education is making a big effort to connect to our former NICHD trainees. We created a LinkedIn group for all of our intramural alumni. Please do consider joining the group through the link below. We will post relevant articles and activities for young scientists and this, our monthly fellows newsletter, The NICHD Connection. We will include alumni profiles too, so let us know if you will be starting a new position soon or want to share a story about your professional life. We would even be happy to post job vacancies for you, if your company or organization is looking for talent.

You can find the LinkedIn group by searching for “NICHD Intramural Alumni” or by going directly to https://www.linkedin.com/groups/NICHD-Intramural-Alumni-2209038/about
November Events

FRIDAY, NOVEMBER 7, 12 – 1PM

“Applying to Teaching-based Academic Jobs”
Sydella Blatch, Ph.D. (a former NICHD postdoc)
Assistant Professor of Biology, Stevenson University

This workshop will provide an overview of what the teaching-based professorship is like on a daily basis and how it differs from being at a research-intensive institution. It will also focus on ways to stand out to various search committees and interpret job ads to identify what key elements to include in an application.

Individual consultations will be available following the workshop. This will give you an opportunity to ask specific questions about your own faculty job packet.
Please note there are 10 slots left. If you are interested, sign up soon by sending Yvette Pittman (yvette.pittman@nih.gov) an email.

FRIDAY, NOVEMBER 21, 10 – 11:30AM

For All New Fellows: NICHD Postdoc Orientation
Room 2A48, building 31

What unique opportunities are available to you at the NICHD?

You can learn the answer at our quarterly NICHD postdoc orientation. This orientation is separate from all of the other orientations and supplements the NIH-wide Office of Intramural Training and Education session. If you recently joined an intramural NICHD lab as a postdoc or visiting fellow, please plan to attend this NICHD-specific event.

Led by the NICHD Office of Education, the orientation will highlight both NICHD and NIH-wide intramural resources for postdoc fellows. Topics will include career-planning tools, grant opportunities for fellows, ideas for presenting your science locally, and the core facilities available to you. You will have the opportunity to meet fellows from other research areas and in different buildings. And we will share information on our key programs that support your professional development, complementing the mentored experience you will have at the bench.

(continued on page 16)
November Events  
(continued from page 15)

MONDAY, NOVEMBER 24, 8:30AM – 4:30PM
Workshop on Reproducibility of Data Collection and Analysis—
Modern Technologies in Cell Biology: Potentials and Pitfalls
Lipsett Amphitheater, Building 10

Learn about the reproducibility problems that can occur with
today’s advanced technologies from world-class scientists and a
panel of scientific journal editors in this all day workshop hosted
by the NIH Office of the Director.

Online registration coming soon.

PhD Comics