

Following Your Passion to a Career Path: A Conversation with Dr. Donna E. Shalala

By Lelsley Earl, Ph.D.

How do you get to be in the cabinet of the President of the United States? Take the advice of Dr. Donna E. Shalala, the keynote speaker for the 4th Annual NIH Career Symposium: “You figure out which one of your friends is going to run for President, and keep in touch for 30 years!”

Dr. Shalala, former Secretary of Health and Human Services, recipient of the Presidential Medal of Freedom, and current President of the University of Miami, has had an extraordinary career, and has been a powerful supporter of healthcare and the sciences in the United States and around the world. Surprisingly, Dr. Shalala did not start out her career in healthcare or science at all (she majored in history in college). She worked towards science gradually, following her nose as opportunities arose, and selecting those options that answered the questions, “Which one is the best adventure? Which one could I really be passionate about?”

Dr. Shalala’s key piece of advice to the audience came early in her talk. She said, “Careers are really a matter of opportunities, careers are a matter of following your passions, and sometimes your luck, and you never know where you’re going to end up.” Those opportunities can come from unexpected directions, and at unexpected times, and taking them on can require the courage to step out of what you know into something for which you are unprepared. While not all of us can drop everything and travel the world, Dr. Shalala suggested that, to have an extraordinary career, following your passion to your next career step can require the flexibility to move and to give up what is comfortable and familiar.

“I hope you don't just look at very traditional career tracks, because there are a wide variety of career tracks,” Dr. Shalala said. Not only have the standard tenure-track professorships been adapted and split up into several types, spanning teaching, research, and clinic, but also a growing subset of professorships include dual appointments in science and business or law, teaching students to apply science in new ways. “All of you, in the future, have to think about ways in which you can pursue your passion, not give up on your passion, and put [your career] together in interesting ways.” Finding the right fit for yourself can require pulling together all the elements of what you are passionate about, and getting an institution to create a position that includes all those pieces.

The biggest key to career success is the flexibility to grab opportunities as they pass by, and to take risks when necessary. Dr. Shalala's career exemplifies this: “Every job I've ever had, the consensus was, I wasn't qualified. It means that I've over-reached in every job I ever had, which made it both dangerous, and enormously fun to do.” Being willing to make mistakes, and to pick yourself back up when necessary, is at the heart of creating a big and successful career. But whether your

dream is to be in the President's cabinet, or to just add your bit of expertise to scientific knowledge, "what [the Career Symposium] is really about is about passion, it's about you being able to fulfill your dreams," about leaping headlong into your next adventure.

Lesley Earl is an IRTA Fellow in the National Institute of Dental and Craniofacial Research. She earned her Ph.D. in Cellular and Molecular Pathology at the University of California, Los Angeles in 2009. She is currently studying the role of mucin-type O-linked glycosylation in *Drosophila* development.

Research in Industry

Anne M. Miermont, Ph.D.

Are you passionate about science? Do you thrive in a fast-paced team-oriented work environment? Do you want work-life balance? Research in industry may be for you. Four scientists at different career stages and from different companies shared their work experiences and job-hunting advice.

Working in research in industry could involve different possible responsibilities. Some employees are technical experts working mostly at the bench, like Dr. Matthew Cheever, Scientist III at BD Diagnostics, and Dr. Christine Kiefer, Scientist I at MedImmune, who are at the beginning of their careers and took positions at the Ph.D. level. However, as you evolve in your job, you may move away from a strict research path and choose to manage people. "You don't give up science by doing so" reassured Dr. Peter Mason, head of the Microbial Molecular Biology section at Novartis, who is still involved in troubleshooting experiments. Likewise, Dr. Christopher MacLauchlin, Manager in Drug Metabolism and Pharmacokinetics at GlaxoSmithKline, oversees data and guides experiments of three bench scientists. In addition, communication is an important common responsibility. Dr. MacLauchlin writes reports and translates data into regulatory documents, and needs excellent oral communication skills to explain data to his project team. Finally, Dr. Mason "sell[s] the data" with strategically chosen words.

Research in industry is fast-paced and requires hard work, passion, and lots of energy – primarily during regular work hours! Indeed, Dr. Kiefer, who recently completed her postdoc, felt guilty at first about going home at 5pm and not working on the weekend. However, a bench scientist workday may not allow much downtime to sit and think about your research – so you may want to do that at home. Dr. Kiefer and Dr. Cheever agreed that, even though they don't decide where the research is heading, they definitely get opportunities to demonstrate their competence and creativity. Overall, all panelists felt rewarded from being part of a team, working toward a common product, or contributing to helping people.

All panelists agreed that networking is crucial to learn about positions and to advertise your expertise. When applying for a lower level position, networking is

also important to help you make an informed decision. Indeed, to respect everyone's best interests, companies may not hire an overqualified candidate with unrealistic expectations for responsibilities and salary, in fear that he or she will cause tension and/or high turnover. Talking to somebody at the company will help you figure out whether you are applying for the appropriate position. Postdoctoral training in industry, even if based at a university, may help you network with the right people and give you an edge to be hired at your dream industry job. To work in research in industry, no business background is needed. As for scientists from other countries, the only potentially limiting factor is the work visa quota. So, are you ready to apply? Get your LinkedIn and Twitter accounts going, and start looking for a position at least one year beforehand. Also, realize that it can take a few months between applying and being hired. Once hired, Dr. Kiefer advised to actively network within the organization to better understand and meet its objectives.

"Show your passion first, demonstrate your expertise, be persistent, and everything [job, money] will follow," recommended Dr. MacLauchlin. When asked whether it is a good time now to get into industry, Dr. Mason replied that it is certainly not the easiest, but getting grants in academia is not easy either. Altogether, to land a research job in industry, remain positive, keep up with science, and start networking!

Anne M. Miermont is a CRTA Postdoctoral Fellow at the National Cancer Institute. Her current research interest in preclinical drug development is to improve MAPK pathway-targeted therapies for pancreatic cancer. She is the recipient of the Sallie Rosen Kaplan Postdoctoral Fellowship for Women Scientists in Cancer Research.

Research Careers (non-Industry)

Janice Elaine Y. Silverman, Ph.D.

"When I grow up, I want to be a scientist!"

How many of us were presidents of science clubs at least once growing up? How many of us have dreamt of the Nobel Prize ever since we received chemistry sets in grade school or touched a beaker for the first time? But somewhere along the way in graduate school or during our postdoc, some of us realized that while we love doing science, we did not necessarily want to pursue the ivory tower. Thankfully, the Non-Industry Research Careers panel showed us that there are research opportunities in government, non-profit organizations, and academia that do not require one to be on a tenure track.

When it comes to funding mechanisms, the panelists agreed that non-tenure track research positions are not that different from those on tenure track. Funding can come from government, state, private sources, or even elsewhere. For instance, Dr.

Matthew Champion, Research Assistant Professor and Director of the Mass Spectrometry and Proteomics Facility at the University of Notre Dame, said that his core facility funds its own research.

While one might think that publishing is not important in a non-tenure track position, this is not so, according to Dr. Brian Bird, Veterinary Medical Officer at the Centers for Disease Control (CDC) and Prevention. “If you’re not publishing, you’re not doing your job.” Dr. Cesar Boggiano of the International AIDS Vaccine Initiative agreed, saying that papers are useful in showing advancement of your work to peers and philanthropists of non-profit organizations. Dr. Laura Gilliam-Ross, Supervisor of the Public Health Microbiology and Serology at the Colorado Department of Public Health and Environment, stressed that while her position does not require publications, they are important for personal growth.

One of the main concerns of the attendees was work-life balance. There was an expectation that while academic tenure translated to academic freedom and ensured job longevity, a non-tenure track position would allow for freedom to do things outside of research and to easily move on to different opportunities. In this regard, the answers of the panelists reflected the diversity of their jobs. As a non-tenured junior faculty at Howard University, Dr. Tamaro Hudson stated that there is still pressure associated with his non-tenure post. However, the pressure mostly comes from himself, since he mentors his own laboratory, and from additional administrative responsibilities outside of research. Dr. Hudson conceded that the teaching load is more lenient for non-tenure compared to tenure positions. Similarly, Dr. Boggiano said his organization’s written work hours of 35 hours per week does not reflect his actual longer work hours, but that he tries to take personal time on weekends. On the other hand, Dr. Gilliam-Ross said that working in public health for the State Department allows her to maintain a nine-to-five schedule. For Dr. Champion, working at a core facility was better than the hours in industry, which allows him to work remotely, but still is much like that in academia. At the CDC, Dr. Bird said that the day “is what you make of it.” Since research at the CDC is international, he travels from six weeks to three months at a time during outbreaks.

Finally, when asked where the best research programs are, the panelists agreed that there is a culture to each individual company and it is important to find your fit at the workplace you choose. Dr. Bird summed it best: “The most productive places are places where people find fun; it doesn’t have to be measured in stack of papers. You can find satisfaction in a cheap passion for viruses.”

Janice Elaine Y. Silverman earned her doctorate in Chemistry at University of Florida, after which she spent 2.5 years researching virology as a Postdoctoral Fellow at the University of Pennsylvania. She is currently a Research Fellow at the National Institute of Diabetes and Digestive and Kidney Diseases investigating the mechanism of HCV entry by developing a novel fluorescent imaging technique.

Faculty Careers in Research-Intensive Schools

By Payal Ray, Ph.D.

Fancy yourself as a small business owner? Like to see your ideas and concepts come to fruition and want to be a part of the process at every step? If yes, then you should direct your own lab at a research-intensive school – advises Dr. Paul Brett, University of South Alabama.

The panelists for this round of career discussion were a mix of junior and senior faculty members from institutes across the nation who offered a glimpse into the life of a PI at research-oriented schools. The panelists gave advice on a wide range of issues, including attaining a faculty position, writing your first RO1 grant, and handling various duties as a junior faculty member.

The most important advice that came from the panelists was to network. Why? Because not all jobs are advertised. Discussing your work with a faculty member at a conference might lead to an interview call even before the job is advertised. Dr. Peter Hitchcock, University of Michigan Medical School, got his first job by networking. Similarly, Dr. Cristina de Guzman Strong, Washington University School of Medicine, tapped into her network to build a team of senior mentors whose knowledge and advice would be helpful when applying for tenure.

So, how can fellows prepare themselves to get that perfect academic position? Begin by focusing on your research because a strong publication record is an important criterion for search committees. However, the strength of publication lies in quality (i.e. journal impact factor) rather than quantity. “But equally important as publication record is evidence of funding”, emphasized Dr. Jayne Raper, New York University School of Medicine. Fellows can get a funding jumpstart by applying for the NIH Pathway to Independence Award (K99/R00). Letters of recommendation are also important, so do not hesitate to ask your mentors for the absolute best recommendation letter. Another trick to increase your chances of getting an interview is to apply to a school where your research interest fits with the departmental goals. For the interview, prepare a clear and strong research seminar, as it is important to convince the search committee of your ability to do the proposed research. Be aware that not everyone in the audience will be an expert in your field, so the presentation should be general and not too focused.

The panelists had helpful advice on how to make a successful transition after you get a faculty position. First, negotiate for less administrative and teaching duties, get some ‘protected time’ when you can set up your lab, and generate data and start writing your RO1. Second, it is important to hit the ground running when you start a new lab, so get an early start gathering data and writing a grant. Take advantage of the grant office and the resources offered by universities. Also, identify secondary sources of funding such as foundation and society grants, like the American Heart Association. Write a grant as a co-PI and use a multidisciplinary

approach, or get on a training grant. Once settled in the lab, increase your visibility on campus by attending events such as poster sessions, and giving guest lectures to graduate students to familiarize them with your work. Remember to pick and choose your administrative duties. Even though serving on a review panel takes up time, it allows you to build your network, which can pave a smoother way for your next paper or grant.

The panel concluded by saying that even though running your own lab is a very rewarding experience, it can be easy to get carried away and lose the work–life balance. So make sure to enjoy some time outside the lab as well.

Payal Ray is a Postdoctoral Fellow at Eunice Kennedy Shriver National Institute of Child Health and Human Development who obtained her Ph.D. from Northwestern University, Chicago. She is currently studying epigenetic regulation of gene expression using *Drosophila* as a model system.

Careers in Science Policy

By Marina Kozak, Ph.D.

Many ‘non-bench’ scientific careers attract those who have a passion for thinking and communicating science to the public. What is unique about policy careers is the ability to not simply communicate but also influence how science is performed and then applied. Of course, communicating ideas clearly and succinctly is a major asset, but those ideas do not just stop there. They may be used to influence budget issues that relay into grant funding for basic research, or informing policy directly through congressional interactions to influence control over drug development, disease prevention, or regulation of research and development. Policy makers are “helping to get science used.” That is the central dogma of this field, according to Dr. Gayarthi J. Dowling, Acting Chief of the Science Policy Branch in the Office of Science Policy and Communications at the National Institute of Drug Abuse.

The panelists in this session provided great insight into the makings of a career in policy from a variety of unique perspectives. Dr. Peter Mason, the Head of Microbial Molecular Biology at Novartis Vaccines and Diagnostics, began his career as a Professor of Pathology developing new vaccines. He continued vaccine development at the USDA and now oversees all viral molecular biology research at Novartis. His influence over policy ranges from swaying vaccine development funding in response to global changes, such as the swine flu outbreak, to helping influence and interpret vaccine policies. Dr. Derek T. Scholes is a Government Affairs Manager in the American Heart Association (AHA) advocacy office, and started out as a science policy fellow with the Health Policy Office after completing his postdoc. Today he advocates on behalf of the AHA for policies that will lead to lower heart and stroke incidence.

Dr. Franca R. Jones is a Senior Policy Analyst for Chemical and Biological Countermeasures in the Office of Science and Technology Policy (OSTP). After completing her postdoc, she went on to serve in the US Navy, becoming involved in a

variety of assignments focusing on biological security before heading to OSTP, where she coordinates research and development, and reviews policies that may affect grant funding and education. Dr. Dowling began by managing grants for the National Institute of Neurological Disorders and Stroke. She now educates anyone from the general public to various members of federal agencies about drug abuse and addiction. Not every panelist completed a postdoc. Dr. Dowling pointed out many pursuing policy careers have limited postdoc experience. For example, Dr. Cherise P. Scott, a Scientific Liaison to the Stop Tuberculosis (TB) Partnership Working Group, went on to get her M.P.H. degree after her Ph.D., and now participates in coordinating TB drug development.

Policy fellowships often provide a stepping stone and exposure to a variety of topics, though many take different paths to the policy world and do not pursue fellowships. Internships can provide an alternative route and are readily available with professional groups, non-profit organizations, or congressional offices. Dr. Scholes pointed out that many events on Capitol Hill are open to the public and provide an easy setting for networking. Policy makers will often look for these types of outside experiences that illustrate broad thinking and are not limited by the thesis of research projects.

Scientists are in a unique position to influence the course of research. Policy-making offers an opportunity to merge many perspectives and coordinate agencies that will influence that course.

Marina Kozak is a Postdoctoral Fellow in the laboratory of Dr. Andre Nussenzweig in the National Cancer Institute. Her research focuses on understanding the molecular pathways of genes involved in DNA repair. She received her Ph.D. from the University of Pennsylvania where she studied the interrelationship of epigenetics, telomeres, and aging.

Bridging the Gap: Careers in Scientific Communications

By Allison Bierly, Ph.D.

Are you the lab member everyone comes to when they need help with their manuscripts? Do you like presenting your research more than you liked actually doing it? Were you that rarest of all grad students who, upon opening the blank document on which your dissertation would take shape, said to yourself, "Now for the fun part!"

If you answered yes to any of these questions, a career in science communications might be for you. When we hear about science communications, we often think of science journalists, or prominent researchers who have authored books. However, the panelists at the NIH Career Symposium represented a much broader range of experiences.

Dr. Zina Johnson, a Medical Science Liaison at Inspire Pharmaceuticals, spans the communication gulf between industry and the doctors and patients they serve. At the other end of the spectrum, Dr. Victoria Aranda works as an Associate Editor for *Nature*, analyzing manuscripts and coordinating the review process. Dr. Larry Miller handles annual reports, media and more as the Director of Communications for the International Partnership for Microbicides. Dr. Cheryl Kassed previously worked as a Senior Research Leader at Thompson-Reuters and the Senior Science Writer for the Director of the National Institute of Drug Abuse. She is now the Chief of Scientific Operations for Health Analytics, LLC. Dr. Alisa Schaefer works as an Advisor for Global Outreach at the National Center for Research Resources, where she meets with foreign delegations and prepares briefings and policy papers.

The panelists showed great enthusiasm for their careers while candidly discussing the challenges. Dr. Aranda said she “was worried that I’d fall into a routine, but that’s never the case; every day is different.” On the flip side, she said, the pace of her job is tough, and she carries a lot of responsibility. Dr. Schaefer recalled being asked to sum up a scientific study in two sentences for policymakers, emphasizing the need for brevity and clarity in government communications. However, she added that working in the administrative side of government also meant less stress and shorter hours than labwork. Dr. Miller spoke of his passion for his work, saying, “What I really love is to translate science and industry issues into English for people.”

To those wishing to trade in the pipet for the pen, the panelists had sound advice. Dr. Johnson stressed the importance of knowing your audience’s needs, and advised fellows to “diversify yourself” in order to stand out. Dr. Miller encouraged fellows to “take every opportunity to grab something you can write” to show employers that you have the skills necessary to transition into this field. Dr. Kassed added that writing letters to the editor and white papers for causes you believe in could also provide pieces for your portfolio, but cautioned fellows to “be very careful and cognizant of your online presence; these short pieces need to be as close to perfect as you can get.” The panelists suggested several ways to gain experience, including master’s programs and the AAAS Mass Media and Policy fellowships. They also suggested volunteering for NIH communications offices or businesses that cover science news, such as NPR, the Discovery Channel, and local TV affiliates.

As the panelists revealed, crafting a career in science communications takes creativity, dedication, and a sincere passion for making science accessible to the non-scientific world. For those who take the plunge, however, the rewards are well worth the journey. If you think this is the path for you, don’t wait. Volunteer, join a newsletter, or start scouting for internships. For aspiring science communicators, there’s no time like the present to start doing the work you love.

Ali Bierly is a Postdoctoral Fellow in the Cancer and Inflammation Program at NCI-Frederick. She resides in Mount Airy, MD, and loves science writing, immunology, and distance running.

Career Opportunities in Nonprofit Organizations

By Smita Chandran, Ph.D.

An unequivocal cause drives a nonprofit organization, and being a part of this common cause can be professionally rewarding while allowing a sense of unity and personal satisfaction.

Five established panelists with varied careers in the nonprofit sector offered their unique perspective to an audience of fellows looking to venture into their world. Dr. Debra Speert, Publication Information Manager at the Society for Neurosciences, supervises the accuracy of scientific communication being disseminated to a wide variety of audience, from the media to the general public. Dr. Albert Hwa, Scientific Program Manager at the Juvenile Diabetes Research Foundation (JDRF), is involved in planning research initiatives, patient advocacy, fund-raising, and increasing public awareness about juvenile diabetes. Dr. Nicole Kresge, editor of the American Society for Biochemistry and Molecular Biology's monthly news magazine, *ASBMB Today*, oversees production of the magazine and is involved in every step of its process, from generating article ideas and hiring writers to editing content and issue design. Dr. Ami Shah Brown, Director of Vaccine Operations at the Sabin Vaccine Institute, directs operations, manages budgets, timelines and regulatory affairs associated with vaccine development. Dr. Sharmila Banerjee-Basu is President and Chief Scientific Officer at Mindspec, Inc., an organization that employs an integrative biology/bioinformatics approach to provide a modular database that can help further our understanding of molecular pathways underlying neurodevelopmental disorders.

So what does a typical working day in a nonprofit organization look like? A common theme that emerged from all the panelists was the lack of a highly structured daily schedule. Like Dr. Brown said, "one needs to be flexible and be able to wear many different hats on any given day." So a position in a nonprofit organization faces a fairly broad set of daily responsibilities that come with its unforeseen challenges, but presents an opportunity to gain experience early on in a diverse arena.

But how does one prepare for a career in a nonprofit organization? Dr. Kresge advised first determining a career goal and then laying down the groundwork for it. For instance, a cogent piece of advice for someone interested in science writing would be to begin building a portfolio of writing samples by seeking out volunteer writing gigs. That's good advice but how does a Ph.D. make that crucial first step into a nonprofit organization? Dr. Speert assured that soft skills like leadership, training, and managing personnel are transferable, and advised tailoring a CV to emphasize those skills from unique personal experiences drawn from our scientific careers. Dr. Basu and Dr. Brown highlighted that the mindset in a nonprofit organization is different. Advancing the cause of the organization, being a team

player and delivering a project well take precedence over personal goals like getting a first author publication.

Websites such as www.idealists.org, www.philanthropy.com, and www.naturejobs.com are good places to learn about positions in the nonprofit sector. However, the importance of networking was brought into sharp focus by Dr. Brown who noted that every job she has ever held had been through a network contact. The panelists unanimously agreed on the importance of networking and suggested maintaining collaborations and connections, using tools like LinkedIn and volunteering at interested organizations. Dr. Hwa also advised on seeking informational interviews to really understand the organization and the position.

The chance of being part of a larger common goal combined with the opportunity of gaining multi-dimensional experience across a breadth of responsibilities might appeal to the wide range of skills and strengths of a bench-trained scientist, making a career in the nonprofit sector certainly one worth considering.

Smita Chandran is a Visiting Fellow at the Vaccine Research Center. She received her Ph.D. from the University of Maryland at Baltimore.

Federal Careers: Non-Research Positions for Ph.D.

By Jacquelyn Cole, Ph.D.

When her husband asked why she just did not get another job, panelist Dr. Shayla West-Barnette, initially replied: "I can't do that. I can't leave research. I've invested all of this time, all of this effort into getting this Ph.D." However, she quickly realized that the skills she had accumulated during her education – organization, presentation, writing, and working with others – could carry over into other fields, and that she would not be wasting her experience in research by changing careers.

Representatives from five federal agencies, including the National Center for Health Statistics, SAIC (Science Applications International Corporation), the Department of the Army, the United States Patent and Trademark Office, and the FDA offered an overview of non-research career options for Ph.D.s. No panelist could pin-point a specific "day in the life" scenario, as each schedule depends greatly on the time of the fiscal year, as well as the project. They all tailored their positions to their own needs. Many discovered after being hired that they needed to acquire additional skills to succeed at their jobs. While they are all encouraged to continue publishing in their current positions, some continue to do research, whereas others are fully engrossed in their non-research workload.

They all stressed the importance of having good writing skills – in this respect, your publication record is valuable even when you're away from the bench. The panelists

cautioned that the hiring process is always evolving and even now, it is different than when many of them applied for their positions just a few years ago. Almost all federal jobs now go through Human Resources, so having a strong résumé is vital. The panelists agreed there is a need for precise use of keywords in both the searches you perform as well as within your résumé. After you clear the HR portion of the process, your résumé needs to be sufficiently descriptive so that the hiring official reviewing it can quickly assess your qualifications. Look for parallels in the advertised job listing and in what you are doing in your research lab, such as mentoring students if applying for a management position, and emphasize them in your résumé. If you are thinking that those grades from graduate school or beyond will be ignored, think again. Many positions require transcripts from your schools, as well as a cover letter, letters of recommendation, and/or proof of current employment. Most positions within the federal government will require citizenship, though there are some options for non-citizens, such as interning. All panelists advised that you read the requirements carefully before applying.

Several key points were emphasized during the panel discussion. For example, work tends to be fast-paced, so procrastination is simply not tolerated in most of these career choices. Also, these jobs extensively rely on teamwork, so people who prefer to work alone may not enjoy the transition to a team. You need to work with a variety of personality types as well as professions, so flexibility is important. It is advised that you get as much experience as you can as a student or trainee, like being a part of FelCom and other committees, mentoring students, and interning. The more experience you have, the better suited you will be for your future career, no matter the path you take.

Further information on federal jobs and current openings can be found at <http://www.usajobs.gov>, <http://www.jobs.nih.gov>, and <http://www.uspto.gov>. Additional vacancies can often be found in scientific journals as well as local newspapers and job fairs.

Jacquelyn Cole is a second-year Postdoctoral Fellow at the National Institute of Mental Health, working on quantitative proteomics. She received her Ph.D. in Chemistry at Rensselaer Polytechnic Institute working on affinity-interactions between proteins and oligonucleotides. She resides in Frederick County with her husband and recently gave birth to their first child.

Get Off the Bench and Into the Game: NIH Careers Away from the Bench

By Wendy M. Knosp, Ph.D.

As a world leader in biomedical research, the NIH employs a number of scientists in non-research positions that provide essential services in order for it to function. Presenting an overview of these diverse types of positions, the session “NIH Careers Away from the Bench” consisted of a five-member panel, including a Senior

Licensing and Patenting Manager, Program Officer, Assistant Director for Science Administration, Scientific Review Officer and a Staff Scientist. All of the panelists have Ph.D.s and completed at least one postdoctoral fellowship, although each took different routes after their postdoctoral training that led them to their current careers.

Dr. Janet Cyr previously held a tenure track research position, which she credits with providing critical insights for her current job as a Program Officer at NIDCD. Dr. Ilene Karsch Mizrachi held two postdoctoral fellowships and then worked for a small company before coming to NCBI, where she is currently a Section Chief for the Primary Data Archives Section in the Information Engineering Branch of NCBI, coordinating the processing of all sequence data received by GenBank.

Many panelists chose their current careers as a result of their desire to have a positive impact on the larger scientific community. This was particularly highlighted by Dr. Rita Devine-Ward, the Assistant Director for Science Administration at the NINDS. She implemented an annual summer internship program for high school and college students that specifically encourages Native Americans to get hands-on research experience at NIH.

Dr. Kevin W. Chang helps move technology forward by facilitating the process of getting scientific discoveries out into the market as a Senior Licensing and Patenting Manager in the Office of Technology Transfer. Dr. Sathavisa B. Kandasamy started out in pharmacology research and now works as a Scientific Review Officer at the NICHD where he enjoys interacting with other scientists and being at the forefront of what is happening in his scientific field.

The panelists recommended seeking out a career that will make you happy and fulfilled, rather than pursuing a career simply because it is expected of you. Another critical factor for many was choosing a career that offers a flexible schedule and/or part-time telecommuting in order to have more time for their families. If you are interested in a non-research career at NIH, one practical piece of advice offered was to get experience by volunteering or applying for an internship or detail. Many institutes at NIH are grateful for an extra pair of helping hands, even if it is only a few hours a week. Getting relevant experience will bolster your CV and helps you get that coveted job interview. Additionally, FAES offers a certificate program that can help you transition from the bench to a job in the field of technology transfer. If you aren't sure which career you want to pursue there are a number of workshops offered by OITE throughout the year that can provide additional information about the various types of jobs that are out there.

If you are interested in pursuing a career beyond the bench, be sure to take advantage of all the resources available at NIH that can help you get into the game and achieve your career goals. Get some real world experience by volunteering or doing an internship, and keep your eyes open for that job posting advertising your next career move. So get out there and good luck!

Wendy M. Knosp is a Postdoctoral Fellow working in the laboratory of Matthew Hoffman at the NIDCR where she is studying salivary gland development and regeneration.

Careers in Science Education: Guiding K through Gray

By Brenda Kostelecky, Ph.D.

Science education for all ages is becoming increasingly important as science and technology advances continue to change our everyday lives. Scientists make valuable contributions to improving science education by pursuing careers in settings from formal schooling (elementary to graduate-level) to informal science education (museums, after-school programs, etc.). In the Careers in Science Education: Guiding K through Gray session of the NIH Career Symposium, a diverse panel of science education professionals detailed their career paths, described what makes their jobs challenging and satisfying, and gave practical advice on how to pursue a career in science education.

Panelist Dr. Jabbar Bennett is Assistant Dean at the Brown University Graduate School where he enjoys assisting graduate students in their professional development. Dr. Bennett's career trajectory has included directing several multicultural, educational and community partnership programs at Harvard Medical School. Dr. Bennett suggested scientists take advantage of their time as postdoctoral fellows to explore career options and to pursue the best career for themselves, regardless of outside pressure.

Maryland native Dr. Suzanne Dashiell Elder took part in the NIH Resident Teacher Program, and is currently teaching biology and chemistry at Urbana High School in Frederick County. Although the NIH Resident Teacher Program no longer exists, many counties offer similar alternative teacher preparation programs for advanced-degree holders intending to become educators. Dr. Dashiell Elder recently completed a summer-long research internship at the Batelle National Biodefense Institute, and emphasized that part-time research opportunities are a great option for science teachers interested in maintaining their research roots.

Before Dr. Nicole Gerlanc became an Assistant Professor of Biology at Frederick Community College, she taught courses as a graduate student at Kansas State University and as a postdoctoral fellow at Murray State University. Dr. Gerlanc emphasized that universities focused on undergraduate education, rather than on research, offer more opportunities for scientists to gain significant teaching experience. Dr. Gerlanc encouraged scientists to build their teaching credentials by applying for adjunct positions at community colleges, which allows scientists to acquire teaching experience without having to make a long-term commitment.

Informal science education is an option for those who want to teach science in a non-traditional setting. Dr. Erika Shugart is the Deputy Director for the Marian Koshland Science Museum where she manages the development of new exhibits and

oversees the museum's website content. Dr. Shugart credits her ability to transition from bench research to science education and science policy, in part, to her experience developing one of the first websites dedicated to helping scientists find a career. She suggested that scientists seeking to transition into new careers participate in one or two long-term volunteer projects where they can develop key organizational and leadership skills to distinguish themselves from applicants who have done multiple short projects requiring less responsibility and commitment.

The panel members' clear enthusiasm for their own jobs gave credibility to their advice that one should follow a career path they are passionate about. To make a career transition work, the panelists emphasized that scientists need to develop the skills they lack and to build networks to increase the opportunities available to them. Finally, the panel participants agreed that Ph.D.-level scientists can offer a depth of scientific understanding that is vital to improving science education and can make a significant difference in students' lives.

Brenda Kostelecky is an IRTA Postdoctoral Fellow at the Eunice Kennedy Shriver National Institute for Child Health and Human Development. She currently studies the impact of changes in mitochondrial morphology and bioenergetics on cell polarity.

Faculty Careers in Teaching-Intensive Schools

By Bindu Abraham, Ph.D.

At a recent social event, I met a mother with three year-old twins who is a faculty member at a four-year college. We talked about her typical workday and schedule. After listening for a while about how she is always busy preparing for class, teaching, writing grants, and doing research, I asked her how she does it, to which she promptly answered, "I drink a lot of coffee." The four faculty members from the teaching-intensive schools panel would not have begged to differ.

Enjoying teaching was key in shaping their careers. Dr. James Saunders spent 26 years at the USDA actively performing research in the field of molecular biology before joining Towson University. Dr. Robert Rosenberg was already a full professor at University of North Carolina at Chapel Hill for over a decade, and was established in the field of electrophysiology and biochemistry research before joining Earlham College. Both loved the aspect of interactive teaching and thus transitioned into a school that was teaching intensive. The other two panelists, Dr. Nathalie Dautin, Assistant Professor at the Catholic University of America, and Dr. Terrie Rife, Associate Professor at James Madison University, made teaching their prime focus very early in their careers. After brief postdoctoral stints, both took up positions in teaching intensive schools. It was clear that when each of them realized teaching is what they wanted to do, they actively pursued every activity that could help them transition into this role. That meant teaching at every opportunity, including volunteering to assist at local schools, serving a substitute teacher, or

offering to teach for one or two sessions for the courses that their Ph.D. or postdoc advisor taught at the university.

At teaching-intensive schools, research is an integral part in the faculty's career, although it needs to be student oriented. Dr. Rosenberg noted from his prior experience that unlike the cutting edge research that is pursued to establish oneself in the field, research in teaching intensive schools is tailored for the students to initiate and trigger an interest in research. Yet, publications are also certainly a measure of success in this endeavor, adding stars to a faculty's tenure application. Similarly, securing grants and scholarships are vital in bringing in funding for research. The general opinion of the panelists was that scholarships from various trusts are more easily acquired than federal grants. These funds cover student assistant salaries and other expendables. Although most equipment are shared to save money and space, specialized equipment with reasonable justification can be bought by individual faculty funding. Research collaborations with larger universities, government or non-governmental institutions are greatly encouraged. Dr. Natalie Dautin said she still uses the contacts she made during her postdoctoral work at NIH to collaborate and conduct some of her current research. Along with performing research, it is a way of helping undergraduate students experience a research-intensive environment.

There is one other thing that all of the panelists enjoy: interacting with students. As Dr. Rosenberg put it eloquently, "You might be listening to a sophomore's rants about his obsessive mother not knowing what say, but just the fact that you are listening goes a long way in inspiring and retaining the student's interests in the subject." Many of us in the room could not agree more that the reason we pursued a certain field was because of one teacher who listened, triggered our curiosity, and inspired our interest.

At the end of the session, it was easy to assess that although teaching is an arduous task that involves hours of lecture preparation and holding office hours, the joy and appreciation from students who realize their own potential is the most rewarding part of this work. At the time, I did not ask my new friend what she got out of working so hard, but now I can almost hear her retort: "100% job satisfaction!"

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Life as a Junior Faculty Member

By Rebecca Lopez, Ph.D.

You just landed that perfect job as an assistant professor. Now what?

Whether you know what you want out of your career or are still deciding which avenue to pursue, this dynamic panel of junior faculty offered relevant advice on everything from landing your dream job to hiring your first employee.

Dr. Michelle Mondoux, who obtained her dream job as an assistant professor at a small liberal arts college, began posting her résumé online during the second year of her postdoctoral fellowship. The greatest advantage of starting the process early was learning where her résumé was lacking. She eliminated a major flaw by teaching part of an FAES cell biology course at NIH. The position she later obtained at College of Holy Cross was in cell biology.

Once you get an ideal job offer, how do you negotiate your employment package and go about the business of starting your own lab? Typically, startup costs are the most negotiable aspect of your contract. Even if you start with your own grant money, the panelists warned against compromising on your startup package. It is better to overestimate the amount needed than to come up short later. Dr. Andrés Cisneros, Assistant Professor at Wayne State University, suggested that postdocs catalogued items used on a daily basis in their current lab. Dr. Debra Silver, Assistant Professor at Duke University, emphasized that you could even take pictures of equipments in your mentor's lab. Try to obtain list prices and if necessary, ask for quotes from manufacturers. And do not forget to include potential postdoc and graduate student salaries and fringe benefits, such as health insurance, in your budget estimates.

Dr. Brian Berman, Assistant Professor at University of Colorado, summarized another important factor for success with the question, "How much of your time is protected so you can do your job successfully?" Protected time includes exemptions for new faculty from duties like teaching and serving on committees for a specified amount of time—usually one year. Dr. Elizabeth Moore, Assistant Professor at University of South Dakota, encouraged obtaining these stipulations in writing, and knowing your department's expectations.

Then there is the question of who to hire. Two panelists quickly hired research technicians, both of which were terminated due to conflicts. Dr. Mondoux also hired an honors student that she had to let go of shortly afterward. The consensus? Who you hire depends entirely on what you want out of your lab. So

take your time and trust your gut instinct. Dr. Moore now favors undergraduates because “with a little training, undergraduates have some serious lab skills that you shouldn’t underestimate.”

Equally important is identifying mentors to guide you through this entire process. Many institutions have mentoring programs in place that often pair new faculty with at least one senior mentor. However, most of the panelists found that the best advice often came from fellow colleagues who had recently obtained tenure. Dr. Berman wisely added, “Don’t be afraid to ask for help!”

Finally, the panelists assured us it is possible to achieve a good balance between work and personal life. For the panelists, this was all about wise time-management. Dr. Moore emphasized the importance of carving out “me-time,” which for her means jumping on the elliptical in the morning before starting her day. Another suggestion was learning to complete tasks in “small windows of time.”

Dr. Berman concluded this session with the inspirational statement, “Believe in yourself and your work!” Ultimately, the panelists demonstrated that success in science hinges on our enthusiasm, dedication, and creativity.

Rebecca Lopez is a Postdoctoral Fellow in Dr. Richard Childs’ laboratory at the National Heart Lung and Blood Institute. Currently, her research efforts focus on various aspects of using natural killer cells of the innate immune system in cancer immunotherapy.

Career Options for Clinicians

By Rainer Paine, M.D., Ph.D.

There are many career options for clinicians beyond seeing patients in a clinic or hospital. This panel discussion at the 4th Annual NIH Career Symposium featured five physician panelists who have expanded their careers through research, administration, teaching, business, and public service.

Most of the panelists continue to do at least some clinical work that is either directly related to their research, or else is a means of earning extra income and maintaining their clinical skills. Dr. Suskauer, Assistant Professor at Johns Hopkins University, enhances her research in traumatic brain injury by seeing clinic patients twice per week. Dr. Porter of the FDA spends his time writing, reviewing drug safety data, and helping get drugs to market. He occasionally moonlights in a hospital to maintain his clinical skills. Dr. Wood, a clinical investigator at NCI, sees patients in clinical trials and writes research protocols. She works with researchers conducting basic research on HIV and assists them in translating benchwork to human trials. Dr. Dreisbach, Associate Professor at the University of Mississippi, spends half of his time with clinical duties and the other half doing translational research, writing protocols, dealing with the institutional review board, and mentoring junior faculty.

Dr. Mutisya of Solvay Pharmaceuticals does not see patients, but feels that she can help many people through work in the pharmaceutical industry. She describes the work of a medical director at a pharmaceutical company as performing clinical research, and being responsible for the protocol, research ideas, and administration. The director also interacts with regulatory affairs and the FDA. Some physicians instead work as medical affairs directors. They are responsible for the oversight of marketing and interpreting data for clinicians and regulatory authorities.

Having at least some medical residency experience is very useful even if one does not directly care for patients. Dr. Wood felt that her residency experience was “invaluable” because it made her better able to understand clinical science. Dr. Porter stated that one must have a medical license to be a medical officer at the FDA. Half of the medical officers are active clinicians, although not all are board certified. He felt that having done enough residency for a medical license is important because the FDA’s actions have such a great effect on clinical care. Dr. Mutisya noted that the utility of a residency really depends on one’s goals. Entrepreneurs in biotechnology don’t need a residency, whereas physicians working in the medical affairs division of a pharmaceutical company generally have at least completed an internship and obtained a medical license.

Physicians who wish to treat patients in the United States must complete a US residency. However, they do not necessarily need to complete a US fellowship if they have already completed a foreign fellowship. They may instead just take the US subspecialty boards. Those who have not completed a US residency still have many career options. For example, they may participate in pharmaceutical trials to assess the value of medications. They may also become involved in health economics, medical communications, medical science consulting, or pharmaceutical sales.

A common experience among some of the panelists was initial discouragement from their mentors about their choices to leave full-time clinical practice. Nevertheless, they took the risk, followed their passions, and found career satisfaction. Dr. Mutisya, speaking about her ability to make a difference in many people’s lives through work in the pharmaceutical industry, called her career choice “one of the best decisions” she had ever made.

Rainer Paine is a Clinical Fellow in movement disorders at the National Institute of Neurological Disorders and Stroke. He completed postdoctoral training in neural network models of movement sequences at the RIKEN Brain Science Institute and a neurology residency at Dartmouth-Hitchcock Medical Center.

Consulting Careers

By Jennifer McCulley, Ph.D.

The variety of the day-to-day work, as well as the challenging nature of the many projects, make consultancy a good choice for those pursuing a career away from the

bench. Consulting companies range from small boutique firms specializing in one particular subject, to larger multinational corporations that tackle a broad range of projects. The projects vary from giving clients advice on business strategy to helping with business organization and operations management. Clients can be large healthcare corporations, small biotech companies, federal agencies, or businesses unrelated to science.

Consulting work is project-based, which means that there is intense focus on one particular project for anywhere from three months to a year at a time. As Dr. Nora Gardner from McKinsey & Company noted, this creates natural start and end points to the work and allows a lot of flexibility for extended periods of time off, as in the case of maternity leave.

The amount of science-based technical knowledge that is used in each consulting project varies. Some people, such as Dr. Claudia Munoz from the Boston Consulting Group (BCG), decided to stay more on the scientific side of consultancy. All projects during her two years with BCG have involved consulting for a pharmaceutical company, and she has been able to leverage her experience as a Ph.D. to move each project forward. Others, including Dr. Laura Borland from Booz Allen Hamilton, apply their Ph.D. skill set to become more generalized problem solvers. Strong interpersonal skills are very important as consultants usually work in groups of diverse individuals to achieve a common goal.

Many consulting companies, including McKinsey, BCG, and Booz Allen Hamilton, offer positions to scientists straight from their Ph.D. without requiring postdoctoral experience. They are looking for talented individuals with advanced degrees who can offer a breadth of expertise to the company. Those with medical, law, business, or master's degrees are also attractive applicants.

One caveat to consultancy, according to Dr. Borland, is that the purpose of a consultant is to give advice. Ultimately, the decision to move forward with any of the advice is dependent on the client. For this reason, many people leave the consulting business for a more active leadership role in the public or private sector. At McKinsey, as many as 30% of consultants leave the firm to work for one of their former clients. Aside from this option, the career trajectories for scientists are varied following their tenure as a consultant. Having acquired business acumen to supplement their technical Ph.D. training, many scientists are comfortable starting a new company or venturing into industry. Due to the intensity of the work and the immense speed at which new skills are acquired, many people only consult for a few years before using what they have learned as a stepping stone to a different job.

While many scientists work for large consulting firms in the beginning stages of their careers, Dr. Dervla Mellerick-Dressler entered consultancy through a different path. Having run an academic lab for 12 years, she was ready for a change, and family concerns facilitated her decision to leave academia and start a boutique consulting company specializing in science writing and editing. Prior to launching

Science Word Doctor, LLC, she took classes in communication, technology, and entrepreneurship to gain the necessary business skills.

Consultancy is a good option for anyone looking for a fast-paced career with constant opportunities to learn and apply technical knowledge to help solve problems. Consultants gain many skills useful in future career paths, and as Dr. Dressler noted, “it’s never too early to start thinking about your long-term career.”

Jennifer McCulley is a Postdoctoral Fellow in the National Human Genome Research Institute. She investigates mechanisms governing genome stability in the lab of Dr. Kyungjae Myung. Jennifer received her Ph.D. in Molecular Cancer Biology from Duke University in 2010.

From Discovery to Start-Up

By Natalie Goldberger, Ph.D.

Do you have a great idea? Are you planning on doing anything with it? During the NIH Career Symposium, a panel of experts in the field of patents and entrepreneurship discussed what it takes to move an idea to reality.

The discussion started off with the most critical question: What skills and traits are necessary to become a successful entrepreneur? Dr. Tania Fernandez, Director of the venture capital company Burrill & Company, explained that as a scientist you already have many of the necessary skills to succeed in business, such as being analytical with a discerning eye to separate out the noise. She also noted you must be extremely creative and unique since it is a very competitive field. Dr. James Kastenmayer, an intellectual property attorney at MedImmune, agreed that you must think critically, like scientists do every day, to identify important facts. You also need to be a good writer to communicate complicated ideas clearly, without using confusing jargon. Dr. Matthew Phillips, a startup company founder, stated that good people skills and magnetism are crucial to sell ideas and assemble an effective team. You must also have a business-oriented mind to assess the market demand for products, and move forward even when there are associated risks. Dr. Mirit Snir, Director of Industrial Relations at her startup company BioAbroad, agreed that you must like taking risks and initiating things, have good writing skills, be a team player, and be able to sell the product. Finally, she suggested having a partner to share some of the risks and decision-making responsibilities.

If you have the traits mentioned, then what is your next step? Once you have a solid idea, you should generate non-disclosure documents to protect your idea when contacting investment groups. The documents should describe your idea in enough detail to be understood and replicated. Next, you should mine the sea of potential investors for funding opportunities; you can pursue seed or angel investors, or more seasoned venture capital investors. In terms of funding, low-interest loans for initiating company expansion, market entry, or product launch are available in Maryland through TEDCO (Maryland Technology Development Corporation). In addition, Montgomery County has an incubator program open to developing

software and biotech companies, which provides business and IT support, as well as cheap rent space.

What challenges might you encounter? Dr. Phillips described two major mental roadblocks he encountered. Unlike what he originally thought, not all good ideas are already taken and patents are not forever — after 17 to 20 years, they fall into the public domain. Second, one does not need to be a genius to start a company. You simply have to have a good idea and be able to raise money for its development. The other experts mentioned financial challenges, namely the lack of a stable salary and the difficulty of raising money. They also mentioned that you must follow competitors and know what they are doing — you must be aware of the competitive landscape. Last of all, keep in mind that you might have a great idea that is not commercially feasible or just too hard to patent.

In closing, the experts emphasized going after your startup dream and not letting self-doubt or other obstacles get in your way: You certainly won't succeed if you do nothing.

“An idea that is developed and put into action is more important than an idea that exists only as an idea.” – Buddha.

Natalie Goldberger is a Postdoctoral Fellow working on breast cancer metastasis as it relates to dysregulation of microRNA expression at the National Cancer Institute. She received her Ph.D. in 2008 from The Ohio State University where she used mass spectroscopy to study the androgen receptor conformation after androgen-binding. Before graduate school, she studied breast and prostate cancer genetics within the National Human Genome Research Institute at NIH.

The Business of Science

By Jeffery Zhao, Ph.D.

Enjoying the big picture instead of the technical details? Fascinated with science but unwilling to get your hands dirty every day? Longing for cutting business deals? If your answers are yes, you are probably thinking about joining a company and escaping the bench.

The transition from an academic lab to a corporate office is not easy even at the best times. However, it is not an uncharted territory either. The panelists of the “Business of Science” session have all achieved success in their various non-bench positions. Dr. Ray Blanchard is the head of the R & D innovation program of QIAGEN's Center of Excellence for Biological Content Development. Dr. John Verburg, a biotech industry veteran, negotiates and plans oligonucleotide business at Life Technologies. Dr. Jhilya Mayas, a scientific supervisor at Ogilvy, a public relations firm, develops educational programs for pharmaceutical companies to introduce new therapeutics to doctors. Dr. Jessica Blumstein, after working as a

management consultant for several firms, currently manages pricing and contracting of BioOncology, a cancer-related franchise at Genentech.

Although a diverse group, the speakers shared an obvious similarity - a Ph.D. degree, which inevitably attracted a question from the audience: would too much education work against you if you are in a non R & D position in the industry? One of the speakers explained that a Ph.D. degree could indeed be a sledge hammer, and shut the door to certain positions. However, if you use the Ph.D. credential responsibly, and know “how to spin your story,” it will help you pry open the door. Blanchard agreed that his problem-solving skills honed as a researcher gave him an advantage in the business. “Selling yourself to a potential employer is similar as presenting your research data,” added Verburg.

Non-bench positions in the biotech industry encompass a wide-range of functions, and often involve highly dynamic and unpredictable situations. As the central theme of these positions is to constantly interact with people, superb diplomatic and communication skills are essential. Unfortunately, such skills may not be clear from a scientist’s track record in research, warned the speakers. Thus, relevant experiences outside the lab are extremely beneficial for a scientist planning to move away from the bench. When she studied at University of California, San Francisco, Blumstein took advantage of being at the heartland of Silicon Valley, and joined a club to discuss business cases and to gain a deeper understanding of business operations. To better prepare for a career in science communications, Mayas became the president of the Graduate Student Council at New York University (NYU), and was a teaching assistant for several graduate and medical school level courses. Her experiences at NYU demonstrated that she could communicate effectively, especially with doctors, who are her current clients. In contrast, Verburg and Blanchard took an indirect yet typical route to the non-bench positions: they joined the companies as research scientists, but gradually transitioned to project management and business development after they proved their excellent business acumen and interpersonal skills.

The panelists also shared some valuable advice that helped them during the job hunting. A polished resume with key points, tailored to different employers, is necessary to win “the hiring manager’s precious ten-second attention,” according to Verburg’s own experience as a hiring manager. Blanchard encouraged job seekers to be persistent. It took him nine months to secure his first job in the industry. Mayas suggested working with recruiters who have lots of connections and are motivated to find a job for their clients.

The speakers concluded the session with a challenge to the audience: Get out of your comfort zone, and you will then find tremendous opportunities out there.

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