Center for Cancer Research
Volume 15 | Issue 1
Spring/Summer
2016

CCR Fellows & Young Investigators Newsletter

Spring and New Beginnings

Spring has sprung and with it comes change. This is my first issue at the helm of the CCR-FYI Newsletter and I want to acknowledge the contributions of esteemed colleagues, both old and new, as we launch the Spring/Summer edition of this Newsletter.

We start off with a recap of the recently held CCR-FYI Colloquium, an annual event that brings together all trainees of the National Cancer Institute (see photos courtesy of Melissa Fernandez, with help from Sanath Janaka). Kyster Nanan has a great rundown of two workshops, with career advice for trainees who are transitioning to that "first big job". Anurag Paranjape follows it up with an excellent summary of the Technology Transfer workshop, with advice for those of you wondering how to break into this field.

And speaking of transitions, Jailynn Harke muses with us regarding where to go after NIH: med school, grad school, or both? And while you're thinking of

CCR-FYI Association is supported by the CCR Office of the Director, National Cancer Institute.

From the Editor-in-Chief's Desktop

Anna Serquiña

your next step, check in with Amanda Decker about The Impostor Phenomenon and how this might be detrimental to you as you take on new challenges.

In the news section, Dan Thoresen discusses the Moonshot Initiative, a different approach from the White House that aims to fast-track cancer research. Abbey Zuehlke reports on the Zika Virus, which has taken over the news space previously occupied by Ebola (I knew it — viruses will take over our world. P.S. I'm a virologist).

Next, Valerie Miller takes us to the Canadian Rockies, where she goes skiing in between hobnobbing with top scientists in personalized medicine and genomics. And last but not the least, Ritankar Majumdar and Majumdar Sheshadri tackle the Inflection Point (you'll have to read it to find out what it means).

We hope you enjoy this issue as much as we had fun writing it. Also, I hope you find that it comes with much heart and sincerity, brought to you by this group of editors and writers who are passionate about getting our voices heard in this big, busy, and glorious place called the NIH.

(Cherry Blossoms at the Washington Monument, DC photo by Anna Serquiña)

Table of Contents

Living Life Off the Beaten (Tenure) Track

Private-sector researchers and scientific writers offer advice on finding your dream job outside of academia

By Kyster K. Nanan

At this year's CCR-FYI Colloquium, there were a number of workshops catering to trainees interested in pursuing non-academic careers. Because of my long-held love of science and a steadfast interest in pursuing a career in industry, I attended both the *Industry* and *Scientific Writing* workshops. Instead of simply rehashing the sessions' proceedings, I thought it would be more beneficial to our readers for me to first compare the salient qualities of these non-academic careers with those of the more familiar tenure track. After this, I will share with you the keys to success in your the CCR-FYI Colloquium Abstract/Program book). After hearing from the Industry workshop panelists, there were a number of clear distinctions between academic and industry science, including the lack of a strict requirement to publish journal articles and the fact that you do not have complete control over your research direction.

It is well-known that academic scientists publish journal articles far more frequently than their industry counterparts. In fact, publishing regularly is a strict requirement for receiving grant funding and achieving tenure in an academic setting. While the panelists mentioned that the "publish-or-perish" mentality is not encountered in industry, some of them offered suggestions for the industry scientist who just *needs* to put pen to paper.

"…an industry scientist is focused on designing or refining a deliverable product or service."

future careers as proposed by the expert panelists.

INDUSTRY WORKSHOP

The panel of experts at the Industry workshop included Terry Riss (Global Strategic Marketing Manager for Promega), Daniel Bednárik (Executive Consultant for Neximmune and Microbion), Jeffrey Fein (Research and Development Scientist III for Thermo Fisher), and Krista Kinneer (Scientist I for MedImmune). Each panelist described their career trajectory and the duties associated with their distinct job titles (for more information on the panelists, see Terry suggested that publishing protocols or manuals could scratch a writer's itch (Terry has written for the NIH Assay Guidance Manual). For a chance at co-authorship, Jeffrey recommended forming collaborations with academic scientists who can oversee the "deep dives" that may sometimes be necessary to characterize an intricate signaling pathway or explain a complex phenomenon that is important to your research.

A key feature of the tenure track is that it allows principal investigators to perform *independent research on topics that interest them*. By contrast, an industry scientist is focused on designing or refining a deliverable product or service that can generate revenue for their employer. One panelist after another reiterated that *an industry scientist is*

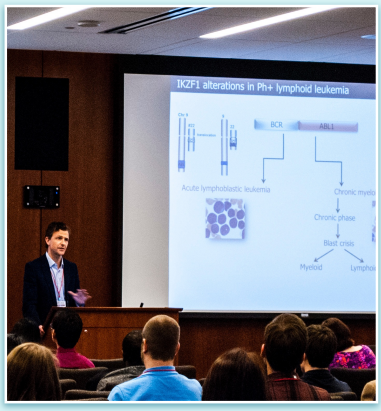
not necessarily his or her own boss. Krista warned that you should not become "too attached" to your current project since the entire company portfolio is, ultimately, influenced by the desires of executives or investors. Krista, who believes that "Industry is fantastic!", suggests that industry scientists "remain flexible" as a means of navigating the ever-shifting ground beneath their feet.

SCIENTIFIC WRITING WORKSHOP

Effective communication was the name of the game at the Scientific Writing workshop held on Day Two of the CCR-FYI colloquium. Representatives from the FDA, Qiagen, MedImmune, and *Science* journal were present to share their experiences as scientific writers. I was delighted to learn from the panelists that scientific communication has recently jumped out of journals and onto the web in a number of creative and innovative forms.

Unlike academic scientists whose main writing tasks include grant applications and journal articles, writers in the private sector are responsible for a stunning array of tasks that fall under the "scientific communication" umbrella. For example, Anne Rowzee, an editor with the FDA's Center for Drug Evaluation and Research (CDER), performs typical editor/writer tasks, like manuscript preparation, but she also helped produce a series of podcasts featuring the CDER's director. Just like virtually all other industries, scientific companies are under pressure to increase their web presence. As such, Miranda Hanson-Baseler, one of Qiagen's Global Market Managers, spends her days creating online marketing literature, educational webinars,

The 16th CCR-FYI Colloquium



Top to bottom: NCI Acting Director Dr. Doug Lowy with Colloquium organizers Vijay Walia and Emilee Senkevitch; Keynote Speaker I Daphne Bell, Ph.D. (NHGRI/NIH); Keynote Speaker III Charles G. Mullighan, MBBS, MSc, MD (St. Jude Children's Hospital); *Photos by Melissa Fernandez with Sanath Janaka*

and Twitter, and other social media channels.

Because science communication and scientific writing is so broad, the panelists all recommended that prospective writers "test drive" a few different styles of scientific writing/editing early in their training so that they can find the perfect fit for their personality, lifestyle, and career goals. Many of the panelists were NIH alumni and suggested taking advantage of the myriad of writing and editing opportunities available to NIH trainees. For example, trainees can gain editing and writing experience by joining the Fellows Editorial Board or submitting articles to this very Newsletter. The most important thing to a future scientific writer is to demonstrate your persistent interest in writing to a potential employer. If you are serious about a career in scientific writing, Miranda summed it up best by stating that your "CV should reflect a writer with research experience, NOT a researcher with writing experience."

KEYS TO SUCCESS IN YOUR FUTURE NON-ACADEMIC CAREERS

Finally, I would like to relay some of the common keys to success that were divulged during both the Industry and Scientific Writing workshops (in no particular order).

1. **Know yourself.** Critically evaluate your interests, lifestyle, and career goals. Do this sooner, rather than later. A free online tool called the Individual Development Plan can help match your skills, interests, and values with

Individual Development Plan available at: http://myidp.sciencecareers.org/

The 16th CCR-FYI Colloquium

Top to bottom: CCT NCI Director Dr. Jonathan Wiest; Poster session showcasing work by NCI trainees; Job fair featuring the FDA and *Science*, among others. *Photos by Melissa Fernandez with Sanath Janaka*

a variety of careers in science.

2. **Excel at your fellowship.** Treat it like the serious job that it is and tout your accomplishments during your future interviews. Use your fellowship as an opportunity to hone the transferable "soft skills" needed for success in virtually all career fields (time-management, project management, teamwork, etc.).
3. **Always be a scientist.** Daniel said it best, "Don't lose the things that jazz you."
4. **Expect and welcome change.** Situations change more quickly outside of academia. If you choose this path, remain flexible and adaptable to ensure success.
5. **Improve your time and project management skills.** Yes, it's a lot of fun to watch deadlines zoom by, but it's important to avoid procrastination as much as possible. In your future career, you may also be required to juggle many projects, so it's worth honing your project management skills. Try using some project management tools or taking an online project management course to improve your skills.
6. **Learn to work well with others.** Now, more than ever, science is realized through collaboration. Hone your interpersonal and team management skills in preparation for your future career.
7. **Strong communication skills are a necessity.** Practice makes perfect. Use lab meetings and conferences as an opportunity to work on your communication and presentation skills. Consider joining the Toastmasters, an international organization that helps members improve their communication and leadership skills. Oh, and be sure to ask for critical feedback whenever possible.
8. **NETWORK!!!** Every single panelist at the Industry and Scientific Writing workshops touted the importance of developing and maintaining a professional network. Having an "inside reference" is an invaluable asset on any job search.
9. **Make it personal.** Supplement your online applications with a direct email or phone call to the hiring manager. If a company tends to hire or promote "from within," online job ads can potentially be filled even before they are posted. By contacting hiring managers directly, you may be able to jump ahead of the pack and secure an interview spot for an unposted position.
10. **You don't start with the perfect job.** Paradoxically, it is much easier to get a job when you already have one. The majority of the Industry and Scientific Writing panelists changed fields and companies multiple times throughout their career. Do not let great opportunities pass you by while waiting for the ideal job to come along.

"Always be a scientist."

Technology Transfer Workshop

at the 16th Annual CCR Fellows and Young Investigators Colloquium

By Anurag N. Paranjape

The annual CCR Fellows and Young Investigators Colloquium is an ideal event for those who are looking to initiate collaborations or are interested in exploring alternate career options. The 16th annual event was held on March 31 and April 1, 2016 at the NCI Shady Grove campus. In addition to excellent keynote lectures and oral/poster presentations, there were various sessions outlining career building opportunities for scientists including industry jobs, networking, tech transfer, academia, scientific writing and mentoring. These sessions were held concurrently, and I attended the Tech Transfer workshop on Day One.

Technology Transfer or Tech Transfer (TT) is a process of transferring various skills, methodologies, and information from universities and government institutions to assist researchers in commercializing their innovations. It involves licensing of intellectual property to companies that have the resources and are willing to develop the technology, and in return, universities receive royalties for the products that were licensed.

"…technology transfer acts as an intersection of business, law, and science..."

All the invited panelists briefly introduced themselves, spoke about their previous research work and how they ended up being TT specialists. Melissa Maderia, Ph.D., a TT Specialist at NCI, initiated the workshop with comprehensive information on TT at NCI. She explained that TT acts as an intersection of business, law, and science and it gives her personal satisfaction as she facilitates commercialization of innovations which would ultimately help the public. She highlighted some of the success stories of NIH TT Center such as an AIDS test kit, drugs like Unituxin (Dinutuximab), Taxol (Paclitaxel), Gardasil (Quadrivalent HPV Vaccine), and Velcade (Bortezomib), to name a few. She later elaborated on the fellowship positions offered at NCI, how to apply for the positions, and how to excel as a candidate applicant. During the course of the discussion, other panelists pitched in with their suggestions. Lisa Finkelstein, Ph.D. and her colleague Kevin Chang, Ph.D., TT specialists from NCI, highlighted some routes to secure the fellowship which included attending courses in TT, business, and law that are offered at NIH, taking the patent bar exam, acquiring experience by interning or volunteering in TT offices, networking with people, brushing-up soft skills such as communication, team work, time management, and people skills. Ting Wang, Ph.D., TT Specialist at the Naval Medical Research Center, stressed upon the importance of networking and how it helped her get this job. She discussed her expectations before she started the

CCR-FYI Association is supported by the CCR Office of the Director, National Cancer Institute.

job and how it has turned out until now. Gayatri Varma, Ph.D., Executive Director of Office of Technology Commercialization at University of Maryland, who comes with over 20 years of experience in this field, elaborated on how the field has progressed in the past two decades and what the day-to-day challenges one has to face in completing jobs on time.

The workshop was interactive and the panelists answered various questions. The key-points included: TT job is different from bench work in a research lab where one gets better work-life balance. Even if not performing research, one gets to keep oneself abreast of the latest research. This job involves juggling multiple tasks at once. The best part of the job is that there is enormous diversity and a variety of scientific fields that one gets to work on. One gets to learn new things every day on the job. Challenges of the job include dealing with frequent interruptions and the art of saying 'no' in a polite way. A TT job opens various other career paths such as entrepreneurship, industry-based positions, patent law, or marketing. This workshop was a great opportunity for postdocs to learn how to get a tech transfer job, how it is different, and how it will help you to build your career.

For further information, here are some helpful links:
NIAID OTD TT Fellowship: ***http://www.niaid.nih.gov/LabsAndResources/techDev/Pages/techTransFellowshipPrg.aspx***
NCI TTC Fellowship: ***https://techtransfer.cancer.gov/abouttttc/jointtc***
NIH PMF: ***https://trainingcenter.nih.gov/intern/pmf***
FLC: ***http://www.federallabs.org/***
TEDCO: ***http://www.marylandtedco.org/***

Life after NIH

A Postbac's Perspective (Choosing a Graduate Program)

By Jailynn Harke

For the longest time, I wanted to be a doctor. It was only once pen met paper for the inevitable personal statement, that I began to question *why*. In that moment I realized I had no particular reason apart from a love of science, a fascination with the human body, and an appetite for knowledge. As it turns out, a career in medicine is not the only to satisfy this vocation; research also fits quite nicely. Fast-forward to present day. Having delved into research full-time as a postbac at the NIH, I am now faced with the question: "Where do I go from here?".

Within the realm of biomedical science, three viable options arise: M.D., Ph.D., or a dual-degree program (M.D.-Ph.D.). Thankfully, the NIH provides resources to shed light on these degree options: graduate fairs, workshops, and career counseling. However, I would argue that the greatest asset the NIH has to offer is

"Challenges include…the art of saying 'no'."

the people. We are fortunate to have a bountiful supply of all degree holders. For me, talking to people is always more beneficial than Google, pamphlets, or group information sessions. Perhaps it's the added value of body language and voice intonation that helps me "try a degree on for size," see if it fits, and try to envision myself there down the road. This type of interaction is formally called an informational interview. Amidst seminar speakers and elevator encounters, I sought out and interviewed doctors in both fields-- medicine and philosophy. Each individual's career path was unique but through casual discourse, I began to uncover subtleties within each field. Here is what I've learned:

LOGISTICS

An M.D. is a four-year program plus residency (a minimum of two years), totaling six years. Limitless fellowship opportunities abound afterwards. A Ph.D. program typically spans 5-7 years of thesis work followed by a postdoctoral fellowship (usually five years). Joint M.D.-Ph.D. programs are a minimum of seven years which saves two years of schooling as compared to completing each degree separately. At the end, you'll still choose a residency and/or postdoc fellowship. Whichever route you opt for, a graduate program is a huge time commitment!

Time is an important factor because you must consider other life goals now (e.g. family, home, ownership, children). We somehow need to approximate the future or at least entertain the idea of life-beyond-school. As career-driven as we are, it is worthwhile to contemplate other things for our future. Be considerate to your future self.

FUNDING

Earning an M.D. can be very expensive. A dear friend of mine disclosed that at the ripe age of 24, she took out a quarter-million-dollar loan to pay for her medical education and life expenses for the next four years (private institution figure). This is not even on the high-end. Of course there are scholarships and funding opportunities, but in general, medical school will cost you.

On the contrary, most Ph.D.'s in STEM education are fully funded; likewise, are many joint programs. This includes a tuition waiver and typically a stipend. I've been told several times, "If you're paying for a Ph.D., you're doing it wrong." Though I doubt monetary considerations trump choosing the career path you'll enjoy, a debt-free education is a nice perk.

IF YOU EVER WANT TO MANAGE A PATIENT, YOU NEED AN M.D.

This doesn't mean you'll never see a human sample; it just means you'll have to collaborate with a medical doctor. You'll have slightly less freedom with regards to clinical access holding a Ph.D. How much control do you want or need to make a contribution to your field? Some Ph.D.'s see this as a hindrance, others embrace the collaboration. What about dealing with patients first-hand? One thing I like about medicine is interacting with patients and their families. You'll work with all kinds of people from different walks of life. This is a unique trait not found in research to the same degree.

KING OF THE JUNGLE

Both degrees have opportunity for expertise. Medical doctors can specialize and sub-specialize but they must remain experts of an entire system, the human body. As a Ph.D., you can get

away with asking "Why?" to no end. In principle, a Ph.D. is contingent upon novel discovery, therefore you must be aware of preexisting knowledge and ask open-ended questions. Keeping the big picture in perspective, Ph.D.'s are able to dive into the nitty-gritty details and be an absolute expert in their field.

AN MD CAN DO A POSTDOC

What a neat alternative! The converse is not true: a Ph.D. cannot partake in a residency. I think this is a great option. Your medical education is unabridged and in the end, you can still sit at a bench. Ph.D.'s cautioned that M.D. applicants may be lower in the pool due to fewer publications. However, M.D. postdocs bring comprehensive knowledge and provide the critical link between bench and bedside. Though this option won't add extra credentials to the end of your name, you will still experience both clinical medicine and research. Food for thought.

WHAT DOES IT LOOK LIKE TO BE A PI?

The role of a PI goes well beyond bench work; it involves managing and operating a lab, things they don't teach in graduate school. The PI is the fearless leader and mentor to a small group of researchers. PIs are curious and creative, provide inspiration and insight with data analysis. Also keep in mind that the natural trajectory of a PI is to write more than perform the experiments. This is debatably the fun part of research but it's a bit detached from the actual physical work. You'll need to trust your team and step back from the bench.

M.D.-PH.D.'S PICK A SIDE

I heard this repeatedly from all degree holders: it is difficult to excel while straddling both fields. I don't think the intent in choosing an M.D.-Ph.D. is to juggle both fields necessarily. Most joint program websites state that the majority of M.D.-Ph.D.'s does *not* practice medicine; they estimate that 90% of time is devoted to research while the remaining is spent in the clinic. Despite a majority of M.D.-Ph.D.'s siding with research, many maintain their licensure and practice medicine minimally, 1-2 days per month. This could be for financial reasons as active licensure increases the salary bracket at many institutions.

A colleague had an interesting spin on the dual degree option stating that, "if the Ph.D. portion does not 'work out' (meaning failure to acquire tenure), you have a backup plan." This is a lot of work to simply have a Plan B. However, having two career choices is not a bad place to be, especially considering the perpetual shortage of tenure-track positions. On the other hand, medical doctors always seem to be in short supply.

Regardless of choosing sides, I believe the allure of the M.D.-Ph.D. is that you have the knowledge and capacity to pursue either path.

In the end, we're all here because we love science. The human body will always be fascinating and there will always be new knowledge to gain. Education is a continuum; degree-seeking merely provides structure. If you're still struggling to make a decision, I suggest talking to people around you. It's a much more intimate way to explore career options and the people are often more than happy to share.

A special thanks to Dr. Lalita Ramakrishnan, Dr. Daniel Lee, Dr. Kumaran Ramamurthi, Dr. Patrick Phillips, Dr. Max Guo, Dr. Anna Serquiña, and Whitney Wolfe; your advice is invaluable.

"In the end, we're all here because we love science."

The Impostor Phenomenon

Overcoming the Fears that Haunt Your Success

By Amanda Decker

Every year, the Office of Intramural Training & Education (OITE) hosts the NIH Graduate Student Research Symposium, where NIH graduate students from across all the Institutes gather to present their dissertation research. One of the many highlights from this all-day event is the keynote address. This year, psychologist Dr. Pauline Rose Clance from Georgia State University described a feeling that many of those in the audience, and likely some readers of this Newsletter, grapple with - "The Impostor Phenomenon".

Dr. Clance was inspired to research what she and a colleague, Dr. Suzanne Imes, coined "the Impostor Syndrome" in 1978 after observing a trend in the mindset of a large portion of her female students. Over the years, she noticed that high-achieving students repeatedly came to her worried about their performances. She described their attitudes as confused and panicked, saying they felt inadequate to fully understand the material, and despite their current success, would surely fail the class. It's a feeling with which Dr. Clance was very familiar. During her time as an undergraduate and graduate student, she often annoyed her fellow classmates by professing her fears of imminent failure and then receive one of the

The Impostor Syndrome, later reclassified as the Impostor Phenomenon (IP), refers to the correlation between high-achieving individuals and their inability to accept accomplishments as a result of their own doing. Instead, people with "high-IP" convince themselves that any success or achievement is a fluke or a stroke of good luck. These individuals live with the persistent anxiety that they will be revealed as "frauds" and that they do not deserve the success or praise that they've earned. In layman's terms, people with "high-IP" doubt themselves and their abilities. While they don't give themselves credit for their successes, they blame their failures (real or perceived) solely on themselves.

During her talk, Dr. Clance gave the audience a chance to evaluate where we fall on the IP spectrum. The Clance Impostor Phenomenon Scale (CIPS) contains a list of twenty statements to be ranked on a scale of 1 (not at all true) to 5 (very true) and is designed to rate an individual's propensity to feeling like an impostor. Examples include:

1. I have often succeeded on a test or task even though I was afraid that I would not do well before I undertook the task.
2. I tend to remember the incidents in which I have not done my best more than those times I have done my best.
3. I rarely do a project or task as well as I'd like to.
4. When I've succeeded at something and received recognition for my

"We convince ourselves that our successes are due to others' influence or sheer dumb luck."

CCR-FYI Association is supported by the CCR Office of the Director, National Cancer Institute.

accomplishments, I have doubts that I can keep repeating that success.

5. I feel bad and discouraged if I'm not "the best" or at least "very special" in situations that involve achievement.

When the audience of the symposium was polled to determine who ranked as low, medium or high-IP, the majority of the audience declared themselves as "high-IP". Dr. Clance did not appear to be too surprised by this. In a competitive yet collaborative field such as research, it is not uncommon to find people who have difficulties taking credit for their accomplishments. We convince ourselves that our successes are due to others' influence or sheer dumb luck. When things do go well, we end up feeling successful only because the pressure made us work that much harder.

The Impostor Phenomenon can manifest in the minds of almost any demographic, but there are some people who are more predisposed than others. Women are more likely to report experiencing the Impostor Phenomenon than men, although that does not mean that women experience it more often than men. Introverts tend to internalize their self-doubts, which can exacerbate the feelings. People who have been pressured to be high achieving from a young age, for example, children that are put into Gifted and Talented groups or in honors tracks at school, also experience IP frequently. Feelings of IP also tend to increase when adjusting to changes, such as a new job, position, or project. How many times have you felt like you weren't good enough to take on a new assignment, but ended up exceeding your professor's or boss's expectations?

Dr. Clance had a few parting words of advice for the audience. It is important to recognize that these are legitimate feelings, for some more often than others. In fact, even Dr. Clance said in a previous interview with Harvard psychologist Amy Cuddy, that "If I could do it all over again, I would call it the impostor experience, because it's not a syndrome or a complex or a mental illness, it's something that almost everyone experiences." Being classified as "high-IP" is in no way a bad thing and it certainly does not have to affect your life in a negative fashion. Dr. Clance suggested that for those who do struggle with their feelings, it might help to make a list (daily, weekly, etc.) of things that you achieved and things that you failed. More often than not, the "Achieved" category will dwarf the "Failed" category. Prior to particularly triggering events, such as presentations or exams, Dr. Clance suggested a liberal use of the power pose (think Superman or a Mr. Universe competitor). It may look silly, she explained, but multiple studies have shown that people who adopt powerful stances report feeling less stressed. Whether or not that is because it makes you laugh, is up for debate.

Full questionnaire and guide at http://www.paulineroseclance.com

Conference Highlights: Keystone Symposia on Genomics and Personalized Medicine

By Valerie Miller

This past February, I attended my first Keystone Symposia. The conference, Genomics and Personalized Medicine, was jointly held with a Keystone Symposium on The Cancer Genome. Nestled in the Canadian Rockies, the idyllic resort town of Banff, Alberta hosted scientists from the collaborative fields. The castle-like hotel, known for its impressive architecture, boasted beautiful mountain views and famous nearby hot springs.

As someone who is relatively new to the fields of bioinformatics and genomics, attending this meeting provided a very valuable learning experience. I heard many impactful presentations regarding the latest developments in the field of cancer genomics and learned about efforts to advance personalized medicine, integrating scientific discovery and clinical practice. I was also exposed to new techniques and online tools that I can apply directly to my own research.

My favorite talk of the conference was given by a researcher who works with IBM Research developing Watson Genomic Analytics. Watson is a computer system famous for its appearance on "Jeopardy" and it can answer questions asked in a natural language. The goal is to integrate genomic and clinical databases with natural language processing of over 23 million research articles, allowing for a centralized way to keep up with the continual generation of patient data and constantly evolving knowledge base.

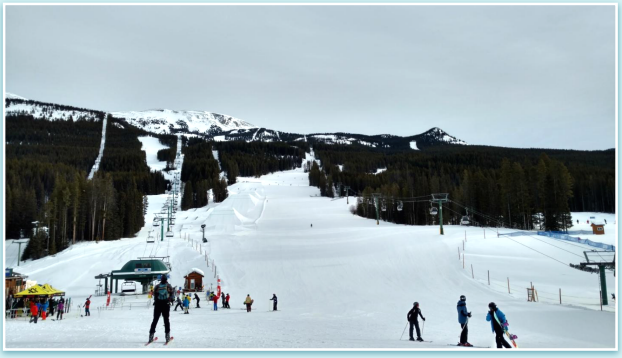
Only a few hundred people attended this joint conference. Due to the small, intimate nature of the meeting, it was quite easy to meet people from a number of institutions and industries all over the world. Keystone Symposia have networking opportunities built into the schedule, with plenty of time to interact with other attendees during poster sessions, social hours and meals. Through these sessions I connected with people from various academic institutions, small biotech companies, as well as large industry (e.g. Thermo-Fisher) and various academic institutes. It was very exciting to have discussions with several people from experts in both academia and industry who share my interested in hepatocellular carcinoma, the focus of my research. I also had the pleasure of meeting several other NIH postdocs who were attending the meeting. Despite coming from the same campus, we work in different buildings. While sharing details of my research with these postdocs, they offered several valuable suggestions and creative ideas for moving my project forward. I also ran into former CCR-FYI Steering Committee member Lars Boeckmann, who is now working on a postdoctoral fellowship in Germany. These symposia lent to networking with scientists near and far.

"Nestled in the Canadian Rockies, the idyllic resort town of Banff, Alberta hosted scientists…"

Another feature of the Keystone Symposia conference series is the “afternoon break.” The conference schedule is set such that there is a morning session followed by a break for lunch and concluding with an evening session after dinner. These lunch breaks are typically several hours, allowing the attendees from the conference to enjoy the sights and local activities. I made the most of these breaks by skiing at Lake Louise Ski Resort and taking a snowshoeing trip, both new experiences for me. I also relaxed in the hot springs and enjoyed the local cuisine of several restaurants in Banff during conference breaks.

I gained many valuable experiences and interactions while attending the Symposia on Genomics and Personalized Medicine. Keystone meetings combine learning about cutting-edge research, and networking with scholars while being on a vacation. I returned home from the meeting feeling rejuvenated, both scientifically and personally. For anyone who has the chance to attend any Keystone Symposia, I would highly recommend the opportunity.

The Keystone Symposia Photos by Valerie Miller



Top to bottom: Snowshoeing trip with other attendees; Lake Louise Ski Resort; Street view of the hotel and the Canadian Rockies The conference center at the Fairmont Banff Springs Hotel in Banff, Alberta, Canada

White House's Cancer Moonshot Initiative Begins to Take Shape

By Dan Thoresen

Significant progress has been made since President Barack Obama's initial announcement of the White House Cancer Moonshot Initiative in January 2016. The primary goal of the initiative is to accomplish ten years of progress in cancer research within the next five years. Vice President Joe Biden leads the fifteen-member task force, along with Greg Simon named as Executive Director of the task force in March. This task force encompasses a wide variety of executive branch departments, including Defense, Commerce, Veterans Affairs, Energy, and our own, Health and Human Services, as well as many executive council chairs. The directors of the NIH, NCI, FDA and NSF have also been recruited to provide their invaluable insight. By selecting so many leaders of the executive branch, the White House seems to be signaling an "all hands on deck" approach they are taking towards achieving success.

In order to assist the White House task force with the technical expertise of cancer research, the Blue Ribbon Panel for the National Cancer Moonshot Initiative was also announced this past April. The panel, currently composed of 28 doctors, scientists and other leaders in the field of cancer research, will convene regularly to prepare recommendations for the National Cancer Advisory Board (NCAB). The NCAB will then pass those recommendations on to Acting NCI Director Douglas Lowy and the White House task force. Members of the public are encouraged to submit ideas to the Blue Ribbon Panel online. The panel will be responsible for balancing the desires and priorities of a large number of cancer research and advocacy groups, all of whom see the initiative as an opportunity to accelerate progress within their specific area.

The initiative may provide additional funds in the next two years, with $195 million earmarked for NIH in additional funding directed towards cancer research in 2016, and $755 million in mandatory funding in 2017 for both the NIH and FDA. One important key objective identified by the task force members includes a resolution to increase data sharing and collaboration among the NIH, Food and Drug Administration (FDA), Department of Defense (DoD) and Veterans Affairs (VA). In addition to funding increases for development of cancer vaccines, early diagnostic screens, and new treatments in immunotherapy and combination therapy, the initiative also seeks to develop a new, virtual Oncology Center of Excellence by the FDA, with the intention of requesting $75 million in 2017. This new virtual center is hoped to expedite the approval of new diagnostic tests, new combination therapies, and other treatments by uniting the regulation of different areas of

Members of the public are encouraged to submit ideas to the Blue Ribbon Panel online at https://CancerResearchIdeas.cancer.gov.

cancer therapy under one regulatory roof.

The Moonshot Initiative also seeks to accelerate the timeline of biomedical research. Vice President Biden has emphasized the need to close the time gap between the submission of a grant and the eventual outcome. Additionally, the creation of the Vice President's Exceptional Opportunities in Cancer Research Fund aims to emphasize the "moonshot" aspect of the initiative by funding high-risk, high-reward research that is unlikely to be funded by conventional grants.

The announcement of the Moonshot Initiative has attracted drawn some criticism from both within the field of cancer research and outside of it. Critics have drawn parallels to the Nixon administration's War on Cancer in the 1970s, claiming that it remains fallacious to expect a cure for cancer in such a short time span. Others believe that the "moonshot" analogy is ill- suited to the objectives of cancer research, and fails to acknowledge the ways researchers in other nations contribute towards understanding cancer. Finally, the inauguration of a new president in January 2017 means that it is unknown whether the Moonshot Initiative will remain a high priority and continue towards to its 2021 target is unknown.

Despite these criticisms, the Moonshot Initiative will still have a significant impact on furthering cancer research if it is able to open up funding opportunities to new ideas and approaches. If the initiative sends additional resources to laboratories and clinics that already receive large amounts funding, that may not provide the same "game-changing" impact as providing resources to establish new independent investigators and clinicians. Additionally, if it enables investigators to turn "druggable" targets into effective treatments by accelerating the approval process (without removing the need for rigorous testing), that may also be a benefit to researchers in both basic and translational science.

Sources:
http://www.cancer.gov/moonshot-cancer-initiative
https://www.whitehouse.gov/the-press-office/2016/01/28/memorandum-white-house-cancer-moonshot-task-force
https://www.whitehouse.gov/the-press-office/2016/02/01/fact-sheet-investing-national-cancer-moonshot
http://www.sciencemag.org/news/2016/02/white-house-wants-1-billion-vice-president-biden-s-cancer-moonshot-where-will-it-come
https://www.statnews.com/2016/04/19/politics-of-cancer/

The Zika Virus: More than Just a Headache

By Abbey Zuehlke

"(Zika)… can be passed on through blood transfusions and sexual intercourse."

In 1947, the single-stranded RNA Zika virus was isolated from a sentinel monkey in Uganda, and five years later the first human infection was confirmed in Nigeria. Due to the lack of recognizable outbreaks from that region, however, it was difficult to determine the long-term effects of Zika infection at that time. The Zika virus is most often transmitted through the *Aedes aegypti* mosquito, which prefers biting humans over other animals. However, it can also be passed on through blood

transfusions and sexual intercourse. Symptoms of the Zika virus first emerged in the Americas in 2014, in northeast Brazil. These symptoms included a flat pinkish rash that begins at the face and spreads to the rest of the body, bloodshot eyes, fever, joint pains and headaches. Although mild, this infection was concerning due to the rapid rate of transmission and its unknown source/origin. Once identified as the Zika virus, the cause for concern was low given that Zika was considered a benign disease, especially when compared to the closely related dengue fever, yellow fever and West Nile viruses. Public health concern quickly grew, however, as health officials observed an association between Zika infection and birth defects.

In 2015, Brazilian officials reported a staggering 2,782 newborn cases of microcephaly, a neurological condition in which head development is stunted, compared to 147 in 2014 and 167 in 2013. Cases of Guillain-Barré syndrome, also associated with Zika infection, were also noticeably increasing within affected areas. On January 15th 2016, the US Centers for Disease Control (CDC) issued a travel alert for pregnant women or women trying to become pregnant advising them to avoid traveling to Zika affected countries. On February 1st 2016, the World Health Organization (WHO) declared the cluster of microcephaly and neurological disorders a health emergency as defined by the 2005 International Health Regulations. Dr. Anthony Fauci, director of the National Institute of Allergy and Infectious Diseases (NIAID), spoke at the NIH regarding the current state of the Zika epidemic and provided evidence of Zika's responsibility for these birth abnormalities. Dr. Fauci included recent studies that have identified serological RNA evidence of past Zika infections in affected newborns. The Zika virus has also been shown to infect neural progenitors and attenuate their growth, suggesting a mechanism behind microcephaly outcomes in newborns. Definitive ties between Zika infection and microcephaly were published in April in *Science*. Currently, one hundred fifty-seven pregnant women within the US are being monitored following Zika infection. The first US case of Zika-related microcephaly was reported recently in New Jersey.

Pregnant women or women trying to get pregnant are currently recommended to postpone travel to 40 endemic countries, unless they travel to higher elevations (>2000 meters) where the mosquito population is low. If you must travel to these regions, use repellant, larvacides, and/or insecticides, keep away from areas with standing water, stay in housing with screens and air conditioning and wear the proper long sleeve and pant attire. To avoid sexual transmission, either abstain from sexual intercourse or properly use a condom.

Although scientific data now demonstrates Zika infection results in damage to brain cell viability and growth, many questions still exist in terms of understanding the impact of Zika on birth abnormalities. The lack of data from previous infections has also left questions as to the clonal diversity of the Zika virus, as well as how primary and secondary infections impact patients. Vaccine development for the Zika virus, currently ongoing at the National Institutes of Health Vaccine Research Center, has been intensified since the recent Zika outbreak. Fortunately, due to the effective vaccines for similar flaviviruses, the creation of a Zika

vaccine is highly promising. The mass production and sales of such a vaccine, however, will take time to pass through clinical trials for its efficacy and safety. In the meantime, following the CDC guidelines for travel is the best way to avoid Zika infection.

The Inflection Point

By Ritankar Majumdar and Namratha Sheshadri

If you are reading this, it is half likely you are a woman, especially a postdoctoral fellow or a staff scientist. It is more likely so if you are a summer intern and perhaps a postbac, but very unlikely if you are a PI. These numbers skew against a PI not because their preference to read the CCR-FYI Newsletter is superseded by scientific journals, it's just that there are not many women PIs at NIH.

According to the Office of the Postbaccalaureate and Summer Research Programs (PSRP), women outnumber the men at the NIH Summer Internship Program. The Office Intramural Research (OIR) mentions that approximately 50% of the graduates enrolled in the Graduate Partnership Program (GPP) are women and this trend is also true among postdoctoral trainees at NIH. However, according to OIR, as of 2013, 35% of the approximately 230 tenure-track PIs are women and this falls sharply for tenured PIs, to only 20%. This is *The Inflection Point*, a period at the end of postdoctoral training when we see a change in parity between men and women in science.

At this point, the following would be typical thoughts running through your head.

A. Gosh! This is one of the many "Women in Science" articles that have become prevalent over the past few years. To them we say, "read on!". This is the CCR-FYI Newsletter. You will have information pertinent to you.

B. March 8th was the International Women's day. February 11th was the first International Day of Women and Girls in Science. Nothing of significance happened at NIH to celebrate these days. No workshops or support symposiums. To them we say, NIH loves you in its own way and we will show you how.

C. Duh! These facts are as intuitive as the institutionalization of division of labor by Paleolithic humans. The women take care of the family and the men take care of provisions. Postdoctoral training is a time of massive personal changes and women take on careers more conducive to their traditional roles as a mother and a wife.

As misogynistic as it may sound, there may be an element of truth to the last of the three point of views. According to a comprehensive survey conducted by the Second Task Force on the Status of NIH Intramural Women Scientists[1], more than 21% of women, but only 7% of men, believed that plans to have children or to have more children were extremely important considerations in planning their career. Similarly, spending time with family members was considered to be extremely important by 40% of women, but by

"…it's just that there are not many women PIs at NIH."

only 25% of men. While majority of both men and women reported having a spouse who works 40 hours or more per week, only 8% of women had a spouse who does not work outside the home, compared to 36% of men who had a spouse who stayed home. Thirty-one percent of married women said that they would make changes to accommodate their husband's job, whereas only 21% of the men reported they would do the same for their wife's career. Not surprisingly, women tend to choose careers that do not interfere with their familial pursuits. This is also reflected in the underrepresentation of women with children in the postdoctoral community.

According to the 2014 CCR Intramural training survey[2], women participate to a greater extent in career development initiatives that detail paths other than academia: for example, women are more interested in writer/editor positions. They also tend to avoid careers that are time-intensive and are more comfortable in teams. This, however, does not reflect an inability of women to excel in science. According to bibliometric analyses published in Association for Psychological Science[3] women and men had comparable authorship and citation indices in major scientific publications. In 2011, a study in Academic Medicine[4] reported on a cross sectional analysis of gender based differences in NIH award programs and found that women and men were generally equally successful at obtaining NIH grants at all career stages.

If social norms are the primary drivers of The Inflection Point, how does one go about reversing the trend? Encouragement and support from a spouse obviously helps, but according to the CCR survey of 2014[1], respondents were happy with the support they receive from their family and were generally satisfied with work/life balance (caveat: 70% of the respondents were non-parents). Another option in tackling The Inflection Point is to provide support to encourage women to continue or resume scientific research. Here is where being at NIH has its advantages.

A 2006 report from the National Academy of Sciences, "Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering,"[5] found that women in the biomedical sciences face institutional and environmental barriers to career advancement at all stages and sought to remedy the situation. In response, NIH created the NIH Working Group on Women in Biomedical Careers and constituted several committees to focus on its priorities. The following are a few initiatives geared towards academic advancement of female scientists:

- The **Sallie Rosen Kaplan** (SRK) **Fellowship** is a one-year program that provides mentoring opportunities, networking, seminars, and workshops to help prepare NCI's female postdoctoral fellows for the competitive nature of the job market and help them to transition to independent research careers.
- The Women Scientist Advisors (WSA) are elected members from the CCR female scientific community who promote women's representation at all levels. The committee has established the **WSA Scholar Award** given to outstanding female FARE (Fellow Award for Research Excellence) awardees.

- For early stage investigators, NIH allows career development grant applicants to describe personal factors that may have delayed their transition to research independence such as family care responsibilities and other personal matters. There also exists tenure-clock modification for NIH intramural scientists that automatically incorporates an additional year to accommodate family leave.
- Trainees and fellows who are recipients of **National Research Service Awards** (NRSA) may receive stipends for up to 60 calendar days (equivalent to 8 work weeks) of parental leave per year for the adoption or the birth of a child. Either parent is eligible for parental leave. (Editor's note: This is also true for CCR postdocs.)
- Women researchers who have taken time off to care for children or tend to other responsibilities and who want to refresh their research skills and knowledge are eligible to apply for **ORWH/NIH Reentry into Biomedical Research Careers program** supplements.
- The Intramural **Keep the Thread Program** offers current postdoctoral fellows several options for increasing flexibility and temporarily reducing effort while remaining connected to their research and the NIH community during times of intense family needs.

And of course, NIH offers family oriented "Value added services" such as an auxiliary care program when one needs to be at work and their regular child or adult/elder care is unavailable (*Editor's note*: The NIH Back-up Care Program is currently unavailable to postdoctoral fellows). NIH Support for Scientific Conferences describe plans to identify resources for child care and other types of family care at the conference site to allow individuals with family care responsibilities to attend.

There is no core grant/fellowship solution for the transitioning women either in the intramural or extramural setup. Within the NIH, early career development awards exist but are confined to programs related to Women's Reproductive Healthcare. This program is called "Building Interdisciplinary Research Careers in Women's Health" (BIRCWH), and it is a mentored program that provides access to supportive senior colleagues to help bridge a researcher's transition from clinical training to research independence. Akin to the WSA Scholar Award, there are no provisions in the career transition fellowships such as the K-series grants to select deserving women among the applicants. There are no equivalents to entry level programs of women PIs such as the Schlumberger Foundation **Faculty of the Future** or the **American Association of University Women**. In all probability, the no discrimination policy of NIH grants goes the other way too (i.e. no special treatment).

Like all happy endings, the story ends with a silver lining. The past few decades have witnessed women scientists aspiring to careers in academe face roadblocks - implicit or overt. Apart from policy changes in the grant scene, opening of opportunities for part time research-teaching programs and

semi-independent scientist positions could promote retention of women in academia. A recent study published in PNAS[6] suggests that women candidates are favored 2 to 1 over men for tenure-track positions in STEM fields. Whether it is an effect of reeducation on STEM gender diversity and bias or something more nuanced is a discussion for another time. But there is certainly a hope that this trend points towards a second inflection point.

Acknowledgements: We thank Jonathan Wiest, Director, Center for Cancer Training; Erika Ginsberg, Program Analyst, Center for Cancer Training and Patricia Sokolove, Director of Postbaccalaureate and Summer Research Programs for proving valuable inputs and resources needed to compile this article.

References:

1. Martinez ED, Botos J, Dohoney KM, et al. Falling off the academic bandwagon. Women are more likely to quit at the postdoc to principal investigator transition. EMBO Reports. 2007; 8(11):977-981. doi:10.1038/sj.embor.7401110.

2. NCI CCR Fellows' Survey Report-2014, Center for Cancer Training

3. SJ Ceci, DK Ginther, S Kahn, and WM Williams. "Women in Academic Science: A Changing Landscape". Association for Psychological Science in the Public Interest, 2014, Vol.15 (3); 75-141.

4. Pohlhaus JR, Jiang H, Wagner RM, Schaffer WT, Pinn VW. Sex Differences in Application, Success, and Funding Rates for NIH Extramural Programs. Academic Medicine. 2011; 86(6):759-767. doi:10.1097/ACM.0b013e31821836ff.

5. Beyond Bias and Barriers: Fulfilling the Potential of Women in Academic Science and Engineering. Washington (DC): National Academies Press (US); 2007. doi: 10.17226/11741

6. Wendy M. Williams and Stephen J. Ceci. National hiring experiments reveal 2:1 faculty preference for women on STEM tenure track. PNAS vol. 112 no. 17, 5360-5365