



Fellows & Young  
Investigators  
Newsletter



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*From the Editor's Desk*

Welcome to the Fall edition of the Fellows and Young Investigators Newsletter. This issue features a special article, an interview with a life coach, Dr. Samantha Sutton; don't miss out on this exciting read! In addition, read about the events organized by the CCR-FYI steering committee in the last quarter. Learn about the resources available at NIH for those of you interested in science policy, a perspective on why women leave science, experience shared by a high school student who interned at NIH this summer and a research highlight from the Laboratory of Pathology. Fellows share their experiences at different meetings such as Structural Biology of HIV and Integrative Molecular Epidemiology, an AACR workshop. As always, we hope that you will enjoy reading what we have put together for the NCI fellows community. If you have any comments or suggestions, or are interested in contributing to the CCR-FYI Newsletter, please send an e-mail to [smita.kakar@nih.gov](mailto:smita.kakar@nih.gov).

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**Providing support for fellows at CCR**

CCR-FYI Association is supported by the CCR Office of the Director

# CCR-FYI Events

## National Postdoc Appreciation Week celebration

This year, National Postdoc Appreciation Week (NPAW), sponsored by the National Postdoctoral Association, was held from September 21<sup>st</sup>-25<sup>th</sup>. With events taking place at universities and research organizations all over the country, the CCR-FYI association participated in the festivities by hosting a picnic for all NIH fellows at Black Hill Regional Park in Boyds, MD on September 26<sup>th</sup>,



Fellows enjoying at the picnic at Black Hill Regional Park to celebrate the National Postdoc Appreciation week.

to celebrate the end of NPAW. We had a great turnout, with fellows from both Bethesda and Frederick campuses attending the picnic. In addition to social networking, attendees of the picnic enjoyed a variety of delicious foods prepared by the fellows, as well as grilled burgers and sausages. The CCR-FYI steering committee would like to thank all of the fellows who came out for the picnic; it was an awesome event!

In honor of NPAW, Office of Intramural Training and Education hosted a Fellows Fest on October 2<sup>nd</sup> at the FAES Terrace in Building 10 on the Bethesda campus to celebrate all the IRTAs, CRTAs, Visiting Fellows, Research Fellows and Clinical Fellows who are doing awesome work at

NIH. Festivities included ice cream and music, and CCR-FYI hosted a table at the event, to help promote the CCR-FYI and to recruit new members.



Fellows enjoying ice-cream and music at the OITE- sponsored Fellows Fest to celebrate National Postdoc Appreciation week.

The CCR-FYI steering committee is also very excited to announce that two fellows have volunteered to serve as the new co-chairs of the Social Committee: Valerie Miller (Bethesda) and Shailesh Ambre (Frederick). This upcoming academic year, CCR fellows can look forward to a variety of social events including happy hours, networking events, coffee meet-ups and outdoor excursions. If you are interested in helping the social committee plan an event, contact Valerie ([valerie.miller@nih.gov](mailto:valerie.miller@nih.gov)) or Shailesh ([shailesh.ambre@nih.gov](mailto:shailesh.ambre@nih.gov)).

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## CCR-FYI Steering committee Retreat 2015

The CCR-FYI association has been around for more than a decade and has since organized innumerable events successfully. The CCR-FYI association is led by a steering committee that organizes these events. The largest event that they organize is the annual colloquium, every spring. The colloquium features keynote speakers, career development workshops and career fair and social networking evenings. After the colloquium, the steering committee gets together for a day of professional development, celebration of the success of the events in the past year, discussion of challenges and future planning.

The steering committee retreat this year was held at NCI, Shady Grove campus on June 26<sup>th</sup> and was organized by the co-chairs of the committee, Dr. Emilee Senkevitch and Dr. Leigh Greathouse. Dr. Jonathan Wiest, director for Office of Training and Education, commenced the day with a welcome address and presented a summary of the annual survey results. This was followed by a session on 'Creating Motivating Environments' by Safiya Stewart-Sagoua from the Office of Workforce and Professional Development. We discussed what incentives motivate people and how these differ for individuals. The attendees then had lunch, generously provided by Dr. Wiest. Five NCI alumni, who had been in leadership roles in the steering committee in previous years, were also invited during lunch. These included Dr. Kevin Chang (now Senior Licensing and Patenting Manager, NIH), Dr. Kristin Fabre (Scientific Program Manager, NIH/NCATS),

Dr. Melissa Maderia (Technology Transfer Specialist, NCI), Dr. Brid Ryan (Investigator, Laboratory of Human Carcinogenesis, NCI/CCR) and Dr. Raed Samara (Global Product Manager, QIAGEN). The general consensus of the invited guests was that serving on the committee helped them immensely in their career development. The committee sought suggestions from them on how to increase participation of fellows at events. After lunch, the steering committee had its monthly meeting in which the colloquium's survey results were discussed along with plans for next year's colloquium.



Attendees at the CCR-FYI Steering Committee Retreat 2015.

Dr. Samantha Sutton, a life coach based in California, conducted the last session of the day. She spoke on "Train your brain to work for your goals, not against them". She stressed that one of the ways to train your brain to work for you is to write your goals as if you have achieved them already. All in all, it was a very professionally fulfilling day that ended with a social networking event at The Pour House,

where the fellows relaxed and got to know each other. The retreat marked an end to a successful year of events, workshops and colloquium and welcomed the newly elected leaders for the current year. If you would like to be a part of the CCR-FYI steering committee and get involved, sign up at [https://list.nih.gov/cgi-bin/wa.exe?SUBED1=CCR-FYI\\_STEERINGCMTE-L&A=1](https://list.nih.gov/cgi-bin/wa.exe?SUBED1=CCR-FYI_STEERINGCMTE-L&A=1).

Contributed by:  
*Smita Kakar, PhD*  
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### **Did you know that the *CCR Office of Training & Education*:**

- **Assists trainees and mentors with mentoring issues**
- **Assists in submitting applications for various funding mechanisms**
- **Provides opportunities for expanding collaborative interactions**
  - **Assists trainees in the transition to different career paths**
    - **Provides numerous courses**
    - **And much more!**

***CCR Office of Training & Education***

**Jonathan S. Wiest, PhD , Director for Training and Education**  
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## Articles

### Why Women Leave Science?

According to the National Science Foundation, women occupy only 25% of senior faculty positions. Despite graduating increasing numbers of women PhDs, where are all the women in academia?

A few weeks ago, I attended a seminar on career options for scientists. Strikingly, women in the audience were over-represented (12 of 15 attendees). Here, then, is a hint as to where women scientists are going.

There is, of course, a large push to retain women in the work force in general. It is encouraging to see how federal employees will now be paid for six weeks parental leave to care for a new child (born or adopted). At the NIH, postdoctoral fellows/trainees are given 8 weeks of maternity leave (OITE's NIH Postdoc Handbook).

There is also a push for paid sick leave for federal contractors, to be used when they or their child is ill. Let's face it: mothers are still primarily the caregivers in the family. When my child gets a high fever on a Sunday night, I'm the one sending out emails to reorganize my Monday schedule, so I can fit in a visit to the pediatrician. However, there is also an increasing trend for fathers and husbands to take on the "lead parent" role, of which Andrew Moravcsik describes his experience in *The Atlantic* (October 2015). Andrew is a professor at Princeton University and the husband of Anne-Marie Slaughter, who wrote the controversial article "Why Women Still Can't Have It All" (*The Atlantic*, July/August 2012). Her book, "Unfinished Business: Women, Men, Work, Family", that came out on September 27, 2015, expands on this topic.

#### Identifying the problem

SJ Ceci and colleagues (*Psychological Science in the Public Interest*, 2014) have identified the major leak in the academic pipeline as the period "between the receipt of the PhD and the attainment of tenure-track positions", at least for the life sciences. D. Ginther & S. Kahn, co-authors of the same work, previously published that: "married women and women with children were significantly less likely to transition to tenure-track jobs compared with single, childless women" (D. Ginther & S. Kahn, *Science and Engineering Careers in the United States*, 2009). The silver lining in this,

though, is that "women PhDs with no children fared as well as men in applying for and getting STEM tenure-track jobs" (Goulden M, Frasch K, Mason M, *Staying Competitive: Patching America's Leaky Pipeline in the Sciences*, 2009).

Do women in science, then, tend to "opt out" (Belkin, L, "The Opt Out Revolution", *New York Times Magazine*, October 26, 2003) rather than "lean in" (Sandberg S, *Lean in: Women, Work, and the Will to Lead*, 2013) due to family reasons?

Even maternity leave brought mixed feelings for me. I know some would argue that this should be an unalienable right for every working mother (and father, for that matter). They frown upon Melissa Mayers' (CEO of Yahoo) decision to take only two weeks of leave after birthing her twin girls. On the other hand, I understand the dread and frustration of stalled work, in a world where everyone fights for their chance to stay relevant in the workplace. In my mind, I can see the weeks falling away, as my postdoc training period (ideally 4 years or less, right?) inevitably ticks away. After all, science is not a career track that you can hop on and off from, like a DC tourbus.

So why do women leave science? Most of the reasons I cite here are parenthood-related, while some are gender specific.

#### Low risk tolerance and need for stability

Science in general is a risky enterprise. You study for decades, you work hard, but you keep your fingers crossed that you actually discover something interesting and relevant to the human condition (i.e. can be funded). Admittedly, this system has brought forth amazing discoveries within our lifetime. But enmeshed within it is a lot of uncertainty. Will my fellowship be renewed for another year? Do I have enough preliminary data to apply for my start-up grant?

As I've become a parent, I found out that my tolerance for risk has become less and less. This is why I have my kid vaccinated and why I obsess about his car seat straps. It's a natural, protective instinct. Unfortunately, this has spilled over to my career planning. Right now, I want to make sure we always have health insurance and an income

(i.e. stable job). We're thinking of settling down (translation: buying a house, choosing a school district). This makes me hesitant about making that leap into academia, where you can be shuttling from one end of the coast to the other in your search for tenure.

### **Need for predictable work hours**

Working at the bench, we do have some degree of flexibility when scheduling our experiments. However, what's important for me right now is predictability in my work schedule. My child's day-care closes at 6pm, so I better make sure that my experiments are done before then. What happens if something goes wrong and I need to stay longer in the lab? So far, I have been lucky that my patient husband covers for me during those times.

### **The leave seldom taken**

Last year, Claire Cain Miller published an article in the New York Times entitled "The Leave Seldom Taken" (online version found here: <http://tinyurl.com/nrddapq>), exploring why men do not take advantage of paternity leave. Similar to the "motherhood penalty", fathers who take time off from work to become the main caregiver are perceived as less committed to their jobs. They "received worse job evaluations...(and) were at greater risk of being demoted or laid off..." However, it all depends on one's work culture. For instance, Ms. Miller writes about Tom Stocky, a vice president from Facebook, who took a four-month paternity leave. Lenna Nepomnyaschy, a professor of social work at Rutgers and Jane Waldfogel, from Columbia University, published a study citing that fathers who took 2 weeks or more of leave are more likely to be involved in caring for their children. And the biggest benefit of "tag-team parenting" is increased future earnings of the mother, according to a Swedish study.

Since we are living in a globalized world and usually lack the benefit of multigenerational family support (i.e. grandma lives halfway across the world), we need to rely more heavily on our partners. Granted, we are all scrutinized about our commitment to our work and jobs whenever conversations come up about taking time off to care for a child. But we have to shift the perceived standards and advocate for our rights as parents. After all, we are raising the next generation of humans.

### **Lack of role models**

Do you know of any female scientist leaders in your department who also balances parenthood and a marriage? I don't, and herein lies part of the problem. Ideally, mentoring by a successful senior female scientist would have addressed gaps on how to navigate one's way. There is a mentoring fellowship available to NCI female postdocs called the Sallie Rosen Kaplan fellowship, sponsored by the Foundation of NIH and NCI's Center for Cancer Training. Hopefully, similar opportunities will come up to address this issue.

### **Gaps in support/network**

Everyone knows the value of networking, but I have never gone to any of those happy hour meet-and-greet events. They usually occur during that crucial period between the end of the workday and dinnertime. Every parent knows the value of a regular dinner and sleep time schedule, especially for younger children. I wonder if anyone would care to join me for a cookie bake-off networking event on a weekend instead.

Our very own Dr. H. Valentine and Dr. F. Collins wrote about a pioneering effort to establish "diversity hubs of innovation" (H. Valentine and F. Collins, PNAS Early Edition, Sept. 21, 2015) which would provide an ecosystem without the traditional barriers of "transition... in the biomedical career path". I am looking forward to seeing this develop sooner rather than later.

The truth of the matter is: you can lean in as much as you want, right up to labor and delivery, but sustaining high performance in one's career progress is difficult without a good support system and a roadmap for success.

### **Additional reading:**

H Valentine and F Collins, "National Institutes of Health addresses the science of diversity", PNAS Early Edition, Sept. 21, 2015  
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.  
NSF's Career-Life Balance Initiative <http://www.nsf.gov/career-life-balance/brochure.pdf>

Contributed by:  
*Anna Serquiña MD, PhD*  
*HIV & AIDS Malignancy branch*

## Resources at NIH: Science Policy Discussion Group

When you think about policy, you think about Capitol Hill and people feverishly negotiating new laws behind closed doors. This is not the first place where you would think science could play a major role, yet our society has become more and more dependent on scientific advances and this is reflected in policy, both in the legislative and executive branches, as well as the judicial.

Because very few elected policymakers have a science degree, they need scientists like us to for expert advice. Congressional committees frequently ask scientific societies for their expert opinion about a specific scientific topic. In addition, some congressional members actually have scientific experts on their staff. Another side of science policy is the production and analysis of scientific reports in response to directives from lawmakers. Thus, science policy sits at the intersection where policy influences science and science influences policy.

Policy can profoundly affect how science is done and that is not limited to controlling the budget. For instance, there are many policies in place that tightly regulate clinical trials. A specific example is when in 2001 stem cell research funding was severely restricted. More recently, the Recalcitrant Cancer Research Act requires NCI to develop framework to address cancers with survival rates less than 50%.

On the other hand, recent developments in the gene editing technology and its potential use in human embryos has sparked a new bioethics debate, which will most likely result in new policies. On a more global scale, the recent Ebola epidemic has led to renewed interest in global monitoring of potential disease outbreaks in combination with a rapid scientific response to study and mitigate a new outbreak.

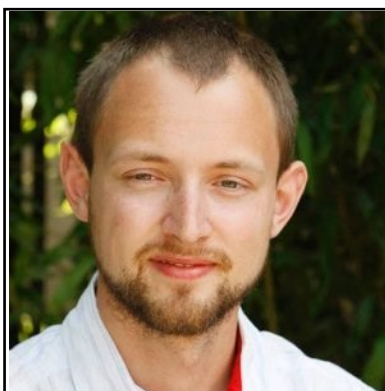
To bring together fellows who share the passion for understanding the immensely wide world of science policy, Kristofor Langlais and Sandra Chapman started a fellows-led and -run Science Policy Discussion Group (SPDG) IN 2009. The purpose of SPDG is to enhance our knowledge and understanding of science policy and contrib-

utes to the public discourse on specific issues of current interest, which we do by inviting speakers for a dialogue. You can find more information about SPDG and its activities at <https://www.training.nih.gov/spdg>

In the past, speakers have come from National Academy of Sciences, Department of State, AAAS, and the White House. We also hosted Dr. Anthony Fauci (NIAID), who talked about the Ebola epidemic in Western Africa and the NIH involvement. This year we will host another series of speakers, including the current NIH director Dr. Francis Collins, with whom we will talk about the Precision Medicine Initiative. Overall, we host a very diverse set of speakers simply because science policy covers such a broad range of topics.

For more information please visit our website: <https://www.training.nih.gov/spdg> or contact the co-chairs April Killikelly ([april.killikelly@nih.gov](mailto:april.killikelly@nih.gov)) and Daniël Melters ([daniel.melters@nih.gov](mailto:daniel.melters@nih.gov)).

Contributed by:  
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*Laboratory of Receptor Biology and Gene Expression*



Coming soon ..



The Center for Cancer Research Fellows and Young Investigators CCR FYI  
Steering Committee Presents



## 16<sup>th</sup> CCR-FYI COLLOQUIUM

### “Pipettes to Syringes: Collaborating for a Cure”



March 31<sup>st</sup> and April 1<sup>st</sup> 2016

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Cancer survivorship advocacy

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**More information coming soon!**

*Supported by the CCR Office of Training and Education and the CCR Office of the Director*

## Internship at NIH: A perspective of a high school student

In partnership with the Merck Company Foundation and the Healthy Americas Foundation, the National Alliance for Hispanic Health established the Alliance/Merck Science Hispanic Scholars Program specifically designed to support an upcoming generation of Hispanic scientists. The scholarship would help increase the Hispanic students' access to mentors, and higher education in STEM fields. Since 2008, the program has provided 50 scholarship awards to Hispanic high school students in specific geographical areas and demonstrated promise for STEM study.

The awardees of the Alliance/Merck *Ciencia* Scholars Program are required to participate in summer research internships in STEM fields of interest over three summers of their undergraduate studies. The summer research internships provide students with opportunities to expand their knowledge, develop and enhance their research skills, apply theoretical principles learned in the classroom setting and provide students with work experience that will enhance their educational and career development. This award provides financial support for each of three consecutive summers toward meeting the program requirements. The first summer is usually spent at the home academic institution looking for potential internship placements. The actual research internships are between the months of May and middle of August, full-time, and for eight to ten consecutive weeks.

Proud to be a Highlander, I am currently pursuing a bachelor's degree in Bioengineering at the University of California, Riverside. Along with being the first person in my family to attend a university, my greatest accomplishment is definitely being part of the Alliance/Merck *Ciencia* Hispanic Scholars Program. After my undergraduate studies, I want to attend graduate school and eventually pursue a career in cancer research. In particular, I want to focus my research on pediatric cancer. Originally from South Central Los Angeles, I have never lived outside of California. However, keeping my career goals in mind, this summer I took the opportunity to intern at the National Institutes of Health in Bethesda, Maryland. I was placed in the Laboratory of Pathology at the National Cancer Institute. I had the opportunity to use my experience and conduct research on a project that was designed especially for me. I worked with breast adenocarcinoma cell lines to explore the roles of

different types of oncogenes. Previous research has shown that several cancer cell-specific pathways can be targeted as a therapeutic strategy without toxicity toward healthy tissues. It is quite exciting to know that one day this strategy can lead to beneficial effects in cancer chemotherapy. From this project, I have learned and improved laboratory skills such as cell culture, treating cells with chemotherapeutic agents, transfection, western blotting and immunoprecipitation. During my time at NIH, I also attended lecture series given by renowned scientists, as well as attended the NIH Graduate and Professional School fair and participated in the NIH Summer Students Poster Day.

In addition, the awardees are invited to visit Washington, DC and research and industry facilities. Since I was interning at NIH, I had the opportunity to host nine fellow-awardees to the lab. My mentor, Dr. Sukhbir Kaur and I conducted experiments with them using several normal and cancerous cell lines. Although the students worked in STEM fields, for many, this type of wet-lab work was very different from their own. Dr. Kaur explained the importance of this research and its impact in future work. This inspired several students to explore the opportunity to carry out future internships at the NIH or similar institutions.

I am grateful to my principal investigator, Dr. David Roberts and Dr. Sukhbir Kaur for being supportive through this experience. It has been incredibly rewarding both personally and academically. Not only did I learn essential laboratory techniques, I also learned how to think critically and plan experiments to meticulous detail. I became intrigued in the research as puzzling results arose that challenged our hypothesis. I spent time reading scientific papers because I realized that a good researcher gathers existing knowledge in the field and stays updated with the evolving literature. It also helped me appreciate the theory behind experimental details. This renewed love for undiscovered knowledge has reinforced my goal to pursue a PhD after my undergraduate studies. Given that my experience was so rewarding, I am proud that to open this path of opportunity to other students as well.

Contributed by:  
*Marlen Castro*  
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## Research Highlights

### Metabolic reprogramming by CD47: mechanism and potential to enhance radiation therapy of cancer

CD47 is a cell surface receptor for thrombospondin-1 and a counter-receptor for the inhibitory receptor SIRP- $\alpha$  on macrophages. Currently, CD47 antibodies are in several Phase I clinical trials for treating advanced hematologic cancers and solid tumors. These antibodies were designed to inhibit the CD47-SIRP interaction, but recent publications from a CCR group led by Dr. David Roberts reveal that the CD47-thrombospondin-1 interaction plays a more important role in therapeutic responses to radiation therapy.

The Roberts lab has been working on CD47 for almost two decades and has discovered that thrombospondin-1 binding to CD47 controls nitric oxide/cGMP signaling, stem cell self-renewal, and autophagy, thereby regulating cellular functions including apoptosis, proliferation, adhesion, differentiation, and migration. Agents that block thrombospondin-1/CD47 signaling enhance the resistance of cells and animals to stress caused by ischemia, reperfusion injury, and ionizing radiation. Of therapeutic interest, CD47 blockade protects normal cells from the toxic effects of ionizing radiation but does not protect tumors, which instead become more sensitive to host adaptive immunity and T cell immunotherapy.

To better understand this selective radioprotection, the Roberts group performed a comprehensive investigation of metabolic regulation in wild type versus CD47-deficient cells in the hours following exposure to a radiation dose sufficient to kill 50% of the wild type cells (<http://www.ncbi.nlm.nih.gov/pubmed/26311851>). Combined liquid and gas chromatography followed by tandem mass spectrometry enabled the identification and quantitative analysis of 342 cellular metabolites. In wild type cells, levels of most metabolites progressively fell after irradiation, but levels of the same metabolites in the CD47-deficient cells remained stable or even increased in some cases. These analyses showed that CD47 specifically regulates glycolysis, the pentose phosphate pathway, the Krebs cycle, nucleotide biosynthesis, mitochondrial homeostasis,

labile methyl group metabolism, and pathways that detoxify reactive oxygen species. A similar global resistance to ionizing radiation was confirmed in transgenic mice lacking CD47 based on metabolomic analysis of lung tissues from irradiated CD47-null and wild type mice.

This comprehensive study answers many key questions about the cellular pathways controlled by CD47 signaling. These results demonstrate that CD47 is a global regulator of cellular metabolism. The mechanistic insights gained will lead to further basic science studies regarding CD47 signaling pathways, but the findings may also translate into improving the outcome of radiation therapy in cancer patients. Inhibitors of CD47 signaling or thrombospondin-1 binding under development in the Roberts lab may increase the ablation of tumors by targeted irradiation while protecting critical nearby organs in cancer patients from debilitating side effects of radiation therapy including fibrosis, immune suppression, and loss of stem cells. Some of the CD47-sensitive metabolites identified could also be useful as biomarkers to optimize CD47 therapeutics and provide a means to noninvasively evaluate responses of patients enrolled in the ongoing clinical trials using CD47 blocking antibodies.

*Original Reference: CD47 Globally Regulates Metabolic Pathways that Control Resistance to Ionizing Radiation. Miller TW, Soto-Pantoja DR, Schwartz AL, Sipes JM, DeGraff WG, Ridnour LA, Wink DA, Roberts DD.*

*Lab of pathology/CCR/NCI/ National Institutes of Health, United States.*

Contributed by:  
Sukhbir Kaur, PhD  
Laboratory of Pathology

## Conference Highlights: Structural Biology related to HIV/AIDS meeting- 2015

National Institute of General Medical Studies (NIGMS) has supported the study of structural details of HIV proteins and other related macromolecules since 1987. The funding mechanism has evolved its focus from determination of structures, to structure based drug design to structure of macromolecular complexes involving HIV. P50 or center level grants have been provided to various groups around the country. The centers have interesting names and acronyms like CHEETAH (Center for structural biology of Cellular Host Elements in Egress, Trafficking and Assembly of HIV), HIVE (HIV Interaction and Viral Evolution Center), HARC (HIV Accessory and Regulatory Complexes), CRNA (Center for HIV RNA studies) and PCHPI (Pittsburgh Center for HIV Protein Interactions). The Structural Biology of HIV Meeting was designed to allow the discussion of the progress in these centers and also let other allied and interested researchers in presenting their work through stage presentations and posters. The progress at each center was delivered as a report by a senior investigator of the respective groups. In addition, several of the PIs in each group also presented the work that was at the forefront of HIV research. Some of the most striking research presented is abridged below.

One exciting prospect of using a HIV-like virus is to deliver drugs or genes to specific cells. The CHEETAH group has been able to take this idea further along by creating peptide cages that assemble into specific lattices. The assembly and egress of HIV has been well defined and by fusing HIV egress elements to peptides that can assemble into specific caged structures. The group has been able to 'create' viral assemblies in cells that can exit the cells by themselves. The potential use of such technology is up to our imagination and is only limited by the size of the caged assemblies. Ongoing work will determine peptides of different sizes that can potentially form cages of different sizes. Targeted drug delivery is a very real possibility when this technology can be transplanted.

One of the latest developments in the field of structural biology is the use of an electron detector system called K2, which can be used as a detector platform in cryo-electron microscopes. Tomographic averaging of electron micrographs in this system could lead to the development of near-

atomic resolution structures of large complexes. At the moment, this technology has been applied to study the structure of proteins that are 200kDa or larger. HIV protein complexes are amenable to such structure determination techniques and several HIV and related proteins are being studied using this technology at PCHPI and at NIH, Bethesda. Significantly, the structure of HIV and retroviral integration complexes which are involved in inserting the viral genome into the host cell genome, the so called Intasomes, have been studied in detail using x-ray crystallography and more recently using cryo-electron tomography.

Systems based approach to study biological phenotypes has been in vogue for a few years now and it is not very different with HIV. Some of the most recent studies focusing on RNA incorporation into HIV virions have taken this approach to understand what cellular RNA moieties are specifically incorporated versus what RNA moieties are non-specifically incorporated. Such studies have been performed in the past, but with currently available advanced sequencing techniques, such information has become highly resolved and provides greater insight into RNA behavior in cells and in viruses.

To highlight a highly significant study that occurs in the NCI at Ft. Detrick, Dr. Wei Shau Hu and colleagues have been studying the movement of HIV RNA in the cells and also other aspects of HIV RNA that are directly relevant to the viral replication cycle. Dr. Wei Shau Hu presented a thorough study of HIV RNA dimerization and kinetics of the HIV RNA movement using advanced microscopes.

Due to spatial limitations, I am unable to include all the other exciting work that is being carried out in the field of structural biology of HIV. These are exciting times for science in general and more specifically for researchers interested in retroviral biology like me. I am happy to observe and ingest the cutting edge science that has been presented at this NIGMS conference.

Contributed by:  
*Sanath Janaka, PhD*  
*HIV Dynamics and Replication Program*

## Conference Highlights: Integrative Molecular Epidemiology (AACR workshop)

Recently, I had the pleasure of attending an American Association for Cancer Research (AACR) Workshop entitled, “Integrative Molecular Epidemiology,” in Boston, MA from August 10-14<sup>th</sup>, 2015. It was a five-day workshop aimed to train cancer researchers to integrate concepts in molecular oncology with epidemiology, with special emphasis on cancer etiology and outcome. The workshop was not only designed for classically trained epidemiologists, but also for bench-scientists, physicians, and other health-related disciplines. This guaranteed that no matter what the training background, the researcher could take something meaningful away.

It was an intimate setting with a rotating cast of highly qualified faculty teaching in their area of expertise. All lectures and in-session laboratories focused on issues surrounding integrating epidemiology and molecular biology studies such as statistical design, feasibility, scalability, quality control, and practical limitations of research studies. Each instructor took time to introduce the material and make sure we were all on the same page before instructing the group. Most effort was spent on statistical analyses most commonly used in molecular epidemiology studies. This field is constantly evolving and using new methods to investigate cancer etiology and thus, new statistical measures are being developed regularly. The faculty took time to introduce the current statistical methods commonly used and also the pros and cons behind each method. For me, this was a critical part of the workshop as I am just beginning to analyze my dataset and benefited greatly from the one-on-one discussion from faculty and other participants. In this way, the workshop was invaluable.

The workshop excelled by connecting early career scientists with faculty willing to give helpful advice such as how to negotiate a start-up package, how to initiate collaborations or start a cancer epidemiology consortia. I appreciated the honesty and candidness that each faculty member brought to the table. Most of all, it struck me how they stressed to follow the data and not necessarily lean on science dogma to investigate the biological unknown.

As a classically trained bench scientist in molecular genetics, before this workshop, I understood the basics behind epidemiological study design and some statistical methods; however, not enough to conduct integrative molecular epidemiology studies independently. After the five-day workshop, I had enough knowledge to be able to conduct statistical analysis of my dataset and had built up a reliable network of experts who could address my concerns in the future. Overall, the workshop provided me with the confidence and skillset to delve into cancer molecular epidemiology with a far-reaching network of individuals available to provide helpful advice along the way and facilitate my success.

It was an incredible opportunity to advance my research and create meaningful professional relationships. I recommend this workshop to any early career scientist interested in acquiring comprehensive knowledge about the field of cancer molecular epidemiology as well as learn specific information and skills that will be helpful to their research in the future.

Contributed by:  
*Cheryl Jacobs Smith, PhD*  
*Laboratory of Human Carcinogenesis*



Omni Parker House, founded in 1855, one of the oldest in the US, was the venue of the Integrative Molecular Epidemiology workshop.

## Interview with a life coach: Dr. Samantha Sutton



**Please provide a brief background on yourself. Where did you receive your undergraduate and graduate education?**

**What was the focus of your dissertation research? If you did a post-doc, where was it and what was the focus of your research during your post doc?**

I proudly hail from Urbana, Illinois, and moved a whopping five blocks away from home to get my BS in Electrical Engineering from the University of Illinois at Urbana-Champaign. I knew that I was an engineer at heart, and was also fascinated by living systems, and so went on to receive a Ph.D. in Biological Engineering at MIT. I was specifically interested in the nascent field of Synthetic Biology, which I had discovered during a summer research project at Oak Ridge National Labs. I spent my grad school years helping to advance the field, both inside and outside the lab, to make it the impactful discipline it is today. My project was specifically focused on engineering protein modules that could be used to selectively regulate nuclear translocation in yeast. It involved a combination of yeast genetics, molecular biology, cell biology, biochemistry, and systems modeling.

**Tell us about your current job. You are a life coach, but also an entrepreneur. What obstacles did you encounter as you were forming your company?**

Good question. I started a *life engineering* company that works with individuals, companies, and institutions like NCI to help people engineer career and lives they love. I believe that each person has an internal blueprint, as unique to them as their fingerprints or genome, for what a great career and life would look like. My company helps you uncover what that is, clear away the barriers to getting it (most of which are internal, it turns out), and make sure that you get it.

Starting a company is a bit like an African safari: moments of breath-taking wonder and exhilaration, and also moments of fear and doubt as you are charged by a pack of wild monkeys. I love that I get to create what inspires me, work with people I admire, and have an impact that is meaningful to me. But, as with most big goals in life, this freedom comes with a price tag. There is a nagging voice of fear that is always, always there. It tells you things like “sure, business is great now... but that might change next month,” or “do I really have what it takes?” I have found that the way to deal with this voice is not to fight it, because this voice is illogical and crazy and will always find a way to twist the argument and win. The key is to let it rage on in the background, kind of like crazy Uncle Ed at your family’s Thanksgiving dinner, and not pay much attention to it. Being passionate about something means that you have to deal with the fear of it being taken away. It just comes with the territory.

Another thing I had to learn was how to say NO. At first when you start a business, you are so eager for clients that you get into the habit of saying YES to every opportunity. The same is true for any career. But soon you start to realize that your company is getting pulled in many different directions, and it’s hard to become a master in any one of them. And so you need to say NO to some very good opportunities, in honor of focusing on a few key directions that are most important to you.

**Why did you decide to leave the bench and pursue a career as a life coach?**

For me, I came to realize that there was a huge need in this world for clarity and direction. There are simply too many people spinning their wheels at jobs that aren’t a right fit for them, or being unhappy in relationships that aren’t functioning well, or lacking the self-confidence to stand up and do what they know is right. One of the reasons for this is that people don’t have the technology to solve these problems. I decided that what we needed was a rigorous set of tools and techniques for life engineering, and I wanted to build them!

I knew that, like everyone reading this article, I had many talents and could pursue many career paths if I so chose: professor, industry research,

science entrepreneur, consultant, etc. What it really came down to was the simple question of “what do I *want* to do.” For driven, ambitious people like us, it is sometimes hard to answer that question, because we are used to doing what seems most prestigious, or practical, or what other people think is important. But the truth is, when I really got down to it, I could think of nothing I was more passionate about than working with people, day in and day out, to improve something as dear to them as their lives.

### **Describe your typical workday.**

I get up around 6 am, meditate, and make the stereotypical kale smoothie. My client sessions start around 7 am because I live in San Francisco and have many clients on the east coast. Most of my sessions are 1-hour long, and are held over phone, Skype, and sometimes in person. My clients have “the bat phone” and can call me anytime, 24/7, if they urgently need me. I usually field one such call every day or so, and it makes me really happy that I am able to be there for them in their moments of need.

I run many courses too. I lead a popular 6-week career discovery course called Engineer Your Career, which is virtual and so people all over the world participate in it. One of the best parts of this course is the amazing community of career-hunters it assembles, and how they inspire each other with their progress during the course. I also lead courses and workshops at various institutions, like NCI’s Sallie Rosen Kaplan Post-Doctoral Fellows program.

I manage a few assistants and junior coaches, and also have an informal board of directors who I consult regularly to discuss strategy and vision. The rest of my time is spent working on proposals, launching new courses, leading webinars, and writing blogs and other content. It’s never a dull moment, let me tell you.

### **How would you describe your current work/life balance?**

Well, I am a life engineer, so if the answer to this were anything other than “fantastic,” I would be in trouble. I am an energetic person, and definitely work hard and play hard. What I love about running my own company is that I can design my time exactly how I want it. I am very certain of my

priorities in my life, and make sure that my weeks reflect this. I probably work about 60-65 hours per week, and spend the rest of my time building my community in San Francisco (I just moved here 2 months ago), staying close to friends and family long-distance, having fun and exploring new things (I joined a karaoke league this fall), taking care of myself (CrossFit 3x per week, meditation group, preparing healthy foods, sleeping enough) and also contributing to the community (I volunteer with the Junior League of SF, NationSwell Council, and my high school’s alumni board).

### **What approaches do you follow while coaching clients?**

I have built my own methodology that combines the analytical, process-driven world of science and engineering, and the intuitive, cognitive world of coaching. I have a toolbox that can be used to build just about anything, and my clients and I work together to get to the heart of what they want, what is stopping them, and we build it together. No two people are alike, and thus no two paths of growth will be, either. I also believe that the whole process should be a lot of fun. My neighbors sometimes comment that they hear an incredible amount of laughter floating through the walls when I am coaching.

### **Where have you coached so far?**

Oh, so many places. Google, Stanford, MIT, Columbia, Duke, Yale, Pratt & Whitney, UNC-Chapel Hill, NCI, American Women in Science (AWIS), to name a few. I work at a lot of start-ups, and that is an exciting scene because I really feel like I am building the future of technology, leader by leader.

### **What has been your favorite coaching “success” story? Have you encountered any difficult cases, and how did you solve them- or how did you coach that person out of their problems?**

My work is a bit like the movie *Mr. Holland’s Opus*, in that my masterpiece is all of the people whose lives I have touched. And all of the people whose lives they then touch. I have so many success stories that it’s hard to pick one, so let’s go with a common one. Unfortunately, I see a trend in the people who come to me: they work really

hard to get big, important roles, and then are so stressed about them that they don't actually enjoy having that role. What, I ask you, is the point of that? So I work with my clients to manage all of the demands on their time so they can simply enjoy the ride. For example, one of my clients is a director in a research hospital, and when she first came to me, she was 95% stressed and 5% enjoying herself. Four months later, she is 50:50. By the end of the year, she will be at 10:90. That is as it should be.

If you would like to learn more about me and my work, check out my website: [samanthasutton-phd.com](http://samanthasutton-phd.com)

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*Come meet us in our next meeting on Thursday, October 29<sup>th</sup> at 11am! Send an e-mail to Emilee (Emilee.senkevitch@nih.gov) or Khadijah (Khadijah.mitchell@nih.gov) for more details.*

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