



From the Editor's Desk

Welcome to the Fall edition of the Fellows and Young Investigators Newsletter. Spring and Summer of 2012 were packed full of events, research festivals, and conferences for CCR fellows. In this issue, we reflect on the 12th Annual CCR-FYI Colloquium that was held in Bethesda during early Spring. We feature a Q & A with the 2012 CCR Outstanding Postdoc, Dr. Junfang Ji and her adviser, Xin Wei Wang. We also feature highlights from the Frederick National Laboratory and Fort Detrick Spring Research Festival that took place in May. As part of our "Off-the-Bench Careers" section, we provide interviews with two bench scientists who have transitioned to careers in Technology Transfer. We also highlight a publication by CCR researcher, Dr. Xiaoli Du, that describes the interaction of two tumor suppressors in lung cancer cells. Be sure to check out the new addition to the newsletter, "Conference Highlights", in which fellows discuss recent conferences that they attended. If you've presented your research at a meeting recently and want your experience featured in the next newsletter, please contact us!

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IF YOU HAVE ANY COMMENTS, SUGGESTIONS OR WOULD LIKE TO CONTRIBUTE TO FUTURE NEWSLETTERS, PLEASE EMAIL US AT nciccfyi@mail.nih.gov, or Miranda.Hanson@nih.gov

CCR-FYI News

A Reflection on the 12th Annual CCR-FYI Colloquium

The annual CCR-FYI Colloquium provides the CCR fellows with a unique opportunity to network with other fellows and distinguished keynote speakers, present their research, participate in informative and skill-building workshops, and attend a diverse career fair. This year the Colloquium was held on March 26-27, at the Natcher Conference Center on the NIH Bethesda campus. Because the event was held on-campus, unlike past colloquia, attendance was below normal and the planning committee had more obstacles to overcome; however, the CCR-FYI Steering Committee was still able to provide an exceptional program for this year's attendees.

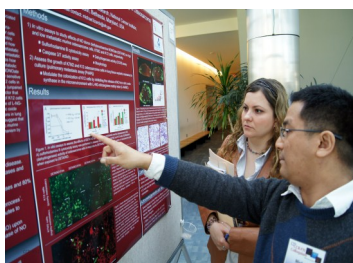
The first day kicked off with several excellent presentations. Dr. Kristin Fabre, Chair of the CCR-FYI Steering Committee and co-chair of the Colloquium Committee, welcomed everyone to the Colloquium and provided an overview of the CCR-FYI Steering Committee's role in the CCR. Opening remarks from Dr. Jonathan Wiest, Associate Director of the Office of Training and Education for CCR, and Dr. Robert Wilttrout, CCR Director, followed. Dr. Jeffrey Schlom, Chief of CCR's Laboratory of Tumor Immunology and Biology, delivered the first keynote address, titled, "Design and Development of Therapeutic Cancer Vaccines." Fellows then had the opportunity to present their research in the form of oral presentations or posters. Following lunch, a special highlight presentation was given by Joanna Rudnick, director of the cancer survivorship film, *In the Family*. The film is a documentary about genetic testing for breast

and ovarian cancers and the choices women make when they are faced with the possibility of developing the disease. The afternoon continued with the second keynote speaker of the day, Dr. Natasha Caplan, Head of CCR's Gene Silencing Section, who presented, "Functional Annotation of the Cancer Genome via RNAi". To conclude the day, several well-attended workshops focused on preclinical research and development, careers in science writing, and how to make yourself marketable.

Day 2 of the colloquium began with the third keynote speaker, Dr. Brigid Hogan, Professor and Chair of the Department of Cell Biology at Duke University, who discussed, "Stem Cells in Lung Regeneration and Repair." Three more exciting workshops followed featuring discussions about careers both in and outside of academia, grants management, and communicating science effectively. In the afternoon, the career fair and the second wave of oral and poster presentations took place concurrently, and both were quite successful. During the career fair, representa-



Drs. Jonathan Wiest, Robert Wilttrout, and Jeffrey Schlom chat during a break at the Colloquium.



Fellows attend the Career Fair, poster sessions, and career-development workshops during the 2-day Colloquium.

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tives from government, biotech, consulting, and advocacy organizations spoke to attendees, accepted resumes, and provided the interested fellows with information about available careers. The final keynote speaker of the Colloquium was the Outstanding Post-Doctoral Fellow, Dr. Junfang Ji, who is currently a research fellow in the Laboratory of Human Carcinogenesis. More about Dr. Ji is featured in the next article.

To conclude the colloquium, Dr. Fabre and Dr. Alyson Freeman, co-chairs of the Colloquium Committee, took to the podium to announce the top four trainees in oral presentations and poster presentations, respectively, all of whom won a travel award. The award winners for outstanding oral presentations were C. Andrew Stewart, of the Cancer and Inflammation Program (CIP); Hui Yang, of the Gene Regulation and Chromosome Biology Laboratory; Mathieu Metifiot, of the Laboratory of Molecular Pharmacology; and Daniel W. Lee III, of the Pediatric Oncology Branch (POB). Outstanding poster presenters were Stephanie K. Watkins, of the CIP; Christopher Huggins, of the Laboratory of Cancer Prevention; Quanlong Lu, of the Laboratory of Cell and Developmental Signaling; and Alexandre K. Rouquette-Jazdanian of the Laboratory of Cellular and Molecular Biology. The Outstanding Post-Graduate Trainee award, which recognizes outstanding science and service by a post-baccalaureate fellow or graduate student, was given to Paul P. Su of the POB. A motivating closing address was delivered by Dr. Michael



Travel award winners, From left: Mathieu Metifiot, C. Andrew Stewart, Quanlong Lu, and Stephanie Watkins.

Gottesman, Deputy Director of Intramural Research at NIH. The CCR-FYI Steering Committee would like to thank all of the fellows who attended the event, as well as the Colloquium Planning Committee for organizing such an engaging program.

*Submitted by:
Miranda Hanson, PhD
Laboratory of Molecular Immunoregulation
Cancer and Inflammation Program*



2012 CCR-FYI Colloquium Planning Committee, From left: Nesrin Rechache, Humeyra Taskent, Kristin Fabre, John Simmons, Alyson Freeman, Ishminder Mann, Jan Varadarajan, Barbara Rath, Christina Rangel, Jeffrey Zhao, and Adeola Makinde. Absent from photo: Muthu Balasubramaniam

Spotlight on 2012 CCR Outstanding Postdoc: Dr. Junfang Ji

Junfang Ji, a research fellow at the NCI-CCR, recently won the 2012 CCR Outstanding Postdoctoral Fellow Award. After obtaining her Ph.D. in cell biology in China, she joined Dr. Xin Wei Wang's lab, which is part of the Laboratory of Human Carcinogenesis at the CCR, as a visiting fellow in 2006 and has since published several high-impact papers as the lead author.

Dr. Ji's initial research pursuits—translational studies on microRNA function in liver cancer heterogeneity—were shaped by Dr. Wang's interests in identification of biomarkers in liver cancer. In particular, her work focused on the miR-181 family of microRNAs that is part of a positive feedback loop to maintain a small fraction of the liver cancer cells in a stem cell-like state. Those so-called cancer stem cells can self-renew or differentiate under distinct molecular cues. Dr. Ji proposed that miR-181 contributes to the heterogeneous nature of liver cancer. Because silencing of the miR-181 expression reduced the number of liver cancer stem cells, her findings suggest a possible new drug target for liver cancer therapy.

Meanwhile, Dr. Ji and colleagues found that miR-26, another set of microRNAs, have a gender-dependent expression pattern in liver cancer patients, which is another example of heterogeneity. Further analysis by Dr. Ji led to an unexpected discovery, published in the *New England Journal of Medicine* (NEJM), that the expression level of miR-26 can predict prognosis and guide liver cancer patients for interferon adjuvant therapy.

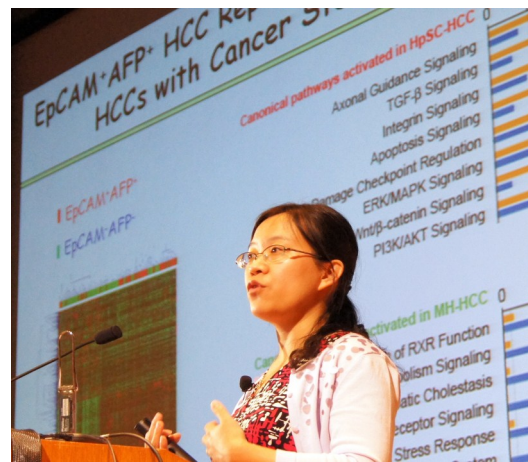
In the long run, Dr. Ji is interested in probing why there is a discrepancy in the morbidity of liver cancer between males and females. By identifying the risk factors for the higher male morbidity, she hopes to find novel therapies or even prevention of liver cancer.

Before her keynote presentation at the 12th Annual CCR Fellows and Young Investigator Colloquium, Dr. Ji and her mentor Dr. Wang, deputy chief of the Laboratory of Human Carcinogenesis, talked about their research and the essentials of a successful postdoctoral fellowship experience.

What prompted you to join the Wang lab?

I applied to several top labs in the cancer research field and got several offers. Then the hard

part came: Which lab should I join? After all, they all conduct stellar research. However, my Ph.D. advisor, Dr. Qimin Zhan, suggested that I choose a PI who matches my own personality and with whom I can collaborate easily. He pointed out that having similar personalities allows us to mutually stimulate each other's enthusiasm for the projects and move research forward. Dr. Zhan mentioned that Dr. Wang is a nice and supportive PI with huge enthusiasm for science. That's why I ultimately accepted the offer here.



Dr. Ji gives her Keynote presentation at the 12th Annual CCR-FYI Colloquium.

What role does Dr. Wang play in your success?

He plays a very important role in my career. He guides me gradually to think big and broad. We constantly discuss, debate, and even argue about projects. Sometimes, there can even be very heated debates. It is often through these discussions that we come up with great ideas.

What do you do when you encounter roadblocks such as negative experimental results?

Over the years, I have learned not to be easily disappointed by negative results. Now, I am even excited to see unexpected results. A great example is my research that led to the NEJM paper.

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We initially identified a biomarker predicting prognosis of liver cancer. However, when we included another study, the conclusion was no longer valid. I had to go back to the drawing board, forget about my original hypothesis, and think “outside of the box.” After countless discussions with my mentor for a couple of months, we finally figured out the reasons for the “negative” results. It turned out to be an exciting discovery and advanced our understanding of liver cancer biology.

Did you feel pressure to work harder as a visiting fellow?

I don't feel any pressure to work harder than American postdocs. But I enjoy working hard since asking questions and seeking answers brings me so much happiness. However, I do feel some disadvantages as a non-native English speaker. Language is a big barrier for me. I read literature more slowly, and do not write as well as native English speakers. It is still not easy for me to accurately and completely communicate my research during presentations, although I put extra effort into improving my communication skills.

Is there anything you would like to have done differently during your postdoc training?

I didn't think about projects from the perspective of a PI in the first two years of my postdoc training. Now, I always try to think about how a project can fit a bigger picture, and then conduct the research accordingly. Had I started preparing myself to be a PI at the very beginning, I would have put more emphasis on grant writing and presentation skills. I just began to learn that a good presentation is not only presenting data, but also providing a global view so that everyone can learn something from it.

What's your next step? Are you looking for PI positions in China and/or in the U.S.?

I'll focus on faculty positions in the U.S. I think the research programs here are stronger, and I want to challenge myself in a competitive environment.

Describe some turning points in your career so far.

I can think of two important turning points. The first one occurred when I joined the Zhan lab as a Ph.D. student. I hadn't had many opportunities to

read literature that explains sophisticated ideas or experiments when I worked on my master's degree. I really struggled to read papers published by Zhan that involved cutting-edge research. But after two exhaustive months of reading, I had a better understanding of research than my colleagues. And when I listened to seminars, I found suddenly that I could follow all of the talks.



Dr. Wiest presents Dr. Ji with the Outstanding Postdoctoral Fellow award.

The extensive reading laid a firm foundation for my success. Another turning point was when I joined the Wang lab. Having been the best Ph.D. student in my former lab and winning many awards, I was a little bit cocky. But when I came here, I found that many people are excellent researchers and have great ideas. This experience helped to open my mind.

Could you give some advice to other fellows on how to make the best out of the postdoc training?

Working hard is necessary if you want to be successful. But working hard does not simply mean working long hours. You have to think hard and work smart. And try to summarize your data and your project often, which will focus your thinking and will become handy when you write papers.

It is also important to see the big picture and not just focus on a particular project. Another point I want to make is communication, which I am still trying to learn. I do a pretty good job to communicate within my own lab. However, it is

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vital to step out of your own lab and build your network.

A brief Q & A with Dr. Xin Wei Wang, the mentor

Why did you recruit Dr. Ji to your lab?

She was recommended by one of my best friends and her Ph.D. advisor, Qimin Zhan. During the interview in Beijing, I was impressed with her in-depth knowledge and positive attitude, both of which are good qualities for a postdoc.

How is Dr. Ji different from other equally outstanding postdocs in your lab?

She has all-around good qualities as a postdoc. Let me talk broadly about the good qualities of a postdoc. Many postdocs don't know exactly what they want to get out of their training. Without a clear focus, a clear understanding and a clear objective, they eventually get lost, and don't know how to move forward. At that time, the postdoc position just becomes a job, rather than career development.

Instead, a postdoc needs to be self-motivated, positive, willing to take criticism, open-minded and forward thinking. A good postdoc can work collaboratively, constructively and effectively. Doing research is not just a job, but also a hobby. He or she must be passionate about research. This is what I see in the best postdocs. Generally, NCI is the best place for postdocs, and we have many outstanding postdocs. I think

Junfang is in a position to represent what the best postdoc should be like at the CCR.

Do you support her decision to become an independent PI?

Of course. Whenever a trainee starts arguing with me, it means he or she is ready to be independent. Research is not just a one-sided story. We have many back-and-forth interactions.

The writer of this interview wishes to thank Dr. Katherine Bricceno at the NINDS and Dr. Michelle Bond at the NIDDK for their great editorial suggestions.

*Submitted by:
Jianfei (Jeffrey) Zhao, PhD
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Laboratory of Metabolism*



**NCI Center for Cancer Research
Fellows & Young Investigators**



What is the CCR-FYI?

The NCI CCR Fellows and Young Investigators (CCR-FYI) Association was organized to foster the professional advancement of young scientists at the CCR and is supported by the NCI CCR Office of Training and Education (OTE).

Who can participate?

All young investigators including postdocs, postbacs, graduate students, research fellows, clinical fellows, technicians, and staff scientists.

Articles

2012 Spring Research Festival

A wide range of scientific, health and commercial exhibitions, large and interactive crowds, and pleasant weather combined to make the 2012 Frederick National Laboratory for Cancer Research and Fort Detrick Spring Research Festival a wonderful success. The annual event, aimed at showcasing the scientific research carried out on the Fort Detrick campus, was held this year on May 9th-10th.



The Spring Research Festival took as the theme this year members of the genus *Philanthus*. Beewolf digger wasps cultivate specific symbiotic bacteria. Image taken from <http://www.asknature.org/>

The new venue, consisting of large tents along Porter Street, was host to a range of posters – with scientific presentations from all categories of scientific staff on base, as well as highlights from a range of scientific services offered on campus such as Advanced Technologies Program and Small Animal Imaging Program. Recently developed products and cutting edge technologies were spotlighted as part of the Commercial Science and Technology Expo. The Health Education and Community Services Exhibition had a number of booths with representation by Occupational Health Services, NIH Recreation &

Welfare Club, and SAIC Frederick Toastmasters, among others.

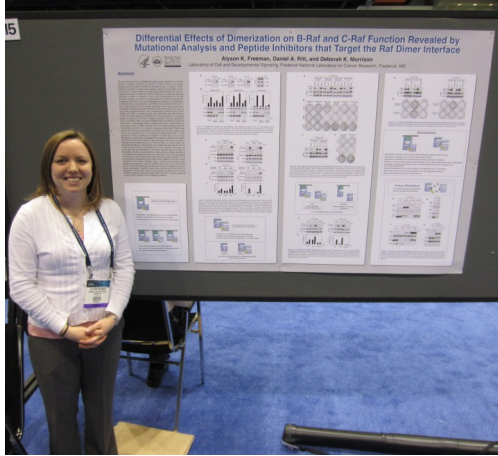
Over the past five years, the postdoctoral and postbaccalaureate symposium has become a very successful component of the festival. This year the theme of the meeting, held on May 7th, was Animal and Plant Models of Disease. The day opened with a keynote talk given by Dr. Yibin Kang from the Department of Molecular Biology at Princeton University on “*Modeling cancer metastasis: from molecular insight to translational applications.*” This was followed by a series of presentations from fellows of both NCI-Frederick and Fort Detrick on their work using a variety of animal and plant models. Travel subsidies were awarded to the best speakers – in first place was Sanaz Jansen (NCI) and in joint second place were Mandy Kendrick (USDA), Miranda Hanson (NCI) and Stephanie Watkins (NCI).

Each year the festival chooses a plant or animal that has the potential to be harnessed for medical benefit as its theme. This year, wasps of the *Philanthus* genus known as beewolves were selected, due to the recent discovery that this species protects itself from microbial infection due to a symbiotic relationship with *Streptomyces* species. These welcomed bacterial guests produce a cocktail of nine antibiotics, which protect the wasp larvae from infection. There is a considerable interest from medical researchers in what can be learned from these organisms, that have evolved their own version of the modern medical strategy of combination prophylaxis.

Submitted by:
Geraldine O'Connor, PhD
Laboratory of Experimental Immunology
Cancer and Inflammation Program

Conference Highlights of Spring/Summer 2012

American Association for Cancer Research (AACR)



Alyson Freeman presenting her poster at AACR.

The annual meeting of the American Association for Cancer Research (AACR) was held this year from March 31st to April 4th in Chicago, IL. This is the biggest meeting for AACR by far, with tens of thousands of registrants and hundreds of exhibitors in attendance. Even after having been to one of these meetings before, it is still a little overwhelming, but a great experience. This is an excellent meeting for scientists and clinicians at all levels with Meet the Expert sessions, career development workshops, a career fair that grows every year, and the ability to hear some of the world's most renowned cancer researchers speak about their work. There are also special scholarships and sessions for women and minorities in cancer research. The people behind the scenes at AACR continually work to make the meeting run efficiently. One of the new tools that was available was a mobile app that lets participants plan their schedule, search for topics or speakers of interest, and navigate the expansive space. With a meeting of this size, you can always find an oral or poster

session of interest. One of the topics that was particularly relevant to my work was the B-Raf kinase inhibitor PLX4032, its use in treating metastatic melanoma, the development of secondary cancers, and mechanisms of inhibitor resistance. I also received excellent feedback from other researchers at all levels for my work, which I presented in a poster session. Overall, I highly recommend this meeting for all trainees at the NCI.

*Submitted by:
Alyson Freeman, PhD
Cellular Growth Mechanisms Section
Laboratory of Cell and Development Signaling*

American Association of Immunologists (AAI)

The conference of 2012 American Association of Immunologists was held in Hynes Convention Center in Boston, which I believe is the best venue compared to the past two years (San Francisco in 2011 and Baltimore in 2010). Hynes center is close to Charles River, the famous Newbury Street and the "T" subway. The accessibility of wireless internet inside the center is superb, and restaurants and coffee shops are within arm's reach for attendees. Since 2010, the topics of major symposiums, presented by top researchers, gradually shifted to focus more on innate immunity and B cells, while autoimmune disease remained the primary interest. The block symposiums, presented by mostly graduate students and post-docs, however, still covered most topics within Immunology. Science aside, this year's AAI was quite eventful. During the president's address on the first day, the fire alarm went off and evacuation was enforced. Though it was a false alarm, the power didn't come back, and the president had to shout to finish her presentation. Kudos to the president of AAI, Dr. Leslie J Berg. On the last day of the conference, two hours before the end of the last session, the power within a 1 mile radius of the convention center went out, which abruptly ended the meeting. My condolences to the last couple of presenters. Next Year's AAI

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will be held in Hawaii. Because the research budget remains an issue worldwide, it is predicted that 2013 AAI attendance will drop significantly.

*Submitted by:
Fanching Lin, PhD
Laboratory of Experimental Immunology
Cancer and Inflammation Program*

European Academy of Tumor Immunology (EATI) and European Research Institute for Integrated Cellular Pathology (ERI-ICP)

The First Annual Conference of the European Academy of Tumor Immunology (EATI) and Third Conference of the European Research Institute for Integrated Cellular Pathology (ERI-ICP) was held this year on May 31st and June 1st, at the Institut Pasteur in Paris, France. This meeting highlighted research focused on the link between cell death and inflammatory and immune processes with an emphasis on cancer and stroke. This was a great meeting bringing together cellular biologists and immunologists from all over Europe and the US with both clinical and basic science backgrounds. There were several outstanding Keynote speakers. Dr. Tyler Jacks (MIT) spoke on the use of genetically engineered models of cancer to explore tumor-immune interactions. NCI's Dr. Joe Oppenheim spoke on how alarmins activate immune responses by inducing dendritic cell chemotaxis and maturation. Dr. Laurence Zitvogel (Institut Gustave Roussy) shared her work on type 1 IFN and ER stress response during chemotherapy. Although, the meeting was only two days, the schedule was filled with stimulating talks on cellular stress, inflammation and cell death by apoptosis and necrosis. It was a relatively small conference, but the benefit to the size was that it allowed for more intimate scientific discussions with established and highly regarded scientists, which is always a plus for trainees! I presented my work in a poster session where I received great feedback as well as made some connections that may turn into future collaborations.

*Submitted by:
Stephanie Watkins, PhD
Laboratory of Molecular Immunoregulation
Cancer and Inflammation Program*



Stephanie Watkins in Paris for the First Annual Conference of the EATI and the Third Conference of the ERI-ICP.

Gene Expression and Signaling in the Immune System

In April 2012 (April 24-28), I was at the Cold Spring Harbor Laboratory to attend a meeting on “Gene Expression and Signaling in the Immune System.” The meeting had about 60 presentations. Each presentation was scheduled for 12-16 minutes with sufficient time given for discussion afterward, which was one of the aspects I liked about this meeting.



Bala Kuppusamy at Cold Spring Harbor for a meeting in April.

The presentations covered topics from basic to advanced immunology. They focused on signaling events and factors involved in class switch recombination, VDJ recombination, and T and B cell development. Dr. David Baltimore from California Institute of Technology talked about how miRNAs, which are small noncoding RNAs, are modulated by immune signaling and how they control inflammatory responses. Another interesting talk was given by Dr. Alexander Tarakhovskiy from Rockefeller University, whose lab studies the mechanisms by which pathogens affect the function of chromatin, and how they affect long-lasting immune and non-immune cell responses to the environment.

Approximately 80 posters were scheduled to be presented over two days. It was slightly overwhelming and I had only little time to spend at each poster. However, we had an opportunity to discuss and interact with fellow scientists during lunch breaks and/or coffee breaks. Altogether, the meeting was well-organized and highlighted the most recent knowledge on how organisms ranging from *C. elegans*, *Drosophila*, mice, and humans cope with and respond to inflammatory signals.

*Submitted by:
Bala Kuppusamy, PhD
Molecular Mechanisms in Development Group
Laboratory of Cell and Developmental Signaling*

To all CCR trainees

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

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Off-the-Bench-Careers: Technology Transfer

The CCR-FYI Newsletter regularly highlights career paths in science. This edition focuses on the area of technology transfer. Technology transfer supports the protection and management of intellectual property which includes the licensing and patenting of scientific discoveries or inventions. Technology transfer can also include the marketing and commercialization of products, essentially moving discoveries from the benchside to the marketplace.

Melissa Maderia, PhD, and Debbie Hodge, PhD, are both pursuing careers in this area. Melissa currently works in the NCI Technology Transfer Center (TTC), while Debbie is a NCI Staff Scientist who is preparing to transition her career from the bench into technology transfer. Interviews with both of them reveal what it takes to break into this field.

Melissa Maderia

Melissa is a former Chair of the CCR-FYI Steering Committee. She served from 2004-2005, and also chaired the CCR-FYI Colloquium in 2004. She earned her PhD in Chemistry from Texas A&M. After a Postdoctoral Fellowship at the University of Minnesota, she became a CRTA Fellow at NCI-Frederick in the Lab of Medicinal



Melissa Maderia, former Chair of the CCR-FYI Steering Committee, currently works in Technology Transfer at NCI.

Chemistry. She continued her training with a CRTA Fellowship at the NCI-TTC, where she continues to work.

Why did you decide to leave bench science and go into tech transfer?

I have always been interested in the law and enjoy writing, so when I realized that I did not want to go into academia, I began to look for alternative careers. I looked at positions in journals and the U.S. Patent and Trademark Office and talked with a lot of folks at career fairs. I learned about technology transfer at the NIH Postdoc Career Fair and shortly after met two of the NCI fellows in technology transfer. I realized that the career offered a good balance of law and science. It seemed very safe to me as a good transition from the bench because I let myself think that if it didn't suit me, I could return to the lab.

What's the job market like now for tech transfer positions?

The job market now is much tougher than it was seven years ago when I started. There are many more positions available, as the demand for technology transfer professionals is growing. However, as other job markets are shrinking, young scientists just leaving the bench to enter into technology transfer have to compete with patent attorneys and business development (PhD/MBA combined) professionals. The fellowships are getting more competitive, with the fellows that get the positions being extremely talented and most likely already having classes or details in technology transfer offices.

What is a typical day like for you?

There is no typical day. Priorities are constantly changing. My schedule is set in response to emails and phone calls that I receive from the scientists that I work with. The more pressing the need that they have, the higher priority to get that task completed. Some days are spent entirely on the computer, while others may be split between meetings, phone calls, and computer work. A typical week is 40-50 hours.

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What kinds of projects are you currently working on?

I see technology transfer as having three main responsibilities. We negotiate the agreements on behalf of the scientists. We work with the investigators to file new Employee Invention Reports (EIRs), make recommendations for patent prosecution, and manage the patent portfolios. We also do business development in order to market the patented scientific technologies to help commercialize the science and get the technology out there to benefit the public.

What's the most fun aspect of your job?

The most fun aspect of my job is working with the scientists and seeing the coolest, most cutting edge science and knowing that it will have an impact on patients.

Do you miss working in the lab?

I don't miss working in the lab at all. I do sometimes feel disconnected because without being in the lab it is hard to keep up with the latest techniques and tools. I still feel very entrenched in science and that I continue to learn new science, as I'm exposed to a breadth of science outside of my specific studied areas.

How much science is involved in your current work?

There is quite a bit of science in technology transfer. You have to know the science well enough to know the questions to ask to be sure that you are protecting the scientists and the NIH when negotiating the agreements. We do literature and patent searches when looking at new EIRs and reviewing patents and have to determine if there are any potential issues or questions that can help the scientists and for commercialization. We also help to write research plans (often from much longer protocols or papers) and have to be able to pick up the more salient points related to the agreements or patents.

What skill sets that you gained in your science training do you use in your tech transfer work?

The best skills that I gained from my scientific training that are useful in technology transfer are

the ability to organize, the ability to critically think about the issues, the willingness to ask the questions, and the desire to learn.

How do you see your career progressing from where you are now?

After a few years in technology transfer, I realized that I really enjoy the business development side of the job. I like the idea of helping to move technologies out of the NIH and seeing something that was developed by the scientists actually make it to the market and into patients. I went back to school and got a Masters in Management with Marketing and am currently finishing my MBA. I'm not sure where my career will lead me, but I look forward to the challenges of future opportunities.

Would you recommend this career path to others?

I enjoy my career immensely. My days are never boring, but also not stressful. I like working with the extremely talented scientists at NIH and the opportunities to continue to grow as a scientist and as a business professional.

Debbie Hodge

Debbie Hodge holds a PhD in Biochemistry and started at NCI as a Post-Doctoral fellow. After a five year tenure in that position, she was offered a staff scientist position, which she accepted. She has been working as a staff scientist for 10 years and is preparing to transition her career into technology transfer.

Why did you decide to transition your career away from bench research?

After many years in the laboratory, I decided that it was time to think about contributing to public health in a different manner. Tech transfer seemed ideal because I have a good understanding of scientific principles. However, tech transfer has a language of its own. It is critical that one understands specific legal foundations and requirements for patenting and licensing. Thus, additional training is required.

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You've been preparing for this shift in your career for several years. What have you done to prepare?

I think that classes are key. FAES offers courses as well as a certificate in tech transfer. At this time, I have completed several classes and plan to continue additional courses in the fall of 2012. In addition to the course work, I completed a six month, one-day-per-week internship at the NIH Office of Tech Transfer. Currently, I am interning one day per week at the NCI Tech Transfer office.

With regard to your internship, what types of projects did you work on?

At OTT, I mainly worked on marketing. I wrote abstracts for the new technologies and identified and contacted groups that I thought would benefit from the technology. At the NCI office, I am working directly with a technology transfer specialist and am focusing on material transfer agreements, collaborative agreements, etc.

What are you looking forward to with this change in your career?

I am looking forward to contributing to science in a different manner. I think that it is extremely important to get new discoveries out of the basic science arena and into company environments where the work can be expanded. Ultimately, the goal is to get the product through clinical trials and FDA approval so it can provide a real benefit to public health.

How is the job market right now for positions in tech transfer?

As with all areas, I believe that the market is tough. What I have observed is the enrollment in the classes is very large. Thus, many people are considering tech transfer as an alternative career to their current positions. I know that many post-docs have been in the FAES classes but it is not limited to post-docs. People with many different types or positions are enrolling.

Do you think you will miss working in a lab?

Of course it will be hard to leave the laboratory because I have so many years dedicated to it. However, I think that I am not unique in look-

ing for a change. I believe that many people change careers because they want to stimulate themselves or to follow the desire to learn new things.



Debbie Hodge, currently a staff-scientist at NCI, is preparing to transition her career into technology transfer.

What skill sets do you think are required to be successful in tech transfer?

A fundamental understanding of science is certainly important but understanding legal terminology is as important. Many people who work in the field have a masters or PhD in a scientific area. In addition, many people hold a JD or at least have taken tech transfer classes. Additionally, knowing how to negotiate is also critical for the position. More often than not agreements are modified multiple times before they are put in place.

*Submitted by:
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CCR Research Highlight: Functional interaction of tumor suppressor DLC1 and caveolin-1 in cancer cells

Lung cancer is the leading cause of cancer-related death in men and women both globally and in the U.S. Up to 90% of lung cancer cases are categorized as non-small cell lung carcinoma (NSCLC), based on their histological properties. Extensive efforts have been devoted to identifying the culprits, on a molecular and genetic level, of the deadly disease over the last two decades, and it is bearing fruits. Apart from the inactivation of a usual suspect, *p53*, the tumor suppressor gene that normally functions to prevent cancer development and progression, scientists have also found some less prominent tumor suppressors that are mutated in NSCLC patients. DLC1 is one such example. In a significant paper published recently by NCI-CCR researchers, Dr. Xiaoli Du and colleagues, in *Cancer Research* sheds light on how DLC1 interacts with another tumor suppressor protein, CAV1, to exert its protective function.

DLC1 is a complex protein, made up of three relatively independent functional domains. One of the domains, Rho-GAP, can convert Rho-GTPases, a type of enzyme that regulates cell migration and thus is implicated in cancer metastasis, to the inactive form. Although this particular domain may restrict the movement of cancer cells, proteins that have this domain are rarely affected by cancer. But DLC1 is not so lucky. In NSCLC, DLC1 is often lost entirely or becomes dysfunctional due to mutation of the amino acids. Du *et al.* reasoned that DLC1 may have other protective activities against cancer, unrelated to Rho-GAP function, which may explain its inactivation in NSCLC and other cancers.

It turns out that DLC1 interacts, either directly or indirectly, with many partners in the cells, including CAV1. Previous work showed that DLC1 and CAV1 appear in the same sites in a cell, but exactly how these two tumor suppressors interacted with each other remained a mystery until now. To figure out which domain of DLC1 is responsible for their interaction, Du and colleagues chopped up DLC1 into different fragments and tested which fragments can or cannot interact with CAV1. They found that a DLC1 fragment lacking one of the three domains, called START, could no longer efficiently bind CAV1, while other fragments bound CAV1 just fine.

Having proved that START acts as a hinge between DLC1 and CAV1, Du and col-

leagues went on to test whether the START-deficient DLC1 could still restrict abnormal movement of cells. They introduced the truncated version of DLC1 into an NSCLC cell type that is derived from a NSCLC patient and that has low levels of full-length DLC1 protein. To compare the results, the full-length DLC1 and a completely unrelated protein were introduced separately into NSCLC cells. Importantly, the shorter DLC1 could still render Rho-GTPase inactive because the Rho-GAP domain was untouched by the truncation.

The results were clear-cut: The truncated DLC1 could barely make a dent on the movement or proliferation of the NSCLC cells, while the full-length DLC1 reduced both the cell migration and growth by more than 50% when compared with the results from the unrelated protein. This means that at least in the cells tested by Du *et al.*, the Rho-GAP alone is not enough to restrict the cancer cell growth, and the interaction with CAV1 is required for DLC1's tumor suppressor activity. Thus, Du's research, for the first time, showed a Rho-GAP independent mechanism for DLC1-mediated tumor suppression.

By analyzing data from more than 400 NSCLC patients, Du and colleagues also found that low levels of DLC1 were associated with a poor prognosis. But, importantly, these findings suggest that NSCLC patients with this molecular feature may benefit from a more aggressive therapy.

Submitted by:
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Upcoming Events

NCI-Frederick Postdoc Seminar Series

- Every other Wednesday, watch email for details. Free pizza and soda are provided.
- We are looking for speakers to give 20-25 minute talks on Jan. 9 and 23; and Feb. 6 and 20.
- If you are interested in presenting as a speaker, please contact Linda Brubaker (brubakerld@mail.nih.gov)



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Opportunities to Practice Talks for Conferences, Seminars & Job Interviews

The **PASS (Presentation and Seminar Skills)** series has teamed up with Scott Morgan to provide CCR scientists with an hour-long session of one-on-one tutoring. During this session, you will go through your presentation with Scott, where he will provide feedback on style, content, delivery of message, etc. A week or two later, you will have the opportunity to present your talk in front of your colleagues and to receive constructive feedback. Scott will also attend and provide additional feedback following the presentation. Scott has over 15 years of valuable experience in science communication and has recently co-authored a book, ‘Speaking about Science’.

We will work with you and Scott to arrange a suitable time and schedule. This is a wonderful opportunity for anyone who wishes to improve his/her presentation skills either for a meeting presentation or job talk.

If you are interested in taking advantage of this opportunity or have additional questions, please contact Leigh Greathouse (kristen.greathouse@nih.gov). Available slots will be filled on a first come – first served basis.