

# Office of Education Division of Intramural Research

# Fellows Newsletter

April 2014

The Fellows Newsletter is published monthly by the Office of Education, Division of Intramural Research, National Heart, Lung, and Blood Institute and distributed to NHLBI DIR members to promote the interest of DIR Fellows.

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## From the Director of the Office of Education

Its April, and it finally feels, after one last snowstorm, that spring has arrived in DC. Spring in the DC area means cherry blossoms. The Cherry Blossom Festival is in full swing, while the current forecast is for cherry blossoms to be at their peak in 10 days. The tidal basin is featured on many tourist guides for the huge number of Yoshino cherry trees, but my suggestion is to avoid the crowds downtown and visit Kenwood, in Chevy Chase, less than a mile from the NIH campus.

Today we open the web site to register for NHLBI DIR Research Day to be held in Natcher Auditorium on June 9th. While travel restrictions have prevented us from holding an off-campus Retreat, we are planning a full day of activities to celebrate the research achievements of the NHLBI DIR. This year, we are including special “Hot Topics” session on the uses and results with gene editing techniques – CRISPR and TALEN. We encourage fellows to present their work with these techniques, even if it is preliminary, so that we can share our knowledge of their advantages and problems. Instructions for getting into this session will be included in the announcement of Research Day. In addition, we will present the NHLBI DIR Outstanding Mentor award, and we encourage nominations on the Research Day website. Poster boards will be assigned in order of submission, and oral presentations will be chosen from the submitted posters. So submit your abstract soon!



**NHLBI DIR Research Day 2014**

**June 9th  
Natcher Conference Center and Auditorium**

**\*Registration is OPEN\***

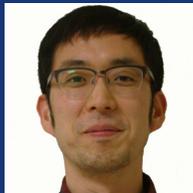
**<https://moss.nhlbi.nih.gov/DIR/OE/ResearchDay/default.aspx>**

### Meet the New Fellows



Dr. Jun Gang Li is a new Visiting Fellow in the Hematology Branch under Dr. Neal Young. Dr. Li earned his Ph.D. at the Third Military

Medical University. His initial project at NIH is to find out the unknown pathogens, large likely some kind of virus, in A-E seronegative patients with hepatitis using an advanced platform, deep sequencing.



Dr. Ji-hoon Park is a new Postdoctoral Fellow in the Center for Molecular Medicine under Dr. Paul Hwang. Dr. Park earned his Ph.D. at

Chungnam National University. His initial project at NIH is to explore the role of p53 in tumor development, especially in mitochondria and metabolism. trient sensing and signaling at the lysosomes.



Dr. Andrea Stoehr is a new Visiting Fellow in the System Biology Center under Dr. Tish Murphy. Dr. Stoehr earned her Ph.D. at

University Medical Center Hamburg-Eppendorf. Her initial project at NIH is to investigate the posttranslational protein modification proline hydroxylation (P-OH) in the heart, how it is mediated and the effects of P-OH inhibition and which targets proline hydroxylation enzymes (PHDs) have.

Yagi, R., Zhong, C., Northrup, D. L., Yu, F., Bouladoux, N., Spencer, S., Hu, G., Barron, L., Sharma, S., Nakayama, T., Belkaid, Y., Zhao, K., & Zhu, J. (2014). *The Transcription Factor GATA3 Is Critical for the Development of All IL-7R $\alpha$ -Expressing Innate Lymphoid Cells.*

Innate lymphoid cells (ILCs) are immune cells that lack a specific antigen receptor yet can produce an array of effector cytokines that in variety match that of T helper (Th) cell subsets. ILCs function in lymphoid organogenesis, tissue remodeling, antimicrobial immunity, and inflammation, particularly at barrier surfaces. Because distinct subsets of ILCs are capable of making the same characteristic effector cytokines as produced by different Th cell subsets, they are similarly classified into type 1 ILCs (ILC1s), including classical NK cells that produce interferon- $\gamma$  (IFN- $\gamma$ ), type 2 ILCs (ILC2s), which produce IL-5 and IL-13, and type 3 ILCs (ILC3s), including lymphoid tissue inducer (LTi) cells, which produce IL-17 and IL-22.

GATA-3 is a critical transcription factor for the differentiation of Th cells. Previous reports showed that GATA-3 is also highly expressed in ILC2 cells. Inactivation of Gata3 in mice completely eliminated IL-13-producing ILC2 Cells. Whether other ILC subsets require GATA3 to develop remains unclear. In this paper, the authors find that GATA3 is not only critical for T cell development but also indispensable for the development of All IL-7R $\alpha$ -Expressing innate lymphoid cells, including ILC2s.

The authors first found that all ILCs express GATA3 at different amounts, indicating GATA3 is also functional in other ILCs beyond ILC2s. To study the role of GATA3 in ILC development in vivo, a conditional knock-out mice (Gata3 hsc-depleted mice) with Gata3 deletion in hematopoietic stem cells were generated. Consistent with previous report, no T cells were detected in these mice. Surprisingly, IL-7R $\alpha$ + cells, whether they expressed ROR $\gamma$ t ( a important transcriptional factor for Th cells development ) or not, were abolished in Gata3 hsc-depleted mice, suggesting that GATA3 is critical for the development of all IL-7R $\alpha$ -expressing ILCs. Given that IL-7R $\alpha$ + ILCs play a critical role in host defense against *Citrobacter rodentium* infection, the authors showed Gata3 hsc-depleted mice are more susceptible to *Citrobacter rodentium* Infection compared with wild-type mice. Further establish the role of GATA3 in the development of IL-22-producing ILCs. Mixed bone marrow chimera experiments confirmed that the effect of GATA3 on the development of IL-7Ra+ ILCs is cell intrinsic.

Combined with In Vivo and In Vitro experiment, the authors further confirmed that

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### Attending a conference soon?

Are you an inventor on any NHLBI technologies?

Let us help you market your inventions!

We will provide you with marketing fliers to advertise your technology to specific companies at your conference.

Please contact the NHLBI Office of Technology Transfer and Development @ 301-402-5579 or carranzam@mail.nih.gov

## Recent Publications by NHLBI Fellows

**Herman, S. E., Mustafa, R. Z., Gyamfi, J. A., Pittaluga, S., Chang, S., Chang, B., Farooqui, M., & Wiestner, A. (2014).** Ibrutinib inhibits B-cell receptor and NF-kappaB signaling and reduces tumor proliferation in tissue-resident cells of patients with chronic lymphocytic leukemia. *Blood*.

Elinoff, J. M., Bagci, U., Moriyama, B., Dreiling, J. L., Foster, B., Gormley, N. J., Salit, R. B., Cai, R., Sun, J., Beri, A., Reda, D. J., Fakhrejahani, F., Battiwalla, M., Baird, K., Cuellar-Rodriguez, J. M., Kang, E. M., Pavletic, S. Z., Fowler, D. H., Barrett, A. J., Lozier, J. N., Kleiner, D. E., Jr., Mollura, D. J., Childs, R. W., & Suffredini, A. F. (2014). Recombinant Human Factor VIIa for Alveolar Hemorrhage Following Allogeneic Stem Cell Transplantation. *Biol. Blood Marrow Transplant*. 10.

Powell-Wiley, T. M., Miller, P. E., **Agyemang, P.**, Agurs-Collins, T., & Reedy, J. (2014). Perceived and objective diet quality in US adults: a cross-sectional analysis of the National Health and Nutrition Examination Survey (NHANES). *Public Health Nutr*. 1-9.

**Park, Y. N., Zhao, X., Yim, Y. I., Todor, H., Ellerbrock, R., Reidy, M., Eisenberg, E., Marrison, D. C., & Greene, L. E. (2014).** Hsp104 overexpression cures yeast [PSI<sup>+</sup>] by causing dissolution of the prion seeds. *Eukaryot. Cell*.

Yagi, R., Zhong, C., **Northrup, D. L.**, Yu, F., Bouladoux, N., Spencer, S., Hu, G., Barron, L., Sharma, S., Nakayama, T., Belkaid, Y., Zhao, K., & Zhu, J. (2014). The Transcription

Factor GATA3 Is Critical for the Development of All IL-7Ralpha-Expressing Innate Lymphoid Cells. *Immunity*. 40, 378-388.

**Hill, J. H., Chen, Z., & Xu, H. (2014).** Selective propagation of functional mitochondrial DNA during oogenesis restricts the transmission of a deleterious mitochondrial variant. *Nat. Genet*. 10.

Yu, Z., **Yu, P.**, Chen, H., & Geller, H. M. (2014). Targeted inhibition of KCa3.1 attenuates TGF-beta-induced reactive astrogliosis through the Smad2/3 signaling pathway. *J. Neurochem*. 10.

Guo, L., Zheng, Z., Ai, J., Howatt, D. A., Mittelstadt, P. R., **Thacker, S.**, Daugherty, A., Ashwell, J. D., Remaley, A. T., & Li, X. A. (2014). Scavenger Receptor BI and High-Density Lipoprotein Regulate Thymocyte Apoptosis in Sepsis. *Arterioscler. Thromb. Vasc. Biol*.

Bradford, D., Raghuram, V., **Wilson, J. L.**, Chou, C. L., **Hoffert, J. D.**, Knepper, M. A., & Pisitkun, T. (2014). Use of LC-MS/MS and Bayes' Theorem to Identify Protein Kinases That Phosphorylate Aquaporin-2 at Ser256. *Am. J. Physiol Cell Physiol*.

Tabet, F., **Vickers, K. C.**, Cuesta Torres, L. F., Wiese, C. B., Shoucri, B. M., Lambert, G., Catherinet, C., Prado-Lourenco, L., Levin, M. G., **Thacker, S.**, Sethupathy, P., Barter, P. J., Remaley, A. T., & Rye, K. A. (2014). HDL-transferred microRNA-223 regulates ICAM-1

## NHLBI DIR Seminar Series



**James Spudich, Ph.D.**

Douglass M. and Nola Leishman Professor of Cardiovascular Disease, Department of Biochemistry & Department of Developmental Biology  
Stanford University  
School of Medicine

"The Myosin Family of Molecular Motors: Natures Exquisite"

Tuesday, April 29th  
11:00 AM - 12:00 PM  
Building 50, Room 1227/1233

Host: Antonina Roll Mecak, Ph.D.

Sponsored by the NHLBI Office of Education and Tenure Track Faculty

## Summary of NHLBI Development and Networking Session - By: Jue Chen

On March 7th, Dr. Renee Wong, a Program Director in the NHLBI Extramural program, shared her career transition experience with a few NHLBI postdoctoral fellows. Before joining the extramural Division of Cardiovascular Sciences (DCVS), Dr. Wong was an NHLBI Intramural fellow under Dr. Elizabeth Murphy in the Cardiac Physiology Section from 2006-2011.

Highlights from the discussion with Dr. Wong:

1) Health Scientist Administrators (HSAs) are responsible for the planning and oversight of extramural research activities. Most HSAs have doctoral level training (e.g., Ph.D., M.D., D.V.M., or D.D.S.) and independent research experience.

2) Being an HSA requires scientific expertise; management skills; effective communication skills; an understanding of the organization's policies and mission; and the ability to work well with others.

3) At NIH, HSAs serve as either a Program Officers or Scientific Review Officers. Scientific Review Officers organize and manage peer-review groups to evaluate the scientific merit of research proposals. Program Officers are responsible for the programmatic, scientific, and/or technical aspects of a grant.

4) Program Officers help advise potential NIH grant applicants throughout the application process and in doing so, they must have

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## Q&A with Investigator

Postdoc Kevin Ramkissoon interviews Dr. Nico Tjandra, Senior Investigator, Laboratory for Structural Biophysics

Dr. Nico Tjandra is a Senior Investigator in the Structural Biophysics Section of the NHLBI. He obtained his M.S. in physics and a Ph.D. in physics/biophysics from Carnegie Mellon University before coming to the NIDDK as a National Research Service Award (NRSA) fellow. He made the transition from NIH fellow to tenure-track investigator in 1997, was awarded



tenure in 2001, and since then, has continued his work developing and employing Nuclear Magnetic Resonance (NMR) as a tool to probe protein-protein, and other biomolecular interactions. In addition to his research activity, Dr. Tjandra is also one of the core instructors for the Summer EMBO course in NMR which is held bi-annually in Europe. He has authored

or coauthored more than 100 papers and book chapters, and was recognized for his innovative research in 2005 with the International Council of Magnetic Resonance in Biological Systems Founder's Medal. Dr. Tjandra has successfully introduced several innovations to solution NMR, including methods that increase its ability to probe larger macromolecules. He is actively working on improving the ability of NMR to capture dynamic information about protein movements in solution over a broad range of time scales, ranging from nano- to milliseconds, which would open the door to new avenues of studying important biomolecular interactions in biologically relevant contexts.

### When did you decide that you wanted to become a research scientist?

I made my decision when I was a senior in college. In fact I switched my major from computer engineering to physics because it was fundamentally more interesting and will provide me with better opportunity to do research.

### What were the primary influences that steered you to biophysics as opposed to other areas of research following the completion of your masters degree in physics?

I made the choice in several stages. I had two general choices to go into more fundamental physics (high-energy or particle physics) or applied physics. I was more interested in applied physics, where one can do research independently rather than as part of a large group of scientists. In applied physics, my interests lay in either biophysics or surface/condensed matter physics. The most important influences to my decision were that I noticed biophysics was expanding rapidly as a field, and having a great professor involved in biophysics who mentored me.

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## Q&A with Postdoc Dr. Jenna DuMond

Postdoc Kevin Ramkissoon interviews Dr. Jenna DuMond, Postdoc Fellow in the Systems Biology Center

### When did you decide that you wanted to become a scientist?

When I entered my undergraduate pre-med program I took a freshman chemistry class and realized chemistry is what I am really interested in. I was given the opportunity to do an internship at Glaxo Smith Kline the following summer working in an organic chemistry lab. That experience further opened my eyes to the broad impact that science, specifically research, can have on people's lives. After that summer, I changed my major to chemistry and have been on the path to becoming a research scientist ever since.

### What factors were most important in your decision to come to the NIH?

I was very excited to come to the NIH. It's known as a place where cutting edge technologies and resources are available to scientists to help further their research and ask novel questions. However, my decision to come here was primarily based on the research and training opportunity that I would gain in the lab of Dr. Maurice Burg in the NHLBI Systems Biology Center. I have a strong background in chemistry, and in using nuclear magnetic resonance (NMR) for characterization. My postdoc with Dr. Burg's group makes use of mass spectrometry for protein identification and characterization, which is an area that I wanted to expand in my scientific training.

### What do you enjoy most about your research and training experience here so far?

The NIH is a wonderful environment to conduct research. As a young scientist, I feel supported in my work, but am granted a certain level of independence. When I have an idea that I would like to pursue, my PI, Dr. Burg, and my advisor, Dr. Joan Ferraris, have always given me great guidance and the encouragement to move forward with my ideas and projects. I have also had the opportunity to collaborate with numerous core facilities and labs in the NHLBI. As a result I am learning different skills such as mass spectrometry, protein purification, CD and fluorescence for protein characterization, which have greatly broadened my scientific skill set.



### What advice would you give to a first year fellow just entering the NHLBI training program?

Science has become highly collaborative, and I feel that my best research is accomplished when scientists who can contribute knowledge from different disciplines are involved. I have also found this can significantly increase the success and impact of a project. The NIH offers many opportunities to network and collaborate with high caliber scientists, both within our campus and around the world.

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### Will I be scooped if I present my data at a meeting?

By Herbert M. Geller, Ph.D.

**T**he NHLBI DIR believes that fellows need to go to meetings in order to network and learn about current developments in their field. However, in the current budgetary climate, NHLBI, like many Ics, has revised rules to permit travel by fellows only when they are presenting at a meeting, either in a poster or oral presentation. When I meet with fellows to discuss this, I am told that certain labs have policies of not presenting research data in public before being accepted for publication, in order to prevent being scooped. So how prevalent is this policy?

In conversations with NHLBI PIs, the opinion varies, but most agree with Dr. Nico Tjandra who notes that its risk vs. benefit. There is clearly a risk that someone will come along and take advantage of your data. However, most PIs note that if a project is far enough along to present, there is a lesser chance that someone will be able to pick up on a poster and replicate the data.

On one end of the spectrum, Dr. Clare Waterman and Dr. Rodney Levine have had a policy of open communication – they encourage their fellows to put their data on a poster as soon as its presentable, in order to get feedback before publication. Dr. Waterman notes “The more you talk and the more feedback you get, it improves your science”. But even here, there is a caveat, as she’s keeping the lid on one project in the lab that’s “too hot”. Dr. Michael Sack, like many of his colleagues notes that if a project is close to completion, he’s happy to have fellows present, but for some projects he might not want to show all the data on the poster.

A similar view is expressed by Dr. Warren Leonard, who notes that “it depends upon the field and the individual topic.” Thus, he says “if you are in a high profile field where others might take advantage of the information, it would not be appropriate to present it before it is in press”. One reason for this is the current long time lag between submission and publication in high profile journals, which would allow others to catch up while your paper is being reviewed. He noted instances where a lab would pick up on a competitors work and get a paper out, even in a lesser journal, in order to compete for priority.

Overall, the consensus seems to be that whether to present your data at a meeting depends upon a balance between the likely importance of the idea and the ability of others to replicate it within a short time frame if they knew about it.



**How would you sum up your NIH postdoctoral experience?**

Easy, it was the greatest experience in my life!

**How did your experience as an NIH fellow influence your approach to mentoring your own trainees?**

I was trained in a one-on-one fashion by my mentor, while also working independently. Naturally, I followed the same approach. I challenge my fellows to think independently and also like to interact with them in a one-on-one, hands on basis.

**What were the most challenging and rewarding aspects of your postdoctoral experience?**

The most challenging was having enough time to do everything while at the same time taking care of a small family. The most rewarding was feeling that I had developed new avenues of research, and doing so independently.

**You have led a very successful research career thus far. What characteristic(s) of your personality have been most influential to your success thus far?**

My easygoing personality is probably the most influential. This allows me to have an open mind when I hear other peoples’ ideas.

**Had you not chosen your current path, what career do you think you be in today?**

Most likely it would have been in condensed matter physics. I would likely either be pursuing research in new materials or developing new technologies.

**What hobbies or activities do you enjoy away from the lab?**

I like to go sailing and enjoy fixing/building motorcycles.

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## The Science Beat, continued

GATA3 is required for maintaining ILC2 number. RNA sequencing (RNA-seq) analyses results showed many TNF and TNFR superfamily genes with altered expression patterns in GATA3 depleted ILC2s, underlining these genes are possible downstream targets of GATA3. The authors also compared genes that are either positively or negatively regulated by GATA3 in ILC2s, ILC3s and Th2 cells. Results indicated that GATA3 regulated a similar set of cytokines and receptors in Th2 cells and ILC2s, but not in ILC3s.

## Q&A with Dr. Jenna DuMond continued

My advice would be to actively seek collaborations by engaging with people outside your lab and specific area of research.

**Had you not chosen your current path, what career do you think you would have pursued?**

Before entering college I was a competitive ice skater. I trained

This study provides a concept that there is an excellent symmetry in ILC and Th cell development: although GATA3 is regarded as the master regulator for Th2 cells, it is also critical for the maintenance and functions of ILC2s, and although GATA3 is critical for the development of all CD4+ T cells, it is also indispensable for the development of all IL-7R $\alpha$ + ILC subsets. GATA3, therefore, plays parallel roles in establishing and regulating both adaptive and innate lymphocyte populations.

extensively in my childhood, and as a young adult taught ice skating to others. I enjoyed it tremendously but entered college to broaden my career choices. Had I not discovered my love for chemistry and decided to pursue a career as a research scientist, I would probably have been a figure skating instructor.

## NHLBI DIR St. Patrick's Day Bake-Off

**Thanks for everyone that participated in making the NHLBI DIR St. Patrick's Day Bake-Off a success. It was a tough choice for the voters but Dr. Kira Holmstrom took the prize for favorite dessert: Coconut Cake.**



*Photo Credit: Smithsonian*

## Summary of NHLBI Development and Networking Session, continued

an in-depth understanding of the NIH grant policies. In addition to guiding applicants, Program Officers also monitor the scientific progress of NIH awards throughout the project period. Another aspect of a Program Officer's role is to identify research gaps in their field of expertise and potential future funding opportunities.

5) Dr. Wong's current job allows for teleworking and hours may be adjusted around core hours to permit some flexibility. She is encouraged to continue her involvement with the Intramural Program at NHLBI by attending Intramural lab meetings one day a week. This permits her to stay in touch with ongoing bench science.

6) To gain crucial experience in health science administration, Dr. Wong performed a 6-month Fellows Rotation in Extramural Research at the end of her postdoctoral training. She encourages fellows to seek out detail opportunities in the fields of their interests to be competitive in the job market and to help them stand-out when applying for jobs in the NIH Extramural program.

7) Dr. Wong recommends having an updated CV ready for when a job of interest pops up with a short response time.