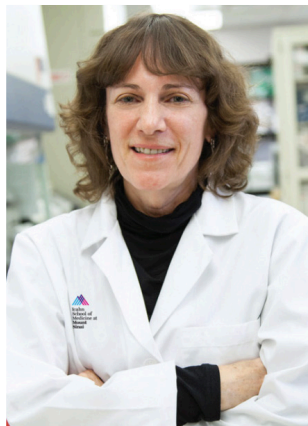


MSTP NEWSLETTER

MEDICAL SCIENTIST TRAINING PROGRAM, FALL 2017



Margaret H. Baron,
MD/PhD
Director of the MSTP

LEADERSHIP HIGHLIGHTS

It has been a momentous year for our MSTP celebrating our 40th Anniversary! The competitive renewal of our MSTP T32 training grant was funded, marking 40 years of continuous NIH support. Many months of planning went into the submission of the renewal application, with input from students and faculty. As part of the renewal process, we hosted an NIH site visit in November and received many compliments on our students' engagement, scientific accomplishments, and our program's innovation.

Some new initiatives of our MSTP include an electronic Individual Development Plan that helps students track their progress through the Program.

This online platform will allow students to update their forms on an annual basis, to minimize redundancy and to maintain a central database. The information obtained has been compiled into a database that is used to provide students with records of laboratory rotations and mentors, F30/F31 awards, and career choice. We expect to use this database to track our alumni accomplishments. We have been working on ways to create more lasting and impactful connections between our students and alumni. In a team effort with students and alumni, we have launched a series of additional innovations to the MSTP:

Facebook group for MSTP Students and Alumni: Now with 128 members and counting, the group serves as a resource to connect current students with MSTP alumni.

MSTPhamilies: This vertical integration networking structure was established to bring together students from various levels of training throughout the Program. Each incoming student is assigned to a family that includes a big sib one year above and a lineage of big sibs all the way up through the final years in the program. The goal is to create connections with students in the Program who might not otherwise interact. The MSTPhamilies will be competing as teams at our Annual MSTP Retreat (September 8-10, 2017). Thanks to Fred Kwon and James Carter for spearheading this effort.

Table for Eight: In this monthly series, one student from each of the ~8 years in the Program meet over a meal. Many thanks to David Chiang, Prashanth Rajarajan, and Harish Vasudevan for piloting this program, which has been a great success.

Meet the Physician-Scientist: Provides a venue for MSTP students to learn about the career trajectories of prominent physician-scientists at our institution and in the NYC area. Thanks to Amara Plaza-Jennings, Andrew Leader, and Conor Gruber for making this successful.

We're delighted to be using social media to highlight the successes of our students, so please send us your updates and follow us on Twitter @SinaiMSTP and Facebook at SinaiMSTP!



(article continued on page 3)

Thesis Defenses 2016-2017

Patrick Maffucci
12/16/16

Next-Generation Sequencing: Novel Computational Approaches and New Molecular Defects in Primary Immune Deficiencies

Efrain Ribeiro
2/16/17

The Role of Nucleus Accumbens Somatostatin Interneurons in Cocaine Induced Plasticity

Robert Rifkin
4/7/17

Sorting Nexin 27: a molecular brake on cocaine addiction

Teddy Wohlbold
4/7/17

The influenza virus neuraminidase as a vaccine antigen and the potential of neuraminidase antibodies to protect against infection

Theodore Pak
4/27/17

Multiple analysis of infectious diseases: integrating omics and clinical informatics data into patient care

Andrew McKenzie
5/1/17

Multiscale Modeling of Oligodendrocytes and Myelin in Alzheimer's Disease

Sean Llewellyn
5/16/17

Deciphering the Combinatorial Influence of Diet and the Microbiota on Experimental Colitis

Joseph Scarpa
5/18/17

Using a systems genetics approach in mouse populations to identify gene networks underlying sleep, stress susceptibility, and neuropsychiatric disease

Douglas Mathern
6/9/17

C3a receptor is a memory-sparing regulator of primary effector CD8+ T cell expansion induced by allogeneic heart transplant

Rajal Sharma
6/20/17

Structural and Chemical Mechanisms in Gene Regulation

Stephen Bohlman
6/21/17

The Role of CDK4 and MDM2 amplification in tumorigenesis

Meet the First Years



MSTP Summer Updates



Helya Ghaffari, MP4, practiced yoga and enjoyed the natural wonders at the 32nd Annual MD/PhD National Student Conference in Keystone, CO this July.



First year bonding at a medical school orientation event in August. Left to Right: Don Nguyen, Joan Shang, Rachel Levantovsky, Alice Chen Liaw, Michael Espino, Camille Spencer-Salmon.



Camille Van Neste, MD2, recently returned from a trip to the Galapagos where she saw tortoise hatchlings and iguanas. She enjoyed her summer PhD rotations in Costa and Morishita Labs and is excited to start 2nd year of medical school, where she'll be helping out the first years in the anatomy lab as a prosection TA!



An MP4 pyramid tradition lives on at the MSTP Annual Retreat, this year held at Honor's Haven Resort in the Catskills the second weekend of September. Clockwise from upper left: Helya Ghaffari, Elisa Nabel, Ranjan Upadhyay, Matt Chambers, Matt Hernandez, Zach Lorsch, Mike Daniels, Kevin Hoffman, Eddie Contijoch, and Phil Avigan (center).



Yuval Itan, PhD
Assistant Professor,
Genetics and Genomic
Sciences

Dr. Itan is a new Assistant Professor in the Department of Genetics and Genomics Sciences, previously of the Rockefeller University. Dr. Itan's research is focused on the development and application of novel computational methodologies across deep

learning, computational biology and bioinformatics, population and quantitative genetics, human disease genomics, and more.

First your background.

How did this all start?

In Tel Aviv I was a double

major in computer science and biology. I like both. Back then, for computational research they'd take computer scientists, but they were not good with understanding biological questions.

(article continued on page 4)

LEADERSHIP HIGHLIGHTS (continued from page 1)

Graduating Class of 2017: Warm congratulations to Timothy Cashman, Peter Goff, Mitra Heshmati, Megan Lancaster, Chaya Levovitz, Gavriel Mullokandov, Dac Nguyen, Rachel Sennett, Noa Simchoni, Harish Vasudevan, and David Zhang! Our students did phenomenally well, matching at top academic programs around the country and all with bright future careers ahead as physician scientists. We are very proud of their many achievements, which we celebrated over champagne and cheese (an MSTP tradition we initiated in 2015) and welcomed faculty and alumni to join in the celebration. Next year we hope to include all students in the MSTP.

Recent PhD graduates:

Congratulations to Stephen Bohlman, Sean Llewellyn, Patrick Maffucci, Douglas Mathern, Andrew McKenzie, Theodore Pak, Efrain Ribeiro, Robert Rifkin, Joseph Scarpa, and Teddy John Wohlbold, who have enthusiastically entered clinical training after successfully completing the Clinical Refresher Course.

Terry Ann Krulwich Physician-Scientist Alumni Award:

In honor of the 40th anniversary of the MSTP, this new award was created in honor of Terry Ann Krulwich, PhD, beloved scientist, student champion, and founding director of the MD/PhD Program at Mount Sinai. It recognizes the accomplishments of an outstanding Mount Sinai-trained physician-scientist. The first recipient of the award was Mark E. Sobel, MD/PhD, MSSM '75, who is now Executive Director of the American Society for Investigative Pathology. Dr. Sobel wanted to pursue a

PhD as a medical student and inspired Dr. Krulwich to start the MD/PhD Program at Mount Sinai. Dr. Sobel joined our students over lunch and delivered a seminar: "Convergence and the path to success: the yellow brick road from Mount Sinai to the wonderful world of science and medicine." We invited the MP2 Class to the award dinner at the Mount Sinai Alumni Association Reunion, to celebrate their completion of the fourth year in the Program.



ISMMS Alumni Awardee, May 19, 2017

Left to right: Benjamin Chen, MD/PhD, Associate Director; Talia Swartz, MD/PhD, Associate Director; Mark Sobel, MD/PhD (MSSM '75); Terry Ann Krulwich, PhD, Founding Director, ISMMS MSTP; and Margaret H. Baron, MD/PhD, Director, ISMMS MSTP.

Newly matriculated MD1 students:

Welcome Daniel Charytonowicz, Alice Chen-Liaw, Michael Espino, Iain Forrest, Rollie Hampton, Kaustubh Kulkarni, Rachel Levantovsky, Clifford Liu, Don Nguyen, Joan Shang, Camille Spencer-Salmon, and Lauren Stalbow! Members of our new class of 12 MD1 students have been actively engaged in summer rotation projects and our interactive MSTP course, "Problem Solving in Biomedical Sciences." Since the day of their arrival (June 28),

they have worked collaboratively and brainstormed with a group of enthusiastic faculty to propose studies that address critical biomedical problems. We look forward to watching them grow during their time in the Program!

New MSTP Program Manager:

Bianca Taylor-Starobin, our new MD/PhD Program Manager, joined us on June 26 from Cornell Tech, where she served as Assistant Director of Enrollment and Student Services. She has been spearheading our Admissions, special events, and various student support activities, to ensure that the Program runs smoothly. She is off to a very strong start!

The **2017 Annual MSTP Retreat** will be held September 8-10 at Honors' Haven in Ellenville, NY. Arturo Casadevall, MD/PhD, the Bloomberg Distinguished Professor and Chair of Molecular and Microbiology and Immunology at Johns Hopkins, will deliver our keynote presentation. The MSTP Retreat Planning Committee has worked hard to develop a wonderful program of student presenters, breakout sessions, an alumni panel, and competitive events. Thanks to our Retreat Planning Committee: Mark Bailey (Chair), Sahil Agrawal, Eziwoma Alibo, James Carter, Michael Daniel, Kevin Hoffman, Fred Kwon, Rachel Levantovsky, Christie Nguyen, Sope Oguntuyo, and Cindy Tian.

It's a great time for our MSTP and we eagerly anticipate the coming year, with ongoing opportunities for us to work together to foster the skills required for our students to become successful physician-scientists and to continue to celebrate our students' accomplishments.

~ Margaret, Talia, Ben

Women in MSTP has been going full steam ahead since our official launch in the spring of 2015! As a group, we aim to advocate for and support the success of women in the Medical Scientist Training Program at ISMMS through mentorship and educational efforts.

In our first years as a student organization, we have hosted numerous events for different audiences. With the support of Student Council, we have sponsored social hours in which students from every program are invited to discuss relevant topics including civil engagement, male feminist allies, imposter syndrome, and wellness. This past March, we collaborated with the school's chapter of the American Medical Women's Association (AMWA), and Women in Science (WIS) to hold a second Negotiating Skills Workshop that expanded upon our inaugural event. The Workshop received an overwhelming amount of support and was able to bring together over 100 people at all stages in their careers throughout the Mount Sinai Health System. We are already hard

at work on planning future large-scale events in collaboration with the Office of Women's Careers and other student groups.

We have also hosted a number of events for students in the MSTP. One special event was a mixer for the incoming MSTP



WiMSTP executive board members march for Science! From Left: Jenny Long, MP5, Rebecca Hamlin, MD4, Dr. Miriam Merad, MD/PhD, Fiona Desland, MP3, and Jessica Tan, MP1.

class and their FlexMed colleagues. We also set up a program-wide mixer that was

attended by students in every year of the program. In addition to engaging the Sinai community, we also walked in New York City's March for Science to advocate for all women in research and medical fields. Please look forward to our upcoming social and educational events where we will discuss issues important to women students, physicians, and scientists. We welcome participation from both women and men! We recognize that everyone has a vital role in advocating for gender equality. We hope to see you at a Women in MSTP event this year. If you're interested in becoming more involved, feel free to contact us about open positions or tell us your ideas for further events!

We also have a research team that is investigating the underlying causes for the gender disparity in MD/PhD programs in collaboration with a similar group at the University of North Carolina. You can check out data from a pilot study here: <https://webcommons.mssm.edu/womeninmstp/research-projects/>.

Faculty Interview with Dr. Yuval Itan (continued from page 3)

What was your PhD thesis work?

I did my masters and PhD at University College London, taking advanced courses in computer science and biology. I had two main evolutionary genetics projects under the guidance of Mark Thomas. The first was where and when did lactase mutations evolve, that is the genetic capacity of adult humans to drink milk. Did you know that the wild-type human trait is lactase intolerance and that all other adult mammals cannot digest lactose? My second project was comparing duplications in Chimp and Human genomes. These duplications were not gradual events, but bursts. Examples of recent bursts include metabolic genes during climate change in Africa and genes involved in cognition.

You did a postdoc next?

Yes, after the PhD I decided to transition to human health and started a postdoc with Jean-Laurent Casanova at Rockefeller University. This was the first time I considered problems in disease, and this transition from evolutionary genetics was quite challenging and took

a few months.

I then side-tracked for two years, focusing on methods to filter out noise from Whole Exome Sequencing (WES) and Whole Genome Sequencing (WGS). I identified genes that are highly mutated in human populations, and therefore unlikely to cause disease.

What is your vision for your career?

Things can change, but I would love to see the implementation of very high level computational precision medicine, where with the press of a single button, you get the most likely variant and most likely drug. To some extent the components of this vision have already been implemented, but it has to be easier, which is necessary for getting to the clinic.

Sounds like MD/PhD candidates would be a good fit for your lab. On that note, what kind of mentorship have you found helpful in the past?

Both my PhD and postdoc supervisors are great mentors for different reasons, the PhD advisor for fostering academic freedom and curiosity, and Casanova for teaching me the principles of genomic medicine and how to be modest and

rigorous about predictions in the context of an experimentalist lab.

Those points really resonate with me. Outside of research, what are your personal interests?

Travelling and hiking, I've been to the Himalayas, New Zealand, the Alps. Now with two small kids I mostly go to Bear Mountain, though. I also like sports, specifically mixed martial arts. I used to tell people I do it to keep in shape, but I don't know how much truth there is to that. I enjoy it though, especially the high level of competition. I also played basketball. Also movies, TV, and reading. I highly recommend "The Expanse," people should know about it!

Any advice for budding scientists?

Think big, keep an open mind, and learn to program beyond Excel. Each medical and biology student should have a programming course.

Now is the best time to get into genomic research, it is really bursting. There are so many options, the field is young, and it's a good time to jump on the wagon. And it is fun.



Bianca Taylor-Starobin, Sinai's new MSTP Program Manager, having fun with her son Dima on the High Line in Chelsea.

We welcome our new MSTP Program Manager, Bianca Taylor-Starobin to the Sinai family.

Tell us about yourself!

I grew up in Baltimore, Maryland. I attended the University of Maryland for undergrad and the University of Pennsylvania for graduate school. I live in

Brooklyn with my five year old (soon to be six) son and my husband. I love reading, history and travel.

What brought you to Mount Sinai?

I was drawn to Mount Sinai because of the wonderful sense of community. I am excited to be at such a highly respected institution, and I'm equally excited to work with and for the MD/PhD students. The students I've met thus far are all wonderfully personable and I look forward to building a relationship with everyone and the program as a whole over the many years to come.

What is the biggest goal you have for your new position?

I have a background in admissions and I look forward to enhancing our recruitment and yield efforts. More specifically, I have experience in cross-channel marketing, email drip campaigns, and event planning. Another major goal of mine is streamlining the tracking of milestones.

If you could go anywhere in the world, where would you go?

That's a hard question. I want to travel

the world, so it is difficult to only pick one place. But if I must pick one place, I'd travel to South Africa. And if I could, I'd squeeze in Botswana and Zimbabwe.

What is one thing you are really looking forward to in New York City?

After having been in NYC for 11 years, there's still a lot to see and do. But I suppose what I love the most is having and raising a "city kid". And I love exploring the city with my son and being able to see it from his perspective. The next big thing on our list is Ellis Island.

Would you rather be invisible or able to read minds?

I feel as if I should pick read minds, but being invisible sounds like so much more fun. Plus being invisible would give you a lot of insight into the person's thoughts, so you kind of get both. I must add that the question you should've asked me is if I'd rather be invisible or travel in time. And my answer would definitely be to time travel. And I'd choose to travel back in time over going to the future.

MSTP Bedside Rounds By Steven Chen, MP1

This past year, I kickstarted MD/PhD Bedside Rounds, a monthly shadowing program in which a small group of MD/PhD students work with a clinician or physician scientist to interview a patient, go through physical exam findings, and discuss diagnosis and treatment. This series was adopted from a similar program run by the Internal Medicine Interest Group here at Mount Sinai -- after discussions with Dr. Talia Swartz and the MSTP leadership, we decided to implement an MD/PhD-tailored version. Our hope is that these sessions will supplement other programs already in place to:

- Better navigate the transition back to third year
- Give students more clinical exposure and practice
- Allow students to explore different specialties

- Serve as a platform for networking with clinicians, and
- Foster camaraderie among students of different years.

Based on student input and interest thus far, we have organized sessions in a variety of subspecialties, including Neurology, Infectious Diseases, Hematology/Oncology, and Anesthesiology. I have been struck by the genuine enthusiasm of the clinician preceptors to work with MD/PhD students, often expressing interest in continued contact following the sessions. Additionally, all the preceptors understand the unique difficulties of being an MD/PhD student juggling both the clinical and research domains and have been extremely supportive and patient with the students. Having participated in some of these sessions myself, I have recognized how important it

is to learn from our patients: that it is such a privilege to walk in our patients' shoes, however briefly, and put a human face to the diseases and conditions we study in the classroom.

Student feedback for the program so far has been great! 100% of student participants have given the program a 4 or 5/5 rating, and 96% answered that they would participate again. I am especially excited to expand to other subspecialties this upcoming year, including Psychiatry, Gastroenterology, and Dermatology. But there is so much more to be done!

I am always looking for more clinicians to contact and want to hear what fields you all are interested in so I can best tailor the program to your needs. I highly encourage everyone to participate if they can!

MSTP Summer Updates

(continued from page 2)



Cindy Tian, MP3, traveled to Peru this summer. She hiked six days in the Andes over Mount Huayanay to Machu Picchu.



A group of MP4+ “Tough Mudphudders” competed in a Tough Mudder this summer! From Left: Michael Daniel, Ted Pak, Kevin Hoffman, Ranjan Upadhyay, Eddie Contijoch, Grace Mosley (MP2), and Benny Laitman (MD4).

Selected Publications: 2016-2017

NEUROSCIENCE

The methyltransferase SETDB1 regulates a large neuron-specific topological chromatin domain. Jiang Y, Loh YE, **Rajarajan P**, Hirayama T, Liao W, Kassim BS, Javidfar B, Hartley BJ, Kleofas L, Park RB, Labonte B, Ho SM, **Chandrasekaran S**, Do C, Ramirez BR, Peter CJ, C W JT, Safaie BM, Morishita H, Roussos P, Nestler EJ, Schaefer A, Tycko B, Brennand KJ, Yagi T, Shen L, Akbarian S. Nat Genet. 2017 Aug;49(8):1239-1250.

NEUROSCIENCE

Gene Network Dysregulation in Dorsolateral Prefrontal Cortex Neurons of Humans with Cocaine Use Disorder. **Ribeiro EA**, **Scarpa JR**, Garamszegi SP, Kasarskis A, Mash DC, Nestler EJ. Sci Rep. 2017 Jul 14;7(1):5412.

BIOPHYSICS AND SYSTEMS PHARMACOLOGY

Distinct Roles of Brd2 and Brd4 in Potentiating the Transcriptional Program for Th17 Cell Differentiation. Cheung KL, Zhang F, Jaganathan A, **Sharma R**, Zhang Q, Konuma T, Shen T, Lee JY, Ren C, Chen CH, Lu G, Olson MR, Zhang W, Kaplan MH, Littman DR, Walsh MJ, Xiong H, Zeng L, Zhou MM. Mol Cell. 2017 Mar 16;65(6):1068-1080.e5.

IMMUNOLOGY

Innate Immune Landscape in Early Lung Adenocarcinoma by Paired Single-Cell Analyses. **Lavin Y**, Kobayashi S, **Leader A**, Amir ED, Elefant N, Bigenwald C, Remark R, Sweeney R, Becker CD, Levine JH, Meinhof K, Chow A, Kim-Shulze S, Wolf A, Medaglia C, Li H, Rytlewski JA, Emerson RO, Soloviyov A, Greenbaum BD, Sanders C, Vignali M, Beasley MB, Flores R, Gnjatich S, Pe'er D, Rahman A, Amit I, Merad M. Cell. 2017 May 4;169(4):750-765.e17.

MICROBIOLOGY

Broadly protective murine monoclonal antibodies against influenza B virus target highly conserved neuraminidase epitopes. **Wohlbold TJ**, Podolsky KA, Chromikova V, Kirkpatrick E, Falconeri V, Meade P, Amanat F, **Tan J**, tenOever BR, Tan GS, Subramaniam S, Palese P, Krammer F. Nat Microbiol. 2017 Aug 21; doi:10.1038/s41564-017-0011-8.

MICROBIOLOGY

Reduced Potency and Incomplete Neutralization of Broadly Neutralizing Antibodies against Cell-to-cell Transmission of HIV-1 with Transmitted Founder Envs. Li H, **Zony C**, Chen P, Chen BK. J Virol. 2017 Apr 13;91(9). pii: e02425-16. doi: 10.1128/JVI.02425-16. Print 2017 May 1.

GENETICS AND GENOMIC SCIENCES

DGCA: A comprehensive R package for Differential Gene Correlation Analysis. **McKenzie AT**, **Katsyv I**, Song WM, Wang M, Zhang B. BMC Syst Biol. 2016 Nov 15;10(1):106.

EAST HARLEM HEALTH OUTREACH PARTNERSHIP

How Well Does a Student-Run Free Clinic Care for Diabetic Patients? **Laitman BM**, **Mosley G**, Thomas DC, Meah YS. Journal of Student-Run Clinics, [S.I.], v. 3, n. 1, aug. 2017. ISSN 2474-9354.

News to share with the MSTP? Interested in contributing to the next issue?
Email the editors:
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