

MASTER OF BIOTECHNOLOGY PROGRAM

FERMENT

MBP SPONSORS BIOTECHNOLOGY DAY 2016



There is a single light of science, and to brighten it anywhere is to brighten it everywhere.

Isaac Asimov

It was with enthusiasm, and an earnest desire to educate that the faculty, staff, and students of both the [Master of Biotechnology Program \(MBP\)](#) and [Biotechnology Training Program \(BTP\)](#) sponsored this year's Biotechnology Day.

In conjunction with Northwestern's [Office of STEM Education Partnerships \(OSEP\)](#), Biotechnology Day welcomed Chicago Public Schools students, and life science graduate students in the Lurie Cancer Center on Northwestern's Chicago campus.

Balancing panel discussions with hands-on experiments, this festival of biological and chemical engineering brings seasoned professionals in contact with young, plastic brains.

Community science education groups (such as [STEM Scouts](#) and the [Dribbly Pear](#)) tabled in our exhibition hall as students participated in hands-on experiments led by MBP students. Do you know how to extract DNA from a strawberry? 'Cause we do.

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SYNBIO RESEARCH CENTER

Northwestern's [Center for Synthetic Biology](#) draws from physics, engineering, and computer science to solve issues in cell-free systems, mammalian systems, enabling technologies, ethics and societal impact.

Three out of the six pioneering faculty at the center also happen to be MBP research preceptors—Michael Jewett, Joshua Leonard and Keith Tyo. (Clearly we're onto something.) Perhaps one our students will design and engineer a new biological system, and address a pressing social problem.



Biotechnology attendees included Chicago Public Schools students, Northwestern students, staff, and faculty, and tired researchers on their lunch hour. Our guests learned about the contemporary industrial landscape, practiced DIY Biology experiments, and listened to an address from keynote speaker Nicole Fisher.



MEET OUR KEYNOTE **NICOLE FISHER**

As a human rights and healthcare access activist operating on the world stage, Fisher's varied career has taken her to political and legislative offices, the U.S. Congressional Budget Office, and the United Nations.

Despite an exemplary career in government service, Fisher left the public sector to create a private consulting firm focused on health and human rights: [HHR Strategies, Inc.](#)

S.T.E.A.M. PUNKS: THE (NOT SO) HIDDEN TALENTS OF MBP STUDENTS



Sana Ma ('17) tickling the ivories.

COMPLEXITY & COMPOSITION

With piano there's accompaniment, and a melody, the music is a bit more complex, and I like that. They say musicians have a personality type that matches their instrument.

Sana Ma
Class of 2016

From the age of four, Sana Ma has been playing music. As a toddler, Ma's parents noticed her affinity for rhythm, and took swift action, engaging her in piano and violin lessons. Their insight proved accurate; By the age of twelve, Ma had already composed her own music (a creative answer to book report), and had a family friend arrange her piece for a bell choir. Writing or playing, Ma draws inspiration from Expressionist composers, explaining that "the notes aren't as important, it's about the feeling beneath them."

Ma's passion for performance brings her to a host of venues – benefit concerts, community orchestras, and the otherwise quiet living rooms of nursing homes. As a youngster she played in Kids for Bach, and the Multiple Piano Festival. Today she participates in not one, but two Chicago-area orchestras, the [Lakeshore Symphony Orchestra](#) and the [Chicago Metropolitan Symphony Orchestra](#). "I like the performing aspect of music. I'd get

really nervous, then play, then get really great feedback," she said. "I'm sort of hooked to the adrenaline rush now."

Now that she's in graduate school, Ma struggles to make time for her music. For now, her research and scholarship comes first, but the impact her musical studies carries through to her scientific pursuits. "I think pedagogically there something there about training different parts of the brain. When I'm a musician, I am very technical. I break things down methodically."

When Ma needs a break, she relaxes with some jazz music at [Andy's Jazz Club](#) in River North or the [Green Mill Cocktail Lounge](#) in Uptown. "I'm really into jazz right now. It isn't just about music, it's about mood, hanging out and relaxing with your friends."

NOVELTY & EXPLORATION

A life-long fine artist, Stephanie Wiegel worked in inks and paints before trading them in for pipettes and plates. But "trade" implies the kind of false dichotomy this article hopes to avoid.

Though competition for time might divide Wiegel's loyalties between art and science, her pursuit of both disciplines has only enriched her perspective. "I solve problems differently," Wiegel said. "My purely analytical classmates haven't thought of themselves as creative for so long. I'm not more creative, but I've been in that mindset longer." Wiegel laments the disservice education can do to those who have been shunted into one disciplinary mindset for too long.

Wiegel counts solo shows, murals, and international commerce among her artistic accomplishments— and was on track to attend the Columbia College of Art in Chicago. But faced with the reality of post-graduate debt, and (deeply) embedded cultural assumptions about the value of art, she made a

decision to study conservation biology. "I wanted to be on the frontier," she said. "As I moved through my education I realized that the real frontier was in molecular biology." With a breadth of opportunities just waiting for novel solutions, Wiegel found her frontier.

Biotechnology offers the kind of creative flexibility she had been seeking since grade school. "In an ideal world I'd like to be an entrepreneur, then get a PhD, and start a company based on an idea I have."

Blending the entrepreneurial with the inventive, Wiegel wins the respect of her peers as she pursues a research project with [NanoCytomics](#). "I've found inventing to be the perfect balance of creative and analytical. I'm hoping to run with that a bit. Making things is what give me joy."



Untitled. Stephanie Wiegel ('17). Mixed Media

LEVITY & DOCUMENTATION

In an era dominated by specialization, Kenneth Wang's pursuit of the well-rounded education appears decidedly classical. For years, Wang applied his analytical aptitude to the hard and soft sciences, and

with his memory for detail, excelled in Art History—often acting as personal docent to his close friends. “But I always knew the stories behind the art and artist, rather than enjoying the work itself,” said Wang. The first step is admitting you have a problem.

In acknowledging this artistic deficit, Wang found a new skill to master. His pursuit of photography gives him genuine artistic experiences and a more nuanced perspective on the work of others. “Photography gives you an appreciation for contrast, shadow, balance – compositional elements every artist uses,” Wang explained.

Though we can attribute Wang’s mastery to the many hours spent working as a commercial photographer, the photographic tradition began with Wang’s grandfather. “He was raised in communist China, where cameras were an upper middle class luxury. You could choose between a camera or a record player as your hobby. My grandfather chose a camera.” To this day, Wang cherishes a collection of Zorki cameras—Russian imitations of Leica cameras—his miniature museum to manual photography.

While many of Wang’s photos are candid, he appreciates the value of photography to record-keeping. “Documentation is so important in science,” he said. “If you don’t document it, it’s not there... Having these primary sources can be quite damning or illuminating.” Collecting these moments in time leads Wang into two social roles: photographer and friend. (We’ll let you decide who’s in the driver’s seat).

Like the masters of street photography before him, Wang captures the “decisive moment” through careful observation of the elements—in this case, people. A shared smile, a distracted focus, a pained expression, Wang waits for his moment. “The entire methodology of setting up a shot is very analogous to designing an experiment. You try to account for everything. When there’s something you can’t change, you minimize its disruption.”



Untitled. Kenneth Wang. Photograph.

IT'S A NEW DAY FOR EXTERNAL RELATIONS: WELCOME NATALIE CHAMPAGNE



MBP is delighted to welcome Natalie Champagne to our ranks. As Director of External Relations & Career Management, Champagne prepares students for the daunting task of entering the workforce. Under her guidance, students compose and perfect their resumes, fine-tune their interview skills, and target that most illusive of animals-- the first job.

Champagne also serves as MBP’s first point of contact for our external partners, and alumni. (Don’t be a stranger.)

GAINFUL EMPLOYMENT FOR THE CLASS OF 2014

Breathe. Despite economic downturn, MBP graduates find jobs

Lu Bai

Research Associate, Moderna Therapeutics

Aditya Basur

Quality Assurance Compliance Specialist, Alcon

Xinyi (Claire) Che

Research Associate, Conagen

Kuan-Wei Chen

Production Associate, Moderna Therapeutics

Ankit Gandhi

Assay Development Research Associate, T2 Biosystems

Chia-Jung (Joy) Han

Senior Associate, Amgen

Mingyang Jiang

Research Associate, Dimension Therapeutics

Catherine Nguyen

Regulatory Manager, USC Norris Comprehensive Cancer Center

Durga Nyayadish

Research Associate II, Ohmx Corporation

Ajinkya Patil

Research Technician II Feinberg School of Medicine

Rahul Shroff

Operations Strategy & Planning Intern, Baxalta

Michael Verleye

Research Engineer, Nanocytomics

Paul Weingarden

Research Associate II, Broad Institute

Henry Weiss

Scientist, Analytical Development Fresenius Kabi

Oliver Weisser

Analyst, Deloitte Consulting

Tzung-Mao Wu

Process Development Associate, Novavax

Xiuyuan Xie

Marketing Specialist, GenScript

Yingjie Xu

Mass Spectrometry Research Assistant, NantOmics

Demin (Grace) Zhao

Research Technologist, Feinberg Cardiovascular Research Institute

Si Zhao

Research Assistant, Institute for BioNanotechnology in Medicine

CURRENT INTERNS WORKIN' FOR THE MAN (EVERY NIGHT AND DAY)

At the bench or at the desk, MBP students gain critical work experience.

Taylor Graff

Nanocytomics

Alex Li

Unnamed San Diego Firm

Rick McMahon

Fresenius Kabi

Krishna Sidhartha

Virology, Eli Lilly

Dora Wu

Cell Culture, Eli Lilly

Jiyang Zhang

Academic Internship Woodruff Lab

Xu Zhang

Academic Internship Wells/Gray Lab

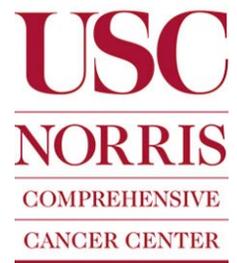
Ge Zhou

Academic Internship

Karen Zuo

Unnamed San Francisco Firm

AMGEN® **Baxalta** **NOVAVAX**



Deloitte.



MBP GRADUATE RECEIVES NSF GRANT



MBP is proud to report that on March 29, 2016 Jessica Yu (class of '14) received a [National Science Foundation Graduate Research Fellowship](#) for her work in "Predicting complex cancer dynamics using multi-scale agent-based models."

Designed to support students in research-based Masters degree and PhD programs, the award is the oldest graduate fellowship of its kind. (And she's in good company. Previous recipients include Nobel prize-winners, cabinet officials, and Pulitzer prize-winning authors.)

NSF fellows receive a three-year annual stipend of \$34,000 along with a \$12,000 cost of education allowance for tuition and fees. Yu will also receive opportunities for international research, professional development, and best of all, the freedom to conduct her own research at the school of her choice. Fortunately, she's chosen Northwestern.



IT DOESN'T TAKE A ROCKET SCIENTIST

Eleasa Wilson (Class of 2005) plans, designs, and optimizes experiments for astronauts on the International Space Station.

Remember that scene from Apollo 13 where the engineers from mission control dump a bunch of parts on a table, and are told "we gotta find a way to make this, fit into the hole for this, using nothin' but that,"?

Well, MBP alumna Elesea Wilson (formerly Elesea Kim) might not face the same life-and-death drama that spurred on NASA engineers in 1970, she knows a thing or two about limited resources. Working from her station at [Teledyne Brown Engineering](#), Wilson helps scientists accomplish their research objectives.

Wilson's aptitude for design and communication bring her to the vanguard of space exploration, working with specialists from NASA's Marshall Space Flight Center, Johnson Spaceflight Center, the Canadian Space Agency and the European Space Agency.

"I transpose their needs into timeline schedules, visuals and detailed activities to help ensure that science objectives are met given the limited resources available on ISS."



SUMMER SITE VISIT: RESEARCH TRIANGLE PARK



THE RESEARCH TRIANGLE PARK

In an effort to bring unique professional development opportunities to its students, MBP will organize a site visit to [Research Triangle Park \(RTP\)](#) in North Carolina this summer.

In the pinewood forests between Chapel Hill, Durham, and Raleigh, the RTP was established in 1959 to retain the local research talent from Duke University, North Carolina State University, and the University of North Carolina.

Today, RTP is home to 170 companies, including Biogen Idec, Syn-genta, United Therapeutics, Cisco, Bayer CropScience, Eisai, BASF, the U.S. EPA, NIH's National Institute of Environmental Health Sciences, and the original research institute that launched the park, RTI International.

This research hub continues to flourish, attracting seasoned professionals and industry novices alike, and the three city governments recently proposed plans to develop a light rail transit system in the coming decade.

Our trip organizers are in the process of establishing connections in the RTP, and will announce companies selections in early summer. Students with leads should contact Natalie Champagne.



WINTER 2015 SITE VISIT: SAN DIEGO



This past December, MBP brought students to San Diego to visit biotechnology firms Genetech, Halozyme, Illumina, and Gilead Sciences. Students toured facilities, attended panel discussions, and mingled at our networking event at Biocom.

Photo: Gilead Sciences in Oceanside, CA. December 2015. (L to R: Sejal Mishra, Masood Qader, Anne Thiel, Peter Zhang, Lexie Kendra, Alison DuFour, and Taylor Graff.)

MBP Alumni Anne Thiel and Peter Zhang find meaningful work in Southern California

The balm of Gilead was a rare medicinal perfume purported to cure all ailments in all people. Primitive in process, and broad in focus, we might regard its production as an early attempt at drug development, (if not marketing). Though the knowledge has grown, and methods have changed, the ambition to find cures remains constant as the aptly-named **Gilead Sciences** sets the pace for new treatments and anti-viral therapeutics.

When MBP visited Gilead's facility in Oceanside, CA, students and faculty gained access Gilead's laboratories, guided by Anne Thiel ('12), and Peter Zhang ('13), two alumni currently working in the company's fast-growing biologics division. Though he's only been with the company for a year and a half, Zhang is considered the veteran in his team—that's how rapidly Gilead has been onboarding new hires. Growth has been so consistent, that the company's three-building site will soon relocate into one large facility—directly across from their tech park neighbors, Genetech.

Though moving the main project forward is a part of each employee's day, Gilead respects their employees' ambitions. "The managers here are very good at trying to get your own personal development, Zhang

said. "You have your own role, and own projects to work on." This doesn't just apply to senior members of the company, but to interns and contractors as well. "The pace is pretty quick around here," Thiel laughed. "But it's nice, because then you can see things finish. The interns I've seen come through here have meaningful projects." This contrasted with Thiel's previous position at an Eli Lilly pilot plant, where bench work tended toward the routine.

The training Thiel and Zhang received during their time in MBP set them up for success in their respective roles. Both cited Bill Miller's bioprocess engineering course as highly relevant to the cell culture work they engage in at Gilead. The technical skills and concepts acquired in lab courses prepared them to take on bench work almost immediately, giving them an edge over other new hires.

A bachelor's degree might be sufficient to start a career, but for those looking to advance their ideas beyond the entry-level, a master's degree is critical to success. "I wanted to make myself more marketable," said Thiel, "it was the network of companies eventually sold me on going to MBP. There was a clear path to where I wanted to be."



There's something to be said for finding a good mentor.

Anne Thiel
*on her working relationship with
Dimitra Georganopoulou*



No matter who you are you will make presentations.

Peter Zhang

EVENT CALENDAR

THURSDAY APRIL 14

ChBE Seminar Series
9AM ITW Room 1350 - Ford

BME Seminar Series:
Sam Sia, PhD
4PM L361 - Tech

FRIDAY APRIL 15

SEGIM Seminar: Mohend Chaouche
12PM A230 - Tech
Civil & Environmental Engineering

Environmental Engineering Seminar: Nancy Love
2PM A230 - Tech
"The Interplay between Chemicals and Microbiomes: An Environmental Biotechnology Perspective"

TUESDAY APRIL 19

Achenbach Lecture 2016: Dean Mary Boyce
2PM ITW Room
Civil & Environmental Engineering

Colloquium: Austin Minnich
4PM L361 - Tech
Materials Science & Engineering

Medical Grand Rounds
7:30 AM 3rd Floor, Conference Room A
Northwestern Memorial Hospital

THURSDAY APRIL 21

Scanning Probe Microscopy Short Courses and Training Workshop
NUANCE Center
8:30AM Room 2058 - Cook Hall

ChBE Seminar Series
9:00 AM ITW Room 1350 - Ford

Lecture for Medical Humanities & Bioethics
12PM Searle Seminar Room - Lurie

BME Seminar Series: George Truskey, PhD
4PM L361 - Tech
George Truskey, PhD

TWO DAY EVENT : APRIL 19 & 20

Scanning Probe Microscopy Short Courses and Training Workshop
NUANCE Center
8:30AM 2058 - Cook Hall
REGISTRATION REQUIRED

TUESDAY APRIL 26

Microbiology-Immunology Seminar: Sara Cherry, PhD
12PM Baldwin Auditorium - Lurie
"Using Genetic Approaches to Study Host-Microbe Interactions"

Center for Molecular Innovation and Drug Discovery Seminar
4PM 4003 - Ryan Hall
"Metal-Catalyzed Alkene Functionalization: An Approach Towards Stereospecific Cross-Coupling"

THURSDAY APRIL 28

ChBE Seminar Series
9AM ITW Room 1350 - Ford

Lecture for Medical Humanities & Bioethics
12PM Searle Seminar Room - Lurie
Megan Crowley-Matoka, PhD

BME Seminar Series: John Wikswow, PhD
4PM L361 - Tech
"Organs on Chips: Bioreactors, Sensors, Controls and Interconnects to Support Constructionist Biology"

THURSDAY MAY 12

ChBE Seminar Series
9AM ITW Room 1350 - Ford

Emotional Capacity: The Role of Emotion in Decisional Capacity
12PM Searle Seminar Room - Lurie
Michael J. Schrifft, DO, MA

BME Seminar Series: Elizabeth Hillman, PhD
4PM L361 Tech
Elizabeth Hillman, PhD



TUESDAY APRIL 19

10AM-6PM

WEDNESDAY APRIL 20

7:30AM-6PM

Hilton Orrington
1710 Orrington Avenue
Evanston, IL 60208

Thus annual industry expo fosters meaningful partnerships in the growing Midwest life science and healthcare markets.

iBIO IndEx 2016 where thought leaders converge and connect to emerge with new insight.



ERIC FALLON

Director of Technology
Genentech, San Diego

PhD Chemical Engineering
Massachusetts
Institute of Technology

THURSDAY APRIL 28

LECTURE

4 - 6 PM

(TECH M164)

SECOND-YEAR STUDENTS WELCOME

RECEPTION

6 - 7 PM

AT COHEN COMMONS

(TECH L482)