

BIOTECHNOLOGY TRAINING PROGRAM ORIENTATION & HANDBOOK 2021

Directors:
Josh Leonard & Laura Lackner

Program Coordinator:
Will Chaussee

The Predoctoral Biotechnology Training Program and Cluster is an interdisciplinary and interdepartmental program that provides select students with greater research and training opportunities than those available through the individual departments/units.

The BTP is supported by the National Institutes of Health (NIH/NIGMS) and the Cluster is supported by the Northwestern University Graduate School.

Slides posted on BTP website: <https://biotechtraining.northwestern.edu/resources/>

biotechtraining.northwestern.edu
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BTP: Program Description

- The Northwestern Predoctoral Biotechnology Training Program is an interdisciplinary and interdepartmental program that provides Trainees and Cluster members greater research and training opportunities than those available through the individual departments.
- It promotes interdisciplinary education in biotechnology, interactions among faculty and students with interests in biotechnology, and provides a substantial exposure of students to industrial biotechnology research.
- **Students trained through this program are better prepared to enter the biotechnology industry or pursue careers in academic and governmental biotechnology research.**

BTP: Program Goals & Benefits to Trainees

- Foster a community of researchers at Northwestern University interested in the development and application of biotechnologies for therapeutic and diagnostic applications in medicine.
- Instill outstanding biotechnology trainees with the fundamentals underlying current and emerging technologies.
- Introduce trainees and the biotechnology community to a range of biomedical problems for which technologies have influenced or could influence the treatment of patients.
- Introduce trainees to leaders in biotechnology within academia and industry to facilitate the development of their personal network, which can be instrumental in launching a successful career.
- Help trainees develop communication, oral presentation, scientific writing, and grant writing skills essential to their success as independent scientists.
- Educate trainees in the ethics of science and responsible conduct of research.

Diversity, Equity, and Inclusion

- The Biotechnology Training Program is committed to promoting excellence in graduate education and research.
- **We believe that having different voices at the table means hearing different points of view, which makes our program stronger.** As an essential part of our mission, we strive to create an environment that values all aspects of diversity including race or ethnicity, religion, gender identity, gender expression, sexual orientation, nationality or place of origin, disability, neurodiversity, and diverse life experiences.
- We believe in providing access and opportunities equitably to all members of the community and valuing all voices.
- BTP leadership, faculty, and trainees take actions that promote recruitment, inclusion and retention.
- BTP is committed to taking anti-racist actions within our program, and to helping our trainees and preceptors to take such actions in general. We commit to continual self-evaluation, striving for improvement, and collaborating with our affiliated graduate programs, labs, and departments and Northwestern to pursue these goals.

This is a *living* statement

BTP Leadership and Contacts

- **Director** Josh Leonard (ChBE)
- **Co-Director** Laura Lackner (IBiS, Molecular Biosciences)
- **Program Coordinator** Will Chaussee
- **Steering Committee:** Guillermo Ameer (BME), Emily Pujadas (BTP Trainee-**outgoing**), Heather Pinkett (IBiS, Molecular Biosciences), Mike Jewett (ChBE), Derk Joester (MSE), Nathan Gianneschi (Chemistry)
 - Trainee member is elected annually and participates in all key decisions *except* trainee selection
- **Preceptors** from the participating graduate programs
- **Trainee committees**

Trainee Committees

- Purpose
 - Trainee committees provide opportunities for trainees to have substantial contributions to BTP activities and direction.
 - Leadership opportunity: Champion a cause, innovation, or activity related biotechnology research and/or practice
- Current Committees
 - Social **and Retreat** Committee
 - Alumni, Site Visit & Networking Committee
 - Practicum Committee
 - Seminar Committee
- **Homework (before the retreat)**
 - [Visit BTP website \(People\) to view descriptions and current committee members](#)
 - [Sign up](#) to indicate your preference for committee assignments (link in email)

Get Connected

- **Slack**

- We have two slack teams that we will use for internal BTP communications
 - btp-nu.slack.com (main BTP team page)
 - btp-alumni.slack.com (for networking with with BTP alumni)
- Will will invite you to join both teams; please join and consider downloading the Slack app.
- Usage: We'll use slack for quick communication and coordination. Formal requests that require communication will go out by email.
- The “Resources” channel includes quick-links to many shared resources

- **Google Calendar**

- We use the google calendar to announce RIP meetings, seminars, and other internal BTP events.
- Will will invite you to join our shared calendar by email

Get Connected

- **LinkedIn**
 - All trainees are required to join linkedIn.
 - Please confirm your registration with Will by sharing your link (e.g., <https://www.linkedin.com/in/joshuanleonard/>) at which time you will be invited to join our group: “Northwestern University Biotechnology Predoctoral Training Program”
- **ORCID iD**
 - All trainees are required to register at <https://orcid.org/register>
 - Please confirm by sending your ORCID iD to Will by email
- **Google Drive**
 - We have a shared Google Drive folder accessible to anyone with the link. This folder is for sharing materials between trainees, leadership, and alumni. Resources posted include RIP agendas, running lists of speakers, site visits, rosters, and internships, and these slides!
 - See Slack for the link under #resources

BTP Monthly Activities

- **Biotechnology Seminars**
- **Research in Progress (RIP) Meetings**
- **Networking and Social Events**

Biotechnology Seminars

- Wednesdays at noon [normally with food] during Fall/Winter
- Weekly in spring as part of *Advances in Biotechnology* course; monthly the rest of the year (summer, fall, winter) (with coffee hour following the seminars)
- **Industrial speakers** from a wide range of companies, product areas and job functions
- **Academic speakers** from a wide range of research areas
- ***Small group of trainees network [normally, have breakfast and lunch] with the speakers***
- Trainee interests drive speaker selection (through Seminar Speaker Committee)
- ***Opportunities for trainees to invite and host speakers***

Research in Progress (RIP) meetings

- Practice motivating and presenting your research project to a diverse audience
 - Long-format presentations
 - Elevator pitches / flash talks
- Get feedback and suggestions from different perspectives, connect to resources on campus
- Learn about many areas of biotechnology research activity on campus
- **Rigor & Reproducibility**
 - NIH recognizes the need for “rigorously designed published preclinical studies, to ensure that such studies can be reproduced”
<https://www.nih.gov/research-training/rigor-reproducibility>
 - May include invited faculty/preceptor talks
 - Trainees are encouraged to integrate into presentations (next slide)

Guidelines for RIP talks

Over the course of this year, you will have the opportunity to give several types of presentations, each of which is designed to develop and practice distinct presentational skills that you will use throughout your career.

I. Long-format Presentations

- **Send a brief title and abstract to Will 1 week before your presentation.**
- Plan on talking for 25-30 minutes with 5-10 minutes for questions.
- Overall structure: please include an overview of your research area and your specific project, talk about results you have obtained, and about future directions of your research while keeping the following in mind:
 - ***It is essential that you make your talk as accessible as possible to the entire audience***, which means providing background, defining key terms and techniques, and avoiding jargon as much as possible. Explain why this research is interesting, compelling, and important; RIP meetings are a key opportunity to development and practice this key part of your research presentation skills.
 - ***Please emphasize educating and engaging the audience over sharing many results.*** RIP meetings are quite different than lab meetings, and you might need to create new slides to explain techniques and concepts that are unique to your field. This is a more important communication goal than is comprehensively showing all that you have accomplished, for these meetings.
- If you are just starting your project the talk can be about what you are planning to do with your project going forward.
- Include a dedicated slide (or more) to discussing salient issues related to rigor & reproducibility (R&R) in your project. Examples may include:
 - Practices that you and your laboratory use to ensure R&R
 - Challenges that you have encountered related to R&R
 - Challenges that your field faces related to R&R
- Asking advice from the group is highly encouraged!

Guidelines for RIP talks (cont.)

II. Elevator Pitches / Flash Talks

- Plan on talking for 5 minutes with 5 minutes for questions. You will be cut off after the five minute mark.
- Just like in the longer presentation, you must explain your research project to your peers, including why this project is interesting, compelling, and important.
- You may include illustrations, drawn “live” within the 5 minute window, on the whiteboard (i.e., a “chalk talk”).
- **Written feedback will be provided**

Regular Networking Opportunities

- Quarterly (approximately) BTP Social Events
 - Get to know colleagues in departments across Northwestern
 - Discuss research and internships
 - Refreshments to enhance the discussion
- Interact with seminar speakers.
 - BTP program will coordinate visit logistics which include **opportunities for addition student-speaker interactions**:
 - Hotel, Car Service (**walk to campus**)
 - Meals (**Trainee breakfast/coffee**, Faculty dinner)
 - Speaker meetings
 - Seminar booking (**with student introductions**)
 - Reimbursements

BTP Annual Activities Calendar

- **BTP Retreat** in August/September
- **Biotechnology Practicum** in August/September
- **IBiS Retreat** (optional for Cluster members) in September
- **NU Biotechnology Networking Reception (NEW)** launched in September 2018, postponed for **2020/21; spring 2022?**
 - **Held Alumni Networking Event associated with Aug 2021 practicum**
- **BTP Internship Workshop & Panel**
 - **Launched Spring 2021 ([view recording here](#)); planned for Winter 2022**
 - **See slides in Handbook (Supplementary Information)**
- **Biotechnology Nexus** in winter
- **Program evaluation survey and focus group** with Searle Center – summer
- **BTP-focused IDP** discuss with research preceptor annually
- **Individual Meetings** discuss IDP and career goals with BTP Program Directors (September). For trainees completing the program, this comprises an exit interview.
- **Biotechnology company site visit/s**

Biotechnology Practicum

The central objective of the practicum is to provide **hands-on training in current and emerging biotechnologies**. In particular, this program is designed to empower students to learn about cutting-edge technologies and to catalyze the integration of these methodologies into their own research projects and laboratories. The Practicum is a full day event divided into theoretical (morning) and experiential (afternoon) components.

Practicum Topics

- 2011 High-Throughput Technologies
- 2012 Imaging Strategies and Capabilities
- 2013 Bionanotechnology
- 2014 From Bench to Bedside – Small Molecule and Protein Production in Molecular Hosts
- 2015 A Practical Guide for Designing and Implementing CRISPR Experiments
- 2016 Next Generation Sequencing
- 2017 Imaging Modalities
- 2018 Biosensors
- 2019 Data Visualization and Communication
- 2020 Statistical Analysis in Biotechnology
- 2021 Entrepreneurship and Biotechnology Commercialization

IBiS Retreat

- Purpose (for BTP trainees)
 - Network with interdisciplinary group of faculty, grad student, and postdoc colleagues across the fundamental and applied life sciences research spectrum at Northwestern
 - Present research in progress to a diverse audience
 - Foster new collaborative interactions with a community working on a range of biomedical problems for which technologies could influence fundamental research and treatment of patients
 - Foster interactions to build both informal and formal mentoring relationships
- Recently revamped format
 - Focus on presentations from students, rather than faculty
 - Choose your own career/mentoring sessions
 - More free time

NU Biotechnology Networking Reception

- First held in Sep 2018; postponed in 2020/21 due to COVID-19 epidemic, tentatively aiming for Spring 2022
- This event will provide opportunities to interact with faculty, students, postdocs, and alumni drawn from across the Biotechnology community at Northwestern, with posters showcasing the breadth of biotechnology research conducted across the university.
- In addition to registering your attendance for this event, we are planning to distribute a dossier of all attendees, to facilitate networking before and after the event.

Biotech Nexus (formerly Biotechnology Day)

- We partner with the MS in Biotechnology Program (MBP) to lead
- Participate in outreach to high school students interested in biotechnology with NU OSEP via career panel and activities
- Panel discussions on diverse biotechnology career paths
- Small group discussion and networking with panelists
- Keynote speaker or special event
- Networking reception with colleagues and panelists
 - Panel discussions on diverse biotechnology career paths
 - Small group discussion and networking with panelists
 - Keynote speaker
 - Outreach to high school students as a panelist or experiment facilitator

BTP Individual Development Plan (IDP)

- **Career goals:** What are your long- and short-term career goals? What skills and competencies do you need to develop to meet these goals, and how do you plan to do so?
- **Research goals:** What are your short- and longer-term research goals, and what will be required to achieve these goals?
- **Industrial internship and additional training goals:** What are your goals for an industrial internship, as well as your additional training goals and needs, and what are your plans for achieving these goals?
- Revise at least annually and review with your advisor (to be sure you are in agreement); **this is a condition for reappointment for NIH trainees**
- Discuss with BTP Directors when desired, or at annual meetings
- [Template available for download from BTP website](#); IBiS students can use the IBiS form.

BTP Annual Reports

- Completed in the early fall quarter (updatable form)
- Career outcomes
 - Fellowships and Awards
 - Internship plans and experience (and jobs later)
 - Progress in coursework, IDP, and qualifying exam
 - Research progress
 - Outreach activities
 - Publications
 - **All publications MUST be in compliance**
 - Acknowledge BTP (T32GM008449) for publications on research done while supported by the BTP.
 - Template in appointment letter and BTP website. *Note that text is different for NIH-funded trainees and cluster members.*
 - It is recommended that you submit your peer-reviewed final manuscripts, accepted for publication, to [PubMed Central](#) (PMC). PMC [submission assistance can be found here](#).

Course Requirements (see website for updates)

- **Biology Fundamentals Courses: 2 courses:**
 - Provide broad coverage of fundamental biological principles, such as cell biology, biochemistry, molecular biology, systems biology, synthetic biology, and quantitative biology.
 - Build upon or complement prior training---student having completed prior coursework in biological fundamentals should take graduate-level courses when possible, and students entering with less training in biological fundamentals may satisfy this requirement with advanced undergraduate coursework. IBiS students are required to take Quantitative Biology (IBiS 410) as one of the courses that satisfies this requirement. Students who have not taken Biol_Sci 315 or 390 at NU, or an equivalent course as an undergraduate, should take one of these foundational courses as one of their Biological Fundamentals courses.
- **Responsible Conduct in Research: 1 of the following classes:**
 - IBiS 423 (Ethics in Biological Research)
 - GEN ENG 519 (Responsible Conduct of Research)
 - CHEM 519 (Responsible Conduct of Research Training)
- **Responsible Conduct in Research refresher course (after 4 years)**
 - IBiS 519 (Ethics in Biological Research – Refresher Course)
- **Rigor & Reproducibility in Research (IBiS 421)**
- **Advances in Biotechnology (ChBE 478)**
- **Electives: 3 biotechnology-related classes (many options)**

These classes fulfill the requirements for the TGS Certificate in Biotechnology. Don't forget to apply using the TGS online form: <https://www.tgs.northwestern.edu/admission/academic-programs/clusters-and-certificates/certificates/index.html>

Industrial Internships

- Internships provide trainees the opportunity to obtain first-hand experience in industrial research or development
 - NIH Trainees are required to pursue an industrial internship before degree completion; during appointment preferred
 - Cluster Trainees are encouraged to pursue an industrial internship
- Work with your mentor on internship timing; they may also have industry contacts related to your research
- **BTP Internship Workshop and Panel (~late Winter/early Spring)**
 - [View 2021 recording here](#)
- BTP Directors and alumni can help you find an internship. *See BTP Google Drive folder for a list of past internships.*
- **Plan ahead to manage student status and ensure you have health insurance**
 - Internship during BTP Traineeship (NIH Trainees): register for courses (often TGS-500 but not always)
 - Internship after BTP Traineeship or some cluster members: might need to apply for a Crown Family Fellowship (McCormick CRDV 510)
 - **Please plan ahead and consult with Will (BTP Program Coordinator) to ensure you make the proper plan**

Industrial Internships



Any company (domestic or foreign) satisfies NIH internship requirement
(but university appointments, national labs, etc. do not)

Trainee Funds

NIH-funded T32 Trainees

- Allowable
 - Lab supplies/chemicals/reagents
 - Biotech conference travel: funds can be used for travel to internships, or travel to biotechnology related conferences. You can be reimbursed for your air travel, taxi, lodging, meals, and registration fees.*Membership dues can be reimbursed if: 1) the membership is necessary for you to attend/present at the conference, or 2) if the cost of purchasing a membership results in a larger decrease in the registration than the cost of the membership itself. Otherwise, membership dues are unallowable.
 - Computers/Laptops: to use while training at NU
 - Software (Prism, GraphPad, SPSS)
- Unallowable
 - Airfare upgrades, Alcohol, Commuting between home and campus, Passports, vaccinations, and visas, Personal Entertainment, Travel Insurance

Cluster Trainees

- Biotech conference travel: same guidelines as above (inquire with detailed questions if needed)

How to order

- Purchasing guide can be found under Resources on the BTP website
- Place order/reimbursement through home department
- Email Will a copy of expense for quick approval turnaround
- **Please do not wait until the last minute to utilize these funds**

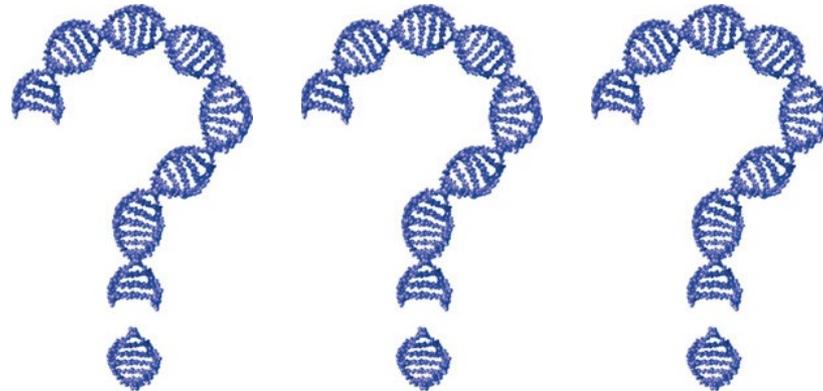
Summary of BTP Trainee Expectations

- Attend the BTP retreat, practicum, and Biotech Day
- Attend the IBiS retreat (Cluster optional)
- Complete class requirements for Biotechnology Certificate
- Attend and *actively participate* in all RIP meetings & seminars
- **Meet with at least half of the BTP seminar speakers**
- Participate in annual BTP survey and focus group session
- Complete annual June progress report and fall update
- Participate in Climate Survey and Focus Group
- Complete industrial internship (Cluster optional)
- Engage with fellow Trainees in BTP events
- Discuss IDP with advisor(s) and BTP Directors
- Keep us posted on career, publications, honors, awards, and service/outreach activities
- Publicize the BTP among incoming and first-year PhD students
- Respond promptly to emails from the directors & coordinator

Homework reminder

- View committee descriptions ([here](#))
- Sign up for a committee (link sent by email) before the retreat
 - We will hold a hand-off meeting with the previous committee members at the retreat

Questions and Resources



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SUPPLEMENTARY INFORMATION



Finding the right internship

- [Develop a network of contacts](#) from BTP seminar speakers, as well as at Biotech Day, meetings, and conferences
- Build on your [mentor's and other faculty contacts](#) in industry
- Search for interesting companies and positions on the web; connect with professionals at these companies via LinkedIn to learn about the company and positions (don't ask for a job!)
 - [Good opener: "I'd love to learn more about your fascinating job and career!"](#)
- You can also connect with [BTP alumni and other NU graduates via LinkedIn](#) (Group: Northwestern University Biotechnology Predoctoral Training Program)
- Connect with [\(former\) BTP Trainees and other NU graduate students](#) who have completed internships for leads
- Review info. on [past internships of BTP Trainees](#) (*see Google Drive folder*)
- Connect with [Northwestern Career Advancement, McCormick Career Development](#)
- [EBRC Internship Portal](#) (Synthetic Biology) (*see BTP Website for link*)