Biology-Biotechnology-Bridge Program

2-year Post-Baccalaureate Program at MIT and its Biotech Partners

https://biology.mit.edu/about/postbac_program
MIT provides minority outreach in STEM fields at various levels

• Middle school
• High school
• College
• Is this enough?
Why start a Bridge Program?

There is a clear need
Target Population

Highly motivated recent college graduates who:

• Need more research experience
• Need stronger more rigorous course work
• Need more time to decide what career path to pursue
• Don’t know enough about graduate school
• Don’t want to be rushed
• Are from non-biology background but interested in graduate programs in the biological sciences
• Are not able to get admission into top PhD programs
Vision for the B³ program

Chris Kaiser, Dept chair (2005-2012)
Vision for the B³ program

- 2-year non-degree program
- Partner with industry for funding
- Combine Research training in Industry with rigorous academic preparation at MIT
- Expose students to careers in biotech
- Well-structured program with a holistic approach to students development
- All faculty must be well-informed and on board
- Industry - academia trust building
- Successful admission into top graduate programs
Why 2 years?

- Cannot accomplish much in one year
- Cannot show much gain after just three month into a program
- Need one year to build skills –another year to build confidence, and to fully understand the scope of the research
Searching for a biotech partners

- MIT is in a unique position
- Cambridge is the world capital of Biotech
- The Biology department has strong ties to industry
Searching for a biotech partners

Need a partner who:

– Has very strong R & D
– Solid financial status
– Shares the B³ program’s vision
– Values a well-trained and diverse scientific workforce and willing to invest in its development
– Has genuine commitment to diversity and education
– Has ties to MIT
Brigitta Tadmor, VP and Global Head
Education, Diversity and Inclusion and Health Policy
Novartis Institutes for BioMedical Research (NIBR)

- A global network of nine major research sites, headquartered in Cambridge, MA
- Within walking distance of MIT
- Many areas of biological and biochemical research
drug discovery project at NIBR* draws from scientific and clinical core competencies globally

* Novartis Institutes for Biomedical Research (NIBR)
Strong outreach programs in many disadvantaged communities around the world

• Fellowships for African faculty and clinicians in Cambridge
• Research Internships in Cambridge for students from disadvantaged communities in the US
• Postdoctoral fellowship program for post-graduate students from Africa focused on vaccine or drug discovery research in neglected diseases (in Italy and Singapore)
• Masters in Vaccinology training program for clinicians from the developing world in Italy (with the University of Siena)
B³ program offerings:

• Research Training in Industry/corporate experience
• Courses at MIT with official transcripts
• Stipend, Tuition, Insurance
• Access to MIT graduate housing/graduate student status
• Individualized tutoring with dedicated tutor
• An academic mentor AND a research mentor
• Community building and networking
• Graduate student mentor
• GRE prep course
• Regular feedback
• Seminars and progress evaluations
• Certificate of completion
Skill Sets necessary for success

• Problem solving and trouble shooting
• Critical thinking
• Critical evaluation of primary literature
• Technical skills
• Resilience
• Presentations skills
• Time management
• Networking
Important things to consider

• Need excellent communication between the academic and biotech partners
• Mechanism to select research mentors
• Need a dedicated faculty advisor at MIT
• Need a dedicated research advisor at Novartis
• Need a program coordinator at MIT and one at Novartis
• Need regular contacts between academic and research advisors
• Must provide regular feedback and evaluation
• Must take good care of the students at both end
• Provide holistic approach to the students development
• Make students feel welcome, included and supported in both locations
• Mechanism for Community building
• Facilitate networking
• Institutional support
Program structure

• First year
  – Summer:
  – Fall:
  – Spring:

• Second year summer:
  – Summer
  – Fall
  – Spring
Faculty Participation

• Weekly meetings with academic advisor
• Monthly meetings with program director
• One-on-one meeting with course faculty
• Weekly meetings with research PI
• Quarterly research presentations
• One-on-one meetings with biology faculty to discuss their research
Messages to students

- Program is not a back-door admission to MIT
- $B^3$ students will not be hired by Novartis at the end of the program
Challenges for students

• Course are really hard, fast paced, very different from courses at their UG institutions
• Very small community- Not many of them
• Come from very different backgrounds
• No longer UG, but not Grad students either. Where do they fit? “special graduate students.”
• Must juggle courses and full-time job
• Must learn to be professionals, proactive and independent
Challenges for MIT/Novartis

- COST
- Finding more partner with the same interest in diversity and inclusion
- No defined category for the B3 students: special student category at MIT, contractors at Novartis, not employees
- How to integrate students in the MIT community
- How is success measured or defined
Outcome

- 5 year program
- 10 participants
  - 3 in PhD programs (MIT, UCSD, NYU)
  - 1 in MD/PhD program (Minnesota)
  - 1 planning to go to medical school/1 need more time
  - Two second years: both applying to grad school this fall
  - Two first years: started last week
What have we learned

• Invaluable experience
• Two years is necessary
• Cannot predict outcome
• Need to cut cost per student
• Dedicated faculty essential for the success of the program
Students’ feedback

• Having to juggle MIT coursework and Novartis research was extremely beneficial. While going through the program, I didn't appreciate this as much as I should have. However, after having to teach, do research, and take a full coursework load in my first year in grad school, I have a new appreciation for the rigor of the B-cubed program.
Students’ feedback

• I learned the importance of networking with faculty and cultivating relationships. It built my confidence in communicating with scientists
• My mentor is always available
• My academic advisor is one of the best parts of the program: She is always ready to help assist me both for class and outside of class
• I learned to read varied scientific literature well and efficiently
• I got to see what industry was like. It’s a very unique experience. We are not employees. We are trained and mentored.
• I was impressed by how much biological research there is in a drug company
Students’ feedback

• My B-cubed experience taught me the importance of networking with faculty and cultivating relationships. It built my confidence in communicating with scientists from various backgrounds regardless of their accomplishments, which is key to a successful graduate experience.
Students feedback

• The seminar course has developed my ability to read varied scientific literature well and efficiently. My instructor has *stimulated* my interests in specific fields that I did not initially have too much affinity for. She has also greatly enhanced my scientific writing