Yale Combined Program in the Biological and Biomedical Sciences (BBS)

Ph.D. Training in Biological & Biomedical Sciences

November 7th, 2018

Anton Bennett, Professor of Pharmacology and of Comparative Medicine
Goal of biomedical research: Uncover the fundamental principals that control biological systems. One can apply this knowledge towards understanding human disease with the goal of developing therapies to combat human suffering.

Scientific avenues to accomplish this:

Population geneticist/epidemiologist
Translational research involving non-human and human subjects
Basic research involving animal models (e.g. mice, zebrafish, flies)
Molecular analysis of genes and proteins
Chemical biology
Computational analyses and bioinformatics
How to get there successfully…

• Discover what excites you!

• Know what you are getting into, educate yourself and prepare practically and mentally for a future career in science.

• Do RESEARCH and then do more RESEARCH!!
The process...

Select a graduate program that fits your needs and interests.

Choose a laboratory in which to do your Ph.D.

Select mentors to guide and assist you.

Strive to do high quality research.

Refine your skills in experimental techniques, writing and public speaking.

Graduate with a Ph.D. or M.D., Ph.D. – now what?
What does it take to succeed in graduate school?

- Enjoy working in a lab, “good hands”.
- Ability to work hard and persist even when things don’t immediately work out.
- Curiosity about biology and biological mechanisms.
- Willingness to ask questions, challenge accepted wisdom.
- Great communication skills, both in person and in writing.
- Ability to take charge of your research – design and interpret experiments, plan new ones.
- Comfort at the interface of the unknown.

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Should you go to graduate school?

• Is doing experiments something you really enjoy?

• Do you like the lab “lifestyle”?
  – Working hard (...exciting work, great collegiality, flexible lifestyle)
  – Generating new knowledge
  – Chance to positively impact human health and well-being

• Are you excited about the many career paths possible?
  – Academic research
  – Pharma/Biotech research
  – Teaching
  – Publishing
  – Policy and Government
  – Consulting

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### Yale Combined Program in Biological & Biomedical Sciences

The Yale BBS is comprised of 8 complementary admissions tracks:

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<td>Plant Molecular Biology</td>
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Research Facilities & Centers @ Yale

Center for Cellular & Molecular Imaging
  Confocal & electron microscopes
  Cell sorter facility
HHMI/Keck Biotechnology lab
  DNA sequencing, microarrays, peptide synthesis, etc.
Richards Center for Structural Biology
  Stem Cell Center
  Vascular Biology
Center for Human Genetics
Human Translational Immunology
  Yale Cancer Center
BBS Application Process

• Online application, due in early December
• Students apply to a Track
• Each Track has an Admissions Committee
• Interviews in February/early March
Yale Combined Program in the Biological and Biomedical Sciences (BBS)

The Yale Combined Program in the Biological and Biomedical Sciences (BBS) is a doctoral program that enables you to take advantage of all of the resources found at a modern research university. Everything Yale has to offer – faculty, facilities, and campuses – is here in one comprehensive, interdisciplinary graduate program. Explore the 8 Tracks below and the rest of our site to learn more about Yale's research and training opportunities.
Application Process

Apply Online

The application for Fall 2018 matriculation has passed, and we do not offer spring term admissions. The next opportunity to apply will be for entry into the fall semester of 2019, and a link to the application will be available on this page in August. Our application deadline will be December 1, 2018.

Application Questions

Please visit http://bbs.yale.edu/apply/faq.aspx and http://gsas.yale.edu/admissions/admissions-faqs for answers to commonly asked questions. For unanswered questions, please email:

1. bbs@yale.edu for general questions about applying to BBS.
2. http://gsas.yale.edu/admissions/contact for specific questions about the online application itself. Please make sure to place an "#" at the beginning of the subject field of your message to signal that you have a question related to the online application.
What we look for in BBS applicants

We take a holistic view of applicants:

• Strong academic record: GPA, GRE, TOEFL
• Research experience
• Strong letters of recommendation.
• Personal Statement should highlight research accomplishments, outline future goals, and how these interface with PhD program at Yale.
BBS Student Costs
2017 - 2018

BBS students are guaranteed funding:

- **Stipend:** $35,850
- **Tuition:** $42,100
- **Health insurance:** $2,402
Yale BBS Ph.D. Training

**Year 1:** Lab rotations, coursework

*Students can do research in any BBS lab*

**Year 2:** Coursework, qualifying exam, thesis research, teaching

**Years 3+:** Thesis research, teaching, travel to conferences

**Time to Degree:** 5.5 - 6.5 years

Deborah Ayenni (MMPP)

Ryann Guayasamin (MMPP)

Rebecca Brown (MB&B)

Jieming Chen (CBB)
A note on diversity

“The Yale Combined Program in the Biological and Biomedical Sciences (BBS) is committed to maintaining a diverse student environment, and we encourage students from all backgrounds to apply to our program. Students who join the BBS Program will receive the necessary support and mentorship both to thrive at Yale and to succeed in their future scientific careers.”
A diverse student body results in greater innovation, creativity, and discovery.

Diversity can result in higher-quality scientific research
Mission Statement

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Yale and BBS offer numerous resources for students from underrepresented populations, as exemplified by the links on the left hand side of this page. In particular, we strive to provide...
Diversity Initiatives

Yale Graduate School/Diversity Recruiting Days – Dean Michelle Nearon and Prof. Anton Bennett


Post-baccalaureate research program (NIH-PREP) – Dean Michelle Nearon and Prof. Anton Bennett

Biomedical SURF Summer Program – Barbara Kazmierczak and Tony Koleske
The students in the Biological and Biomedical Sciences who represent those from underrepresented backgrounds participate in a monthly forum called the “Yale Minority Scientist Research Network (YMSRN).”

The goals for these meetings are to foster community among, share academic interests, and provide resources for students from diverse backgrounds who are pursuing careers in the biological and biomedical sciences.

http://bbs.yale.edu/diversity/events.aspx
BBS Student guidance

• Each Track has a **faculty director** and **student advisory committe**.
  • Transition to graduate school
  • Courses to take
  • Lab rotations, choosing a thesis advisor
  • Living in New Haven

• Once students join a Ph.D. program in the second year, the department has a faculty Director of Graduate Studies.

• Thesis advisory committee - regular meetings to make sure projects are progressing.

• Thesis advisor - provides project ideas, resources, guidance and career advice.

• **Our goal is to train colleagues.**

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Many additional opportunities

• Internships and Job Shadowing
  ** Alexion (New Haven)
• Yale Biotechnology & Pharmaceutical Society
• Yale Biomedical Careers Council
• Office of Career Services
• Yale Teaching and Learning Center
• Women in Science at Yale
• Funded by NIH Molecular Medicine Training Grant
• Medical training for Ph.D. students.
• Lower barriers between basic scientists and medicine.
• Promote translational research.
• Courses in human physiology and pathophysiology.
• Mentored clinical experience, led by physician-scientists.

bbs.yale.edu/mrsp
• Integrated graduate program at the interface of biology, engineering and physics.
  • BBS Program
  • Department of Physics
  • School of Engineering and Applied Science

• Reciprocal peer tutoring in "boot camp"-style courses.
• Emphasis on the importance of computational approaches.
• Joint mentoring by faculty from physics, engineering, and biology backgrounds.

peb.yale.edu
Yale Cancer Biology Training Program

Training in cancer biology and practical issues in clinical oncology
two year program beginning year 2 for graduate students

- format: BBS training plus additional activities
- clinical co-mentor for exposure to clinical concepts and decision-making
- Certification as CBTP trainee upon successful completion of program

1. Path 650b “Cellular and Molecular Biology of Cancer”
   *general survey class covering basic principles of cancer biology and genetics*
2. Path 681a “Advanced Topics in Cancer Biology”
   *seminar workshop course with in-depth discussion of topics introduced 650b*
3. Path 682b “Cancer Clinical Translation”
   *practical issues in moving research ideas into the clinic
   clinician perspectives on outstanding biological questions for cancer investigators.*

Clinical exposure:
1. co-mentoring by clinical adviser, including shadowing and attendance at tumor boards
2. Yale Cancer Center Grand Rounds and Program Meetings
3. Precision Medicine Tumor Board

questions: contact David F. Stern, PhD, program director df.stern@yale.edu
Questions?

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