Dartmouth | QBS

Training highly qualified students in bioinformatics, biostatistics, epidemiology and health data science, for careers in academia and industry.
What We Will Cover Today

- Dartmouth College & QBS Program Overview
- Application & Admissions
- Degree Requirements & Timeline
- Current Student & Alumni Profiles
- COVID Related Changes
- Q & A
Dartmouth is located on border of NH and VT
Dartmouth

• Founded in 1769, Dartmouth is a member of the Ivy League and
• Liberal arts college and 4 professional schools:
  • Geisel School of Medicine,
  • Thayer School of Engineering,
  • Tuck School of Business
  • Guarini School of Advanced and Graduate studies
Quantitative Biomedical Sciences Degrees

- Doctor of Philosophy (PhD)
  - Interdisciplinary training in Biostatistics, Bioinformatics, & Epidemiology
  - First QBS Ph.D. class in 2011

- Masters of Science (MS)
  - Health Data Science
  - Epidemiology
  - Medical Informatics
  - First QBS M.S. class in 2018
Six Reasons To Join QBS at Dartmouth

- QBS Community
- Interdisciplinary Program
- Career Opportunities
- The Ivy League Experience
- Dedicated Faculty
- Strong Alumni Network
QBS Leadership

• Diane Gilbert-Diamond, ScD
  • Director, Quantitative Biomedical Sciences (QBS)
  • Associate Professor of Epidemiology
  • Departments of Epidemiology, Medicine and Pediatrics
  • Norris Cotton Cancer Center

• Scott Gerber, PhD
  • Associate Director, Quantitative Biomedical Sciences (QBS)
  • Professor of Molecular & Systems Biology (MSB)
  • Kenneth E. and Carol L. Weg Distinguished Professor
  • Department of Molecular & Systems Biology (MSB)
  • Norris Cotton Cancer Center
QBS Program

- 45 Faculty Members
- ~39 Total MS Students
- 37 Total PhD Students
- Interdepartmental
- Multiple collaborations across Dartmouth programs, schools, and departments
Interdisciplinary Training in Bioinformatics, Biostatistics, Epidemiology
• **Mission.** To train highly qualified students for productive careers in biomedical research and teaching through the completion of an interdisciplinary PhD degree in bioinformatics, biostatistics and epidemiology.

• **Philosophy.** The modern biomedical researcher must be able to speak more than one language to successfully collaborate in a highly multidisciplinary environment. Students trained through QBS will be versed in bioinformatics, biostatistics and epidemiology.
Applications

Application Deadline
December 1, 2020

Additional application requirements

3 letters of recommendation
Personal statement
CV/Resume
Supplemental Statements
Transcripts (official if offer accepted)
Coursework Requirements
• 1 course in calculus
• 1 course in statistics or equivalent experience
• 1 course in programming or equivalent experience
Applications: Test Scores

**GRE**
*Optional 20-21 & otherwise waived for all 4+1 Dartmouth undergraduate applicants*
- Total 308
- 153 verbal
- 155 quantitative
- 4 analytical writing

**GPA**
- 3.0 or above
- International students should include class ranking instead of GPA

**TOEFL**
- 450 or above for paper-based exam
- 90 or above for internet-based exam scores

**IELTS**
- 7.0 or higher (international students)
Admissions

Holistic Application Review

- Grades & Test Scores
- Research & Work Experience
- Relevant Course Work
- Mentor, Supervisor, Manager References
- Personal Essay & Statements
  - Personal background
  - Specific faculty & research of interest
  - Genuine interest in program
  - Career & learning goals
  - Explanations – Poor grades, hardships, frequent school or job changes
Admissions

100-120 Applicants
• 58% International Applicants

35-40 Remote Interviews
• 3-4 Faculty
• 1 Student Panel

Information Session

Accepted Students Day – situation dependent

8 Students Accepted to PhD Program
Tuition & Stipend

• Full tuition scholarship
• Prepaid health insurance plan

• The student stipend 2020–21: $31,080
  • Health Access Fee 20-21: $98.00 per term (Full-Time Students Only)
  • International Student Fee 20-21: $102.00 per term
  • Student Activity Fee: $60.00 (charged once a year in Fall)
  • Student Record Fee: $50.00 (one time fee charged in 1st Fall)

• Adjusted for inflation
• Contingent upon satisfactory performance in studies
• We do not offer financial aid beyond the QBS Fellowship
Pre-Matriculation

- Techniques of calculus
  - Differentiation and integration of multivariable functions
- Procedural and Object Oriented Programming in
  - R or Python
  - Concepts of algorithms & data structures
- Basic Probability and Statistical Concepts
- Mandatory Programming Boot Camp with Math/Stats review
• 3 Research rotations
• Core Courses
  • QBS 110: Integrative Biomedical Sciences Seminar
  • QBS 102: Scientific Writing
  • Two Foundational Courses in each:
    • Bioinformatics
    • Biostatistics
    • Epidemiology
  • QBS 100: Molecular Basis for Human Health & Disease*May place out
• Journal Club (QBS 270 for first year) 8 total
• One quarter of supervised teaching (QBS 196)
• 3.5 units of approved elective courses
• Oral qualifying exam
• Annual research in progress presentations
• Satisfactory completion of a significant research project and preparation of a thesis describing this research
• Successful defense of the thesis in an oral examination and presentation of the work in a public lecture
<table>
<thead>
<tr>
<th>SUMMER</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
<th>Summer</th>
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<tbody>
<tr>
<td><strong>1st Year</strong></td>
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<tr>
<td>•QBS 110: Integrative Biomedical Sciences Seminar (0.5 units)</td>
<td>•QBS 120: Biostatistics I</td>
<td>•QBS 100: Molec Basis ofHuman Disease</td>
<td>•QBS 146: Bioinformatics I</td>
<td>•QBS 199: 4th Research Rotation if needed</td>
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<tr>
<td>•Programming Bootcamp</td>
<td>•QBS 130: Epidemiology I</td>
<td>•QBS 121: Biostatistics II: Regression</td>
<td>•QBS 197: Research Rotation</td>
<td>•Begin Organizing Qualifier Exam</td>
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<td>•QBS 270: Epidemiology Journal Club</td>
<td>•QBS 131: Epidemiology II</td>
<td>•QBS 270: Bioinformatics Journal Club</td>
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<td>•QBS 197: Research Rotation</td>
<td>•QBS 270: Biostatistics Journal Club</td>
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<td>•UNSG 700: Mandatory Ethics</td>
<td>•QBS 197: Research Rotation</td>
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<td>Preferred Electives</td>
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<tr>
<td>•<strong>QBS 110.5: Integrative Biomedical Sciences Seminar Projects(0.5 units</strong></td>
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<tr>
<td>•**QBS 136: Applied Epidemiology I</td>
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<td>2nd Year</td>
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<td></td>
<td>•QBS 102: Seminar in Scientific Writing</td>
<td>•QBS 197: Research</td>
<td>•QBS 197-198: Research</td>
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<td></td>
<td>•QBS 197-198: Research</td>
<td>•Journal Club of Choice</td>
<td>•Journal Club of Choice</td>
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<td>•QBS 196: Supervised Teaching</td>
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<td>•QBS 196: Supervised Teaching</td>
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<td></td>
<td>•Begin Work on Qualifier Exam</td>
<td>•Continue Work on Qualifier Exam</td>
<td>•Continue Work/defend Qualifier Exam</td>
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<td>•Elective Options</td>
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<td>3rd Year</td>
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<td>•QBS 297-299: Research</td>
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<td></td>
<td>•Journal Club of Choice</td>
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<td>•QBS 196: Supervised Teaching</td>
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**Informatics Core Options:**
- •QBS 175: Bioinformatics II (Sp-21)
- •QBS 139: Advanced Method in Health Services Research (Sp)
- •QBS108: Applied Machine Learning (Sp)
- •QBS 140: Decision & Cost Eff. Analysis (Sp)

**Elective Options:**
- •QBS 199 or 299: Research
- •Begin Organizing Qualifier Exam
- •Elective Options
# Current Students

<table>
<thead>
<tr>
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<th>(2020)</th>
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<tbody>
<tr>
<td><strong>GRE Average</strong></td>
<td>V-160, Q-162, T-322, A-4</td>
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<tr>
<td><strong>GPA Average</strong></td>
<td>3.55</td>
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<tr>
<td><strong>URM</strong></td>
<td>14%</td>
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<tr>
<td><strong>International</strong></td>
<td>59%</td>
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<tr>
<td><strong>Male</strong></td>
<td>43%</td>
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<tr>
<td><strong>Female</strong></td>
<td>57%</td>
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Current Students

Masters Degrees (~40%)

- Applied Statistics
- Biochemistry
- Bioengineering
- Biological Anthropology
- Bioinformatics
- Bioinformatics & Computational Biology
- Computer science
- Computational Biology
- Statistics
- Epidemiology
- Epidemiology & Biostatistics
- Master of Health Science in Mental Health
- Master of Health Science in Epidemiology
- Master of Science in Public Health
- Master of Public Heath: Global Health Epidemiology
- Master of Arts International Development & Global Health
- Master of Public Health: Epidemiology
## Current Students

### Undergraduate Degrees

<table>
<thead>
<tr>
<th>Biology</th>
<th>Biochemistry &amp; Neuroscience</th>
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<tr>
<td>Biology Sciences</td>
<td>Biological Chemistry &amp; Mathematics</td>
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<td>Biology &amp; German</td>
<td>Ecology &amp; Evolutionary Biology</td>
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<tr>
<td>Biology &amp; Political Economy</td>
<td>Computational Biology</td>
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<tr>
<td>Biology &amp; Psychology</td>
<td>Genetics</td>
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<tr>
<td>Biology &amp; Mathematics</td>
<td>Statistics</td>
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<tr>
<td>Quantitative Biology</td>
<td>Applied Statistics</td>
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<tr>
<td>Molecular and Cellular Biology</td>
<td>Mathematics</td>
</tr>
<tr>
<td>Microbiology and Immunology</td>
<td>Applied Mathematics &amp; Statistics</td>
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<tr>
<td>Human Biology &amp; Anthropology</td>
<td>Neuroscience &amp; Behavior</td>
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<tr>
<td>Biochemistry</td>
<td>Integrative Neuroscience</td>
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<tr>
<td></td>
<td>BM in Preventive Medicine</td>
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<td></td>
<td>BM in Medicine &amp; Surgery</td>
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<td>BM in Laboratory Medicine</td>
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<td>Engineering</td>
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<td>Biomedical Engineering</td>
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<td>Engineer in Automation</td>
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<td>Anthropology &amp; Economics</td>
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<td></td>
<td>Physics</td>
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<td>Music</td>
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Current Students

Institutions

• Amherst
• Brown University
• Boston College
• Dartmouth College
• Bates College
• University of New Hampshire, Durham
• Smith College
• Tufts University
• University of Rochester
• Columbia University
• Binghamton University
• Johns Hopkins University
• Johns Hopkins Bloomberg School of Public Health
• St. Mary’s College of Maryland
• University of Pennsylvania
• Carnegie Mellon University
• University of Pittsburgh
• Lafayette College
• North Carolina University at Chapel Hill
• North Carolina Central University
• University of Virginia
• Tulane University
• Emory University
• University of Missouri – Columbia
• Saint Louis University
• Rice University
• Texas State
• Creighton University
• University of Wisconsin-Madison
• University of Utah
• University of Denver
• University of Oregon
• Pacific Lutheran University
• University of Michigan-Ann Arbor
• University of California Davis
• University of California Berkley
• University of California Irvine
• University of Guelph, Canada
• University of Manchester, UK
• University of Science & Technology, Ghana
• New York University Abu Dhabi
• Fudan University, China
• Nanyang Technological University, China
• Beijing Jiaotong University, China
• Nanjing Medical University, China
• Jilin University, China
• Tsinghua University, China
• Central South University, China
Alumni

19 Total Alums

Current Positions

- Academia: 16%
- Industry: 42%
- Post-Doc: 26%
- Medical Training: 16%
## Positions Held Current and Previous

<table>
<thead>
<tr>
<th>Positions</th>
<th>Held Current and Previous</th>
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<tbody>
<tr>
<td><strong>Post Doctoral</strong></td>
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<tr>
<td>Harvard Medical School</td>
<td>Dept Biomedical Data Science, Geisel School of Medicine at Dartmouth College</td>
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<tr>
<td><strong>Academic</strong></td>
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<tr>
<td>Instructor in Biomedical Data Science, Geisel School of Medicine at Dartmouth, Hanover, NH</td>
<td>Assistant Professor of Biomedical Data Science, Geisel School of Medicine at Dartmouth, Hanover, NH</td>
</tr>
<tr>
<td><strong>Industry</strong></td>
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<tr>
<td>Computational Biologist at VL56</td>
<td>Quantitative Data Analyst at Flatiron Health, NY</td>
</tr>
<tr>
<td><strong>Medical</strong></td>
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<tr>
<td>MD Completion, Geisel School of Medicine at Dartmouth College</td>
<td>Radiation Oncology, Emory</td>
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<tr>
<td><strong>Government</strong></td>
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<tr>
<td>Assistant Director of Defense Research &amp; Engineering for Biotechnology, US Department of Defense</td>
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COVID Related Changes

• QBS
  • All QBS have a remote option
  • Select classes can be attended in-person
  • Most research & rotations can be conducted remotely (discretion of advisor)
  • PhD students are expected to be local unless otherwise approved
  • Remote & in-person TA’s

• Dartmouth
  • Weekly testing
  • Online assessment check in prior to entering campus facilities
  • Socially distanced classroom space
Thank you for attending: Questions?

Email

quant.biomed.sci@dartmouth.edu

(For questions about the program and application process)

Kristine Giffin, PhD

Curriculum Director

Email: kristine.a.giffin@dartmouth.edu | Phone: 603-653-9197