Dartmouth QBS
Master of Science Degree
The Dartmouth QBS program trains highly qualified students in Bioinformatics, Biostatistics, Epidemiology, and Health Data Science for careers in academia and industry.
What we will cover today

• Dartmouth College and QBS program overview
• Degree requirements and timeline
• Application and admissions
• Program training and academics, degree specific components
• Q & A

• Please sign in so we know who you are!
  https://apply.gs.dartmouth.edu/register/qbs-events
Dartmouth is located on the border of New Hampshire and Vermont
Dartmouth College

Founded in 1769, Dartmouth is a member of the Ivy League and is a liberal arts college with 4 professional schools:

- Geisel School of Medicine
- Thayer School of Engineering
- Tuck School of Business
- Guarini School of Advanced and Graduate Studies
Six reasons to join QBS at Dartmouth

- QBS community
- Interdisciplinary program
- The Ivy League experience
- Dedicated faculty
- Career opportunities
- Strong alumni network
Quantitative Biomedical Sciences degrees

- **Doctor of Philosophy (PhD)**
  - Interdisciplinary training in Biostatistics, Bioinformatics, & Epidemiology
  - First PhD class in 2011

- **Masters of Science (MS)**
  - Health Data Science
  - Epidemiology
  - Medical Informatics
  - First MS class in 2018
QBS Leadership

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

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

Susan Diesel, PhD
Program and Operations Director

Rosemary White
Program Coordinator

Kristine Giffin, PhD
Director of Academic and Student Affairs
QBS Program

47 Faculty Members

44 MS Students

39 PhD Students

Interdepartmental

Multiple collaborations across Dartmouth programs, schools, and departments
• **Mission.** The QBS MS programs seek to provide rigorous quantitative training to develop analytical and prudent professionals for productive careers in healthcare or biomedicine.

• **Philosophy.** The modern quantitative career in industry or academia relies upon speaking more than one language to successfully collaborate in a highly multidisciplinary environment.
Concentration Options

QBS MS

Concentration In Health Data Science
  Emphasis on Statistical Data Science Training

Concentration In Epidemiology
  Emphasis on Epidemiological training

Concentration in Medical Informatics
  Emphasis on Medical Informatics training
Duration  Degree Requirements

**Duration**

- 15 Months = 5 terms/quarters
- 4+1 MS program for Dartmouth undergrads = 4 quarters
- Applied capstone experience during Summer term

**Degree Requirements: 18 Units**

- QBS Programming bootcamp and career/professional development pre-matriculation
- **14 Core units + 4 elective units**
  - Independent study course for students interested in research
  - Journal club courses may count toward elective credit
  - Students may petition director and administration for electives not listed
- 4 units per quarter
- 4+1 Dartmouth students complete 3 units during undergrad
First Application Deadline: December 1, 2021

<table>
<thead>
<tr>
<th>Coursework Requirement</th>
<th>Additional application requirements</th>
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<tbody>
<tr>
<td><strong>Health Data Science</strong></td>
<td>3 of the following:</td>
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<tr>
<td></td>
<td>• 1 course in calculus</td>
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<tr>
<td></td>
<td>• 1 course in statistics or</td>
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<td></td>
<td>equivalent experience</td>
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<td>• 1 course in programming or</td>
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<td></td>
<td>equivalent experience</td>
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<tr>
<td></td>
<td>• 1 course in multivariable</td>
</tr>
<tr>
<td></td>
<td>calculus</td>
</tr>
<tr>
<td></td>
<td>• 1 course in linear algebra</td>
</tr>
<tr>
<td><strong>Epidemiology</strong></td>
<td>1 course in calculus</td>
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<td></td>
<td>1 course in statistics or</td>
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<tr>
<td></td>
<td>equivalent experience</td>
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<td>equivalent experience</td>
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<tr>
<td><strong>Medical Informatics</strong></td>
<td>1 course in calculus</td>
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<td></td>
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<tr>
<td></td>
<td>equivalent experience</td>
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</table>

- 3 letters of recommendation
- Personal statement
- CV/resume
- Transcripts (official if offer accepted)
Applications: Test Scores

**GRE**
Optional 20-21, otherwise waived for 4+1 applicants

**GPA**

**TOEFL**

**IELTS**
Admissions

- 250 applicants
- Information session
- Accepted students day (situation dependent)
- 40 students accepted to MS program
Admissions

Holistic Application Review

- Grades & Test Scores
- Research & Work Experience
- Relevant Course Work
- Mentor, Supervisor, Manager References
- Personal Essay & Statements

- Personal background
- Genuine interest in program
- Career & learning goals
- Explanations – Poor grades, hardships, frequent school or job changes
## Current Students

<table>
<thead>
<tr>
<th>Category</th>
<th>Average</th>
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<tbody>
<tr>
<td>GRE Average</td>
<td>V-160, Q-162, T-322, A-4</td>
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<tr>
<td>GPA Average</td>
<td>3.45</td>
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<tr>
<td>URM</td>
<td>17%</td>
</tr>
<tr>
<td>International</td>
<td>33%</td>
</tr>
<tr>
<td>Male</td>
<td>60%</td>
</tr>
<tr>
<td>Female</td>
<td>40%</td>
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</table>
Tuition and financial aid

<table>
<thead>
<tr>
<th>Academic year 2021-2022</th>
<th>Tuition per term</th>
<th>QBS MS program cost to students per term</th>
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</thead>
<tbody>
<tr>
<td><strong>Standard program = 5 terms</strong></td>
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<tr>
<td>Fall 2021</td>
<td>$19,651</td>
<td>$15,624</td>
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<tr>
<td>Winter 2022</td>
<td>$19,651</td>
<td>$15,624</td>
</tr>
<tr>
<td>Spring 2022</td>
<td>$19,651</td>
<td>$15,624</td>
</tr>
<tr>
<td>Summer 2022</td>
<td>$20,142</td>
<td>$16,115</td>
</tr>
<tr>
<td>Fall 2022</td>
<td>$20,142</td>
<td>$16,115</td>
</tr>
<tr>
<td><strong>Total tuition</strong></td>
<td><strong>$99,237</strong></td>
<td><strong>$79,102</strong></td>
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<tr>
<td><strong>4+1 program = 4 terms</strong></td>
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<tr>
<td><strong>Total tuition</strong></td>
<td><strong>$79,095</strong></td>
<td><strong>$63,285</strong></td>
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Dartmouth employment opportunities

• Self identify
  • Research opportunities
  • General employment via student employment office

• Visa holders
  • 20 hours per week when classes in session
  • 40 hours per week when classes not in session
  • Only work for Dartmouth College, no other employer
Program training and academics
Examples of data sets you will encounter

- Electronic Medical Record
- Administrative Data (Claims)
- Randomized Trials
- Genetic and Genomic Data
- Other “Omics” (E.g. Microbiome)
- Imaging Data
- Mobile Device Data
- Social and Other Network Data
Industry seminars and professional development
Capstone

• Culminating experience incorporating core courses
  • Local placement with PI
  • Internship placement
  • Self-led project

• Paid or unpaid

• Visa-holders enroll in CPT for summer term

• Capstone only offered during summer term

• Competitive mid-year scholarship opportunity based on capstone proposal (single award valued at one term’s tuition)
Capstone and fulltime placement

Young program: 4th year
Diverse interests

Placement resources
- Center for Professional Development
- Guarini Career Services
- Dartmouth career fairs
- Thayer career fairs
- QBS information sessions
- Handshake, LinkedIn, others

<table>
<thead>
<tr>
<th>Fulltime</th>
<th>Internship</th>
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<tbody>
<tr>
<td>IBM</td>
<td>Research work with various faculty at Dartmouth</td>
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<tr>
<td>Eli Lily</td>
<td>Oracle</td>
</tr>
<tr>
<td>Insight Placement: NYC Tech &amp; Health companies</td>
<td>OmicX</td>
</tr>
<tr>
<td>Institute for Systems Biology</td>
<td>Takeda</td>
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<tr>
<td>Kia</td>
<td>TriNetX</td>
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<tr>
<td>University Health Network</td>
<td>Merck COOP</td>
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<tr>
<td>Better You</td>
<td>WRJ VA Hospital</td>
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<td>WRJ VA Hospital</td>
<td>BlueCross BlueShield</td>
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<tr>
<td>GNS Healthcare</td>
<td>Tista Science &amp; Technology Corporation</td>
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<tr>
<td>Emergent Dynamics</td>
<td>Mininglamp Technology Group</td>
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<tr>
<td>PhD Programs (including QBS)</td>
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<tr>
<td>MD Degree Programs</td>
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<tr>
<td>Radiology Residency</td>
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<tr>
<td>Research at Dartmouth</td>
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Concentrations

Health Data Science
Emphasizes critical thinking about data, quantitative approach and problem solving

Epidemiology
Emphasis on interdisciplinary quantitative epidemiological training & epidemiologically focused capstone

Medical Informatics
Training applied to medical and health services data: medical and surgical registries, medical records, medical claims, surveys
Career Opportunities

Health Data Science
• Big data in industry or academia
• Health care
• Biomedical research in industry or academia

Epidemiology
• Biomedical Research in industry or academia
• Government Agencies
• Private Industries
• Nonprofit Health Organizations

Medical Informatics
• Health care
• Biomedical research in industry or academia
• Government Agencies
• Private Industries
• Nonprofit Health Organizations
### Core Training

<table>
<thead>
<tr>
<th></th>
<th>Health Data Science</th>
<th>Epidemiology</th>
<th>Medical Informatics</th>
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<tbody>
<tr>
<td>Data Wrangling</td>
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<td>Data Visualization</td>
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<td>Statistical Methodology</td>
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<tr>
<td>Machine Learning</td>
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<tr>
<td>Epidemiological Methodology</td>
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<tr>
<td>Bioinformatics Methodology</td>
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<td>Medical Informatics</td>
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<tr>
<td>Capstone</td>
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<tr>
<td>Prepare</td>
<td>Prepare for bootcamp and fall coursework</td>
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<tr>
<td>Think</td>
<td>Think critically about personal goals, academic, &amp; career goals</td>
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<tr>
<td>Review</td>
<td>Review QBS website and identify course offerings that may support those goals</td>
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Important Factors

- Class-size: ~30 students
- PhD & MS cohort effect
- Faculty teach every course
- Strongly encourage & welcome interaction with faculty
- Diverse applied opportunities: breadth & depth
- QBS Career and Conference Travel Fellowships
- Dartmouth: Abundance of resources
- Access to most undergrad and graduate level course
- PhD Option: Must apply separately to the PhD Program
COVID-19 and Dartmouth

See Dartmouth’s Health and Prevention page for up-to-date information about

• Arriving on campus
• Ongoing prevention
• Campus resources

https://covid.dartmouth.edu/
Questions?
quant.biomed.sci@Dartmouth.edu