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
- Degree Requirements & Timeline
- Application & Admissions
- Program Training & Academics
  - Degree specific components
- 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
Six Reasons To Join QBS at Dartmouth

- QBS Community
- Interdisciplinary Program
- Career Opportunities
- The Ivy League Experience
- Dedicated Faculty
- Strong Alumni Network
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
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
Shaniqua Jones, MBA
Program Director: Operations/Marketing

Rosemary White
Program Coordinator

Kristine Giffin, PhD
Curriculum Director

QBS Administration
QBS Program

45 Faculty Members

~39 Total MS Students

37 Total PhD Students

Interdepartmental

Multiple collaborations across Dartmouth programs, schools, and departments
Training highly qualified students in bioinformatics, biostatistics, epidemiology and health data science, for careers in academia and industry.
• **Mission.** The QBS M.S. 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

- Term/Quarter System
- 15 Months: 5 terms
- 4+1 MS Program: 4 Quarters (Dartmouth undergrads only)
- Applied Capstone Experience

Degree Requirements: 18 Units

- QBS Programming Bootcamp & Career/Professional Development Pre-Matriculation
- **12.5 Core units**
- **5.5 Elective Units**
  - QBS 195: Independent Study for students interested in research
  - 2 Journal Club courses may count toward elective credit
  - Students may petition director and administration for electives not listed
- 4 units per quarter (Suggested Timeline)
- 4+1 Dartmouth Students Complete 3 units during undergrad
Applications

First Application Deadline: December 1, 2020

Coursework Requirement

<table>
<thead>
<tr>
<th>Health Data Science</th>
<th>Epidemiology</th>
<th>Medical Informatics</th>
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<tbody>
<tr>
<td>• 3 out of 5:</td>
<td>• 1 course in calculus</td>
<td>• 1 course in calculus</td>
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<tr>
<td>• 1 course in calculus</td>
<td>• 1 course in statistics or equivalent experience</td>
<td>• 1 course in statistics or equivalent experience</td>
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<td>• 1 course in statistics or equivalent experience</td>
<td>• 1 course in programming or equivalent experience</td>
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<td>• 1 course in programming or equivalent experience</td>
<td>• 1 course in multivariable calculus</td>
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<td>• 1 course in linear algebra</td>
<td>• 1 course in linear algebra</td>
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Additional application requirements

• 3 letters of recommendation
• Personal statement
• CV/Resume
• Transcripts (official if offer accepted)
## Applications: Test Scores

<table>
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<tr>
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<th>GRE</th>
<th>GPA</th>
<th>TOEFL</th>
<th>IELTS</th>
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<tr>
<td>Optional</td>
<td>Optional 20-21 &amp; otherwise</td>
<td>3.0 or above</td>
<td>450 or above for paper-based</td>
<td>7.0 or higher (international</td>
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<tr>
<td>waived for all 4+1</td>
<td>waived for all 4+1 Dartmouth</td>
<td>International students should include class</td>
<td>exam</td>
<td>students)</td>
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<tr>
<td>Dartmouth</td>
<td>undergraduate applicants</td>
<td>ranking instead of GPA</td>
<td>ranking instead of GPA</td>
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<td></td>
<td>• Total 308</td>
<td>• 3.0 or above</td>
<td>• 450 or above for paper-based</td>
<td>• 7.0 or higher (international</td>
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<tr>
<td></td>
<td>• 153 verbal</td>
<td>• International</td>
<td>exam</td>
<td>students)</td>
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<td></td>
<td>• 155 quantitative</td>
<td>students should</td>
<td>90 or above for internet-based</td>
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<td>• 4 analytical writing</td>
<td>include class</td>
<td>exam scores</td>
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<td>ranking instead of</td>
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<td>GPA</td>
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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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</thead>
<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>• 3.45</td>
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<tr>
<td><strong>URM</strong></td>
<td>• 17%</td>
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<tr>
<td><strong>International</strong></td>
<td>• 33%</td>
</tr>
<tr>
<td><strong>Male</strong></td>
<td>• 60%</td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td>• 40%</td>
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</tbody>
</table>
Tuition & Financial Aid

• All students receive $4400 per term towards tuition
• Merit scholarships available
  • 40% of offers
• Cost of Living
  • Variable
  • PhD Students are a great resource
Dartmouth Employment Opportunities

• Self identify
  • Research Opportunities
  • General Employment via Student Employment Office

• Visa Holders
  • 20hrs per week: Classes in session
  • 40hrs per week: Classes NOT in session
  • Only work for Dartmouth College, no other employer
Program Training & 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 & Professional Development

- Optum Health
- OmicX
- Google
- Agilent
- Oracle
- Back Bay
- Pfizer
- Merck
- TriNetX
- Amazon
- FlatIron Health
- Blue Cross Blue Shield
- Berg Analytics
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 & Fulltime Placement

- Young Program: 3rd Year
- Diverse Interests
- Placement Resources:
  - Center for Professional Dev.
  - Guarini Career Services
  - Dartmouth Career Fairs
  - Thayer Career Fairs
  - QBS Information Sessions
  - Handshake, Linked In, etc

<table>
<thead>
<tr>
<th>Full-time</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>
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<tr>
<td>Insight Placement: NYC Tech &amp; Health companies</td>
<td>OmicX</td>
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<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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<tr>
<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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<tr>
<td>Data Visualization</td>
<td>X</td>
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<td>Statistical Methodology</td>
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<td>X</td>
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<tr>
<td>Machine Learning</td>
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<td>X</td>
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<tr>
<td>Epidemiological Methodology</td>
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<td>X</td>
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<td>Bioinformatics Methodology</td>
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<td>Medical Informatics</td>
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<td>Capstone</td>
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<td>Summer Checklist</td>
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<td>Prepare</td>
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<td>Prepare for bootcamp and fall coursework</td>
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<td>Think</td>
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<td>Think critically about personal goals, academic, &amp; career goals</td>
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<td>Review</td>
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<tr>
<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 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
  - Local Capstone Projects Encouraged
  - 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: 803-653-9197