



Graduate School Applications: Information session 2023

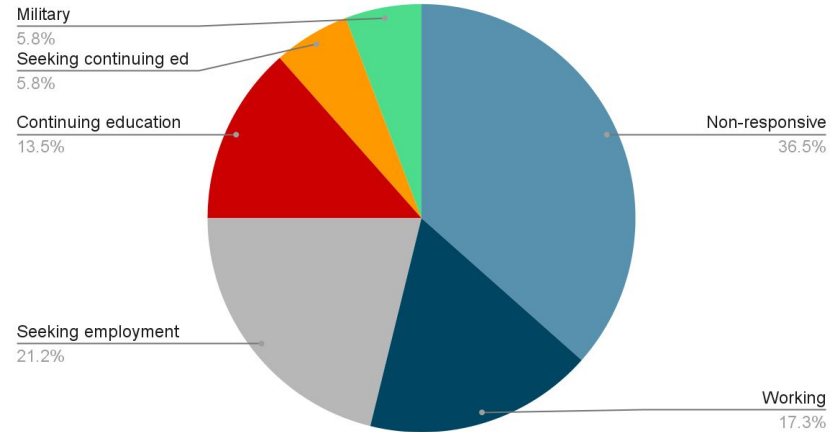


COLLEGE OF SCIENCE
MATHEMATICS
VIRGINIA TECH.

Who goes to graduate school ?

- Some MATH majors go directly into graduate school, others do so after a few years of work.
- 2021-22 MATH graduates
 - ~47% continued their education
 - ~24% participated in undergraduate research
 - ~39% wish they had “learned more, or earlier, about graduate or professional school”
- 2020-21 MATH graduates enrolled in
 - Biomedical Eng. PhD @ Georgia Tech
 - Mathematics PhD @ University of Southern California
 - Applied Math MA @ University of Tennessee
 - 3x Math. Ed MA @ Virginia Tech
 - Mathematics MA @ Virginia Tech

Survey of 2020-21 MATH Graduates



<https://fds.career.vt.edu/Results/Details?id=1621>

What does graduate school entail ?

Masters programs (1-2 years)

- Core courses in your topic
- Deeper understanding of your topic
 - Surveying existing research
 - Synthesizing existing methods & ideas
 - Applying known methods to new problems
- Writing a thesis (technical report)
- Public presentation of your thesis project

- Building a professional network

Ph.D. programs (Masters + 3-4 years)

- Advanced courses in your research area
- Conduct original research & develop new
 - Ideas, methods, analysis
 - Tools, software, algorithms
 - Understanding
- Writing a dissertation (lengthy tech report)
- Public defense of your dissertation

- Expanding your professional network
- Presenting at conferences & workshops
- Becoming a leading expert in your field !!!

What is different about a professional master's degree ?

- Good advice from one of your peers:
 - If you think you might want to pursue a graduate degree some day, take the GRE now, while your standardized test-taking skills are still sharp.
- Many universities offer professional master's degrees in some flavor of “Data Science”.
- Some questions to ask to understand whether a professional master's degree is right for you:
 - What are the prerequisites for this program?
 - If the program does not require much math or coding, then it probably can't go to the depth of some of your MATH classes.
 - What is the focus of the program?
 - Some programs focus more on CS, Stats, or Business Analytics.
 - Make sure the program aligns with your interests.
 - What new skills will you acquire?

Which graduate degree path should you take ?

- PhD degrees are research oriented and involve writing a dissertation
 - If you know you want to pursue a PhD, apply to PhD programs
 - *These positions are almost always funded by the university, through research grants or teaching students*
 - *The selection process is usually distinct from master's programs*
- Unsure you want to pursue a PhD? Apply for a master's degree
 - Research-oriented master's degrees can involve writing a thesis and can convert to PhD programs
 - *These positions are often funded by the university*
 - *Keep in mind that some graduate programs prioritize PhD applicants*
- Professional master's degrees do not usually involve a thesis, and can often be completed part-time and/or online. They do not usually lead to a PhD program.
 - *These positions are not typically funded by the university*
 - *However, some employers will pay for you to attend, as a benefit*
 - *You might need to agree to stay at the company for several years*

What additional scholarships are available* ?

US federal government fellowships:

- US National Science Foundation (GRFP)
 - Graduate Research Fellowship ([link](#))
 - Stipend: \$37,000/yr
 - Deadline: mid October 2022
- US Department of Energy (Krell Institute)
 - Computational Science Grad. Fellowship ([link](#))
 - Stipend: \$45,000/yr ([link](#))
 - Deadline: early January 2023
- US Department of Defense (NDSEG)
 - National Defense Science & Engineering Grad. Fellowship ([link](#))
 - Stipend: \$38,4000/yr
 - Deadline: October 2022 ([link](#))

Other fellowships:

- The Hertz Foundation
 - The Hertz Fellowship ([link](#))
 - Stipend: up to \$250,000
 - Deadline: late October 2022
- Marshall Aid Commemoration Commission
 - US/UK Marshall Scholarship ([link](#))
 - Stipend: cost of living, fees, books...
 - Deadline: late September ([link](#))
- Fulbright US Student Program
 - Fulbright foreign study fellowship
 - Stipend: depends on country ([link](#))
 - Deadline: variable ([link](#))

* Many scholarships have eligibility restrictions

What are some pros and cons of graduate school ?

Pros

- Intellectually demanding
- Delayed entry into workforce

- Freedom to innovate*
- Exciting discovery of **new** ideas
- Get to focus on your area of interest
- Working with motivated & smart people

- A graduate degree has the potential to
 - Increase starting salary
 - Improve long term job satisfaction
 - Give access to positions with more intellectually challenging work

Cons

- Intellectually demanding
- Delayed entry into workforce

- Relatively modest stipend
- Possibility of accumulating debt
- Thesis/dissertation requirements

- Working directly after graduation:
 - Quickly gain real life work experience
 - May reveal new areas of interest
 - Starts your career track early
 - Makes it easier to hop jobs early on

How do you judge quality of graduate school programs ?

- Programs vary in admissions standards, quality, & status
 - A prestigious university may have low ranked graduate programs
 - A less prestigious university may have stellar graduate programs
 - Two programs at a university can be of very different quality
- The US News grad school rankings are not unreasonable
 - Universities and their graduate programs are ranked separately
- VT faculty may be able to give insight into:
 - The faculty at a program
 - The reputation of a program
 - Experiences of former students who have gone through a program
- **Advice:** apply to several programs with a range of rankings

The screenshot shows the US News Best Graduate Schools website. At the top, there's a search bar with a dropdown menu for 'Programs (Required)' and a 'Search' button. Below the search bar is a banner for 'PART THE CLOUD' research program, which includes statistics: '\$65 million since 2012', '\$1 billion in new funding', and '65 projects worldwide'. The banner also mentions a partnership with the Alzheimer's Association. Below the banner is a section titled 'GRADUATE SCHOOL ADVICE' with four sub-sections: 'Applying to Graduate School', 'Paying for Graduate School', 'About the GRE', and 'Studying at a U.S. Graduate School'. Each sub-section has a small image and a title. Below this is a section titled 'Considering Graduate School?' with a 'Sign Up Now' button and a US News logo. At the bottom, there's a section titled 'GRADUATE SCHOOL RANKINGS' with a sub-section for 'Best Business Schools' listing the University of Chicago (Booth) and the University of Pennsylvania (Wharton) as top programs, and a sub-section for 'Programs & Specialties' listing Accounting, Entrepreneurship, Executive MBA, and Finance.

How do you apply ?

Process:

- Reflect on your favorite subject area(s)
- Identify a range of schools/graduate programs
 - Ask VT faculty for insight on programs
- Write customized personal statements
 - Identify faculty with interesting research areas in your subject area at each school
 - Mention 1-2 faculty & their research in your customized research statements
- Take the Graduate Record Exam (GRE)
 - Practice first !
 - You can take the GRE online or in person
 - Some programs have waived GRE scores
- Update your resume/CV
- Request transcripts from VT
- Ask tenure track active VT faculty to write recommendation letters
 - Ideally you have taken a course with the faculty member, and it is relevant to your target graduate programs & research area
- Apply online to your target schools
 - See department/program websites
 - Most charge application fees
 - Some programs waive application fees in case of hardship

When do you start your application (hint: NOW) ?

Sophomore/junior/senior years:

- Take fundamental and advanced courses relevant to your target program
- Attend research seminars to get the vibe
- Get to know tenure track faculty at VT
- Participate in VT undergraduate research
- Attend an NSF Research Experience for Undergraduate (REU) program

Senior year:

- September - ask tenure track VT faculty to write recommendation letters
 - Make sure to send your letter writers your updated resume in advance
- Take the Graduate Registered Exam ([GRE](#))
- December/January - graduate school application due dates
 - Deadlines vary by institution
 - Typically early December to early January for admission the following fall semester

Math Alliance F-Gap Scholar

The 2023-2024 F-GAP Program

F-GAP: Your pathway to graduate school and beyond!

Welcome to the 2023-2024 *Facilitated Graduate Admissions Procedure*! F-GAP has been providing information, mentoring and guidance for students who are transitioning to grad school for almost ten years now and has a great track record of placing them in grad programs. If you are planning to enter a graduate program in a quantitative science in Fall, 2024, then we hope you will consider taking advantage of this great opportunity!

Am I eligible?

Participation in F-GAP is generally limited to students who will be eligible for graduate school in a quantitative science in Fall, 2024, who are US citizens or permanent residents and who come from ethnic groups that are underrepresented in the quantitative sciences. Learn about the **detailed criteria**. Your Math Alliance Mentor will discuss this further when you meet with them. (See below.)

How does F-GAP work?

What makes F-GAP different is that *every F-GAP student is provided with their own personal doctoral faculty guide*. These *F-GAP Facilitators* are seasoned Math Alliance faculty who teach at universities with doctoral programs and who will work closely with you throughout your transition to graduate school. They will be available to you via email, phone and video calls and they will be there when you need them!



First Position: postdoc fellow at ETH Zurich

<https://www.mathalliance.org/the-2023-2024-f-gap-program.html>

Can you attend graduate school at VT ?

Options

- “4+1” degree:
 - Double-count up to 12 credits of classes
 - Can *potentially* substitute 5000-level classes for MATH Restricted Electives
 - Hard to fit in a master’s thesis
- Apply to a VT M.S. program:
 - Spend two years as a VT grad student
 - Easier route if you want to write a master’s thesis
 - Can *potentially* transition to PhD at VT or apply elsewhere
- Apply to a VT PhD program:
 - All your degrees will come from VT.

Pros:

- 4+1 is a fast way to get a master’s degree, especially with double-counted courses
- Convenient if you have personal reasons to stay in Blacksburg
- If you work well with VT faculty and like their research areas, can be a great fit

Cons:

- Temptation to keep an undergrad mentality
- More limited professional network (internships / research travel can help)
- Narrower view of your field and its important research topics
- For PhD’s, there can be some bias against seeing all degrees from one school

Where do you apply (for an applied math grad program) ?

Just some of the many US Applied Math Ph.D. programs

University	Org	Subject	Info	Applications
Berkeley	Mathematics	Applied Math	link	link
Brown University	Division of Applied Math	Applied Math	link	link
Cornell University	Center for Applied Math	Applied Math	link	link
Florida State University	Department of Mathematics	Applied Comp. Math	link	link
Georgia Tech	CSE program (link)	Comp. Sci. Eng.	link	link (MATH)
Louisiana State University	Mathematics	Math	link	link
Massachusetts Institute of Technology	Department of Mathematics	Applied Math	link	link
New York University	Courant Institute of Mathematical Sciences	Applied Math	link	link
Rice University	Comp. Applied Math & Operations Research	Applied Math	link	link
University of Minnesota	School of Mathematics	Applied/industrial math	link	link
University of North Carolina Chapel Hill	Department of Mathematics	Applied Math	link	link
University of North Carolina Charlotte	Department of Mathematics	Applied Math	link	link
University of Texas Austin	Oden Institute	Comp. Sci. Eng.	link	link
University of Washington	Department of Applied Math	Applied Math	link	link
Virginia Tech	Department of Mathematics	Math	link	link

Where do you apply (for a statistics grad program) ?

Just some of the many US Statistics Ph.D. programs

University	Org	Subject	Info	Applications
Carnegie Mellon University	Dept. of Statistics and Data Science	Stat/data science	link	link
Columbia University	Department of Statistics	Statistics	link	link
Cornell University	Dept. of Statistics and Data Science	Stat/data science	link	link
Duke University	Department of Statistical Sciences	Statistical science	link	link
Harvard University	Department of Statistics	Statistics	link	link
North Carolina State University	Department of Statistics	Statistics	link	link
Stanford	Department of Statistics	Statistics	link	link
Texas A&M University	Department of Statistics	Statistics	link	link
University of California Berkeley	Berkeley Statistics	Statistics	link	link
University of California Davis	Department of Statistics	Statistics	link	link
University of Chicago	Department of Statistics	Statistics	link	link
University of Michigan Ann Arbor	Department of Statistics	Statistics	link	link
University of Minnesota Twin Cities	Department of Statistics	Statistics	link	link
University of Pennsylvania	Wharton Business School	Stat/data science	link	link
University of Washington	Department of Statistics	Statistics	link	link
University of Wisconsin-Madison	Department of Statistics	Statistics	link	link
Virginia Tech	Department of Statistics	Statistics	link	link
Yale University	Dept. of Statistics and Data Science	Stat/data science	link	link

Where do they go?

VT PhD Graduates 2022-23

Instructor at VT

Assistant Professor at George Fox University

Postdoctoral Fellow at Colorado State University

Postdoctoral Fellow at Australian National University

Department of Defense

VT PhD Graduates 2021-22

Assistant Professor at Lehigh University

Assistant Professor at University of Texas Rio Grande

Researcher at Fujitsu

Johns Hopkins Applied Physics Lab

Visiting Assistant Professor at Wake Forest

Mathematics Sciences Publisher

Teacher at private high school academy

Closing thoughts

- Continuing your education, if it fits with your personal goals and commitments, is a permanent benefit during the remainder of your career
- It may or may not be cost-effective, but that's only one of several important considerations
- **Seniors** - start building your application now !
- **Sophomores** and **Juniors** make sure you
 - Take courses that align with your grad school interests
 - Talk to faculty
 - Aim to get some undergraduate research experience !

https://career.vt.edu/grad-school/finding_schools.html