



Graduate School Applications:  
information session 2022

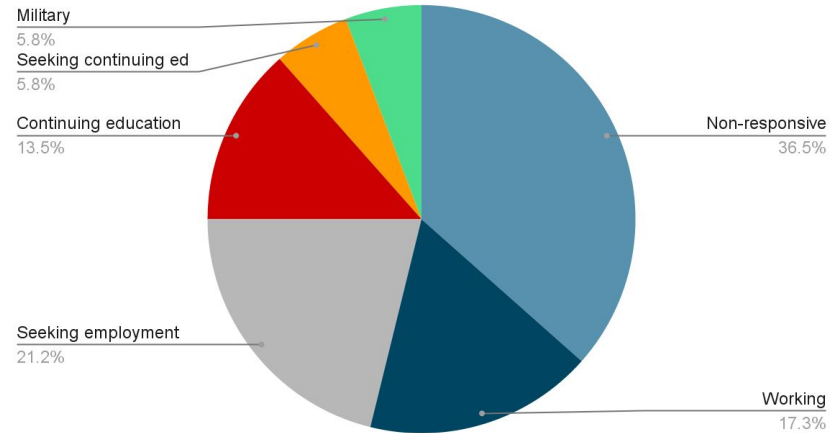


COLLEGE OF SCIENCE  
**MATHEMATICS**  
VIRGINIA TECH.

# Who goes to graduate school ?

- Some MATH majors go directly into graduate school, others do so after a few years of work.
- 2020-21 MATH graduates ( [data](#) )
  - ~13% continued their education
  - ~5% intended to continue their education
- 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=1348>

# 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](#))
  - Register by: 08/19/22, 09/23/22, 03/03/23
  - Tests: 09/17/22, 10/29/22, 04/08/23
- 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

<https://mathalliance.org/the-2022-2023-f-gap-program/>

## The 2022-2023 F-GAP Program

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



Welcome to the 2022-2023 *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, 2023, 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, 2023, who are US citizens or permanent residents and who come from ethnic groups that are underrepresented in the quantitative sciences. (Please go [here](#) for more detailed criteria.) Your Math Alliance Mentor will discuss this further when you meet with them. (See below.)

# 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	Phd App Deadline	Info	Applications
Berkeley	Mathematics	Applied Math	12/15/22	<a href="#">link</a>	<a href="#">link</a>
Brown University	Division of Applied Math	Applied Math	12/09/22	<a href="#">link</a>	<a href="#">link</a>
Cornell University	Center for Applied Math	Applied Math	01/07/23	<a href="#">link</a>	<a href="#">link</a>
Florida State University	Department of Mathematics	Applied Comp. Math	12/15/22	<a href="#">link</a>	<a href="#">link</a>
Georgia Tech	CSE program ( <a href="#">link</a> )	Comp. Sci. Eng.	12/15/22	<a href="#">link</a>	<a href="#">link</a> (MATH)
Louisiana State University	Mathematics	Math	01/15/23	<a href="#">link</a>	<a href="#">link</a>
Massachusetts Institute of Technology	Department of Mathematics	Applied Math	12/15/22	<a href="#">link</a>	<a href="#">link</a>
New York University	Courant Institute of Mathematical Sciences	Applied Math	01/04/23	<a href="#">link</a>	<a href="#">link</a>
Rice University	Comp. Applied Math & Operations Research	Applied Math	12/15/22	<a href="#">link</a>	<a href="#">link</a>
University of Minnesota	School of Mathematics	Applied/industrial math	12/15/22	<a href="#">link</a>	<a href="#">link</a>
University of North Carolina Chapel Hill	Department of Mathematics	Applied Math	12/13/22	<a href="#">link</a>	<a href="#">link</a>
University of North Carolina Charlotte	Department of Mathematics	Applied Math	08/01/22 ???	<a href="#">link</a>	<a href="#">link</a>
University of Texas Austin	Oden Institute	Comp. Sci. Eng.	12/15/22	<a href="#">link</a>	<a href="#">link</a>
University of Washington	Department of Applied Math	Applied Math	01/12/23	<a href="#">link</a>	<a href="#">link</a>
Virginia Tech	Department of Mathematics	Math	1/1/23	<a href="#">link</a>	<a href="#">link</a>

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

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

University	Org	Subject	Phd Deadline	Info	Applications
Carnegie Mellon University	Dept. of Statistics and Data Science	Stat/data science	12/1/22	<a href="#">link</a>	<a href="#">link</a>
Columbia University	Department of Statistics	Statistics	01/05/23	<a href="#">link</a>	<a href="#">link</a>
Cornell University	Dept. of Statistics and Data Science	Stat/data science	01/01/22	<a href="#">link</a>	<a href="#">link</a>
Duke University	Department of Statistical Sciences	Statistical science	1/4/23	<a href="#">link</a>	<a href="#">link</a>
Harvard University	Department of Statistics	Statistics	12/01/22	<a href="#">link</a>	<a href="#">link</a>
North Carolina State University	Department of Statistics	Statistics	12/15/22	<a href="#">link</a>	<a href="#">link</a>
Stanford	Department of Statistics	Statistics	12/1/22	<a href="#">link</a>	<a href="#">link</a>
Texas A&M University	Department of Statistics	Statistics	1/10/23	<a href="#">link</a>	<a href="#">link</a>
University of California Berkeley	Berkeley Statistics	Statistics	12/01/22	<a href="#">link</a>	<a href="#">link</a>
University of California Davis	Department of Statistics	Statistics	01/15/23	<a href="#">link</a>	<a href="#">link</a>
University of Chicago	Department of Statistics	Statistics	01/03/23 (?)	<a href="#">link</a>	<a href="#">link</a>
University of Michigan Ann Arbor	Department of Statistics	Statistics	12/15/22	<a href="#">link</a>	<a href="#">link</a>
University of Minnesota Twin Cities	Department of Statistics	Statistics	12/15/22	<a href="#">link</a>	<a href="#">link</a>
University of Pennsylvania	Wharton Business School	Stat/data science	12/15/22	<a href="#">link</a>	<a href="#">link</a>
University of Washington	Department of Statistics	Statistics	12/1/22	<a href="#">link</a>	<a href="#">link</a>
University of Wisconsin-Madison	Department of Statistics	Statistics	12/01/22	<a href="#">link</a>	<a href="#">link</a>
Virginia Tech	Department of Statistics	Statistics	01/15/23	<a href="#">link</a>	<a href="#">link</a>
Yale University	Dept. of Statistics and Data Science	Stat/data science	12/15/22	<a href="#">link</a>	<a href="#">link</a>



# 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 !