

Why Villanova Mathematics and Statistics?

Candidates Day

April 20, 2020

Jesse Frey (Chair)

For More Information

- Zoom sessions will be held from 8 to 9 PM on Tuesday 4/21, Wednesday 4/22, and Monday 4/27.
- Join at <https://villanova.zoom.us/j/325411203>.
- For more information: jesse.frey@villanova.edu

What the Department Offers

- Major in Mathematics
- Minor in Mathematics
- Major in Statistics – Brand new!
- Minor in Statistics
- Courses to prepare for actuarial exams P and FM
- 38 full-time faculty
- 11 full-time faculty who specialize in Statistics

Requirements for the Mathematics Major

- MAT 1000: Mathematical Communities
- MAT 1500, 1505, 2500: Calculus I, II, and III – AP credit can help here.
- MAT 2600: Foundations of Mathematics
- MAT 2705: Differential Equations and Linear Algebra
- MAT 3300: Advanced Calculus
- MAT 3400: Linear Algebra
- MAT 3500: Modern Algebra
- MAT 5900: Seminar in Mathematics
- Four mathematics electives (like Statistical Methods, Financial Derivatives, or Coding Theory)
- One approved upper-level analysis course
- A two-semester natural science sequence with a lab like the Physics sequence – AP credit can help here.
- One more science elective like CSC 1051: Algorithms and Data Structures I
- Courses to fulfill the core requirements for the college – AP credit can help with the foreign language requirement.
- Enough free electives to meet the university requirement for credit hours – AP credit can help here.

Requirements for the Statistics Major

- MAT 1500, 1505, 2500: Calculus I, II, and III – AP credit can help here.
- MAT 2705: Differential Equations and Linear Algebra or MAT 3100: Applied Linear Algebra
- MAT 4310: Statistical Methods
- MAT 4315: Applied Statistical Models
- MAT 4380: Data Science
- MAT 5700: Mathematical Statistics I
- MAT 5705: Mathematical Statistics II
- MAT 5905: Seminar in Statistics
- Three statistics electives (like Design of Experiments, Data Mining, or Bayesian Data Analysis)
- Two natural science courses with labs at the science major level – AP credit can help here.
- CSC 1051: Algorithms and Data Structures I
- Courses to fulfill the core requirements for the college – AP credit can help with the foreign language requirement.
- Enough free electives to meet the university requirement for credit hours – AP credit can help here.
- Note: Available starting in Fall 2020. Come to Villanova as a Mathematics major and then switch.



Award-Winning Teachers!

- Profs. Charlie Ashley and Klaus Volpert have won the university-wide Lindback outstanding faculty teaching award.
- Profs. Maria Baranski and Paul Pasles have won college-wide outstanding faculty teaching awards.
- Profs. Klaus Volpert and Andy Woldar have won teaching awards from the local section of the Mathematical Association of America.
- Profs. Charlie Ashley and Michael Posner have won the university-wide award for innovative teaching.
- Prof. Michael Posner has won the national Waller education award from the American Statistical Association.
- Prof. Alexander Diaz-Lopez (at left) has won the university-wide teaching award for junior faculty.



Award-Winning Researchers!

- Profs. Bob Jantzen and Andy Woldar have won the university-wide outstanding faculty research award.
- Prof. Michael Posner has been the principal investigator or a co-principal investigator on many grants in Statistics Education.
- Prof. Michael Tait (at left) holds a research grant from the National Science Foundation.
- Profs. Tim Feeman, Bob Jantzen, Michael Posner, and Klaus Volpert have all won outstanding paper awards.
- Prof. Michael Posner is a fellow of the American Statistical Association.

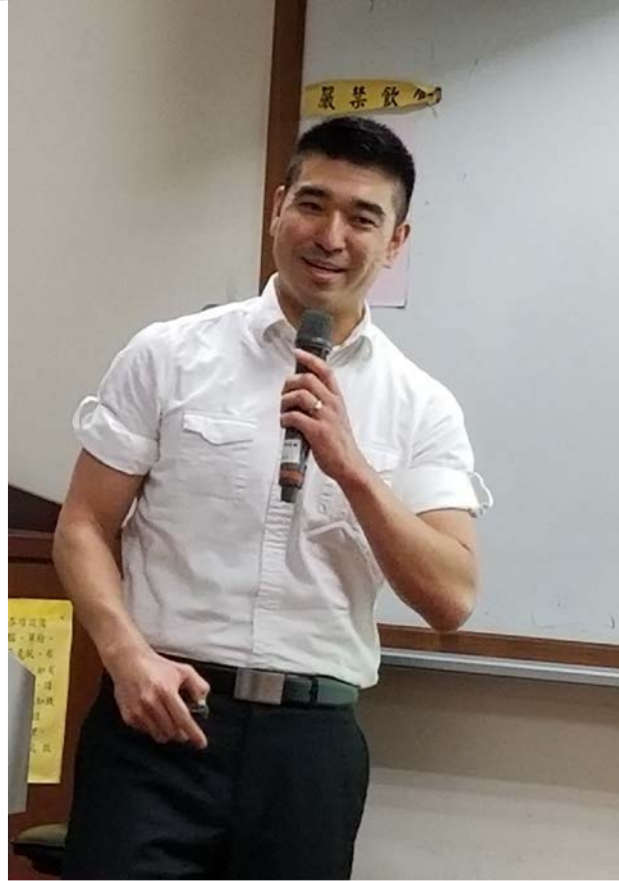
Opportunities to Do Research!

- A new program (as of Fall 2019) matches interested students with faculty who have accessible research problems.
- Summer REUs at different schools across the country.
- Projects from the Seminar MAT 5900 have led to published papers.
- Independent study courses are possible!
- Villanova Undergraduate Research Fellowships (summer)
- The DREAMS program (offered in May every other year) introduces students to research problems in Mathematics and Statistics.

Lots of Elective Courses!

- Recent pure math electives: Number Theory, Topology, Combinatorics, Graph Theory, Complex Analysis, Geometry, Fourier Series, History of Mathematics, Coding Theory
- Recent applied math electives: Numerical Analysis, Operations Research, Medical Imaging, Financial Derivatives, Cryptography, Applied Linear Algebra
- Recent statistics electives: Data Science, Bayesian Statistics, Data Mining, Biostatistics, Mathematical Statistics, Monte Carlo Methods, Design of Experiments
- Students with senior status and at least a 3.0 GPA may take graduate courses in Mathematics or Applied Statistics.





Ten New Faculty Hired Since 2017!

A Continuously Updated Curriculum!

- New first-year seminar course: Mathematical Communities
- New electives: Data Science, Bayesian Statistics, Applied Linear Algebra
- Statistics minor added a few years ago.
- Statistics major approved to start in Fall 2020.
- Use of software: Maple, R, SAS, Minitab, Matlab

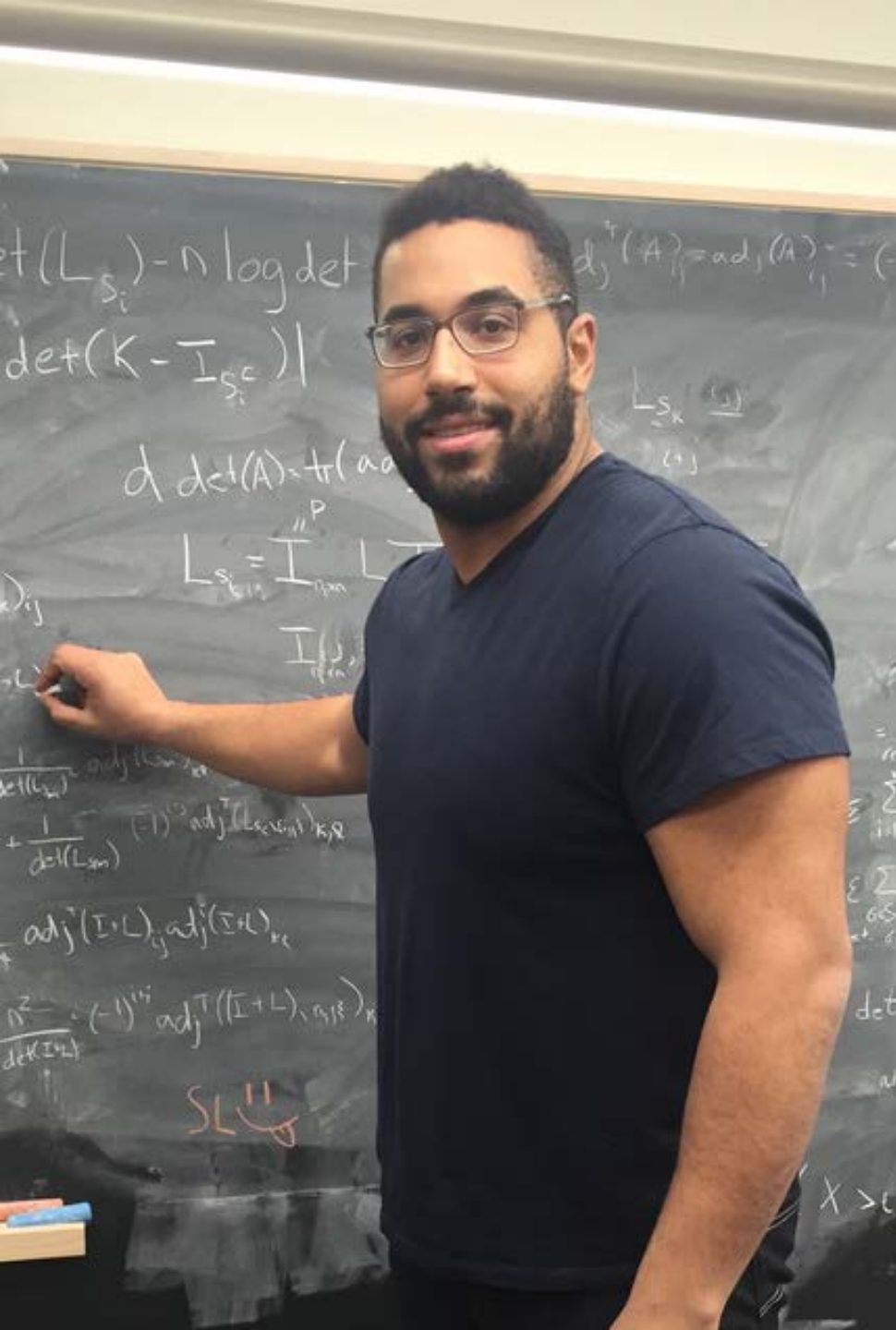


Student-Run Organizations!

- Math Club
- Association for Women in Mathematics (AWM)
- Villanova Society of Actuaries



Recent AWM Activities



Other Department Activities

- Department colloquia with internal and external speakers like John Urschel from MIT (at left) on February 26.
- Putnam Mathematical Competition each December
- Pi Day (3/14)
- Pi Mu Epsilon honor society induction ceremony (May)
- The *SUM Times* keeps students updated about department activities and elective course offerings each semester.

DataFest Philly!

- Organizer: Prof. Michael Posner
- Past data providers: Indeed, eHarmony, Expedia, TicketMaster
- Next event: April 2021

Villanova University Hosts Annual DataFest Philly Student Competition

VILLANOVA, Pa. — Villanova University will host more than 70 students from 12 colleges and universities for the annual DataFest Philly competition from April 12-14. Put on by the American Statistical Association, DataFest is a nationally-coordinated undergraduate data analysis case competition, where teams of students analyze a complex dataset from a major company and mine it for insights. DataFest has been hosted by colleges and universities around the country every spring since 2011.



The program takes data analysis beyond the classroom setting by enabling students to work with real-world data as a team—bringing together students from statistics, mathematics, business, engineering, computer science, social sciences and more. Throughout the weekend, students are guided by professors and industry professionals from companies that could one day be their future employer.

"DataFest is a tremendous way for students to get experience working with real data, developing their data acumen, and showcasing their talents to potential employers," said Michael Posner, PhD, PStat® associate professor of Statistics. "It's an honor for Villanova to host this event for the third year in a row and we are excited how it has grown."



Combined BS/MA and BS/MS Programs!

- Outstanding students can earn both a BS in Mathematics and a Master's degree in an accelerated time frame of five years or so (less with AP credit).
- Mathematics: Three graduate course double-count, and the last two graduate course are tuition-free.
- Applied Statistics: Four graduate courses double-count, and the last graduate course is tuition-free.
- Program directors: Profs. Paul Bernhardt (Applied Statistics, lower left) and Katie Haymaker (Mathematics)
- Any student with at least a 3.0 GPA can take graduate courses once they have senior status.



Study Abroad is Possible!

- All required math major courses are available every semester.
- Any study abroad program is possible with some planning.
- Pre-approved courses count towards your VU degree – as free electives, core courses, or math major courses.
- Going abroad to study math is also possible.
- We encourage you to study abroad!
- Junior math major headed to Spain: “It wasn’t hard at all!”



Many Students Add a Minor or a Second Major!

Common minors:

- Statistics
- Business
- Economics
- Computer Science
- French
- Spanish

Common second majors:

- Computer Science
- Economics
- Education
- Physics

AP Credit in Mathematics and Statistics

Advanced Placement Subject-Test Number	Score of 3		Score of 4 or 5	
	Courses	Credits	Courses	Credits
Calculus AB- (66) or Calculus Subgrade- (69)			MAT 1500	4
Calculus BC- (68)			MAT 1500	4
			MAT 1505	4
Statistics- (90)			MAT 1230 or CSC 2300	3

Advising in the Department

- Each Mathematics major is assigned an advisor.
- Students meet with their advisor each semester at registration time (or more often as needed) to discuss course choices.
- Advisors are ready to discuss more than just courses.
- Changes can be made if needed.

The Core Curriculum for Math/Stat Majors

- Augustine and Culture Seminar (2 courses)
- Ethics (1 course)
- Fine Arts (1 course)
- Foreign Language (0 to 4 courses) – AP credit can help.
- History (1 course)
- Core Literature and Writing (1 course)
- Philosophy (1 course)
- Theology and Religious Studies (2 courses)
- Social Sciences (2 courses)
- Diversity Requirement (two different types)

The Statistics Minor

- MAT 1500, 1505, 2500: Calculus I, II, and III
- MAT 4310: Statistical Methods
- MAT 4315: Applied Statistical Models
- MAT 5700: Mathematical Statistics I
- Two approved electives like Data Science and Data Mining
- Requires four extra courses beyond the Mathematics major

The Math Learning and Resource Center

- Located on the 2nd floor of the Falvey Library
- Staffed by undergraduate and graduate student tutors
- Students can go for help in calculus and statistics courses.
- Mathematics majors can work as tutors.

Selected Employers of Recent Graduates

- Ernst and Young
- Deloitte
- MassMutual
- Willis Towers Watson
- New York Yankees
- JP Morgan Chase
- Price Waterhouse Coopers
- Lockheed Martin
- National Security Agency
- Other possibilities: medical school, law school, graduate studies in math-related fields, service organizations like the Peace Corps.

Will D. Cat
(#6) at a
faculty
meeting.



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