

SPENCER NICHOLAS WHITEHEAD

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EDUCATION

Duke University

Fall 2022 -

Ph.D. student, Department of Mathematics

Member of the Certificate in College Teaching program

University of Waterloo

Fall 2021 - Spring 2022

Master of Mathematics, Pure Mathematics

Supervised by Benoit Charbonneau. Title of thesis: Integrality theorems for symmetric instantons.

University of Waterloo

Fall 2016 - Winter 2021

Bachelor of Mathematics, Pure Mathematics (Minor: East Asian Studies)

Recipient of Alumni Gold Medal at graduation for the second-highest average in the Faculty of Mathematics

SKILLS

Proficient in French (DELF B2), Japanese (not recently tested)

Experienced with C, C++, Python, Sage, Maple, Scheme.

ACADEMIC ACTIVITY

Grants and Research Scholarships

- MEXT Research Scholarship (Declined)
- NSERC CGS M (Declined)
- NSERC USRA (May – August 2021); U. Waterloo, supervised by Dr. Benoit Charbonneau
- NSERC USRA (May – August 2020); U. Waterloo, supervised by Dr. Matthew Satriano
- NSERC USRA (May – August 2019); U. Waterloo, supervised by Dr. Benoit Charbonneau

Papers

- Whitehead, S. N., *Generalized Pythagorean Lutes*. Proceedings of Bridges 2022: Mathematics, Art, Music, Architecture, Culture (pp. 335–338), 2022. Presented at Bridges 2022.
- Charbonneau, B. and Whitehead, S., *Studying Wythoff and Zometool Constructions using Maple*. Maple in Mathematics Education and Research (pp. 65–76), 2020. Presented at Maple Conference 2019.

Preprints

- Edidin, D., Satriano, M., and Whitehead, S., *On a smoothness criterion for good moduli spaces*. (Submitted, May 2021) arxiv.org/abs/1905.04845.
- Whitehead, S. N., *Classifying Regular Polyhedra and Polytopes using Wythoff's Construction*. arxiv.org/abs/2001.09364.

Supervision

- Sanket Biswas (MITACS intern), joint with Benoit Charbonneau. Spring 2022.
- Catalina Quincosis Martinez (MITACS intern), joint with Benoit Charbonneau. Spring 2022.

Posters

- *Classifying regular polytopes using Wythoff's construction*. Presented at the Undergraduate Mathematics Symposium at the University of Illinois in Chicago 2019.

External Talks

- *Generalized Pythagorean lutes*, Bridges 2022, Helsinki, August 2022
- *Integrality theorems for symmetric instantons*, Union College Mathematics Conference, Schenectady, June 2022
- *From Plato to Coxeter: The History of Polytopes*, Canadian Undergraduate Math Conference, Kingston, July 2019

Local Talks

- Index theory learning seminar (Four talks), May 2022 — July 2022
- *Symmetric Instantons*, Waterloo Differential Geometry Working Seminar, August 2021
- *A Brief Introduction to Chern Classes*, Waterloo Algebraic Geometry Working Seminar, July 2021
- *Classifying regular polytopes using Wythoff's construction*, Waterloo Differential Geometry Working Seminar, August 2019

Other conferences attended

- *CIRGET Orbifolds Workshop*, University of Quebec at Montreal, May 2022
- *Waterloo undergraduate math conference*, University of Waterloo, August 2019

Part-Time Teaching Assistant Positions

- (Fall 2022, 6h/wk) Facilitator and tutorial lecturer for MATH 111L (Lab calculus 1)
- (Fall 2021, 10h/wk) Marker for MATH 137 (Calculus 1 for Honours Mathematics)
- (Winter 2021, 5h/wk) Official tutor for MATH 136 (Linear Algebra 1 for Honours Mathematics)
- (Fall 2020, 5h/wk) TA team leader for MATH 135 (Algebra for Honours Mathematics)
- (Fall 2019, 5h/wk) Official tutor for MATH 136
- (Fall 2018, 10h/wk) Tutorial lecturer and marker for CS 246 (Object-Oriented Software Development)
- (Winter 2018, 5h/wk) Tutorial lecturer and marker for CS 246

OTHER WORK EXPERIENCE

Citadel LLC, Chicago

Winter 2020

Software Engineering Intern

- Developed C++ data pipelines to parse and archive data streams from Thompson Reuters
- Handled over 300GB per day of market data at the height of the market impact of COVID-19

University of Waterloo, Waterloo

Fall 2018 (Part time Winter 2019, Fall 2019)

Instructional Support Assistant

- Worked as the primary instructional support assistant for CS 246e: Object Oriented Programming (Enriched) and as a secondary assistant for CS 246: Object Oriented Programming
- Designed and delivered over 50 hours of content on C++, Linux, and object-oriented design to classes of up to 400 students
- Coordinated graduate teaching assistants for marking and proctoring

ContextLogic Inc., San Francisco

Winter 2018

Software Engineering Intern

- Worked as a member of the Platform Data team, monitoring the health of policies and shipping estimates
- Conducted shipping time estimate experiments ranging from neutral to gross +2.5% profits, and integrated these results into the development of an improved shipping time estimator
- Created reports combining data from MongoDB and TreasureData tracking merchant policy effectiveness
- Developed a Slack bot in Go to optimize workflow for 180 engineers; won first of 10 teams at WishHacks 18

Citadel LLC, Chicago

Fall 2017

Software Engineering Intern

- Worked on the Accounting Development Team, creating and maintaining software for over 100 clients
- Modified an existing Django accounting service to support date ranges and reference data. Designed, tested and implemented new response formats reducing response size by 10x and increasing speed 5x
- Added multithreading functionality to Tornado server, serving up to 128 concurrent clients with Nginx

AWARDS

University of Waterloo

- 2021 Alumni Gold Medal Award (Faculty of Mathematics)
- 2021 Jessie W.H. Zou Award for Excellence in Undergraduate Research
- 2021 Mike Vangoch Memorial Award
- 2021 Peter Swann Achievement Award in East Asian Studies
- 2020 Pure Mathematics Department Silver Medal
- 2020 Co-op Student of the Year Honourable Mention
- 2019 Work Term Report Award
- 2016 Canadian Computing Olympiad Silver Medalist