Ryan Anselm

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EDUCATION

Columbia University 2021 - 2024
B.S. in Computer Science (Foundations Track), Magna Cum Laude ***GPA:*** *4.05/4.33*

- Minors in Applied Math and Applied Physics
- Selected coursework: Quantum Computing, Computational Learning Theory, Unconditional Lower Bounds & Derandomization, Advanced Algorithms, Functional Analysis, Quantum Optics

RESEARCH EXPERIENCE

Summer Research Assistant, Flatiron Institute May 2024 - Aug. 2024
New York, NY

· Investigated quantum-inspired classical methods to compress and transform continuous-variable multivariate functions using tensor networks at the Flatiron's Center for Computational Quantum Physics.
· Designed and implemented algorithms for tensor network construction, optimization, and function approximation in Julia.

Columbia Quantum Computing Theory Group Aug. 2023 - May 2024
New York, NY

· Studied complexity-theoretic lower bounds for hybrid digital-analog quantum computation under the supervision of Prof. Henry Yuen.
· Investigated architecture-aware quantum circuit compilation for reconfigurable neutral atom quantum computers.

Summer REU Student, Learning the Earth with AI and Physics June 2022 - Aug. 2022
New York, NY

· Developed neural network-based ML models to emulate cloud microphysics in atmospheric models, achieving comparable accuracy to traditional bulk/bin numerical simulation techniques, as measured by MSE.
· Leveraged Python ecosystem (NumPy, PyTorch, Scikit-learn, SciPy, Xarray) to implement and evaluate ML models, culminating in a presentation at the 2022 American Geophysical Union Fall Meeting.

Freshman Research Initiative Fellow, Henkelman Group Jan. 2021 - Aug. 2021
Austin, TX

· Developed algorithms to efficiently locate charge density saddle points corresponding to chemical bonds in molecular datasets as part of Bader, a computational charge analysis code written in Fortran.

PROFESSIONAL EXPERIENCE

Software Engineer, Salesforce Sept. 2024 - Present
San Francisco, CA

· On the Agentforce team, building LLM-powered AI agents for customer service, sales, and operations.

Teaching Assistant, Columbia Department of Computer Science Sept. 2022 - May 2024
New York, NY

· Led office hours, graded assignments, and contributed to course content for: COMS 4232: Advanced Algorithms (Spring 2024), COMS 4281: Intro to Quantum Computing (Fall 2023), COMS 3261: Computer Science Theory (Spring 2023), CSOR 4231: Analysis of Algorithms I (Fall 2022)

Software Engineer Intern, Salesforce May 2023 - Aug. 2023
San Francisco, CA

· Engineered cross-platform marketing integrations for Salesforce Data Cloud, connecting major social media platforms like Snapchat and LinkedIn to streamline multi-channel campaign management for customers.
· Leveraged Java, Spring Boot, SQL, and Docker to execute and optimize key technical changes across the Salesforce Data Cloud infrastructure.

ACTIVITIES & SERVICE

Seminar Co-Organizer, Columbia Undergraduate Learning Seminar in Theoretical CS

· Led and organized a Spring 2024 undergraduate reading group on quantum complexity theory with 8 weekly talks, covering topics such as hardness results for shallow quantum circuits, stabilizer circuit simulation, and the quantum PCP conjecture.
· Gave presentations in other semesters on spectral graph theory, randomized complexity classes, and semidefinite programming for MAX-CUT approximation.

Mentee, Columbia Mathematics Directed Reading Program

· Explored percolation theory and its connections with statistical physics with a graduate student mentor.

Co-President, Columbia University Science Olympiad

· Founded and led a team of 12 to organize a day-long Science Olympiad tournament for 400+ high school students, managing a $2000+ budget, coordinating 75 volunteers, and liaising with 29 teams.
· Wrote 12 Science Olympiad tournament tests as an event supervisor for Columbia, MIT, UT Austin, UPenn, and UPitt invitationals, as well as the 2021 national tournament.

PUBLICATIONS & PRESENTATIONS

R. Anselm, R. Levy, and J. Tindall. *Quantum-inspired tree tensor network methods for compression and transformation of multivariate functions.* American Physical Society March Meeting, Oral Presentation. Expected March 2025. In Submission.

R. Anselm, K. Lamb, H. Morrison, S.P. Santos, and M. van Lier-Walqui. *Machine learning optimal prognostic moments for single-category cloud microphysics parameterizations.* American Geophysical Union Fall Meeting, Oral Presentation. December 2022.

P. Chowdhury, R. Dasgupta, P.R. Phelps, C-T.A. Lee, and **R. Anselm**. *Partitioning of chalcophile and highly siderophile elements (HSEs) between sulfide and carbonated melts – Implications for HSE systematics of kimberlites, carbonatites, and melt metasomatized mantle domains.* Geochimica et Cosmochimica Acta 305:130-147. 2021.

AWARDS

1st Place, 2024 MIT iQuHack Quantum Hackathon	2024
Tau Beta Pi Junior Inductee	2023
Top 500 scorer, William Lowell Putnam Mathematical Competition	2022
USA Physics Olympiad Semifinalist	2020
United States National Chemistry Olympiad High Honors	2019, 2020
USA Computing Olympiad Gold Division	2019