VINIT RANJAN

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EDUCATION

Princeton University *Princeton, NJ* *Aug 2020 - Present*
Ph.D. in Operations Research & Financial Engineering
Advisor: B. Stellato
Thesis: "Data-driven Algorithm Verification and Design for Real-time Optimization"

Duke University *Durham, NC* *Aug 2016 - Dec 2019*
B.S. in Computer Science, Mathematics *Graduation Honors: Magna Cum Laude*
Minor in Financial Economics **Cumulative GPA: 3.929/4.00**

RESEARCH INTERESTS

- Algorithm verification and design for real-time decision-making
- Machine learning to accelerate optimization algorithms
- Applications in fast real-time optimization, including portfolio optimization and control of high-speed autonomous systems

PUBLICATIONS

- **V. Ranjan**, B. Stellato. "Large Scale Performance Verification of Fixed-point Optimization Algorithms." *(In preparation.)*
- J. Park, **V. Ranjan**, B. Stellato. "Probabilistic Analysis of First-Order Methods via Distributionally Robust Optimization." *(In preparation.)*
- **V. Ranjan**, S. Gualandi, A. Lodi, B. Stellato. "Exact Verification of First-Order Methods via Mixed-Integer Linear Programming ." *arXiv preprint:* 2412.11330. Code respository. (Under review in *The 26th Conference on Integer Programming and Combinatorial Optimization.*)
- **V. Ranjan**, B. Stellato. "Verification of First-Order Methods for Parametric Quadratic Optimization." *arXiv preprint:* 2403.03331. Code repository. (Under review in *Mathematical Programming.*)
- **V. Ranjan**, J. Ryang, and A. Xue. "Time to Leave the Louvre: A Computational Network Analysis." *The Journal of Undergraduate Mathematics and Its Applications*, 40.2-3 (2019), pp. 135-160.
- I. Cristali, **V. Ranjan**, J. Steinberg, E. Beckman, R. Durrett, M. Junge, and J. Nolen. "Block size in Geometric(p)-biased permutations." *Electronic Communications in Probability*, 23 (2018), paper no. 80, pp. 10. doi:10.1214/18-ECP182.
- **V. Ranjan**, J. Ryang, and K. Zhang. "An Analysis of the Impact of Self-Driving Cars on Traffic Conditions." *SIAM Undergraduate Research Online*, 11 (2018). doi:10.1137/17S015768.

PROFESSIONAL EXPERIENCE

Quantitative Research Intern *May 2023 - Aug 2023*
Quantbot Technologies, New York City, NY

Software Engineering Intern *May 2019 - Aug 2019*
Google Health Research Team, Google, Palo Alto, CA

Research Intern *May 2018 - Aug 2018, Jan 2020 - Jun 2020*
Lineage Logistics, San Francisco, CA

RESEARCH EXPERIENCE

Graduate Research

Algorithm Verification and Design for Real-time Optimization
Professor: B. Stellato   *Jan 2021 - Present*

Undergraduate Research

Point Clouds and Geometric Algorithms   *May 2018 - Aug 2018, Jan 2020 - June 2020*
Mentors: E. Wolf and C. Eckman at Lineage Logistics

Online Admission Control Algorithms   *Jan 2018 - May 2018*
Professor: D. Panigrahi

Machine Learning Applications   *Aug 2017 - May 2018*
Professor: L. Carin

Probability and Stochastic Processes   *May 2017 - Aug 2017*
Professors: R. Durrett, M. Junge, and J. Nolen

Talks

- "Performance Verification of First Order Methods for Parametric Quadratic Optimization."

  International Symposium of Mathematical Programming, (Jul 2024).

  INFORMS Annual Meeting, (Oct 2022, 2023, 2024).

  International Conference on Continuous Optimization, (Jul 2022).
- "Pace and Space: An Alternative Measure of NBA Shooting Prowess." *Carnegie Mellon Sports Analytics Conference*, (Oct 2018).

Poster Presentations

- "Verification of First-Order Methods for Parametric Quadratic Optimization." *Princeton Workshop on Optimization, Learning, and Control*, (Jun 2024).

  - Best Poster Award.
- "Pace and Space: An Alternative Measure of NBA Shooting Prowess." *MIT Sloan Sports Analytics Conference*, (May 2019).

TEACHING EXPERIENCE

Graduate Teaching Assistant

Responsibilities include: Teaching precept sections (25+ students), hosting office hours, and designing assignments/exams.

Graduate Optimization   *Fall 2023*
Professor: I. Akrotirianakis

Optimization   *Spring 2022, 2023, 2024*
Professor: B. Stellato

- Course material and code on Github.

Optimal Learning   *Fall 2021*
Professor: M. Soner

Undergraduate Teaching Assistant

Discrete Mathematics for Computer Science   *Fall 2017, 2018, 2019*
Professor: B. Donald

- Note: appointed as Head Undergraduate Teaching Assistant during the Fall 2019 term.

Discrete Mathematics for Computer Science   *Spring 2019*
Professor: D. Panigrahi

Intro to Operating Systems   *Spring 2019*
Professor: A. Lebeck

Intro to Design/Analysis of Algorithms   *Spring 2018*
Professor: D. Panigrahi

AWARDS

Mathematical Modeling Awards

- 2019 Consortium for Mathematics and Its Applications (COMAP), Mathematical Contest in Modeling/Interdisciplinary Contest in Modeling (MCM/ICM), **Outstanding solution** (top 7 of 5000+ for chosen problem). Earned the **Leonard Euler Award** for excellence in modeling and $10000 **COMAP scholarship.**
- 2018 COMAP MCM/ICM, **Meritorious Solution** (top 15%).
- 2017 COMAP MCM/ICM, **Finalist Solution** (top 11 of 1500+ for chosen problem).

Other Research Awards

- Carnegie Mellon Sports Analytics Conference, Reproducible Research Competition, **2nd place**. Joint work with: A. Ghadiyaram, S. Silwal, and R. Shah.

Duke Awards

- **Karl Menger Award** for excellence in mathematical competitions. May 2017, 2019.
- **Dean's List** for earning a top GPA during the respective semester. Earned in Fall 2017, Spring 2018, and with distinction for Fall 2016, Spring 2017, Spring 2019.

TECHNICAL SKILLS

Programming Languages:	Python, R, Java, C/C++
Software:	Git, SLURM, LaTeX