Manu Upadhyaya

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Education

2020–PRESENT	**Ph.D. in mathematical optimization**, Lund University, Sweden Advisors: Pontus Giselsson and Sebastian Banert (**GPA: pass/fail only**)
2018–2020	**M.Sc. in finance**, Lund University, Sweden (**GPA: 87.5% highest possible grade**)
2014–2020	**M.Sc. and Civ. Ing. in engineering physics**, Lund University, Sweden (**GPA: 5.0/5.0**)
2016–2017	**Study abroad**, University of California, Berkeley, USA (**GPA: 4.0/4.0**)
2011–2015	**B.Sc. in mathematics**, Lund University, Sweden (**GPA: 100% highest possible grade**)

Research interests

I am interested in continuous optimization and its applications, including machine learning, control, and finance. My current research focuses on the design and performance analysis of first-order algorithms for convex optimization and monotone inclusion problems.

Research experience

JUL 2020–PRESENT	**Ph.D. student**, Department of Automatic Control, Lund University, Sweden
SEP 2024–FEB 2025	**Visiting researcher**, Inria Paris, Paris, France Hosted by Francis Bach and Adrien Taylor.
JUN 2018–AUG 2018	**Visiting student researcher**, ETH Zürich, Basel, Switzerland Conducted research on the stability of stochastic biochemical reaction networks under the supervision of Ankit Gupta in the Control Theory and Systems Biology Laboratory, led by Mustafa Khammash.
MAY 2017–AUG 2017	**Visiting student researcher**, University of California, Berkeley, USA Worked on tactile sensing in robotic manipulation using deep neural networks under the supervision of Roberto Calandra in Sergey Levine's research group, resulting in a paper accepted to CoRL 2017.
JUN 2016–AUG 2016	**Research assistant**, Research Institutes of Sweden, Stockholm, Sweden Developed and evaluated finite element models for paperboard container manufacturing using Abaqus under the supervision of Mikael Nygårds.

Professional experience

AUG 2019–JAN 2020	**Master thesis student**, Lynx Asset Management AB, Stockholm, Sweden Designed a data-driven method for covariance matrix regularization specifically tailored for portfolio optimization, under the supervision of Tobias Rydén. Technologies used: Julia, MATLAB.
JUN 2019–JUL 2019	**Quantitative developer intern**, OQAM AB, Malmö, Sweden Contributed to the development of data-driven solutions and automation for equities in the Swedish market, focusing on Python-based processes.

Teaching experience

Teaching assistant, Lund University, Sweden

Courses:

- Optimization for learning [2020–2024]
- Modeling and learning from data [2023]
- Deep learning [2021, 2023]
- Network dynamics [2022]
- Project in systems, control, and learning [2021]
- Automatic control, basic course [2020]
- Programming in Java [2015]

Thesis supervisor, Lund University, Sweden

Supervised master's thesis:

- Oscar Gummesson Atroshi and Osman Sibai: *Deep hedging of CVA* [2024].
  Co-supervised with Magnus Wiktorsson (Lund University) and Shengyao Zhu (Nordea Markets)

Publications

[1] Manu Upadhyaya, Puya Latafat, and Pontus Giselsson. *A Lyapunov analysis of Korpelevich's extragradient method with fast and flexible extensions*. 2025. arXiv: 2502.00119 [math.OC].

[2] Manu Upadhyaya, Sebastian Banert, Adrien B. Taylor, and Pontus Giselsson. "Automated tight Lyapunov analysis for first-order methods". In: *Mathematical Programming* 190 (2024), pp. 437–475. DOI: 10.1007/s10107-024-02061-8.

[3] Sebastian Banert, Manu Upadhyaya, and Pontus Giselsson. *The Chambolle–Pock Method Converges Weakly with* $\theta > 1/2$ *and* $\tau\sigma\|L\|^2 < 4/(1+2\theta)$. 2023. arXiv: 2309.03998 [math.OC].

[4] Manu Upadhyaya. "Covariance Matrix Regularization for Portfolio Selection: Achieving Desired Risk". Master's Thesis. Lund University, Jan. 2020. URL: http://lup.lub.lu.se/student-papers/record/9005476.

[5] Roberto Calandra, Andrew Owens, Manu Upadhyaya, Wenzhen Yuan, Justin Lin, Edward H. Adelson, and Sergey Levine. "The Feeling of Success: Does Touch Sensing Help Predict Grasp Outcomes?" In: *Proceedings of the 1st Annual Conference on Robot Learning (CoRL)*. Ed. by Sergey Levine, Vincent Vanhoucke, and Ken Goldberg. Vol. 78. Proceedings of Machine Learning Research. PMLR, Nov. 2017, pp. 314–323.

Presentations

- Seminar at Inria Paris, Paris, France. October 2024.
- 33rd European Conference on Operational Research (EURO 2024), Copenhagen, Denmark, June–July 2024.
- 21st Conference on Advances in Continuous Optimization (EUROPT 2024), Lund, Sweden, June 2024.
- 20th Conference on Advances in Continuous Optimization (EUROPT 2023), Budapest, Hungary, August 2023.
- SIAM Conference on Optimization (OP23), Seattle, USA, May–June 2023.
- Seminar at the Department of Automatic Control, Lund University. Lund, Sweden. May 2023
- SIAM Conference on Computational Science and Engineering (CSE23), Amsterdam, Netherlands, Feb–Mar 2023.
- 1st Workshop on Performance Estimation Problems, UCLouvain, Belgium, Feb 2023.
- Seminar at the Department of Automatic Control, Lund University. Lund, Sweden. June 2022.
- Seminar at the Department of Automatic Control, Lund University. Lund, Sweden. June 2021.

Professional service

Conference organization

- Co-organizer and stream organizer for the 21st Conference on Advances in Continuous Optimization (EUROPT 2024), Lund University, Sweden, June 26–28, 2024.

Peer reviewing: Journals

- IEEE Transactions on Automatic Control

Peer reviewing: Conferences

- Reviewer for the Learning for Dynamics & Control (L4DC) conference, University of Oxford, UK, July 2024.

Awards and honors

- **2024** – Skånska Ingenjörsklubbens Stiftelse Scholarship.
- **2024** – The Royal Physiographic Society of Lund Scholarship.
- **2015–2020** – Nine scholarships awarded by Lund University.
- **2018** – Akademiska Föreningens Stipendienämnd Scholarship.
- **2017** – Carl Erik Levins Stiftelse Scholarship (twice).
- **2017** – Gustaf Söderbergs Stiftelse Scholarship.
- **2016** – Civilingenjören Hakon Hanssons Stiftelse Scholarship.
- **2016** – Winner of Accenture IT Case Challenge, Stockholm.

Skills

Programming languages

- Proficient: Python.
- Experience with: R, MATLAB, Java, SQL, Haskell, Julia, Scala, Spark.