

AI Institute for Advances in Optimization

The Monthly Opt-In Newsletter | May 2024

LETTER FROM THE DIRECTOR

One of AI4OPT's core strengths is bringing people together to achieve things that would not be possible otherwise.



This was on full display at the AI4OPT retreat last week, where more than 60 faculty and students gathered at UC Berkeley to discuss the future of AI and optimization. The event was a great success, with students also organizing a workshop the following day. One topic discussed was the increasing need for trustworthy AI that can be safely deployed in practice. This newsletter puts the spotlight on **Reza Zandehshahvar** and **Thomas Bruys**, who are very active in this area.



Pascal Van Hentenryck

One standout event is the first "High School AI Day," where AI4OPT introduced high school students to AI and optimization through custom games about power systems and supply chains. We are also eagerly anticipating the return of the external advisory board to discuss our achievements and receive guidance on the Institute's future direction.

A number of exciting events are happening, many of which are highlighted in this newsletter.

Member Spotlight



Reza Zandehshahvar is a postdoctoral fellow with the AI4OPT and the H. Milton Stewart School of Industrial and Systems Engineering (ISyE) at Georgia Tech. He earned his Ph.D. in electrical and computer engineering from Georgia Tech in 2023, focusing on developing ML methods for inverse design and knowledge discovery in nanophotonics, as well as enhancing human-machine cooperation for medical image analysis. In his current role at AI4OPT, under the supervision of Professor Pascal Van Hentenryck, he is focused on developing trustworthy AI methods that enable reliable and efficient decision-making within the engineering and healthcare fields.



Reza Zandehshahvar

Advancing Trustworthy AI for

Decision-Making in Healthcare, Supply Chain, and Power Systems

My research focuses on developing trustworthy AI frameworks by integrating machine learning with optimization techniques. The goal is to create robust, explainable, and

adaptable models for decision-making in high-stakes environments such as healthcare, supply chain management, and power systems. Collaborating closely with students and fellow researchers, we push the boundaries of practical AI applications.

My foundational work involves developing uncertainty quantification techniques crucial for sensitive fields like healthcare, supply chain management, and power systems, where decisions significantly impact people's lives. This includes creating AI-assisted decision-making tools for package delivery, planning in supply chain management, and confidence-aware time series prediction.

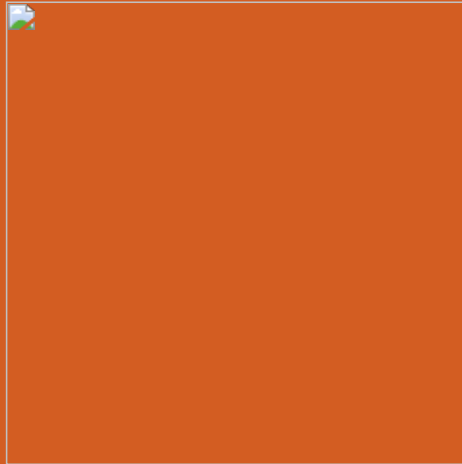
In healthcare, my work at AI4OPT includes a collaboration with Shriners Children's Hospital to improve treatment strategies for children with idiopathic scoliosis. By developing predictive models for children's growth rates and growth cessation using various data sources, we aim to enhance prognosis strategies and tailor treatments according to individual growth trajectories, ultimately improving overall patient outcomes. Ensuring the explainability and trustworthiness of these models is essential.



Spotlight on Zandehshahvar's Achievements

Zandehshahvar has earned numerous awards, including the Georgia Tech Sigma Xi Best Ph.D. Thesis Award, the SPIE Optics and Photonics Education Scholarship, and the Georgia Tech ECE Graduate Research Assistant Excellence Award.

Student Highlight



Meet **Thomas Bruys**, a first-year Ph.D. student in the Supply Chain group at AI4OPT. He holds a dual degree from a French engineering school and Georgia Tech. His journey into optimization began during his master's program in France, focusing on Performance and Risk Management. This interest led him to intern at Hopia, a French startup that optimizes hospital schedules. Later, he pursued his master's degree at Georgia Tech, which inspired him to continue his research in AI4OPT and ultimately pursue a Ph.D. in optimization and machine learning.



Thomas Bruys

Q&A

Q: How are you using AI4OPT to work on projects that improve decision-making and reduce costs in the supply chain industry?

A: Within AI4OPT, I collaborate with Reza Zandehshahvar and Amira Hijazi, both post-docs in the supply chain group, on a project for UPS. Our focus is to develop predictive models for decision shifts between planned and actual decisions made by operators. Accurately predicting and optimizing these decisions is crucial for cost reductions in the industry.

Alongside Reza, I'm also exploring the application of Deep Learning techniques to tabular data, a significant challenge with potential transformative impact similar to its influence in fields like Computer Vision and NLP.

Q: What do you enjoy doing in your free time outside of your professional work?

A: I enjoy watching sports games, particularly basketball, with friends. Since moving to the US, I've become more interested in the sport and even attended an NBA game. I also enjoy dining out and spending quality time with friends at restaurants.

News



[Wenbo Chen's PhD Defense in AI-Optimized Real-time Risk Assessment in Power Systems](#)



[Pascal Van Hentenryck Earns Outstanding AI Presentation Award During HBCU Seminar](#)



High School AI Day 2024

AI4OPT hosted students from Drew Charter High School, who were accompanied by Beth White, Drew Charter's Engineering Teacher and Academic Integration Specialist, for a day of AI exploration. The visit included sessions on power systems, mobility, optimization games, and demonstrations at the Institute's CODA headquarters in Midtown Atlanta's Tech Square.

[Full Recap](#)

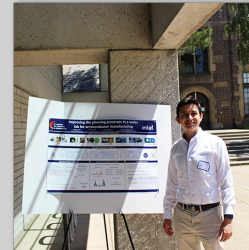


GA Rep. Rick Allen's Office Explores AI and Supply Chain Innovations at AI4OPT Institute



AI4OPT Engages High School Students During Georgia Tech Scholars Weekend Tour

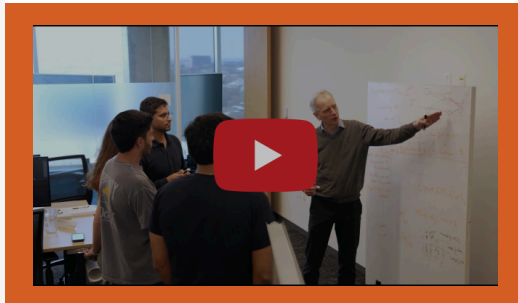
AI4OPT 2024 Retreat



The **AI4OPT 2024 Retreat** took place on April 29 at UC Berkeley, bringing together more than 60 participants for a day of panels and collaborative working groups on AI and optimization. Discussions covered topics such as sequential decision-making, ethical AI, electrification of transportation, and the future of AI and optimization. The retreat included a student poster session and competition, showcasing innovative research projects. The event also offered opportunities for networking and strategic planning as we work toward future progress in the field.

AI4OPT Released New Videos

AI for Clean Energy Transformation



AI4OPT Director Pascal Van Hentenryck discusses AI's potential to enable a renewable energy system, addressing challenges like volatility, electrification, and grid transition. It stresses the importance of trustworthy AI in forecasting, optimization, and risk assessment for a clean energy future.

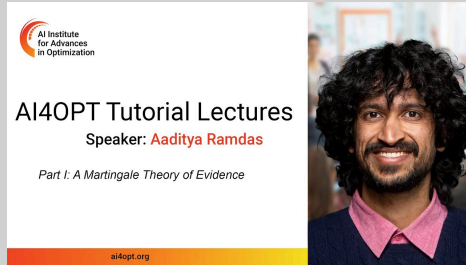
AI-Powered Supply Chain Resilience



AI4OPT Director Pascal Van Hentenryck highlights the need for a new vision integrating resilience, sustainability, and efficiency. He emphasizes AI's role in predicting and managing uncertainty, optimizing processes, and partnering with industry for real-time solutions.

AI4OPT videos are also available in the [Media Center](#).

AI4OPT Seminar Series (Spring 2024)



Watch Latest

AI4OPT Seminars

- [AI4OPT Tutorial Lectures: Aaditya Ramdas](#)
- [AI4OPT Tutorial Lectures: Victor de la Pena](#)
- [AI4OPT Seminar Series: Alex Rakhlin](#)
- [AI4OPT Seminar Series: Robert Freund](#)

Past Seminars

Outreach and Education

AI4OPT Announces Faculty Training Program Cohort 2024 - 2026

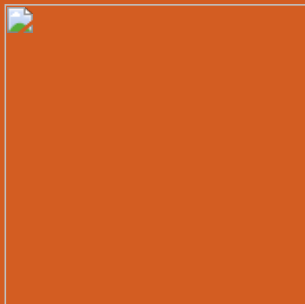
We're excited to welcome Marcia Daley from Clark Atlanta University, Weizheng Gao from Elizabeth City State University, Ming-Lun Ho from Chabot College, Soudeh Khoubrouy from California State University San Marcos, Carlos Olivos Matus from Universidad Católica del Norte, Dorothy Muhammad from Houston Community College, and Qing Shao from Georgia Gwinnett College.



FTP Cohort

Accomplishments and Announcements





Thank you to [Nethan Nagendran](#) for facilitating the teacher training of the Seth Bonder Camp! Nethan participated in the camp as a high school student in 2021, took on a mentorship role in 2022, and led the teacher training in 2023. He has now taken on an important role in leading the professional development trainings.



Publications

The latest AI4OPT publications are now available on [Google Scholar](#).

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