



# AI Institute for Advances in Optimization

The AI4OPT Newsletter | February 2026



AI4OPT prides itself on its commitment to use-inspired research. We seek out real challenges that inspire foundational advances, which then make their way back into industry and society. This approach has led to highly impactful work at the intersection of AI and optimization. This newsletter contains many examples, including spotlights on Dorit Hochbaum and Joe Ye, who are each bridging AI and optimization in different ways to advance the field. AI4OPT was also well represented at the CPAIOR conference, where Junyang Cai won the Best Paper Award, and the Institute had seven papers accepted to PSCC, one of the premier conferences in power systems.

Our unique approach to research continues to be widely recognized around the world. Recently, I had the pleasure of speaking at an AI forum organized by the Royal Society of New South Wales in Australia, as well as at the AI Festival in Vienna. These events bring together academia, industry, government, and the general public to explore how AI is transforming society. It is gratifying that AI4OPT is recognized as a leader in this space and is regularly invited to be part of these conversations.

Closing the loop is essential for maximizing the impact of use-inspired research. We continue to make our work accessible through open-source software, public benchmarks, and technology transfers. Many transfers have already taken place, and

we have several ongoing implementations of AI4OPT research with partners in energy, supply chains, and power systems.

As our research on AI-powered decision-making matures across applications, the time is right to push for a broader paradigm shift in how optimization software is used. To help advance that vision, I have accepted the opportunity to lead Gurobi's AI Innovation Lab, where our insights can directly influence software used around the world. This role strengthens the bridge between AI4OPT and industry, and I look forward to bringing back practical insights that will continue to inform and amplify our work.

- Pascal Van Hentenryck

## AI4OPT Member Spotlight



Dorit S. Hochbaum is a distinguished professor of Industrial Engineering and Operations Research at UC Berkeley and co-PI of AI4OPT. She holds a Ph.D. from the Wharton School at the University of Pennsylvania. Her research spans discrete optimization, network flow, data mining, image segmentation, and supply chain management, with applications in machine learning, experimental design, and resource allocation. Hochbaum has authored more than 200 papers and developed influential algorithms, including the PseudoFlow algorithm and parametric flow techniques.

Dorit Hochbaum | UC Berkeley

She has received numerous honors, including a honorary doctorate from the University of Copenhagen. She is a fellow of INFORMS and SIAM.

### Bridging AI and Optimization

My research integrates artificial intelligence and optimization in two complementary ways.

First, I use AI to make advanced optimization tools accessible to nonexperts. Many real-world problems are computationally complex, and selecting the right solver typically requires deep technical expertise. My group develops meta-algorithms, which are “master algorithms” that analyze a problem instance and automatically select the most effective method from a library of optimization tools.

One example is the real-time Vehicle Routing Problem, where the goal is to assign customers to vehicles in a way that ensures service for all while minimizing total distance or cost. We also design AI systems that coach optimization algorithms as they run, guiding their search and enabling them to find high-quality solutions significantly faster than traditional approaches.

Second, I apply combinatorial optimization, particularly network flow techniques, to strengthen machine learning. Modern AI systems depend heavily on large volumes of labeled training data, which are often expensive, time-consuming, or unreliable to obtain. Network flow models are uniquely suited to capturing complex relationships among data points, allowing high-performance learning even when training data are limited, noisy, or incomplete.

My current work focuses on reducing the need for labeled data by modeling similarities and dependencies efficiently through network flow methods. This approach enables more robust, data-efficient learning systems that are better suited for real-world applications, including defect pattern detection in semiconductor manufacturing.

*In 2024, Hochbaum was also awarded the Khachiyan Prize by the INFORMS Optimization Society, recognizing her extensive contributions to optimization, including her work on the design and analysis of algorithms and their applications across various domains.*



## AI4OPT Student Feature



Joe Ye | Georgia Tech

Joe Ye is a third-year Ph.D. student at Georgia Tech. His research focuses on the intersection of optimization and machine learning, with a particular emphasis on real-world applications in logistics and transportation. His work centers on large-scale decision-making under uncertainty, including machine learning–accelerated optimization and contextual optimization methods. Recently, he has explored the use of large language models in operations research to support decision-making systems.

## Q&A

### **Q: What drives your research in optimization and machine learning?**

A: I've always been motivated by real-world challenges. My passion for this field stems from seeing how mathematical models can be translated into tangible efficiency in our daily lives.

### **Q: What are the main directions of your research?**

A: My work focuses on two primary directions: 1.) Learning to Accelerate Optimization – Leveraging machine learning to speed up large-scale solvers through ML-guided heuristics and end-to-end learning using “optimization proxies.” 2.) Contextual Optimization – Utilizing contextual information to improve optimization outcomes via contextual stochastic optimization, decision-focused learning, and conformal prediction. Most recently, I have expanded my research to explore the intersection of large language models and operations research for decision support systems.

### **Q: What accomplishment are you most proud of?**

A: I am most proud of my collaboration with a major e-commerce company. We've developed a framework that combines mixed-integer programming with distributional forecasting. It's been incredibly rewarding to test on a real-world dataset and demonstrate the value of my work for industrial applications.

### **Q: How do you use AI in your research and career development?**

A: In my research, I use AI as a collaborative tool to solidify complex ideas, assist with

code implementation, and refine my technical writing. On the career front, I've also found AI to be a helpful partner in polishing my CV and framing my research for a broader audience.

**Q: Was there a defining moment that shaped your career path?**

A: My defining moment occurred during my time at Cornell, where I led a group of undergraduates to redesign the final exam scheduling for the entire university. Seeing that research make a direct, positive impact on the campus community solidified my decision to pursue a career dedicated to solving large-scale, real-world logistical problems.

**Q: What skills do you consider essential for success in this field?**

A: A strong mathematical foundation and robust coding skills are essential, but I believe the most important trait is a relentless curiosity to learn new things and adapt to evolving technologies.

**Q: What are your plans after graduation?**

A: After graduation, I aim to pursue a research position in either industry or academia.

**Q: What do you enjoy outside of research?**

A: When I'm not in the lab, I'm a huge soccer fan.



Hongzhao Guan, Ali Moradi, and Joe Ye at the FIFA Club World Cup

## AI4OPT Highlight & News



## AI4OPT // From Vision to National Impact

### 2021

AI4OPT launched as an NSF AI Institute, setting its research vision and partnerships.

### 2022

Core research, education programs, and early industry and government engagement formed.

### 2023

Interdisciplinary research and applied collaborations scaled across various fields.

### 2024

Research translated into real-world applications and broader educational outreach.

### 2025

Research, education, and partnerships aligned with national and industry priorities.

### 2026

AI4OPT emerging as a nationally recognized institute driving sustained AI innovation.

Over the past five years, AI4OPT has grown from a bold vision into a nationally recognized leader in artificial intelligence and optimization. Since launching in 2021 as a National Science Foundation AI Institute, AI4OPT has built a strong foundation of groundbreaking research, interdisciplinary collaboration, and strategic partnerships across academia, industry and government.

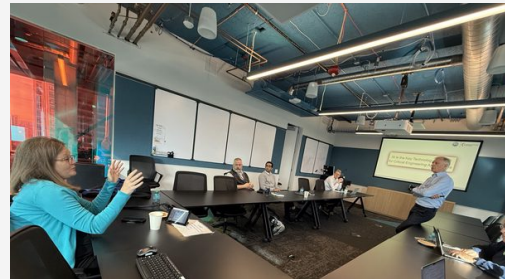
What began as a focused research initiative quickly evolved into a dynamic ecosystem advancing core scientific discovery, expanding education and workforce development programs, and translating innovation into real-world impact. The institute has aligned research and partnerships with national and industry priorities while demonstrating how AI can strengthen infrastructure, support communities and improve complex systems.

Today, AI4OPT stands as a model for sustained research excellence and collaboration, shaping the future of AI and preparing the next generation of leaders in optimization and intelligent systems.

### News



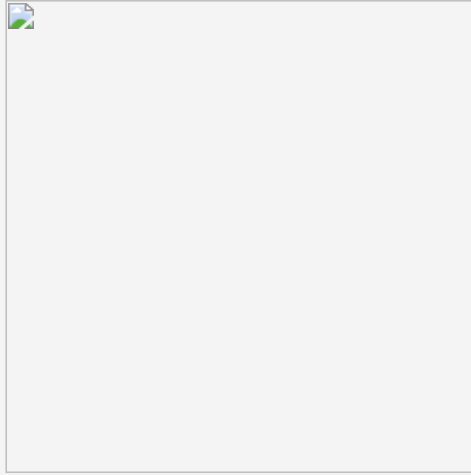
[AI4OPT Director Delivers Keynote at AI Festival in Austria Capital](#)



[AI4OPT and Tech AI Host the General Consul of Belgium at Georgia Tech](#)



[AI4OPT Researchers Present Advances, Earn Awards at CPAIOR](#)



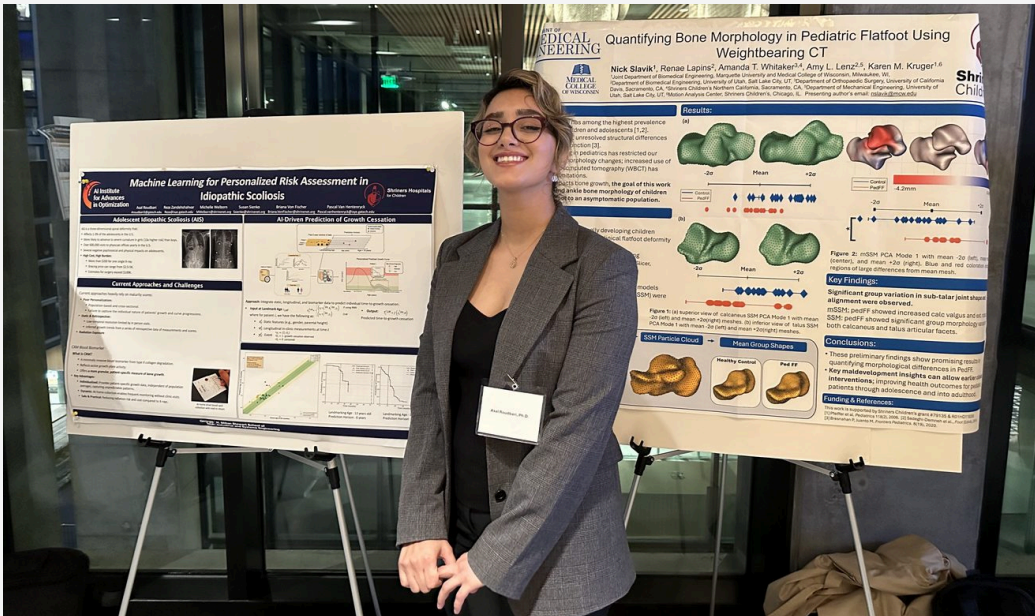
Return of the AI4OPT Seminar Series



AI4OPT Managing Director Speaks at Learners and Leaders Forum



AI4OPT Director Spotlights AI in Australia



AI4OPT Researcher Earns Best Poster Award for Shriners Collaboration

A collaborative research project between AI4OPT and Shriners Children’s earned top recognition at a recent Shriners–Georgia Tech event, with doctoral researcher Asal Roudbari receiving a Best Poster Award for her work applying AI to pediatric healthcare. The team, led by Reza Zandehshahvar, is developing advanced AI models to improve risk assessment and clinical decision-making for adolescent idiopathic scoliosis. Using complex, real-world longitudinal patient data, the research aims to enable earlier intervention, more personalized treatment plans, and better outcomes for children and their families.

**Upcoming Events and Conferences**



[AI4OPT Seminar: Pierre Schaus](#)



Coming Soon | AI4OPT TechFest 2026



[CPAIOR 2026](#)



[PSCC 2026](#)

## Publications

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