# AI Institute for Advances in Optimization

**Opt-In Newsletter** | January 2025

As we step into 2025, my wish for AI4OPT is to continue empowering people and organizations to harness the transformative power of AI. Our institute has a long track record of building responsible AI systems that create significant value across various sectors, including power systems and supply chains.

We are thrilled to announce a groundbreaking new project with the Power Systems Engineering Research Center starting this month. Additionally, we are excited to welcome Eli Kuperman as our new Corporate Relations Program manager. He will help drive impactful AI solutions.

Education remains a cornerstone of AI4OPT's efforts to empower people. After graduating, our former Ph.D. students continue to bring value with AI and optimization in a wide variety of roles. This newsletter spotlights Chung Jae Lee, one of these students. Furthermore, AI4OPT programs like the Seth Bonder Camp for high school students continue to inspire the next generation of AI and optimization enthusiasts.

AI4OPT is also helping legislators learn more about AI to support them in their public roles, enabling them to make informed decisions. For example, I had the privilege of serving on the bipartisan Georgia Senate Study Committee on Artificial Intelligence,

where we discussed the opportunities and challenges of AI. Our latest initiative is an AI workshop for the incoming class of Georgia legislators so they can start their terms with a solid understanding of AI.

As we look ahead, I am confident that AI4OPT will continue to make a lasting impact by integrating AI and optimization to solve complex challenges. Together, we are poised to tackle new opportunities, drive innovation, and empower individuals and organizations to achieve their full potential. Let's make 2025 a year of remarkable progress.

- Pascal Van Hentenryck

## AI4OPT Member Spotlight


### Shaping the Future of Freight Optimization

I believe my research made three main contributions. First, I proposed a framework using a scalable flow-based mixed-integer programming (MIP) model to design autonomous transfer hub networks (ATHNs) and optimize delivery schedules. This framework efficiently managed large-scale systems and demonstrated the cost-saving potential of autonomous trucking through sensitivity analyses with real-world data. Second, I introduced a framework combining MIP and constraint programming to optimize hub utilization within ATHNs. This approach reduced hub capacity requirements by adjusting schedules, enhancing operational efficiency. Lastly, I proposed a framework to assess the impacts of ATHNs on the U.S. freight market. This framework evaluated cost savings and labor market dynamics under various adoption scenarios, offering valuable insights for policy planning and the national-scale implementation of ATHNs.

My research provides optimization frameworks for studying large-scale ATHN systems. These frameworks help the freight industry explore how to adapt to the future market with the adoption of self-driving technology, offering insights into cost savings and labor market impacts by testing multiple operational scenarios.

My research has been featured in media outlets such as *The Wall Street Journal* and *Bloomberg*. Ryder also published a white paper and videos on the ATHN work, helping to share insights on the potential impact of this technology in the freight industry.

#### Looking Toward The Future

My career aspiration lies in industry, where I can stay close to practical problems and apply optimization techniques to large-scale challenges. I believe this environment offers valuable

opportunities to work on impactful, real-world problems. Currently, as a Discrete Optimization Scientist at ExxonMobil, I am experiencing this directly through projects focused on solving service network design problems in the company's pipeline network.

## Beyond The Office

My current interests revolve around raising my baby son and caring for our dog. Since becoming a parent, I've been learning a lot about child-rearing. It has only been a few weeks since I moved to Houston, so I've been spending time with my family and our dog, exploring different parts of the city together.


Check Out Chung Jae Lee's Research

# AI4OPT Management Spotlight

"I'm Eli Kuperman, and I'm the Corporate Relations Manager for AI4OPT. While reporting through the Office of Corporate Engagement, I'm fully assigned to AI4OPT. My role, in practice, is to foster new engagements with corporations looking to collaborate on projects in the field of AI Optimization, as well as steward existing relationships with our corporate partners. I also work with our researchers to make sure they are taken care of, especially regarding interactions with our industry partners."

## Fostering Corporate Relationships

I earned my B.S. in Business Administration from Georgia Tech in May 2024. During my time there, I had the privilege of serving as Team Lead for Georgia Tech Motorsports (GTMS), the campus Formula Student team. Leading a group of 103 students, we designed, built, and competed with a race car against teams from around the globe.

In this role, I closely collaborated with the Office of Corporate Engagement to manage industry partnerships for GTMS. That experience sparked my passion for building meaningful relationships between academia and industry. When I discovered the Corporate Relations role with AI4OPT, I immediately knew it was the perfect fit—an opportunity to

work on cutting-edge technology while contributing to a dynamic team. I'm also currently pursuing a M.S. in Economics at Georgia Tech.

**My Responsibilities**

- Building new industry connections and identifying opportunities for partnerships and projects.
- Maintaining and strengthening relationships with AI4OPT's existing industry collaborators.
- Supporting researchers by onboarding new students to projects.
- Organizing events that bring industry partners together to share knowledge and insights.

## Beyond The Office

In my free time, I enjoy playing video games with friends, braving hot yoga with my girlfriend, and going to theater performances and movies. I also draw (though not particularly well) and am an avid reader. And, of course, I'll never pass up a good cup of coffee!

## Words Of Inspiration

"Do or do not, there is no try"- Jedi Master Yoda

My dad would say this to me anytime I used the word "try" in asentence. Though annoying, it did prove helpful.

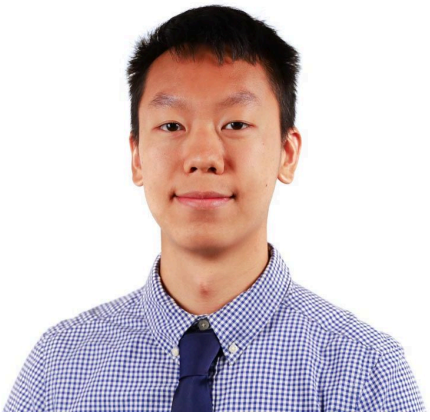
# News and Featured Events

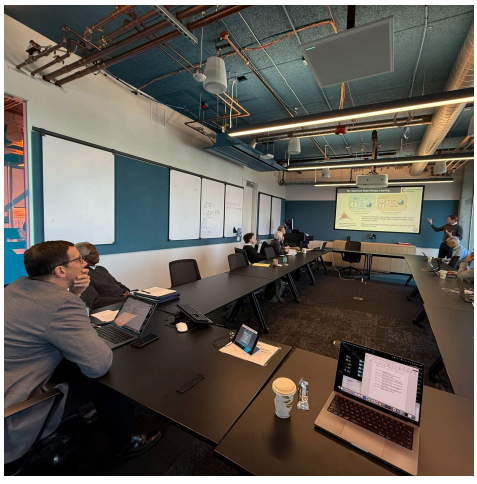
French Transmission Operator, RTE, Collaborates with Pascal Van Hentenryck

Priya Donti put on a seminar exploring machine learning in conjunction with climate and energy.

AI Takes Center Stage in Georgia's Legislative Agenda

On Tuesday, December 03, 2024, the Senate Study Committee on Artificial Intelligence finalized 22 recommendations to guide Georgia's response to AI. In its eighth and final meeting at the Capitol, the nine-member committee unanimously approved a detailed 185-page report. The document's key recommendations focus on state and local government, education and workforce development, public safety, healthcare, transparency and accountability, and industry-specific findings for entertainment, agriculture, and manufacturing. The committee, chaired by Sen. John Albers, included AI4OPT Director Pascal Van Hentenryck. "The committee did outstanding work engaging with many stakeholders across the state, learning about AI's role in key economic sectors, about AI education, the opportunities and dangers of AI, and potential legislation to balance innovation with the well-being of Georgia residents. It was a true privilege to be part of this committee, and the report has already drawn praise around the country," said Van Hentenryck.





Kevin Wu, Anderson-Interface Fellowship Recipient.

AI4OPT hosted Daniel Linzell, NSF Division Director of Civil, Mechanical and Manufacturing Innovation (CMMI) at Georgia Tech.

## Upcoming Events

Southeastern Energy Conference


2025 AI4OPT Retreat & Student Day


QUAD-AI ENGAGE Workshop 2025 on AI and Digital Agriculture

## Publications

*AI4OPT publications available on **Google Scholar***

Engage with the NSF AI4OPT Institute on Social Media