



THE MONTHLY OPT-IN



AI4OPT Monthly Newsletter

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ai4opt.org

FROM THE DIRECTOR

From the beginning, research activities at AI4OPT have been complemented by ambitious educational programs to democratize access to AI education, AI research, and the AI job market. This includes partnerships with high schools to offer dedicated longitudinal training camps in AI and data science (the Seth Bonder Camps), partnerships with community colleges to build degree programs in AI (the Faculty Training Program), and a partnership with HerWILL to empower women of color and help them enter the STEM field.

These programs have reached dozens this year alone, and we are already seeing the benefits for the people involved: high-schoolers in the Seth Bonder Camp are coming back next year to mentor the new cohort; participants in the faculty training program are preparing for joint research with AI4OPT; and the ties with the HerWILL community are growing ever stronger, for example with Bistra Dilkina sharing her story in the monthly HerWILL meet-up, and AI4OPT setting up research internships for next year.



These early successes were only possible because of exceptional people both within and outside of AI4OPT.

This newsletter highlights two of those people: student Michael Klamkin, who used his passion for teaching to fill the role of head teaching assistant (TA) in the Seth Bonder Camp, and Charles Pierre, whose vision and ambition are a driving force in the Faculty Training Program. But we are not stopping there: my New Year's resolution for AI4OPT is to scale these programs to reach thousands over the coming years, and we are working hard to make that happen. Happy holidays!

- Pascal Van Hentenryck

MANAGEMENT MEMBER SPOTLIGHT

WORK AND CONTRIBUTIONS OF AI4OPT TEAM MEMBERS

Charles Pierre is the thrust leader for the educational and diversity initiatives of AI4OPT. Pierre also leads the Undergraduate Initiative at Clark Atlanta University (CAU), which also consist of offering and assisting in data science and artificial intelligence courses. Pierre is also an associate professor of mathematics at CAU and a 2020 INFORMS DEI Fellow.



AI4OPT's Educational and Diversity Thrust

Written by Charles B. Pierre

Supporting the growth of underrepresented populations in artificial intelligence (AI) is not only vital in the step for AI equity and inclusion, but also important to help empower future leaders and teachers across the world. We saw that there was a dearth of Black and Hispanic Americans in the field of AI— particularly in operations research and analytics and data sciences. AI4OPT has created strategies and programs to bolster and increase the numbers of underrepresented minorities in the field of AI.

Our Institute is using the “decision tree” approach whereby we train college and university professors, and university professors. This approach allows them to go back and train their respective undergraduate students; thereby, creating a pipeline for their students to enter the field of AI.

Last June, we introduced the first cohort of the AI4OPT Faculty Training Program. The program, held at Georgia Tech, consisted of faculty members from Historically Black Colleges and Universities (HBCU's) and Minority Serving Institutions (MSI's) from states including Georgia, California, Texas, and Virginia. The three-year program is comprised of courses in AI data science and course design.

In today's ever-evolving higher education landscape, we see that schools are beginning to recognize the importance of investing in faculty training programs much like this one. Fundamentally, higher education faculty have built their careers around learning and teaching, so they understand the importance of continual education. For many of the instructors who participated in the program, they take it upon themselves to seek out learning opportunities and create ones if they are not provided the options or means at their institution.



The work we are doing is innovative, forward-thinking, and revolutionary. We aim to establish a minor or major data science program for each of the participants' home institutions, as each participant will be equipped to set up joint research projects with AI4OPT researchers at Georgia Tech, UC Berkeley, and the University of Southern California to eventually host their own data science seminars and workshops.

Click links to see more of Pierre's work:

- The Longitudinal Education Programs of AI4OPT
- Kara Tucker, Editor of OR/MS Today talks with INFORMS member and 2020 DEI Ambassador Charles Pierre from Clark Atlanta University.



The inaugural AI4OPT TechFest featured Georgia Tech President, Ángel Cabrera, Executive Vice President for Research, Chaouki Abdallah, and presentations from core industry partners.



Stephanie Sigler, AI4OPT's Corporate Relations Manager coordinated the half-day event.



Presenters



Nathan Call
Bank of America



Anne-Flore Elard
Kinaxis



AHassan Lionel
Hijazi
LANL



Lama Nachman
Intel



Jon Orwant
Google AI



Rajneesh Vijh
Bank of America



Yentai Wan
UPS





STUDENT HIGHLIGHTS

GET TO KNOW OUR STUDENTS AND THEIR CONTRIBUTIONS!

Meet Michael Klamkin, a senior industrial engineer major at Georgia Tech. He joined the energy systems group in early 2021, and currently focuses on extending active learning to optimization proxy learning. More specifically, Klamkin works with the alternating current optimal power flow (ACOPF) problem, which is an NP-hard optimization problem that determines the optimal way to control power grids.



While current tools cannot solve the ACOPF quickly enough to be useful in practice, proxy models—typically neural networks—are used instead. However, proxies themselves require a substantial amount of time to obtain in the first place, from generating the dataset to training the model. Klamkin's work focuses on creating a balance between the two to reduce the overall time required to obtain a proxy model so that they can be deployed reliably in the real world.

Q: What sparked your interest in artificial intelligence (AI) and optimization?

A: Like anyone else, I want my work to contribute to a better world. Optimization helps conceptualize this by creating a mathematical framework to define precisely what “better” means, and what a particular system's constraints look like. Optimization has already demonstrated positive impacts on the world and fusing it with AI at the methodological level will create techniques more powerful and more applicable than ever before.

Q: What's something unique about you?

A: I love teaching! I was a tutor in high school, and now I'm a teaching assistant (TA) for an optimization course at Georgia Tech. This past summer, I was the head TA for the Seth Bonder Camp in Computational and Data Science for Engineering, which is designed to give high school students a better understanding of career paths and other opportunities available in industrial engineering and operations research. It was incredibly rewarding to teach younger, disadvantaged students—it really felt as though I was making a difference in their lives, while giving my attention to those who need it most.

Q: Tell us something fun you do when you're not studying or doing research work?

A: Amidst a chaotic semester, carving out the time to hang out with my friends, play the piano, and care for my plants and pets has been key to keeping me going. I'm also fascinated by the way the world around me works and came to be, so I really enjoy listening to talks, particularly about cosmology and neuroscience.

AI4OPT Student Leaders Introduce Plans for Student Activities

The Student Leadership Council (SLC) is committed to serving AI4OPT students and activities. While student leaders are actively working to recruit more students from our partnering universities and institutions, initial plans include virtual student days to connect with more students, host thesis competitions and connect with our industry partners to help build a resume book.



NEWS & PUBLICATIONS

CURATED COVERAGE OF OUR RESEARCH AND EVENT APPEARANCES



AI4OPT FALL 2022 RETREAT

Principal investigators, researchers and the members of the management team gathered last month at Georgia Tech for discussions and brain-storming sessions during the hybrid retreat. AI Research topics included education, ethics, integration, and scoping new research projects.

During the retreat our newest management team members, Breon Martin, director of communications, and Stephanie Sigler, corporate relations manager introduced themselves, while Rachel Harris introduced the newly installed AI4OPT Student Leadership Council 2023, with presentations by AI4OPT's new faculty Scott Moura and Barna Saha.

The Institute has accomplished a lot this year, and we're excited to achieve more AI and optimization break-throughs in the year ahead.

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SEMESTER SEMINAR SERIES WRAPS UP

The last AI4OPT Seminar of Fall 2022 series ended with a presentation from Weijun Xie, an assistant professor in the Georgia Tech H. Milton Stewart School of ISyE, and his Ph.D. student, Yongchun Li.

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AI4OPT TUTORIAL

AI4OPT offered a four-day tutorial, which consisted of four white-board lectures presented by Subhabrata Sen, an assistant professor of statistics at Harvard University.

[Read More](#)

HIGHLIGHTED PUBLICATIONS

Recent publications show how AI4OPT is combining AI and optimization in a variety of ways, involving optimization proxies, reinforcement learning, and learning parameters that speed up the solvers

- Asín-Achá, R., Goldschmidt, O., Hochbaum, D., & Huerta, I. (2022). Fast algorithms for the capacitated vehicle routing problem using machine learning selection of algorithm's parameters. *Proceedings of the 14th International Joint Conference on Knowledge Discovery, Knowledge Engineering and Knowledge Management*. Retrieved from <https://doi.org/10.5220/0011405400003335>
- Chen, W., Park, S., Tanneau, M., & Van Hentenryck, P. (2021, December 27). *Learning optimization proxies for large-scale security-constrained economic dispatch*. arXiv.org. Retrieved from <https://arxiv.org/abs/2112.13469>
- Yuan, E., Chen, W., & Hentenryck, P. V. (n.d.). *Reinforcement learning from optimization proxy for ride-hailing vehicle relocation*. *Journal of Artificial Intelligence Research*. Retrieved from <https://www.jair.org/index.php/jair/article/view/13794/26867>

MARK YOUR CALENDAR!

Upcoming AI4OPT Events

The AI4OPT Seminar Series is returning for the 2023 Spring academic semester and will feature seminars on a wide range of AI and optimization topics.

The series, coordinated by Siva Theja Maguluri, is heading into its 2nd year. So far, the series has hosted over 10 speakers around the country and world. Presentations have and will continue to be open to the public.

Artificial intelligence (AI) and machine learning (ML) majors, faculty and researchers are encouraged to sign up and attend.



For upcoming schedule and past seminars, click [here](#).

Don't forget to sign up to our mailing list to receive the latest seminar information by clicking [here](#).

[FULL EVENT LIST](#)

Conferences

AI4OPT members attend Summit for AI Institutes Leadership (SAIL)
December 12-15, 2022
Asilomar Hotel and Conference
Grounds, Pacific Grove CA



Hosted by:  **AIVO**
AI Institutes
Virtual Organization

[LEARN MORE](#)

OUTREACH

DIVE INTO OUR WORK!

Partnering with HBCU's and MSI's

Through AI4OPT's innovative educational partnerships, students attending historically Black high schools, colleges and universities and other minority-serving institutions, from states including Georgia, California, Texas and Virginia, can take a wider variety of courses in AI, optimization, and a variety of courses in STEM.

The Institute is looking to collaborate and help HBCU's and MSI's create these pathways and would like to hear from you.



If you are interested in programs such as the Seth Bonder Camp or our Faculty Training Program, we'd love to hear from you.

AI4OPT is funded by the [National Science Foundation](#).



CONNECT WITH US!

We aim to broaden community contribution through the development of an AI and mathematical optimization-based system to address societal challenges in energy, logistics and supply chains, resilience, and sustainability and circuit design and control.

Subscribe and follow us to learn more about our latest projects and research and upcoming community events. If you are interested in media relations or AI4OPT's research, education and partnership initiatives email and call us by clicking [here](#).

Email, subscribe, and follow us to learn more!

