UNIVERSITY OF MINNESOTA

Minnesota Robotics Institute

ROB 8970 | **ROBOTICS COLLOQUIUM** | **FALL 2025**

Class Report – Lecture 2 (09/12/2025)

Speaker : Prof. Aryan Deshwal

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Prof. Deshwal gave an engaging talk on how AI can speed up scientific discovery by reducing the need for endless trial-and-error experiments. He showed how methods like Bayesian optimization let researchers test ideas on the computer first and then focus only on the most promising ones. Examples ranged from designing new drugs and materials to creating cleaner concrete and more efficient computer chips. The talk highlighted how AI can help balance hard decision making, save time and resources, and open new paths for innovation.

Questions

- How can students with little background in AI start learning about tools like Bayesian optimization?
- What are some real-world skills we should focus on if we want to work in this area?
- When multiple goals conflict, how do scientists and engineers select the Pareto optimal solution?

Comments

- I liked how the professor showed that robotics faces the same challenges as scientific fields like drug discovery and material design. It made the ideas easier to connect with.
- Bayesian optimization and surrogate models were explained in a very approachable way, showing how they help reduce unnecessary experiments instead of being just abstract math.
- The sustainability examples, like carbon capture, green concrete, and hydrogen storage, made the talk feel relevant to real-world problems we hear about every day.
- The idea of balancing exploration and exploitation was especially memorable and reminded me of similar decisions in robotics research.

What I Liked

- I liked how the professor used real-world examples, like cleaner concrete and chip design. It helped me picture where these ideas actually get used.
- The part about exploration v/s. exploitation clicked for me because it felt like the same decision I make in coding projects, do I try something new or go with what already works?

Areas for Improvement

- The lecture was full of technical details. more visual and real life examples or simplified diagrams could have helped.
- Stronger connection to current robotics specific research problems at UMN would have made the talk even more relatable.

Overall Assessment

The lecture gave a clear view of how AI can speed up scientific discovery by reducing expensive trial-and-error experiments. Professor Deshwal discussed how methods like Bayesian optimization and surrogate models can help scientists toward better results with fewer testing. I liked that the talk didn't just stay technical, it included real-world examples like cleaner concrete, hydrogen storage, and chip design, which made the ideas easier to connect with. The mix of practical applications and a bigger picture impact made the session both informative and interesting, especially for students like me who are interested in robotics and AI.