SOUTH AFRICAN COUNCIL FOR AUTOMATION AND CONTROL

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IFAC DISTINGUISHED LECTURER

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Winokur Family Professor of Electrical Engineering and Applied Mathematics

Na Li is a Winokur Family Professor of Electrical Engineering and Applied Mathematics at Harvard University. She received her Bachelor's degree in Mathematics from Zhejiang University in 2007 and PhD degree in Control and Dynamical systems from California Institute of Technology in 2013. She was a postdoctoral associate at the Massachusetts Institute of Technology 2013-2014. She has held a variety of short-term visiting appointments including the Simons Institute for the Theory of Computing, MIT, and Google Brain.

Her research lies in the control, learning, and optimization of networked systems, including theory development, algorithm design, and applications to real-world cyber-physical societal system. She has been an associate editor for IEEE Transactions on Automatic Control, Systems & Control Letters, IEEE Control Systems Letters, and served on the organizing committee for a few conferences. She received the NSF career award, AFSOR Young Investigator Award, ONR Young Investigator Award, Donald P. Eckman Award, McDonald Mentoring Award, IFAC Distinguished Lecture, and IFAC Manfred Thoma Medal, along with other awards. READ MORE

REPRESENTATION-BASED LEARNING AND CONTROL FOR DYNAMICAL SYSTEMS

ABSTRACT

The explosive growth of machine learning and data-driven methodologies have revolutionized numerous fields. Yet, adapting these successes to the domain of dynamical physical systems remains a significant challenge. Closing the loop from data to actions in these systems faces many difficulties, stemming from the need for sample efficiency and computational feasibility, along with many other requirements such as verifiability, robustness, and safety. In this talk, we bridge this gap by introducing innovative representations to develop nonlinear stochastic control and reinforcement learning methods. The key in the representation is to represent the stochastic, nonlinear dynamics linearly onto a nonlinear feature space. We present a comprehensive framework to develop control and learning strategies that achieve efficiency, safety, robustness, and scalability with provable performance. We also show how the representation could be used to close the sim-to-real gap. Lastly, we will briefly present some concrete real-world applications, discussing how domain knowledge is applied in practice to further close the loop from data to actions.

University of Pretoria

8 October 2024 | 17h30 for 18h00-19h00

Venue: Exhibition Space, Engineering 1

REGISTER:

ATTEND IN PERSON: https://bit.ly/3MSbbZH

Stellenbosch University

9 October 2024 | 17h30 for 18h00-19h00

Venues: Neelsie Cinema and online

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ATTEND ONLINE: https://bit.ly/4eauzN4

The event is hosted in collaboration with the National Institute for Theoretical and Computational Sciences (NITheCS), as well as support from the International Federation of Automatic Control (IFAC).