

Mathematical Challenges and Opportunities for Autonomous Vehicles

September 14 - December 18, 2020

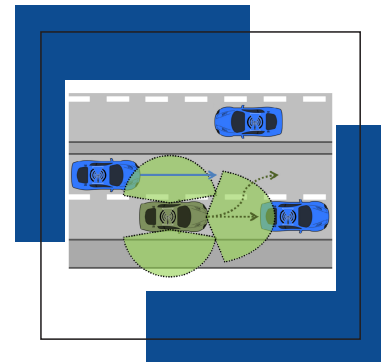
Scientific Overview

Autonomous vehicle (AV) research and development has achieved a similar status in terms of money invested, societal excitement, and media coverage as space travel and exploration. At the same time, AV research is not rocket science; it is more complicated: while in itself, an AV is no more complex than a spacecraft, it must reliably interact and communicate with many other agents, particularly humans both inside and outside of the vehicle, much of it in a decentralized fashion. Hence, AVs, and their impact on us humans and our transportation systems, incur some of the most complicated science and engineering challenges that we shall face in the near future. At the same time, there is some disconnect across the various research communities: professional product development is highly opaque, and public expectations and media communications are frequently inaccurate or exaggerated.

This long program aims to address these problems by connecting research communities, bridging gaps between theory and practice, exposing software experts to hardware and vice versa, and bringing mathematicians, other scientists, and engineers together to shape the research and development agenda on AVs, both in terms of individual and holistic components.

Long Program Schedule

- Opening Day. September 14, 2020.
- Tutorials. September 15-18, 2020.
- Workshop I: Individual Vehicle Autonomy: Perception and Control. October 5-9, 2020.
- Workshop II: Safe Operation of Connected and Autonomous Vehicle Fleets. October 26-30, 2020.
- Workshop III: Large Scale Autonomy: Connectivity and Mobility Networks. November 16-20, 2020.
- Workshop IV: Social Dynamics beyond Vehicle Autonomy. November 30-December 4, 2020.
- Culminating Retreat at Lake Arrowhead. December 13-18, 2020.



Organizers

Ruzena Bajcsy (UC Berkeley), Paola Goatin (INRIA), Jana Kosecka (George Mason University), Hani Mahmassani (Northwestern University), Benedetto Piccoli (Rutgers University), Benjamin Seibold (Temple University), Jonathan Sprinkle (University of Arizona), and Daniel Work (Vanderbilt University).

Participation

This long program will involve senior and junior researchers from several communities relevant to this program. You may apply for financial support to participate in the entire fourteen-week program, or a portion of it. We prefer participants who stay for the entire program. Applications will be accepted through **May 29, 2020**, but offers may be made up to one year before the start date. We urge you to apply early. Mathematicians and scientists at all levels who are interested in this area of research are encouraged to apply for funding. Supporting the careers of women and minority researchers is an important component of IPAM's mission and we welcome their applications. More information and an application is available online.

