Stanford

Somil Bansal

Assistant Professor of Aeronautics and Astronautics

Bio

BIO

Somil Bansal is an assistant professor at the Department of Aeronautics and Astronautics at Stanford. Before joining Stanford, he was an assistant professor in the ECE department at the University of Southern California. He received an MS and a Ph.D. in Electrical Engineering and Computer Sciences (EECS) from the University of California at Berkeley in 2014 and 2020, respectively. Before that, he obtained a B.Tech. in Electrical Engineering from the Indian Institute of Technology, Kanpur in 2012. After his PhD, he spent a year as a Research Scientist at Waymo (formerly known as the Google Self-Driving Car project). He has also collaborated closely with companies like Skydio, Google, Boeing, as well as NASA AMES/JPL. Somil is broadly interested in developing mathematical tools and algorithms for the control and analysis of safety-critical autonomous and robotic systems, with a special emphasis on ensuring the safety of learning-enabled systems. Somil has received several awards, most notably the NSF CAREER award, the Eli Jury Award at UC Berkeley for his doctoral research, the RSS Pioneer Award, and the Outstanding Graduate Student Instructor Award.

ACADEMIC APPOINTMENTS

- Assistant Professor, Aeronautics and Astronautics

HONORS AND AWARDS

- CAREER Award, NSF (2022)
- Eli Jury Award, UC Berkeley (2020)
- RSS Pioneer, RSS (2019)
- Outstanding Graduate Student Instructor Award, UC Berkeley (2019)

PROFESSIONAL EDUCATION

- PhD, UC Berkeley , Electrical Engineering and Computer Sciences (2020)
- MS, UC Berkeley , Electrical Engineering and Computer Sciences (2014)
- BTech, IIT Kanpur , Electrical Engineering (2012)

Teaching

COURSES

2025-26

- Introduction to Control Design Techniques: ENGR 205 (Win)
- Principles of Safety-Critical Autonomy: AA 276 (Spr)

2024-25

- Introduction to Control Design Techniques: ENGR 205 (Win)
- Principles of Safety-Critical Autonomy: AA 276 (Spr)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Maximilian Adang, Timothy Chen, Romeo Valentin, Isaac Ward

Doctoral Dissertation Advisor (AC)

Colton Crosby, Zeyuan Feng, Aryaman Gupta, Albert Lin

Orals Evaluator

Romeo Valentin

Master's Program Advisor

Zeb Barry, Lucie Giannoni, Aditya Kothari, Emily Parkerson, Ottavia Personeni, Yash Rampuria

Doctoral (Program)

Sathwik Karnik

Publications

PUBLICATIONS

- **Safety-Aware Imitation Learning via MPC-Guided Disturbance Injection** *IEEE ROBOTICS AND AUTOMATION LETTERS*
  Qiu, L., Ciftci, Y., Bansal, S.
  2026; 11 (6): 7222-7229
- **Safety Evaluation of Motion Plans Using Trajectory Predictors as Forward Reachable Set Estimators** *IEEE ROBOTICS AND AUTOMATION LETTERS*
  Chakraborty, K., Feng, Z., Veer, S., Sharma, A., Ding, W., Topan, S., Ivanovic, B., Pavone, M., Bansal, S.
  2026; 11 (3): 3262-3269
- **One Filter to Deploy Them All: Robust Safety for Quadrupedal Navigation in Unknown Environments** *IEEE TRANSACTIONS ON ROBOTICS*
  Lin, A., Peng, S., Bansal, S.
  2026; 42: 545-560
- **DualGuard MPPI: Safe and Performant Optimal Control by Combining Sampling-Based MPC and Hamilton-Jacobi Reachability** *IEEE ROBOTICS AND AUTOMATION LETTERS*
  Borquez, J., Raus, L., Ciftci, Y., Bansal, S.
  2025; 10 (7): 6944-6951
- **Stable-BC: Controlling Covariate Shift With Stable Behavior Cloning** *IEEE ROBOTICS AND AUTOMATION LETTERS*
  Mehta, S. A., Ciftci, Y., Ramachandran, B., Bansal, S., Losey, D. P.
  2025; 10 (2): 1952-1959
- **A Physics-Informed Machine Learning Framework for Safe and Optimal Control of Autonomous Systems**
  Tayal, M., Singh, A., Kolathaya, S., Bansal, S.
  edited by Singh, A., Fazel, M., Hsu, D., Lacoste-Julien, S., Berkenkamp, F., Maharaj, T., Wagstaff, K., Zhu, J.
  JMLR-JOURNAL MACHINE LEARNING RESEARCH.2025: 59237-59258
- **Linear Supervision for Nonlinear, High-Dimensional Neural Control and Differential Games**
  Sharpless, W., Feng, Z., Bansal, S., Herbert, S.
  edited by Ozay, N., Balzano, L., Panagou, D., Abate, A.
  JMLR-JOURNAL MACHINE LEARNING RESEARCH.2025: 365-377

- **Updating Robot Safety Representations Online from Natural Language Feedback**
  Santos, L., Li, Z., Peters, L., Bansal, S., Bajcsy, A.
  edited by Ott, C.
  IEEE.2025: 7778-7785
- **System-Level Safety Monitoring and Recovery for Perception Failures in Autonomous Vehicles**
  Chakraborty, K., Feng, Z., Veer, S., Sharma, A., Ivanovic, B., Pavone, M., Bansal, S.
  edited by Ott, C.
  IEEE.2025: 12885-12891
- **Exact Imposition of Safety Boundary Conditions in Neural Reachable Tubes**
  Singh, A., Feng, Z., Bansal, S.
  edited by Ott, C.
  IEEE.2025: 5489-5495
- **Reachability Analysis for Black-Box Dynamical Systems**
  Chilakamarri, V., Feng, Z., Bansal, S.
  edited by Ott, C.
  IEEE.2025: 3552-3558
- **SAFE-GIL: SAFEty Guided Imitation Learning for Robotic Systems**
  Ciftci, Y., Chiu, D., Feng, Z., Sukhatme, G. S., Bansal, S.
  edited by Ott, C.
  IEEE.2025: 3559-3566
- **Providing Safety Assurances for Systems With Unknown Dynamics** *IEEE CONTROL SYSTEMS LETTERS*
  Wang, H., Borquez, J., Bansal, S.
  2024; 8: 1108-1113
- **Cooptimizing Safety and Performance With a Control-Constrained Formulation** *IEEE CONTROL SYSTEMS LETTERS*
  Wang, H., Dhande, A., Bansal, S.
  2024; 8: 2739-2744
- **Detecting and Mitigating System-Level Anomalies of Vision-Based Controllers**
  Gupta, A., Chakraborty, K., Bansal, O., IEEE
  IEEE.2024: 9953-9959
- **On Safety and Liveness Filtering Using Hamilton-Jacobi Reachability Analysis** *IEEE TRANSACTIONS ON ROBOTICS*
  Borquez, J., Chakraborty, K., Wang, H., Bansal, S.
  2024; 40: 4235-4251
- **Provably Safe and Scalable Multivehicle Trajectory Planning** *IEEE TRANSACTIONS ON CONTROL SYSTEMS TECHNOLOGY*
  Bansal, S., Chen, M., Tanabe, K., Tomlin, C. J.
  2021; 29 (6): 2473-2489
- **Visual Navigation Among Humans With Optimal Control as a Supervisor** *IEEE ROBOTICS AND AUTOMATION LETTERS*
  Tolani, V., Bansal, S., Faust, A., Tomlin, C.
  2021; 6 (2): 2288-2295
- **A Hamilton-Jacobi Reachability-Based Framework for Predicting and Analyzing Human Motion for Safe Planning**
  Bansal, S., Bajcsy, A., Ratner, E., Dragan, A. D., Tomlin, C. J., IEEE
  IEEE.2020: 7149-7155
- **Robust Sequential Trajectory Planning Under Disturbances and Adversarial Intruder** *IEEE TRANSACTIONS ON CONTROL SYSTEMS TECHNOLOGY*
  Chen, M., Bansal, S., Fisac, J. F., Tomlin, C. J.
  2019; 27 (4): 1566–82
- **Reachability-Based Safety Guarantees using Efficient Initializations**
  Herbert, S. L., Bansal, S., Ghosh, S., Tomlin, C. J., IEEE

IEEE.2019: 4810-4816

- **Closed-loop Model Selection for Kernel-based Models using Bayesian Optimization**
  Beckers, T., Bansal, S., Tomlin, C. J., Hirche, S., IEEE
  IEEE.2019: 828-834