

## **Ali Kashani**

Interested in Artificial Pancreas, Nonlinear Systems, and Informed Machine Learning

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## **EDUCATION**

### **Ph.D. in Mechanical Engineering**

University of New Mexico (UNM), United States

2021 to 2025

Thesis title: Data-Driven Constrained Control

Committee: Claus Danielson (advisor), Meeko Oishi, Rafael Fierro, Wenbin Wan

### **M.S. in Electrical Engineering**

University of Tehran

2014 to 2017

Thesis title: Adaptive control of a nonlinear 3-DOF Delta robot

### **B.S. in Electrical Engineering**

Shiraz University

2010 to 2014

Thesis title: Designing and Prototyping Levelometer Based on Resonance Tubes

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## **JOURNAL PUBLICATIONS (PEER-REVIEWED)**

1. Ali Kashani, Amy K. Strong, Leila J. Bridgeman, Claus Danielson  
Data-Driven Certified Control Barrier Functions, *Systems and Control Letters*, 2026
2. Ali Kashani, Claus Danielson  
Data-Driven Invariant Set for Nonlinear Systems with Application to Command Governors, *Automatica*, 2024
3. Ali Kashani, Shirin Panahi, Ankush Chakrabarty, Claus Danielson  
Robust Data-Driven Dynamic Optimization Using a Set-Based Gradient Estimator  
*Optimal Control Methods and Applications (OCAM)*, 2024
4. Ali Kashani, Amy Strong, Leila Bridgeman, Claus Danielson  
Probabilistic Data-Driven Invariance for Constrained Control of Nonlinear Systems  
*IEEE Control Systems Letters (L-CSS)*, 2024

5. Shirin Panahi, Ali Kashani, Claus Danielson  
Primal-Dual Interior-Point Algorithm for Symmetric Model Predictive Control  
Automatica, 2023
  6. Mehran Tamizi, Ali Kashani, Faraz Azad, Ahmad Kalhor, Mehdi Masouleh  
Experimental Study on a Novel Simultaneous Control and Identification of a 3-DOF  
Delta Robot Using Model Reference Adaptive Control  
European Journal of Control (EJC), 2022
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### **CONFERENCE PUBLICATIONS (PEER-REVIEWED)**

1. Ali Kashani, Ahmad Kalhor, Babak Nadjari Araabi, Claus Danielson  
Dead-beat Identification for Model Reference Adaptive Control  
IEEE Conference on Decision and Control (CDC), 2022
  2. Ali Kashani, Amy Strong, Leila Bridgeman, Claus Danielson  
Probabilistic Data-Driven Invariance for Constrained Control of Nonlinear Systems  
American Control Conference (ACC), 2025
  3. Amy Strong, Ali Kashani, Claus Danielson, Leila Bridgeman  
Data-Driven Synthesis of Invariant Sets for Unmodeled Dynamical Systems Using a  
Tree Data Structure  
American Control Conference (ACC), 2025
  4. Amy Strong, Ali Kashani, Claus Danielson, Leila Bridgeman  
Invariant Set and Lyapunov Function Synthesis for Unmodeled Discrete Dynamical  
Systems Using Tree Data Structures  
IFAC Symposium on Nonlinear Control Systems, 2025
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### **PATENT**

Ganiyu Azeez, Ali Kashani, Claus Danielson  
A System and Method for Enforcing Operational Hard Constraints for an Air Conditioner  
Provisional Patent

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### **EXPERIENCE**

#### **Postdoctoral Research Associate**

University of Virginia, School of Data Science and Center for Diabetes Technology

Advisor: Heman Shakeri

Aug 2025 to Present

- Developing glucose control algorithms for artificial pancreas systems
  - Designing personalized data-driven control methods for automated insulin delivery
  - Improving glucose time in range 70-180 by 3% for a type 1 diabetes population using a novel data-driven online parameter adaptation
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### **Graduate Researcher**

Planning, Autonomy and Control Lab

University of New Mexico

2021 to July 2025

- Developed physics-informed machine learning methods for autonomous systems
- Designed learning-based controllers for safety-critical systems including autonomous driving, drones, and HVAC

Key contributions:

- Designed large-scale multi-agent MPC (Automatica 2023)
  - Reduced MPC computation time by 10x using symmetry in primal-dual optimization
  - Developed data-driven Lyapunov and barrier function methods with formal guarantees (L-CSS, ACC, Automatica, SCR)
  - Introduced probabilistic invariance via scenario optimization (L-CSS 2024)
  - Designed algorithms for maximal controlled invariant set computation
  - Solved data-driven dynamic optimization problems using RBFs, splines, Gaussian processes, and neural networks
  - Developed safety-enforcing MPC for autonomous driving, drones, and HVAC systems (Provisional Patent)
  - Improved extremum seeking control efficiency by 50 to 100 percent (OCAM 2024)
  - Designed data-driven safety verification using barrier functions tested on nonlinear and chaotic systems
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## **COMPUTER SKILLS**

Programming: Python, C, C++, MATLAB, LaTeX

Software: PyTorch, TensorFlow, Keras, Simulink, LabVIEW, Qt, CodeVision

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## **AWARDS**

- Doctoral Conference Presentation Award, UNM, 2022
- Mechanical Engineering Dove Graduate Fellowship, UNM, 2022