

# VENKATRAMAN RENGANATHAN



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## PROFESSIONAL EXPERIENCE

### Postdoctoral Research Fellow

Department of Automatic Control, LTH - Lund University, Sweden August 2021 - Present  
Mentor: Dr. Anders Rantzer

### Graduate Research Assistant

Department of Mechanical Engineering - UT Dallas, USA August 2016 - August 2021  
Advisor: Dr. Tyler Holt Summers

### Graduate Student Researcher

Department of Electrical Engineering - Arizona State University, USA May 2014 - July 2016  
Advisor: Dr. Armando Antonio Rodriguez

### Software Engineer

Aspire Systems - India Private Limited, Chennai - India June 2011 - September 2012

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## EDUCATION

PhD, Mechanical Engineering (Dynamics & Controls), CGPA: 3.95/4.0 June 2021  
Thesis Advisor: Dr. Tyler Holt Summers  
The University of Texas at Dallas, Richardson, TX, USA

Master of Science, Electrical Engineering (Control Systems), CGPA: 3.76/4.0 July 2016  
Thesis Advisor: Dr. Armando Antonio Rodriguez  
Arizona State University, Tempe, AZ, USA

Bachelor of Engineering, Electrical & Electronics Engineering, CGPA: 9.12/10.0 May 2011  
Project Advisor: Dr. V. Prasanna Moorthy  
Government College of Technology - Anna University, Coimbatore, TN, India

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## AWARDS

- DAAD AI-Net for CPS Postdoc Networking Fellowship, October 2022.
  - Travel Fellowship from Lund University - Faculty of Engineering LTH, 2022-2023.
  - Louis Beecherl Jr. Fellowships from UT Dallas for the academic years 2019-2020 & 2020-2021.
  - GCT Alumni Association Scholarship for Academic Excellency during the year 2010.
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## PREPRINTS SUBMITTED & IN PREPARATION

- **V. Renganathan**, A. Rantzer, O. Kjellqvist, "Distributed Minimax Adaptive Control For Uncertain Networks", *Submitted for European Control Conference*, 2024.
- A. Banse, **V. Renganathan**, R. Jungers, "A Cantor-Kantorovich Metric Between Markov Decision Processes", *Manuscript in Preparation for MTNS*, 2024.
- **V. Renganathan**, N. Hashemi, J. V. Deshmukh, "Data-driven Anomaly Detection Using Conformal Prediction", *Manuscript In Preparation for COLT*, 2024.
- **V. Renganathan**, I. Shames, M. Cantoni, "Measuring Regret Using  $\nu$ -Gap Metric", *Manuscript in Preparation for IEEE CDC*, 2024.
- **V. Renganathan**, M. Cantoni, "Stereographic Projection of Probabilistic Uncertainties", *Manuscript in Preparation for IEEE TAC*, 2024.
- M. Pfeifferkorn, **V. Renganathan**, R. Findeisen, "Regret & Conservatism of Stochastic MPC", *Manuscript in Preparation for IEEE TAC*, 2024.
- **V. Renganathan**, M. Jeeninga, "A Novel Anticipatory Distributed Consensus Protocol for Multi-agent Systems", *Manuscript In Preparation for IEEE LCSS*, 2024.

- **V. Renganathan**, “Probabilistic Robust Control Using Model-Ambiguity Sets”, *Journal Manuscript In Preparation*, 2024.
- **V. Renganathan**, “Distributionally Robust Risk Allocation for Optimal Sampling Based Motion Planning Under Uncertainty”, *Journal Manuscript In Preparation*, 2024.

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## JOURNAL PUBLICATIONS

1. **V. Renganathan**, S. Safaoui, A. M. Kothari, B. Gravell, I. Shames, T. Summers, “Risk Bounded Nonlinear Motion Planning With Integrated Perception & Control”, *Special Issue on “Risk-aware Autonomous Systems: Theory and Practice”*, *Artificial Intelligence*, 2023.
2. **V. Renganathan**, B. Gravell, J. Ruths, T. Summers, “Anomaly Detection Under Multiplicative Noise Model Uncertainty”, *IEEE Letters to Control Systems Society*, 2022.
3. **V. Renganathan**, N. Hashemi, J. Ruths, T. Summers, “Higher-Order Moment-Based Anomaly Detection”, *IEEE Letters to Control Systems Society*, 2022.
4. **V. Renganathan**, K. Fathian, S. Safaoui, T. Summers, “Spoof resilient coordination in distributed & robust robotic networks”, *IEEE Transaction on Control Systems Technology*, 2021.

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## CONFERENCE PUBLICATIONS

1. **V. Renganathan**, A. Iannelli, A. Rantzer, “Online Learning Analysis for Minimax Adaptive Control”, *Accepted for IEEE CDC*, 2023.
  2. C. Alptürk, **V. Renganathan**, “Risk Averse Path Planning Using Lipschitz Approximated Wasserstein Distributionally Robust Deep Q-learning”, *ECC*, Bucharest, Romania, 2023.
  3. **V. Renganathan**, A. Cervin, et.al, “Learning-based Control and Estimation for Attitude Regulation of a Reusable Launcher for Landing Scenario”, *Accepted to the ESA-GNC & ICATT Conference*, Sopot, Poland, 2023.
  4. **V. Renganathan**, J. Pilipovsky, P. Tsoitras, “Distributionally Robust Covariance Steering With Optimal Risk Allocation”, *Accepted to IEEE ACC*, 2023.
  5. K. Ekenberg, **V. Renganathan**, B. Olofsson, “Distributionally Robust RRT with Risk Allocation”, *Accepted to IEEE ICRA*, 2023.
  6. T. Jouini, Z. Sun, **V. Renganathan**, Veit Hagenmeyer, “Input and state constrained inverse optimal control with application to power networks”, *IFAC World Congress*, 2023.
  7. **V. Renganathan**, B. Gravell, J. Ruths, T. Summers, “Anomaly Detection Under Multiplicative Noise Model Uncertainty”, *IEEE American Control Conference*, Atlanta, USA 2022.
  8. S. Safaoui, B. Gravell, **V. Renganathan**, T. Summers, “Risk-Averse RRT\* Planning with Nonlinear Steering and Tracking Controllers for Nonlinear Robotic Systems Under Uncertainty”, *IEEE IROS*, 2021.
  9. **V. Renganathan**, I. Shames, T. Summers, “Towards Integrated Perception and Motion Planning with Distributionally Robust Risk Constraints”, *IFAC World Congress*, 2020.
  10. **V. Renganathan**, N. Hashemi, J. Ruths, T. Summers, “Distributionally Robust Tuning of Anomaly Detectors in Cyber-Physical Systems with Stealthy Attacks”, *IEEE American Control Conference*, 2020.
  11. V. Raghuraman, **V. Renganathan**, T. Summers, J. Koeln, “Hierarchical MPC with Coordinating Terminal Costs”, *IEEE American Control Conference*, 2020.
  12. **V. Renganathan**, T. Summers, “Spoof Resilient Coordination for Distributed Multi-Robot Systems”, *Proceedings of The International Symposium on Multi-Robot and Multi-Agent Systems(MRS)*, Los Angeles, USA, Dec 4-5, 2017.
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## BOOKS & THESES

1. **V. Renganathan**, “Learn & Control Systems With Data”, *Graduate Textbook (In Preparation)*, Lund University, 2023.
2. **V. Renganathan**, “Robust, resilient, and risk-aware optimization and controls for Cyber-physical systems”, *PhD (ME) Thesis*, The University of Texas at Dallas, 2021.
3. **V. Renganathan**, “Kill Zone Analysis for a Bank-to-Turn Missile-Target Engagement”, *MS(EE) Thesis*, Arizona State University, 2016.
4. **V. Renganathan et al.**, “PLC Logic Implementation for Controlling Tube-Bending Machine Operation”, *BE(EEE) Thesis Project*, BHEL Trichy and Government College of Technology, Coimbatore, India, 2011.

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## INVITED TALKS

1. **Distributed Implementation of Minimax Adaptive Controller for Finite Set of Linear Systems**, Department of Process Engineering, TU Berlin, Germany, February 16, 2023. *Host:* Dr. Steffi Knorn.
2. **Distributionally Robust Covariance Steering with Optimal Risk Allocation**, Institute for Systems Theory and Automatic Control (IST), University of Stuttgart, Germany, February 14, 2023. *Host:* Dr. Andrea Iannelli & Dr. Frank Allgower.
3. **Anomaly Detection for Cyber-physical Systems**, Institute of Industrial Automation and Software Engineering (IAS), University of Stuttgart, Germany, February 13, 2023. *Host:* Dr. Andrey Morozov.
4. **Motion Planning Under Uncertainty With Risk Allocation**, Control and Cyber-Physical Systems Laboratory (CCPS), TU Darmstadt, Germany, February 07, 2023. *Host:* Dr. Rolf Findeisen.
5. **Distributionally Robust Covariance Steering with Optimal Risk Allocation**, Department of Electrical Engineering, IIT Madras, India, January 18, 2023. *Host:* Dr. Puduru Viswanadha Reddy.

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## STUDENTS MENTORED

### **Role: Masters Thesis Supervisor**

1. **Cem Alptürk** - Lund University, Sweden - Spring 2022.  
**Thesis Topic:** Risk Averse Path Planning Using Distributionally Robust Deep Reinforcement Learning. (Research Paper Accepted to ECC 2023).
2. **Kajsa Ekenberg** - Lund University, Sweden - Spring 2022.  
**Thesis Topic:** Distributionally Robust Risk Bounded Path Planning Through Iterative Spatio-temporal Risk Allocation. (Research Paper Accepted to ICRA 2023).

### **Role: PhD Co-Supervisor**

1. **Olle Kjellqvist** - Lund University, Sweden. (Main Supervisor: Dr. Anders Rantzer)  
**Thesis Topic:** On Control and Estimation of Large and Uncertain Systems.

### **Role: Mentor**

1. **Aadi M Kothari** - Bachelor Student Researcher at UT Dallas, USA.  
**Current Position:** Pursuing Masters in Mechanical Engineering at MIT, Boston, USA.

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## REVIEWING ACTIVITIES

Automatica, IEEE Transaction on Automatic Control, IEEE Transaction on Control of Network Systems, Control Engineering Practice, IEEE Letters to Control Systems Society, IEEE Signal Processing Letters, ACC, CDC, IROS, ICRA, RAL, ASME DSCC, IEEE CCTA, L4DC.

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## TEACHING EXPERIENCE

**Department of Automatic Control, Lund University, Lund, Sweden**

**Role: Course Instructor**

PhD Course on Linear Systems

Spring 2022

**Role: Teaching Assistant**

Course on Learning Based Control

Spring 2022

**School of Mechanical Engineering, UT Dallas - TX, USA**

**Role: Graduate Teaching Assistant**

MECH 4310 - Systems and Controls

Spring 2020

**Department of Mathematics & Statistics - ASU, AZ - USA**

**Role: Grader**

MAT 265 - Calculus for Engineers - I

Fall 2013

MAT 267 - Calculus for Engineers - III

Spring 2014

MAT 265 - Elementary Linear Algebra

Summer 2014

MAT 210 - Brief Calculus

Fall 2014

MAT 265 - Calculus for Engineers - I

Spring 2015

MAT 265 - Calculus for Engineers - I

Spring 2016

MAT 211 - Math for Business Analysis

Spring 2016

MAT 210 - Brief Calculus

Spring 2016

**Role: Instructional Aide**

MAT 265 - Calculus for Engineers - I

Summer 2014

MAT 170 - Pre-Calculus

Summer 2014

MAT 142 - College Mathematics

Summer 2015

MAT 170 - Pre-Calculus

Fall 2015

MAT 142 - College Mathematics

Summer 2016

**School of Mechanical, Aerospace, Chemical & Materials Engg., ASU - AZ, USA**

**Role: Grader for Dr. Daniel Rivera**

CHE 461 - Process Dynamics and Controls

Fall 2014

CHE 494/598 - System Identification

Spring 2015

## REFERENCES

**Dr. Anders Rantzer:** *Postdoctoral Mentor*

Email: anders.rantzer@control.lth.se

Professor & Head of the Department of Automatic Control,  
Lund University, Lund - Sweden.

**Dr. Tyler H. Summers:** *PhD Advisor*

Email: tyler.summers@utdallas.edu

Associate Professor in Mechanical Engineering,  
University of Texas at Dallas, Richardson, TX - USA.

**Dr. Iman Shames:** *Research Collaborator*

Email: Iman.Shames@anu.edu.au

Professor of Mechatronics - School of Engineering,  
Australian National University, Acton, Australia.

**Dr. Justin Ruths:** *PhD Committee Member*

Email: jruths@utdallas.edu

Assistant Professor in Mechanical Engineering  
The University of Texas at Dallas, Richardson, TX - USA.

**Dr. Mark W. Spong:** *PhD Committee Member*

Email: mspong@utdallas.edu

Professor in Systems Engineering,  
The University of Texas at Dallas, Richardson, TX - USA.

**Dr. Bjorn Olofsson:** *Research Collaborator*

Email: bjorn.olofsson@control.lth.se

Associate Professor in Department of Automatic Control,

Lund University, Lund - Sweden.

PERSONAL  
DETAILS

- **Nationality:** Indian
- **Languages:** English, Tamil, Hindi
- **Spouse Name:** Reshma Renganathan (Married Since: July 11, 2019)
- **Child Name:** Vishruth Venkatraman (Born: October 2022)