



Updated: August 25, 2020

EDUCATION

Ph.D., Electrical Engineering, 2015;
University of Nevada Las Vegas, Las Vegas, NV
Advisor: Dr. Pushkin Kachroo, Lincy Professor
Topic: Robust Observability, Control & Economics of Complex Cyber-physical Networks

M.S., Applied Mathematics, 2015;
University of Nevada Las Vegas, Las Vegas, NV
Advisor: Dr. Monika Neda, Associate Professor
Topic: Inverse Problem for Non-viscous Mean Field Control: Example from Traffic

M.S., Electrical Engineering, 2012;
University of Nevada Las Vegas, Las Vegas, NV
Advisor: Dr. Pushkin Kachroo, Lincy Professor
Topic: Wavelets in Intelligent Transportation Systems: Data Compression and Incident Detection

B. Tech., Electronics and Communication Engineering, 2009;
Indian Institute of Technology (I.I.T.), Guwahati, India

APPOINTMENTS

Assistant Professor, 2018-present;
Department of Civil, Environmental & Construction Engineering,
University of Central Florida, Orlando, Florida

Assistant Professor, 2016-2018;
Electrical & Computer Engineering Department,
California State University, Los Angeles, CA

Senior Consultant, Apr-Aug'2016;
EXL Service, New York, NY

Postdoctoral Associate, Oct'15-Apr'16;
Civil and Urban Engineering Department,
New York University, New York, NY
Mentor: Dr. Kaan Ozbay, Professor

Research Assistant, Aug'12-Sep'15;
Transportation Research Center,
University of Nevada, Las Vegas, NV

Teaching Assistant, Jan'11-July'12;
Electrical and Computer Engineering Department,
University of Nevada, Las Vegas, NV

Consultant, July'09-Jan'11;
PricewaterhouseCoopers (PwC), India

RESEARCH INTERESTS

Dr. Agarwal's research interest include Cyber-physical Systems, Smart Cities, Intelligent Transportation Systems, Connected and Autonomous Vehicles, & Socio-technical systems. Current research agenda is as follows:

- Heterogeneous sensor fusion and state estimation for applications in urban & autonomous mobility
- Developing synergy between data driven and physics informed modeling frameworks for complex CPS
- Optimization, mean field game theory, and control theory with applications in urban mobility and CPS



BOOKS

1. Michael Muhlmeyer and Shaurya Agarwal. "Information Spread in a Social Media Age: Modeling and Control." CRC Press, 2021, (In Press).

JOURNAL PUBLICATIONS

Note: Journal publication are grouped by broad research themes indicated by keywords.

Keywords: Smart urban mobility, CAVs, State Estimation, Control Theory, Optimization, Mean Field Games

- JP1. **Shaurya Agarwal**, Pushkin Kachroo, Sergio Contreras and Shankar Sastry, "Feedback-Coordinated Ramp Control of Consecutive On-Ramps Using Distributed Modeling and Godunov-Based Satisfiable Allocation", *IEEE Transactions on Intelligent Transportation Systems*, 16.5 (2015): 2384-2392.
- JP2. Pratik Verma, Hongtao Yang, Pushkin Kachroo and **Shaurya Agarwal**, "Modeling and Estimation of Vehicle-miles Traveled (VMT) Tax Rate Using Stochastic Differential Equations", *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, 46.6 (2016): 818-828
- JP3. Pushkin Kachroo, **Shaurya Agarwal** and Shankar Sastry, "Inverse Problem for Non-viscous Mean Field Control: Example from Traffic", *IEEE Transactions on Automatic Control*, 2015. DOI: 10.1109/TAC.2015.2511929
- JP4. Anjala Krishen, Pushkin Kachroo, **Shaurya Agarwal**, Shankar Sastry and Masha Wilson, "Safety culture from an interdisciplinary view: Proposing a hierarchical feedback-based transportation framework", *Transportation Journal*, 54.4 (2015): 516-534.
- JP5. Sergio Contreras, Pushkin Kachroo, and **Shaurya Agarwal**, "Observability and Sensor Placement Problem on Highway Segments: A Traffic Dynamics-Based Approach", *IEEE Transactions on Intelligent Transportation Systems*, 17.3 (2016): 848-858
- JP6. **Shaurya Agarwal**, Pushkin Kachroo and Sergio Contreras, "A Dynamic Network Modeling Based Approach for Traffic Observability Problem", *IEEE Transactions on Intelligent Transportation Systems*, 17.4 (2016): 1168-1178
- JP7. **Shaurya Agarwal** Pushkin Kachroo and Emma Regentova, "A Hybrid Model Using Logistic Regression and Wavelet Transformation to Detect Traffic Incidents", *IATSS Research* (Elsevier), 40.1 (2016): 56-63.
- JP8. Pushkin Kachroo, Saumya Gupta and **Shaurya Agarwal**, "Optimal Control for Congestion Pricing: Theory, Simulation and Evaluation", *IEEE Transactions on Intelligent Transportation Systems*, 18.5 (2017): 1234-1240.
- JP9. Pratik Verma, **Shaurya Agarwal**, Pushkin Kachroo and Anjala Krishen, "Declining transportation funding and need for analytical solutions: dynamics and control of VMT tax", *Journal of Marketing Analytics*, 5 (3-4), 131-140.
- JP10. **Shaurya Agarwal**, Pushkin Kachroo, Emma Regentova and Himanshu Verma, "Multidimensional Compression of ITS Data Using Wavelet-Based Compression Techniques", *IEEE Transactions on Intelligent Transportation Systems*, 18 (7), 1907-1917.
- JP11. Sergio Contreras, **Shaurya Agarwal**, and Pushkin Kachroo, "Quality of Traffic Observability on Highways With Lagrangian Sensors", *IEEE Transactions on Automation Science and Engineering*, 15 (2), 761-771.
- JP12. Pushkin Kachroo, **Shaurya Agarwal**, Benedetto Piccoli and Kaan Ozbay, "Multi-scale Modeling and Control Architecture for V2X Enabled Traffic Streams", *IEEE Transactions on Vehicular Technology*, 66 (6), 4616-4626.
- JP13. **Shaurya Agarwal** and Pushkin Kachroo, "Controllability and Observability Analysis for Intelligent Transportation Systems", *Transportation in Developing Economies* (Springer), 5 (1), 2.
- JP14. Jiheng Huang and **Shaurya Agarwal**, "Physics Informed Deep Learning: Applications to Traffic State Estimation in Connected Vehicle Environment", *Transportation Research Record*, 2021. (Under Review)
- JP15. Redwan Shabab, Shakib Mustavee, **Shaurya Agarwal**, and Mohamed Zaki, "Exploring Dynamic Mode Decomposition for Robust System Identification: Applications to Adaptive Signalised Intersections", *Transportation Research Record*, 2021. (Under Review)

Keywords: Customer satisfaction and loyalty, E-marketing, Qualitative comparative analysis

- JP16. Anjala Krishen, Orié Berezan, **Shaurya Agarwal** and Pushkin Kachroo, "The Generation of Virtual Needs: Recipes for Satisfaction in Social Media Networks", *Journal of Business Research*, 69.11 (2016): 5248-5254.



- JP17. Anjala Krishen, **Shaurya Agarwal**, Pushkin Kachroo and Robyn Raschke, "Framing the Value and Valuing the Frame? Algorithms for Child Safety-Set Use", *Journal of Business Research*, 69.4 (2016): 1503-1509.
- JP18. Pushkin Kachroo, Anjala Krishen, and **Shaurya Agarwal**, "Fuzzy logic programming based knowledge analysis for qualitative comparative analysis", *Quality & Quantity*, 51 (5), 2101-2113
- JP19. Anjala Krishen, **Shaurya Agarwal**, and Pushkin Kachroo, "Is Having Accurate Knowledge Necessary for Implementing Safe Practices? A Consumer Folk Theories-of-Mind Perspective on the Impact of Price", *European Journal of Marketing*, 50.5/6 (2016): 1073-1093.
- JP20. Anjala Krishen, Orié Berezan, **Shaurya Agarwal** and Pushkin Kachroo, "The Pursuit of Virtual Happiness: Exploring the Social Media Experience Across Generations", *Journal of Business Research*, 89, 455-461.
- JP21. Anjala Krishen, Orié Berezan, **Shaurya Agarwal** and Pushkin Kachroo, "Social media networking satisfaction in the US and Vietnam: Content versus connection", *Journal of Business Research*, 101, 93-103.
- JP22. Anjala Krishen, Orié Berezan, **Shaurya Agarwal** and Pushkin Kachroo, "Exploring loneliness and social networking: Recipes for hedonic well-being on Facebook", *Journal of Business Research*, 115, 258-265.
- JP23. Anjala Krishen, Orié Berezan, **Shaurya Agarwal**, and Brian Robison, "Harnessing the waiting experience: Anticipation, expectations, and WOM", *Journal of Services Marketing*, 2020. (In press)
- JP24. Anjala Krishen, Orié Berezan, **Shaurya Agarwal**, Robyn Raschke, and Pushkin Kachroo, "The digital self and virtual satisfaction: A cross-cultural perspective", *Journal of Business Research*, (Under Review).

Keywords: Social media, Information diffusion, Socio-technical systems

- JP25. Michael Muhlmeyer, Jiheng Huang and **Shaurya Agarwal**, "Event Triggered Social Media Chatter: A New Modeling Framework", *IEEE Transactions on Computational Social Systems*, 6 (2), 197-207.
- JP26. Michael Muhlmeyer, **Shaurya Agarwal**, and Jiheng Huang, "Modelling Social Contagion and Information Diffusion in Complex Socio-technical Systems", *IEEE Systems Journal*, 2020 (In Press).
- JP27. Pushkin Kachroo, Aaron Saewitz, Robyn Raschke, **Shaurya Agarwal**, and Jiheng Huang, "A New Language and Hidden Markov Input/Output Model for Automated Audit Inquiry", *IEEE Systems Journal*, 2020 (In Press).

Technical Reports

- TR1. Mohamed Abdel-Aty, Qing Cai, **Shaurya Agarwal**, et. al., "Using Smartphone as On-board unit (OBU) Emulator Implementation Study," Technical Report, Accession Number: 01746656, Contract Numbers: BDV24-977-30, TRID database, 2020.
- TR2. **Shaurya Agarwal** and Pushkin Kachroo, "Vehicle Miles Traveled Usage Fee - Mathematical Models and Analysis" Technical Report PR-149-13-006, submitted to Nevada Department of Transportation, 2014.
- TR3. **Shaurya Agarwal** and Pushkin Kachroo, "Integration and Analysis of Traffic and Trauma Data Associated with Traffic Crashes" Technical Report 23-408TR-8, submitted to Nevada Office of Traffic Safety, 2013.
- TR4. **Shaurya Agarwal** and Pushkin Kachroo, "Evaluation of Child Safety Seat Usage and Related Programs in Nevada" Technical Report 22-OP-6, submitted to Nevada Office of Traffic Safety , 2012.

FULL PAPER/ EXTENDED ABSTRACT REVIEWED CONFERENCE PAPER

- CP1. **Shaurya Agarwal**, Atul Sancheti, Romesh Khaddar, and Pushkin Kachroo. "Geospatial Framework for Integration of Transportation Data Using Voronoi Diagrams," Transportation Research Board, 92nd Annual Meeting, no. 13-5378. 2013.
- CP2. Anjala Krishen, Pushkin Kachroo and **Shaurya Agarwal**. "Paving the Way to a Safety Culture: Introducing a Hierarchical Feedback-based Framework." Academy of Marketing Science, Annual Conference , May 12-14 2015, Denver, Colorado
- CP3. Anjala Krishen, **Shaurya Agarwal**, Pushkin Kachroo and Robyn Raschke. "Framing the Value and Valuing the Frame? Algorithms for Child Safety-Set Use." Global Innovation and Knowledge Academy (GIKA), 13-16 July 2015, Valencia, Spain.



- CP4. Anjala Krishen, Orié Berezan, **Shaurya Agarwal** and Pushkin Kachroo. "The Generation of Virtual Needs: Recipes for Satisfaction in Social Media Networks." Accepted for presentation in Global Innovation and Knowledge Academy (GIKA), March 20-23, 2016, Valencia, Spain.
- CP5. Orié Berezan, Anjala S. Krishen, **Shaurya Agarwal**, Pushkin Kachroo. "The Pursuit of Virtual Happiness: Exploring the Social Media Experience Across Generations." Global Innovation and Knowledge Academy (GIKA), 2017, Lisbon Portugal
- CP6. **Shaurya Agarwal**, Pushkin Kachroo. "On the Economic Control of Cyber-physical System." The 7th Annual IEEE Int. Conf. on CYBER Technology in Automation, Control, and Intelligent Systems (IEEE CYBER 2017), Hawaii, USA, July 31 – August 4, 2017.
- CP7. Hector Cruz, **Shaurya Agarwal**, and Mehran Mazari. "Traffic Incident Prediction Using Wavelet Based Feature Extraction and Artificial Neural Networks," Transportation Research Board, 97th Annual Meeting, January 7-11, 2018, Washington, D.C., No. 18-05331. 2018.
- CP8. Jiheng Huang and **Shaurya Agarwal**. "Physics Informed Deep Learning for Traffic State Estimation," IEEE 23rd International Conference on Intelligent Transportation Systems (ITSC), Rhodes, Greece, Sept. 20-23, 2020.
- CP9. Jiheng Huang and **Shaurya Agarwal**, "Physics Informed Deep Learning: Applications to Traffic State Estimation in Connected Vehicle Environment", Transportation Research Board, 100th Annual Meeting, January 21-29, 2020, Washington, D.C., (Under Review).
- CP10. Redwan Shabab, Shakib Mustavee, **Shaurya Agarwal**, and Mohamed Zaki, "Exploring Dynamic Mode Decomposition for Robust System Identification: Applications to Adaptive Signalised Intersections", Transportation Research Board, 100th Annual Meeting, January 21-29, 2020, Washington, D.C., (Under Review).

ABSTRACT REFEREED PAPERS

1. **Shaurya Agarwal**, Himanshu Verma , Emma Regentova, Pushkin Kachroo. "Multidimensional Compression of Intelligent Transportation Systems Data Using Wavelet Decomposition Techniques," Transportation Planning and Implementation Methodologies for Developing Countries, 10th Conference, December 12-14, 2012, IIT Bombay.
2. **Shaurya Agarwal** and Pushkin Kachroo. "Intelligent Transportation Systems: Functional Requirements & Components," Transportation Planning and Implementation Methodologies for Developing Countries, 10th Conference, December 12-14, 2012, IIT Bombay.
3. **Shaurya Agarwal**, Pushkin Kachroo, Benedetto Piccoli and Kaan Ozbay. "Impact of V2X Diffusion to Traffic Flow Efficiency and Control." 4th Connected and Autonomous Vehicle Symposium, SUNY Polytechnic Institute, Albany, NY, December 2, 2015.
4. **Shaurya Agarwal**, Pushkin Kachroo, Saumya Gupta and Santonu Goswami. "Controllability and Observability Analysis for Intelligent Transportation Systems." 12th Transportation Planning and Implementation Methodologies for Developing Countries (TPMDC 2016) conference, Indian Institute of Technology Bombay, Mumbai, 19-21 December 2016.

GRANTS

- GR1. Urban Multi-sensor System and Informatics, *Gunjit S. Sikand Faculty Endowment for Research in Urban Sustainability*, Role: Sole PI, Amount: \$32,000, Duration: 2017-18.
- GR2. SHRP2 Education Connection, *Federal Highway Administration (FHWA)* , Role: Co-PI, Amount: \$8,000, Duration: 2017-19.
- GR3. Development of Haptic Plate, *Oculus VR*, Role: Sole PI, Amount: \$53,800, Duration: 2018-19.
- GR4. Smartphone Based OBU: Implementation Study, *Florida Department of Transportation*, Role: Co-PI (10%), Amount: \$325,000, Duration: 2018-20.
- GR5. Connecting Residents Experiencing Homelessness during Disasters and Emergency Situations, *UCF Seed Funding program*, IR1 award, Role: Co-PI (equal share among 5 co-PIs), Total amount: 55,000, Duration: 2020-21.

INVITED TALKS



1. "Mean Field Games: The New Big Fish," CE&S Seminar Series, September 29, 2017, California State University, Los Angeles, CA.
2. "Connected Vehicles and V2X Technology: The Future of Transportation Applications," ITS Travel Information Systems and Mobile Applications for enhanced Transportation, December 10, 2015, New York Institute of Technology, New York, NY 10023.

SUPERVISED GRADUATE STUDENTS

<i>Student Name</i>	<i>Degree</i>	<i>Completion</i>	<i>Topic</i>
Shakib Mustavee	Ph.D.	Sp' 2023	Heterogeneous Sensor Fusion for Autonomous Mobility
Jiheng Huang	Ph.D.	Sp' 2022	Physics Informed Data Driven Modeling and Control
Ian Marquez	M.S.	Fa' 2018	Development of Haptic Surfaces for Virtual Reality Applications
Oscar Ramirez	M.S.	Su' 2018	Predicting Renewable Energy Generation using Machine Learning
Sosy DerSarkissian	M.S.	Su' 2018	Dynamic Modeling and Control Methods for Smart Cities
Joshua Saunders	M.S.	Su' 2018	Strategies for Mitigating Traffic Shock Waves Utilizing CAVs
Michael Muhlmeyer	M.S.	Fa' 2017	Digital Media, Social Campaigns, and Fake News: Mathematical Modeling & Control Methods

SUPERVISED SENIOR DESIGN PROJECTS

<i>Period</i>	<i>Project Title</i>
2016-2017	Unmanned Aircraft Systems (UAS)
2017-2018	Haptic Plate Development
2017-2018	Autonomous and Connected Vehicle Testbed
2017-2018	Urban Multi-sensor System

TEACHING

<i>Course</i>	<i>Semester</i>
Stochastic Systems and Estimation (EE 5610)	Fall 2016, Fall 2017
Modern Control Systems (EE 4620)	Fall 2016, Fall 2017
Linear Systems Analysis (EE 5600)	Spring 2017, Spring 2018
Advanced Digital Control Systems (EE 5620)	Spring 2017
Optimal Control Theory (EE 5630)	Spring 2017, Spring 2018
Fundamentals of Machine Learning (EE 4540)	Spring 2018
Numerical Methods for Civil Engineers (CGN 3405)	Fall 2018, Fall 2019, Fall 2020
Interdisciplinary Introduction to Smart Cities (CGN 5341)	Fall 2019 (course coordinator)
Cyber-physical Systems and Smart Cities (CGN 6343)	Spring 2020
Internet of Things: Applications in Smart Cities (CGN 5340)	Fall 2020 (to be taught)

AWARDS

- **Best Ph.D. Dissertation Award**, Howard R. Hughes College of Engineering, UNLV, 2016
- **Best paper** award for USA authors, Global Innovation and Knowledge Academy (GIKA) Conference, March 2016, Valencia, Spain, (Anjala Krishen, Orié Berezan, Shaurya Agarwal, Pushkin Kachroo, "The generation of virtual needs: Recipes for satisfaction in social media networks")
- Roy and Helen Kelsall Scholarship, UNLV, 2014-2015
- UNLV Access Grant-Grad NN (multiple times)

PROFESSIONAL AFFILIATIONS

- IEEE
- Phi Kappa Phi

PROFESSIONAL ACTIVITIES

- Reviewer for
- IEEE Transactions on ITS
 - IEEE Transactions on Automatic Control



- IEEE Transactions on Systems
- IEEE Transactions on Engineering Management
- Journal of Intelligent Transportation Systems: Technology, Planning, and Operations
- IEEE Transactions on Vehicular Technology
- Many Others

Member of

- Editorial Review Board (ERB) for Journal of Marketing Analytics (JMA, Springer)
- Technical Program Committee, 1st IEEE International Conference on Intelligent Circuit and Systems (ICICS 2019), 18-19 January, 2019.
- Member - Scientific Committee, 1st International Conference on Smart Tourism, Smart Cities and Enabling Technology, May 1-4, 2019, Orlando, Florida, USA

UNIVERSITY SERVICE

At UCF

- Member/Secretary: Faculty Search Committee (2018-19)
- Member: Faculty Search Committee (2019-20)
- Member: Library Advisory Committee (2019-22)
- Coordinator: Smart City Graduate Courses (2019-22)

At CSULA

- Vice-Chair: Library Subcommittee (2017-18)
- Chair: Taskforce for Increasing Response Rate of Student Opinion Online Surveys on Instruction (2017-18)
- Member: Student Educational Equity Advisory Committee (2017-18)



PROFESSIONAL REFERENCES

Dr. Pushkin Kachroo

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University of Nevada Las Vegas,
4505 S. Maryland Parkway
Las Vegas, NV 89154-4026
Phone: 540-588-3142, Email: pushkin@unlv.edu

Dr. Kaan Ozbay

Professor, Department of Civil and Urban Engineering,
and Center for Urban Progress and Science (CUSP),
NYU Tandon School of Engineering,
New York University, NY
Phone: 646-997-0552, Email: kaan.ozbay@nyu.edu

Dr. Anjala Krishen

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Dr. Monika Neda

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University of Nevada Las Vegas,
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Dr. Amit Kumar Mishra

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University of Cape Town,
Cape Town, South Africa
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