

# Yash Vardhan Pant

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CONTACT INFORMATION	279 Levine Hall, 3330 Walnut St., Philadelphia, PA 19104, USA	E-mail: yashpant@seas.upenn.edu Homepage: yashpant.github.io	Phone: +1-267-563-0011
RESEARCH INTERESTS	Control Theory, Formal Methods and Optimization with applications in Control and Planning for Autonomous Systems		
EDUCATION	<b>Doctor of Philosophy (Ph.D.)</b> in Electrical Engineering Sep 2012 - Aug 2019 (expected) University of Pennsylvania (UPenn) (GPA 3.7/4.0) Thesis Title: Robust Predictive Methods for Planning and Control of Autonomous Systems Committee: Profs. George Pappas (Chair), Manfred Morari, Georgios Fainekos & Jyo Deshmukh Advisor: Prof. Rahul Mangharam		
	<b>Master of Science (M.S.)</b> in Electrical Engineering Sep 2010 - May 2012 University of Pennsylvania (GPA 3.7/4.0) Thesis Title: AutoPlug: A Testbed for Automotive Control Software/Hardware Diagnostics and Remote Recalls Management Advisor: Prof. Rahul Mangharam		
	<b>Bachelor of Technology (B.Tech)</b> in Electronics & Telecom. Engineering Aug 2006 - Jun 2010 College of Engineering Roorkee (GPA 72/100)		
EXPERIENCE	Research Intern, Control Systems Lit Motors, San Francisco, CA		May 2014 – Aug 2014
	Graduate Research Assistant Real-Time and Embedded Systems Lab, Electrical and Systems Engineering, University of Pennsylvania Advisor: Prof. Rahul Mangharam		Jun 2011 – Aug 2012
	Undergraduate Research Intern Networked Control Systems Lab, Electrical Engineering, Indian Institute of Technology, Kanpur Advisor: Prof. Ramprasad Potluri		May 2008 – Jul 2008, May 2009 – Jul 2009
HONORS AND AWARDS	Best Student Paper Award: IEEE NAECON Student Travel Grant: IEEE CCTA Student Travel Grant: ACC Top-10 finish, Intel Cornell Cup competition Third place, World Embedded Software Competition Student Travel Grant: ACM HiCoNS Richard K. Dentel Memorial Prize for outstanding research in Urban Transportation Second place, the Embedded System Competition		Dayton, Ohio, USA 2018 Big Island, Hawaii, USA 2017 Portland, USA 2014 Orlando, USA 2013 Seoul, South Korea 2013 Beijing, China 2012 UPenn 2012 Indian Institute of Technology Roorkee, India 2009
PUBLICATIONS	[1] <b>Y. V. Pant</b> , R. A. Quaye, H. Abbas, A. Varre, R. Mangharam. Fly-by-Logic: A Tool for Unmanned Aircraft System Fleet Planning using Temporal Logic. <i>NASA Formal Methods Symposium</i> , 2019. [2] K. J. Jang, <b>Y. V. Pant</b> , B. Zhang, J. Weimer and R. Mangharam. Robustness Evaluation of Computer-aided Clinical trials for Medical Devices. <i>ACM/IEEE International Conference on Cyber-Physical Systems (ICCPs)</i> , 2019.		

- [3] H. Abbas, **Y. V. Pant**, R. Mangharam. Temporal Logic Robustness for General Signal Classes. *ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*, 2019.
- [4] M. Z. Li, W. R. Tan, S. M. Prakash, J. F. Kearney, M. S. Ryerson, D. Lee, **Y. V. Pant**. Design and implementation of a centralized system for autonomous unmanned aerial vehicle trajectory conflict resolution. *IEEE National Aerospace and Electronics Conference (NAECON)*, 2018. **Best Student Paper Award**
- [5] **Y. V. Pant**, H. Abbas, R. A. Quaye, R. Mangharam. Fly-by-Logic: Control of Multi-Drone Fleets with Temporal Logic Objectives. *ACM/IEEE International Conference on Cyber-Physical Systems (IC-CPS)*, 2018.
- [6] **Y. V. Pant\***, H. Abbas\*, R. Mangharam (\*Co-first authors). Smooth Operator: Control of systems using the Smooth Robustness of Temporal Logic. *IEEE Conference on Control Technology and Applications (CCTA)*, 2017. **IEEE CCTA Student Travel Award**
- [7] **Y. V. Pant**, H. Abbas, R. Mangharam. Robust Model Predictive Control for Non-Linear Systems with Input and State Constraints via Feedback Linearization. *IEEE Conference on Decision and Control (CDC)*, 2016.
- [8] **Y. V. Pant**, H. Abbas, K. Mohta, T. X. Nghiem, J. Devietti, R. Mangharam. Co-design of Anytime Computation and Robust Control. *IEEE Real-Time Systems Symposium (RTSS)*, 2015.
- [9] **Y. V. Pant**, H. Abbas, K. N. Nischal, P. Kelkar, D. Kumar, J. Devietti, R. Mangharam. Power-efficient algorithms for autonomous navigation. *IEEE Conference on Complex Systems Engineering (ICCSE)*, 2015.
- [10] **Y. V. Pant**, T. X. Nghiem, R. Mangharam. Peak power reduction in hybrid energy systems with limited load forecasts. *American Control Conference (ACC)*, 2014. **ACC Student Travel Award**
- [11] U. Drolia\*, Z. Wang\*, **Y. V. Pant\***, R. Mangharam (\*Co-first authors). Autoplug: An automotive test-bed for electronic controller unit testing and verification. *IEEE Intelligent Transportation Systems Conference (ITSC)*, 2011.

**Under Preparation:**

- [12] **Y. V. Pant**, H. Abbas, K. Mohta, R. A. Quaye, T. X. Nghiem, J. Devietti, R. Mangharam. Anytime Computation and Control for Autonomous Systems. *submitted to the IEEE Transactions on Control Systems Technology*. 2019
- [13] **Y. V. Pant**, H. Abbas, R. A. Quaye, R. Mangharam. Distributed planning for multi-drone fleets with Signal Temporal Logic objectives. 2019
- [14] **Y. V. Pant**, M. Z. Li, R. A. Quaye, H. Abbas, M. Ryerson, Rahul Mangharam. FADS: Framework for Autonomous Drone Safety. 2019

DEMO  
ABSTRACTS,  
WORKSHOP  
PAPERS AND  
WORKS-IN-  
PROGRESS

- [15] **Y. V. Pant**, H. Abbas, R. Mangharam. Distributed planning of Multi-rotor drone fleets using the Smooth Robustness of Signal Temporal Logic. *Monitoring and Testing of CPS Workshop (MTCPS), CPS Week*, 2019.
- [16] **Y. V. Pant**, H. Abbas, R. Mangharam. Control with Temporal Logic Requirements (poster). *SRC TECHCON*, 2017.
- [17] **Y. V. Pant**, H. Abbas, R. Mangharam. Control using the Smooth Robustness of Temporal Logic. *Monitoring and Testing of CPS Workshop (MTCPS), CPS Week*, 2017.
- [18] K. N. Nischal, P. Kelkar, D. Kumar, **Y. V. Pant**, H. Abbas, J. Devietti, R. Mangharam. Hardware Optimizations for Anytime Perception and Control. *Work-in-progress, Real-Time Systems Symposium*

(RTSS), 2015.

- [19] P. Gurniak, **Y. V. Pant**. Demo: Low-cost Autonomous Navigation with Anytime Control and Computation. *University Transportation Center (UPenn-CMU) Annual Meeting*, 2014.
- [20] **Y. V. Pant**, T. X. Nghiem, R. Mangharam. Knock NOx: Model-based Remote Diagnostics of a Diesel Exhaust Control System. *Work-in-progress, IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS)*, 2013.
- [21] **Y. V. Pant**, H. Jain, A. Mulay, R. Dutta. Protodrive: Rapid Prototyping and Simulation of Electric Vehicle Powertrains. *Final report: Intel Cornell Cup*, 2013. **Award for Top-10 Finish**
- [22] **Y. V. Pant**, S. Diaz, H. Jain, W. Price, A. Botelho. Protodrive: Simulation of Electric Vehicle Powertrains. *Final report: World Embedded Software Competition*, 2013. **Third Place Award**
- [23] W. Price, H. Jain, **Y. V. Pant**, R. Mangharam. Protodrive: An experimental platform for electric vehicle energy scheduling and control. *Work-in-progress, Real-Time Systems Symposium (RTSS)*, 2012.
- [24] S. Diaz, H. Jain, **Y. V. Pant**, W. Price, R. Mangharam. Protodrive: An experimental platform for electric vehicle energy scheduling and control. *Demo Abstract Real-Time Systems Symposium (RTSS)*, 2012.
- [25] **Y. V. Pant**. Demo: AutoPlug 2.0. *Real-Time and Embedded Technology and Applications Symposium (RTAS): Demo session*, 2012.
- [26] **Y. V. Pant**, R. Mangharam. Observer-based Sensor Fault Detection and Isolation. *Work-in-progress, ACM International Conference on High Confidence Networked Systems (HiCoNS)*, 2012. **HiCoNS Student Travel Award**

SOFTWARE  
TOOLS

- “FLY-BY-LOGIC”: A Tool for multi-drone planning using Temporal Logic Objectives.  
**Y. V. Pant**, R. A. Quaye, H. Abbas, A. Varre, R. Mangharam  
<https://github.com/yashpant/FlyByLogic>
- “SMOOTH OPERATOR”: Control Using the Smooth Robustness of Temporal Logic.  
**Y. V. Pant**, H. Abbas, R. Mangharam  
<https://github.com/yashpant/SmoothOperator0>

SELECTED  
TALKS

- “Distributed planning for drone fleets with Temporal Logic Objectives”  
— Intel-UPenn annual visit, Philadelphia, USA May 2019
- “Fly-by-Logic: Control of Multi-rotor drone fleets using Temporal Logic Objectives”  
— Nokia-Bell Labs, Murray Hill, USA Jun 2019  
— NASA Formal Methods Symposium, Houston, USA May 2019  
— Monthly WAS Intel Science and Technology Center (ISTC) seminar Aug 2018  
— Amazon Robotics, Boston, USA Jul 2018  
— Mathworks Research, Boston, USA Jul 2018  
— ICCPS at CPS Week, Porto, Portugal Apr 2018  
— UPenn GRASP/ PRECISE Industry Symposium (Poster and Demonstration),  
Philadelphia, USA Feb 2018
- “Smooth Operator: Control using the Smooth Robustness of Metric Temporal Logic”  
— IEEE CCTA , Big Island, Hawaii, USA Aug 2017  
— SRC Techcon (Poster), Austin, USA Sep 2017
- “Robust Model Predictive Control for Non-Linear Systems with Input and State Constraints  
via Feedback Linearization”  
— CDC, Las Vegas, USA Dec 2016

	“Co-design of Anytime Computation and Robust Control”	
	— UPenn ESE PhD Colloquium, Philadelphia, USA	Mar 2016
	— UPenn PRECISE Industry Day (Poster), Philadelphia, USA	Feb 2016
	— RTSS, San Antonio, USA	Dec 2015
TEACHING	Teaching Assistant	
EXPERIENCE	— ESE 406/505: Control Theory, UPenn, Philadelphia, USA	Fall 2014
	— ESE 406: Control Theory, UPenn, Philadelphia, USA	Fall 2013
	Guest Lecturer	
	— ESE 350: Embedded Systems, UPenn, Philadelphia, USA	Apr 2019
	— ESE 519: Embedded Systems, UPenn, Philadelphia, USA	Nov 2018
	— CSCI 699: Formal methods for Cyber-Physical Systems, University of Southern California (via teleconferencing), Los Angeles, USA	Oct 2018
MENTORING	Senior Design Technical Advisor: Team EagleEye, ESE UPenn	2018
	— Winners of the 2018 Frederick Ketterer Memorial Award	
	— Winners of the 2018 FAA RAISE Award	
	Senior Design Technical Advisor: Team UrbanDrone, ESE UPenn	2019
REVIEWING	Chemical Product and Process Modeling (CPPM)	
ACTIVITIES	ACM Transactions on Embedded Computing Systems	
	IEEE Embedded Systems Letters	
	Design Automation Conference (DAC)	2018
	ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS)	2013 – 2018
	IEEE Conference on Decision and Control (CDC)	2016, 2019
	American Control Conference (ACC)	2014, 2018
	Indian Control Conference (ICC)	2015 – 2017
	EMSOFT: International Conference on Embedded Software	2013, 2015, 2018
	Symposium on Reliable Distributed Systems (SRDS)	2015
	ACM SIGPLAN/SIGBED Conference on Languages, Compilers, Tools and Theory for Embedded Systems (LCTES)	2015
	ACM International Conference on Future Energy Systems (ACM e-Energy)	2015
	International Conference on Information Processing in Sensor Networks (IPSN)	2015
	European Conference on Wireless Sensor Networks (EWSN)	2015
	ACM International Conference on High Confidence Networked Systems (HiCoNS)	2014
	IEEE Real-Time Systems Symposium (RTSS)	2012
	IEEE International Conference on Sensing, Communication and Networking (SECON)	2012
CONFERENCE	<i>Program Committee Member</i> : 4th Workshop on the Design and Analysis of Robust Systems	
SERVICES	(DARS), as a part of the International Conference on Computer-Aided Verification (CAV).	2019
	<i>Technical Committee Member</i> : 8th International Conference on Communications, Computation, Networks and Technologies (INNOV)	2019
SKILLS	Scientific Computing: MATLAB/Simulink and R.	
	Programming Languages: C and C++.	
	Tools: Robot Operating System (ROS), CasADI, CVX, CVXgen, MPT, YALMIP, STaliro, qpOASES	
	Embedded Platforms: Pixhawk flight controller, Arduino, Odroid, Raspberry PI, Teensy, dsPIC, AT-MEGA32, NVIDIA Jetson	
	Other skills: Proficient with Linux/Unix Shell; Version control.	

RELEVANT COURSES Non-linear Control Theory, Optimal Control, Convex Optimization, Machine Learning, Applied Regression and Analysis of Variance, Linear Systems, Robotics and Automation, Elements of Probability Theory, Computer Vision, Networked Control Systems, Convex Optimization in Control Systems.