

Venanzio Cichella

Mechanical Engineering
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Education

- 2012 – 2018 *Ph.D. in Mechanical Engineering*
University of Illinois at Urbana-Champaign, Urbana, Illinois
Adviser: Prof. Naira Hovakimyan
Thesis - Cooperative Autonomous Systems: Motion Planning and Coordinated Tracking Control for Multi-Vehicle Missions
- 2008 – 2011 *M.S. in Automation Engineering*
University of Bologna, Bologna, Italy
Adviser: Prof. Lorenzo Marconi
Thesis: UAVs Path Following Control
- 2004 – 2007 *B.S. in Automation Engineering*
University of Bologna, Bologna, Italy

Professional Positions

- 2018 – Present *Assistant Professor*
Department of Mechanical Engineering
The University of Iowa

Awards

- 2017 ***Distinguished Student Recognition Award***
Mechanical Science and Engineering - University of Illinois at Urbana-Champaign
- 2016 ***Distinguished Student Recognition Award***
Mechanical Science and Engineering - University of Illinois at Urbana-Champaign
- 2015 ***Ross Martin Award for Outstanding Research Achievement by a Graduate Student***
College of Engineering - University of Illinois at Urbana-Champaign
- 2014 ***NSF Travel Award - Cyber-Physical Systems Week 2014***
National Science Foundation, Berlin, Germany, April 2014
- 2014 ***NSF Travel Award - Early Career Professional Workshop on Exploring New Frontiers in Cyber-Physical Systems***
National Science Foundation, Washington DC, March 2014
- 2009 ***ERASMUS European Exchange Program Scholarship***
University of Bologna/TU Delft

Research Experience

- 2012 – Pres. *University of Illinois at Urbana-Champaign, Urbana, IL*
Design, development, and testing of planning and control algorithms for multiple autonomous robots in stochastic and dynamic environments; assistive robotics for aging in place, assistive firefighting, and delivery in urban area; robust and adaptive control; fault-tolerant control; distributed consensus algorithms; machine learning.
- 2014 *NASA Langley, Hampton, VA*
Control of Multiple UAVs for Atmospheric Science Missions; Control of UAVs for Package Dropping.
- 2010 – 2012 *Naval Postgraduate School, Monterey, CA*
Vision Based Tracking of Autonomous Vehicles; Path-Following of UAVs; Cooperative Control of Multiple Autonomous Agents.

Teaching Experience

- 2013-2014 Teaching Assistant
University of Illinois at Urbana-Champaign
Courses:
- Introductory Dynamics
 - Signal Processing

Active Scientific and Professional Society Memberships

- Member of IEEE (CSS and TCAC)
- Member of AIAA
- Member of Grant Training Center Member Community

Publications

Books

- 2017 I. Kaminer, M. A. Pascoal, E. Xargay, N. Hovakimyan, V. Cichella, and V. Dobrokhodov. *Time-Critical Cooperative Control of Autonomous Air Vehicles*. Elsevier. ISBN: 9780128099469, 2017

Book Chapters

- 2015 I. Kaminer, E. Xargay, V. Cichella, N. Hovakimyan, A. M. Pascoal, A. P. Aguiar, V. Dobrokhodov, and R. Ghabcheloo. Time-critical cooperative path following of multiple uavs: Case studies. In *Advances in Estimation, Navigation, and Spacecraft Control*, pages 209–233. Springer, 2015

Journal Publications

- 2018 H. Lee, V. Cichella, and N. Hovakimyan. L1 Adaptive Output Feedback for Non-square Systems with Arbitrary Relative Degree. *IEEE Transactions on Automatic Control*. **Submitted**
- V. Cichella, I. Kaminer, C. Walton, and N. Hovakimyan. Optimal motion planning for differentially flat systems using Bernstein approximation. *IEEE Control Systems Letters*, 2(1):181–186, 2018
- V. Cichella, T. Marinho, D. Stipanovic, N. Hovakimyan, I. Kaminer, and A. Trujillo. Collision avoidance based on line-of-sight angle: Guaranteed safety using limited information about the obstacle. *Journal of Intelligent & Robotic Systems*, 89:139–153, January 2018
- 2016 R. Choe, J. Puig-Navarro, V. Cichella, E. Xargay, and N. Hovakimyan. Cooperative trajectory generation using Pythagorean Hodograph Bézier curves. *AIAA Journal of Guidance, Control, and Dynamics*, 38(8):1744–1763, 2016
- V. Cichella, R. Choe, S. B. Mehdi, E. Xargay, N. Hovakimyan, V. Dobrokhodov, I. Kaminer, M. A. Pascoal, and A. P. Aguiar. Safe coordinated maneuvering of teams of multirotor unmanned aerial vehicles: A cooperative control framework for multivehicle, time-critical missions. *IEEE Control Systems Magazine*, 36(4):59–82, 2016
- 2015 Z. Zuo, V. Cichella, M. Xu, and N. Hovakimyan. Three-dimensional coordinated path-following control for second-order multi-agent networks. *Journal of the Franklin Institute*, 352(9):3858–3872, September 2015
- V. Cichella, I. Kaminer, V. Dobrokhodov, E. Xargay, R. Choe, N. Hovakimyan, A. P. Aguiar, and M. A. Pascoal. Cooperative Path-Following of Multiple Multirotors over Time-Varying Networks. *IEEE Transactions on Automation Science and Engineering*, 12(3):945–957, July 2015
- 2013 E. Xargay, I. Kaminer, M. A. Pascoal, N. Hovakimyan, V. Dobrokhodov, V. Cichella, A. P. Aguiar, and R. Ghabcheloo. Time-critical cooperative path following of multiple unmanned aerial vehicles over time-varying networks. *AIAA Journal of Guidance, Control, and Dynamics*, 36(2):499–516, 2013

- 2012 K. Andersson, I. Kaminer, V. Dobrokhodov, and V. Cichella. Thermal centering control for autonomous soaring; stability analysis and flight test results. *AIAA Journal of Guidance, Control, and Dynamics*, 35(3):963–975, 2012

Conference Papers

- 2018 T. Marinho, M. Amrouche, V. Cichella, D. Stipanovic, and N. Hovakimyan. Guaranteed collision avoidance based on line-of-sight angle and time to collision. In *Proceedings of the American Control Conference (ACC), 2018*. **Accepted**
- 2017 S. B. Mehdi, V. Cichella, T. Marinho, and N. Hovakimyan. Collision avoidance in multi-vehicle cooperative missions using speed adjustment. In *Proceedings of the 56th IEEE Conference on Decision and Control (CDC)*, 2017
- C. Widdowson, H.-J. Yoon, V. Cichella, F. Wang, and N. Hovakimyan. VR environment for the study of co-located interaction between small UAVs and humans. In *Proceedings of the 8th International Conference on Applied Human Factors and Ergonomics and the Affiliated Conferences*, Los Angeles, USA
- H. Lee, V. Cichella, and N. Hovakimyan. L1 adaptive output feedback control for underactuated MIMO systems. In *Proceedings of the 20th IFAC World Congress*, Toulouse, France, July 2017
- 2016 G. Blois, J. Best, K. Christensen, V. Cichella, A. Donahue, N. Hovakimyan, A. Kennedy, and I. Pakrasi. UAV-based PIV for quantifying water-flow processes in large-scale natural environments. In *Proceedings of the 18th International Symposium on the Application of Laser and Imaging Techniques to Fluid Mechanics, Lisbon, Portugal*, pages 4–7, 2016
- G. Blois, J. L. Best, K. T. Christensen, V. Cichella, A. B. Donahue, N. Hovakimyan, A. B. Kennedy, and I. Pakrasi. Assessing the use of UAV to quantify flow processes in rivers. In *Proceedings of the International Conference On Fluvial Hydraulics (River Flow 2016)*, Iowa City, USA, July 2016
- S. B. Mehdi, J. Puig-Navarro, R. Choe, V. Cichella, N. Hovakimyan, M. Chandarana, A. Trujillo, P. M. Rothhaar, L. Tran, and J. H. Neilan. A safe cooperative framework for atmospheric science missions with multiple heterogeneous UAS using piecewise Bézier curves. In *Proceedings of the AIAA Aviation Technology, Integration, and Operations Conference*, Washington DC, June 2016
- T. Marinho, A. Lakshmanan, V. Cichella, C. Widdowson, H. Cui, R. M. Jones, B. Sebastian, and C. Goudeseune. VR study of human-multicopter interaction in a residential setting. In *Proceedings of the IEEE Virtual Reality*, Greenville, SC, 2016
- H.-J. Yoon, V. Cichella, and N. Hovakimyan. Robust adaptive control allocation for an octocopter under actuator faults. In *Proceedings of the AIAA Conference of Guidance, Navigation and Control, SciTech Forum, San Diego*, 2016
- 2015 V. Cichella, T. Marinho, D. Stipanovic, N. Hovakimyan, I. Kaminer, and A. Trujillo. Collision avoidance based on line-of-sight angle. In *Proceedings of the 54th IEEE Conference on Decision and Control*, Osaka, Japan, December 2015
- V. Cichella, I. Kaminer, V. Dobrokhodov, and N. Hovakimyan. Coordinated vision-based tracking for multiple UAVs. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, pages 656–661. IEEE, 2015

- A. Trujillo, H. Fan, C. D. Cross, L. E. Hempley, V. Cichella, J. Puig-Navarro, and S. B. Mehdi. Operator informational needs for multiple autonomous small vehicles. In *Proceedings of the 6th International Conference on Applied Human Factors and Ergonomics and the Affiliated Conferences, Las Vegas, USA*, volume 3, pages 936–943. Elsevier, 2015
- G. Blois, J. L. Best, K. T. Christensen, A. B. Kennedy, A. S. Donahue, N. Hovakimyan, V. Cichella, and I. Pakrasi. Combining UAV and high-resolution image-based particle image velocimetry to monitor flow in lakes and rivers. In *Proceedings of the American Geophysical Union Fall Meeting*, 2015
- S. B. Bilal Mehdi, R. Choe, V. Cichella, and N. Hovakimyan. Collision avoidance through path replanning using Bézier curves. In *Proceedings of the AIAA Conference of Guidance, Navigation and Control*, Kissimmee, FL, January 2015
- R. Choe, J. Puig-Navarro, V. Cichella, E. Xargay, and N. Hovakimyan. Trajectory generation using spatial Pythagorean Hodograph Bézier curves. In *Proceedings of the AIAA Conference of Guidance, Navigation and Control*, Kissimmee, FL, January 2015
- 2014 H. Lee, V. Cichella, and N. Hovakimyan. L1 adaptive output feedback augmentation of model reference control. In *Proceedings of the American Control Conference (ACC)*, pages 697–702, 2014
- V. Cichella, R. Choe, S. B. Mehdi, E. Xargay, N. Hovakimyan, V. Dobrokhodov, and I. Kaminer. Trajectory generation and collision avoidance for safe operation of cooperating UAVs. In *Proceedings of the AIAA Conference of Guidance, Navigation and Control*, National Harbor, MD, January 2014. AIAA 2014-0972
- 2013 V. Cichella, R. Choe, S. B. Mehdi, E. Xargay, N. Hovakimyan, I. Kaminer, and V. Dobrokhodov. A 3D path-following approach for a multirotor UAV on $SO(3)$. In *Proceedings of the IFAC Research, Education and Development of Unmanned Aerial Systems*, volume 2, pages 13–18, 2013
- V. Cichella, I. Kaminer, V. Dobrokhodov, and N. Hovakimyan. Cooperative vision-based tracking of multiple UAVs. In *Proceedings of the AIAA Conference of Guidance, Navigation and Control*, Boston, MA, August 2013 2013. AIAA 2013-5110
- R. Choe, V. Cichella, E. Xargay, N. Hovakimyan, A. Trujillo, and I. Kaminer. A trajectory-generation framework for time-critical cooperative missions. In *Proceedings of the AIAA Infotech@ Aerospace, Boston, MA. AIAA*, volume 4582, 2013
- 2012 V. Cichella, I. Kaminer, E. Xargay, V. Dobrokhodov, N. Hovakimyan, M. A. Pascoal, and A. P. Aguiar. A Lyapunov-based approach for time-coordinated 3D path-following of multiple quadrotors. In *Proceedings of the 51st IEEE Conference on Decision and Control (CDC)*, pages 1776–1781. IEEE, 2012
- 2011 V. Cichella, R. Naldi, V. Dobrokhodov, I. Kaminer, and L. Marconi. On 3D path following control of a ducted-fan UAV on $SO(3)$. In *Proceedings of the 50th IEEE Conference on Decision and Control (CDC)*, pages 3578–3583. IEEE, 2011
- V. Cichella, E. Xargay, V. Dobrokhodov, I. Kaminer, A. M. Pascoal, and N. Hovakimyan. Geometric 3D path-following control for a fixed-wing UAV on $SO(3)$. In *Proceedings of the AIAA Conference of Guidance, Navigation and Control*, 2011

Citizenship: Italian.

Languages: Italian (native), English (fluent).

Piano player.

Marathon runner and member of A.S.D. Runners Pescara.

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