

# GENNARO NOTOMISTA

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## PERSONAL INFORMATION

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## EDUCATION

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AUG 2016 – AUG 2020	<b>Ph.D. in Robotics</b> Georgia Institute of Technology, Atlanta, GA, USA
MAY 2019 – DEC 2019	<b>M.S. in Mathematics</b> Georgia Institute of Technology, Atlanta, GA, USA
MAR 2015 – JAN 2016	<b>M.S. in Mechanical Engineering</b> Università degli Studi di Napoli “Federico II”, Napoli, Italy THESIS SUPERVISOR: Dr. Bruno Siciliano THESIS TITLE: Validation of Model-Based Criticality Estimates in Vehicle Safety Using a Multi Camera Reference System
OCT 2013 – MAR 2015	<b>M.Eng. in Automotive Engineering</b> Technische Hochschule Ingolstadt, Ingolstadt, Germany THESIS SUPERVISOR: Dr. Michael Botsch THESIS TITLE: Parking Maneuver Planning Based on Machine Learning
OCT 2009 – SEP 2012	<b>B.S. in Mechanical Engineering</b> Università degli Studi di Napoli “Federico II”, Napoli, Italy THESIS SUPERVISOR: Dr. Luciano Rosati THESIS TITLE: Polar Decomposition of the Deformation Gradient

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## RESEARCH INTERESTS

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- Energy-aware robotics for long-duration autonomy
- Resilience and safety in robot control and learning
- Mechanical design of robotic platforms
- Human-multi-robot interaction

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## RESEARCH AND PROFESSIONAL EXPERIENCES

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OCT 2021 – –	<b>Assistant Professor</b> University of Waterloo, Waterloo, ON, Canada
NOV 2020 – SEP 2021	<b>Researcher</b> CNRS, Rennes, France <ul style="list-style-type: none"><li>• Human-multi robot interaction</li></ul>
JAN 2017 – AUG 2020	<b>Member of the Robotarium Team</b> Georgia Institute of Technology, Atlanta, GA, USA <ul style="list-style-type: none"><li>• Mechanical design of components of differential drive robots</li><li>• Mechanical design of components of the Robotarium testbed</li><li>• Design and implementation of visual tracking algorithms</li></ul>
JUL 2019 – AUG 2019	<b>Visiting Scholar</b> Stanford University, Stanford, CA, USA <ul style="list-style-type: none"><li>• Autonomous car racing</li><li>• Robust safety</li><li>• Adaptive reinforcement learning</li></ul>
JAN 2016 – JUN 2016	<b>Internship Position</b> Istituto Italiano di Tecnologia, Genova, Italy <ul style="list-style-type: none"><li>• Stereo vision for objects pose estimation</li><li>• Grasping and mobile manipulation</li><li>• Vision-aided teleoperated control of robot manipulators</li></ul>
JUL 2015 – DEC 2015	<b>Research Assistant Position</b> Technische Hochschule Ingolstadt, Ingolstadt, Germany <ul style="list-style-type: none"><li>• Cooperative driving</li><li>• Stereo vision tracking algorithms and applications</li><li>• Embedded systems design</li></ul>
JUL 2015 – DEC 2015	<b>Internship Position</b> Audi AG, Ingolstadt, Germany <ul style="list-style-type: none"><li>• Automotive active safety</li><li>• Criticality estimation</li><li>• Stereo vision system design</li></ul>
DEC 2014 – MAR 2015	<b>Software Developer</b> BFFT, Ingolstadt, Germany <ul style="list-style-type: none"><li>• Vehicle simulation software development</li><li>• CAN databases for automotive applications</li></ul>

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## SKILLS

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LANGUAGES	Italian: native proficiency English: full working proficiency German: limited working proficiency
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## GRANTS, SCHOLARSHIPS, AWARDS, AND CERTIFICATES

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GRANTS	Alumni Small Grant Program 2020 “What can robots teach us about the Covid-19 pandemic” <i>2020 - 2021</i>
	Fulbright scholarship to pursue doctoral studies in USA <i>September 2016 - June 2017</i>
SCHOLARSHIPS	DAAD scholarship B1 to conduct research in Germany <i>July 2015 - December 2015</i>
	DAAD scholarship A1 to pursue graduate studies in Germany <i>October 2013 - March 2015</i>
AWARDS	Best Paper Award Finalist at International Symposium on Multi-Robot and Multi-Agent Systems <i>New Brunswick, NJ, USA, August 2019</i>
	Study award “Roberto Rocca Educational Program” <i>Napoli, Italy, July 2015</i>
	Study award “Roberto Rocca Educational Program” <i>Napoli, Italy, July 2013</i>
	3rd place in the national Mathematics competition “MeravigliosaMenteMatematica” <i>Capua, Italy, April 2009</i>
	Rotary International “Premiazioni alunni meritevoli” <i>Castellammare di Stabia, Italy, November 2008</i>
CERTIFICATES	Deutschkurs Teilnahmezertifikat, Stufe B1.2 <i>Volkshochschule Ingolstadt, Ingolstadt, Germany, February 2015</i>
	PRO/Engineering CAD Operator <i>Protom Group S.p.A, Napoli, Italy, April 2012</i>
	Solfège exam certificate <i>Conservatorio Musicale di Salerno “Giuseppe Martucci”, Salerno, Italy, June 2005</i>

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## PUBLICATIONS

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### Journal Articles

- A17.** Y. Emam, P. Glotfelter, S. Wilson, G. Notomista, and M. Egerstedt, “Data-Driven Robust Barrier Functions for Safe, Long-Term Operation”, *IEEE Transactions on Robotics (to appear)*
- A16.** G. Notomista, C. Pacchierotti, and P. Robuffo Giordano, “Online Robot Trajectory Optimization for Persistent Environmental Monitoring”, *IEEE Control Systems Letters (to appear)*
- A15.** G. Notomista, S. Mayya, Y. Emam, C. Kroninger, A. Bohannon, S. Hutchinson and M. Egerstedt, “A Resilient and Energy-Aware Task Allocation Framework for Heterogeneous Multi-Robot Systems”, *IEEE Transactions on Robotics (to appear)*

- A14.** G. Notomista and M. Saveriano, “Safety of Dynamical Systems with Multiple Non-Convex Unsafe Sets Using Control Barrier Functions”, *IEEE Control Systems Letters (to appear)*
- A13.** S. Wilson, P. Glotfelter, S. Mayya, G. Notomista, Y. Emam, X. Cai, and M. Egerstedt, “The Robotarium: Automation of a Remotely Accessible, Multi-Robot Testbed”, *IEEE Robotics and Automation Letters*, Vol. 6, no. 2, pp. 2922-2929, 2021
- A12.** M. Ohnishi, G. Notomista, M. Sugiyama, and M. Egerstedt, “Constraint learning for control tasks with limited duration barrier functions”, *Automatica*, Vol. 127, 2021
- A11.** G. Notomista and M. Egerstedt, “Persistification of robotic tasks”, *IEEE Transactions on Control Systems Technology*, vol. 29, no. 2, pp. 756-767, 2021
- A10.** M. Santos, G. Notomista, S. Mayya, and M. Egerstedt, “Interactive Multi-Robot Painting Through Colored Motion Trails”, *Frontiers in Robotics and AI*, 7, 143, 2020
- A9.** A. Ames, G. Notomista, Y. Wardi, and M. Egerstedt, “Integral Control Barrier Functions for Dynamically Defined Control Laws”, *IEEE Control Systems Letters*, Vol. 5, No. 3, pp. 887-892, 2020
- A8.** R. Funada, X. Cai, G. Notomista, M. W. Surya Atman, J. Yamauchi, M. Fujita, and M. Egerstedt, “Coordination of robot teams over long distances. From Georgia Tech to Tokyo Tech and back: An 11,000 km multi-robot experiment”, *IEEE Control Systems Magazine*, Vol. 40, No. 4, pp. 53-79, 2020
- A7.** S. Wilson, P. Glotfelter, L. Wang, S. Mayya, G. Notomista, M. Mote, and M. Egerstedt, “The Robotarium: Globally impactful opportunities, challenges, and lessons learned in remote-access, distributed control of multi-robot systems”, *IEEE Control Systems Magazine*, Vol. 40, No. 1, pp. 26-44, 2020
- A6.** M. Ohnishi, L. Wang, G. Notomista, and M. Egerstedt, “Safety-aware adaptive reinforcement learning with applications to brushbot navigation”, *IEEE Transactions on Robotics*, Vol. 35, No. 5, pp. 1186-1205, 2019
- A5.** G. Notomista, Y. Emam, and M. Egerstedt, “The SlothBot: A novel design for a wire-traversing robot”, *IEEE Robotics and Automation Letters*, Vol. 4, No. 2, pp. 1993-1998, 2019
- A4.** M. Egerstedt, J. Pauli, G. Notomista, and S. Hutchinson, “Robot ecology: Constraint-based control design for long duration autonomy”, *Annual Reviews in Control*, Vol. 46, pp. 1-7, 2018
- A3.** G. Notomista, S. Ruf, and M. Egerstedt, “Persistification of robotic tasks using control barrier functions”, *IEEE Robotics and Automation Letters*, Vol. 3, No. 2, pp. 758-763, 2018
- A2.** G. Notomista and M. Botsch, “A machine learning approach for the segmentation of driving maneuvers and its application in autonomous parking”, *Journal of Artificial Intelligence and Soft Computing Research*, Vol. 7, No. 4, pp. 243-255, 2017
- A1.** G. Notomista, M. Selvaggio, F. Sbrizzi, G. Di Maio, S. Grazioso, and M. Botsch, “A fast airplane boarding strategy using online seat assignment based on passenger classification”, *Journal of Air Transport Management*, Vol. 53, pp. 140-149, 2016

## Book Chapters

- B2.** G. Notomista and X. Cai, “On the Safety of Dynamical Systems with Multiple Non-Convex Unsafe Sets”, *Human-Friendly Robotics 2021 (to appear)*

**B1.** G. Notomista and X. Cai, “A Safety and Passivity Filter for Robot Teleoperation Systems”, In *M. Saveriano, E. Renaudo, A. Rodríguez-Sánchez, and J. Piater (editors), Human-Friendly Robotics 2020, Cham, 2021. Springer International Publishing*

## Conference Proceedings Papers

**C20.** Y. Emam, G. Notomista, P. Glotfelter, and M. Egerstedt, “Data-Driven Adaptive Task Allocation for Heterogeneous Multi-Robot Teams Using Robust Control Barrier Functions”, *IEEE International Conference on Robotics and Automation, 2021*

**C19.** G. Notomista and M. Egerstedt, “Communication constrained distributed spatial field estimation using mobile sensor networks”, *IFAC World Congress, 2020*

**C18.** G. Notomista, M. Wang, M. Schwager, and M. Egerstedt, “Enhancing game-theoretic autonomous car racing using control barrier functions”, *IEEE International Conference on Robotics and Automation, 2020*

**C17.** G. Notomista, S. Mayya, M. Selvaggio, M. Santos, and C. Secchi, “A set-theoretic approach to multi-task execution and prioritization”, *IEEE International Conference on Robotics and Automation, 2020*

**C16.** Y. Emam, S. Mayya, G. Notomista, A. Bohannon, and M. Egerstedt, “Adaptive task allocation for heterogeneous multi-robot teams with evolving and unknown robot capabilities”, *IEEE International Conference on Robotics and Automation, 2020*

**C15.** G. Notomista, S. Mayya, A. Mazumdar, S. Hutchinson, and M. Egerstedt, “A study of a class of vibration-driven robots: Modeling, analysis, control and design of the brushbot”, *IEEE/RSJ International Conference on Intelligent Robots and Systems, 2019*

**C14.** S. Mayya, G. Notomista, D. Shell, S. Hutchinson, and M. Egerstedt, “Non-uniform robot densities in vibration driven swarms using phase separation theory”, *IEEE/RSJ International Conference on Intelligent Robots and Systems, 2019*

**C13.** G. Notomista, X. Cai, J. Yamauchi, and M. Egerstedt, “Passivity-based decentralized control of multi-robot systems with delays using control barrier functions”, *IEEE International Symposium on Multi-Robot and Multi-Agent Systems, 2019*

**C12.** M. Santos, S. Mayya, G. Notomista, and M. Egerstedt, “Decentralized minimum-energy coverage control for time-varying density functions”, *IEEE International Symposium on Multi-Robot and Multi-Agent Systems, 2019*

**C11.** G. Notomista, S. Mayya, S. Hutchinson, and M. Egerstedt, “An optimal task allocation strategy for heterogeneous multi-robot systems”, *European Control Conference, 2019*

**C10.** A. Ames, S. Coogan, M. Egerstedt, G. Notomista, K. Sreenath, and P. Tabuada, “Control barrier functions: Theory and applications”, *European Control Conference, 2019*

**C9.** G. Notomista and M. Egerstedt, “Constraint-driven coordinated control of multi-robot systems”, *American Control Conference, 2019*

**C8.** G. Notomista, M. Santos, S. Hutchinson, and M. Egerstedt, “Sensor coverage control using robots constrained to a curve”, *IEEE International Conference on Robotics and Automation, 2019*

- C7.** G. Notomista and M. Egerstedt, “Coverage control for wire-traversing robots”, *IEEE International Conference on Robotics and Automation*, 2018
- C6.** M. Selvaggio, S. Grazioso, G. Notomista, and F. Chen, “Towards a self-collision aware teleoperation framework for compound robots”, *IEEE World Haptics Conference*, 2017
- C5.** F. Sbrizzi, S. Grazioso, M. Selvaggio, G. Di Maio, and G. Notomista, “Enhancing airplane boarding procedure using vision based passenger classification”, *IEEE International Conference on Intelligent Transportation Systems*, 2016
- C4.** M. Selvaggio, G. Notomista, F. Chen, B. Gao, F. Trapani, and D. Caldwell, “Enhancing bilateral teleoperation using camera-based online virtual fixtures generation”, *IEEE/RSJ International Conference on Intelligent Robots and Systems*, 2016
- C3.** M. Selvaggio, F. Chen, B. Gao, G. Notomista, F. Trapani, and D. Caldwell, “Vision based virtual fixture generation for teleoperated robotic manipulation”, *IEEE International Conference on Advanced Robotics and Mechatronics*, 2016
- C2.** G. Notomista, A. Kammenhuber, P. Nadarajan, M. Botsch, and M. Selvaggio, “Relative motion estimation based on sensor eigenfusion using a stereoscopic vision system and adaptive statistical filtering”, *VDE International Symposium on Robotics*, 2016
- C1.** G. Notomista and M. Botsch, “Maneuver segmentation for autonomous parking based on ensemble learning”, *IEEE International Joint Conference on Neural Networks*, 2015

### Conference Workshops Papers

- D2.** S. Mayya, G. Notomista, and M. Egerstedt, “Optimal task allocation in heterogeneous multi-robot systems using a mixed centralized/decentralized strategy”, *Workshop "Resilient Robot Teams: Composing, Acting, and Learning" at IEEE International Conference on Robotics and Automation*, 2019
- D1.** M. Selvaggio and G. Notomista, “Towards natural human-swarm teleoperation using hand synergies”, *Workshop "Swarms: From Biology to Robotics and Back" at IEEE International Conference on Robotics and Automation*, 2018

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## PATENTS

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- The SlothBot: A Novel Design for a Wire-Traversing Robot
- The Brushbot: A Robust and Versatile Swarm Robotics Platform (provisional)