

# NICK ROTELLA

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## EDUCATION

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**Ph.D. in Computer Science**, University of Southern California

May 2014 - May 2018

Thesis: “[Estimation-Based Control for Humanoid Robots](#)”

*Los Angeles, CA*

Advisors: Prof. Stefan Schaal and Prof. Ludovic Righetti

**M.S. in Computer Science**, University of Southern California

Aug 2012 - May 2014

Specialization: Intelligent Robotics

*Los Angeles, CA*

**B.S. in Mechanical Engineering**, The Cooper Union

Aug 2008 - June 2012

Thesis: “[Gestural Language for Operations in Virtual Environments](#)”

*New York, NY*

## EXPERIENCE

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### Seegrid

Jan 2021 - Present

Research Software Engineer

*Pittsburgh, PA (Remote)*

- Founding team member of [Blue Labs](#) R&D group; exploration of aspirational technologies for AMRs
- Past projects include high-fidelity simulation, model predictive control, deep learning-based perception, and advanced stereo vision

### Ainstein

*Kansas City, MO*

Independent Contractor/Consultant

Jan 2021 - Present

- ROS package development for radar-based perception
- Support definition of long-term strategic objectives in robotics space

Senior Robotics Software Engineer

Sept 2018 - Jan 2021

- Developed sensor fusion, multi-object tracking, mapping, and motion control software for self-driving vehicles, AMRs, and drones using LIDAR, radar, vision, GPS, and IMU
- Utilized NVIDIA Jetson, NVIDIA Drive, and Xilinx SoC embedded computing platforms
- Developed and maintained [ROS packages](#) for sensor integration and radar-based 3d perception

### Garmin

Jan 2018 - Sept 2018

Controls Software Engineer

*Kansas City, MO*

- Developed optimal controllers and adaptive estimators for underactuated marine systems
- Tuned and validated algorithms in a custom physics simulator and on real systems

### Max Planck Institute for Intelligent Systems

Mar 2017 - Aug 2017

Freelance Robotist

*Tuebingen, Germany*

- Developed a walking control system for bipedal locomotion
- Implemented and tuned low-level torque control firmware for humanoid robots

### SUNY Downstate Medical School

June 2011 - Dec 2011

Research Intern (Advisor: Dr. Joe Francis)

*Brooklyn, NY*

- Simulated a population of motor cortex neurons in a center-out reaching task
- Implemented a simulated brain-machine interface using a neural network trained by reinforcement learning, analyzed performance, and published results

### University of Iceland

June 2010 - July 2010

Exchange Researcher (Advisor: Prof. Robert Dell)

*Reykjavik, Iceland*

- Designed and constructed a geothermally-heated garden, performed data analysis of plant growth

## SKILLS

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<b>Programming Languages</b>	C, C++, Python, MATLAB, L <sup>A</sup> T <sub>E</sub> X
<b>Software/Libraries</b>	ROS, ROS 2, TensorFlow, Eigen, OpenCV, PCL, Gazebo, Xenomai
<b>Tools</b>	Git, Docker, Atlassian, JetBrains
<b>Certifications</b>	Deep Learning Specialization (Coursera, 2022) DeepLearning.AI TensorFlow Developer Certification (Coursera, 2022)

## CONFERENCES AND PUBLICATIONS

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S. Khorshidi, A. Gazar, **N. Rotella**, M. Naveau, L. Righetti, and M. Khadiv. “On the Use of Torque Measurement in Centroidal State Estimation”. In: *2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. 2022 (in review).

S. Mason, **N. Rotella**, S. Schaal, and L. Righetti. “MPC Walking Framework With External Contact Forces”. In: *2018 IEEE International Conference on Robotics and Automation (ICRA)*. 2018.

**N. Rotella**, S. Schaal, and L. Righetti. “Unsupervised Contact Learning for Humanoid Estimation and Control”. In: *2018 IEEE International Conference on Robotics and Automation (ICRA)*. 2018.

S. Mason, **N. Rotella**, S. Schaal, and L. Righetti. “Balancing and walking using full dynamics LQR control with contact constraints”. In: *2016 IEEE-RAS 16th International Conference on Humanoid Robots (Humanoids)*. Nov. 2016.

**N. Rotella**, S. Mason, L. Righetti, and S. Schaal. “IMU-based joint state estimation for humanoid control”. In: *Proceedings of Dynamic Walking 2016*. June 2016.

**N. Rotella**, S. Mason, S. Schaal, and L. Righetti. “Inertial sensor-based humanoid joint state estimation”. In: *2016 IEEE International Conference on Robotics and Automation (ICRA)*. May 2016.

A. Herzog, **N. Rotella**, S. Schaal, and L. Righetti. “Trajectory generation for multi-contact momentum control”. In: *Humanoid Robots (Humanoids), 2015 IEEE-RAS 15th International Conference on*. Nov. 2015.

A. Herzog, **N. Rotella**, S. Mason, F. Grimmering, S. Schaal, and L. Righetti. “Momentum control with hierarchical inverse dynamics on a torque-controlled humanoid”. In: *Autonomous Robots* (2015).

**N. Rotella**, A. Herzog, L. Righetti, and S. Schaal. “Momentum Estimation, Planning and Control for Force-Centric Bipedal Locomotion”. In: *Proceedings of Dynamic Walking 2015*. July 2015.

**N. Rotella**, A. Herzog, S. Schaal, and L. Righetti. “Humanoid momentum estimation using sensed contact wrenches”. In: *Humanoid Robots (Humanoids), 2015 IEEE-RAS 15th International Conference on*. Nov. 2015.

**N. Rotella**, M. Bloesch, L. Righetti, and S. Schaal. “State estimation for a humanoid robot”. In: *2014 IEEE/RSJ International Conference on Intelligent Robots and Systems*. Sept. 2014.

**N. Rotella**, M. Bloesch, L. Righetti, and S. Schaal. “State Estimation for Walking Humanoids on Unknown Terrain”. In: *Proceedings of Dynamic Walking 2014*. June 2014.

A. Tarigoppula, **N. Rotella**, and J. T. Francis. “Properties of a temporal difference reinforcement learning brain machine interface driven by a simulated motor cortex”. In: *2012 Annual International Conference of the IEEE Engineering in Medicine and Biology Society*. Aug. 2012.

## TEACHING, MENTORSHIP, AND SERVICE

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- Regular reviewer for conference (IROS, ICRA, Humanoids, CoRL, MFI, AIM, BioRob) and journal (RA-L, TR-O, AURO, JINT, RAS, Sensors, Electronics) publications 2012 - Present
- Programming Mentor, FIRST Robotics Team 1939 Nov 2019 - Present
- TA, Intro to Neurophysiology, The Cooper Union Aug 2011 - Dec 2011
- TA, Summer Engineering Research Program, The Cooper Union June 2011 - Aug 2011