

Jared Alan Frank, Ph.D.

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SUMMARY

Accomplished system engineer with experience in research and development of robotic and control systems. History of leadership and teaching roles, involvement in a broad set of analytical and experimental work. Objective is to contribute multidisciplinary skills in the development of innovative autonomous robotic technologies.

Work Authorization: US Citizen

EDUCATION

Ph.D., Mechanical Engineering, New York University, Tandon School of Engineering, Sept. 2017. (**GPA: 4.0/4.0**).

Dissertation: "Mobile Devices as Platforms that Enhance Measurement, Control, and Interaction with Systems"

M.Sc., Mechanical Engineering, Polytechnic Institute of New York University, May 2012. (**GPA: 4.0/4.0**).

Thesis: "Multimodal Mobile Apps for Intuitive Human-Machine Interaction"

B.Sc., Mechanical Engineering, Polytechnic Institute of New York University, May 2010. (**Summa Cum Laude**).

Minor: Aerospace Engineering

SKILLS

Foreign Languages: Spanish (Level B1)

Certification: Engineer in training (EIT)

Technical Skills: Robotics, statistical analysis, system modeling, estimator and control design, application development

Programming Experience: MATLAB/Simulink, LabVIEW, C/C++, Python, OpenCV, ROS, Linux, SolidWorks

EXPERIENCE

R&D Sensor System Engineer

07/2017–Present

Siemens Gamesa Renewable Energy, S.A. (SGRE), Boulder, CO

- Tested software solutions for improving signal quality and resolution from mechanical wind vanes.
- Developed and tested fault detection and data fusion solutions to obtain the most accurate and robust estimations of wind speed and wind direction from redundant sensors on wind turbines.
- Performed root-cause analysis of wind sensor faults associated with turbines at a customer's wind farm.

Ph.D. Candidate and Lab Manager

08/2012–08/2017

NYU Tandon School of Engineering, Mechatronics, Robotics, and Control Lab (MRCL), Brooklyn, NY

- Developed various autonomous systems for mobile navigation, manipulation, and social interaction.
- Designed mobile applications that use inertial sensing, computer vision, augmented reality, and touchscreen input to enhance measurement, control, and interaction with robots and control systems.
- Conducted user studies, collecting and analyzing both performance and user experience data.
- Coordinated with research assistants and directed their efforts in the laboratory.

Research Mentor

06/2009 – 08/2017

NYU Tandon School of Engineering, Mechatronics, Robotics, and Control Lab (MRCL), Brooklyn, NY

- Guided the research of five graduate, six undergraduate, and three visiting high school students.
- Trained teachers in mechatronics for 6 summers in an NSF-funded program.
- Taught dynamic systems modeling, analysis, and controller design to undergraduates for 3 semesters.
- Performed experiments in electronic filtering, motor control, magnetic levitation, and pendulum stabilization.

HONORS AND AWARDS

- NASA/New York Space Grant Consortium and Robotics-5 Fellowships
- NYC Media Lab Connected Futures Research and Prototyping Grant (\$25,000)
Project Title: "Connecting People to Robots Using Interactive Augmented Reality Apps"
- NYU School of Engineering Annual Research Expo, (First place, three consecutive years)
2015 Project Title: "Making Faces with CAESAR: Teaching Emotions to Expressive Humanoid Robots"
2014 Project Title: "Intuitive Interaction with Mobile and Humanoid Robots"
2013 Project Title: "Mobile Apps for Intuitive Human-Robot Interaction"
- Tau Beta Pi, National Engineering Honor Society, Rho of New York

PROJECTS

Design of an Autonomous Domestic Robot using LIDAR-based Localization and Mapping 07/2017-Present

- Assembled a tracked robot chassis and mounted appropriate motors, motor controller, and single-board computer.
- Created scripts for acquiring, processing, and visualizing data from motor encoders and a Hokuyo LIDAR sensor.
- Utilized ROS on a single-board computer and laptop to implement various localization and mapping algorithms.

Interfacing Mobile Devices with Mobile, Manipulation, and Humanoid Robotic Platforms 01/2014-08/2017

- Studied the ability of untrained people to use mobiles to monitor, command, and control robots to perform tasks.
- Explored effects of interactive augmented-reality on user experience, task performance, and situation awareness.

Cellular-Accessible, Expressive, Semi-Autonomous Robot (CAESAR) 09/2013-08/2017

- Supervised the design and testing of all structural, aesthetic, control, and perception systems of a humanoid robot.
- Oversaw evaluations of the robot's manipulation of objects and its recognition and social interaction with people.
- Presented and demonstrated the robot at public events, research expos, summits, competitions, and festivals.

Integration of Mobile Devices and Laboratory Test-beds 10/2013-08/2017

- Established two approaches for developing more portable, affordable, and engaging science and engineering learning platforms by directly mounting smartphones to test-beds or by pointing tablet cameras at test-beds.
- Investigated the distinct educational features and affordances provided by the two proposed approaches.

PUBLICATIONS AND PATENTS

Peer-reviewed journal articles:

1. **Frank, J.A.**, Krishnamoorthy, S.P., and Kapila, V., 2017. "Toward Mobile Mixed-Reality Interaction With Multi-Robot Systems," In *IEEE Robotics and Automation Letters*, 2(4), pp. 1901—1908.
2. **Frank, J.A.**, Moorhead, M., and Kapila, V., 2017. "Mobile Mixed-Reality Interfaces That Enhance Human-Robot Interaction in Shared Spaces," In *Frontiers in Robotics and AI*, 4(20).
3. **Frank, J.A.**, Brill, A., and Kapila, V., 2016. "Mounted Smartphones as Measurement and Control Platforms for Motor- Based Laboratory Test-Beds," In *Sensors*, 16(8), 1331, pp. 1—21.
4. **Frank, J.A.** and Kapila, V., 2016. "Using Mobile Devices for Mixed-Reality Interactions with Educational Laboratory Test-Beds," In *ASME Dynamic Systems & Control*, 4(2), pp. 2—6.
5. **Frank, J.A.** and Kapila, V., 2014. "Development of Mobile Interfaces to Interact with Automatic Control Experiments," In *IEEE Control Systems Magazine*, 34(5), pp. 78—98.

Book chapters:

1. **Frank, J.A.** and V. Kapila, "Integrating Smart Mobile Devices for Immersive Interaction and Control of Physical Systems: A Cyber-Physical Approach," *Advanced Mechatronics and MEMS Devices II*, (D. Zhang and B. Wei, Eds.), 73— 93, Switzerland: Springer, 2017.

Conferences:

1. **Frank, J.A.**, Moorhead, M., and Kapila, V., 2016. "Realizing Mixed-Reality Environments with Tablets for Intuitive Human-Robot Collaboration for Object Manipulation Tasks," In *Int. Symp. Robot-Human Interactive Comm.*, NY.
2. Brill, A., **Frank, J.A.**, and Kapila, V., 2016. "Using Inertial and Visual Sensing from a Mounted Smartphone to Stabilize a Ball and Beam Test-bed," In *Proc. American Control Conf.*, Boston, MA, pp. 1335—1340.
3. Brill, A., **Frank, J.A.**, and Kapila, V., 2016. "Visual Servoing of an Inverted Pendulum on Cart using a Mounted Smartphone," In *Proc. American Control Conf.*, Boston, MA, 1323—1328.
4. **Frank, J.A.** and Kapila, V., 2016. "Towards Teleoperation-based Interactive Learning of Robot Kinematics using a Mobile Augmented Reality Interface on a Tablet," In *Proc. Indian Control Conf.*, pp. 385-392.
5. **Frank, J.A.**, Gómez, J.A.D, Kapila, V., 2015. "Using Tablets in the Vision-Based Control of a Ball and Beam Test-bed," In *Informatics in Control, Automation and Robotics*, Colmar, Alsace, France, pp. 92—102.
6. **Frank, J.A.**, Brill, A., Bae, J., and Kapila, V., 2015. "Exploring the Role of a Smartphone as a Motion Sensing and Control Device in the Wireless Networked Control of a Motor Test-bed," In *Informatics in Control, Automation and Robotics*, Colmar, Alsace, France, pp. 328—335.
7. **Frank, J.A.** and Kapila, V., 2015. "Path Bending: Interactive Human-Robot Interfaces With Collision-Free Correction of User-Drawn Paths," In *Proc. ACM Int. Conf. Intelligent User Interfaces*, Atlanta, GA, pp. 186—190.
8. **Frank, J.A.**, Sahasrabudhe, Y., and Kapila, V., 2015. "An augmented reality approach for reliable autonomous path navigation of mobile robots," In *Proc. Indian Control Conf.*, Chennai, India.

Patents:

1. Prieto, R., Kapila, K., **Frank, J.A.**, Lopez, D.A., Universal construction robotics interface, Application No: US 13/901,275, Publication No: US 20140350723 A1. Published Nov 27, 2014.