Alexander Volkov

Robotics, Mechatronics, & Controls

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EXPERIENCE

Mechatronics / Robotics Engineer Sep. 2018 – Apr. 2019
Berkshire Grey Lexington, MA
. . . Developed software interfaces to custom hardware, designed safety and power control cabinets, debugged and repaired various robotic machines, constructed robot testing equipment, and assisted in the design of future system prototypes.

Graduate Researcher Aug. 2016 – Aug. 2018
Manipulation Lab, The Robotics Institute: Prof. Matt Mason Pittsburgh, PA
. . . Investigated modern modeling and control techniques for dynamic robot manipulation and locomotion.

Lab Technician Oct. 2015 – Dec. 2016
Robotic Personal Assistants Lab, Cornell University: Prof. Ross Knepper Ithaca, NY
. . . Designed system architecture for a remote controlled car retrofitted for autonomous operation. Assisted in the initial system design of a custom autonomous blimp designed for long-deployment NDVI and atmospheric measurement.

Undergraduate Researcher Jan. 2013 – Dec. 2015
Laboratory for Intelligent Machine Systems, Cornell University: Prof. Ephrahim Garcia Ithaca, NY
. . . Designed and constructed a custom, high-power and high-bandwidth linear dynamometer for testing fluidic artificial muscles. Also assisted in the design, construction, and testing of a human-size bipedal walking machine, used to study the energetics of human locomotion.

Undergraduate Researcher Sep. 2012 – May 2015
Creative Machines Lab, Cornell University: Prof. Hod Lipson Ithaca, NY
. . . Developed hardware implementations of cellular soft robots evolved in simulation for locomotion. Additionally, assisted in research into novel soft-robot actuation techniques.

Hardware Intern Jun. 2014 – Aug. 2014
Vecna Robotics Cambridge, MA
. . . Internship focused on mobile hydraulic pump system construction, characterization, and analysis.

SKILLS

Mechatronics: Multi-domain physical modeling, controls & state estimation, sensor and actuator selection, OEM component integration, microcontroller firmware design, ML/AI for automation

Maker: Rapid prototyping (software/electronics/hardware), reverse engineering, debugging, field repairs

CAD Software: Solidworks, Ansys, Altium Designer, EagleCAD, SPICE, Blender (learning)

Programming Languages: Python [4/5], MATLAB + Simulink [3/5], C [3/5], C++ [2/5], Rust (learning) [1/5]

Typesetting Languages: LaTeX[4/5], Markdown [4/5]

Human Languages: English [5/5], Russian [4/5]

EDUCATION

Master of Science, Robotics (in progress) — Aug. 2016 – Dec. 2019
The Robotics Institute, Carnegie Mellon University — Pittsburgh, PA
Thesis: "The Art of Robotics: Toward a Holistic Approach"[1]

Bachelor of Science, Electrical & Computer Engineering — Aug. 2012 – May 2016
Cornell University — Ithaca, NY
Minors: Computer Science, Mechanical Engineering
Final GPA: 3.85 (Magna cum laude)
Concentration: Mechatronics, Robotics

TEACHING

Finch Robot Programming with Scratch — Jun. 2017, Jun. 2018
CMU Gelfand Center — Pittsburgh, PA
. . . Prepared and taught four sessions of a 20 hour introductory robotics course for 4th/5th graders.

Undergraduate Teaching Assistant — Aug. 2014 – May 2016
Cornell University — Ithaca, NY
Courses: ECE Practice and Design, Robotic Manipulation, System Dynamics, Mechatronics

AWARDS

Hunter R. Rawlings III Cornell Presidential Research Scholarship — Aug. 2012 – May 2016
Cornell University — Ithaca, NY

Engineering Dean's List — Aug. 2012 – May 2016
Cornell University — Ithaca, NY

PUBLICATIONS[2]

Sensorless Pose Determination using Randomized Action Sequences. — 2019
P Mannam, A Volkov, R Paolini, G Chirikjian, M Mason — Entropy

Linear dynamometer testing of hydraulic artificial muscles with variable recruitment. — 2017
J Chipka, MA Meller, A Volkov, M Bryant, E Garcia — Journal of Intelligent Material Systems and Structures

Improving actuation efficiency through variable recruitment hydraulic McKibben muscles. — 2016
M Meller, J Chipka, A Volkov, M Bryant, E Garcia — Bioinspiration & Biomimetics

OUTREACH

Covestro PRSEF Sponsor Judge — Mar. 2017
CMU Gelfand Center — Pittsburgh, PA

Cornell Alternative Breaks Program — Jan. 2015 – Apr. 2015
Cornell University & Mountain Lake Academy — Lake Placid, NY

Cornell IvyQ 2015 Planning Committee — Dec. 2014 – Nov. 2015
Cornell University — Ithaca, NY

Notes

[1] In my master's thesis, I argue that robotics should be studied as an independent scientific field that captures the unique properties, challenges, and inter-disciplinary scope of intelligent autonomous systems.

[2] Happy to provide copies upon request; also available at `www.rustechstudio.com/publications`