

Vasileios Vasilopoulos

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Last update: February, 2019

EDUCATION

- University of Pennsylvania** August 2015 - present
School of Engineering and Applied Science (SEAS)
Department of Mechanical Engineering and Applied Mechanics (MEAM)
PhD, Mechanical Engineering
Advisor: Prof. Daniel E. Koditschek
- University of Pennsylvania** August 2015 - December 2018
School of Engineering and Applied Science (SEAS)
Department of Mechanical Engineering and Applied Mechanics (MEAM)
MSE, Mechanical Engineering
GPA: 3.91/4.00
Mechatronic and Robotic Systems
- National Technical University of Athens (NTUA)** September 2009 - October 2014
School of Mechanical Engineering
5-year Diploma Degree
Diploma Degree Grade: 9.38/10.00 (*1st out of 179 graduates*)
Mechanical Design Option
Thesis: *Dynamics and Control of a Monopod Robot with a Single Actuator on Compliant Terrain*
Supervisor: Prof. Evangelos G. Papadopoulos

RESEARCH PROJECTS

- Autonomous Mobile Manipulation** 2016 - present
Development of hierarchical architecture for task planning with provable guarantees
Coupling of deliberative, reactive and gait layers for task execution with legged robots
Development of software with offline and online modules for mobile manipulation
- Reactive Navigation in Non-Convex Environments** 2016 - present
Reactive navigation in partially known environments with provable guarantees
Integration of global and local information and development of algorithm for online execution
Development of sensor and planning software pipeline
- Legged Locomotion on Compliant Terrains** 2013 - 2015
Modeling of foot-terrain interaction for legged locomotion on compliant terrains
Control of hopping height and speed over compliant terrains with a single actuator per leg

RESEARCH AND WORK EXPERIENCE

- Ghost Robotics** July 2018 - present
Scientific Advisor
Navigation & Perception
- GRASP Laboratory, University of Pennsylvania** August 2015 - present
Research Assistant
Research areas: Motion Planning & Task Planning, Legged Robotics
Advisor: Prof. Daniel E. Koditschek

Ghost Robotics

January 2017 - July 2018

Engineering Consultant

Navigation & Perception

Software development for reactive obstacle avoidance with legged robots

Biomimetics Lab, Control Systems Laboratory (CSL), NTUA

October 2013 - July 2015

Research Assistant

Research areas: Legged Robotics, Contact Dynamics, Control

Supervisor: Prof. Evangelos G. Papadopoulos

Interlink Automations SA

July 2013 - October 2013

Undergraduate Intern

Project: "Lito PTL" (Put/Pick to Light Systems)

GUI development using Qt Creator and C++

Biomimetics Lab, Control Systems Laboratory (CSL), NTUA

July 2011 - July 2013

Undergraduate Research Trainee

Research areas: Legged Robotics, Mechatronics

Supervisor: Prof. Evangelos G. Papadopoulos

GRADUATE COURSEWORK

Advanced Dynamics (MEAM 535), Nonlinear Control Theory (ESE 617), Differential Geometry (MATH 501), Differential Topology (MATH 600), Algebraic Topology (MATH 601), Convex Optimization (ESE 605), Principles & Techniques of Applied Math I (ENM 520), Principles & Techniques of Applied Math II (ENM 521), Continuum Mechanics (MEAM 530), Transport Processes (MEAM 570), Design of Mechatronic Systems (MEAM 510).

PUBLICATIONS

Journal Publications:

- [1] **Vasilopoulos, V.**, Paraskevas, I. S., and Papadopoulos, E. G., "Monopod Hopping on Compliant Terrains", *Robotics and Autonomous Systems*, vol. 102, pp. 13-26, April 2018.

Conference Publications:

- [9] **Vasilopoulos, V.**, and Koditschek, D. E., "Reactive Navigation in Partially Known Non-Convex Environments", *13th International Workshop on the Algorithmic Foundations of Robotics (WAFR '18)*, Mérida, Mexico, December 2018.
- [8] **Vasilopoulos, V.**, Topping, T. T., Vega-Brown, W., Roy, N., and Koditschek, D. E., "Sensor-Based Reactive Execution of Symbolic Rearrangement Plans by a Legged Mobile Manipulator", *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS '18)*, Madrid, Spain, October 2018, pp. 3298-3305.
- [7] **Vasilopoulos, V.**, Vega-Brown, W., Arslan O., Roy, N., and Koditschek, D. E., "Sensor-Based Reactive Symbolic Planning in Partially Known Environments", *IEEE International Conference on Robotics and Automation (ICRA '18)*, Brisbane, Australia, May 2018, pp. 5683-5690.
- [6] **Vasilopoulos, V.**, Arslan, O., De, A., and Koditschek, D. E., "Sensor-Based Legged Robot Homing Using Range-Only Target Localization", *IEEE International Conference on Robotics and Biomimetics (ROBIO '17)*, Macau, China, December 2017, pp. 2630-2637.
- [5] **Vasilopoulos, V.**, Machairas, K., and Papadopoulos, E. G., "Quadruped Pronking on Compliant Terrains Using a Reaction Wheel", *IEEE International Conference on Robotics and Automation (ICRA '16)*, Stockholm, Sweden, May 2016, pp. 3590-3595.
- [4] Topping, T. T., **Vasilopoulos, V.**, De, A., and Koditschek, D. E., "Towards bipedal behavior on a quadrupedal platform using optimal control", *SPIE 9837, Unmanned Systems Technology XVIII, p. 98370H*, Baltimore, MD, USA, April 2016.
- [3] **Vasilopoulos, V.**, Paraskevas, I. S., and Papadopoulos, E. G., "Control and Energy Considerations for a Hopping Monopod on Compliant Terrains", *IEEE International Conference on Robotics and Automation (ICRA '15)*, Seattle, Washington, USA, May 2015, pp. 4570-4575.

- [2] **Vasilopoulos, V.**, Paraskevas, I. S., and Papadopoulos, E. G., “Monopod Hopping on Rough Planetary Environments”, *13th Symposium on Advanced Space Technologies in Robotics and Automation (ASTRA '15)*, ESA, ESTEC, Noordwijk, The Netherlands, May 2015.
- [1] **Vasilopoulos, V.**, Paraskevas, I. S., and Papadopoulos, E. G., “Compliant Terrain Legged Locomotion Using a Viscoplastic Approach”, *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS '14)*, Chicago, Illinois, USA, September 2014, pp. 4849-4854.

Technical Reports:

- [2] **Vasilopoulos, V.**, and Koditschek, D. E., “Technical Report: Reactive Navigation in Partially Known Non-Convex Environments”, *Technical Report*, July 2018, arXiv:1807.08432.
- [1] **Vasilopoulos, V.**, Vega-Brown, W., Arslan O., Roy, N., and Koditschek, D. E., “Technical Report: Sensor-Based Reactive Symbolic Planning in Partially Known Environments”, *Technical Report*, September 2017, arXiv:1709.05474.

Thesis:

- [1] **Vasilopoulos, V.**, “Dynamics and Control of a Monopod Robot with a Single Actuator on Compliant Terrain”, Diploma Thesis, National Technical University of Athens (NTUA), Athens, Greece, September 2014 (in Greek).

TEACHING, MENTORING & OUTREACH

Teaching Assistant:

- **MEAM 513 - ESE 505 (Feedback Control) - University of Pennsylvania** 2017
Offering recitations, holding office hours, grading exams, offering solutions to homework problems.
- **MEAM 348 (Mechanical Engineering Design Laboratory) - University of Pennsylvania** 2017
Helping in lab sections, grading reports.
- **MEAM 210 (Statics and Strength of Materials) - University of Pennsylvania** 2016
Offering recitations, holding office hours, grading exams, offering solutions to homework problems.

Curriculum Development:

- **EdX - “Robotics: Locomotion Engineering” (MicroMasters Program: Robotics)** 2017
Development of projects on legged locomotion (SLIP/Jerboa), managing forum discussion.

Guest Lectures:

- **MEAM 517 (Control & Optimization with Applications in Robotics)** 2018
Lecture title: “Towards Bipedal Standing on a Quadrupedal Robot Using Polynomial Optimization”

Mentoring:

- **Rosalind Shinkle** (Master’s student in Robotics) 2018 - present
- **Meghna Gummadi** (Master’s student in Robotics) 2018 - present
- **Vidula Kopli** (Master’s student in Robotics) 2018 - present
- **Mitch Fogelson** (Master’s student in Robotics) - Now at Rakuten, Japan 2017 - 2018
Independent study: “Visual Inertial State Estimation on Wheeled and Legged Robots”
- **Yilin Liu** (Master’s student in Robotics) - Now at Beckman Coulter Life Sciences 2016
Independent study: “Design, Construction and Programming of Double Inverted Pendula”

Outreach:

- **“Research Experience for Teachers (RET)” (NSF program)** 2016
Guiding a middle school teacher through a research project for 8 weeks.
- **FIRST LEGO League - Qualifiers** 2016
Project Judge (Philadelphia, PA)
- **USA Science & Engineering Festival** 2016
Representing GRASP Lab (Washington, DC)

HONORS AND AWARDS

- **Award from the Technical Chamber of Greece** 2017
For excellent performance during the undergraduate studies at NTUA
- **Thomaidion Award for Scientific Publications, NTUA** 2015
For the paper “Monopod Hopping on Rough Planetary Environments”
- **Awards from the National Technical University of Athens** 2015
For graduating 1st out of 179 students in 2014 graduating class
- **Student Travel Grant from IEEE** 2015
For participation at ICRA '15
- **Limmat Stiftung 1st prize (€10,000)** 2015
For graduating 1st out of 179 students in 2014 graduating class
- **Chrisovergi Award** 2014
For graduating 1st out of 179 students in 2014 graduating class
- **Thomaidion Award for Scientific Publications, NTUA** 2014
For the paper “Compliant Terrain Legged Locomotion Using a Viscoplastic Approach”
- **Sarantopoulos Foundation scholarship for undergraduate studies** 2009-2014
- **State Scholarships Foundation annual award** 2009-2012
For achieving the best GPA at the entrance exams and in the 1st, 2nd and 3rd year of undergraduate studies
- **Tiftixi Award** 2011
For achieving the best GPA in the 2nd year of undergraduate studies
- **Nikolaos I. Kritikos scholarship** 2010
For exceptional performance in Mathematics during the 1st year of undergraduate studies
- **Award from the National Technical University of Athens** 2009
For achieving the best grade at the entrance examinations for the School of Mechanical Engineering
- **Bronze Medal in the 25th Hellenic Mathematical Olympiad** 2008
Participation in the qualifying stage for the National Mathematical Team guided by the Hellenic Mathematical Society (HMS)

SKILLS

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|--------------------------|--|
| Programming | C, C++, Python, Fortran, MATLAB, ROS, Gazebo, Git VCS, |
| Design Software | Solidworks - SolidCAM, Autodesk Inventor, ANSYS Mechanical, CadSoft EAGLE, |
| Operating Systems | Mac OS X, Linux, Unix-based systems, MS Windows, |
| Other Software | MS Office, LaTeX, Wolfram Mathematica, MathCad, |
| Languages | English (Excellent knowledge), French (Basic knowledge), Greek (Native) |

PRESS

- **IEEE Spectrum - Video Friday** July 6, 2018
For the video accompanying the paper “Sensor-Based Reactive Execution of Symbolic Rearrangement Plans by a Legged Mobile Manipulator”, IEEE IROS 2018
URL: <https://goo.gl/r8pPfA>
- **IEEE Spectrum - Video Friday** October 27, 2017
For the video accompanying the paper “Sensor-Based Legged Robot Homing Using Range-Only Target Localization”, IEEE ROBOTICS 2017
URL: <https://goo.gl/TnhKtS>
- **Technical.ly** August 23, 2016
Why 10 District teachers spent their summer doing grad-level STEM research
URL: <https://goo.gl/XJepDV>

MEMBERSHIPS AND ACADEMIC SERVICES

- **Memberships:** IEEE (Student Member), ASME (Student Member), American Mathematical Society (Graduate Student Member), IEEE Robotics and Automation Society (RAS)
- **Reviewer:** Elsevier Mechatronics, Elsevier Mechanism and Machine Theory, IEEE Robotics and Automation Letters (RA-L), IEEE International Conference on Robotics and Automation (ICRA), IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), AACC American Control Conference (ACC)