

IVAN F. EKMAN SIMOES

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Portfolio: ivanekman.com

EDUCATION

Doctor of Philosophy in Mechanical Engineering *Fall 2021 - Present (est. completion in Spring 2026)*
Virginia Polytechnic Institute and State University

- Awarded: *Pratt Fellowship*

Master of Science in Mechanical Engineering *Sept. 2017 - July 2020*
University of Sao Paulo

- Master Thesis: Biped gait controller with active perturbation recovery.

B.S. in Mechanical Engineering *Aug. 2012 - July 2017*
Pontifical Catholic University of Rio de Janeiro

Mechanical Engineering, Exchange Program - University of Wisconsin Madison *Sept. - Dec. 2015*

PROFESSIONAL AND ACADEMIC EXPERIENCE

*** Software Engineering Intern** *Summer 2023 & 2024*
Aptronik *Austin, TX - USA*

- Developing legged locomotion control algorithms for bipedal robots.

Professional Internship - Summer break & Winter break *Feb. 2017 & July 2016*
SEMCON *Resende, RJ - Brazil*

- Structural analysis of vehicles utilizing Finite Elements methods - *Altair HyperWorks* (Feb. 2017).
- Design and layout of heavy vehicles using 3D environment tools - *CATIA V5* (July 2016).

Factory Futures - 3DS Academy *Sept. 2016 - Jan. 2017*
Dassault Systems, PUC Rio *Rio de Janeiro, RJ - Brazil*

- Development of a control algorithm for a turbine carrying robot, for operation inside a plane factory, including path finding algorithm. Part of an international collaborative project among universities.

Undergraduate Research Assistance *Aug. - Dec. 2015*
University of Wisconsin Madison, US *Madison, WI - US*

- Co-inventor of a patented robotic prosthetic ankle (patent listed in the previous section, Patent No. US 10,568,749 B2).

RioBotz *Aug. 2012 - Aug. 2015*
PUC Rio Robotics Team *Rio de Janeiro, RJ - Brazil*

- Development, construction and maintenance of competition robots. Member since 2012, Coordinator of Mechanics from 2013 to 2014, Captain of the team from 2014 to 2015.

PUBLICATIONS & PATENT

Non-Backdrivable Wedge Cam Mechanism for a Semi-Active Two-Axis Prosthetic Ankle
Co-author - Prosthesis, 2024.

Perturbation rejection and active fall recovery for biped robots based on the capture point dynamics
First author - Journal of the Brazilian Society of Mechanical Sciences and Engineering, 2022.

PROSTHETIC MANIPULATOR AND METHOD THEREFOR
Co-inventor - Patent No.: US 10,568,749 B2, 2020.

Walking in the 2-Step Capture Region; pushes, ramps and speed modulation
First author - Proceedings of the 19th International Conference on Advanced Robotics, 2019.

Predicted Step Viability: a stability criterion for biped gait

Co-author - Journal of the Brazilian Society of Mechanical Sciences and Engineering, 2019.

Modeling of a double pendulum on a cart using the Gibbs-Appell method and implementing LQR control

First author - Proceedings of the XVIII International Symposium on Dynamic Problems of Mechanics, 2019.

TECHNICAL STRENGTHS

Programming Languages Java, C++, Python;
Software IHMC Open Robotics Software, Matlab, SolidWorks, CATIA, and Autodesk Inventor;
Workshop Lathe and Milling Machine, CNC, 3D Printing and Power/Shop tools;

EXTRACURRICULAR COURSES

Fundamentals of Reinforcement Learning - Coursera *2023*
Machine Learning - Coursera *2018*
Fundamentals CATIA V5, Mechanical Design Expert CATIA V5 & Surface Design Expert CATIA V5 - TECMES, Sao Paulo *2012*

LANGUAGES

English - Fluent **Portuguese** - Native