

# ROGERIO BONATTI

Senior Researcher, Microsoft

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[www.rogeriobonatti.com](http://www.rogeriobonatti.com) · [LinkedIn](#) · [Publications](#)

## EDUCATION

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**Carnegie Mellon University**, Robotics Institute, Pittsburgh, PA *Aug 2016 - May 2021*

Ph.D. in Robotics, School of Computer Science

Research Advisor: Prof. Sebastian Scherer

Thesis Proposal: Autonomous Aerial Cinematography with Learned Artistic Decision-Making

Thesis Committee: Sebastian Scherer, Jessica Hodgins, Oliver Kroemer, Ashish Kapoor, Nathan Ratliff

**University of São Paulo**, Polytechnic School, São Paulo, Brazil *Jan 2011 - Jul 2016*

B.S., Mechatronics Engineering - Robotics

GPA: 8.6/10, non-curved, top 3/800

B.S. Thesis: *Development of Email Classifier Using Feature Selection for Automatic Response*

Research Advisor: Prof. Fabio Cozman

**Cornell University**, College of Engineering, Ithaca, NY *Jan 2013 - Dec 2013*

Study abroad, Mechanical Engineering.

GPA: 4.08/4.30

One-year study program. Full scholarship by Brazil's Ministry of Education

Research Advisor: Prof. Ephraim Garcia

## RESEARCH EXPERIENCE

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**Microsoft Research** *July 2021 - Present*

*Senior Researcher, Autonomous Systems Group*

*Redmond, WA*

- Working on robust robot intelligence using machine learning. My research focus is at the intersection of machine learning and robotics, where I create methods for robust robot intelligence. My goal is to develop robots that can be deployed in the wild (unstructured environments), in close proximity to humans (collaborating or maintaining safety), and learn from (good and bad) experiences over time.

**Facebook AI Research (FAIR)** *May 2020 - Aug 2020*

*Research Intern with Dr. Jessica Hodgins and Dr. Mustafa Mukadam*

*Pittsburgh, PA*

- Worked with [Jessica Hodgins](#) and [Mustafa Mukadam](#) on learning a manifold of movie emotion descriptors, and a generative model to automatically execute distinct styles for autonomous drone cameras.

**Microsoft Research (MSR)** *May 2019 - Aug 2019*

*Research Intern with Dr. Ashish Kapoor*

*Redmond, WA*

- Worked with [Ashish Kapoor](#) and [Vibhav Vineet](#) on learning efficient state representations for imitation learning that can generalize across simulation and real-life data.

**AirLab, Carnegie Mellon University** *Aug 2016 - Present*

*Ph.D. Student with Prof. Sebastian Scherer*

*Pittsburgh, PA*

- Worked at the AirLab developing motion planning and perception algorithms for aerial vehicles.

**Decision Making Lab, University of São Paulo** *Jan 2015 - Feb 2016*

*Research Intern with Prof. Fabio Cozman*

*São Paulo, Brazil*

- Developed an automated email answering algorithm for call centers, using artificial intelligence, machine learning and natural language processing, achieving 87% precision in business email classification in 8 categories.

**Laboratory for Intelligent Machine Systems, Cornell University** Feb 2013 – Dec 2013  
*Research Intern with Prof. Ephraim Garcia* Ithaca, NY

- Worked on energy harvesting from wind turbines in urban environments, analyzing wind speed around bluff bodies in wind tunnels in order to identify turbulences. Identified a 240% increase in wind power density combined with a relatively small increase of 10% in turbulence.

**Biomedical Engineering Laboratory, University of São Paulo** Jul 2011 – Dec 2012  
*Research Intern with Prof. Henrique Takachi Moriya* São Paulo, Brazil

- Work on the design and development of a small animal mechanical ventilator for studying the respiratory system of small mammals (20-300 g).

## AWARDS, HONORS AND SCHOLARSHIPS

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- 2020: Best Student Paper Award finalist, IROS 2020
- 2020: Siebel Scholarship, class of 2021 (\$35,000)
- 2020: Microsoft Research Dissertation Grant (\$25,000)
- 2019: Best paper finalist, IROS 2019 Vision-Based Drones Workshop
- 2019: James R. Swartz Entrepreneurial Fellowship, CMU
- 2019: Selected for the CMU NSF I-Corps entrepreneurship program (\$2,500)
- 2017-2019: Travel awards: RSS'17, ISER'18, IROS'19, CMU Provost
- 2017: CMU Technology and Entertainment Proposal for Autonomous Cinematography (\$60,000)
- 2014: Fundação Estudar fellowship for outstanding academic trajectory (28/31,000) (~\$10,000)
- 2012-2014: Research scholarship, State of São Paulo Research Foundation (FAPESP) (~\$3,000)
- 2013: Dean's List, Cornell University
- 2013: Full one-year scholarship from Brazil's Ministry of Education for Cornell University (~\$65,000)
- 2011: Entered the Polytechnic School of the University of São Paulo in 3rd/10,600 applicants
- 2010: High school valedictorian – Colégio Visconde de Porto Seguro, São Paulo, Brazil
- 2010: Gold Medal, Brazilian Physics Olympics (top 20 from over 50,000 competitors)

## PUBLICATIONS

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### Journals:

[J1] Rogério Bonatti, Wenshan Wang, Cherie Ho, Aayush Ahuja, Mirko Gschwindt, Efe Camci, Erdal Kayacan, Sanjiban Choudhury, Sebastian Scherer. **Autonomous Aerial Cinematography Among Unstructured Environments With Learned Artistic Decision-Making**. *Journal of Field Robotics (JFR)*. 2020. [[PDF](#)] [[Video](#)] [[Media](#)]

### Peer-reviewed conferences:

[C1] Cherie Ho, Andrew Yong, Harry Freeman, Rohan Rao, Rogério Bonatti, Sebastian Scherer. **3D Human Reconstruction in the Wild with Collaborative Aerial Cameras**. *International Conference on Intelligent Robots and Systems (IROS)*. 2021.

[C2] Rogério Bonatti, Arthur Bucker, Sebastian Scherer, Mustafa Mukadam, Jessica Hodgins. **Batteries, camera, action! Learning a semantic control space for expressive robot cinematography**. *International Conference on Robotics and Automation (ICRA)*. 2021. [[PDF](#)] [[Video](#)]

[C3] Arthur Buckner, Rogerio Bonatti, Sebastian Scherer. **Do you See What I See? Coordinating Multiple Aerial Cameras for Robot Cinematography.** *International Conference on Robotics and Automation (ICRA)*. 2021. [[PDF](#)] [[Video](#)]

[C4] [**Best Student Paper Award Finalist – 3 out of 2996 submissions**]

Rogerio Bonatti, R. Madaan, V. Vineet, S. Scherer, A. Kapoor. **Learning Visuomotor Policies for Aerial Navigation Using Cross-Modal Representations.** *International Conference on Intelligent Robots and Systems (IROS)*. 2020. [[PDF](#)] [[Video](#)] [[Code](#)] [[Media](#)]

[C5] Rogerio Bonatti, Cherie Ho, Wenshan Wang, Sanjiban Choudhury, Sebastian Scherer. **Towards a Robust Aerial Cinematography Platform: Localizing and Tracking Moving Targets in Unstructured Environments.** *International Conference on Intelligent Robots and Systems (IROS)*. 2019. [[PDF](#)] [[Video](#)]

[C6] Mirko Gschwindt, Efe Camci, Rogerio Bonatti, Wenshan Wang, Sebastian Scherer. **Can a Robot Become a Movie Director? Learning Artistic Principles for Aerial Cinematography.** *International Conference on Intelligent Robots and Systems (IROS)*. 2019. [[PDF](#)] [[Video](#)]

[C7] Wenshan Wang, Aayush Ahuja, Yanfu Zhang, Rogerio Bonatti, Sebastian Scherer. **Improved Generalization of Heading Direction Estimation for Aerial Filming Using Semi-supervised Regression.** *International Conference on Robotics and Automation (ICRA)*. 2019. [[PDF](#)] [[Video](#)]

[C8] Rogerio Bonatti, Yanfu Zhang, Sanjiban Choudhury, Wenshan Wang, Sebastian Scherer. **Autonomous drone cinematographer: Using artistic principles to create smooth, safe, occlusion-free trajectories for aerial filming.** *International Symposium on Experimental Robotics (ISER)*. 2018. [[PDF](#)] [[Video 1](#)] [[Video 2](#)] [[Video 3](#)]

[C9] Yanfu Zhang, Wenshan Wang, Rogerio Bonatti, Daniel Maturana, Sebastian Scherer. **Integrating kinematics and environment context into deep inverse reinforcement learning for predicting off-road vehicle trajectories.** *Conference on Robot Learning (CoRL)*. 2018. [[PDF](#)] [[Video](#)]

[C10] Mikhail Yakhnis, Rogerio Bonatti, Ryan Gryszko, and Chinaso Obiejesi. **Influence of Building Geometry on Wind Power Potential.** *American Institute of Aeronautics and Astronautics Student Conference (AIAA)*. 2014. [[PDF](#)]

[C11] Rogerio Bonatti, Andrea F. Cruz, and Henrique Takashi Moriya. **Design and Characterization of a Volume-Cycled Small Animal Mechanical Ventilator Coupled with a Respiratory System Model.** *VI Latin American Congress on Biomedical Engineering (CLAIB)*. 2014. [[PDF](#)]

[C12] Rogerio Bonatti and Henrique Takashi Moriya. **Small animal mechanical ventilator with control software.** *International Symposium of the University of São Paulo (SIICUSP)*. 2012. [[PDF](#)]

#### Workshops and others:

[W1] [**Best workshop paper finalist**] Rogerio Bonatti, Wenshan Wang, Cherie Ho, Aayush Ahuja, Mirko Gschwindt, Efe Camci, Erdal Kayacan, Sanjiban Choudhury, Sebastian Scherer. **Autonomous Aerial Cinematography Among Unstructured Environments With Learned Artistic Decision-Making.** *IROS Vision-based Drones Workshop*. 2019. [[PDF](#)]

[W2] Yanfu Zhang\*, Wenshan Wang\*, Rogerio Bonatti\*, Daniel Maturana, Sebastian Scherer, \*Equal contribution. **Autonomous Cinematography using Unmanned Aerial Vehicles.** *IROS Vision-based Drones Workshop*. 2018. [[PDF](#)]

[W3] R. Madaan, D.M Saxena, Rogerio Bonatti and S. Scherer. **Deep Flight: Autonomous Quadrotor Navigation with Deep Reinforcement Learning.** *Workshop on Learning perception and control for autonomous flight: safety, memory, and efficiency, RSS*. 2017. [[PDF](#)] [[Longer PDF](#)] [[Video](#)]

[W4] Rogerio Bonatti, Arthur G. de Paula, Vitor S. Lamarca and Fabio G. Cozman. **Effect of Part-of-Speech and Lemmatization Filtering in Email Classification for Automatic Reply.** *Workshop*

on Knowledge Extraction from Text, Association for the Advancement of Artificial Intelligence AAAI. 2016. [PDF]

[Undergraduate Thesis] Rogerio Bonatti, Arthur G. de Paula. **Development of Email Classifier in Brazilian Portuguese Using Feature Selection for Automatic Response.** *Undergraduate Thesis at University of São Paulo, Dept. of Mechatronics Engineering.* 2015. [PDF]

## PROFESSIONAL EXPERIENCE

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**McKinsey & Co.** Aug 2015 - May 2016  
*Business Analyst Intern* São Paulo, Brazil

- Worked as a generatist consultant on Supply Chain, Logistics, Purchasing, and Commercial Policy Transformation across multiple industries

**Itaú BBA** Jul 2014 – Aug 2014  
*Winter Intern, Cost Optimization and Estimation Team* São Paulo, Brazil

- Itaú BBA is Latin America's largest corporate investment bank, in a holding with \$85B market cap
- Studied different cost analysis techniques and their application to the bank's products in a \$2 B segment
- Developed 2 new reports used in the comparison between Corporate Inv. Banking and Middle clients

**Amgen Inc** May 2013 – Aug 2013  
*Summer Intern, Global Strategic Sourcing, Finance and Strategy Team* Thousand Oaks, CA

- Amgen is the largest biotech company in the world with \$18.7B in sales in 2013
- Optimized marketing contracts with traditional advertising agencies
- Developed and applied statistical analysis to a marketing benchmarking database leading to an estimated 4x increase in savings (\$8M) and 60% decrease (4 months) in the time required to perform data analysis

## ACADEMIC AND PROFESSIONAL TALKS

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### Institutional talks:

<b>DJI</b> Invited talk, Shenzhen, China	Nov 2019
<b>Apple</b> Invited talk, Seattle, WA	Aug 2019
<b>Microsoft Research</b> Research talk, Redmond, WA	Aug 2019
<b>University of Washington</b> Invited talk, Seattle, WA	Aug 2019
<b>Carnegie Mellon University</b> PhD Qualifier, Pittsburgh, PA	Nov 2018
<b>University of São Paulo</b> Invited talk, São Paulo, Brazil	Jul 2017
<b>Federal University of Espirito Santo</b> Invited talk, Vitoria, Brazil	Jul 2016
<b>University of São Paulo</b> Invited talk, São Paulo, Brazil	Jun 2016
<b>Colegio Visconde de Porto Seguro</b> Invited talk, São Paulo, Brazil [Video]	May 2016

### Conference orals:

<b>IROS 2020</b> Main conference presentation (online)	Nov 2020
<b>RSS 2020</b> Robust Autonomy Workshop (online)	June 2020
<b>ICRA 2020</b> Machine Learning in Planning and Control Workshop (online)	June 2020
<b>IROS 2019</b> Main conference presentation, Macau, China	Nov 2019
<b>IROS 2019</b> Workshop on Vision-Based drones, Macau, China	Nov 2019
<b>ISER 2018</b> Single-track oral presentation, Buenos Aires, Argentina	Nov 2018
<b>IROS 2018</b> Workshop on Vision-Based drones, Madrid, Spain	Oct 2018
<b>RSS 2017</b> Workshop on Learning Perception and Control for Flight, Boston, MA	Jul 2017
<b>AAAI 2016</b> Workshop on Knowledge Extraction from Text, Phoenix, AZ	Feb 2016

## SELECTED MEDIA COVERAGE

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<b>Venture Beat</b> AI that directs drones to film ‘exciting’ shots lowers production costs [ <a href="#">Link</a> ]	Nov 2020
<b>Microsoft Research</b> Dissertation Grant supports students’ cutting-edge work [ <a href="#">Link</a> ]	June 2020
<b>Microsoft Research Blog</b> Training deep control policies for the real world [ <a href="#">Link</a> ]	March 2020
<b>Venture Beat</b> Researchers train AI in simulation to control a real-world drone [ <a href="#">Link</a> ]	March 2020
<b>Gizmodo</b> Autonomous Camera Drones Film Like a Hollywood Director [ <a href="#">Link</a> ]	Nov 2019
<b>CMU Computer Science</b> Putting the Power of a Film Director in a Drone [ <a href="#">Link</a> ]	Nov 2019
<b>Inverse</b> Stunning A.I. results show how drones could become the next auteurs [ <a href="#">Link</a> ]	Nov 2019
<b>ZD Net</b> Action! Autonomous drone doubles as a film director [ <a href="#">Link</a> ]	Nov 2019
<b>Microsoft Research Blog</b> Rapidly enabling autonomy at scale with simulation [ <a href="#">Link</a> ]	April 2019
<b>Nvidia Developer</b> Autonomous Drone Cinematographer [ <a href="#">Link</a> ]	Sep 2018
<b>CMU Robotics Institute</b> Autonomous Drone Cinematographer [ <a href="#">Link</a> ]	Aug 2019
<b>Estudar Fora:</b> Undergraduate students represent Brazil at AAI 2016 [ <a href="#">Link</a> ]	Mar 2016
<b>Fundacao Estudar</b> Profile page for fellowship given to outstanding students [ <a href="#">Link</a> ]	Jul 2014

## ACADEMIC ACTIVITY AND SERVICE

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### Teaching assistant:

CMU 16-782 Planning and Decision-Making. Instructor: <a href="#">Maxim Likhachev</a> [ <a href="#">Website</a> ]	Fall 2019
CMU 16-811 Math Fundamentals for Robotics. Instructor: <a href="#">Michel Erdmann</a> [ <a href="#">Website</a> ]	Fall 2018

### Conference and Journal Reviewing:

RA-L 21, ICRA 21, CHI 21	2020
JFR 20, IROS 20, CHI 20, TCSVT 20	2020
JFR 19, ICRA 19, IROS 19, SSRR 19	2019
JFR 18, ICRA 18, IROS 18	2018

### University Activity:

<b>Chair, Activities Committee</b> Field Robotics Center, CMU	2017 - Present
<b>Volunteer, RoboOrg</b> Robotics Institute, CMU	2016 - Present

### Masters / PhD Thesis Committees at CMU Robotics:

<b>Xuning Yang</b> , Toward intuitive human controlled MAVs: motion primitives based teleoperation	2019
<b>Matthew Collins</b> , Efficient Planning for High-Speed MAV Flight Using Topological Graphs	2019
<b>Samuel Clarke</b> , Robot Learning for Manipulation of Granular Materials	2019
<b>Vasu Agrawal</b> , Ground Up Design of a Multi-modal Object Localization System	2019

## SKILLS

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<b>Natural Languages</b>	Native Portuguese, English, German, Spanish, French, Basic Mandarin Chinese
<b>Computer Languages</b>	C, C++, Python, Tensorflow, Pytorch, MATLAB, Java, LabVIEW, HTML, CSS, PHP, G, $\LaTeX$
<b>Software</b>	ROS, SolidWorks, NX7.5, Autodesk Inventor, AutoCAD, Office Suite, DipTrace, Weka
<b>Technical Skills</b>	Basic machining ability, Basic manufacturing of Printed Circuit Boards (PCBs), 3D Printing, CNC Machining

## **ADDITIONAL ACTIVITIES**

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- Competitive swimmer (2003-2009) – Pinheiros Club, São Paulo, Brazil
- Hobbies: Swimming, mountain biking, beginner tennis, traveling

## **REFERENCES**

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Available upon request

July 29, 2021