Maria Bauza Villalonga
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Education

2016–present **Massachusetts Institute of Technology (MIT)**, *Cambridge*, United States.

- PhD student at the Mechanical Engineering department of MIT. GPA: 5.0.
- Advisor: Prof. Alberto Rodriguez.

2015–2016 **Massachusetts Institute of Technology (MIT)**, *Cambridge*, United States.

- Visiting student at the MCube Lab supervised by Prof. Alberto Rodriguez.

2011–2016 **Polytechnic University of Catalonia (UPC)**, *Barcelona*, Spain.

- Dual Bachelors in **Mathematics** and **Engineering Physics** through CFIS.
- CFIS is a talent center that selects some of the top technical students from Spain and provides them with a scholarship to simultaneously study two bachelor's degrees.

Research Experience

2015–present **MIT** research assistant at Mcube Lab.
I develop algorithms that enable embodied intelligence to improve how robots perceive and interact with their environment. In my work, I have studied both the power of applying the most recent advances in AI and computer vision to control robotic systems, and the capabilities of high-resolution tactile sensing to solve complex tasks, such as grasping and localization. My objective is to effectively use AI to combine both different sensing modalities to make robots more reactive and dexterous.

Summer 2016 **Google Zurich** intern at the SafeSearch team.
Software engineer for three months. Research and implementation of Deep Learning algorithms for a Computer Vision task.

Awards and Grants

2021 **RSS pioneers** Selected to attend the 2021 RSS Pioneers Workshop which brings together a cohort of the world's top early-career researchers in robotics.

2021 **Best Paper Finalist Award** on Service Robotics at ICRA 2021 for the work "Real-time shape and pose estimation from planar pushing using implicit surfaces".

2019 Selected to attend the **Global Young Scientists Summit**. Awarded to no more than 5 PhD students throughout all MIT departments.

2019 **Rising Stars in Mechanical Engineering.** Awarded to 30 graduate and postdoctoral women.

2019 **DeFlorez Travel Award in Design and Manufacturing.** Awarded to 1 MIT Mechanical Engineering Graduate Student annually.

2018 **Facebook Emerging Scholar Award**. Full funding for 2 years, only 21 awardees among more than 900 applications.

2018 **NVIDIA Graduate Fellowship**. Awarded to 10 PhD students from more than 230 applications. Declined in favour of Facebook Award.

2018 **Best Paper Award on Cognitive Robotics** at IROS 2018 for the work "Augmenting Physical Simulators with Stochastic Neural Networks: Case Study of Planar Pushing and Bouncing".

2018 Amazon Robotics **Best Systems Paper Award** for the submission "Robotic pick-and-place of novel objects in clutter with multi-affordance grasping and cross-domain image matching".

2018 Travel Award to attend RSS 2018. The award is founded by the Women in Robotics Workshop.

2018 **Best Poster Award** at ICRA 2018 workshop on Active touch for perception and interaction.

2017 **1st Place Winners** (Stow Task) at the international competition **Amazon Robotics Challenge** (ARC) 2017 with the MIT-Princeton team.

2016 **Best Paper Finalist Award** at IROS 2016 for the work "More than a Million Ways to Be Pushed. A High-Fidelity Experimental Data Set of Planar Pushing".

2016 Proud recipient of 1 of just 45 prestigious **"La Caixa" Scholarships** for graduate studies. Full funding for 2 years in any graduate program of my choosing.

2016 3rd Place at the 2016 Amazon Robotics Challenge with the MIT-Princeton team.

2016 IROS 2016 NSF Travel Grant.

2015 UPC-Internship Program Grant to do research during one year at MIT.

2015 Google Grace Hopper Travel Award to attend the conference with all expenses paid.

Peer-reviewed Publications

[16] F. Alet, K. Kawaguchi, **M. Bauza**, N. Kuru, T. Lozano-Perez, L. Kaelbling. "Tailoring: Encoding Inductive Biases by Optimizing Unsupervised Objectives at Prediction Time", *Under review, NeurIPS 2021*.

[15] S. Suresh, **M. Bauza**, A. Rodriguez, J. Mangelson, M. Kaess."Real-time shape and pose estimation from planar pushing using implicit surfaces", *ICRA 2021*.

[14] **M. Bauza**, E. Valls, B. Lim, T. Sechopoulos, A. Rodriguez. "Tactile Object Pose Estimation from the First Touch with Geometric Contact Rendering", *CoRL 2020*.

[13] A. Kloss, **M. Bauza**, J. Wu, J. Tenenbaum, A. Rodriguez, J. Bohg. "Accurate Vision-based Manipulation through Contact Reasoning", *ICRA 2020*.

[12] Y. Lin, **M. Bauza**, P. Isola. "Experience-Embedded Visual Foresight", *CoRL 2019*.

[11] F. Alet, A. Jeewajee, **M. Bauza**, A. Rodriguez, T. Lozano-Perez, L. Kaelbling. "Graph Element Networks: adaptive, structured computation and memory", *ICML 2019*.

[10] **M. Bauza**, O. Canal, A. Rodriguez, "Tactile Mapping and Localization from High-Resolution Tactile Imprints", *ICRA 2019*.

[9] **M. Bauza**, F. Alet, Y. Lin, T. Lozano-Perez, L. Kaelbling, P. Isola, A. Rodriguez. "Omnipush: accurate, diverse, real-world dataset of pushing dynamics with RGB-D video", *IROS 2019*.

[8] A. Ajay, **M. Bauza**, J. Wu, N. Fazeli, J. Tenenbaum, A. Rodriguez, L. Kaelbling et. al. . "Combining Physical Simulators and Object-Based Networks for Control", *ICRA 2019*.

[7] **M. Bauza**, A. Rodriguez. "GP-SUM. Gaussian Processes Filtering of non-Gaussian Beliefs", *WAFR 2018*.

[6] **M. Bauza***, F. Hogan*, A. Rodriguez. "Learning vs. physics-based control of a planar push system", *CoRL 2018*.

[5] **M. Bauza***, F. Hogan*, A. Rodriguez. "Tactile Regrasp: Grasp Adjustments via Simulated Tactile Transformations", *IROS 2018*.

[4] A. Ajay, J. Wu, N. Fazeli, **M.Bauza**, L. Kaelbling, J. Tenenbaum, A. Rodriguez. "Augmenting Physical Simulators with Stochastic Neural Networks: Case Study of Planar Pushing and Bouncing", *IROS 2018*.

[3] A Zeng, S Song, K. Yu, E. Donlon, F. Hogan, **M. Bauza**, et. al. "Active Perception of Novel Objects in Clutter with Multi-Affordance Grasping and Cross-Domain Image Matching" in *ICRA 2018, IJRR 2019*.

[2] **M. Bauza**, A. Rodriguez. "A Probabilistic Data-Driven Model for Planar Pushing", in *ICRA 2017*.

[1] K. Yu, **M. Bauza**, N. Fazeli, and A. Rodriguez. "More than a Million Ways to Be Pushed. A High-Fidelity Experimental Data Set of Planar Pushing," in *IROS 2016*.

Press Coverage and Outreach

2021 Invited talk at University of Toronto, AI in Robotics Seminar.

2021 Invited talk at University of Pennsylvania, Grasp Seminar.

2020 Co-organized workshop at ICRA 2020 on Uncertainty in Contact-Rich Interactions (cancelled due to CoVID19).

2019 MIT new article: Pushy robots learn the fundamentals of object manipulation.

2019 Selected poster at the MIT College of Computing Launch.

2019 Invited talk at Tec de Monterrey (Mexico).

2019 Selected talk at the ML across MIT retreat.

2019 ElMundo (spanish newspaper) Una mano robotica inteligente.

2019 El Iris (spanish newspaper, front page) Una ciutadellenca en el camp de la intelligencia artificial.

2018 Invited talk at IROS2018 Workshop on RoboTac: Tactile Perception and Learning in Robotics.

2018 MIT News Front page. Teaching robots how to move objects.

2018 Invited talk for broad audience (100+ attendees). First summer talk at Mercadal: Maria Bauza.

2018 MIT MechEConnects. Student Spotlight: Maria Bauza, PhD Candiate.

2018 MIT News Front page. Robo-picker grasps and packs.

2018 ExpressNews (spanish version). Maria Bauza, a spanish woman who makes history.

2018 La Vanguardia (spanish newspaper). MIT: the science paradise.

2017 Co-organized the workshop at RSS 2017 on Data-Driven Robotic Manipulation.

Advising

PhD and Master students: Antonia Bronars, Bryan Lim.

Undergraduate students: Claudia Lozano, Meenakshi Singh, Eric Valls, Shreya Skarpoor, Max Thomsen, Oleguer Canals, Jasmine Zeng, Theo Sechopoulos, Ashay Athalye.