Valentin **Peretroukhin**

PhD Candidate · Deep Probabilistic Models for State Estimation in Robotics

2-70 Nina St., Toronto, ON, Canada, M5R 1Z6.

(416) 557-1519 | v.peretroukhin@mail.utoronto.ca | valentinp.com | valentinp | @valentinp

I am a Ph.D. candidate at the University of Toronto Institute for Aerospace Studies. I work on developing novels ways in which deep Bayesian observation models can improve visual and LIDAR-based localization in mobile robotics.

Education

University of Toronto — *Toronto, Canada*

Ph.D. Candidate in Mobile Robotics | Institute for Aerospace Studies — *Sep. 2013 - Present*

- Direct transfer into Ph.D. stream from M.A.Sc. GPA: 4.00/4.00.
- Ph.D. thesis focuses on deep probabilistic observation models to improve visual-inertial estimation for mobile robots.
- President of Aerospace Students' Association in 2015-2016.

University of Toronto — *Toronto, Canada*

B.A.Sc. in Engineering Science, Aerospace Major — *Sep. 2008 - May 2013*

- Graduated with Honours. GPA: 3.86/4.00.
- Undergraduate thesis examined the optimal stereo camera orientation for stereo visual odometry for mobile robots. Work published at the 2014 Conference on Computer and Robot Vision.

Skills

Scientific Computing	Python (NumPy/SciPy), C/C++, MATLAB, Mathematica
Robotics	ROS, Deep Learning (Pytorch, Caffe), Stereo Cameras/LIDAR/IMUs (including IMU arrays)
Web & Mobile Full Stack	iOS/Android experience, Ruby on Rails, Django, jQuery, HTML5 & CSS, Sketch, Photoshop
Languages	Russian (Fluent), French (Semi-Fluent)

Research & Teaching

University of Toronto, Division of Engineering Science — *Toronto, Canada*

Teaching Assistant | CSC190: Algorithms & Data Structures, ESC103: Engineering Math & Computation — *Sept 2013 - Present*

- **ESC103** (Fall 2013 - 2016) : Taught weekly tutorials and labs (including the creation and administration of labs in 2016) for two sections of 20+ first year engineering students with engaging discussions and interactive lessons on topics in linear algebra and scientific programming in MATLAB.
- **CSC190** (Winter 2014): Lead bi-weekly labs for two sections of 100+ first year engineering students. Taught fundamental data structures and algorithms in C.
- Consistently highly ranked in Teaching Assistant evaluations. Nominated for Teaching Excellence Award.

University of Toronto, Autonomous Space Robotics Lab (ASRL) — *Toronto, Canada*

Research Assistant — *May 2013 - Aug 2013*

- Adapted Visual Teach & Repeat algorithm to work on quadrotor in collaboration with a student at ETH, Zurich.
- Extended and re-constructed instrumented ascender assembly on rover to better assist in high gradient descents.

Canadian Space Agency — *Montreal, Canada*

Student Researcher | Physical Sciences in Space — *May. 2011 - Sept. 2012*

- Developed parallel software toolkit in Mathematica to analyze residual gravity levels from the International Space Station, Parabolic Aircraft and recoverable satellites
- Participated in 2 different campaigns onboard the Falcon 20 parabolic aircraft, accumulating over an hour of reduced gravity time.
- Presented a research poster at International Symposium for Physical Sciences in Space in Bonn, Germany.
- Lead an interactive zero gravity workshop for over 60 French and English secondary school teachers at a Space Educators Conference.

University of Toronto, Flight Systems & Control Lab *Toronto, Canada*

Student Researcher | Funding from NSERC Undergraduate Research Award *Jul. 2012 - Jun. 2013*

- Aided a graduate student in successfully implementing a dynamic search path algorithm using a team of iRobot autonomous robots with VICON infrared tracking.
- Developed search path planning algorithms, running in-depth MATLAB simulations and analyzing computational efficiency.

Leadership & Entrepreneurial Experience

Diem Medical (formerly Pillsy) *Toronto, Canada*

Co-founder | diempouch.com *April 2015 - June 2017*

- Created Diem Pouch: a smart pill pouch and app that helps patients take medication consistently. Lead development of iOS app and integration with Bluetooth-enabled hardware.
- Accepted into two accelerators: Start at UTIAS and Hatchery. Received funding from the Ontario Centre of Excellence. Invited to open Toronto Stock Exchange.
- Press from University of Toronto Press, the Toronto Star, and Wired Magazine.

Aerospace Students' Association *Toronto, Canada*

Executive Member | Student Council at the Institute for Aerospace Studies *Sep 2013 - Sept 2016*

- Elected President (2015-2016) of the executive committee for a student body of over 120 graduate students at the University of Toronto Institute for Aerospace Studies.
- Lead the organization of several events and committees at the Institute, including a comprehensive student feedback report, an interactive booth at the U of T *Science Rendezvous*, and an invited speaker seminar series.

University of Toronto Sports Analytics Group *Toronto, Canada*

Executive Member *Sep 2014 - June 2015*

- Part of the founding members of the University of Toronto Sports Analytics Group.
- Presented at an annual sports marketing conference in Toronto. Received analytics data from the Toronto Blue Jays.

Honors & Awards

2015	**Canadian Graduate Scholarship (CGS-D3)**, NSERC Doctoral Award ($105 000 total value)	*Toronto*
2015	**SmartStart Seed Grant**, Ontario Centre of Excellence (awarded to Diem Medical/Pillsy)	*Toronto*
2015	**Orozco Prize**, University of Toronto Hatchery Accelerator (for Diem Medical/Pillsy)	*Toronto*
2013	**Canadian Graduate Scholarship (CGS-M)**, NSERC Master's Award ($17 500 total value)	*Toronto*
2009-13	**Department of Engineering Dean's List**, University of Toronto	*Toronto*
2013	**Canadian Space Agency Student Travel Bursary**, ISPS4 in Bonn, Germany	*Montreal*
2010	**Undergraduate Summer Research Award**, NSERC	*Toronto*

Selected Publications

2017	**Reducing Drift in Visual Odometry by Inferring Sun Direction Using a Bayesian CNN**, ICRA	*Singapore*
2016	**PROBE-GK: Predictive Robust Estimation using Generalized Kernels**, ICRA	*Stockholm, Sweden*
2015	**PROBE: Predictive Robust Estimation for Visual-Inertial Navigation**, IROS	*Hamburg, Germany*
2014	**Optimizing Camera Perspective for Stereo Visual Odometry**, Computer Robot Vision	*Montreal, Canada*

Conferences Attended

2017	**IEEE Conference on Robotics and Automation (ICRA)**, Spotlight Presentation	*Singapore*
2016	**IEEE Conference on Robotics and Automation (ICRA)**, Spotlight Presentation	*Stockholm, Sweden*
2015	**IEEE Conference on Intelligent Robots and Systems (IROS)**, Spotlight Presentation	*Hamburg, Germany*
2015	**IEEE Conference on Robotics and Automation (ICRA)**, Workshop Presentation	*Seattle, USA*
2014	**Robotics: Science and Systems**, Attendee	*Berkeley, California*
2014	**Conference on Computer and Robot Vision**, Spotlight Presentation	*Montreal, Canada*