# Mikhail Volkov   Михаил Волков   ミカイル・ヴォルコー

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**EDUCATION**

*2013−2016*  **Massachusetts Institute of Technology:** Ph.D. (EECS)
Thesis: *Machine Learning and Coresets for Automated Real-Time Data Segmentation and Summarization*
Achievements: 8 authored publications, 1 Best Student Paper, 1 industry patent
Minor: *Quantitative Finance & Corporate Law*

*2010−2013*  **Massachusetts Institute of Technology:** M.Sc., (EECS)
Thesis: *Deployment Algorithms for Multi-agent Exploration and Patrolling*

*2006−2010*  **Trinity College Dublin:** B.A. (Mathematics), B.A.I. (EECS)
Achievements: Gold Medal, Foundation Scholarship, 8 academic awards, best EE thesis.

**EXPERIENCE**

*2017−present*  **Quantitative Developer,** SMBC Nikko Securities, Tokyo, Japan
∘ In one year we have delivered a realtime GPU-based risk management system for our equity derivatives trading desks, allowing us to compute risk and P&L intraday.
∘ Developed a complete framework for interfacing our platform with Kdb+, realtime position management system, risk calculation tools, and integrated display tools.
∘ My data mining tools are currently generating quarterly profits of upwards of ¥60M.
∘ JSDA RR1 license (May 2017). Fully certified to trade derivaties on JPX.

*2010−2016*  **Graduate researcher,** Distributed Robotics Laboratory, MIT CSAIL
∘ Developed online system for real-time analysis of live data streams, such as video and financial data. Quantitative analysis of Bitcoin market price trends (NIPS '14).
∘ Implemented first ever coreset for PCA, allowing us to compute low rank approximations of massive sparse datasets such as the entire English Wikipedia (NIPS '16).
∘ Piloted machine learning platform for surgical video analysis at Mass. General Hospital.

*2013−2014*  **Data analyst,** Percipio Media, Cambridge, MA
∘ Six month internship with data brokerage firm, as part of database marketing team.
∘ Developed statistical models to optimize bidding strategies for different data channels.

*2013−2015*  **Co-founder,** TaxiSG, Singapore
∘ Singapore Innovation Grant, 2013. Awarded the top seed fund of $200,000.
∘ Developed mobility app and analytics suite for taxi fleets: taxisg.csail.mit.edu .

**SKILLS**

**Software:** Industry systems with Python, C++, Kdb+/q; MATLAB for research.

**Hardware:** FPGA prototyping with Verilog, Bluespec. ASIC design and fabrication.

**Dev-Ops:** Code versioning and release management with Git, Artifactory, Ansible.

**Data:** Machine learning: SVM, neural nets; data reduction, segmentation, PCA.

**HPC:** Cloud-computing with AWS (EC2), MATLAB DCS/PCT, Hadoop.

**Languages:** English, Russian: native. Japanese: conversational (JLPT N4).

PUBLICATIONS

[1] **Mikhail Volkov**, Dan A. Hashimoto, Guy Rosman, Ozanan R. Meireles, and Daniela Rus. Machine learning and coresets for automated real-time video segmentation of laparoscopic and robot-assisted surgery. In *IEEE International Conference on Robotics and Automation (ICRA)*, Singapore, Singapore, May 2017. IEEE.

[2] Dan Feldman, **Mikhail Volkov**, and Daniela Rus. Dimensionality reduction of massive sparse datasets using coresets. In *Advances in Neural Information Processing Systems 29*, pages 2766–2774. Curran Associates, Inc., 2016.

[3] **Mikhail Volkov**, Dan A. Hashimoto, Guy Rosman, Ozanan R. Meireles, and Daniela Rus. Machine learning and coresets for automated, real-time video segmentation of laparoscopic surgery. In *SAGES Emerging Technology Session*, Boston, Massachusetts, March 2016.

[4] Gavin Chase Hall, **Mikhail Volkov**, and Daniela Rus. Dynamic Patrolling Policy for Optimizing Urban Mobility Networks. In *Intelligent Transportation Systems (ITSC), 2015 18th International IEEE Conference on*, Las Palmas de Gran Canaria, Spain, September 2015. IEEE.

[5] **Mikhail Volkov**, Guy Rosman, Dan Feldman, John W Fisher III, and Daniela Rus. Coresets for visual summarization with applications to loop closure. In *IEEE International Conference on Robotics and Automation (ICRA)*, Seattle, Washington, USA, May 2015. IEEE.

[6] Soliman Nasser, Andew Barry, Marek Doniec, Guy Peled, Guy Rosman, Daniela Rus, **Mikhail Volkov**, and Dan Feldman. Fleye on the Car: Big Data meets the Internet Of Things. In *Information Processing in Sensor Networks (IPSN), 14th International Conference on*, Seattle, Washington, May 2015. IEEE.

[7] Guy Rosman, **Mikhail Volkov**, Dan Feldman, John W Fisher III, and Daniela Rus. Coresets for $k$-segmentation of streaming data. In *Advances in Neural Information Processing Systems 27*, pages 559–567. Curran Associates, Inc., 2014.

[8] Afian Anwar, **Mikhail Volkov**, and Daniela Rus. ChangiNOW: A mobile application for efficient taxi allocation at airports. In *Intelligent Transportation Systems (ITSC), 2013 16th International IEEE Conference on*, The Hague, The Netherlands, October 2013. IEEE.

[9] **Mikhail Volkov**, Javed Aslam, and Daniela Rus. Markov-based redistribution policy model for future urban mobility networks. In *Intelligent Transportation Systems (ITSC), 2012 15th International IEEE Conference on*, Anchorage, Alaska, September 2012. IEEE.

[10] **Mikhail Volkov**, Alejandro Cornejo, Nancy Lynch, and Daniela Rus. Environment characterization for non-recontaminating frontier-based robotic exploration. In Agents in Principle, Agents in Practice, pages 19–35. Springer, 2011.

THESES     [1] **Mikhail Volkov**. Machine Learning and Coresets for Automated Real-Time Video Segmentation and Summarization. Ph.D. thesis, Massachusetts Institute of Technology, Cambridge, Massachusetts, September 2016.

[2] **Mikhail Volkov**. Deployment algorithms for multi-agent exploration and patrolling. M.Sc. thesis, Massachusetts Institute of Technology, Cambridge, Massachusetts, February 2013.

PATENTS     [1] Daniela Rus, **Mikhail Volkov**, and Gavin Chase Hall. Algorithms for Patrolling Loop and Virtualized Taxi Stands from Historical Data. U.S. Patent Application No. 62/036152. August 12, 2014.

AWARDS     *2011*   **Best Student Paper:** for publication [10], PRIMA 2011.

*2010*   **Gold Medal:** outstanding performance in final examinations.

*2010*   **Collen Prize:** best thesis in Electronic & Electrical Engineering.

*2009*   **B.K.P. Scaife Prize in Electronic Engineering:** on the recommendation of the Head of Department of Electronic & Electrical Engineering.

*2008*   **Foundation Scholarship:** the most historic symbol of academic achievement in Trinity College. Awarded for First Class Honors in advanced curriculum examinations.

*2007*   **E.R. Stuart Prize in Engineering:** awarded by the Department of Chemistry for best overall performance in engineering chemistry course.

*2007–2010*   4×**First Class Book Prize:** First Class Honors in annual examinations.

*2006*   **Entrance Exhibition Award:** for maximum possible score (600 points) in Leaving Cert. state examinations. Ranked in the top 100 students in Ireland.