

**ANTON MITROKHIN**anton.mitrokhin@phystech.edu / amitrokh@umd.edu ([website](#))Google Scholar: ([link](#))*Education*

<b>Moscow Institute of Physics and Technology</b> <b>B.E., Electrical and Computer Engineering</b> Institute of Microelectronics and Advanced Control Systems Internship (co-op) at Intel, Advisor: Dmitry Babokin	09/2012 – 07/2018
<b>University of Maryland, College Park</b> <b>Ph.D, Computer Science</b> Perception and Robotics Group, Advisor: Prof. Yiannis Aloimonos Degree in progress, expected graduation 05/2020	09/2016 – present

*Research Interests*

autonomous robotics, perception for robotics, embedded systems, ASICs for vision, AI

*Relevant skills*

Programming languages: C/C++ (STL, Boost, C++11, 14), Assembly, Python, Bash, Verilog  
 Tools: Git, SVN, OpenCL, OpenCV, PCL, ROS, TensorFlow, PyTorch  
 IDEs: Vim, Eclipse, Xilinx ISE, Vivado  
 my Github page is available [here](#)

*Employment*

<b>University of Maryland, College Park</b> Research Assistant: Perception and Robotics Group ( <a href="#">website</a> ) Teaching Assistant: CMSC 132: Advanced object oriented programming	09/2016 – present 01/2017 – present 09/2016 – 01/2017
Teaching Assistant: CMSC 498F ( <a href="#">website</a> ): An introduction to the design and programming of robotics systems	01/2017 – 05/2017
Teaching Assistant: ENPM 673: Perception for autonomous robots	01/2018 – 05/2018, 01/2019 – 05/2019
<b>NVIDIA</b> Research Intern: Autonomous Driving / Obstacle Perception Team (Sangmin Oh, Tilman Wekel)	06/2018 – 08/2018, 06/2019 – 08/2019
<b>Intel Corporation</b> Research Intern (co-op): Technology Pathfinding and Innovation (Dmitry Babokin)	07/2014 – 07/2016
<b>Moscow Institute of Physics and Technology</b> Teaching Assistant: MIPT Program for High School Students (Anna Tykova)	09/2013 – 07/2016
<b>Intel Corporation</b> Teaching Assistant: Intel iLab Computer Science (Ilya Dedinsky)	09/2014 – 07/2016
<b>MIPT Robotics Laboratory</b> Teaching Assistant: ROS Framework (Alexey Tsyganov, Taras Pustovoy)	11/2014 – 07/2016
<b>Parallels, Inc</b> Research Intern (co-op): Device Virtualization Division (Anna Melekhova)	08/2013 – 06/2014

## Publications

- A. Mitrokhin, P. Sutor, C. Fermüller, Y. Aloimonos. "**Learning sensorimotor control with neuromorphic sensors: Toward hyperdimensional active perception**" - Science Robotics 4 (30) (preprint: <http://users.umiacs.umd.edu/~fer/postscript/eaaw6736.full.pdf>). Project [page](#)
- A. Mitrokhin, C. Ye, C. Fermüller, Y. Aloimonos, T. Delbruck. "**EV-IMO: Motion Segmentation Dataset and Learning Pipeline for Event Cameras**" - accepted to iROS 2019 (arXiv preprint: <https://arxiv.org/abs/1903.07520>). Project [page](#), [video](#), [dataset](#)
- A. Mitrokhin, C. Ye, C. Fermüller, J. A. Yorke, and Y. Aloimonos. "**Unsupervised Learning of Dense Optical Flow and Depth from Sparse Event Data**" - arXiv preprint: <https://arxiv.org/abs/1809.08625>. Project [page](#), [video](#)
- A. Mitrokhin, C. Fermüller, C. Parameshwara, and Y. Aloimonos. "**Event-based Moving Object Detection and Tracking**" - accepted to iROS 2018 (arXiv preprint: <https://arxiv.org/abs/1803.04523>). Project [page](#), [video](#)
- Preparing for publication: Mitrokhin, Anton, et al. "**Yet Another Random Program Generator: Compiler verification using random test generation**" (<https://github.com/01org/yarpgen>)

## Invited Talks

- Data processing and Motion analysis with Dynamic Vision Sensors**  
2018 Northrop Grumman Mission Systems University Research Symposium Apr 17, 2018
- BetterFlow: High speed Optical Flow estimation with Neuromorphic Sensors**  
2017 Telluride Neuromorphic Cognition Engineering Workshop Jul 25, 2017
- YARP-gen: Random test generator for optimization verification in C/C++ compilers**  
59th Moscow Institute of Physics and Technology Scientific Conference (honors section) Nov 24, 2016
- LLVM: Advanced Vectorization Support and Drawbacks in Presence of Explicitly Parallel Code**  
58th Moscow Institute of Physics and Technology Scientific Conference Nov 28, 2015
- A Survey of Random Program Generation Methods for C/C++ Compiler Testing**  
58th Moscow Institute of Physics and Technology Scientific Conference Nov 28, 2015

## Projects

**DVS Flow** [Anton Mitrokhin, Cornelia Fermüller, Yiannis Aloimonos]

DVS, or Dynamic Vision Sensor is a neuromorphic asynchronous sensor which allows to capture ultra high speed motion at rates of more than 10000 frames per second. The goal of my PhD at the University of Maryland is to develop techniques and algorithms capable of processing DVS data and allow for robust navigation, motion segmentation, tracking and collision avoidance for future autonomous robots.

**ISPC** [Anton Mitrokhin, Vsevolod Livinsky, Dmitry Babokin] ([website](#))

ISPC stands for Intel SPMD (Single Program, Multiple Data) Program Compiler – an open source compiler for a variant of C programming language with extensions for SPMD model. ISPC utilizes SIMD units of CPUs to run several instances of a regular serial code with different data inputs, thus delivering up to 4x performance gain on 4-wide SSE units, 8x on AVX units and 16x on AVX-512 units. ISPCs primary purpose is to facilitate the process of creating parallel code for CPU. ISPCs programming model is especially effective with image processing algorithms and renderers. I was one of the [major contributors](#) to the project, implementing support for AVX-512, KNC and KNL.

**YARP** [*Anton Mitrokhin, Vsevolod Livinsky, Dmitry Babokin*] ([website](#))

YARP is an open source random C/C++ program generator, which produces correct runnable C/C++ programs. This project was a part of my Bachelor's thesis at MIPT. The generator is designed to trigger compiler optimization bugs and is intended for compiler testing. YARP utilizes a sophisticated grammar for program generation and is able to outperform modern state of the art test generators such as CSmith and Orange in terms of number of errors found. I am currently preparing a paper on YARP generator for publishing in IEEE.

*Relevant Coursework***University of Maryland, College Park (GPA: 3.95)**

Image Processing (CMSC 828G, CMSC 733), Natural Language Processing (CMSC 723), Computer Graphics (CMSC 740), Network Security (CMSC 818O, ENEE 759F).

**Moscow Institute of Physics and Technology**

Distributed Systems, Operating Systems, Computer Security, Parallel Computing, Computer Networks (Cisco Network Course at MIPT), Object Oriented Programming.

**Intel**

VLSI design, FPGA development, Graph Theory, Compiler Theory, Computer Architecture, Programming Languages.

*Teaching***University of Maryland, College Park Teaching Assistant**

- CMSC 132: Advanced object oriented programming 09/2016 – 01/2017
- CMSC 498F: An introduction to the design and programming of robotics systems 01/2017 – 05/2017
- ENPM 673: Perception for autonomous robots 01/2018 – 05/2018

**Intel iLab: Introduction to Programming Languages**

Fall 2014, Fall 2015

Teaching Assistant for Ilya Dedinsky, Intel

**Intel iLab: C/C++ and Object Oriented Programming**

Spring 2015, Spring 2016

Teaching Assistant for Ilya Dedinsky, Intel

**MIPT Program for High School Students**

Fall 2013 – Summer 2016

Teaching Assistant for Anna Tykova, MIPT

**MIPT Robotics Laboratory**

Fall 2014 – Summer 2016

Teaching Assistant: ROS Framework for Alexey Tsyganov

**MIPT Robotics Laboratory**

Fall 2014 – Summer 2016

Student Volunteer: Fast Prototyping and Robotics master classes

*Awards*

- PROPHESSEE PhD Fellowship for research on event-based vision 2019
- Generously awarded the Brin Family Prize for Autonomous Drone Research 2018
- Northrop Grumman Symposium - Student Poster Award 2018
- University of Maryland Flagship Fellowship 2016 – 2020
- 59th MIPT Scientific Conference Best Poster Award 2016
- Intel Recognition Award 2014, 2015
- Abramov-Frolov merit-based Scholarship 2012 – 2015