

# Artem MOLCHANOV

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GOOGLE SCHOLAR: <https://scholar.google.com/citations?user=BSJyuqQAAAAJ>

## RESEARCH INTERESTS

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Robotics, Artificial General Intelligence, Reinforcement Learning, Deep Learning.

## EDUCATION

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- AUG 2013 - MAY 2020 **PhD in Computer Science / Robotics,**  
**University of Southern California, Los Angeles, US**  
Thesis: Data Scarcity in Robotics: Leveraging Structural Priors and Representation Learning  
Advisor: Gaurav S. Sukhatme  
GPA: 3.88/4.0
- SEP 2004 - MAY 2010 **Engineering Degree in Robotics,**  
**Bauman Moscow State Technical University (BMSTU), Moscow, Russia**  
Thesis: Attitude and Heading Reference System for a  
Remotely Operated Underwater Vehicle  
Advisor: Sergey A. Egorov  
GPA: 4.94/5.0. **Diploma with Honours**

## PROFESSIONAL EXPERIENCE

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- JUN-SEPT 2019 | **Research Intern at Facebook AI Research, Menlo Park, CA, US**  
[Project on Meta Learning via Learned Loss.](#)
- JUN-AUG 2017 | **Research Intern at Nvidia, Seattle area, WA, US**  
*Contributed to 2 research projects:*  
- Project on [Automatic Curriculum Generation for Deep Reinforcement Learning with Sparse rewards.](#)  
- Project on [Image-Centric Domain Randomization for Learning Human-Readable Plans from Real-World demonstrations.](#) The work resulted in patent [US20190228495A1](#)
- JUN-AUG 2016 | **Deep Learning Intern at Volkswagen group of America, Belmont, US**  
[Research and bench-marking of deep compression algorithms using TensorFlow in application to autonomous driving.](#)
- JUN-AUG 2015 | **Software Intern at Blue River Technology, Sunnyvale, US**  
[Development of a plant classifier/detector for the vision system of the Lettuce Thinning Bot using convolutional neural networks.](#)
- MAR 2009  
JUL 2013 | **Control Systems Engineer at**  
**Research Institute of Special Mechanical Engineering of BMSTU,**  
**Moscow, Russia**  
*Development of Underwater Robotic Systems:*  
- [Software and hardware control systems architecture design.](#)  
- Development (C++, Matlab) of motion control and signal processing algorithms.  
- Design, development (C++,Qt) and deployment of user interfaces for pilot control units.  
- Deployment and field tests (ocean trials) of the entire ROV system.

## ENTREPRENEURSHIP

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[Swerve.ai](#) (FEB – AUG 2018): **Co-founder and Chief Data Officer (CDO)**. The startup targeted autonomous driving safety improvement by developing technologies for car planning and control at the limits of handling. As a CDO I was working on the perceptual system of the autonomous car. Particularly, I was developing [wet surface detectors from cameras and microphones](#) for the purpose of friction estimation.

## LEADERSHIP

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### Student advisor:

Tao Chen - Sim-to-Real for Quadrotor Control. [Earned 2019 Viterbi Master's Award](#).

Jialou Wang - Sim-to-Real for Quadrotor Control.

Pushpreet Singh - Sim-to-Real for Quadrotor Control.

Joe Mathai - RL for Active Perception

## TEACHING

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SUMMER 2020 Machine Learning (CS-567). Teaching Assistant.

FALL 2017 Deep Learning (CS-599). Teaching Assistant.

SUMMER 2018 Introduction to Programming (CS-103). Teaching Assistant.

2017 – 2019 Introduction to Computer Science (CS-109). Teaching Assistant.

FALL 2010 Invited talk on sensors in the course "Underwater Vehicle System Design"

## SOFTWARE DEVELOPMENT SKILLS

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Programming Languages: PYTHON, C/C++, MATLAB,  $\LaTeX$

Libraries and Frameworks: PYTORCH, TENSORFLOW, KERAS, ROS, OPENCV, QT

SW Development Tools: GIT, PYCHARM, CMAKE, QTCREATOR, KDEVELOP

Operating Systems: LINUX

## GRANTS, SCHOLARSHIPS, AWARDS

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MAY 2019, MAY 2017 USC Robotics Bekey Award for RESL compute infrastructure development

NOV 2016, MAY 2017 NVIDIA GPU grant

2005-2010 Recipient of stipend for outstanding students at BMSTU

## VOLUNTEERING

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ICRA 2014-2019, IROS 2014-2020, CoRL 2018, Journal of Ocean Engineering and Science (JOES) 2016, Autonomous Robots (AURO) 2019, IEEE Transactions on Robotics (T-RO) 2019

## PRESS

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Our work on RL for quadrotors was featured in [USC Viterbi news article](#) and in [Import AI newsletter](#).

## INTERESTS AND HOBBIES

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Astrophysics, Sports (Rock Climbing, Running, BJJ), Guitar, Motorcycles

## PATENTS

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J. Tremblay, S. Birchfield, S. Tyree, T. To, J. Kautz, **A. Molchanov**. [Learning robotic tasks using one or more neural networks](#), United States patent US20190228495A1, 2019.

## SELECTED PUBLICATIONS

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S. Bechtle\*, **A. Molchanov\***, Y. Chebotar\*, E. Grefenstette, L. Righetti, G.S. Sukhatme, F. Meier. [Meta-Learning via Learned Loss](#). International Conference on Pattern Recognition (ICPR), Jan 2021

**A. Molchanov**, T. Chen, W. Hönig, J. A. Preiss, N. Ayanian, G. S. Sukhatme. [Sim-to-\(Multi\)-Real: Transfer of Low-Level Robust Control Policies to Multiple Quadrotors](#). IEEE/RSJ International Conference on Intelligent Robots and Systems, Nov 2019

J. Tremblay, T. To, **A. Molchanov**, S. Tyree, J. Kautz, S. Birchfield. [Synthetically Trained Neural Networks for Learning Human-Readable Plans from Real-World Demonstrations](#). IEEE International Conference on Robotics and Automation (ICRA), May 2018

**A. Molchanov**, O. Kroemer, Z. Su, G. Sukhatme. [Contact Localization on Grasped Objects using Tactile Sensing](#). IEEE International Conference on Intelligent Robots and Systems (IROS), 2016.

Z. Su, K. Hausman, Y. Chebotar, **A. Molchanov**, G. Loeb, G. Sukhatme, S. Schaal. [Force Estimation and Slip Detection for Grip Control using a Biomimetic Tactile Sensor](#). IEEE-RAS International Conference on Humanoid Robotics (Humanoids), Jul 2015.

**A. Molchanov**, A. Breitenmoser, G. Sukhatme. [Active Drifters: Towards a Practical Multi-Robot System for Ocean Monitoring](#). IEEE International Conference on Robotics and Automation (ICRA), May 2015.

S. Subbaraya, A. Breitenmoser, **A. Molchanov**, Jorg Muller, Carl Oberg, D. Caron, G. Sukhatme. [Circling the Seas: Design of Lagrangian Drifters for Ocean Monitoring](#). IEEE Robotics and Automation Magazine (RAM), 2016.

**A. Molchanov**, K. Chernenko, S. Egorov, A. Kutsenko. [Data processing and Control System of a Small Survey Class Remotely Operated Underwater Vehicle](#). Journal of Science and Innovations, pages 65-73, Moscow, 2012.

## INVITED TALKS AND WORKSHOPS

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**A. Molchanov**, A. Petrenko. Autonomous Drones: Applications, Technologies and Research. [Archipelag 20.35](#). Russian Federation, 2020.

S. Bechtle, **A. Molchanov**, Y. Chebotar, E. Grefenstette, L. Righetti, G. Sukhatme, F. Meier. Meta Learning via Learned Loss. ICML Workshop on Multi-Task and Lifelong Reinforcement Learning, 2019.

**A. Molchanov**, T. Chen, W. Honig, J. A. Preiss, N. Ayanian and G. S. Sukhatme. Sim-to-(Multi)-Real: Transfer of Low-Level Robust Control Policies to Multiple Quadrotors. Southern California Robotics Symposium, 2019.

**A. Molchanov**, O. Kroemer, Z. Su, G. S. Sukhatme. Model-free Contact Localization for Manipulated Objects using Biomimetic Tactile Sensors. Humanoids Workshop on Tactile Sensing for Manipulation, 2016.

Y. Chebotar, K. Hausman, Z. Su, **A. Molchanov**, O. Kroemer, G. Sukhatme, S. Schaal. BiGS: BioTac Grasp Stability Dataset. ICRA Workshop on Grasping and Manipulation Datasets, 2016.

Z. Su, K. Hausman, Y. Chebotar, **A. Molchanov**, G. Loeb, G. Sukhatme, S. Schaal. Slip Classification using Tangential and Torsional Skin Distortions on BioTac. BMVA Workshop on Visual,

Tactile and Force Sensing for Robot Manipulation, 2015.

Z. Su, K. Hausman, Y. Chebotar, **A. Molchanov**, G. Loeb, G. Sukhatme, S. Schaal. Slip Detection and Classification for Grip Control using Multiple Sensory Modalities on BioTac. IROS Workshop on Multimodal Sensor-Based Robot Control for HRI and Soft Manipulation, 2015.

**A. Molchanov**, A. Breitenmoser, G. Sukhatme. [Active Drifters: Sailing with the Ocean Currents](#). RSS Workshop on Autonomous Control, Adaptation, and Learning for Underwater Vehicles, 2014.

S.A. Egorov, **A. Molchanov**, K.V. Chernenko. Specifics of using carrier navigation data in the navigation system of a remotely operated underwater vehicle. In Proceedings of the "Integrated Automatic Control Systems" Conference, pages 68-70, Ulyanovsk, Russian Federation, March 2011.

**A. Molchanov**, S.A. Egorov, A.S. Kutsenko, V.V. Veltishev. State estimation and control system of a small survey class remotely operated underwater vehicle. In Proceedings of the VI All-Russia Conference on Applied Science. "Advanced control systems", pages 365-367, Taganrog, Russian Federation, April 2011.

**A. Molchanov**, A.S. Kutsenko, S.A. Egorov. Magnetic compass TCM-XB characteristics analysis. In Proceedings of the VI All-Russia Conference on Applied Science. "Advanced control systems", pages 374-377, Taganrog, Russian Federation, April 2011.

**A. Molchanov**, S.A. Egorov. Overview of motion control algorithms for underwater vehicles. In Proceedings of the "Students' Scientific Spring - 2011" Conference, pages 99-101, Moscow, Russian Federation, April 2011.

**A. Molchanov**, A.S. Kutsenko. Onboard control system of a small survey class remotely operated underwater vehicle. In Proceedings of the XXX Scientific and Technical Conference for Young Scientists and Specialists. "Marine Underwater Vehicles: Design, Development and Technologies", pages 153-155, Saint Petersburg, Russian Federation, May 2011.

**A. Molchanov**, K.V. Chernenko, S.A. Egorov, A.S. Kutsenko. Data processing and control system of a small survey class remotely operated underwater vehicle. In Proceedings of the IV Scientific and Technical Conference. "Technical problems of exploitation of the World Ocean", pages 66-70, Vladivostok, Russian Federation, October 2011.

**A. Molchanov**, S.A. Egorov. Design of an attitude and heading reference system for a small survey class remotely operated underwater vehicle. In Proceedings of the "Students' Scientific Spring - 2010" Conference, pages 304-305, Moscow State Technical University, Russian Federation, April 2010.