

# Alexander Sherikov

## CONTACT INFORMATION

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## PERSONAL INFORMATION

*Website* <http://asherikov.github.com>  
*Other* <http://github.com/asherikov>  
<https://www.linkedin.com/in/asherikov>

## SUMMARY

I am an R&D engineer in software and control for autonomous systems with a doctoral degree in humanoid robot control and diverse professional experience in general IT, software quality and architecture, computational software, and robotics frameworks. In particular, I've worked on design and implementation of software for simulation and control of legged, wheeled, and flying robots.

## EMPLOYMENT

**2019 – present, Senior Autonomy Engineer (UAV)**, Sevendof, Norway

- Onboard software architecture, 3d mapping, simulated and field tests, software quality, cross-compilation, deployment. [C++, ROS, CUDA/Thrust]

**2017 – 2019 Software & Control Engineer (humanoid robots)**, PAL Robotics, Spain

- Humanoid robot simulation, identification, motion planning, control; numerical optimization. [C++, ROS]

**2016 – 2017, Research Engineer (humanoid robots)**, INRIA, France

- Development of a software framework for implementation of optimization-based controllers for humanoid robots. [C++] <https://bip-team.github.io/humoto/>

**2012 – 2016, Doctoral Student (humanoid robots)**, INRIA, France

- Research in model predictive control of humanoid robots for balancing and locomotion. [C++, MATLAB]

**2012 – 2012, Software Developer (UGV)**, Örebro University, Sweden

- Implementation of a path tracking model predictive controller with obstacle avoidance for an autonomous forklift truck. [C++, ROS, CAN]

**2009 – 2010, System & Network Administrator**, InfoLan LLC, Russia

- Administration of FreeBSD servers and configuration of networking hardware (L2 switches, Cisco Routers) of an Internet service provider.

**2006 – 2008, IT Support Engineer**, Petrozavodsk State University, Russia

- Web site support, shell scripting.

## PERSONAL OPEN-SOURCE PROJECTS

- Eigen-based, header-only C++ implementation of Goldfarb-Idnani dual active set algorithm for quadratic programming with double sided constraints and simple bounds: <https://github.com/asherikov/qpmad>
- C++ reflection/serialization library supporting YAML, JSON, XML, ROS parameter server, and more: <https://github.com/asherikov/ariles>
- Real-time model predictive controller for Nao humanoid robot and specialized solvers for it: <http://asherikov.github.io/Projects/naowalk.html> (master's project)

## EDUCATION

**2012 – 2016, University of Grenoble, France**

*Degree* PhD in Automatic Control and Production Systems

*Thesis* Balance preservation and task prioritization in whole body motion control of humanoid robots  
<http://asherikov.github.com/files/asherikov-phd-thesis.pdf>

**2010 – 2012, Örebro University, Sweden**

*Degree* Master in Robotics and Intelligent Systems

*Thesis* Model predictive control of a walking bipedal robot using online optimization  
<http://asherikov.github.com/files/asherikov-ms-thesis.pdf>

**2003 – 2008, Petrozavodsk State University, Russia**

*Degree* Specialist in Information Systems and Technologies

*Thesis* Application of multidimensional data structures for indexing of NetFlow records (in Russian)

## Summer schools

- Numerical Optimal Control, 04.08.2014 – 13.08.2014, Freiburg, Germany

## SKILLS

### APPLIED MATHEMATICS

<i>Linear algebra</i>	factorizations, pseudoinverses
<i>Numerical optimization</i>	quadratic programming, sequential quadratic programming, prioritized least squares, linear complementarity problems
<i>Control</i>	model predictive control, inverse kinematics and dynamics
<i>Modeling</i>	rigid body modeling of robots, basics of friction and collision modeling

### ROBOTICS

<i>Frameworks</i>	ROS, Nao SDK
<i>Dynamic modeling and control</i>	RBDL
<i>Simulation / visualization</i>	Microsoft AirSim, Gazebo, RViz
<i>Motion planning</i>	OMPL
<i>Volumetric mapping</i>	OpenVDB, OctoMap
<i>UAV controllers</i>	PX4, DJI
<i>Messaging</i>	protobuf, mavlink, UAVCAN, CAN
<i>Sensors</i>	lidar, GPS, ADS-B

### PROGRAMMING LANGUAGES

<i>C/C++</i>	STL, Boost, C++XX, POSIX, pthreads
<i>Computations/CAS</i>	Octave/MATLAB, Maxima
<i>Parallel computations</i>	CUDA/Thrust
<i>Other</i>	shell scripting, python

### PROGRAMMING TOOLS

<i>Compilers/compiler wrappers</i>	clang, gcc, nvcc, ccache, scan-build
<i>Version control systems</i>	git, SVN
<i>Debugging</i>	gdb, lldb, strace
<i>Static and dynamic checks</i>	gcc/clang sanitizers, cppcheck, valgrind, clang-tidy
<i>Profilers</i>	callgrind, gprof
<i>Testing</i>	googletest, googlemock, Boost UTF, ctest
<i>Build automation tools</i>	catkin, colcon, cmake, make, autotools
<i>Documentation</i>	doxygen, PlantUML, graphviz
<i>Continuous integration</i>	Jenkins, Travis
<i>Web-based SCM</i>	GitHub, GitLab, GForge

### UNIX SYSTEMS ADMINISTRATION AND NETWORKING

<i>Operating systems</i>	FreeBSD, Ubuntu
<i>Isolation/emulation</i>	docker, qemu, systemd-nspawn, VirtualBox
<i>Service management</i>	systemd
<i>Computer networks</i>	TCP/IP, VLAN, DHCP, DNS, SMTP, Ethernet, routing, switching
<i>Time synchronization</i>	NTP, PTP
<i>Other</i>	POSIX utilities

### OTHER

<i>Quadratic Programming</i>	qpOASES, QuadProg++, ipopt
<i>Linear algebra</i>	Eigen
<i>Document preparation systems</i>	L <sup>A</sup> T <sub>E</sub> X
<i>3D graphics toolkits</i>	OpenSceneGraph
<i>Hardware platforms</i>	Raspberry Pi, NVIDIA Jetson Xavier

### LANGUAGES

- Russian (native)
- English (fluent)

## ACADEMIC ACTIVITIES

- Reviewer for IEEE T-RO, ICRA, IROS, Humanoids.
- [Google Scholar](#) page.

## PUBLICATIONS

- [1] D. J. Agravante, A. Cherubini, A. Sherikov, P.-B. Wieber, and A. Kheddar. “Human-Humanoid Collaborative Carrying”. In: *IEEE Transactions on Robotics* 35.4 (2019), pp. 833–846. DOI: [10.1109/RO.2019.2914350](https://doi.org/10.1109/RO.2019.2914350). URL: <https://hal-lirmm.ccsd.cnrs.fr/lirmm-01311154>.
- [2] D. J. Agravante, A. Sherikov, P.-B. Wieber, A. Cherubini, and A. Kheddar. “Walking pattern generators designed for physical collaboration”. In: *IEEE ICRA*. 2016.
- [3] N. Bohórquez, A. Sherikov, D. Dimitrov, and P.-B. Wieber. “Safe navigation strategies for a biped robot walking in a crowd”. In: *IEEE-RAS International Conference on Humanoid Robots*. 2016.
- [4] S. A. Homsí, A. Sherikov, D. Dimitrov, and P.-B. Wieber. “A hierarchical approach to minimum-time control of industrial robots”. In: *IEEE ICRA*. 2016.
- [5] D. Serra, C. Brasseur, A. Sherikov, D. Dimitrov, and P.-B. Wieber. “A Newton method with always feasible iterates for Nonlinear Model Predictive Control of walking in a multi-contact situation”. In: *IEEE-RAS International Conference on Humanoid Robots*. 2016.
- [6] H. Andreasson, A. Bouguerra, M. Cirillo, D. Dimitrov, D. Driankov, L. Karlsson, A. Lilienthal, F. Pecora, J. Saarinen, A. Sherikov, and T. Stoyanov. “Autonomous Transport Vehicles: Where We Are and What Is Missing”. In: *Robotics Automation Magazine, IEEE* 22.1 (2015).
- [7] C. Brasseur, A. Sherikov, C. Collette, D. Dimitrov, and P.-B. Wieber. “A robust linear MPC approach to online generation of 3D biped walking motion”. In: *IEEE-RAS International Conference on Humanoid Robots*. 2015.
- [8] D. Dimitrov, A. Sherikov, and P.-B. Wieber. “Efficient resolution of potentially conflicting linear constraints in robotics”. Preprint. 2015. URL: <https://hal.inria.fr/hal-01183003>.
- [9] A. Sherikov, D. Dimitrov, and P.-B. Wieber. “Balancing a humanoid robot with a prioritized contact force distribution”. In: *IEEE-RAS International Conference on Humanoid Robots*. 2015.
- [10] A. Sherikov, D. Dimitrov, and P.-B. Wieber. “Whole body motion controller with long-term balance constraints”. In: *IEEE-RAS International Conference on Humanoid Robots*. 2014.
- [11] D. Dimitrov, A. Sherikov, and P.-B. Wieber. “A sparse model predictive control formulation for walking motion generation”. In: *IEEE/RSJ IROS*. 2011.
- [12] A. Sherikov and Y. Bogoyavlenskii. “The use of multidimensional index structures for NetFlow record processing”. In: *AMICT '07, Proceedings of the Annual International Workshop on Advances in Methods of Information and Communication Technology*. 2007.

## PARTICIPATION IN RESEARCH PROJECTS

### 2016 – 2017, COMANOID

- COMANOID (“Multi-Contact Collaborative Humanoids in Aircraft Manufacturing”) is a RIA four-year European research project that started in January 2015 as part of the Horizon H2020 program.
- <http://comanoid.cnrs.fr/project-overview>

### 2012 – 2016, Romeo 2

- Romeo 2 project is a french research project focusing on Romeo humanoid robot designed by Aldebaran Robotics.
- <https://projetromeo.com/>

### 2012 – 2012, SAUNA

- SAUNA is a major AASS 3-year project at Örebro University aimed at achieving international excellence in a research area of strong industrial relevance namely, safe autonomous navigation for professional industrial vehicles like forklift trucks, wheel loaders, mining trucks etc.
- <https://www.oru.se/english/research/research-projects/rp/?rdb=p693>

## GRANTS

### 2017, Torres Quevedo, Spain

- Torres Quevedo Program (PTQ) - Grants for recruiting PhDs
- [https://www.ciencia.gob.es/stfls/eSede/Ficheros/2018/RESOLUCION\\_TORRES\\_QUEVEDO-2017-1.pdf](https://www.ciencia.gob.es/stfls/eSede/Ficheros/2018/RESOLUCION_TORRES_QUEVEDO-2017-1.pdf)