# Dr. Alexander Sherikov

## CONTACT INFORMATION

United Arab Emirates

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## PERSONAL INFORMATION

*Website*    http://sherikov.net
*Latest CV*  https://github.com/asherikov/cv
*Other*      http://github.com/asherikov
             https://www.linkedin.com/in/asherikov

## SUMMARY

- Fullstack autonomous systems software developer with diverse experience in control, mapping, planning, sensor integration, simulation, reinforcement learning, deployment, telemetry collection, etc.
- R&D engineer with a doctoral degree in robot control, familiar with numerical environments and data handling frameworks, as well as development of numerical software.
- C++/python UNIX/Linux developer with 15 years international experience in general IT, networking, software quality and architecture, performance optimization, project management, etc.

## EXPERIENCE

**2024 – 2025**    **Senior Robotics Developer**, Technology Innovation Institute, UAE
- UAV onboard software integration and development for control, mapping, and motion planning. [C++, ROS2]

**2022 – 2023**    **Reinforcement Learning Engineer**, Keybotic, remote
- Reinforcement learning for quadruped robot control using parallel GPU-accelerated simulations. [python, ROS, IsaacGym]

**2019 – 2022**    **Senior Autonomy Engineer**, Sevendof, Norway
- Responsible for UAV onboard software and quality: architecture, 3d mapping, simulated and field tests, software quality, cross-compilation, deployment, sensor integration. [C++, ROS, CUDA/Thrust]
- https://www.youtube.com/watch?v=JxZ-O4Rpnps      https://www.youtube.com/watch?v=R63JKgDqbnE https://www.youtube.com/watch?v=07FoSaGxQ9g

**2017 – 2019**    **Software & Control Engineer**, PAL Robotics, Spain
- Various tasks related to humanoid robot simulation, identification, motion planning, control (inverse kinematics and dynamics). Development of in-house rigid body simulator. [C++, ROS]
- Supported by "Torres Quevedo Program (PTQ)" grant https://www.ciencia.gob.es/stfls/eSede/Ficheros/2018/RESOLUCION_TORRES_QUEVEDO-2017-1.pdf

**2016 – 2017**    **Research Engineer**, 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**, INRIA, France
- Research in model predictive control of humanoid robots for balancing and locomotion. [C++, MATLAB]
- Participation in "Horizon H2020 COMANOID" (https://cordis.europa.eu/project/id/645097) research project focused on development of humanoid robots and their industrial applications.

**2012 – 2012**    **Software Developer**, Örebro University, Sweden
- Implementation of a path tracking model predictive controller with obstacle avoidance for an autonomous forklift truck. [C++, ROS, CAN]
- Participation in "SAUNA" research project focused on safe autonomous navigation for industrial vehicles like forklift or mining trucks. https://www.oru.se/english/research/research-projects/rp/?rdb=p693

**2009 – 2010**    **System & Network Administrator**, InfoLan LLC, Russia
- Administration of FreeBSD servers and configuration of networking hardware of an Internet service provider.

## PERSONAL OPEN-SOURCE PROJECTS

- https://github.com/asherikov/qpmad: High-performance quadratic programming solver in C++
- https://github.com/asherikov/ariles: C++ reflection/serialization library
- http://sherikov.net/Projects/naowalk.html: walking controller for Nao humanoid robot
- https://github.com/asherikov/ccws: ROS development and continuous integration framework

# 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
https://github.com/asherikov/phd-thesis/raw/master/asherikov-phd-thesis.pdf
*Summer schools*   Numerical Optimal Control, 04.08.2014 – 13.08.2014, Freiburg, Germany

### 2010 – 2012   Örebro University, Sweden
*Degree*   Master in Robotics and Intelligent Systems
*Thesis*   Model predictive control of a walking bipedal robot using online optimization
https://github.com/asherikov/ms-thesis/raw/master/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

# SKILLS

## AUTONOMOUS SYSTEMS

| | |
|---|---|
| *Manipulator modeling and control* | RBDL, URDF |
| *Simulators* | Microsoft AirSim, Gazebo, IsaacGym |
| *Visualization* | RViz, OpenSceneGraph |
| *Frameworks* | ROS, Nao SDK |
| *Motion planning* | OMPL |
| *Volumetric mapping* | OpenVDB, OctoMap |
| *UAV controllers* | PX4, DJI, ArduPilot |
| *Messaging* | protobuf, mavlink, UAVCAN, CAN, mqtt |
| *Sensors* | lidars, GPS (RTK, RINEX), ADS-B, IMU |
| *Telemetry* | time-series databases, Grafana, PlotJuggler |
| *Hardware platforms* | Raspberry Pi, NVIDIA Jetson Nano / Xavier |
| *Time synchronization* | NTP, PTP |
| *Geodetic libraries* | geopandas, pyproj, shapely, GeographicLib, OSMnx |

## RESEARCH AND DEVELOPMENT

| | |
|---|---|
| *Numerical optimization* | quadratic programming (qpOASES, QuadProg++, ipopt, qpmad) sequential quadratic programming, prioritized least squares (LexLS), linear complementarity problems (siconos) |
| *Control* | model predictive control, inverse kinematics and dynamics |
| *Modeling* | rigid body modeling of robots, basics of friction and collision |
| *Numerical environments / CAS* | Octave/MATLAB, Maxima, ipython |
| *Numerical libraries* | Eigen, numpy, pandas, scipy |
| *Reinforcement learning* | PyTorch, optuna, tensorboard, ONNX |
| *Document preparation systems* | LaTeX |
| *Visualization* | matplotlib, graphviz, asymptote |

## SOFTWARE DEVELOPMENT

| | |
|---|---|
| *C/C++* | STL, Boost, C++XX, POSIX, pthreads |
| *Parallel computations* | CUDA/Thrust |
| *Compilers/compiler wrappers* | clang, gcc, nvcc, ccache, scan-build |
| *Version control systems* | git, SVN |
| *Debugging* | gdb, lldb, strace |
| *Static and dynamic checks* | gcc/clang sanitizers, cppcheck, valgrind, clang-tidy, pylint, flake8 |
| *Profilers* | callgrind, gprof |
| *Testing* | googletest, googlemock, Boost UTF, ctest |
| *Build automation tools* | catkin, colcon, cmake, make, autotools |
| *Documentation* | doxygen |
| *Packaging* | FreeBSD ports, dpkg, CloudSmith, conan, vcpkg, guix |
| *Continuous integration* | GitLab, GitHub Actions, Jenkins, Travis |
| *Web-based SCM* | GitHub, GitLab, GForge, Gitea |
| *Task management* | Jira, Trello |

UNIX SYSTEMS ADMINISTRATION AND NETWORKING

| | |
|---|---|
| *Operating systems* | FreeBSD, Ubuntu |
| *Isolation/emulation* | docker, qemu, systemd-nspawn, VirtualBox |
| *Service management* | systemd, dinit |
| *Computer networks* | TCP/IP, VLAN, DHCP, DNS, SMTP, routing, switching |
| *Other* | sh, bash, CLI utilities (xargs, sed, grep, screen, ...) |

LANGUAGES

Russian (native), English (fluent)

# ACADEMIC ACTIVITIES

- Reviewer for IEEE T-RO, ICRA, IROS, Humanoids.

- Google Scholar page: https://scholar.google.fr/citations?user=yVOvGd0AAAAJ&hl=en.

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/TRO.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. Homsi, 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.