

Curriculum vitae with track record

PERSONAL INFORMATION

Family name, First name: Shiriaev, Anton

Date of birth: 27.03.1970

Sex: Male

Nationality: Sweden and Russian Federation

ResearcherID: H-4556-2016, ORCID: 0000-0002-9404-6442

URL for personal web site: <http://www.ntnu.no/ansatte/shiriaev>

EDUCATION

- 1997 PhD in Applied Mathematics. **Disputation date:** 15.05.1997
Department of Theoretical Cybernetics, Faculty of Mathematics & Mechanics, St. Petersburg State University, Russia
- 1993 Master in Applied Mathematics
Department of Theoretical Cybernetics, Faculty of Mathematics & Mechanics, St. Petersburg State University, Russia

CURRENT AND PREVIOUS POSITIONS

- 2009-present Professor (full), Department of Engineering Cybernetics, NTNU, Norway
- 2014-2014 Professor (part time), Automatic Control Department, Lund University, Sweden
- 2003-2014 Professor (full), Umeå University, Umeå, Sweden (on leave since 2009)
- 2003-2003 Research Associate of the first Class, CNRS, Grenoble, France
- 2000-2003 Assistant, Associate Professor, University of Southern Denmark, Odense

FELLOWSHIPS AND AWARDS (if applicable)

- 2009 the Fellow of the Japanese Society of Promotion of Science
- 1998-1999 Postdoctoral Scholarship, Department of Engineering Cybernetics, NTNU, Norway

SUPERVISION OF GRADUATE STUDENTS AND RESEARCH FELLOWS

- 2000-2016 9 Postdocs, 10+4 PhD students (main supervisor + co-supervisor), 42 Master Students

ORGANISATION OF SCIENTIFIC MEETINGS

- 2015 Member of Program Committee: *IEEE Conference on Decision and Control, Kyoto, Japan*

INSTITUTIONAL RESPONSIBILITIES (if applicable)

- 2010-2017 Member of a Committee for Research and Research Education at the Faculty of Information Technology, Mathematics and Electrical Engineering (IME), NTNU, Trondheim, Norway

COMMISSIONS OF TRUST

- 2012-2016 Associate Editor: *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*
- 2015-2017 Associate Editor: *IEEE Robotics and Automation Letters (RALs)*

MAJOR COLLABORATIONS

- Dr. Leonid Freidovich, Department of Applied Physics and Electronics, Umea University, Sweden. Topics: Robotics, mechatronics, control for under-actuated systems
- Dr. Rolf Johansson, Department of Automatic Control, Lund University, Sweden. Topics: identification for mechanical systems, robotics, robust control methods
- Dr. Anders Robertsson, Department of Automatic Control, Lund University, Sweden. Topics: Modeling and real-time control architectures for mechanical systems, friction reconstruction and compensation

Research projects (recent and large)

- 2017-2020: : *the Norwegian Research Council*, the main applicant of the project “Dynamic manipulation for industrial and service robotics applications,” (FRINATEK/ITKPLUS NFR program ~10M NOK);
- 2012-2016: *the Norwegian Research Council*, the main applicant of the project ‘Trajectory Planning, Numerical Analysis and Stabilization for Mechanical Systems: Case Studies in Industrial Automation and Walking Robots,’ (FRINATEK program, ~10 MNOK);
- 2011-2013: *the Special Program of the Russian Ministry of Education and Science for collaboration with EU-universities in prioritized research areas*. The applicant and the principal investigator of the project: ‘Trajectory planning, numerical analysis and control for mechanical systems with applications in industrial automation and rehabilitation’ with the budget ~ \$US 220.000. The coordinator: Prof. Alexey Bobtsov (St. Petersburg State University of Information Technologies, Mechanics and Optics, Russia);
- 2008-2014: *the Swedish Research Council*, the co-applicant and principal investigator of the project ‘Active Control of Compressor Systems Based on New Methods of Nonlinear Dynamic Feedback Stabilization.’ (~4 MSEK). The coordinator: Prof. Rolf Johansson (Lund, Sweden);
- 2009-2013: *the Norwegian Research Council*, the co-applicant and principal investigator of the KMB project ‘Next generation robotics for Norwegian industry’ supported (~ 30 MNOK). The coordinator: Dr. Ingrid Schjøberg (SINTEF, Norway);
- 2009-2010: *the Special Program of the Russian Ministry of Education and Science for Russian scientists living abroad*. The applicant and the principal investigator of the project: ‘Geometrical methods for controlling under-actuated and hybrid mechanical systems’ with the budget ~ \$US 120.000. The coordinator: Prof. Alexander Fradkov (Institute for Problems of Mechanical Engineering, Russian Academy of Sciences, St. Petersburg, Russia
- 2009: *the NTNU program for advanced research equipment*, the project leader and principal investigator of the project ‘Robotics Lab for Advanced Perception and Collaborative Manipulation’ supported (~ 1,8 MNOK);
- 2007-2009: *the Swedish Research Council and Swedish Strategic Research Council*, the co-applicant and principal investigator of the project ‘Towards noninvasive measurement of the

cerebrospinal fluid system dynamics using magnetic resonance imaging' with the budget (~4 MSEK) The coordinator: Dr. Anders Eklund (Umea University Hospital, Sweden);

- 2006-2010: *the Swedish Research Council*, the project leader and principal investigator of the project 'Inducing stable oscillations in nonlinear systems by feedback' (~4MSEK)

Organization of scientific schools and networks

- 2017-2020: The founder and the co-leader of the GEMINI NTNU/SINTEF Centre in Robotics with applications in Grasping and Manipulation
- 2006-2008: The leader of Swedish Korean Robotics Network (Umea University, KTH, and SKKU) supported by the Swedish Foundation for International Cooperation (STINT)

Key publications

- [J1] Pchelkin S.S., A.S. Shiriaev, A. Robertsson, L.B. Freidovich, S.A. Kolyubin, L.V. Paramonov, and S.V. Gusev. 'On Orbital Stabilization for Industrial Manipulators: Case Study in Evaluating Performances of Modified PD+ and Inverse Dynamics Controllers,' *IEEE Transactions on Control Systems Technology*, 25(1):101-117, 2017. DOI: 10.1109/TCST.2016.2554520
- [J2] Johansson R., A. Robertsson and A.S. Shiriaev. 'Observer-based strictly positive real (SPR) variable structure output feedback control,' *Journal of the Franklin Institute*, 353(16): 4213-4232, 2016.
- [J3] Pchelkin S.S., A.S. Shiriaev, U. Mettin, L.B. Freidovich, L.V. Paramonov, S.V. Gusev. 'Algorithms for finding gaits of locomotive mechanisms: case studies for Gorilla robot brachiation,' *Autonomous Robots*, 40: 849-865, 2016. DOI 10.1007/s10514-015-9497-1
- [J4] Gusev S.V., A.S. Shiriaev and L.B. Freidovich. 'SDP-based approximation of stabilising solutions for periodic matrix Riccati differential equations,' *International Journal of Control*, 89(7): 1396-1405, 2016. DOI: 10.1080/00207179.2015.1131850
- [J5] Pchelkin S., A. Shiriaev, L. Freidovich, U. Mettin, S. Gusev, Woong Kwon, and L. Paramonov. 'A Dynamic Human Motion: Coordination Analysis,' *Journal of Biological Cybernetics*, 109(1): 47-62, 2015.
- [J6] Shiriaev A.S., L. Freidovich, and M.W. Spong. 'Controlled invariants and trajectory planning for underactuated mechanical systems,' *IEEE Transactions on Automatic Control*, 59(9): 2555-2561, 2014.
- [J7] La Hera P.X., A.S. Shiriaev, L.B. Freidovich, U. Mettin and S.V. Gusev. 'Stable walking gaits for three-link planar biped walker with one actuator,' *IEEE Transactions on Robotics*, 29(3): 589-601, 2013.
- [J8] Shiriaev A.S., L.B. Freidovich and S.V. Gusev. 'Transverse linearization for controlled mechanical systems with several passive degrees of freedom,' *IEEE Transactions on Automatic Control*, 55(4): 893-906, 2010.
- [J9] Freidovich L.B, A. Robertsson, A.S. Shiriaev and R. Johansson. 'Friction compensation based on LuGre model,' *IEEE Transactions on Control Systems Technology*, 18(1): 194-200, 2010.
- [J10] Gusev S., S. Johansson, B. Kågström, A.S. Shiriaev, and A. Varga. 'Numerical evaluation of solvers for the periodic Riccati differential equation,' *BIT Numerical Mathematics*, 50: 301-329, 2010.

- [J11] Mettin U., P. La Hera, L.B. Freidovich, and A.S. Shiriaev. 'Parallel elastic actuators as control tool for preplanned trajectories of under-actuated mechanical systems,' *International Journal of Robotics Research*, 29(9): 1186-1198, 2010.
- [J12] Shiriaev A.S. and L.B. Freidovich. 'Transverse linearization for impulsive mechanical systems with one passive link,' *IEEE Transactions on Automatic Control*, 54(12): 2882-2888, 2009.
- [J13] Shiriaev A.S., L. Freidovich and I. Manchester. 'Can we make a robot ballerina perform a pirouette? Orbital stabilization of periodic motions of underactuated mechanical systems,' *Annual Reviews in Control*, 32(2): 200-211, 2008.
- [J14] Shiriaev A.S., J.W. Perram, C. Canudas-de-Wit. 'Virtual constraints: a constructive tool for orbital stabilization of under-actuated nonlinear systems,' *IEEE Transactions on Automatic Control*, 50(8): 1164-1176, 2005.

Publications, h-index 27 (Google Scholar), 16 (Web of Science)

44 published peer-reviewed journal papers, 4 book chapters, more than 110 peer-reviewed conference

Invited presentations to peer-reviewed, internationally established conferences and schools

Professor Shiriaev has delivered a large number of guest lectures at research institutes, companies and universities in Europe, Asia and US. Among the most representative invited keynote presentations on international conferences, one can list the following

2016: the invited keynote speaker to the Nordic MATLAB EXPO

2010: the invited keynote speaker the 5th Workshop on Dynamical Walking 2010, MIT, USA

2007: the plenary lecturer at the IFAC 3rd Workshop on 'Periodic Control Systems,' St. Petersburg, Russia

2002: the plenary lecturer at the Annual Meeting of the Danish Mathematical Society, Denmark

2000: the plenary lecturer at the IFAC Workshop on 'Lagrangian and Hamiltonian Methods for Nonlinear Control,' Princeton University, USA

Major contributions to the early careers of excellent researchers

Several former PhD-students and postdoctoral researchers of Professor Shiriaev have been recognized and successful in continuing research career. Among others it is worth mentioning

- Dr. Leonid Freidovich, Associate Professor, Department of Applied Physics and Electronics, Umea University, Sweden
- Dr. Ian Manchester, Senior Lecturer, School of Aerospace, Mechanical and Mechatronic Engineering, Sydney University, Australia
- Dr. Pedro La Hera, Researcher, Department of Forest Biomaterials and Technology, Swedish University of Agricultural Sciences, Sweden.