Curriculum Vitae

Personal information	**SERGEY ALYAEV**
Telephone(s)	+47 402 00 902
Email(s)	sergey.alyaev@iris.no, cobxo3bot@gmail.com
Nationality(-ies)	Russia
Gender	Male
Mother tongue(s)	**Russian**
Other languages(s)	English, Norwegian
Researcher unique identifier(s)	`https://scholar.google.no/citations?user=PadtBoUAAAAJ`
URL	`http://www.iris.no/about-iris/employees/431609952/SEAL`

Personal description

Sergey Alyaev grew up in Saratov (Russia) where he finished diploma in mechanics at the Saratov State University. He moved to Bergen in 2008 to pursue education in applied mathematics and completed MSc and PhD degrees at University of Bergen. Currently Sergey works as a researcher at IRIS where he applies mathematical modelling to solve problems of drilling, well modelling and geosteering. His main research interests include fluid-flow modelling, multi-scale methods, inverse problems and optimization.

Occupational field **Research in applied and computational mathematics**

Responsibilities
– Conducting research, publishing and presenting results of projects
– Networking, securing funding and writing applications for grants
– Software development in C#, Python

Research interests
– Multi-scale methods and homogenization for fluid flow
– Inverse modelling and optimization
– Integration of real-time data with physical models

Work Experience

2013 ⟶ International Research Institute of Stavanger, Bergen, Norway.

- Geosteering for IOR (Project leader since 2018)
  Development and implementation of closed loop ensemble-based geosteering workflow
  Global optimization of well trajectories under uncertainty
  Integration with industry tools for EM modelling and inversion
- Drilling Data Hub: a framework for data streaming and aggregation. [5]
  Preparation of data model suitable for drilling automation.
  Development of a complete prototype for reference server-client implementation.
  Demonstration of core functionality in real-time virtual environment.
- PressureAhead: Reduced uncertainty in overpressures and drilling window prediction ahead of the bit (DrillWell).
  Analysis of indirect measurement to predict overpressures and related uncertainties.
- Pre-project for CFD-based calculation and risk analysis for medical applications. [7]
- DrillScene. Improvement of usability of drilling monitoring system. (Sekal)
  Focus on automated trending and system calibration.
- Drilling solutions for improved recovery (DrillWell). [9]
  Development of a complete ensemble-based geosteering workflow
  Successful application for a follow-up project "Geosteering for IOR" (NFR 268122)
- Advanced drilling fluid processing. [10]
  Development of simulator of top side processing equipment
  Modelling for drilling fluids processing advisory.
  Drilling fluid composition optimization

2010 – 2013 PhD Research Fellow, University of Bergen, Norway.

2009 – 2010 Summer student, Statoil Research Center, Bergen, Norway.

- Heuristics-based modeling of fracture generation and growth in oil reservoirs (C++).
- 3D visualization of the modeling results.

2008 – 2008 Intern, Mirantis/Grid Dynamics, Saratov, Russia. Investigation of databases for cloud computing. (Java)

Education and training

2010 – 2017 Ph.D., Applied Mathematics, University of Bergen, Norway. **Disputation date: 03.02.2017** [8]

- Mathematical analysis of fractal structure formation in freezing brine. (Matlab) [**??**]
- Semi-analytical solution for micro-mechanics of agglomeration forced by capillary bridging. (Maple) [3]
- Development and analysis of control volume HMM for non-linear flows in porous media. (Python) [2],[11]; with focus on near-well modeling [6].

2008 – 2010 M.Sc., Applied Mathematics, University of Bergen, Norway. Credits: 150. Grade: A. [12]

2004 – 2010 Specialist Diploma, Mechanics, Saratov State University, Russia. With honors. Major in Mechanics of gas liquid and plasma. [13]

Fellowships and awards

2014 Good results (2nd in Bergen) in The 2014 Nordic Collegiate Programming Contest

2011 Best Poster Award at the international workshop "Numerical Analysis of Multiscale Problems & Stochastic Modelling" (RICAM, Linz, Austria)

2009 Support grant for participation in the International Conference on Non-linearities and Upscaling in Porous Media (NUPUS, Stuttgart, Germany)

2009 12th place (1st in Bergen) in IDI Open

2005-2007 Diplomas of 3rd and 2nd degree in ACM Russian Southern Regional team programming contest (ACM, Saratov, Russia)

2006	1st place in All-Russian Team Mathematical Battle (Ural State Pedagogical University, Ekaterinburg, Russia)
Mobility	
2011	Johann Radon Institute for Computational and Applied Mathematics (RICAM), Austria. Awarded by Austrian Academy of Sciences.
Teaching activities	
2010	Lecturer - Special topics in homogenization, Department of Mathematics, University of Bergen, Norway
Organization of scientific meetings	
2018	Geosteering workshop for IOR, 20 participants, Bergen, Norway. Role: main organizer.
2016	IRIS Energy Science Day, 85 participants, Stavnger, Norway. Role: arrangement of technical program and brainstorming sessions.
Commissions of trust	
2016-2017	External examinator at Western Norway University for Applied Sciences
2017	Reviewer for International Conference of Computational Methods In Sciences and Engineering
2013	Reviewer for the Journal of Applied Mathematics and Computation
2011-2012	Reviewer for Vadose Zone Journal
Professional membership	
2015-2018	Member of the Society of Petrophysicists and Well Log Analysts (SPWLA) / Norwegian Formation Evaluation Society (NFES)
2014,2017-2018	Member of the European Association of Geoscientists and Engineers (EAGE)
2009-2015	Member of international and interdisciplinary cooperation NUPUS: Non-linearities and upscaling in porous media
Major collaborations	
Nordbotten J.M. and Keilegavlen E.	Efficient numerical methods for flow in porous media. University of Bergen, Norway
Pop I.S.	Upscaling/downscaling of mushy layers during ice formation, University of Hasselt, Belgium
Balakin B.	Analysis of multiphase flow models; CFD analysis for medical applications. Western Norway University of Applied Sciences, Norway
Daireaux B., Cayeux E., and Iversen, F.	Flow modelling and optimization for drilling applications. IRIS, Norway
Luo X., Suter E., and Vefring E.	Ensemble-based estimation and optimization of well placement. IRIS, Norway
Bratvold R.B., Hong A.	Decision analytics methods for operational decision problems. University of Stavanger, Norway
Publications	Journal Articles
Alyaev S., Keilegavlen E., Nordbotten J.M., and Pop I.S. (2017)	[1] **Fractal structures in freezing brine,** Journal of Fluid Mechanics. URL `http://dx.doi.org/10.1017/jfm.2017.472`
Alyaev S., Keilegavlen E., and Nordbotten J.M. (2014)	[2] **Analysis of control volume heterogeneous multiscale methods for single phase flow in porous media,** Multiscale Modeling & Simulation. URL `http://hdl.handle.net/1956/15562`
Balakin B.V., Alyaev S., Hoffmann A.C., and Kosinski P. (2013)	[3] **Micromechanics of agglomeration forced by the capillary bridge: the restitution of momentum,** AIChE Journal. URL `http://dx.doi.org/10.1002/aic.14162`

Other publications

Alyaev S., Bratvold R.B., Luo X. et al. (2018) [4] **An Interactive Decision Support System for Geosteering Operations,** in SPE Norway One Day Seminar. URL http://dx.doi.org/10.2118/191337-MS

Suter E., Alyaev S., and Daireaux B. (2017) [5] **RT-Hub: next generation real-time data aggregation while drilling,** in First EAGE Workshop on Pore Pressure Prediction. URL http://dx.doi.org/10.3997/2214-4609.201700060

Alyaev S., Keilegavlen E., and Nordbotten J.M. (2017) [6] **Multiscale simulations of non-linear flows in porous media,** submitted to Computational geosciences.

Alyaev S., Bogdanova A., Farbu E.H., and Balakin B.V. (2016) [7] **Elucidating empty nose syndrome with CFD,** in VCBM & MedViz.

Alyaev S. (2016) [8] **Multiscale analysis of selected problems in fluid dynamics,** PhD thesis. University of Bergen. URL http://hdl.handle.net/1956/15563

Luo X., Eliasson P., Alyaev S. et al. (2015) [9] **An Ensemble-Based Framework for Proactive Geosteering,** in SPWLA 56th Annual Logging Symposium. URL http://www.onepetro.org/conference-paper/SPWLA-2015-KKKK

Iversen F., Daireaux B., Alyaev S. et al. (2015) [10] **Towards Closing the Loop on Drilling Fluid Management Control,** in SPE Bergen One Day Seminar. URL http://dx.doi.org/10.2118/173887-MS

Alyaev S., Keilegavlen E., and Nordbotten J.M. (2012) [11] **Multiscale simulation of non-Darcy flows,** in Computational Methods in Water Resources, CMWR XIX. URL http://hdl.handle.net/1956/15561

Alyaev S. (2010) [12] **Adaptive Multiscale Methods Based on A Posteriori Error Estimates,** Master's thesis. University of Bergen. URL http://hdl.handle.net/1956/13151

Alyaev S., and Antonenko E.V. (2008) [13] **Influence of non-uniformity of a thin-walled cylinder on axial critical forces,** Mathematics. Mechanics. (Collection of scientific papers). In Russian.

Technical Reports

Alyaev S., Suter E., Vefring E. et al. (2016) [14] **DrllWell P2: Geosteering for Improved Recovery. Report Phase 1 (2011-2015),** Technical report. IRIS.

Alyaev S. (2016) [15] **Investigation of Reservoir Dynamics Based on Logging While Drilling Data,** Technical report. IRIS.

Iversen F., Petersen J., and Alyaev S. (2014) [16] **Modelling for drilling fluids precessing advisory. Model and application documentation with test and demo results.,** Technical report. IRIS.

Chen Y., Luo X., Alyaev S., and Vefring E. (2014) [17] **On Bias Correction for Parameter Estimation Problems with Applications to Model Updating for Geosteering,** Technical report. IRIS.

Alyaev S., Daireaux B., and Saadallah N. (2014) [18] **ADFP. Simulator of mud and processing equipment.,** Technical report. IRIS.

Iversen F., Petersen J., and Alyaev S. (2013) [19] **Modelling for drilling fluids processing advisory. Starting point, functional requirements and verification plan.,** Technical report. IRIS.