

Name: Valeriya Naumova
Born: November 11, 1987
Nationality: Ukraine
Present position: Deputy Section Director, Section for Computing and Software, Simula Research Laboratory
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Academic degrees

2012 PhD in Natural Sciences (Applied Mathematics), Johannes Kepler University (JKU) Linz and Johann Radon Institute for Computational and Applied Mathematics (RICAM), Austrian Academy of Sciences, Austria.
2010 MSc in Intellectual Decision-Making Systems, Department of Computer Science, National University of Kyiv-Mohyla Academy, Ukraine.

Work experience

2017–present Deputy Section Director, Section for Computing and Software, Simula Research Laboratory (Simula), Norway.
2016 Senior Research Scientist, Section for Computing and Software, Simula, Norway.
2014–2015 EU Coordinator in Computational Biomedicine, Simula.
2015 Guest Scientist, Institute of Computational Biology, Helmholtz Zentrum München, Germany.
2010–2013 Research Scientist, Inverse Problems Group, RICAM, Linz, Austria.
2010–2014 Lecturer, JKU Linz, Austria.
2008–2010 Communication/IT Expert, Technical Assistance EU Projects, Ukraine.

Research interests

My research focuses on development of theoretical approaches and numerical methods for learning from samples of complex high-dimensional data sets (noisy, random, and usually incomplete data sets). I am interested into the principles that allow to learn from small as well as massive samples of data and into the computational schemes that implement these principles. I pursue these questions using analytical, numerical, and probabilistic tools, within a multidisciplinary approach drawing concepts and techniques primarily from theory of inverse and ill-posed problems, regularisation and approximation theory, sparse recovery, and compressed sensing. In the past years I gained a unique experience on how to treat and analyse real-life high-dimensional data, coming from the medical problem of estimating and predicting the blood glucose concentration of diabetic patients from therapeutical valuable factors.

Fellowships and awards

2015 Offer of a W1-professor position (declined), University of Würzburg, Germany.
2013 TUM University Foundation Fellowship (declined), Faculty of Mathematics, TUM, Germany.
2011 Grant of the European Women in Mathematics association.
2010 Second Level Diploma, Scientific Works in Mathematics, Ukraine.
2010 Best Students Award, Ministry of Higher Education of Ukraine.

Research leadership

2017-2019 Training coordinator and Supervisory Board Head for the *EU Training Network in Novel Targets and Methods in Atrial Fibrillation (AFib-TrainNet)*, funded by H2020 MSCA ITN.
2016-2019 Project leader for the FRINATEK project *Function-driven Data Learning in High Dimension project (FunDaHD)*, funded by Norwegian Research Council.
2016-2021 Local project leader for the *Generation of the CanPath Prototype - a Platform for Predictive Cancer Pathway Modelling (CanPathPro)*, funded by H2020 LEIT.
2014-2016 National coordinator for the *EU Ukrainian Mathematicians for Life Science (EUMLS)*, funded by MC IRSES FP7-PEOPLE.
2014-2016 External collaborator and co-author for the Austrian-German research project *Multi-parameter regularisation in high-dimensional learning*, funded by FWF and DFG.

Teaching

June 2017	Lecturer and project supervisor, UCSD/UiO/Simula 2017 Summer school in Computational Physiology.
May 2017	Lecturer and co-organiser, Regularisation Methods for Machine Learning (RegML), Simula.
March 2017	Lecturer and co-organiser, Computational Modelling in Computational Physiology (ComPh), Simula.
Aug 2016	Main lecturer and co-organiser, Crash course on Machine Learning, Simula.
July 2016	Lecturer and project supervisor, UCSD/UiO/Simula 2016 Summer School in Computational Physiology.
WS 2015	Co-lecturer and tutor for MA5068: Statistical Learning, Technical University Munich, Germany.
July 2015	Project supervisor, UCSD/UiO/Simula 2015 Summer School in Computational Physiology.
Oct 2014	Lecturer, Autumn School on Mathematical Imaging and Statistical Learning, University of Verona, Italy.
Sep 2013	Co-lecturer, Special course on Novel Methods for Learning Theory, RICAM, Austria.
2012–2014	Lecturer, Mathematics I and II for Chemistry Students, JKU, Austria.
2010–2014	Tutor, Mathematics I and III, JKU, Austria.

Supervision At Simula I am currently supervising one PhD student (Timo Klock) and one postdoctoral fellow (Zeljko Kereta), working on high-dimensional data representation learning within the FunDaHD project. I also provide training and general supervision to two AFib-TrainNet PhD students (Marcia Vagos and Ilse van Herck). In addition, I have been co-supervising 2 PhD students (Steffen Peter, Johannes Maly) at Chair in Applied Mathematics, TUM, Germany, and closely collaborating with a PhD student (Christopher Villongco) at Cardiac Mechanics Research Group, Department of Bioengineering, UCSD.

Organisation of scientific meetings I actively involved in organisation of schools and modelling weeks for undergraduate and graduate students (e.g., RegML 2017, Crash Course on Machine Learning, ComPh). At the same time, I regularly organise workshops within the most relevant and interesting conferences in my field of research such as Applied Inverse Problems, SIAM Uncertainty Quantification, International Federation for Information Processing (IFIP).

Service to the community Reviewer for Inverse Problems, Frontiers in Applied Mathematics, Computational Methods in Applied Mathematics, Applicable Analysis, Journal of Mathematical Analysis and Applications, Diabetes & Metabolism, Journal of Complexity, Abstract and Applied Analysis.

Oral Presentations (Selected)

September 2017	<i>Multi-parameter regularisation for solving unmixing problems in signal processing: theoretical and practical aspects</i> , plenary talk at Mathematical Signal Processing and Data Analysis, Bremen, Germany.
September 2017	<i>A machine learning approach to optimal regularization: affine manifolds</i> , keynote talk at Dictionary Learning on Manifolds, Nice, France.
August 2017	<i>Dictionary Learning from Incomplete Data for Efficient Image Restoration</i> , invited talk at European Signal Processing Conference, Kos, Greece.
May 2017	<i>Innovative solution of unmixing problems by means of multi-penalty regularisation</i> , Applied Inverse Problems, Hangzhou, China.
May 2016	<i>Dictionary learning from incomplete data</i> , SIAM Conference on Imaging Science, Albuquerque, New Mexico, USA.
May 2014	<i>Meta-Learning approach to the image denoising problem</i> , SIAM Conference on Imaging Science, Hong Kong.
March 2014	<i>Minimisation of multi-penalty functionals and optimal parameter choices</i> , SIAM Conference on Uncertainty Quantification, Savannah, Georgia, USA.
July 2013	<i>Data-driven and problem-oriented multiple-kernel learning</i> , Applied Inverse Problems (AIP), Daejeon, Korea.
Oct 2012	<i>Regularization in variable RKHSs with application to the blood glucose reading</i> , Oberwolfach Workshop "Computational Inverse Problems," Oberwolfach, Germany.

- Sep 2012 *Learning in variable RKHSs with application to the blood glucose reading*, Dagstuhl Seminar “Algorithms and Complexity for Continuous Problems,” Dagstuhl, Germany.
- Feb 2012 *Prediction of nocturnal hypoglycemia from SMBG measurements* (Poster Presentation), Advanced Technologies & Treatment for Diabetes, Barcelona, Spain.
- Dec 2011 *Reading blood glucose from subcutaneous electric current by means of a regularisation in variable Reproducing Kernel Hilbert Spaces*, IEEE Conference on Decision and Control and European Control Conference 2011, Orlando, Florida, USA.

Publications

Books

1. V. Naumova. *Numerical Methods for Diabetes Technology: Mathematical Algorithms for a Better Management of Type 1 Diabetes*. LAP LAMBERT Academic Publishing (2012).

Book chapters

1. K. Hlavackova-Schindler, V. Naumova, and S. Pereverzyev J. *Multi-penalty regularisation for detecting relevant variables*. Recent Applications of Harmonic Analysis to Function Spaces, Differential Equations, and Data Science, Birkhäuser. 2017.
2. V. Naumova, L. Nita, J. U. Poulsen, and S. V. Pereverzyev. *Meta-learning based Blood Glucose Predictor for Diabetic Smartphone App*. Prediction Methods for Blood Glucose Concentration: Design, Use and Evaluation. Springer Lecture Notes in Bioengineering, 2016.
3. K. Hlavackova-Schindler, V. Naumova, and S. Pereverzyev J. *Granger Causality for Ill-Posed Problems: Ideas, Methods, and Application in Life Sciences*. Causality and Statistics. Methods for Applied Empirical Research. Hoboken, NJ: Wiley, 2015.

Refereed Journal Papers

1. M. Grasmair, T. Klock and V. Naumova. *Adaptive multi-penalty regularization based on a generalized Lasso path*. Submitted, 2017.
2. V. Naumova and K. Schnass *Dictionary Learning from Incomplete Data*. Submitted, 2017.
3. E. De Vito, M. Fornasier, and V. Naumova *A machine learning approach to optimal Tikhonov regularization I*. Submitted, 2016.
4. M. Grasmair and V. Naumova. *Conditions on optimal support recovery in unmixing problems by means of multi-penalty regularization*. Inverse Problems 32 (2016), 104007.
5. V. Naumova and S. Peter. *Minimization of multi-penalty functionals by alternating iterative thresholding and optimal parameter choices*. Inverse Problems 30 (2014), 125003, 34 pp.
6. M. Fornasier, V. Naumova and S. V. Pereverzyev. *Parameter choice strategies for multi-penalty regularization*. SIAM Journal on Numerical Analysis 52 (2014), 1770–1794.
7. V. Naumova, S. V. Pereverzyev and P. Tkachenko. *Regularized collocation for Spherical harmonics Gravitational Field Modeling*. International Journal on Geomathematics 5 (2014), 81–98.
8. H. N. Mhaskar, V. Naumova, and S. V. Pereverzyev. *Filtered Legendre expansion method for numerical differentiation at the boundary point with application to blood glucose predictions*. to appear in Applied Mathematics and Computation, 2013.
9. V. Naumova and S. V. Pereverzyev. *Multi-penalty regularization with a component-wise penalization*. Inverse Problems 29 (2013), 075002, 16pp.
10. V. Naumova and S. V. Pereverzyev. *Blood glucose predictors: an overview on how recent developments help to unlock the problem of glucose regulation*. Recent Patents on Computer Science 5 (2012), 1–11.
11. S. Lu, V. Naumova, and S. V. Pereverzyev. *Legendre polynomials as a recommended basis for numerical differentiation in the presence of stochastic white noise*. Journal of Inverse and Ill-posed Problems 20 (2012), 1–22.
12. V. Naumova, S. V. Pereverzyev, and S. Sivananthan. *Adaptive parameter choice for one-sided finite difference schemes and its application in diabetes technology*. Journal of Complexity 28 (2012), 524–538.
13. V. Naumova, S. V. Pereverzyev, and S. Sivananthan. *A meta-learning approach to the regularized learning – case study: blood glucose prediction*. Neural Networks 33 (2012), 181–193.

14. V. Naumova, S. V. Pereverzyev, and S. Sivananthan. *Extrapolation in variable RKHSs with application to the blood glucose reading*. Inverse Problems 27 (2011), 075010, 13 pp.
15. S. Sivananthan, V. Naumova, C. Dalla Man, A. Facchinetti, E. Renard, C. Cobelli, und S. V. Pereverzyev. *Assessment of blood glucose predictors: The Prediction-Error Grid Analysis*, Diabetes Technol Ther 13 (2011), 787–796.

Conference Papers

1. M. Fornasier, J. Maly and V. Naumova *Robust Recovery of Low-Rank Matrices using Multi-Penalty Regularization*. Accepted to NIPS Workshop Optimisation for Machine Learning, 2017.
2. V. Naumova and K. Schnass *Dictionary Learning from Incomplete Data for Efficient Image Restoration*. EUSIPCO 2017.
3. V. Naumova and S. V. Pereverzyev. *Data-driven and problem-oriented multiple-kernel learning*. Proceedings of the International Workshop on Advances in Regularization, Optimization, Kernel Methods, and Support Vector Machines: theory and applications, Leuven, Belgium, July (2013).
4. V. Naumova, S. V. Pereverzyev, and S. Sivananthan. *Learning in variable RKHSs with application to the blood glucose reading*. Dagstuhl Report “Algorithms and Complexity for Continuous Problems” (Dagstuhl Seminar 12391) 2 (9) (2013), 213–214.
5. V. Naumova, S. V. Pereverzyev, and S. Sivananthan. *A meta-learning approach to the adaptive regularization – case study: blood glucose prediction*. Mathematisches Forschungsinstitut Oberwolfach, Report No 51/2012.
6. V. Naumova, S. V. Pereverzyev, and S. Sivananthan. *Learning in variable RKHSs with application to the blood glucose reading*. Mathematisches Forschungsinstitut Oberwolfach, Report No 51/2012.
7. S. Lu, V. Naumova, and S. V. Pereverzyev. *Numerical differentiation by means of Legendre polynomials in the presence of square summable noise*. RICAM Report No 2012-15 (2012).
8. V. Naumova, S. V. Pereverzyev, and S. Sivananthan. *Regularization in variable RKHSs with application to the blood glucose reading*. Mathematisches Forschungsinstitut Oberwolfach, Report No 31/2012.
9. V. Naumova, S. V. Pereverzyev, and S. Sivananthan. *Reading blood glucose from subcutaneous electric current by means of a regularization in variable Reproducing Kernel Hilbert Spaces*. Proceedings of the 50th IEEE Conference on Decision and Control and European Control Conference, Orlando, FL USA, December (2011), 5158–5163.

Lecture Notes

1. V. Naumova and S. Pereverzyev Jr., Lecture Notes (Mathematics I and Mathematics II for Chemistry Students), Linz, Austria (2012).