

# Ilya O. Tolstikhin

**Date of birth:** October 29, 1988

**Nationality:** Russian

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## EDUCATION

**PhD (Candidate of Physics and Mathematics)** October 2014  
*Dorodnicyn Computing Centre of Russian Academy of Sciences*  
“Concentration Inequalities Applied to Transductive Learning and PAC-Bayesian Analysis”.  
Supervisor: Konstantin V. Vorontsov.

**PhD Student** 2010 – 2014  
Dorodnicyn Computing Center of the Russian Academy of Sciences  
Advisor: Konstantin V. Vorontsov

**Diploma of Higher Education** (with honors: GPA 4.94/5.0) 2005 – 2010  
Lomonosov Moscow State University  
Department of Computational Mathematics and Cybernetics  
Advisor: Konstantin V. Vorontsov  
Diploma: “*Generalization error bounds and rule learning algorithms in protein secondary structure prediction*”.

## PROFESSIONAL EXPERIENCE

**PostDoc**, MPI for Intelligent Systems, Tübingen, Germany November 2014 –  
Department of Empirical Inference (Bernhard Schölkopf group)  
Group: learning theory.

## INDUSTRY EXPERIENCE

**Senior Research Developer**, Kaspersky Lab, Moscow, Russia 2010 – November 2014  
Machine learning for malware analysis and detection.

- Design, prototyping, and implementation of internal data processing pipelines (domain expertise, data gathering, feature engineering, learning algorithms);
- Building up the team, interviewing and hiring new members, regular ML tutorials and reading groups for the group.
- **Patents:** US9171155B2, “*System and method for evaluating malware detection rules*”.

**Malware Analyst**, Kaspersky Lab, Moscow, Russia 2008 – 2009  
Malware analysis (Windows PE, Scripts), disassembling (IDE), debugging (OllyDbg).

## PUBLICATIONS

### Conference papers (chronologically ordered)

1. *Adam Scibior, Carl-Johann Simon-Gabriel, Ilya Tolstikhin, Bernhard Schölkopf.*  
**Consistent Kernel Mean Estimation for Functions of Random Variables.** [PDF](#)  
Advances in Neural Information Processing Systems (NIPS), 2016.
2. *Ilya Tolstikhin, Bharath Sriperumbudur, Bernhard Schölkopf.*  
**Minimax Estimation of Maximum Mean Discrepancy with Radial Kernels.** [PDF](#)  
Advances in Neural Information Processing Systems (NIPS), 2016.

3. *Ilya Tolstikhin, Nikita Zhivotovskiy, Gilles Blanchard.*  
**Permutational Rademacher Complexity: a New Complexity Measure for Transductive Learning.** [PDF](#)  
 International Conference on Algorithmic Learning Theory (ALT), 2015.
4. *David Lopez-Paz, Krikamol Muandet, Bernhard Schölkopf, Ilya Tolstikhin.*  
**Towards a Learning Theory of Cause-Effect Inference.** [PDF](#)  
 International Conference on Machine Learning (ICML), 2015.
5. *Ilya Tolstikhin, Gilles Blanchard, Marius Kloft.*  
**Localized Complexities for Transductive Learning.** [PDF](#)  
 Conference on Learning Theory (COLT), 2014. (*Full oral presentation*)
6. *Ilya Tolstikhin, Yevgeny Seldin.*  
**PAC-Bayes-Empirical-Bernstein Inequality.** [PDF](#)  
 Advances in Neural Information Processing Systems (NIPS), 2013. (*Spotlight presentation*)

#### Preprints, technical reports, and others

1. *Ilya Tolstikhin, Sylvain Gelly, Olivier Bousquet, Carl-Johann Simon-Gabriel, Bernhard Schölkopf.*  
**AdaGAN: Boosting Generative Models.** [\[PDF\]](#) [\[Code\]](#) (*Under review, 2017*)
2. *Ilya Tolstikhin, Bharath Sriperumbudur, Krikamol Muandet.*  
**Minimax Estimation of Kernel Mean Embeddings.** [PDF](#) (*Under review, 2016*)
3. *Ilya Tolstikhin, David Lopez-Paz.*  
**Minimax Lower Bounds for Realizable Transductive Classification.** [PDF](#)

#### PhD Thesis

Concentration Inequalities Applied to Transductive Learning and PAC-Bayesian Analysis. [PDF](#)

#### Papers in Russian (chronologically ordered)

1. *Ilya Tolstikhin.*  
**On two approaches to concentration for sampling without replacement.** [PDF](#)  
 Theory of Probability and Its Applications, Vol. 61, No. 3, 2016.
2. *Alexander Frey, Ilya Tolstikhin.*  
**Combinatorial bounds on probability of overfitting based on clustering and coverage of classifiers.** [PDF](#)  
 Machine Learning and Data Analysis (JMLDA), Vol. 1, No. 3, 2013.
3. *Ilya Tolstikhin.*  
**Localized excess risk bounds in combinatorial theory of overfitting.** [PDF](#)  
 9th International conference "Intelligent information processing", 2012.
4. *Ilya Tolstikhin.*  
**Probability of overfitting for compact and sparse sets of classifiers.** [PDF](#)  
 8th International conference "Intelligent information processing", 2010.
5. *Ilya Tolstikhin.*  
**Exact generalization error bound for one particular model of classifiers.**  
 17th International student, postgraduate and young scientists conference "Lomonosov", 2010.
6. *Ilya Tolstikhin.* **Research and development of malware executables classification methods.** Moscow State University, Technical report, 2009.
7. *Ilya Tolstikhin.* **An application of rule learning classification algorithms to churn prediction.** Moscow State University, Technical report, 2008.

## TEACHING EXPERIENCE

- Lecturer**, Bocconi Summer School in Advanced Statistics and Probability. July 2017  
Statistical Causal Learning. Together with David Lopez-Paz and Bernhardt Schölkopf.
- Lecturer**, Eberhard Karls Universität Tübingen. [webpage](#) 2016 – 2017  
Machine Learning Theory. Together with Ruth Urner.
- Teaching assistant**, Skolkovo Institute of Science and Technology 2013 – 2013  
Machine Learning course. Instructors: Tommi Jaakkola, Regina Barzilay, Jacob White.
- Teaching fellow**, Lomonosov Moscow State University 2012 – 2013  
Tutorials on Machine learning.
- Teaching fellow**, Moscow Institute of Physics and Technology 2011 – 2012  
Tutorials on Machine learning.

## OTHER ACADEMIC ACTIVITIES

**Reviewing:** Journal of Machine Learning Research, Annals of Statistics, Machine Learning Journal, International Conference on Machine Learning (ICML 2013, 2015, 2016, 2017), Neural Information Processing Systems (NIPS 2013, 2015, 2016), International Conference on Artificial Intelligence and Statistics (AISTATS 2014, 2015, 2016), Algorithmic Learning Theory (ALT 2015).

**PC and Senior PC:** Workshop on New Directions in Transfer Learning (NIPS-2013), UAI 2016.

**Coorganizing** Machine Learning Summer School, Tübingen, Germany, 2017.  
(together with Ruth Urner, Michael Hirsch, and Bernhard Schölkopf)

## WORKSHOPS, RESEARCH VISITS, LECTURES, OTHERS

- Dagstuhl workshop, “New Directions for Learning with Kernels and Gaussian Processes”, Schloss Dagstuhl, Germany 2016
- Dagstuhl workshop, “Foundations of Unsupervised Learning”, Schloss Dagstuhl, Germany 2016
- Spring School “Structural Inference”, Brodten, Germany 2016
- Yandex School of Data Analysis Conference, “Machine Learning: Prospects and Applications”, Berlin, Germany. 2015
- Dagstuhl workshop, “Machine Learning with Interdependent and Non-Identically Distributed Data”, Schloss Dagstuhl, Germany. 2015
- GRAAL, Laval University, Québec, Canada. 2013  
Short research visit, group of François Laviolette and Mario Marchand.
- “Problems in Stochastic Analysis”, Moscow, Russia. 2013 – 2014  
Joint MSU/IUM seminars. Chairs: A. V. Gasnikov, G. K. Golubev, V. G. Spokoiny.

## EXTRA INFO

**Married to** Zoya Katashinskaya. **Children:** Nina Tolstikhina (born 27.08.2015).  
**Languages spoken:** Russian (native), English (fluent), Japanese (lived in Japan for 6 years, used to be fluent), German (beginner).  
**Programming languages:** Python, C++, Matlab, R. **Publishing:** LaTeX  
**Passions in life:** data analysis for fitness & health, olympic weightlifting, cooking and eating clean.