Curriculum Vitae

Yuri Kalnishkan

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1 Personal Details

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Nationality: Russian (by birth) and British (by naturalisation)

2 Employment

2011–now Senior Lecturer, Department of Computer Science, Royal Holloway, University of London;

2003–2011 Lecturer, Department of Computer Science, Royal Holloway, University of London;

2001–2003 Research Assistant, Department of Computer Science, Royal Holloway, University of London;

1997 translating 'Introduction to Algorithms' by T. Cormen, C. Leiserson, and R. Rivest into Russian. Moscow Center for Continuous Mathematical Education, Russia.

3 Education and Training

2005 Certificate in Academic Practice in Teaching and Learning, Royal Holloway, University of London.

1998–2002 PhD, Department of Computer Science and Computer Learning Research Centre, Royal Holloway, University of London. Dissertation: The Aggregating Algorithm and Predictive Complexity.

1993–1998 MSc in Mathematics and Applied Mathematics, Department of Mechanics and Mathematics, Lomonosov Moscow State University, Russia. Specialisation: mathematical logic and theory of algorithms. Average grade 4.97 of 5; a distinction ('red diploma') awarded.

4 Memberships

- The Higher Education Academy: Practitioner 2005-2007, Fellow since 2007.

Research

5 Research Interests

My current research focuses on:

- developing universal algorithms that are able to compete with large pools of prediction strategies;
- developing practical applications of prediction with expert advice techniques, in particular, those based on sleeping experts;
- applying competitive prediction techniques to real-world data with a focus on economics and finance.

6 Publication Output

Book Chapter

1. Y. Kalnishkan. Predictive Complexity for Games with Finite Outcome Spaces. In *Measures of Complexity: Festschrift for Alexey Chervonenkis*, pp. 117-139, Springer, 2015.

Refereed Journals

2. T. Scarfe, W. Koolen, and Y. Kalnishkan. Segmentation of electronic dance music. International Journal of Engineering Intelligent Systems for Electrical Engineering and Communications, 22, 3/4 (2014).
3. Y. Kalnishkan, M. V. Vyugin, and V. Vovk. Generalised Entropies and Asymptotic Complexities of Languages. Information and Computation, 237, 101-141 (2014).
4. F. Zhdanov and Y. Kalnishkan. An Identity for Kernel Ridge Regression. Theoretical Computer Science, 473, 157–178 (2013).
5. F. Zhdanov and Y. Kalnishkan. Universal Algorithms for Probability Forecasting. International Journal on Artificial Intelligence Tools, 21(4) (2012).
6. A. Chernov, Y. Kalnishkan, F. Zhdanov, and V. Vovk. Supermartingales in Prediction with Expert Advice. *Theoretical Computer Science,* 411(29–30): 2647–2669 (2010).

7. Y. Kalnishkan and M. V. Vyugin. The weak aggregating algorithm and weak mixability. *Journal of Computer and System Sciences,* 74(8): 1228–1244 (2008).

8. Y. Kalnishkan, V. Vovk, and M. V. Vyugin. How many strings are easy to predict? *Information and Computation,* 201: 55–71 (2005).

9. Y. Kalnishkan, V. Vovk, and M. V. Vyugin. Loss functions, complexities, and the Legendre transformation. *Theoretical Computer Science,* 313(2): 195–207 (2004).

10. A. M. Raigorodskii and Yu. A. Kalnishkan. On Borsuk's Problem in $\mathbb{R}^3$. *Matematicheskie Zametki*, 74(1):149–152 (2003) (in Russian). English translation in *Mathematical Notes,* 74(1):144–146, Springer, 2003.

11. Y. Kalnishkan. General linear relations among different types of predictive complexity. *Theoretical Computer Science,* 271: 181–200 (2002).

Refereed Conference Proceedings

12. T. Scarfe, W. M. Koolen, and Y. Kalnishkan. A Long-Range Self-similarity Approach to Segmenting DJ Mixed Music Streams. In *Artificial Intelligence Applications and Innovations — 9th IFIP WG 12.5 International Conference, AIAI 2013, Proceedings*, pages 235–244. Springer, 2013.

13. F. Zhdanov and Y. Kalnishkan. An Identity for Kernel Ridge Regression. In *Proceedings of the 21st International Conference on Algorithmic Learning Theory,* vol. 6331 of *Lecture Notes in Computer Science,* pages 405–419, Springer, 2010.

14. F. Zhdanov and Y. Kalnishkan. Linear Probability Forecasting. In *Proceedings of the 6th IFIP Conference on Artificial Intelligence Applications and Innovations (AIAI 2010),* pages 4–11, Springer, 2010.

15. A. Chernov, Y. Kalnishkan, F. Zhdanov, and V. Vovk. Supermartingales in Prediction with Expert Advice. In *Algorithmic Learning Theory, 19th International Conference, ALT 2008, Proceedings,* vol. 5254 of *Lecture Notes in Computer Science,* pages 199–213. Springer, 2008.

16. S. Busuttil and Y. Kalnishkan. On-line Regression Competitive with Changing Predictors. In *Algorithmic Learning Theory, 18th International Conference, ALT 2007, Proceedings,* vol. 4754 of *Lecture Notes in Computer Science,* pages 181–195. Springer, 2007.

17. S. Busuttil and Y. Kalnishkan. Weighted Kernel Regression for Predicting Changing Dependencies. In *Machine Learning: ECML 2007, 18th European Conference on Machine Learning,* vol. 4701 of *Lecture Notes in Computer Science,* pages 535–542. Springer, 2007.

18. Y. Kalnishkan, V. Vovk and M. V. Vyugin. Generalised Entropy and Asymptotic Complexities of Languages. In *Learning Theory, 20th Annual Conference on Learning Theory, COLT 2007,* vol. 4539 of Lecture Notes in Computer Science, pages 293–307, Springer 2007.

19. Y. Kalnishkan and M. V. Vyugin. The Weak Aggregating Algorithm and weak mixability. In *Learning Theory, Proceedings of the 18th Annual Conference (COLT 2005),* vol. 3559 of *Lecture Notes in Artificial Intelligence,* pages 188–203, Springer, 2005.

20. Y. Kalnishkan, V. Vovk, and M. V. Vyugin. A criterion for the existence of predictive complexity for binary games. In *Algorithmic Learning Theory, 15th International Conference, ALT 2004, Proceedings,* vol. 3244 of *Lecture Notes in Artificial Intelligence,* pages 249–263, Springer, 2004.

21. A. Gammerman, Y. Kalnishkan, and V. Vovk. On-line prediction with kernels and the Complexity Approximation Principle. In *Uncertainty in Artificial Intelligence,* pages 170–176, Proceedings of the Twentieth Conference, AUAI press, 2004.

22. Y. Kalnishkan, V. Vovk, and M. V. Vyugin. How many strings are easy to predict? In *16th Annual Conference on Learning Theory (COLT) and 7th Annual Workshop on Kernel Machines, Proceedings,* vol. 2777 of *Lecture Notes in Artificial Intelligence,* pages 522–536, Springer, 2003.

23. Y. Kalnishkan and M. V. Vyugin. On the absence of predictive complexity for some games. In *Algorithmic Learning Theory 13th International Conference, ALT 2002,* vol. 2533 of *Lecture Notes in Artificial Intelligence,* pages 164–172, Springer, 2002.

24. Y. Kalnishkan and M. V. Vyugin. Mixability and the existence of weak complexities. In *Computational Learning Theory 15th Annual Conference, COLT 2002,* vol. 2533 of *Lecture Notes in Artificial Intelligence,* pages 105–120, Springer, 2002.

25. Y. Kalnishkan, M. V. Vyugin, and V. Vovk. Loss functions, complexities, and the Legendre transformation. In *Algorithmic Learning Theory 12th International Conference, ALT 2001,* vol. 2225 of *Lecture Notes in Artificial Intelligence,* pages 181–189, Springer, 2001.

26. Y. Kalnishkan. Complexity approximation principle and Rissanen's approach to real-valued parameters. In *Machine Learning: ECML 2000, 11th European Conference on Machine Learning,* vol. 1810 of *Lecture Notes in Artificial Intelligence,* pages 203–210, Springer, 2000.

27. Y. Kalnishkan. General linear relations among different types of predictive complexity. In *Algorithmic Learning Theory, 10th International Conference, ALT'99,* vol. 1720 of *Lecture Notes in Artificial Intelligence,* pages 323–334, Springer, 1999.

28. Y. Kalnishkan. Linear relations between square-loss and Kolmogorov complexity. In *Proceedings of the Twelfth Annual Conference on Computational Learning Theory,* pages 226–232, Association for Computing Machinery, 1999.

7 Research Grants

1. On-line Self-Tuning Learning Algorithms for Handling Historical Information, Leverhulme RPG–2013–047, 2013–2016 (sole investigator, 100%).

2. Practical competitive prediction (with V. Vovk and A. Gammerman), EPSRC EP/F002998, 2007–2010 (co-investigator, 30%).

3. Complexity Approximation Principle and Predictive Complexity: Analysis and Applications, EPSRC GR/R46670, 2001-2003 (researcher co-investigator).

8 Academic Prizes and Awards

1. Best paper award at the 6th IFIP Conference on Artificial Intelligence Applications and Innovations, AIAI 2010, with F. Zhdanov.
2. E. Mark Gold Award for the best student paper at the 10th International Conference on Algorithmic Learning Theory, ALT 1999.
3. PhD funded by the Overseas Research Scholarship Award (1998–2001).

9 Organisation of Conferences

2015 Neural Information Processing Systems, NIPS 2015, reviewer.

2014 Neural Information Processing Systems, NIPS 2014, reviewer.

2013 Second Workshop on Conformal Prediction and its Applications, CoPA 2013, programme committee member.

2009 Workshop on Advances in Machine Learning for Computational Finance, UCL, London, programme committee member.

2007 The 18th International Conference on Algorithmic Learning Theory, ALT 2007, programme committee member.

10 PhD Student Supervision

1. Steven Busuttil, PhD awarded in 2008.
2. Tim Scarfe, PhD awarded in 2015.

11 Examining and External Services

2015-2019 External examiner for the MSc in Big Data Analytics and MSc in Computational Mathematics, University of Derby.

2015 PhD examiner of Xinyue Wang, School of Electronic Engineering and Computer Science, Queen Mary, University of London.

2015 PhD examiner of Ufuk Mat, Department of Mathematics, Royal Holloway, University of London.

2014 PhD examiner of Meng Yang, Department of Computer Science, Royal Holloway, University of London.

2014 PhD examiner of Zelun Zhang, School of Electronic Engineering and Computer Science, Queen Mary, University of London.

2007 An external member of the validation panel a proposed MSc programme in Computing for Financial Services, University of Ulster.

2005 PhD examiner of Daniil Ryabko, Department of Computer Science, Royal Holloway, University of London.

Teaching

12 Teaching Achievements

My key achievement is the launching of Big Data MSc programmes (the portfolio contains six programmes, MSc in Data Science and Analytics, MSc in Computational Fiance, MSc in Machine Learning and their year in industry versions) in 2013. I coordinated the preparation of the programmes and individual course units for them and wrote most of the programmes documentation. The programmes started in September 2013 with the intake of 30 students.

13 Breadth of Teaching Experience

I have extensive teaching experience covering most forms and types of teaching provided by the department:

- lecturing to first year, second year, third year, and MSc students;
- teaching small groups of advisees;
- supervising technical lab sessions for first, second, and third year students;
- supervising undergraduate, taught MSc and MSc by research projects.

14 Selected Courses Taught

CS1801 Object Oriented Programming

CS1860 Mathematical Structures

CS2660 Operating Systems

CS3920 Computer Learning

CS3930 Computational Finance

CS5200 On-line Machine Learning

BI5621 Information Systems Design, Development and Management

Administration

15 Internal Positions of Responsibility

- Director of graduate studies, 2005–2008.
- Undergraduate admissions officer 2003–2005 and 2008–2013, director of undergraduate admissions 2004–05 and 2010–12.
- MSc programme director, since 2013.