Michal Valko

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Experience

- **Inria – team SequeL**, Lille, France
  Experienced Junior Scientist - CR1 (2014 – . . .)
- **ENS Cachan – Master 2 MVA**, Cachan, France
  External Lecturer - CEV (2014 – . . .)
- **Inria – team SequeL**, Lille, France
  Junior Scientist - CR2 (2012 – 2014)
- **Inria – team SequeL**, Lille, France
  Postdoctoral Researcher (2011 – 2012), Advisor: *Rémi Munos*
- **Intel Research**, Santa Clara, CA, USA
  Research Intern (2009, 2010), Advisor: *Branislav Kveton*

Education

- **École normale supérieure de Cachan**, Cachan, France
  HdR in Mathematics, June 2016.
  Thesis: *Bandits on Graphs and Structures*, Advisor: *Nicolas Vayatis*
- **University of Pittsburgh**, Pittsburgh, PA
  PhD in Machine Learning, August 2011.
  Thesis: *Adaptive Graph-Based Algorithms*, Advisor: *Milos Hauskrecht*
- **Comenius University Bratislava**, Slovakia
  MSc. , Summa cum laude in Computer Science, June 2005.
  Majors: Artificial Intelligence and Mathematical Methods of CS
  Thesis: *Evolving Neural Networks for Statistical Decision Theory*, Advisor: *R. Harman*

Selected Awards

Inria award for scientific excellence: Prime d'excellence scientifique (2014 - 2017)

International Conference on Machine Learning Reviewer Award (2015)

Distinguished Alumni of Comenius University, Slovakia (2015)

Compunetix Best Research Award at Computer Science Department (2008 and 2011)

University of Pittsburgh Honors Convocation 2009 Recognition

Andrew Mellon Predoctoral Fellowship (Fall 2008, Summer 2009)

Slovak Academy of Sciences Fellowship (2003 – 2005)

Research Interests

machine learning, bandit theory, minimal feedback, online learning, sequential learning, graph-based methods, inverse reinforcement learning, semi-supervised learning

Project Funding

- CompLACS (EU FP7), 2011 - 2015 (PI: J. Shawe-Taylor)
- BoB (ANR), 2016 - 2020 (PI: R. Bardenet)
- Extra-Learn (ANR), 2014 - 2018 (PI: A. Lazaric)
- EduBand (with CMU), 2015 - 2018 (with A. Lazaric and E. Brunskill)
- INTEL/Inria - Algorithmic Determination of IoT Edge Analytic - 2013 (PI: M. Valko)

◇ NIH grants (1R01LM010019-01A1, 1R21LM009102-01A1), 2009 - 2013 (PI: M. Hauskrecht)

SELECTED PUBLICATIONS

◇ Daniele Calandriello, Alessandro Lazaric, **Michal Valko**: *Second-order kernel online convex optimization with adaptive sketching*, International Conference on Machine Learning (ICML 2017)

◇ Guillaume Gautier, Rémi Bardenet, **Michal Valko**: *Zonotope hit-and-run for efficient sampling from projection DPPs*, International Conference on Machine Learning (ICML 2017)

◇ Daniele Calandriello, Alessandro Lazaric, **Michal Valko**: *Distributed sequential sampling for kernel matrix approximation*, International Conference on Artificial Intelligence and Statistics (AISTATS 2017)

◇ Akram Erraqabi, Alessandro Lazaric, **Michal Valko**, Emma Brunskill, Yu-En Liu: *Trading off Rewards and Errors in Multi-armed Bandits*, International Conference on Artificial Intelligence and Statistics (AISTATS 2017)

◇ Tomáš Kocák, **Michal Valko**, Rémi Munos, Branislav Kveton, Shipra Agrawal: *Spectral Bandits*, accepted for publication to Journal of Machine Learning Research (JMLR 2017)

◇ Branislav Kveton, Zheng Wen, Azin Ashkan, **Michal Valko**: *Learning to act greedily: Polymatroid semi-bandits*, accepted for publication to Journal of Machine Learning Research (JMLR 2017)

◇ Jean-Bastien Grill, **Michal Valko**, Rémi Munos: *Blazing the trails before beating the path: Sample-efficient Monte-Carlo planning*, Neural Information Processing Systems (NIPS 2016)

◇ Akram Erraqabi, **Michal Valko**, Alexandra Carpentier, Odalric-Ambrym Maillard: *Pliable rejection sampling*, International Conference on Machine Learning (ICML 2016)

◇ Daniele Calandriello, Alessandro Lazaric, **Michal Valko**: *Analysis of Nyström method with sequential ridge leverage scores*, Uncertainty in Artificial Intelligence (UAI 2016)

◇ Tomáš Kocák, Gergely Neu, **Michal Valko**: *Online learning with Erdős–Rényi side-observation graphs*, Uncertainty in Artificial Intelligence (UAI 2016)

◇ Tomáš Kocák, Gergely Neu, **Michal Valko**: *Online learning with noisy side observations*, International Conference on Artificial Intelligence and Statistics (AISTATS 2016) [**full oral**]

◇ Alexandra Carpentier, **Michal Valko**: *Revealing graph bandits for maximizing local influence*, International Conference on Artificial Intelligence and Statistics (AISTATS 2016)

◇ Jean-Bastien Grill, **Michal Valko**, Rémi Munos: *Black-box optimization of noisy functions with unknown smoothness*, Neural Information Processing Systems (NIPS 2015)

◇ Alexandra Carpentier, **Michal Valko**: *Simple regret for infinitely many armed bandits*, International Conference on Machine Learning (ICML 2015)

◇ Tomáš Kocák, Gergely Neu, **Michal Valko**, Rémi Munos: *Efficient learning by implicit exploration in bandit problems with side observations*, Neural Information Processing Systems (NIPS 2014)

◇ Alexandra Carpentier, **Michal Valko**: *Extreme bandits*, Neural Information Processing Systems (NIPS 2014)

◇ Gergely Neu, **Michal Valko**: *Online combinatorial optimization with stochastic decision sets and adversarial losses*, Neural Information Processing Systems (NIPS 2014)

◇ **Michal Valko**, Rémi Munos, Branislav Kveton, Tomáš Kocák: *Spectral bandits for smooth graph functions*, International Conference on Machine Learning (ICML 2014)

◇ **Michal Valko**, Alexandra Carpentier, Rémi Munos: *Stochastic simultaneous optimistic optimization*, International Conference on Machine Learning (ICML 2013) [**oral presentation**]

◇ **Michal Valko**, Branislav Kveton, Ling Huang, Daniel Ting: *Online semi-supervised learning on quantized graphs*, Conference on Uncertainty in Artificial Intelligence (UAI 2010)

◇ Milos Hauskrecht, **Michal Valko**, Shyam Visweswaram, Iyad Batal, Gilles Clermont, Gregory Cooper: *Conditional outlier detection for clinical alerting* in Annual American Medical Informatics Association conference (AMIA 2010) [**Homer Warner best paper award**]

PUBLICATIONS Mohammad Ghavamzadeh, Yaakov Engel, **Michal Valko**: *Bayesian policy gradient and actor-critic algorithms*, Journal of Machine Learning Research (JMLR 2016)

◇ Manjesh Hanawal, Venkatesh Saligrama, **Michal Valko**, Rémi Munos: *Cheap Bandits*, The 32th International Conference on Machine Learning (ICML 2015) [**oral presentation**]

◇ Julien Audiffren, **Michal Valko**, Alessandro Lazaric, Mohammad Ghavamzadeh: *Maximum Entropy Semi-Supervised Inverse Reinforcement Learning*, The 24th International Joint Conference on Artificial Intelligence (IJCAI 2015) [**oral presentation**]

◇ Tomáš Kocák, **Michal Valko**, Rémi Munos, Shipra Agrawal: *Spectral Thompson Sampling*, The 28th AAAI Conference on Artificial Intelligence (AAAI 2014) [**oral presentation**]

◇ Philippe Preux, Rémi Munos, **Michal Valko**: *Bandits attack function optimization*, IEEE Congress on Evolutionary Computation (CEC 2014)

◇ Julien Audiffren, **Michal Valko**, Alessandro Lazaric, Mohammad Ghavamzadeh: *MESSI: Maximum Entropy Semi-Supervised Inverse Reinforcement Learning*, NIPS Workshop on Novel Trends and Applications in Reinforcement Learning (NIPS 2014 - TCRL)

◇ Tomáš Kocák, **Michal Valko**, Rémi Munos, Branislav Kveton, Shipra Agrawal: *Spectral Bandits for Smooth Graph Functions with Applications in Recommender Systems*, AAAI Workshop on Sequential Decision-Making with Big Data (AAAI 2014 - SDMBD) [**oral presentation**]

◇ **Michal Valko**, Nathan Korda, Rémi Munos, Ilias Flaounas, Nello Cristianini: *Finite-Time Analysis of Kernelised Contextual Bandits*, The 29nd Conference on Uncertainty in Artificial Intelligence (UAI 2013)

◇ Branislav Kveton, **Michal Valko**: *Learning from a Single Labeled Face and a Stream of Unlabeled Data*, The 10th IEEE International Conference on Automatic Face and Gesture Recognition (FG 2013) [**spotlight**]

◇ **Michal Valko**, Mohammad Ghavamzadeh, Alessandro Lazaric: *Semi-supervised apprenticeship learning*, in European Workshop on Reinforcement Learning (EWRL 2012)

◇ Milos Hauskrecht, Iyad Batal, **Michal Valko**, Shyam Visweswaran, Gregory F. Cooper, Gilles Clermont: *Outlier detection for patient monitoring and alerting*, Journal of Biomedical Informatics (JBI 2013)

◇ **Michal Valko**, Hamed Valizadegan, Branislav Kveton, Milos Hauskrecht: *Conditional Anomaly Detection with Soft Harmonic Functions*, International Conference on Data Mining (ICDM 2011)

◇ Thomas C. Hart, Patricia M. Corby, Milos Hauskrecht, Ok Hee Ryu, Richard Pelikan, **Michal Valko**, Maria B. Oliveira, Gerald T. Hoehn, and Walter A. Bretz: *Identification of Microbial and Proteomic Biomarkers in Early Childhood Caries*, International Journal of Dentistry (IJD 2011)

◇ **Michal Valko**: *Adaptive Graph-Based Algorithms for Conditional Anomaly Detection and Semi-Supervised Learning*, PhD thesis, University of Pittsburgh, (PITT 2011)

◇ **Michal Valko**, Hamed Valizadegan, Branislav Kveton, Gregory F. Cooper, Milos Hauskrecht: *Conditional Anomaly Detection Using Soft Harmonic Functions: An Application to Clinical Alerting*, Workshop on Machine Learning for Global Challenges in The Twenty-Eight International Conference on Machine Learning (ICML 2011 - Global)

◇ Branislav Kveton, **Michal Valko**, Ali Rahimi, Ling Huang: *Semi-Supervised Learning with Max-Margin Graph Cuts*, The 13th International Conference on Artificial Intelligence and Statistics (AISTATS 2010)

- ◇ Branislav Kveton, **Michal Valko**, Matthai Phillipose, Ling Huang: *Online Semi-Supervised Perception: Real-Time Learning without Explicit Feedback*, The Fourth IEEE Online Learning for Computer Vision Workshop in The 23rd IEEE Conference on Computer Vision and Pattern Recognition (CVPR 2010 - OLCV) [**Google Best Paper Award**]
- ◇ **Michal Valko**, Milos Hauskrecht: *Feature importance analysis for patient management decisions*, 13th International Congress on Medical Informatics (MEDINFO 2010)
- ◇ **Michal Valko**, Gregory Cooper, Amy Seybert, Shyam Visweswaran, Melissa Saul, Milos Hauskrecht: *Conditional anomaly detection methods for patient-management alert systems*, Workshop on Machine Learning in Health Care Applications in The Twenty-Fifth International Conference on Machine Learning (ICML 2008 - MLHealth)
- ◇ **Michal Valko**, Milos Hauskrecht: *Distance metric learning for conditional anomaly detection*, Twenty-First International Florida AI Research Society Conference (FLAIRS 2008)
- ◇ **Michal Valko**, Richard Pelikan, Milos Hauskrecht: *Learning predictive models for combinations of heterogeneous proteomic data sources*, AMIA Summit on Translational Bioinformatics (STB 2008) [**best paper award**]
- ◇ Milos Hauskrecht, **Michal Valko**, Branislav Kveton, Shyam Visweswaram, Gregory Cooper: *Evidence-based Anomaly Detection in Clinical Domains* in Annual American Medical Informatics Association conference (AMIA 2007) [**nominated for the best paper award**]
- ◇ Wendy W. Chapman, John N. Dowling, Gregory F. Cooper, Milos Hauskrecht, **Michal Valko**: *A Comparison of Chief Complaints and Emergency Department Reports for Identifying Patients with Acute Lower Respiratory Syndrome* in Proceedings of the National Syndromic Surveillance Conference (ISDS 2006)
- ◇ Milos Hauskrecht, Richard Pelikan, **Michal Valko**, James Lyons-Weiler: *Feature Selection and Dimensionality Reduction in Genomics and Proteomics*. Fundamentals of Data Mining in Genomics and Proteomics, eds. Berrar, Dubitzky, Granzow. Springer (2006)
- ◇ **Michal Valko**, Nuno C. Marques, Marco Castelani: *Evolutionary Feature Selection for Spiking Neural Network Pattern Classifiers* in Proceedings of Portuguese Conference on Artificial Intelligence (EPIA 2005), eds. Bento et al., IEEE, p. 24–32
- ◇ **Michal Valko** *Evolving Neural Networks for Statistical Decision Theory*, Comenius University, Bratislava, master thesis, advisor: Radoslav Harman (2005)

STUDENTS

- ◇ *Pierre Perrault*, 2017 – 2020, PhD. student, Inria/ENS Cachan, with V. Perchet
- ◇ *Julien Seznec*, 2017 – 2020, PhD. student, Inria, with A. Lazaric and J. Banon
- ◇ *Guillaume Gautier*, 2017 – 2020, PhD. student, Inria/CNRS, with R. Bardenet
- ◇ *Daniele Calandriello*, 2014 – 2017, PhD. student, Inria, with A. Lazaric
- ◇ *Jean-Bastien Grill*, 2014 – 2017, PhD. student, Inria/ENS Paris, with R. Munos
- ◇ *Tomáš Kocák*, 2013 – 2016, PhD. student, Inria, with R. Munos
- ◇ *Xuedong Shang*, 2017, master student, ENS Rennes, with E. Kaufmann
- ◇ *Guillaume Gautier*, 2016, master student, ENS Cachan, with R. Bardenet
- ◇ *Andrea Locatelli*, 2015 – 2016, master student, ENS Cachan, with A. Carpentier
- ◇ *Akram Erraqabi*, 2015, master student, École Polytechnique, Paris
- ◇ *Souhail Toumdi*, 2015 – 2016, master student, École Centrale de Lille, with R. Bardenet
- ◇ *Mastane Achab*, 2015, master student, École Polytechnique, Paris, with G. Neu
- ◇ *Jean-Bastien Grill*, 2014, master student, ENS Paris, with R. Munos
- ◇ *Alexandre Dubus*, 2012 – 2013, master student, Université Lille1 - Sciences et Technologies
- ◇ *Karim Jedda*, 2012–2013, master student, École Centrale de Lille
- ◇ *Alexis Wehrli*, 2012–2013 master student, École Centrale de Lille

Invited Talks

- ◇ *Distributed sequential sampling for kernel matrix approximation*, Presented on June 28th, 2017, L?Institut de Mathématiques de Toulouse, France (IMT 2017)
- ◇ *Online sequential solutions for recommender systems*, Presented on June 14th, 2017 at Journées Scientifiques Inria 2017 in Nice, France (JS 2017)
- ◇ *Ou comment maximiser la détection des influenceurs sur les réseaux sociaux ?*, popularization talk, Presented on May 30th, 2017 at 13 France (Inria 13:45 2017)
- ◇ *Where is Justin Bieber?*, Presented on March 30th, 2017 at Dating day in Lille, France (Dating 2017)
- ◇ *Distributed sequential sampling for kernel matrix approximation*, Presented on March 22nd, 2017, for Universität Potsdam at Amazon (Berlin 2017)
- ◇ *Graphs in online machine learning*, Presented on December 21st, 2016 at Textkernel talk series in Amsterdam, Netherlands (TK 2016)
- ◇ *Where is Justin Bieber?*, Presented on September 22nd, 2016 at Comenius University in Bratislava, Slovakia (FMFI 2016)
- ◇ *Bandit learning*, Presented on September 15–19th, 2016 at Information technologies - Applications and Theory, at Tatranské Matliare, High Tatras, Slovakia (ITAT 2016)
- ◇ *Decision-making on graphs without graphs*, Presented on June 16-17th, 2016 at Graph-based Learning and Graph Mining workshop, at Inria Lille, France (GBLGM 2016)
- ◇ *Sequential learning on graphs with limited feedback*, Presented on May 11–13th, 2016 at Data Driven Approach to Networks and Language, at ENS Lyon, France (NETSpringLyon 2016)
- ◇ *Benefits of Graphs in Bandit Settings*, Presented on January 11–12th, 2016 at Multi-armed Bandit Workshop 2016 at STOR-i, Lancaster University, UK (STOR-i 2016)
- ◇ *Online decision-making on graphs: Smoothness and Side Observations*, Presented at DaSciM, LIX, École Polytechnique, France, April 14th, 2015 (X 2015)
- ◇ *Bandits on Graphs: Exploiting Smoothness and Side Observations*, Presented at CMLA, ENS Cachan, France, December 16th, 2014 (ENS 2014)
- ◇ *Optimistic Optimization*, Presented at MIST conference, Fačkovské sedlo, Slovakia, January 7th, 2014 (MIST 2014)
- ◇ *Sequential Face Recognition with Minimal Feedback*, Presented at 30 minutes of Science, Lille, May 2nd, 2013 (Inria 2013)
- ◇ *One Class Learning From Streams of Unlabeled Data*, Presented at Large-scale Online Learning and Decision Making Workshop, April 28th, 2012 (LSOLDM 2012)
- ◇ *Scaling Graph-Based Algorithms*, Presented at LAMPADA workshop, July 20th, 2012 (LAMPADA 2012)
- ◇ *Large Scale Sequential Learning*, opening speaker at Slovak Oxford Science, April 28th, 2012 (Oxford UK 2012)
- ◇ *Adaptive Graph-Based Algorithms*, Presented on July 6th, 2011 at Microsoft Research Redmond (MSR Redmont 2011)
- ◇ *Online Semi-Supervised Learning*, Presented in 2011 at MPI Tübingen, Germany (MPI Tuebingen 2011)
- ◇ *Semi-supervised Learning with Random Walks on Graphs*, Presented at 6th Comenius University Alumni conference (TAM 2009)

Demos, Presentations

- ◇ **Michal Valko**: *Graph-Based Anomaly Detection with Soft Harmonic Functions*, Presented at CS Department Research Competition (2011), also at CS Day (2011) and Grad Expo (2011) [1$^{\mathbf{st}}$ **place**]

- Branislav Kveton, **Michal Valko**, Matthai Philiposse: *Real-Time Adaptive Face Recognition*, Presented at 23rd Neural Information Processing Systems conference (NIPS 2009), Demonstration
- **Michal Valko**, Branislav Kveton, Matthai Philiposse: *Robust Face Recognition Using Online Learning*, Presented at 9th University of Pittsburgh Science conference (SCIENCE 2009) Live Demo (CS Day 2010) Poster (Grad Expo 2010) Talk
- **Michal Valko**: *Conditional anomaly detection with adaptive similarity metric*, Presented at CS Department Research Competition (2008) [$1^{\mathbf{st}}$ **place**]
- **Michal Valko**, Milos Hauskrecht, G. Cooper, S. Visweswaran, M. Saul, A. Seybert, J. Harrison, A. Post: *Conditional Anomaly Detection*, Presented at (CS Day 2008), Poster [$1^{\mathbf{st}}$ **place by people's choice,** $2^{\mathbf{nd}}$ **by faculty**] also at (Grad Expo 2008)

PRESS ARTICLES

- *Interview A. Lazaric about our work on ML for education*, at inria.fr (December 2016)
- *Interview with N. Vayatis and M. Valko Graphs in ML course at ENS/MVA* (July 2015)
- *Interview with Rue89 about machine learning at Inria* (June 2015)
- *Intel advertising face recognition* (February 2015) (February 2015)
- *Biometric applications will soon be part of our daily life* at ARTE Future (November 2014)
- *Face Recognition* at Sciences et Avenir (July 2014)
- *Ford and Intel Mobii project using Face Recognition*, at engadget.com (June 2014)
- *Ford prototype using Face Recognition* at intel.com (June 2014)
- *Intel collaborates with Inria on Face Recognition*, at inria.fr (March 2013)
- *Studying abroad* at Bussiness Magazine Profit/Trend (2010)

WORK EXPERIENCE

- **Intel Labs**, Intel, Santa Clara, CA (2010)
  Multi-manifold learning. Large scale semi-supervised learning.
- **Intel Research**, Intel, Santa Clara, CA (2009)
  Online semi-supervised learning. Max-margin structured prediction.
- **Research Assistant**, University of Pittsburgh (2007 – 2011)
  Conditional Anomaly Detection project: System for Anomaly Detection in Medicine
- **Research Assistant**, University of Pittsburgh (2006)
  Bioinformatics: Tools for preprocessing, analysis of high-throughput proteomic and genomic data and biomarker discovery.
- **Teaching Assistant**, University of Pittsburgh (Fall 2005)
  CS7 course: Introduction to Programming
- **Research Assistant**, Institute of Normal and Pathological Physiology (2003 – 2005)
  Slovak Academy of Sciences, Bratislava, Slovakia
- **Research Fellow**, Centro de Inteligência Artificial, (Spring 2005)
  Universidade Nova de Lisboa, Portugal
- **Organizer and Lecturer**, Math Seminars in Slovakia (1998 – 2005)
  Math Competitions, Math Summer Camps, Slovakia

SERVICE ACTIVITIES

- Organizing Committee: JFPDA (2013)
- Research project reviewer: FNRS (2014 – now)
- Senior Program Committee: IJCAI (2017)
- Program Committee: AISTATS (2016–2017), AAAI (2012, 2015), IJCAI (2015), RLDM (2015), EWRL (2012, 2015–2016), JFPDA (2014)

- ◇ Reviewer: TPAMI (2017), JMLR (2016), Automatica (2016–2017), NIPS (2012–2017), ICML (2012–2016), COLT (2014, 2017), UAI (2011–2012), IJCAI (2009), KDD (2011), AAAI (2009, 2014), ECML (2012), MEDINFO (2010)
- ◇ INTEL/Inria - Algorithmic Determination of IoT Edge Analytic - 2013 (project leader)
- ◇ European FP7 grant (CompLACS), ANR grant (ExtraLearn), NIH grants
- ◇ Erasmus agreement between EC Lille and CU Bratislava in Computer Science.
- ◇ Committee of experts for hiring junior faculty at CMLA, ENS Cachan (2017)
- ◇ National Inria acceptance committee for hiring junior researchers (2017)
- ◇ Elected member of Inria Evaluation Committee (CE Inria 2014 – 2015, 2015 – 2019)
- ◇ Hiring committee for junior researchers at Inria Nancy (2015)
- ◇ Hiring committee for junior researchers at Inria Sophia Antipolis (2016)
- ◇ Hiring committee for junior researchers at Inria Saclay (2017)
- ◇ Selection committee for Inria award for scientific excellence - juniors (2015 – 2017)
- ◇ Selection committee for Inria award for scientific excellence - confirmed (2016 – 2017)
- ◇ Inria work group for avoiding conflicts of interest (2015 – 2019)
- ◇ Promotion committee for junior researchers at Inria (2014, 2015)
- ◇ Member of Slovak Mathematicians and Physicists Scientific Society (2000 – present)
- ◇ Member of Slovak Chemical Society (1997 – 2002)

THESIS COMMITTEES

- ◇ *Clément Bouttier*, Université Toulouse 3 Paul Sabatier, June 2017, Optimisation globale sous incertitude: algorithmes stochastiques et bandits continus avec application aux performances avion. *Reviewer*

CONTESTS

- ◇ Best Graduate Research, Computer Science, University of Pittsburgh, 2011
- ◇ Best Graduate Research, Computer Science, University of Pittsburgh, 2008
- ◇ 1st place, Slovak Mathematical Olympiad, regional final 1993, 1994, 1996
- ◇ 9th place, Programming Contest Zenit (national final) 1998
- ◇ Correspondence seminars in Computer Science and Math 1992 – 2000 consistently ranked in top 10 nation–wide

SKILLS & HOBBIES

- ◇ Certificate in Academic Entrepreneurship
- ◇ English, French, Czech and Slovak (native language),
- ◇ Academic Senate Member, Comenius University, Bratislava, Slovakia (2003 – 2005)
- ◇ Volunteer, Tree of Life, environmental group (2003)
- ◇ Volunteer, Association la Clé (2014 – now)
- ◇ Volunteer, PASS Senior (2013 – now)
- ◇ Sports: hiking, squash, racquetball, running, volleyball, swimming
- ◇ Organizer of various correspondence math seminars (KMS, STROM, SKMS) (1998 – 2005)
- ◇ Volleyball Player, TU Slavia, Kosice (1998 – 2000)
- ◇ Choir Singer - Tenor 2a: Cœli et terra (chœur de chambre, 2012 – now) Madrigal de Lille (2011 – 2014), Chœur Régional Nord-Pas-de-Calais Madrigal de Lille (2011 – 2013) University of Pittsburgh Men's Glee Club (2009 – 2011), First Baptist Choir (2007 – 2009), St. Paul's Choir (2007), Dominik Choir (1990–1991). Taken private lessons with Noémi Capron (2013 – now), Maurice Bourbon (2012–2015), Richard Earl Teaster (2007 – 2011), and Claudia Pinza (2007)

Research Projects

- *Graph and Combinatorial Bandits* with Gergely Neu, Tomáš Kocák, Rémi Munos, Shipra Agrawal, Branislav Kveton (2013 - present)
  We are interested in efficient sequential algorithms for complex action spaces. For example, the set of actions can be graph (users in a social networks, movies in the recommender systems) or a large combinatorial space (set of all paths from A to B in a given graph). When appropriate, we seek to use similarity properties - close-by actions exhibit similar behavior. Moreover, we also make use of side observations (information from the connections in social networks).
- *Structured bandit problems* with Jean-Bastien Grill, Rémi Munos, Nathan Korda, Alexandra Carpentier (2011 - present)
  Leveraging structure properties in the bandits problems with large number of arms. For example, the rewards of arms may be smooth function of their contexts as given by some similarity function (kernel). In the more challenging case, the reward function may be only locally smooth around one of the best arms and this smoothness is unknown.
- *Composing Learning for Artificial Cognitive Systems* with Rémi Munos, Mohammad Ghavamzadeh, Alessandro Lazaric, and Daniil Ryabko (2011 - 2015)
  The purpose of this project is to develop a unified toolkit for intelligent control in many different problem areas. This toolkit will incorporate many of the most successful approaches to a variety of important control problems within a single framework, including bandit problems, Markov Decision Processes (MDPs), Partially Observable MDPs (POMDPs), continuous stochastic control, and multi-agent systems.
- *Semi-supervised apprenticeship learning* with Julien Audiffren, Mohammad Ghavamzadeh and Alessandro Lazaric, (2011 - now)
  In apprenticeship learning we aim to learn a good behavior by observing an expert or a set of experts. We assume a setting where the expert is maximizing an unknown true reward function, which is often a linear combination of known state features. We consider a situation when we observe many trajectories of behaviors but only one or a few of them are labeled as experts' trajectories. We investigate the assumptions under which the remaining unlabeled trajectories can aid in learning a policy with a good performance.
- *Large-scale semi-supervised learning* with Daniele Calandriello, Alessandro Lazaric, Branislav Kveton, Avneesh Saluja (2010 - present)
  We parallelized online harmonic solver to process 1 TB of video data in a day. I am working on the multi-manifold learning that can overcome changes in distribution. I am showing how the online learner adapts as to characters' aging over 10 years period in Married ... with Children sitcom. My research was part of Everyday Sensing and Perception (ESP) project.
- *Anomaly detection* with Milos Hauskrecht (2007 - 2011)
  Statistical anomaly detection methods for identification of unusual outcomes and patient management decisions. I combined max-margin learning with distance learned to create and anomaly detector, which outperforms the hospital rule for Heparin Induced Thrombocytopenia detection. I later scaled the system for 5K patients with 9K features and 743 clinical decisions per day. At the recent study, from 222 alerts 50% were highly relevant.
- *Online semi-supervised learning* with Branislav Kveton (2009)
  Extended graph-based semi-supervised learning to the structured case and demonstrated on handwriting recognition and object detection from video streams. Regularized harmonic function solution: The algorithm outputs a confidence of inference and uses it for learning. I came up with an online algorithm that on the real-world datasets recognizes faces at 80–90% precision with 90% recall.
- *Odd-Man-Out* with Wendy Chapman, Roger Day and Gregory Cooper (2007 - 2011)
  We hypothesized that clinical data in emergency department (ED) reports would increase sensitivity and specificity of case identification for patients with an acute lower respiratory syndrome (ALRS). We designed a statistic of disagreement (odd-man-out) to evalute the

machine learning classifier with expert evaluation in the cases when the gold standard is not available.

- ◇ *Mass Spec Bioinformatics* with Milos Hauskrecht (2005 - 2007)
  I built a framework for the cancer prediction from high-throughput proteomic and genomic data sources. I found a way to merge heterogeneous data sources: My fusion model was able to predict pancreatic cancer from Luminex combined with SELDI with 91.2% accuracy.
- ◇ *Evolutionary feature selection algorithms* with Nuno Marques (2005)
  I enhanced the existing FeaSANNT neural feature selection with spiking neuron model to handle inputs noised with up to 10% Gaussian noise.
- ◇ *Plastic Synapses* with Juraj Pavlasek (2003 - 2005)
  I was modelling basic learning function at the level of synapses. I designed a model that is able to adapt to the regular frequencies with different a rate as the time flows. I used genetic programming to find biologically plausible networks that distinguish different gamma distribution and provided explanation of the strategies evolved.