

Zoltán Szabó

Research Associate Professor

(Last updated: 2nd August, 2018)

CONTACT INFORMATION

Center for Applied Mathematics (CMAP) *Web:* <http://www.cmap.polytechnique.fr/~zoltan.szabo/>
École Polytechnique *E-mail:* a@b [a = zoltan.szabo, b = polytechnique.edu]
Route de Saclay, 91128 Palaiseau, France

RESEARCH INTEREST

- Theory: kernel methods, information theory¹, statistical machine learning.
- Applications:
 - distribution regression, hypothesis testing, structured sparsity, independent subspace analysis,
 - criminal data analysis, remote sensing, collaborative filtering, face emotion recognition and face tracking, natural language processing.

PROFESSIONAL ACTIVITIES

Area Chairing, Senior Program Committee Member

International Conference on Artificial Intelligence and Statistics (AISTATS)	2019
Advances in Neural Information Processing Systems (NIPS)	2018
International Conference on Machine Learning (ICML)	2018
International Conference on Artificial Intelligence and Statistics (AISTATS)	2018
Conference on Uncertainty in Artificial Intelligence (UAI)	2017
International Conference on Machine Learning (ICML)	2017
International Conference on Artificial Intelligence and Statistics (AISTATS)	2017
Conference on Uncertainty in Artificial Intelligence (UAI)	2016

Reviewing Grant Applications

European Research Council (ERC)	2018–
Swiss National Science Foundation (SNF)	2017–

Program Chairing

Data Science Summer School ²	2018
– co-organizers: Emmanuel Bacry, Nozha Boujemaa, Maud Cadiz-Pena, Viviane Hoang, Aldjia Mazari, Charlotte Renaud, Erwan Scornet	
Data Science Summer School	2017
– co-organizers: Emmanuel Bacry, Aldjia Mazari, Éric Moulines, Erwan Scornet	

Reviewing for Journals

Journal of Multivariate Analysis	2017–
Annals of Statistics	2016–
Machine Learning Journal	2016–
Statistics and Computing	2015–
IEEE Signal Processing Letters	2015–
Statistical Analysis and Data Mining	2014–
IET Computer Vision	2014–
International Journal of Computer Vision	2014–
IEEE Transactions on Information Theory	2013–
Journal of Machine Learning Research	2013–

¹ITE toolbox: <https://bitbucket.org/szzoli/ite-in-python/>.

²DS³ website: <http://www.ds3-datascience-polytechnique.fr/>.

IEEE Transactions on Pattern Analysis and Machine Intelligence	2013–
Progress in Artificial Intelligence	2013–
Entropy	2012–
IEEE Transactions on Neural Networks and Learning Systems	2012–
Signal, Image and Video Processing	2012–
IEEE Transactions on Signal Processing	2009–
Neurocomputing	2009–
IEEE Transactions on Neural Networks	2007–2011
Reviewing Books	
Cambridge University Press	2018–
Reviewing for Conferences	
Conference on Learning Theory (COLT)	2018
International Conference on Learning Representations (ICLR-2018)	2017
Conference on Learning Theory (COLT)	2017
Advances in Neural Information Processing Systems (NIPS)	2017
Advances in Neural Information Processing Systems (NIPS)	2016
International Conference on Machine Learning (ICML)	2016
Advances in Neural Information Processing Systems (NIPS)	2015
Advances in Neural Information Processing Systems (NIPS)	2014
International Conference on Machine Learning (ICML)	2012
International Conference on Latent Variable Analysis and Signal Separation (LVA/ICA)	2012
International Joint Conference on Artificial Intelligence (IJCAI)	2011
International Joint Conference on Neural Networks (IJCNN)	2011
European Conference on Complex Systems (ECCS)	2011
European Signal Processing Conference (EUSIPCO)	2011
European Conference on Complex Systems (ECCS)	2009
Reviewing for Workshops	
NIPS: ‘Challenges in Machine Learning: Gaming and Education’	2016
stat.ML Moderator on arXiv	Aug.–, 2018
Organizing	
Conference (Workflow Chair)	
International Conference on Artificial Intelligence and Statistics (AISTATS)	2016
– co-workflow chair: Rodolphe Jenatton	
Workshop	
NIPS: ‘Learning on Distributions, Functions, Graphs and Groups’	2017
– co-organizers: Florence d’Alché-Buc, Krikamol Muandet, Bharath K. Sriperumbudur	
NIPS: ‘Adaptive and Scalable Nonparametric Methods in Machine Learning’	2016
– co-organizers: Aaditya Ramdas, Bharath K. Sriperumbudur, Han Liu, John Lafferty, Mladen Kolar, Samory Kpotufe	
NIPS: ‘Modern Nonparametrics 3: Automating the Learning Pipeline’	2014
– co-organizers: Arthur Gretton, Mladen Kolar, Samory Kpotufe, Han Liu, Andrew G. Wilson, Le Song, Eric Xing	
Machine Learning External Seminars @ CMAP, École Polytechnique	2017–
Machine Learning External Seminars @ Gatsby Unit, University College London	2014–2016
Machine Learning Journal Club	2017–
– co-organizers: Elodie Vernet, Erwan Scornet, Alain Virouleau	
Session Chairing	

International Conference on Machine Learning (ICML) 2018
Paris Summit on Big Data (ParisBD) 2017

Reviewing Scientific Competitions

Hungarian National Scientific Student Competition and Conference 2005, 2013
Scientific Student Competition and Conference 2012

PUBLICATIONS

Journal Articles & Conference Papers

- [1] Zoltán Szabó and Bharath K. Sriperumbudur. Independence via cross-covariance operators. In *Polish-Italian Mathematical Conference: Challenges and Methods of Modern Statistics*, Wrocław, Poland, 17-20 September 2018.
- [2] Zoltán Szabó and Bharath K. Sriperumbudur. Characteristic and universal tensor product kernels. *Journal of Machine Learning Research*, 18(233):1–29, 2018.
- [3] Zoltán Szabó and Bharath K. Sriperumbudur. Characteristic tensor product kernels. In *Conference of the International Society for Non-Parametric Statistics (ISNPS)*, Salerno, Italy, 11-15 June 2018.
- [4] Bharath K. Sriperumbudur and Zoltán Szabó. Kernel dependency measures. In *Conference of the International Society for Non-Parametric Statistics (ISNPS)*, Salerno, Italy, 11-15 June 2018.
- [5] Zoltán Szabó and Bharath K. Sriperumbudur. Tensor product kernels: Characteristic property, universality. In *Hangzhou International Conference on Frontiers of Data Science*, Hangzhou, China, 18-20 May 2018.
- [6] Wittawat Jitkrittum, Wenkai Xu, Zoltán Szabó, Kenji Fukumizu, and Arthur Gretton. A linear-time kernel goodness-of-fit test. In I. Guyon, U. V. Luxburg, S. Bengio, H. Wallach, R. Fergus, S. Vishwanathan, and R. Garnett, editors, *Advances in Neural Information Processing Systems (NIPS)*, pages 261–270, Long Beach, CA, U.S., 4-9 December 2017. Curran Associates, Inc. (Best Paper Award = in top 3 out of 3240 submissions).
- [7] Wittawat Jitkrittum, Zoltán Szabó, and Arthur Gretton. An adaptive test of independence with analytic kernel embeddings. In Doina Precup and Yee Whye Teh, editors, *International Conference on Machine Learning (ICML)*, volume 70, pages 1742–1751, Sydney, Australia, 6-11 August 2017. PMLR. (25.46% acceptance rate).
- [8] Zoltán Szabó, Bharath K. Sriperumbudur, Barnabás Póczos, and Arthur Gretton. Learning theory for distribution regression. *Journal of Machine Learning Research*, 17(152):1–40, 2016.
- [9] Wittawat Jitkrittum, Zoltán Szabó, Kacper Chwialkowski, and Arthur Gretton. Interpretable distribution features with maximum testing power. In D. D. Lee, M. Sugiyama, U. V. Luxburg, I. Guyon, and R. Garnett, editors, *Advances in Neural Information Processing Systems (NIPS)*, pages 181–189, Barcelona, Spain, 5-10 December 2016. Curran Associates, Inc. (full oral presentation = top 1.84%).
- [10] Zoltán Szabó, Bharath K. Sriperumbudur, Barnabás Póczos, and Arthur Gretton. Minimax-optimal distribution regression. In *Conference of the International Society for Non-Parametric Statistics (ISNPS)*, Avignon, France, 11-16 June 2016.
- [11] Bharath K. Sriperumbudur and Zoltán Szabó. Optimal rates for random Fourier features. In C. Cortes, N. D. Lawrence, D. D. Lee, M. Sugiyama, and R. Garnett, editors, *Advances in Neural Information Processing Systems (NIPS)*, pages 1144–1152, Montréal, Canada, 7-12 December 2015. Curran Associates, Inc. (contributed equally; spotlight presentation – 3.65% acceptance rate).

- [12] Heiko Strathmann, Dino Sejdinovic, Samuel Livingstone, Zoltán Szabó, and Arthur Gretton. Gradient-free Hamiltonian Monte Carlo with efficient kernel exponential families. In C. Cortes, N. D. Lawrence, D. D. Lee, M. Sugiyama, and R. Garnett, editors, *Advances in Neural Information Processing Systems (NIPS)*, pages 955–963, Montréal, Canada, 7-12 December 2015. Curran Associates, Inc. (poster presentation – 17.46% acceptance rate).
- [13] Mijung Park, Wittawat Jitkrittum, Ahmad Qamar, Zoltán Szabó, Lars Buesing, and Maneesh Sahani. Bayesian manifold learning: The locally linear latent variable model. In C. Cortes, N. D. Lawrence, D. D. Lee, M. Sugiyama, and R. Garnett, editors, *Advances in Neural Information Processing Systems (NIPS)*, pages 154–162, Montréal, Canada, 7-12 December 2015. Curran Associates, Inc. (poster presentation – 17.46% acceptance rate).
- [14] Wittawat Jitkrittum, Arthur Gretton, Nicolas Heess, Ali Eslami, Balaji Lakshminarayanan, Dino Sejdinovic, and Zoltán Szabó. Kernel-based just-in-time learning for passing expectation propagation messages. In *Conference on Uncertainty in Artificial Intelligence (UAI)*, pages 405–414, Amsterdam, Netherlands, 12-16 July 2015.
- [15] Zoltán Szabó, Arthur Gretton, Barnabás Póczos, and Bharath K. Sriperumbudur. Two-stage sampled learning theory on distributions. In *International Conference on Artificial Intelligence and Statistics (AISTATS)*, pages 948–957, San Diego, California, USA, 9-12 May 2015. (oral presentation – 6.11% acceptance rate).
- [16] Balázs Pintér, Gyula Vörös, Zoltán Szabó, and András Lőrincz. Wikifying novel words to mixtures of Wikipedia senses by structured sparse coding. In Ana Fred and Maria De Marsico, editors, *Pattern Recognition Applications and Methods*, volume 318 of *Advances in Intelligent and Soft Computing*, pages 241–255. Springer, 2015.
- [17] Zoltán Szabó. Information theoretical estimators toolbox. *Journal of Machine Learning Research*, 15:283–287, 2014.
- [18] László Jeni, András Lőrincz, Zoltán Szabó, Jeffrey F. Cohn, and Takeo Kanade. Spatio-temporal event classification using time-series kernel based structured sparsity. In David Fleet, Tomas Pajdla, Bernt Schiele, and Tinne Tuytelaars, editors, *European Conference on Computer Vision (ECCV)*, volume 8692 of *Lecture Notes in Computer Science*, pages 135–150, Zürich, Switzerland, 6-12 September 2014. Springer International Publishing Switzerland.
- [19] Balázs Pintér, Gyula Vörös, Zoltán Szabó, and András Lőrincz. Explaining unintelligible words by means of their context. In *International Conference on Pattern Recognition Applications and Methods (ICPRAM)*, pages 382–387, Barcelona, Spain, 15-18 February 2013.
- [20] Balázs Pintér, Gyula Vörös, Zsolt Palotai, Zoltán Szabó, and András Lőrincz. Determining unintelligible words from their textual contexts. *Procedia - Social and Behavioral Sciences*, 73:101–108, 2013. (Proceedings of the 2nd International Conference on Integrated Information (IC-ININFO 2012), Budapest, Hungary, 30 August – 3 September).
- [21] Zoltán Szabó and András Lőrincz. Distributed high dimensional information theoretical image registration via random projections. *Digital Signal Processing*, 22(6):894–902, 2012.
- [22] Balázs Pintér, Gyula Vörös, Zoltán Szabó, and András Lőrincz. Automated word puzzle generation using topic models and semantic relatedness measures. *Annales Universitatis Scientiarum Budapestinensis de Rolando Eötvös Nominatae, Sectio Computatorica*, 36:299–322, 2012.
- [23] László A. Jeni, András Lőrincz, Tamás Nagy, Zsolt Palotai, Judit Sebők, Zoltán Szabó, and Dániel Takács. 3D shape estimation in video sequences provides high precision evaluation of facial expressions. *Image and Vision Computing*, 30(10):785–795, 2012.

- [24] Balázs Pintér, Gyula Vörös, Zoltán Szabó, and András Lőrincz. Automated word puzzle generation using topic models and semantic relatedness measures. In Zoltán Csörnyei, editor, *Joint Conference on Mathematics and Computer Science (MaCS)*, Siófok, Hungary, 9-12 February 2012.
- [25] Zoltán Szabó, Barnabás Póczos, and András Lőrincz. Collaborative filtering via group-structured dictionary learning. In Fabian Theis, Andrzej Cichocki, Arie Yeredor, and Michael Zibulevsky, editors, *International Conference on Latent Variable Analysis and Signal Separation (LVA/ICA)*, volume 7191 of *Lecture Notes in Computer Science*, pages 247–254, Tel-Aviv, Israel, 12-15 March 2012. Springer-Verlag, Berlin Heidelberg.
- [26] Zoltán Szabó, Barnabás Póczos, and András Lőrincz. Separation theorem for independent subspace analysis and its consequences. *Pattern Recognition*, 45(4):1782–1791, 2012.
- [27] Barnabás Póczos, Zoltán Szabó, and Jeff Schneider. Nonparametric divergence estimators for independent subspace analysis. In *European Signal Processing Conference (EUSIPCO) – Special Session on Dependent Component Analysis*, pages 1849–1853, Barcelona, Spain, 29 August – 2 September 2011. (ISSN: 2076-1465).
- [28] Zoltán Szabó and Barnabás Póczos. Nonparametric independent process analysis. In *European Signal Processing Conference (EUSIPCO)*, pages 1718–1722, Barcelona, Spain, 29 August – 2 September 2011. (ISSN: 2076-1465).
- [29] Zoltán Szabó, Barnabás Póczos, and András Lőrincz. Online group-structured dictionary learning. In *IEEE Computer Vision and Pattern Recognition (CVPR)*, pages 2865–2872, Colorado Springs, CO, USA, 20-25 June 2011.
- [30] Zoltán Szabó. Autoregressive independent process analysis with missing observations. In Michel Verleysen, editor, *European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning (ESANN)*, pages 159–164. d-side, 28-30 April 2010. (ISBN 2-930307-10-2).
- [31] Zoltán Szabó, Barnabás Póczos, and András Lőrincz. Auto-regressive independent process analysis without combinatorial efforts. *Pattern Analysis and Applications*, 13(1):1–13, February 2010.
- [32] Zoltán Szabó and András Lőrincz. Complex independent process analysis. *Acta Cybernetica*, 19:177–190, 2009.
- [33] Zoltán Szabó and András Lőrincz. Controlled complete ARMA independent process analysis. In *International Joint Conference on Neural Networks (IJCNN)*, pages 3038–3045, 14-19 June 2009. (IEEE Catalog Number: CFP09IJS-CDR; ISBN: 978-1-4244-3553-1; ISSN: 1098-7576).
- [34] Zoltán Szabó and András Lőrincz. Fast parallel estimation of high dimensional information theoretical quantities with low dimensional random projection ensembles. In Tülay Adali, Christian Jutten, João Marcos T. Romano, and Allan Kardec Barros, editors, *International Conference on Independent Component Analysis and Signal Separation (ICA)*, volume 5441 of *Lecture Notes in Computer Science*, pages 146–153, Berlin Heidelberg, 15-18 March 2009. Springer-Verlag.
- [35] Zoltán Szabó. Complete blind subspace deconvolution. In Tülay Adali, Christian Jutten, João Marcos T. Romano, and Allan Kardec Barros, editors, *International Conference on Independent Component Analysis and Signal Separation (ICA)*, volume 5441 of *Lecture Notes in Computer Science*, pages 138–145, Berlin Heidelberg, 15-18 March 2009. Springer-Verlag.
- [36] Zoltán Szabó and András Lőrincz. Post nonlinear hidden infomax identification. In *Joint Conference of Hungarian PhD students*, pages 52–58, 2008.
- [37] Zoltán Szabó, Barnabás Póczos, and András Lőrincz. Undercomplete blind subspace deconvolution via linear prediction. In Joost N. Kok, Jacek Koronacki, Ramon Lopez de Mantaras, Stan Matwin, Dunja Mladenič, and Andrzej Skowron, editors, *European Conference on Machine Learning (ECML)*,

volume 4701 of *Lecture Notes in Artificial Intelligence*, pages 740–747, Berlin Heidelberg, 17-21 September 2007. Springer-Verlag.

- [38] Zoltán Szabó, Barnabás Póczos, Gábor Szirtes, and András Lőrincz. Post nonlinear independent subspace analysis. In Joaquim Marques de Sá, Luís A. Alexandre, Wlodzislaw Duch, and Danilo P. Mandic, editors, *International Conference on Artificial Neural Networks (ICANN)*, volume 4668 of *Lecture Notes in Computer Science - Part I*, pages 677–686, Berlin Heidelberg, 9-13 September 2007. Springer-Verlag.
- [39] Barnabás Póczos, Zoltán Szabó, Melinda Kiszlinger, and András Lőrincz. Independent process analysis without a priori dimensional information. In Mike E. Davies, Christopher J. James, Samer A. Abdallah, and Mark D. Plumbley, editors, *International Conference on Independent Component Analysis and Signal Separation (ICA)*, volume 4666 of *Lecture Notes in Computer Science*, pages 252–259, Berlin Heidelberg, 9-12 September 2007. Springer-Verlag.
- [40] Zoltán Szabó, Barnabás Póczos, and András Lőrincz. Undercomplete blind subspace deconvolution. *Journal of Machine Learning Research*, 8:1063–1095, 2007.
- [41] András Lőrincz and Zoltán Szabó. Neurally plausible, non-combinatorial iterative independent process analysis. *Neurocomputing - Letters*, 70(7-9):1569–1573, 2007.
- [42] Zoltán Szabó and András Lőrincz. Independent subspace analysis can cope with the „curse of dimensionality”. *Acta Cybernetica (+Symposium of Intelligent Systems 2006)*, 18:213–221, 2007.
- [43] Zoltán Szabó and András Lőrincz. Multilayer kercep tron. *Journal of Applied Mathematics*, 24:209–222, 2007.
- [44] Zoltán Szabó, Barnabás Póczos, and András Lőrincz. Cross-entropy optimization for independent process analysis. In Justinian Rosca, Deniz Erdogmus, José C. Príncipe, and Simon Haykin, editors, *International Conference on Independent Component Analysis and Blind Source Separation (ICA)*, volume 3889 of *Lecture Notes in Computer Science*, pages 909–916. Springer, 5-8 March 2006.
- [45] Zoltán Szabó and András Lőrincz. ϵ -sparse representations: Generalized sparse approximation and the equivalent family of SVM tasks. *Acta Cybernetica*, 17(3):605–614, 2006.
- [46] György Hévízi, Mihály Biczó, Barnabás Póczos, Zoltán Szabó, Bálint Takács, and András Lőrincz. Hidden markov model finds behavioral patterns of users working with a headmouse driven writing tool. In *International Joint Conference on Neural Networks (IJCNN)*, 26-29 July 2004. (IJCNN2004 CD-ROM Conference Proceedings, Paper No. 1268. IEEE Catalog Number: 04CH37541C, ISBN: 0-7803-8360-5).

Workshop Papers

- [1] Matthieu Lerasle, Zoltán Szabó, Éric Moulines, Guillaume Lécué, Sidonie Lefebvre, and Gaspar Massiot. MOM-based robust nonlinear anomaly detection for multispectral and hyperspectral data. In *50émes Journées de Statistique (JdS)*, Palaiseau, France, 28 May – 1 June 2018.
- [2] Zoltán Szabó and Bharath K. Sriperumbudur. HSIC, a measure of statistical independence? In *Data Learning and Inference (DALI)*, Lanzarote, Canary Islands, Spain, 3-5 April 2018.
- [3] Wittawat Jitkrittum, Wenkai Xu, Zoltán Szabó, Kenji Fukumizu, and Arthur Gretton. A linear-time kernel goodness-of-fit test. In *Workshop on Functional Inference and Machine Intelligence*, Tokyo, Japan, 19-21 February 2018.
- [4] Wittawat Jitkrittum, Zoltán Szabó, Kenji Fukumizu, and Arthur Gretton. A fast goodness-of-fit test with analytic kernel embeddings. In *Greek Stochastics Workshop – Model Determination*, Milos, Greece, 14-17 July 2017.

- [5] Zoltán Szabó and Éric Moulines. Locally-adaptive kernel tests. In *Data Learning and Inference (DALI)*, Tenerife, Spain, 17-20 April 2017.
- [6] Wittawat Jitkrittum, Zoltán Szabó, and Arthur Gretton. The finite-set independence criterion. In *UCL Workshop on the Theory of Big Data*, London, UK, 28 June 2017.
- [7] Wittawat Jitkrittum, Zoltán Szabó, and Arthur Gretton. An adaptive test of independence with analytic kernel embeddings. In *Probabilistic Graphical Model Workshop*, Tokyo, Japan, 24 February 2017.
- [8] Heiko Strathmann, Dino Sejdinovic, Samuel Livingstone, Ingmar Schuster, Maria Lomeli Garcia, Zoltán Szabó, Christophe Andrieu, and Arthur Gretton. Kernel techniques for adaptive Monte Carlo methods. In *Greek Stochastics Workshop on Big Data and Big Models*, Tinos, Greece, 10-13 July 2016.
- [9] Wittawat Jitkrittum, Zoltán Szabó, Kacper Chwialkowski, and Arthur Gretton. Distinguishing distributions with interpretable features. In *International Conference on Machine Learning (ICML): Data-Efficient Machine Learning workshop*, New York, 24 June 2016.
- [10] Bharath K. Sriperumbudur and Zoltán Szabó. Optimal uniform and L^p rates for random Fourier features. In *Theory of Big Data Workshop*, London, UK, 6-8 January 2016. (contributed equally).
- [11] Wittawat Jitkrittum, Arthur Gretton, Nicolas Heess, Ali Eslami, Balaji Lakshminarayanan, Dino Sejdinovic, and Zoltán Szabó. Just-in-time kernel regression for expectation propagation. In *International Conference on Machine Learning (ICML) – Large-Scale Kernel Learning: Challenges and New Opportunities workshop*, Lille, France, 10-11 July 2015.
- [12] Zoltán Szabó, Bharath K. Sriperumbudur, Barnabás Póczos, and Arthur Gretton. Distribution regression - make it simple and consistent. In *Data, Learning and Inference workshop (DALI)*, La Palma, Canaries, Spain, 10-12 April 2015.
- [13] Wittawat Jitkrittum, Arthur Gretton, Nicolas Heess, Ali Eslami, Balaji Lakshminarayanan, Dino Sejdinovic, and Zoltán Szabó. Kernel-based just-in-time learning for passing expectation propagation messages. In *Data, Learning and Inference workshop (DALI)*, La Palma, Canaries, Spain, 10-12 April 2015.
- [14] Zoltán Szabó, Arthur Gretton, Barnabás Póczos, and Bharath K. Sriperumbudur. Consistent vector-valued distribution regression. In *UCL Workshop on the Theory of Big Data*, London, UK, 7-9 January 2015.
- [15] Zoltán Szabó, Arthur Gretton, Barnabás Póczos, and Bharath K. Sriperumbudur. Simple consistent distribution regression on compact metric domains. In *UCL-Duke Workshop on Sensing and Analysis of High-Dimensional Data (SAHD)*, London, UK, 4-5 September 2014.
- [16] Zoltán Szabó, Arthur Gretton, Barnabás Póczos, and Bharath K. Sriperumbudur. Learning on distributions. In *Kernel methods for big data workshop*, Lille, France, 2 April 2014.
- [17] Zoltán Szabó. Information theoretical estimators toolbox. In *Advances in Neural Information Processing Systems (NIPS) – Workshop on Machine Learning Open Source Software 2013: Towards Open Workflows*, Harrahs and Harveys, Lake Tahoe, Nevada, United States, 10 December 2013.
- [18] András Lőrincz, László A. Jeni, Zoltán Szabó, Jeffrey Cohn, and Takeo Kanade. Emotional expression classification using time-series kernels. In *IEEE Conference on Computer Vision and Pattern Recognition Workshops (CVPRW): IEEE International Workshop on Analysis and Modeling of Faces and Gestures (AMFG)*, pages 889–895, Portland, Oregon, USA, 23-28 June 2013.
- [19] Balázs Pintér, Gyula Vörös, Zoltán Szabó, and András Lőrincz. Automated word puzzle generation via topic dictionaries. In *International Conference on Machine Learning (ICML) – Sparsity*,

Dictionaries and Projections in Machine Learning and Signal Processing workshop, Edinburgh, Scotland, 30 June 2012.

- [20] Zoltán Szabó, Barnabás Póczos, and András Lőrincz. Online dictionary learning with group structure inducing norms. In *International Conference on Machine Learning (ICML) – Structured Sparsity: Learning and Inference workshop*, Bellevue, Washington, USA, 2 July 2011.
- [21] Zoltán Szabó and András Lőrincz. Towards independent subspace analysis in controlled dynamical systems. In *ICA Research Network International Workshop (ICARN)*, pages 9–12, 25–26 September 2008.
- [22] Zoltán Szabó and András Lőrincz. Real and complex independent subspace analysis by generalized variance. In *ICA Research Network International Workshop (ICARN)*, pages 85–88, 18–19 September 2006.

Symposium Papers

- [1] Bharath K. Sriperumbudur and Zoltán Szabó. Optimal uniform and L^p rates for random Fourier features. Quinquennial Review Symposium, 23 September 2015. (contributed equally).
- [2] Mijung Park, Wittawat Jitkrittum, Ahmad Qamar, Zoltán Szabó, Lars Buesing, and Maneesh Sahani. Bayesian manifold learning: Locally linear latent variable model (LL-LVM). Quinquennial Review Symposium, 23 September 2015.
- [3] Zoltán Szabó. Independent subspace analysis in case of missing observations. In *Symposium of Intelligent Systems*, 20 November 2009.

Technical Reports

- [1] Romain Brault, Alex Lambert, Zoltán Szabó, Maxime Sangnier, and Florence d’Alché Buc. Infinite-task learning with vector-valued RKHSs. Technical report, 2018. (<https://arxiv.org/abs/1805.08809>).
- [2] Matthieu Lerasle, Zoltán Szabó, Guillaume Lecué, Gaspar Massiot, and Éric Moulines. MONK – outlier-robust mean embedding estimation by median-of-means. Technical report, 2018. (<http://arxiv.org/abs/1802.04784>).
- [3] András Lőrincz, Viktor Gyenes, Zsolt Palotai, Balázs Pintér, Zoltán Szabó, and Gyula Vörös. Innovation engine for blogspaces (EOARD - US Air Force Research Laboratories). Technical report, Eötvös Loránd University, Budapest, 2011. (<http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA550367>).
- [4] Zoltán Szabó. Towards nonstationary, nonparametric independent process analysis with unknown source component dimensions. Technical report, Eötvös Loránd University, Budapest, 2010. (<http://arxiv.org/abs/1008.1393>).
- [5] Zoltán Szabó, Barnabás Póczos, and András Lőrincz. Separation theorem for \mathbb{K} -independent subspace analysis with sufficient conditions. Technical report, Eötvös Loránd University, Budapest, 2006. (<http://arxiv.org/abs/math.ST/0608100>).
- [6] Zoltán Szabó, Barnabás Póczos, and András Lőrincz. Separation theorem for independent subspace analysis with sufficient conditions. Technical report, Eötvös Loránd University, Budapest, 2006. (<http://arxiv.org/abs/math.ST/0603535>).
- [7] Zoltán Szabó, Barnabás Póczos, and András Lőrincz. Separation theorem for independent subspace analysis. Technical report, Eötvös Loránd University, Budapest, 2005. (http://www.gatsby.ucl.ac.uk/~szabo/publications/szabo05separation_TR.pdf).

- [8] Zoltán Szabó and András Lőrincz. L_1 regularization is better than L_2 for learning and predicting chaotic systems. Technical report, Eötvös Loránd University, Budapest, 2004. (<http://arxiv.org/abs/cs/0410015>).

Theses

- [1] Zoltán Szabó. *Group-Structured and Independent Subspace Based Dictionary Learning*. PhD thesis, Eötvös Loránd University, Budapest, 2012.
- [2] Zoltán Szabó. *Separation Principles in Independent Process Analysis*. PhD thesis, Eötvös Loránd University, Budapest, 2009.
- [3] Zoltán Szabó. Retina based sampling in face component recognition. Master's thesis, Eötvös Loránd University, Budapest, 2003.

INVITED TALKS & POSTERS

- [1] HSIC, a measure of independence? Laboratory for Information and Inference Systems (LIONS), EPFL, presentation (40 minutes), 28 February 2018.
- [2] HSIC, an independence measure? Machine Learning & Computational Biology Lab, Department of Biosystems Science and Engineering (D-BSSE), ETH Zürich, presentation (1 hour), 26 February 2018.
- [3] Linear-time divergence measures with applications in hypothesis testing. Tao Seminar, INRIA Saclay, presentation (45 minutes), 13 February 2018.
- [4] Characterizing independence with tensor product kernels. Department of Statistics, Pennsylvania State University, presentation (1 hour), 13 December 2017.
- [5] Tensor product kernels: Independence and beyond. Google Brain, Mountain View, presentation (1 hour), 1 December 2017.
- [6] Tensor product kernels: Characteristic property and beyond. Advanced Methods Group, Cubist Systematic Strategies, New York, presentation (90 minutes), 28 November 2017.
- [7] Independence with tensor product kernels. Yahoo Research, New York, presentation (1 hour), 28 November 2017.
- [8] Tensor product kernels: Characteristic property and universality. Research Seminar, Sfs, ETH Zürich, presentation (45 minutes), 3 November 2017.
- [9] Characteristic tensor kernels. CREST Statistics Seminar, ENSAE, presentation (75 minutes), 9 October 2017.
- [10] Data-efficient independence testing with analytic kernel embeddings. PASADENA Seminar, Télécom ParisTech, presentation (1 hour), 17 May 2017.
- [11] Distribution regression: A simple technique with minimax-optimal guarantee. Parisian Statistics Seminar, Henri Poincaré Institute, presentation (1 hour), 27 March 2017.
- [12] A linear-time adaptive nonparametric two-sample test. Signal Processing and Machine Learning Seminar, Marseilles, presentation (1 hour), 24 March 2017.
- [13] Minimax-optimal distribution regression. Probability and Statistics Seminar, Orsay, presentation (1 hour), 16 March 2017.
- [14] T-testing: A linear-time adaptive nonparametric technique. Machine Learning Seminar, Télécom ParisTech, presentation (1 hour), 2 February 2017.

- [15] Distribution regression. New Directions for Learning with Kernels and Gaussian Processes Dagstuhl Seminar, presentation (30 minutes), 1 December 2016.
- [16] Adaptive linear-time nonparametric t-test. Facebook AI Research, Paris, France, presentation (45 minutes), 21 November 2016.
- [17] Distinguishing distributions with maximum testing power. Realeyes, Budapest, Hungary, presentation (1 hour), 24 August 2016.
- [18] Optimal regression on sets. eResearch Domain launch event, London, UK, poster, 29 June 2016.
- [19] Hypothesis testing with kernels. International Workshop on Pattern Recognition in Neuroimaging (PRNI), Trento, Italy, presentation (1 hour), 22-24 June 2016.
- [20] Kernel-based learning on probability distributions. University of California, San Diego, presentation (30 minutes), 25 April 2016.
- [21] Distribution regression with minimax-optimal guarantee. MASCOT-NUM, presentation (45 minutes), 25 March 2016.
- [22] Performance guarantees for kernel-based learning on probability distributions. Special Symposium on Intelligent Systems, MPI, Tübingen, presentation (20 minutes), 16 March 2016.
- [23] Optimal rates for the random Fourier feature technique. École Polytechnique, presentation (2 hours), 14 March 2016.
- [24] Learning theory for vector-valued distribution regression. CMStatistics 2015, presentation (35 minutes), 12 December 2015.
- [25] Optimal uniform and L^p rates for random Fourier features. Pennsylvania State University, presentation (1 hour), 4 December 2015.
- [26] Optimal rates for the random Fourier feature method. Statistical ML Reading Group, Carnegie Mellon University, presentation (1 hour), 1 December 2015.
- [27] Distribution regression: Computational and statistical tradeoffs. ML Lunch Seminar, Carnegie Mellon University, presentation (50 minutes), 30 November 2015.
- [28] Distribution regression: Computational and statistical tradeoffs. Princeton University, presentation (1 hour), 26 November 2015.
- [29] Optimal rates for random Fourier feature approximations. University of Alberta, presentation (1 hour), 24 November 2015.
- [30] Optimal rates for random Fourier feature kernel approximations. AMPLab, UC Berkeley, presentation (1 hour), 20 November 2015.
- [31] Performance guarantees for random Fourier features - limitations and merits. Neil Lawrence's lab, University of Sheffield, presentation (1 hour), 25 June 2015.
- [32] Regression on probability measures: A simple and consistent algorithm. Centre for Research in Statistical Methodology Seminars, Department of Statistics, University of Warwick, presentation (1 hour), 29 May 2015.
- [33] Vector-valued distribution regression - keep it simple and consistent. Computational Statistics and Machine Learning reading group, Department of Statistics, University of Oxford, presentation (50 minutes), 1 May 2015.

- [34] A simple and consistent technique for vector-valued distribution regression. Artificial Intelligence and Natural Computation seminars, University of Birmingham, presentation (50 minutes), 26 January 2015.
- [35] Consistent vector-valued regression on probability measures. Bernhard Schölkopf's Lab, MPI for Intelligent Systems, Tübingen, presentation (1 hour), 15 January 2015.
- [36] Vector-valued distribution regression: A simple and consistent approach. Statistical Science Seminars, UCL, presentation (1 hour), 9 October 2014.
- [37] Distribution regression - the set kernel heuristic is consistent. CSML Lunch Talk Series, UCL, presentation (1 hour), 2 May 2014.
- [38] Consistent distribution regression via mean embedding. University of Hertfordshire, presentation (1 hour), 5 March 2014.
- [39] Dictionary learning: Independence, structured sparsity and beyond. Gatsby Unit, UCL, presentation (45 minutes), 23 April 2013.
- [40] Dictionary optimization problems and their applications. Eötvös Loránd University, Day of Science, presentation (40 minutes), 22 November 2012.
- [41] Recommender systems, applications in education. Child's Play with Adult's Mind, Conference, Budapest University of Technology and Economics, presentation (20 minutes), 22 March 2012.
- [42] Collaborative filtering via group-structured dictionary learning. Eötvös Loránd University, Innovation Day, poster, 23 February 2012.
- [43] Beyond independent subspace analysis. INRIA, SIERRA project-team, presentation (90 minutes), 17 January 2012.
- [44] Hedging with Lasso. Morgan Stanley, presentation (25 minutes), 9 September 2011.
- [45] Interpreting natural language: applications of group-structured dictionary learning. Eötvös Loránd University, Faculty of Informatics, Neumann's Day, poster, 12 May 2011.
- [46] Interpreting words: an application of (structured) sparse coding. Eötvös Loránd University, Faculty of Informatics, Neumann's Day, poster, 12 May 2011.
- [47] Online group-structured dictionary learning. Eötvös Loránd University, Faculty of Informatics, Neumann's Day, poster, 12 May 2011.
- [48] Structured sparsity and non-convex sparsity-inducing methods. Morgan Stanley, presentation (25 minutes), 9 May 2011.
- [49] Online group-structured dictionary learning. Eötvös Loránd University, TÁMOP Research Seminar, presentation (45 minutes), 28 January 2011.
- [50] Online group-structured dictionary learning. Machine Learning at Budapest, presentation (45 minutes), 22 November 2010.
- [51] Online structured dictionary learning and its applications. Eötvös Loránd University, Problem Solving Seminar for Applied Mathematicians, presentation (45 minutes), 5 November 2010.
- [52] Nonparametric regression, Lasso. Eötvös Loránd University, Problem Solving Seminar for Applied Mathematicians, presentation (45 minutes), 12 November 2009.
- [53] Analysis and prediction of time series with missing data. Morgan Stanley, Speaker Series Event, presentation (30 minutes), 9 October 2009.

- [54] Analysis and prediction of time series with missing data. Morgan Stanley - BME Financial Innovation Centre Kick-off & Workshop, presentation (25 minutes), 15 June 2009.
- [55] Independent subspace analysis; tensor-SVD, tensorfaces; blind subspace deconvolution. Eötvös Loránd University, Problem Solving Seminar for Applied Mathematicians, presentation (45 minutes), 19 October 2007.
- [56] Exploration of behavioral patterns and its applications in human-computer interaction. Info Savaria, Szombathely, presentation (30 minutes), 14-16 April 2005.
- [57] Recognition of behavioral patterns and its potentials of human-computer interaction. Info ÉRA, Békéscsaba, presentation (30 minutes), 14-16 April 2004.
- [58] Adaptive human-computer interaction via face and gaze tracking. Eötvös Loránd University, Faculty of Informatics, Neumann's Day, presentation (20 minutes), 6 November 2003.

LECTURING (G-GRADUATE, U-UNDERGRADUTE)

École Polytechnique (France)

- Structured Data: Learning, Prediction, Dependency, Testing (g; M2 MDA) Spring, 2019
 - with Prof. Florence d'Alché-Buc, Prof. Slim Essid
- Advanced Machine Learning (g; Master of Data Science X-HEC) Spring, 2019
 - with Prof. Stéphane Canu, Prof. Erwan Le Pennec
- Statistics (g; Master of Data Science X-HEC) Fall, 2018
 - with Prof. Stéphanie Allasonnière
- Introduction to Machine Learning (g; Master of Data Science X-HEC) Fall, 2018
 - with Prof. Julie Josse, Prof. Erwan Scornet
- Structured Data: Learning, Prediction, Dependency, Testing (g) Spring, 2018
 - ca. 70 students
 - with Prof. Florence d'Alché-Buc, Prof. Slim Essid, Prof. Arthur Tenenhaus, Alexandre Garcia (Datalab)
- Advanced Machine Learning (g; MSc Big Data For Business - X/HEC) Spring, 2018
 - ca. 60 students
 - with Prof. Stéphane Canu, Prof. Erwan Le Pennec, Anne Auger
- Structured Data: Learning, Prediction, Dependency, Testing (g) Spring, 2017
 - ca. 95 students
 - with Prof. Florence d'Alché-Buc, Prof. Slim Essid, Prof. Arthur Tenenhaus
- Functional Data Analysis (g) Fall, 2016
 - special course

INRIA (France)

- Kernel Methods, Divergence and Independence Measures, Hypothesis Testing (g) July 18 & 20, 2018
 - Summer School on Data Science for Document Analysis and Understanding
 - (2 × 3-hour long course)
- Manifold Learning and Classification for EEG Analysis (g) July 27, 2017
 - Summer School on Mathematical and Computational Methods for Life Sciences
 - (3-hour long course)

Carnegie Mellon University (US)

- Kernel-based Dependency Measures and Hypothesis Testing (g) Nov. 27, 2017
 - Guest Lecture @ Machine Learning Department

University College London (UK)

- Advanced Topics in Machine Learning - Theory of RKHS (g) Spring, 2015–2016
 - ca. 60 students

– with Prof. Arthur Gretton, Kacper Chwialkowski	
Adaptive Modelling, Introduction to Kernel Methods (g)	Spring, 2015–2016
– ca. 20 students	
– with Prof. Arthur Gretton, Heiko Strathmann, Wittawat Jitkrittum	
Eötvös Loránd University (Hungary)	
Reinforcement Learning (g)	Spring, 2009–2013
– ca. 45 students in each semester	
– with Prof. András Lőrincz	
Artificial Neural Networks (g)	Fall, 2008–2012
– ca. 45 students in each semester	
– with Prof. András Lőrincz	
Image Processing, Speech Recognition, Applications of Artificial Intelligence (g)	2007–2008
– ca. 25 students in each semester	
Introduction to Mathematics (u)	2006–2007
– ca. 25 students in each semester	
Symbolic Programming (u)	2004–2006
– ca. 25 students in each semester	

STUDENT SUPERVISION

Supervision

Linda Chamakh (Ph.D.)	Apr., 2018–
– CMAP, École Polytechnique & BNP Paribas, France	
– Co-supervised with Prof. Emmanuel Gobet, Jean-Philippe Lemor	
– Topic: Uncertainty Quantification, Robustness of Systematic Strategies	
Gaspar Massiot (PostDoc)	Oct., 2017–
– French Aerospace Lab ONERA, France	
– Co-supervised with Prof. Éric Moulines, Sidonie Lefebvre	
– Topic: Kernel Methods in Hyperspectral Imaging	
Romain Brault (PostDoc)	Oct., 2017–
– CMAP, École Polytechnique & LTCI, Télécom ParisTech, France	
– Co-supervised with Prof. Florence d’Alché-Buc, Prof. Arthur Tenenhaus	
– Topic: Prediction of Functional Outputs by Kernels	
Alex Lambert (Ph.D.)	Oct., 2017–
– CMAP, École Polytechnique & LTCI, Télécom ParisTech, France	
– Co-supervised with Prof. Florence d’Alché-Buc	
– Topic: Statistical Learning of Vector-Valued Functions with Operator Random Fourier Features	
Zoltán Milacski (M.Sc.)	2012–2013
– School of Computer Science, Eötvös Loránd University (ELU), Hungary	
– Co-supervised with Prof. András Lőrincz of the national student competitor (2 nd prize)	
– Topic: Recurrent Reinforcement Learning in High-Frequency Algorithmic Trading	
Gabriella Merész (M.Sc.)	2012
– Department of Applied Mathematics, ELU, Hungary	
– Topic: Prediction of Financial Time Series via ARMA-GARCH Methods	

Mentoring

Meyer Scetbon (M.Sc. intern)	Apr., 2018–
– INRIA, France	
– Co-supervised with Gaël Varoquaux	
– Topic: Fast Kernel-based Hypothesis Testing	
Roulier Lorraine, Flore Martin (M.Sc.)	Jan. – Mar., 2018
– Sciences for Environmental Challenges, École Polytechnique, France	

- Topic: Low-Dimensional Embedding of Environmental Variables
- Moussab Djerrab (Ph.D.) Oct., 2017–
- LTCI, Télécom ParisTech, France
- Topic: Structured Prediction with Surrogate Losses
- Wittawat Jitkrittum (Ph.D.) 2013–2016
- Gatsby Unit, University College London, UK
- Topic: Kernel Techniques, Statistics
- Máté Csákvári, Zoltán Tóser (M.Sc.) 2012–2013
- School of Computer Science, ELU, Hungary
- Topic: Information Theory, Dictionary Learning
- László Jeni (PostDoc) 2011–2013
- Robotics Institute, Carnegie Mellon University, US
- Topic: Extensions of Constrained Local Models, Facial Expression Recognition
- Balázs Pintér, Gyula Vörös (Ph.D.) 2011–2013
- School of Computer Science, ELU, Hungary
- Topic: Structured-Sparse Coding and Dictionary Learning in Natural Language Processing
- András Sárkány (M.Sc.) 2011–2013
- School of Computer Science, ELU, Hungary
- Topic: Hedging via Sparse Coding
- Gergő Hammer (M.Sc.) 2011 Autumn – 2012 Spring
- Department of Applied Mathematics, ELU, Hungary
- Topic: Self-Similar Structures for Financial Prediction
- Mária Mészáros, Dávid Retek (M.Sc.) 2009 Autumn – 2010 Spring
- Department of Applied Mathematics, ELU, Hungary
- Topic: Online Structured Dictionary Learning and Its Applications
- Kitti Korbács, Nóra Villányi, Gabriella Merész (M.Sc.) 2007 Autumn – 2008 Spring
- Department of Applied Mathematics, ELU, Hungary
- Topic: Tensor Textures
- Kata Péter, Anikó Márton (M.Sc.) 2007 Autumn – 2008 Spring
- Department of Applied Mathematics, ELU, Hungary
- Topic: Temporal Independent Subspace Analysis of Facial Features

Thesis Committee

- Zhu Li (M.Sc., Wolfson College) Summer, 2018
- University of Oxford, Department of Statistics, UK
- Thesis title: On Kernel Approximation and Distribution Regression
- (External Examiner for Thesis defense)
- Romain Brault (Ph.D.) July 3, 2017
- Télécom ParisTech, France
- Thesis title: Large-scale Operator-Valued Kernel Regression
- (Committee member for Thesis defense)
- Gábor Matuz (M.Sc.) 2010
- Budapest University of Technology and Economics, Hungary
- Thesis title: Adaptive Algorithms in Multiagent Environments
- (External Examiner for Thesis defense)
- Kornél Kovács (Ph.D.) 2008
- University of Szeged, Hungary
- Thesis title: Various Kernel Methods with Applications
- (External Examiner for Thesis defense)

Internship Committee

- X-HEC (M.Sc.) Sept. 10, 2018

– École Polytechnique, France	
Statistical Models in Biology and Physics (M.Sc.)	Mar. 22, 2018
– École Polytechnique, France	
Data Science (M.Sc.)	Sept. 27, 2017
– École Polytechnique (morning) & Télécom ParisTech (afternoon), France	
Data Science (M.Sc.)	Sept. 4-5, 2017
– École Polytechnique, France	

Referent Professor

Camille Jandot's internship (M.Sc.)	Apr.–Sept., 2017
– Télécom ParisTech, France	
– Title: Modelling Space Time Series with Operator-Valued Kernels	
– Application to Detection of Epidemics	

EMPLOYMENT

École Polytechnique, CMAP , Palaiseau, France	
Research Associate Professor	2016–
University College London, CSML , London, United Kingdom	
Gatsby Unit	
Research Associate (with Prof. Arthur Gretton)	2013–2016
Eötvös Loránd University, School of Computer Science , Budapest, Hungary	
Research Fellow	2009–2013
Assistant Research Fellow	2008–2009
Assistant Professor	2007–2008

EDUCATION

Eötvös Loránd University , Budapest, Hungary	
School of Computer Science	
Ph.D. (Computer Science; summa cum laude)	2009
Ph.D. Candidate (Computer Science)	2008–2009
Ph.D. Student (Computer Science)	2004–2007
Faculty of Natural Sciences, Applied Mathematics	
Ph.D. (summa cum laude)	2012
Ph.D. Candidate	2009–2012
Ph.D. Student	2003–2006
M.Sc. (summa cum laude)	1998–2003

INTERVIEW

At TWiML & AI on our work winning best paper award at NIPS-2017	Dec., 2017
---	------------

GRANT

Labex DigiCosme	2017
– joint work with Prof. Florence d'Alché-Buc, Prof. Arthur Tenenhaus	

ACADEMIC HONORS, AWARDS

Best Paper Award at NIPS (awarded to 3 papers out of the 3240 submissions)	2017
Bronze Medal of the Pro Patria et Scientia Award of Hungarian Ph.D. Students	2008
Scientist of the Year Award of the School of Computer Science	2007
Outstanding Student Award of the Faculty of Natural Sciences	2003

MEMBERSHIPS

Member of the French Statistical Society (SFdS)	2018–
Member of the PASCAL2 Network of Excellence	2008–2013
Member of the John von Neumann Computer Society	2007–2013

PROJECTS (EÖTVÖS LORÁND UNIVERSITY)

EIT ICT Labs:	2013
– Projects: Playful Learning on the Cloud; Travel Dashboard; Computers as Social Actors; Medical Cyber-Physical Systems	
– Topic: dictionary learning, structured sparse methods, kernel techniques	
EuroSurge (EU FP7)	2012–2013
– Topic: natural language processing, structured sparsity, recommender systems	
U.S. Air Force (Innovation Engine for Blogspaces)	2007–2011
– Topic: natural language processing, structured sparsity, dictionary learning	
Morgan Stanley	2008–2011
– Topic: financial time series (prediction, hedging)	
KMOP	2011
– Topic: constrained local models	
TÁMOP	2010–2012
– Topic: recommender systems	
Archi-Data	2009–2011
– Topic: financial time series (prediction)	
PERCEPT (Perceptual Consciousness - Explication and Testing; EU FP6)	2007–2010
– Topic: infomax identification	

SCHOLARSHIPS

Scholarship of the John von Neumann Computer Society (intelligent systems)	2005–2012
Scholarship of the Bliss Foundation	2004
Scholarship of the Eötvös Loránd University	2003

COMPETITION AND PROBLEM SOLVING SEMINAR DURING M.Sc.

Scientific Student Competition and Conference

Localization of Facial Components via Retina Based Sampling (<i>2nd</i> prize)	2002
Supervisor: Botond Szatmáry.	

Problem Solving Seminar for Applied Mathematicians

Skin Detection Algorithms,	2001 Autumn – 2002 Spring
Supervisor: Prof. András Lőrincz.	

LANGUAGES

- English (fluent), Spanish (basic), Hungarian (native).
- Programming languages: Matlab/Octave, Python, Maple, \LaTeX , HTML.