

# Filip Železný

born on March 5, 1974  
<http://ida.felk.cvut.cz/zelezny>

## Curriculum Vitae

11/2015	<i>Professor of Computer Science</i>
9/2013 - 12/2015	<i>Chair, Dept. of Computer Science, Faculty of Electrical Engineering, Czech Tech. Univ. in Prague</i>
11/2010 - 11/2015	<i>Associate Professor, Czech Tech. Univ. in Prague</i>
3/2004 - 11/2010	<i>Assistant Professor, Czech Tech. Univ. in Prague</i>
9/2004 - 11/2004	<i>Visiting Professor, State Univ. of New York in Binghamton</i>
3/2003 - 3/2004	<i>Postdoctoral Researcher, Univ. of Wisconsin in Madison</i>
3/2003	<i>Ph.D., Czech Tech. Univ. in Prague</i>

## Journal papers

- Klema J., Malinka F., Zelezny F.: Semantic biclustering for finding local, interpretable and predictive expression patterns. *BMC Genomics*, 18(7):41-53, 2017
- Cernoch R., Kuzelka O., Zelezny F.: Polynomial and Extensible Solutions in Lock-Chart Solving. *Applied Artificial Intelligence*, 30(10):923-941, 2016
- Holec M., Kuzelka O., Zelezny F.: Novel Gene Sets Improve Set-Level Classification of Prokaryotic Gene Expression Data. *BMC Bioinformatics*, 16:348, 2015
- Monge D. A., Holec M., Zelezny F., Garino C.-G.: Ensemble learning of runtime prediction models for gene-expression analysis workflows. *Cluster Computing* 18(4):1317-29, 2015
- Kuzelka O., Szaboova A., Zelezny F.: A Method for Reduction of Examples in Relational Learning. *Journal of Intelligent Information Systems*, 42(2):255-281, 2014
- Wohlfahrtova M., Brabcova I., Zelezny F., Balaz P., Janousek L., Lodererova A., Honsova E., Wohlfahrt P., and Viklicky O.: Tubular atrophy and low netrin-1 expression levels are risk factors associated with delayed kidney allograft function. *Transplantation*, 97(2):176-183, 2014
- Bartak R., Cernoch R., Kuzelka O., Zelezny F.: Formulating the Template ILP Consistency Problem as a Constraint Satisfaction Problem. *Constraints* 18(2):144-165, 2013
- Szaboova A., Kuzelka O., Zelezny F., Tolar J.: Prediction of DNA-binding proteins from relational features. *Proteome Science* 10:66, 2012
- Szaboova A., Kuzelka O., Zelezny F., Tolar J.: Prediction of DNA-binding Propensity of Proteins by the Ball-Histogram Method using Automatic Template Search. *BMC Bioinformatics* 13(Suppl 10):S3, 2012
- Holec M., Klema J., Zelezny F., Tolar J.: Comparative Evaluation of Set-Level Techniques in Predictive Classification of Gene Expression Samples. *BMC Bioinformatics* 13(Suppl 10):S15, 2012
- Urbanova M., Brabcova I., Girmanova E., Zelezny F., Viklicky O.: Differential Regulation of the Nuclear Factor- $\kappa$ -B Pathway by Rabbit Antithymocyte Globulins in Kidney Transplantation. *Transplantation* 93(6):589-96, 2012
- Kuzelka O., Zelezny F.: Block-Wise Construction of Tree-like Relational Features with Monotone Reducibility and Redundancy. *Machine Learning* 83(2):163-192, 2011
- Zahalka J., Zelezny F.: An Experimental Test of Occam's Razor in Classification (Technical Note). *Machine Learning* 82(3):475-481, 2011
- Zakova M., Kremen P., Zelezny F., Lavrac N.: Automatic Knowledge Discovery Workflow Composition through Ontology-Based Planning. *IEEE Trans. Automation Science and Engineering* 8(2):253-264, 2011

- Kuzelka O., Zelezny F.: A Restarted Strategy for Efficient Subsumption Testing. *Fundamenta Informaticae* 89(1):95-109, 2008
- Trajkovski I., Zelezny F., Lavrac N., Tolar J.: Learning Relational Descriptions of Differentially Expressed Gene Groups. *IEEE Trans. Sys Man Cyb C* 38(1):16-25, 2008.
- Klema J., Novakova L., Karel F., Stepankova O., Zelezny F.: Sequential Medical Data Mining: A Case Study. *IEEE Trans. Sys Man Cyb C*, 38(1):3-15, 2008.
- Zelezny F., Srinivasan A., Page D.: Randomized Restarted Search in ILP. *Machine Learning* 64(1-2):183-208, 2006.
- Zelezny F., Lavrac N.: Propositionalization-Based Relational Subgroup Discovery with RSD. *Machine Learning* 62(1-2):33-63, 2006.
- Gamberger D., Lavrac N., Zelezny F., Tolar J.: Induction of comprehensible models for gene expression datasets by subgroup discovery methodology. *Journal of Biomedical Informatics* 37(4):269-284, 2004
- Zelezny F.: Efficiency-conscious Propositionalization for Relational Learning. *Kybernetika* 4(3):275-292, 2004

## Selected Conference Papers

- Sourek G., Svatos M., Zelezny F., Schockaert S., Kuzelka O.: Stacked Structure Learning for Lifted Relational Neural Networks. *ILP 2017: The 27th International Conference on Inductive Logic Programming*. - Best paper award
- Rysavy P., Zelezny F. Estimating Sequence Similarity from Read Sets for Clustering Sequencing Data. *IDA 2016: The 15th International Symposium on Intelligent Data Analysis* - Frontier Prize for the best paper of the symposium
- Kuzelka O., Szaboova A., Holec M., Zelezny F.: Gaussian Logic for Predictive Classification. *ECML/PKDD 2011: 22th European Conference on Machine Learning / 15th European Conference on Principles and Practice of Knowledge Discovery*
- Kuzelka O., Zelezny F.: Block-Wise Construction of Acyclic Relational Features with Monotone Irreducibility and Relevancy Properties. *ICML 2009: the 26th International Conference on Machine Learning*
- Kuzelka O., Zelezny F.: Fast Estimation of First-Order Clause Coverage through Randomization and Maximum Likelihood. *ICML 2008: the 25th International Conference on Machine Learning*
- Zakova M., Zelezny F.: Exploiting Term, Predicate, and Feature Taxonomies in Propositionalization and Propositional Rule Learning. *ECML/PKDD 2007: 18th European Conference on Machine Learning / 11th European Conference on Principles and Practice of Knowledge Discovery*

## Editorials

- Riguzzi F., Zelezny F.: Guest editors' introduction: special issue on Inductive Logic Programming. *Machine Learning* 94:1-2, 2014
- Blockeel H., Kersting K., Nijssen S., Zelezny F.: Guest editor's introduction: special issue of the ECML PKDD 2013 journal track. *Data Min. Knowl. Discov.* 27(3): 291-293, 2013
- Blockeel H., Kersting K., Nijssen S., Zelezny F.: Guest editor's introduction: special issue of the ECML PKDD 2013 journal track. *Machine Learning* 93(1): 1-3, 2013
- Blockeel H., Kersting K., Nijssen S., Zelezny F.: (Eds.): Machine Learning and Knowledge Discovery in Databases - European Conference, ECML PKDD 2013, Prague, Czech Republic, September 23-27, 2013, Proceedings, Parts I, II, III. *Lecture Notes in Computer Science* 8188, Springer 2013
- Riguzzi F., Zelezny F. (Eds.): Inductive Logic Programming - 22nd International Conference, ILP 2012, Dubrovnik, Croatia, September 17-19, 2012, Revised Selected Papers. *Lecture Notes in Computer Science* 7842, Springer 2013
- Riguzzi F., Zelezny F. (Eds.): Late Breaking Papers of the 22nd International Conference on Inductive Logic Programming, Dubrovnik, Croatia, September 17-19, 2012. *CEUR Workshop Proceedings* 975, CEUR-WS.org 2012
- Zelezny F., Lavrac N.: Guest editors' introduction: Special issue on Inductive Logic Programming. *Machine Learning* 76(1):1-2, 2009

- Berendt B., Mladenic D., de Gemmis M., Semeraro G., Spiliopoulou M., Stumme G., Svatek V., Zelezny F. (editors): Knowledge Discovery Enhanced with Semantic and Social Information, Springer 2009
- Zelezny F., Lavrac N. (editors): Proceedings of the 18th International Conference on Inductive Logic Programming (ILP-2008), *Lecture Notes in Computer Science* Springer 2008

## Awards

- ILP 2017 Best Paper Award (co-authors Gustav Sourek, Martin Svatos, Stephen Schockaert, Ondrej Kuzelka)
- My PhD student Ondrej Hubacek won the 2017 Soccer Prediction Challenge held in conjunction with the Machine Learning Journal special issue on machine learning for soccer
- IDA 2016 Frontier Prize for the best paper of the symposium (with my PhD student Petr Rysavy)
- Werner von Siemens Prize for the Best Innovation in the Czech Republic in 2015 (project involved a few of my students, most significantly Radomir Cernoch)
- EMCSR 2002 Best Paper Award

## Invited Keynote Talks

- KESW 2016 - Semantic Web and Machine Learning: Time to Re-Sync
- PlanLearn 2012 - Planning to learn: Recent developments and future directions
- SOFSEM 2010 - Taming the Complexity of Inductive Logic Programming

## Patents

- Sourek G., Bartos K., Zelezny F., Pevny T., Somol P.: Events from Network Flows. US Patent 9374383 (Assignee: Cisco Technology, Inc.)
- Zelezny E., Tolarova S., Zelezny F.: A device for converting heat energy into mechanical energy. US Patent 7634902

## Principal Investigator in Projects

- 2017 - 2019: *Deep Relational Learning*. Czech Science Foundation 17-26999S, 5.2M CZK (4.4M agency contribution)
- 2016 - 2019: *Design of Large Key-Lock Systems by Artificial Intelligence*. Technology Agency of the Czech Republic TH02010824, 8.8M CZK (6.7M agency contribution)
- 2015 - 2015: *CyberCalc: Automatic Computation of Key/Lock Systems* (Contractual research). Assa Abloy (Czech Republic)
- 2014 - 2015: *Modelling Network Traffic with Relational Features* (Contractual research). CISCO Systems (Czech Republic)
- 2012 - 2015: *SUPREME: Sustainable Predictive Maintenance for Manufacturing Equipment*. European Commission FP7-314311, CTU costs 274k EUR
- 2012 - 2014: *Predicting Protein Properties with Spatial Statistical Relational Machine Learning*. Czech Science Foundation P202/12/2032, 4M CZK
- 2011 - 2013: *Using and creating domain knowledge for classification in bioinformatic applications*. Czech Technical University internal grant SGS11/155/OHK3/3T/13, 1.4M CZK
- 2011 - 2012: *Transferring ILP Techniques to Statistical Relational Learning*. Czech Science Foundation P103/11/2170, 1M CZK
- 2010 - 2012: *Predictive Data Modeling for Effective Gene Therapy and Bone Marrow Transplantation* (joint with Univ. of Minnesota). Czech Ministry of Education ME10047, CTU costs 1.34M CZK

- 2010 - 2011: *Data Mining over Distributed Computing* (joint travel grant with Univ. of Mendoza). Czech Ministry of Education MEB111005, CTU costs 200k CZK
- 2010 - 2012: *Learning from Theories*. Czech Science Foundation P103/10/1875, 2M CZK
- 2009 - 2011: *ProLearn: Bridging the Gap Between Systems Biology and Machine Learning*. Czech Science Foundation P201/09/1665, 2M CZK
- 2008-2010 *LeCoS: Merging machine learning with constraint satisfaction* (joint with Charles Univ. Prague, Faculty of Mathematics and Physics). Czech Science Foundation 201/08/0509, 2M CZK
- 2007 - 2010 *OntoExpres: Using gene ontologies and annotations for gene expression data interpretation through relational machine learning algorithms* (joint with Univ. of Minnesota). Czech Ministry of Education ME910, CTU costs 400k CZK
- 2006 - 2008 *SEVENPRO: Semantic Virtual Engineering Environment for Product Design*. European Commission FP6-027473, CTU costs 420k EUR
- 2005 - 2006 *Logic-Based Machine Learning for Genomic Data Analysis*. Grant Agency of the Czech Academy of Sciences KJB201210501, 300k CZK
- 2005 - 2006 *Methods of Statistical Search for Improving the Efficiency of Relational Machine Learning Algorithms* (joint with Univ. of Wisconsin). Czech Ministry of Education 1P05ME755, CTU costs 200k CZK
- 2004 - 2006 *Research and Implementation of Efficient Propositionalization Methods*. Czech Ministry of Education 1K04108, 400k CZK
- 2004 - 2004 *Educational Web Site on Methods of Machine Learning and Data Mining* (teaching project). Czech Ministry of Education F12029, 100k CZK
- 2001 - 2001 *An ILP System for Knowledge Discovery in Databases* (student project). Czech Ministry of Education, 100k CZK

## Editorial Board Member

- Machine Learning Journal (Springer)
- Journal of Data Semantics (Springer)
- ECML PKDD 2014 Guest Editorial Board
- Advances in Artificial Intelligence (Hindawi, till 2010)

## Conference/Workshop Chair

- ECAI 2014 - local co-chair (with Vladimir Marik and Olga Stepankova)
- ECML/PKDD 2013 - conference chair and program co-chair (with Hendrik Blockeel, Kristian Kersting and Siegfried Nijssen)
- ILP 2012 - program co-chair (with Fabrizio Riguzzi)
- ILP 2008 - conference chair and program co-chair (with Nada Lavrac)
- PriCKL'07 - ECML/PKDD'07 Workshop on Prior Conceptual Knowledge in Machine Learning and Knowledge Discovery, Warsaw 9/2007. Co-chair (with Bettina Berendt and Vojtech Svatek)

## Committees

- Member of program committees of major conferences: IJCAI (2016, 2017), AAAI (2011), ECAI (2012, 2016 area chair), ICML (2004, 2005, 2009, 2011), KDD (2011), ECML/PKDD (2006, 2007, 2008, 2010, 2011, 2014-2017), ILP (2004-2017)
- Member of ECML/PKDD steering committee (2013-2016)
- Proposal evaluator (2007,2008,2011,2014,2015) and project reviewer (2010-2012, FP7 project e-Lico) for the European Commission, Czech Science Foundation evaluation panel P103 (cybernetics, information processing) member
- PhD jury member: Nuno Fonseca (University of Porto), Igor Trajkovski (JSI Ljubljana), Tijn Witsenburg (Leiden University), Vid Podpecan (JSI Ljubljana), Jana Silhava (VUT), Anze Vavpetic (JSI Ljubljana), Martin Stehlik (FI MU)
- Board member: Open Informatics and Biomedical Informatics graduate programs at CTU, Computer Science PhD programs at MFF UK and CTU, Artificial intelligence and biocybernetics PhD program at CTU, Scientific Board of the Faculty of Electrical Engineering at CTU
- Reviewer for major journals: Machine Learning, Journal of Machine Learning Research, BMC Bioinformatics

## Leaves of absence

- *University of Minnesota* (2006 - 2 months, 2005 - 2 months, c/o Jakub Tolar)
- *Oxford University Computing Laboratory* (2002, 2 weeks, c/o Ashwin Srinivasan)
- *Laboratoire Lorraine de Recherche en Informatique et ses Applications*, Nancy (2001, 3 months, c/o Amedeo Napoli)
- *Institute Josef Stefan*, Ljubljana (1999 - 1 month, 2002 - 2 months, c/o Nada Lavrac)

## Supervised Dissertations

- Andrea Szaboova - Predictive Modelling of Protein-DNA Interaction through Relational Learning (completed in 2013)
- Ondrej Kuzelka - Fast Construction of Relational Features for Machine Learning (completed in 2013)
- Matej Holec - Set-Level Classification of Gene Expression Data (completed in 2015)
- Petr Buryan - Refinement Action-based Framework for Utilization of Softcomputing in Inductive Learning (completed in 2014)
- Monika Zakova - Exploiting ontologies and higher-order knowledge in relational machine learning (completed in 2012)

## Lecturing

- B4M36SMU Symbolic Machine Learning
- A6M33BIN Bioinformatics