

Marinka Zitnik

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	Faculty of Computer and Information Science University of Ljubljana Bioinformatics Laboratory Vecna pot 113 Ljubljana, SI-1000, Slovenia	marinka.zitnik@fri.uni-lj.si
RESEARCH POSITIONS	Stanford University, USA Postdoctoral Research Scholar Department of Computer Science	2016–
EDUCATION	University of Ljubljana, Slovenia Ph.D. in Computer Science Faculty of Computer and Information Science Advisor: Blaz Zupan Committee: Peter Semrl, Igor Kononenko, Saso Dzeroski, Florian Markowetz <i>summa cum laude</i> (GPA 10.00/10) Jozef Stefan Golden Emblem Prize	2012–2015
	Stanford University, Department of Computer Science, USA ASEF Research Fellow in Jure Leskovec's group	2014
	Baylor College of Medicine, Department of Molecular and Human Genetics, USA Predoctoral Fellow in Gad Shaulsky's laboratory	2013–2014
	Imperial College London, Department of Computing, United Kingdom Research Student in Natasa Przulj's group	2012
	University of Toronto, Donnelly Centre for Cellular and Biomolecular Research, Canada Research Student in Charles Boone's laboratory	2012
	University of Ljubljana, Slovenia B.Sc. in Computer Science and Mathematics Faculty of Computer and Information Science, Faculty of Mathematics and Physics <i>summa cum laude</i> (GPA 10.00/10)	2008–2012
SELECTED AWARDS AND FELLOWSHIPS	Travel Fellowship, ISCB, ISMB/ECCB'17, Prague, Czech Republic Jozef Stefan Golden Emblem Prize, best PhD dissertation in the fields of natural sciences, and medicine and biotechnology, 3 awardees within 3 years after PhD, Jozef Stefan Institute Travel Fellowship, ISCB, ISMB'16, Orlando, FL, USA The 2015 Outstanding Research Award, 10 awardees, University of Ljubljana Best Teaching Assistant of the Year, Computer Science Department, University of Ljubljana Award for Early Completion of the PhD Degree, 8 months early, ARRS, Slovenia Travel Fellowship, ISCB, PSB'16, Hawaii, HI, USA	2017 2017 2016 2015 2015 2015 2015

	Travel Fellowship , ISCB, ISMB'15, Dublin, Ireland	2015
	Best Poster Award , Basel Computational Biology Conference, [BC] ² '15, Basel, Switzerland	2015
	Google Global AB Committee – GHC Travel Grant , 20 awardees worldwide, Google	2014
	First Prize Winner for Excellent Research , CAMDA, ISMB'14, Boston, MA, USA	2014
	Travel Fellowship , ISCB, ISMB'14, Boston, MA, USA	2014
	Heidelberg Laureate Forum , 100 CS graduate students selected worldwide.	
	Forum of Turing, Fields, Nevanlinna and Abel Prize laureates, Heidelberg, Germany	2014
	Research Scholarship , ASEF & Stanford CS	2014
	Best Poster Award , RECOMB'14, Pittsburgh, PA, USA	2014
	Travel Fellowship , ISCB, PSB'14, Hawaii, HI, USA	2014
	Fellowship for Research Visit to USA , SHRSF	2013
	Department Award for Excellent Research Work , University of Ljubljana	2013, 2014, 2015
	First Prize Winner for Excellent Research , CAMDA, ISMB'13, Berlin, Germany	2013
	University of Ljubljana Preseren Award , award for best research thesis, Slovenia	2012
	University of Ljubljana Best Student Award , Slovenia	2011
	Google Anita Borg Scholarship , Google	2011
	Zois Scholarship Fund for Gifted Students , Slovenia	2004–2012
	Distinguished Student Award , University of Ljubljana	2009–2012
	EuroSkills , silver medal in project management, and silver medal in design and implementation of infosystems, Lisbon, Portugal	2010
	SloSkills , gold medal in design of infosystems, Slovenia	2010
	Swiss Talent Forum , Energy Challenge. Young researcher at the Meeting of Nobel Laureates, Switzerland	2009
	Imagine Cup , bronze medal, Slovenia	2009
	International Olympiad in Informatics , Egypt	2008
	NetRiders Competition , networking competition, Cisco Systems, USA	2008
	European Union Contest for Young Scientists , Strunz chemical classification, Spain	2007
	Winner of the Year , gold medal for student research in the EU accession process, Hewlett-Packard, Germany	2007
	Winner of the Year , gold medal for student research in chemistry, Slovenia	2007
TEACHING	Stanford University , CS191: Senior Project (mentor)	Winter 2016–
	Stanford University , CURIS: Undergraduate Research in CS (mentor)	Summer 2016
	Stanford University , CS341: Project in Mining Massive Data Sets (instructor)	Spring 2016
	Stanford University , CS399: Independent Project (mentor)	Winter 2016
	University of Pavia , Machine Learning in Python (instructor)	2015
	University of Ljubljana , Data Mining (assistant)	2015
	Baylor College of Medicine , Data Mining without Programming (assistant)	2015
	University of Ljubljana , Social and Information Network Analysis (assistant)	2013–2015
	University of Ljubljana , Programming, Algorithms & Data Structures, Business Intelligence, Data Mining (tutor)	2010–2012
	Cisco Networking Academy , CCNA Discovery and Exploration (instructor)	2009–2011
SERVICE	Google Global Planning Committee for Women in Computer Science , Europe & USA	2014–
	ACM Ubiquity Next Gen Advisory Panel , USA	2016–

	ECML/PKDD Demo Co-chair	2017
	ACM XRDS: Crossroads , department editor, USA	2012–2016
	Outreach. CS Summer School at University of Ljubljana, Rails Girls Ljubljana, Django Girls Ljubljana	2011–2015
	Reviewer or PC Member. Bioinformatics, Journal of Machine Learning Research, IEEE Transactions on Neural Networks and Learning Systems, IEEE Journal of Biomedical and Health Informatics, Computers in Biology and Medicine, IEEE Signal Processing Letters, Journal of Cheminformatics, IEEE Transactions on Computational Biology and Bioinformatics, Nucleic Acids Research, Journal of Biomedical Informatics, Knowledge and Information Systems, SIGKDD 2016, BMC Bioinformatics, Swiss National Science Foundation (SNFS), ECML PKDD 2017, Machine Learning Journal, BioData Mining, Data Mining and Knowledge Discovery, AIME 2017 – Advanced Predictive Models in Healthcare, IEEE Transactions on Knowledge and Data Engineering, Nature Neuroscience	
RESEARCH CHALLENGES	DREAM Olfaction Prediction Challenge , team member, 3rd/19 Given physical and chemical features of small molecules, build models that predict odor intensity as well as odor valence and other descriptors	2015
	BioNLP Shared Task 2013: Gene Regulation Network , team member, 1st/30 Given annotated biomedical texts, reconstruct gene regulation network of sporulation in <i>B. subtilis</i> , where edges encode various types of interactions, e.g., inhibition, activation, requirement, binding, transcription	2013
	JRS 2012 Data Mining Competition , team member, 1st/126 Given the information about concepts in the MeSH hierarchy, how well can biomedical literature be classified	2012
	EMC Israel Data Science Challenge , team member, 2nd/91 Given the source code files collected from various open source projects, how well can unseen source code files from the same set of open source projects be classified	2012
JOURNAL PAPERS	M. Zitnik , R. Sasic, J. Leskovec. Prioritizing Network Communities. <i>In Review</i> , 2017. M. Zitnik , M. Agrawal, J. Leskovec. Network-Based Discovery of Drug Indications. <i>In Review</i> , 2017. A. Copar, M. Zitnik , B. Zupan. Scalable Non-Negative Matrix Tri-Factorization. <i>In Review</i> , 2017. J.C. Puigvert, M. Zitnik , B. Hallstrom, M. Carter, A.-S. Jemth, O. Loseva, Z. Karem, J.M. Calderon-Montano, J. Unterlass, C. Lindskog, P.H. Edqvist, D. Matuszewski, H.A. Blal, R. Berntsson, M. Hagglad, U. Martens, M. Studham, M. Uhlen, B. Lundgren, C. Wahlby, E. Sonnhhammer, E. Lundberg, P. Stenmark, B. Zupan, T. Helleday. A Comprehensive Structural, Biochemical and Biological Profiling of the Human NUDIX Hydrolase Family. <i>Nature Communications (to appear)</i> , 2017. M. Zitnik , J. Leskovec. Predicting Multicellular Function Through Multi-Layer Tissue Networks. <i>Bioinformatics</i> , 33, 14:190-198, 2017. Oral presentation at ISMB/ECCB 2017. A. Keller, R.C. Gerkin, Y. Guan, A. Dhurandhar, G. Turu, B. Szalai, J.D. Mainland, Y. Ihara, C.W. Yu, R. Wolfinger, C. Vens, L. Schietgat, K. De Grave, R. Norel, DREAM Olfaction Consortium , G. Stolovitzky, G. Cecchi, L.B. Vosshall, P. Meyer. Predicting Human Olfactory Perception from Chemical Features of Odor Molecules. <i>Science</i> , 355, 6327:820-826, 2017. M. Zitnik , B. Zupan. Jumping Across Biomedical Contexts Using Compressive Data Fusion. <i>Bioinformatics</i> , 32, 12:90-100, 2016. Oral presentation at ISMB 2016.	

- M. Strazar, **M. Zitnik**, B. Zupan, J. Ule, T. Curk. Orthogonal Matrix Factorization Enables Integrative Analysis of Multiple RNA Binding Proteins. *Bioinformatics*, 32, 10:1527-1535, 2016.
- S. Zitnik, **M. Zitnik**, B. Zupan, M. Bajec. Sieve-Based Relation Extraction of Gene Regulatory Networks from Biological Literature. *BMC Bioinformatics*, 16, Suppl 16:S1, 2015.
- M. Zitnik**, E. A. Nam, C. Dinh, A. Kuspa, G. Shaulsky, B. Zupan. Gene Prioritization by Compressive Data Fusion and Chaining. *PLoS Computational Biology*, 11, 10:e1004552, 2015.
Department award for excellent research work.
- M. Zitnik**, B. Zupan. Gene Network Inference by Fusing Data from Diverse Distributions. *Bioinformatics*, 31, 12:230-239, 2015.
Oral presentation at ISMB 2015.
- M. M. Usaj*, M. Brloznic*, P. Kaferle*, **M. Zitnik**, H. Wolinski, F. Leitner, S. D. Kohlwein, B. Zupan, U. Petrovic. Genome-Wide Localization Study of Yeast Pex11 Identifies Peroxisome-Mitochondria Interactions through the ERMES Complex. *Journal of Molecular Biology*, 427, 11:2072–2087, 2015.
- M. Zitnik**, B. Zupan. Survival Regression by Data Fusion. *Systems Biomedicine*, 2, 3:47-53, 2015.
- M. Zitnik**, B. Zupan. Data Imputation in Epistatic MAPs by Network-Guided Matrix Completion. *Journal of Computational Biology*, 22, 6:595-608, 2015.
- M. Zitnik**, B. Zupan. Data Fusion by Matrix Factorization. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 37, 1:41-53, 2015.
- M. Zitnik**, B. Zupan. Gene Network Inference by Probabilistic Scoring of Relationships from a Factorized Model of Interactions. *Bioinformatics*, 30, 12:246-254, 2014.
Oral presentation at ISMB 2014.
Department award for excellent research work.
- M. Zitnik**, B. Zupan. Matrix Factorization-Based Data Fusion for Drug-Induced Liver Injury Prediction. *Systems Biomedicine*, 2, 1:16-22, 2014.
- M. Zitnik**, V. Janjic, C. Larminie, B. Zupan, N. Przulj. Discovering Disease-Disease Associations by Fusing Systems-Level Molecular Data. *Scientific Reports*, 3, e3202, 2013.
Department award for excellent research work.
- J. Demsar *et al.* Orange: Data Mining Toolbox in Python. *Journal of Machine Learning Research*, 14:2349-2353, 2013.
- M. Zitnik**, B. Zupan. Nimfa: A Python Library for Nonnegative Matrix Factorization. *Journal of Machine Learning Research*, 13:849-853, 2012.

- CONFERENCE PAPERS M. Agrawal*, **M. Zitnik***, J. Leskovec. Large-Scale Analysis of Disease Pathways in the Human Interactome. In Pacific Symposium on Biocomputing (to appear), 2018.
- M. Zitnik**, B. Zupan. Collective Pairwise Classification for Multi-Way Data Analysis of Diseases and Drugs. In Pacific Symposium on Biocomputing, 21:81-92, Hawaii, HI, USA, 2016.
- M. Zitnik**, B. Zupan. Large-Scale Data Fusion. In Minisymposia at 37th Annual International Conference of the IEEE Engineering in Medicine and Biology, EMBC, Milan, Italy, 2015.
- M. Zitnik**, B. Zupan. Survival Regression by Data Fusion. In International Conference on Intelligent Systems for Molecular Biology, ISMB, CAMDA, Boston, MA, USA, 2014.
First prize excellent research award at ISMB/CAMDA 2014.
- M. Zitnik**, B. Zupan. Imputation of Quantitative Genetic Interactions in Epistatic MAPs by Interaction Propagation Matrix Completion. In Proceedings of 18th Annual International Conference on Research in Computational Molecular Biology, RECOMB, 8394:448-462, Pittsburgh, PA, USA, 2014.
- M. Zitnik**, B. Zupan. Matrix Factorization-Based Data Fusion For Gene Function Prediction in Baker's Yeast and Slime Mold. In Pacific Symposium on Biocomputing, 19:400-411, Hawaii, HI, USA,

2014.

M. Zitnik, B. Zupan. Matrix Factorization-Based Data Fusion for Drug-Induced Liver Injury Prediction. In International Conference on Intelligent Systems for Molecular Biology, ISMB, CAMDA, Berlin, Germany, 2013.

First prize excellent research award at ISMB/CAMDA 2013.

S. Zitnik, **M. Zitnik**, B. Zupan, M. Bajec. Extracting Gene Regulation Networks Using Linear-Chain Conditional Random Fields and Rules. In Association for Computational Linguistics, ACL, BioNLP Shared Task Workshop, Sofia, Bulgaria, 2013.

First prize winner in gene regulatory network extraction at ACL BioNLP 2013.

J. Zbontar, **M. Zitnik**, M. Zidar, G. Majcen, M. Potocnik, B. Zupan. Team ULjubljana's Solution to the JRS 2012 Data Mining Competition. In Rough Sets and Current Trends in Computing, 7413/2012, 471-478, Chengdu, China, 2012.

POSTER
SESSIONS

M. Zitnik, J. Leskovec. Predicting Multicellular Function Through Multi-Layer Tissue Networks. Poster session presented at International Conference on Intelligent Systems for Molecular Biology, ISMB/ECCB, Jul 21-25 2017, Prague, Czech Republic.

M. Zitnik, B. Zupan. Jumping Across Gene-Disease Contexts Using Compressive Data Fusion. Poster session presented at International Conference on Intelligent Systems for Molecular Biology, ISMB, Jul 8-12 2016, Orlando, FL, USA.

M. Zitnik, B. Zupan. Jumping Across Biomedical Contexts Using Compressive Data Fusion. Poster session presented at Pacific Symposium on Biocomputing, Jan 4-8 2016, Hawaii, HI, USA.

M. Zitnik, B. Zupan. Integrate Everything but the Kitchen Sink: Data Set Selection and Sensitivity Estimation in Collective Factor Models. Poster session presented at International Conference on Intelligent Systems for Molecular Biology, ISMB, Jul 10-14 2015, Dublin, Ireland.

M. Zitnik, E. A. Nam, C. Dinh, A. Kuspa, G. Shaulsky, B. Zupan. Gene Prioritization by Compressive Data Fusion and Chaining. Poster session presented at Basel Computational Biology Conference, [BC]², Jun 7-10 2015, Basel, Switzerland.

Best poster award.

M. M. Usaj, M. Usaj, **M. Zitnik**, D. Kablawi, B. Zupan, B. J. Andrews, C. Boone. Exploring the Yeast Endocytic Pathway by Combining High-Throughput Genetics and High-Content Microscopy. Poster session presented at International Specialised Symposium on Yeast, Oct 9-12 2014, Vipava, Slovenia.

M. Zitnik. Learning by Fusing Heterogeneous Data. Poster session presented at Heidelberg Laureate Forum, Sept 21-26 2014, Heidelberg, Germany.

M. Zitnik, E. A. Nam, C. Dinh, A. Kuspa, G. Shaulsky, B. Zupan. Data Fusion for Gene Prioritization. Poster session presented at International Conference on Intelligent Systems for Molecular Biology, ISMB, Jul 11-15 2014, Boston, MA, USA.

M. Zitnik, B. Zupan. Biomedical Data Fusion by Simultaneous Matrix Tri-factorization. Poster session presented at RECOMB, Apr 2-5 2014, Pittsburgh, PA, USA.

Best poster award.

M. Zitnik, B. Zupan. Matrix Factorization-Based Data Fusion For Gene Function Prediction in Baker's Yeast and Slime Mold. Poster session presented at Pacific Symposium on Biocomputing, Jan 3-7 2014, Hawaii, HI, USA.

M. Zitnik, B. Zupan. Data Fusion by Matrix Factorization. Poster session presented at Machine Learning Summer School, Sept 25 2013, Max Planck Institute for Intelligent Systems, Tuebingen, Germany.

M. M. Usaj, M. Usaj, **M. Zitnik**, B. Zupan, D. G. Drubin, B. J. Andrews, C. Boone. Studying Yeast Endocytosis with High-throughput Multi-channel Fluorescence Microscopy: a Tale of Cortical Actin Patches, Endosomes and Vacuoles. Poster session presented at 13th International Conference

on Systems Biology, Aug 19-23 2012, Toronto, Canada.

INVITED
TALKS

- M. Zitnik.** To appear. Jan 10-13 2018. AMS-MAA Joint Mathematics Meetings, Clustering of Graphs: Theory, Practice, and Applications, San Diego, CA, USA.
- M. Zitnik.** Uncovering Cellular Functions Through Multi-Layer Tissue Networks. Jun 19 2017. NetSci 2017, Network Medicine, Indianapolis, IN, USA.
- M. Zitnik.** Boosting Biomedical Discovery Through Network Data Analytics. Apr 13 2017. International Conference for Big Data and AI in Medical & FinTech, Taiwan.
- M. Zitnik.** Predictive Network Medicine. Apr 12 2017. Asia University, Taiwan.
- M. Zitnik.** Learning by Fusing Heterogeneous Data. Jan 5 2017. Jozef Stefan Institute, Ljubljana, Slovenia.
- M. Zitnik.** Structure, Organization and Dynamics of Complex Networks for Cancer Analytics. Oct 19 2016, DARPA Cancer Analytics Workshop, White House Cancer Moonshot, Washington D.C., USA.
- M. Zitnik, B. Zupan.** Learning Latent Factor Models by Data Fusion. Jun 20 2015, 15th Conference on Artificial Intelligence in Medicine, AIME, Workshop on Matrix Computations in Biomedical Informatics, Pavia, Italy.
- M. Zitnik.** Compressive Data Fusion and Persistent Homology. Jun 24 2015, Summer School on Computational Topology and Topological Data Analysis, University of Ljubljana, Slovenia.
- M. Zitnik.** If Computer Science is a Science about Computers then Biology is a Science about Microscopes. Oct 15 2014, TEDx, University of Ljubljana, Slovenia.
- M. Zitnik.** Data Fusion by Matrix Factorization. Jan 30 2014, Department of Molecular and Human Genetics, Baylor College of Medicine, Houston, TX, USA.
- M. Zitnik.** Topological Methods in Machine Learning. Jul 2 2013, Summer School on Computational Topology and Topological Data Analysis, University of Ljubljana, Slovenia.
- M. Zitnik.** Data Fusion for Dictyostelium Bacterial Response Gene Prioritization. Jun 12 2013, 8th CFGBC Symposium, Faculty of Medicine, University of Ljubljana, Slovenia.
- M. Zitnik.** Biomedical Data Fusion: The Whole can be More than the Sum of its Components. May 24 2013, BioDay: Trends in Bioinformatics, Ljubljana, Slovenia.
- M. Zitnik.** A Matrix Factorization Approach for Inference of Prediction Models from Heterogeneous Data Sources. Sept 8 2012, Donnelly Centre for Cellular and Biomolecular Research, University of Toronto, Toronto, Canada.

RESEARCH
COLUMNS

- M. Zitnik.** The Infinite Mixtures of Food Products. *ACM Crossroads*, 23, 1:66-67, 2016.
- M. Zitnik.** The Brownian Wanderlust of Things. *ACM Crossroads*, 22, 3:81-83, 2016.
- L. Zupan, **M. Zitnik.** According to Sensor 22 Benny is Preparing Dinner. *ACM Crossroads*, 22, 2:72-74, 2015.
- L. Zupan, **M. Zitnik.** Sorry Kids, Iron Man's Superpowers aren't Unique. *ACM Crossroads*, 22, 1:66-67, 2015.
- M. Zitnik.** Hidden Genes: Understanding Cancer Data with Matrix Factorization. *ACM Crossroads*, 21, 4:72-74, 2015.
- M. Zitnik.** The Anatomy of Human Disease Network. *ACM Crossroads*, 21, 2:58-60, 2014.
- M. Zitnik.** Dynamics of News from The New York Times. *ACM Crossroads*, 21, 1:64-66, 2014.
- M. Zitnik.** Exploring Data with Topological Tools. *ACM Crossroads*, 20, 4:65-66, 2014.
- M. Zitnik.** Efficient Sensor Placement for Environmental Monitoring. *ACM Crossroads*, 20, 3:73-75, 2014.
- M. Zitnik.** On Constructing the Tree of Life. *ACM Crossroads*, 20, 2:65-67, 2013.

M. Zitnik. Zero-Knowledge Proofs. *ACM Crossroads*, 20, 1:65-67, 2013.

M. Zitnik. Matrix Function: A “VIP” in Linear Algebra and its Applications. *ACM Crossroads*, 19, 3:66-67, 2013.

M. Zitnik. Iterative Numerical Methods for Nonlinear Systems. *ACM Crossroads*, 19, 2:64-66, 2012.

M. Zitnik: Using Sentiment Analysis to Improve Business Operations. *ACM Crossroads*, 18, 4:42-43, 2012.

THESES

M. Zitnik. A Matrix Factorization Approach for Inference from Heterogeneous Data. B.Sc. Thesis, University of Ljubljana, 2012.

Summa cum laude.

University Preseren’s award for best thesis.

M. Zitnik. Learning by Fusing Heterogeneous Data, Ph.D. Thesis, University of Ljubljana, 2015.

Summa cum laude.

Jozef Stefan Golden Emblem Prize.

TUTORIAL &
WORKSHOP
ORGANIZER

M. Zitnik, B. Zupan. Large-Scale Data Fusion by Collective Matrix Factorization. Basel Computational Biology Conference, [BC]², Basel, Switzerland, 2015.

M. Zitnik, B. Zupan. Data Fusion of Everything. 37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, EMBC, Milan, Italy, 2015.