CURRICULUM VITAE

PERSONAL INFORMATION

Primoz Skraba

Website: http://ailab.ijs.si/primoz_skraba

Nationality: Slovenian

Date of birth: 20.11.1980

EDUCATION

2009 Ph.D.	Stanford University Dept. of Electrical Engineering *Title:* Topology in Sensor Networks *Advisor:* Leonidas Guibas
2004 Masters of Science	Stanford University Dept. of Electrical Engineering
2002 Bachelor of Science and Engineering (magna cum laude)	Princeton University Dept. of Electrical Engineering

CURRENT POSITIONS

2011 – Researcher, Artificial Intelligence Laboratory, Jozef Stefan Institute, Slovenia

2014 – Assistant Professor, Faculty of Mathematics, Natural Sciences and Information Technologies, University of Primorska, Slovenia

2016 – Adjunct Professor of Mathematics, University of Nova Gorica, Slovenia

2016 – Consulting for Bloomberg L.P.

PREVIOUS POSITIONS

2009 – 2010 Postdoctoral Researcher, Geometrica INRIA-Saclay, France (w/ Frederic Chazal)

2005 – 2008 Research Assistant, Geometric Computing Group, Stanford University

2007 – 2007 Intern, Robert Bosch LLC, Research and Technology Center, USA

2004 – 2004 Intern, Intel Research, USA

PUBLICATION STATISTICS:

H-index: 12, Citations: 640

COMMISSIONS OF TRUST

2012 – 2015 Coordinator for EU FET project TOPOSYS (project number: FP7 – 318493)

2013 – 2016 EU FET project Sophocles Advisory Board (project number: FP7 – 317534)

2013 – Program Committee – Symposium of Geometry Processing

2015 – Program Committee – Eurographics

2014 – Panel member – EC Information Day and Consortium Building Event – Horizon 2020, FET Open and FET HPC

2015 – Co-Leader – TDA and Learning, Applied Algebraic Topology Research Network

FELLOWSHIPS AND AWARDS

2013, 2015 –Best Paper Award, Pacific Visualization Symposium

2010 – Best Paper, NORDIA-CVPR Workshop on Deformable Shape Analysis

2002 – 2005 – Ad-Futura Fellowship (Slovenia), Stanford University

2002 (elected) – Scientific Research Society of Sigma Xi

2001 (elected) – Tau Beta Pi Engineering Honor Society

KEY PUBLICATIONS

O. Bobrowski, M. Kahle, and **P. Skraba,** *Maximally Persistent Cycles in Random Geometric Complexes*, accepted to the Annals of Applied Probability, 2016.

F. Chazal, L. Guibas, S. Oudot, **P. Skraba**, *Persistence-Based Clustering in Riemannian Manifolds*, Journal of the ACM, vol. 60, no. 6, Article 10, 2013

P. Skraba, B. Wang, *Approximating Local Homology from Samples,* Proceedings of the 25th Annual ACM-SIAM Symposium on Discrete Algorithms, January 5-7, 2014, Portland, Oregon, USA

M. Kerber, D. Sheehy, **P. Skraba**. *Persistent Homology and Nested Dissection*. Proceedings of the 27th Annual ACM-SIAM Symposium on Discrete Algorithms. SIAM, 2016, Arlington, Virginia, USA.

P. Skraba, B. Wang, G. Chen, P Rosen, *2D Vector Field Simplification based on Robustness*, 7th Pacific Visualization Symposium, March 4-7, 2014, Yokohama, Japan. PacificVis 2014. (Best Paper Award)

REFERENCES

Robert Adler
Professor - Louis and Samuel Seiden Technion Academic Chair
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GRANTS

(2017-2018) Learning Topological Representations – Slovenian National Project (ARRS) 200.000 €

(2016) Industrial Project with Petrol d.o.o. on setting credit risk and limits (2016) 20.000 €

ERC Starting Grant 2nd Round 2016

(2012-2015) FP7 FET Proactive EU Grant (FP7-ICT-318493-STREP) - Topological Complex Systems - TOPOSYS - Coordinator - participants: Herbert Edelsbrunner - IST Austria, Danica Kragic - KTH, Marian Mrozek - Jagellonian University, Robert Adler - Technion) - 642.813 €, 2.635.000 € total,

Contributed to:

SUNSEED FP7: Sustainable and robust networking for smart electricity distribution (FP7-ICT-619437) (2014-2017)

ProaSense FP7: The Proactive Sensing Enterprise (FP7-ICT-612329) (2013-2016)

MOBIS FP7: Personalized Mobility Services for energy efficiency and security through advanced Artificial Intelligence techniques (FP7-ICT-318452) (2012-2015)

SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

Post-doctoral researchers

2012 – 2016 Joao Pita Costa – Topos foundations of persistent homology – (Genialis d.o.o.)

2014 – 2015 Ganna Kudryavtseva – Semigroup theory (currently teaching at U. of Ljubljana)

2013 – 2014 Mikael Vejdemo-Johannson – Applied topology – (CUNY-Staten Island)

Doctoral Students

2013 – Dejan Govc – Math – Persistence & the unimodal category

2014 – Luka Stopar – CS – Visualization and analysis of multivariate time-series

Masters

2016 – Blaz Sovdat – Applied Math & CS – Homology for Text Mining

2015 – Zala Herga – Financial Mathematics – Finding Arbitrage in Foreign Exchange Markets

2013 – Domen Soberl – CS – Distributed computation of homology in sensor networks

TEACHING

2016 – Analysis I, University of Nova Gorica

2015 – System Dynamics, FAMNIT, University of Primorska

2014 – Theoretical Computer Science I, FAMNIT, University of Primorska

2013 – 2014 Computational Topology FMF, University of Ljubljana

REVIEWER

ERC Consolidator Grant (secondary reviewer), Journal of Computational Geometry, Discrete and Computational Geometry, Foundations of Computational Mathematics, Computational Geometry: Theory and Applications, SIAM Journal on Applied Algebra and Geometry, ACM SIGCOMM Computer Communications Review (CCR), ACM Transactions on Sensor Networks. Pacific Graphics, Symposium of Geometry Processing, ACM-SIAM Symposium of Discrete Algorithms, Symposium of Computational Geometry, Eurographics

MAJOR INTERNATIONAL COLLABORATIONS

Computational Geometry and Computational Topology

Herbert Edelsbrunner – Professor of Computer Science, Institute of Science & Technology, Austria

Konstantin Mishcaikow – Professor, Dept. of Mathematics, Rutgers University, USA

Frederic Chazal – Senior Researcher, INRIA Saclay, GEOMETRICA group, France

Marian Mrozek, – Professor, Dept. of Computational Mathematics, Jagiellonian University, Poland

Vin de Silva – Associate Professor, Dept. of Mathematics, Pomona

Bei Wang – Assistant Professor, Dept. of Computer Science, University of Utah, USA

Michael Kerber – Assistant Professor, Institute of Geometry, TU Graz

Michel Vejdemo-Johannson – Assistant Professor, Mathematics, CUNY-Staten Island, USA

Maks Ovsjanikov – Assistant Professor, Computer Science, Ecole Polytechnique, France

Probabilistic and statistical aspects of topological invariants

Robert Adler – Professor, Dept. of Electrical Engineering, Technion, Israel

Sayan Mukherjee – Professor, Dept. of Statistical science, Duke University, USA

Matt Kahle – Associate Professor, Dept. of Mathematics, Ohio State University

Omer Bobrowski – Assistant Professor, Dept. of Electrical Engineering, Technion, Israel

D. Yogeshwaran – Assistant Professor, Indian Statistical Institute (Bangalore), India

Katharine Turner – post-doctoral researcher EPFL, Switzerland

SELECTED INVITED TALKS

- Applied and Computational topology: ATMCS 5, 2012 – main applied topology meeting
- European Conference on Complexity Science, Session on Dynamic Multi-scale Systems, 2013, 2014 – main European meeting on complexity science
- AMS-MAA Joint Meeting Special Session on Applied Topology, Boston, USA, 2012
- Topological Systems: Communication, Sensing, and Actuation, Institute of Mathematics and Applications, IMA, 2014
- Annual Meeting of the Israeli Statistical Association, 2014
- Applications of Algebraic Topology in Computer Science and Data Analysis (GETCO), 2015
- Dynamics, Topology and Computations, Bedlewo, Poland, 2015
- Sheaves and Category Theory, CG-Week Symposium of Computational Geometry, Eindhoven, Netherlands, 2015
- Functoriality in Geometric Data, Institute of Advanced Study, Hong Kong University of Science and Technology, 2015
- Workshop on Applied Topology, Institute of Mathematics Sciences, Singapore, 2015
- Workshop on Multidimensional Persistence, EPFL, Switzerland, 2016
- TDART: Topological Data Analysis and Related Topics, AIMR, Tohoku University, Sendai, Japan 2017

This represents a sample of recent invited talks at workshops. It does not include invited seminars and lectures at universities or presentations based on contributions. It also does not include visits to Dagstuhl, Oberwolfach and American Institute of Mathematics.

COMPLETE LIST OF PUBLICATIONS

2017

P. Skraba, Wasserstein Stability of Persistence Diagrams, in preparation

J. Pita-Costa, P. Skraba, M. Vejdemo-Johansson, The Persistence Topos, in preparation

P. Skraba, D. Yogeshwaran, A Central Limit Theorem for Persistent Betti Numbers, in preparation

P. Skraba, G. Thoppe, D. Yogeshwaran, Randomly Weighted d−Complexes: Minimal Spanning Acycles and Persistence Diagrams, submitted to Random Structures and Algorithms, https://arxiv.org/abs/1701.00239

D. Govc, P. Skraba, An Approximate Nerve Theorem, submitted to the Foundations of Computational Mathematics (FoCM), https://arxiv.org/abs/1608.06956

L. Stopar, P. Skraba, M. Grobelnik, D. Mladenic, StreamStory: Exploring Multivariate Time Series on Multiple Scales, submitted to IEEE Conference on Visual Analytics Science and Technology (IEEE VAST 2017) (http://streamstory.ijs.si)

B. Kazic, J. Rupnik, P. Skraba, L. Bradesko, D. Mladenic, Predicting Users' Mobility Using Monte Carlo Simulations, submitted to IEEE Access

2016

O. Bobrowski, M. Kahle, and P. Skraba, Maximally Persistent Cycles in Random Geometric Complexes, Accepted to the Annals of Applied Probability, https://arxiv.org/abs/1509.04347

G. Kudryavtseva and P. Skraba The principal bundles over an inverse semigroup, Semigroup Forum, https://arxiv.org/abs/1503.08560

M. Kerber, D. Sheehy, P. Skraba, Persistent Homology and Nested Dissection. Annual ACM-SIAM Symposium on Discrete Algorithms, Twenty-Seventh Annual ACM-SIAM Symposium on Discrete Algorithms. SIAM, 2016, Arlington, Virginia, USA.

P. Skraba, P. Rosen, B. Wang, G. Chen, V. Pasucci. Critical Point Cancellation in 3D Vector Fields: Robustness and Discussion, IEEE Pacific Visualization 2016 and in IEEE Transactions in Computer Graphics and Visualization vol. 22, no. 6, p. 1683-1693 (**Best Paper Award**)

C. Fortuna, E. De Poorter, P. Skraba, I. Moerman, Data Driven Wireless Network Design: a Multi-level Modeling Approach, Wireless Personal Communications 88.1 (2016): 63-77.

J. Rupnik, A. Muhic, G. Leban, P. Skraba, B. Fortuna, M. Grobelnik, News Across Languages - Cross-Lingual Document: Similarity and Event Tracking, JAIR: Special Track on Cross-language Algorithms and Applications

2015

P. Skraba and M. Vejdemo-Johansson, Topology, Big Data and Optimization, chapter in Big Data Optimization: Recent Developments and Challenges, Volume 18 of the series Studies in Big Data pp 147-176

M. Vejdemo-Johansson, F. Pokorny, P. Skraba, D. Kragic, Cohomological learning of periodic motion, Applicable algebra in engineering, communication and computing, 2015, vol. 26, no. 1/2, p. 5-26. (https://www.youtube.com/watch?v=NGQ-M2gdibQ)

P. Skraba, B. Wang, G. Chen, P. Rosen, Robustness-based simplification of 2D steady and unsteady vector fields. IEEE Trans. on visualization and computer graphics, 2015, vol. 21, issue 8, p. 930–944

M. Mole, L. Wang, K. Bergant, W. Eichinger, S. Stanic, P. Skraba. Lidar measurements of Bora wind effects on aerosol loading. International Symposium on Atmospheric Light Scattering and Remote Sensing (ISALSaRS'15), June 1-5, 2015

2014

M. Vejdemo-Johansson, P. Skraba, Algebraic and Topological Perspectives on Semi-Supervised Clustering, European Conference on Complexity Science 2014

J. Pita Costa, P. Skraba, A topological data analysis approach to epidemiology, European Conference on Complexity Science 2014

P. Skraba, R. Adler, Topological Detection of Heavy Tailed Distributions, European Conference on Complexity Science 2014

P. Skraba, J. Pita Costa, A Lattice for Persistence, https://arxiv.org/abs/1307.4192

P. Skraba, M. Vejdemo-Johansson, Persistence modules: Algebra and algorithms, https://arxiv.org/abs/1302.2015, to be submitted to the Springer Journal of Applicable Algebra in Engineering, Communication and Computing

J. Rupnik, P. Skraba, J. Shawe-Taylor, S. Guettes, A Comparison of Relaxations of Multiset Cannonical Correlation Analysis and Applications, https://arxiv.org/abs/1302.0974

P. Skraba, B. Wang, G. Chen, P Rosen, 2D vector field simplification based on robustness,: 7th Pacific Visualization Symposium, March 4-7, 2014, Yokohama, Japan. PacificVis 2014. (Best Paper)

P. Skraba, B. Wang, Approximating local homology from samples, Proceedings of the Twenty-Fifth Annual ACM-SIAM Symposium on Discrete Algorithms, January 5-7, 2014, Portland, Oregon, USA, p. 174-192.

P. Skraba, B. Wang, Interpreting feature tracking through the lens of robustness, Topological methods in data analysis and visualization III: theory, algorithms applications, (Mathematics and visualization), Springer, 2014, p. 19-37

M .Mole, K. Bergant, L. Honzak, J. Rakovec, Joe, G. Skok, S. Stanic, R. Zabkar, P. Skraba. Analysis of measurements of the Bora wind in Vipava valley, European Geosciences Union, General Assembly 2014, Vienna, Austria, 27 April-02 May 2014.

2013

F. Chazal, L. Guibas, S. Oudot, P. Skraba, Persistence-Based Clustering in Riemannian Manifolds, Journal of the ACM, vol. 60, no. 6, Article 10

B. Wang, P. Rosen, P. Skraba, H. Bhatia, V. Pasucci, Visualizing robustness of critical points for 2D time-varying vector fields, Proceedings of the 15th EuroVis 2013, The European Conference on Visualization, June 17-21, 2013, Leipzig, Germany, (Computer graphics forum, vol. 32, no. 3, pt. 2 pp. 221-230)

2012

F. Chazal, A. Patel, P. Skraba, Computing Robustness of Roots, Applied Mathematical Letters 2012, vol. 25, no. 11, str. 1725-1728

P. Skraba, M. Vejdemo-Johansson, Parallel and scalable zig-zag persistent homology, 2012 Work- shop book: NIPS 2012, Neural Information Processing Systems Workshop, December 7-8, 2012, Lake Tahoe, Nevada

V. de Silva, P. Skraba, M. Vejdemo-Johansson, Topological analysis of recurrent systems, 2012 Work-shop book : NIPS 2012, Neural Information Processing Systems Workshop, December 7-8, 2012, Lake Tahoe, Nevada

J. Rupnik, A. Muhic, P. Skraba, Cross-lingual document retrieval through hub languages, 2012 Workshop book : NIPS 2012, Neural Information Processing Systems Workshop, December 7-8, 2012, Lake Tahoe, Nevada

J. Rupnik, A. Muhic, P. Skraba, Spanning spaces: learning cross-lingual similarities, 2012 Work- shop book : NIPS 2012, Neural Information Processing Systems Workshop, December 7-8, 2012, Lake Tahoe, Nevada

A. Muhic, J. Rupnik, P. Skraba, Cross-lingual document similarity, 34rd International Conference on Information Technology Interfaces, ITI 2012, June 25-28, 2012, Dubrovnik, Croatia

J. Rupnik, A. Muhic, P. Skraba, Multilingual document retrieval through hub languages, Proceedings of the 15th International Multiconference Information Society - IS 2012, October 8th-12th, 2012, Ljubljana, Slovenia

2011

N. Milosavljevic, D. Morozov, P. Skraba, Computing Zig-Zag Persistence in Matrix Multiplication Time, Symposium of Computational Geometry 2011, Paris France

F. Chazal, L. Guibas, S. Oudot, P. Skraba, Persistence-Based Clustering in Riemannian Manifolds, Symposium of Computational Geometry 2011, Paris, France

F. Chazal, L. Guibas, S. Y. Oudot, P. Skraba, Analysis of Scalar Fields over Point Cloud Data, Discrete and Computational Geometry 2011

2010

P. Skraba, M. Ovsjanikov, F. Chazal, L. Guibas, Persistence Based Segmentation of Deformable Shapes, NORDIA-CVPR Workshop on Deformable Shape Analysis 2010, San Francisco, CA, USA, Best Paper Award

N. Milosavljevic, D. Morozov, P. Skraba, Computing Zig-Zag Persistence in Matrix Multiplication

Time, Technical Report RR-7393

2009

P. Skraba, S. Oudot, F. Chazal, L. Guibas, Persistence-Based Clustering in Riemannian Manifolds, Technical Report RR-6968

A. Motskin, T. Roughgarden, P. Skraba, and L.Guibas Lightweight Coloring and Desynchronization for Networks, INFOCOMM 2009, Rio de Janeiro, Brazil

F. Chazal, L. Guibas, S. Y. Oudot, P. Skraba, Analysis of Scalar Fields over Point Cloud Data, Symposium of Discrete Algorithms 2008, New York, USA

-2008

P. Skraba, Topology in Sensor Networks, Ph.D. Dissertation, Stanford University, December 2008

P. Skraba and L. Guibas, Energy Efficient Intrusion Detection in Camera Sensor Networks, DCOSS 2007, Santa Fe, New Mexico

P. Skraba, Q. Fang, A. Nguyen, L. Guibas, Sweeps over Sensor Networks, IPSN 2006, Nashville USA

P. Skraba and A. Mutapcic, Linear ε-suboptimal network flow allocations, Softcom, October 2004

P. Skraba, H. Aghajan, and A. Bahai, Distributed Passive Routing Decisions in Mobile Ad-Hoc Networks, VTC04, Los Angeles, Sept. 2004.

P. Skraba, H. Aghajan, and A. Bahai, RFID Wake-up in event driven sensor networks, Poster presented at SigComm04, Portland, August-Sept. 2004.

P. Skraba, H. Aghajan, and A. Bahai, Cross-Layer Optimization for High Density Sensor Networks: Distributed Passive Routing Decisions, Ad-Hoc Now04, Vancouver, July 2004.

P. Skraba, H. Aghajan, and A. Bahai, RFID Enabled Networks, Stanford Computer Forum, May 2004

P. Skraba, K.A. Boakye, Oversampled Non-uniform Filter Banks Independent Work, January 2002 2001

C. Gerson, M. Anthony and P. Skraba, The Phoenix Project: Coordinated Flight of Multiple Unmanned Vehicles. Presented to the Joint University Program for Air Transportation Research, Quarterly Review, April, 2001.