Lovro Šubelj Since 1986

UNIVERSITY OF LJUBLJANA
Faculty of Computer and Information Science
Laboratory for Data Technologies
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RESEARCH INTERESTS

NETWORK SCIENCE | Primary research area
Structure and dynamics of complex social, information & technological networks, machine learning with graphs
Methods and algorithms for network modeling, sampling & comparison, clustering & partitioning, link analysis
Applications in bibliometrics & scientometrics, fraud & anomaly detection, software engineering

DATA SCIENCE | Other fields of interest
Selected areas of data analysis, data mining, stream mining, statistics

EDUCATION

PhD | Computer and Information Science
University of Ljubljana | Faculty of Computer and Information Science
Thesis "Detecting groups of nodes in networks using label propagation" | Advisor **Marko Bajec**
Course grade average: 9.82 / 10.0 | Thesis grade: 10
Oct 2008 — June 2013

DIPLOMA [BSc] | Computer Science and Mathematics
University of Ljubljana | Faculty of Computer and Information Science & Faculty of Mathematics and Physics
Diploma "Detecting fraud based on the analysis of social networks" | Advisors **Marko Bajec** & **Matjaž Kukar** | **Prešeren award**
Course grade average: 9.78 / 10.0 | Diploma grade: 10 | Summa Cum Laude
Oct 2004 — Sep 2008

POSITIONS

ASSOCIATE PROFESSOR | Computer and Information Science
University of Ljubljana | Faculty of Computer and Information Science
Oct 2022 — Oct 2027

RESEARCH FELLOW | Methodology, Statistics and Informatics
University of Ljubljana | Faculty of Social Sciences
Jan 2018 — Dec 2025

Teacher & Assistant
University of Ljubljana | Faculty of Computer and Information Science
Oct 2015 — & July — Dec 2013

[Postdoctoral] Researcher
University of Ljubljana | Faculty of Computer and Information Science
Oct 2008 — June 2015

FUNDING

AWARDS & HONORS

2017	UNIVERSITY AWARD	University of Ljubljana	Young university professors
2012	NATIONAL AWARD	Slovenian Research Agency	Journal publication
2011	FACULTY AWARD	University of Ljubljana	Faculty of Computer and Information Science	Journal publication
2008	PREŠEREN AWARD	University of Ljubljana	Faculty of Computer and Information Science	BSc thesis
2008	1ST PLACE	University of California, San Diego	Data Mining Contest	Undergraduate division
2006	RECTOR'S LIST	University of Ljubljana	Top university students
2005 — 08	DEAN'S LIST	University of Ljubljana	Faculty of Computer and Information Science	Top faculty students
2000 — 08	ZOIS FELLOWSHIP	Slovene Human Resources and Scholarship Fund	Top national students

TALKS & SEMINARS

— "Network abstraction with backbones and skeletons: Spanning trees versus convex skeletons" | Department seminar (**Imperial College London**, Centre for Complexity Science, 2022) | Host **Tim Evans**

— "On computing spanning trees of unweighted networks" | *Wednesday Seminar* (University of Ljubljana, Faculty of Mathematics and Physics, 2021) | Host **Vladimir Batagelj**

— "Intermediacy of publications: Uncovering important publications for the development of a field" | At: *6th European Conference on Statistical Network Science* **COSTNET** (online, 2020)

— "Label propagation for clustering" | At: *6th Slovenian Conference on Network Science* **NetSlo** (Ljubljana, Slovenia, 2020)

— "Intermediacy of publications" | At: *5th Slovenian Conference on Network Science* **NetSlo** (Ljubljana, Slovenia, 2019)

— "Intermediacy of publications" | *AI Seminar* (University of Ljubljana, Faculty of Computer and Information Science, 2019) | Host **Marko Robnik-Šikonja**

— "Convexity in complex networks" | *LCN2 Seminar* (**Leiden University**, Institute of Advanced Computer Science, 2017) | Host **Frank W. Takes**

— "Network analysis in bibliometrics" | Department seminar (**Leiden University**, Centre for Science and Technology Studies, 2017) | Host **Vincent Traag**

— "On convexity in complex networks" | At: *6th International Workshop on Social Network Analysis* **ARS** (Naples, Italy, 2017)

— "Should you (not) publish in computer science journals?" | *Cookie Seminar* (University of Ljubljana, Faculty of Computer and Information Science, 2017) | Host **Sebastijan Šprager**

— "Comparison of methods for clustering scientific publications based on citations" | *IBMI Seminar* (University of Ljubljana, Faculty of Medicine, 2017) | Host **Nataša Kejžar**

— "Reliability of bibliographic databases for scientometrics network analysis" | At: *8th International Conference on Information Technologies and Information Society ITIS* (Šmarješke toplice, Slovenia, 2016)

— "On convexity in complex networks" | *Wednesday Seminar* (University of Ljubljana, Faculty of Mathematics and Physics, 2016) | Host **Vladimir Batagelj**

— "Network analysis vs WikiLeaks" | *Cookie Seminar* (University of Ljubljana, Faculty of Computer and Information Science, 2015) | Host **Janez Demšar**

— "Selected topics from network analysis" | *Wednesday Seminar* (University of Ljubljana, Faculty of Mathematics and Physics, 2014) | Host **Vladimir Batagelj**

— "Network analysis" | Habilitation lecture (University of Ljubljana, Faculty of Computer and Information Science, 2014) | Host **Igor Kononenko**

— "Network and link analysis" | Department seminar (**University of West Bohemia**, Department of Computer Science and Engineering, 2014) | Host **Dalibor Fiala**

— "Detecting groups of nodes in networks by label propagation" | Invited lecture (Faculty of Information Studies in Novo mesto, 2014) | Host **Zoran Levnajić**

— "An expert system for detecting automobile insurance fraud using social network analysis" | Invited talk (Slovenian Academy of Sciences and Arts, 2013) | **National award**

— "Detecting insurance fraud using network analysis" | *Seminar for Probability, Statistics and Financial Mathematics* (University of Ljubljana, Faculty of Mathematics and Physics, 2013) | Host **Aleš Toman**

— "Structured-world conjecture: On modules and communities in real-world networks" | Group seminar (**Stanford University**, Computer Science Department, 2012) | Host **Jure Leskovec**

— "Structured-world conjecture: On modules and communities in real-world networks" | *AI Seminar* (**University of California, San Diego**, Department of Computer Science and Engineering, 2012) | Host **Charles Elkan**

— "Introduction to data networks analysis" | Invited lecture (University of Ljubljana, Faculty of Computer and Information Science, 2010) | Host **Marko Bajec**

PUBLICATIONS & PATENTS

JOURNAL PUBLICATIONS

— Romi Koželj, **Lovro Šubelj** & Jurij Bajc | "Methods for representing earthquake time series with networks" | *Informatica* 48(14), 1-26 (2024)

— Žiga Babnik, Jasmina Pegan, Domen Kos & **Lovro Šubelj** | "Generating lyrics using constrained random walks on a word network" | *Informatica* 48(1), 131-140 (2024)

— Milan Jović, **Lovro Šubelj**, Tea Golob, Matej Makarovič, Taha Yasseri, Danijela Boberić Krstićev, Srdjan Škrbić & Zoran Levnajić | "Terrorist attacks sharpen the binary perception of "Us" vs. "Them"" | ***Scientific Reports*** 13, 12451 (2023)

— Vincent Traag & **Lovro Šubelj** | "Large network community detection by fast label propagation" | ***Scientific Reports*** 13, 2701 (2023)

— Tim Poštuvan, Semir Salkić & **Lovro Šubelj** | "Learning-based link prediction analysis for Facebook100 network" | *Uporabna Informatika* 29(2), 83-94 (2021)

— Ilya Makarov, Dmitry Kiselev, Nikita Nikitinsky & **Lovro Šubelj** | "Survey on graph embeddings and their applications to machine learning problems on graphs" | *PeerJ Computer Science* 7, e357 (2021)

— Anej Svete, Jakob Hostnik & **Lovro Šubelj** | "It is not just about the melody: How Europe votes for its favorite songs" | *Uporabna Informatika* 28(2), 66-84 (2020)

— Jaka Stavanja, Matej Klemen & **Lovro Šubelj** | "Predicting kills in Game of Thrones using network analysis" | *Uporabna Informatika* 28(2), 55-65 (2020)

— **Lovro Šubelj**, Ludo Waltman, Vincent Traag & Nees Jan van Eck | "Intermediacy of publications" | ***Royal Society Open Science*** 7(1), 190207 (2020)

— Luka Naglić & **Lovro Šubelj** | "War pact model of shrinking networks" | ***PLoS ONE*** 14(10), e0223480 (2019)

— **Lovro Šubelj**, Dalibor Fiala, Tadej Ciglarič & Luka Kronegger | "Convexity in scientific collaboration networks" | ***Journal of Informetrics*** 13(1), 10-31 (2019)

— Vitjan Zavrtanik & **Lovro Šubelj** | "Community detection in Slovene public spending" | *Uporabna Informatika* 26(3), 107-117 (2018)

— Jaka Šircelj, Romi Koželj & **Lovro Šubelj** | "Effects of species extinction on ecosystems stability" | *Uporabna Informatika* 26(3), 118-127 (2018)

— **Lovro Šubelj** | "Convex skeletons of complex networks" | ***Journal of the Royal Society Interface*** 15(145), 20180422 (2018)

— Tilen Marc & **Lovro Šubelj** | "Convexity in complex networks" | ***Network Science*** 6(2), 176-203 (2018)

— Neli Blagus, **Lovro Šubelj** & Marko Bajec | "Empirical comparison of network sampling: How to choose the most appropriate method?" | ***Physica A*** 477, 136-148 (2017)

— **Lovro Šubelj** & Dalibor Fiala | "Publication boost in Web of Science journals and its effect on citation distributions" | ***JASIST*** 68(4), 1018-1023 (2017)

— **Lovro Šubelj**, Nees Jan van Eck & Ludo Waltman | "Clustering scientific publications based on citation relations: A systematic comparison of different methods" | ***PLoS ONE*** 11(4), e0154404 (2016)

— **Lovro Šubelj**, Marko Bajec, Biljana M. Boshkoska, Andrej Kastrin & Zoran Levnajić | "Quantifying the consistency of scientific databases" | ***PLoS ONE*** 10(5), e0127390 (2015)

— Neli Blagus, **Lovro Šubelj**, Gregor Weiss & Marko Bajec | "Sampling promotes community structure in social and information networks" | ***Physica A*** 432, 206-215 (2015)

— Dalibor Fiala, **Lovro Šubelj**, Slavko Žitnik & Marko Bajec | "Do PageRank-based author rankings outperform simple citation counts?" | ***Journal of Informetrics*** 9(2), 334-348 (2015)

— **Lovro Šubelj**, Dalibor Fiala & Marko Bajec | "Network-based statistical comparison of citation topology of bibliographic databases" | ***Scientific Reports*** 4, 6496 (2014)

— **Lovro Šubelj**, Slavko Žitnik, Neli Blagus & Marko Bajec | "Node mixing and group structure of complex software networks" | ***Advances in Complex Systems*** 17(7), 1450022 (2014)

— Neli Blagus, **Lovro Šubelj**, Aljaž Zrnec, Marko Janković & Marko Bajec | "Preserving properties under simplification of social networks" | *Uporabna Informatika* 22(3), 127-136 (2014) | In Slovene

— Neli Blagus, **Lovro Šubelj** & Marko Bajec | "Assessing the effectiveness of real-world network simplification" | ***Physica A*** 413, 134-146 (2014)

— Slavko Žitnik, **Lovro Šubelj** & Marko Bajec | "SkipCor: Skip-mention coreference resolution using linear-chain conditional random fields" | ***PLoS ONE*** 9(6), e100101 (2014)

— Marko Janković, Slavko Žitnik, **Lovro Šubelj**, Neli Blagus, Aljaž Zrnec & Marko Bajec | "Improvement of software development method with minimal involvement of developers" | *Uporabna Informatika* 22(1), 3-11 (2014) | In Slovene

— **Lovro Šubelj** & Marko Bajec | "Group detection in complex networks: An algorithm and comparison of the state of the art" | ***Physica A*** 397, 144-156 (2014)

— **Lovro Šubelj**, Slavko Žitnik, Marko Janković, Bojan Klemenc, Aleš Kumer, Aljaž Zrnec & Marko Bajec | "Large real-world networks" | *Uporabna Informatika* 21(2), 107-115 (2013) | In Slovene

— Slavko Žitnik, **Lovro Šubelj**, Dejan Lavbič, Olegas Vasilecas & Marko Bajec | "General context-aware data matching and merging framework" | *Informatica* 24(1), 119-152 (2013)

— Dejan Lavbič, Slavko Žitnik, **Lovro Šubelj**, Aleš Kumer, Aljaž Zrnec & Marko Bajec | "Traversal and relations discovery among business entities and people using semantic web technologies and trust management" | *Databases and Information Systems* 7, 164-174 (2013)

— Aljaž Zrnec, Dejan Lavbič, **Lovro Šubelj**, Slavko Žitnik, Aleš Kumer & Marko Bajec | "NoSQL databases" | *Uporabna Informatika* 20(3), 164-172 (2012) | In Slovene

— **Lovro Šubelj** & Marko Bajec | "Ubiquitousness of link-density and link-pattern communities in real-world networks" | ***European Physical Journal B*** 85(1), 32 (2012) | **Editors' highlight**

— Neli Blagus, **Lovro Šubelj** & Marko Bajec | "Self-similar scaling of density in complex real-world networks" | ***Physica A*** 391(8), 2794-2802 (2012)

— **Lovro Šubelj** & Marko Bajec | "Robust network community detection using balanced propagation" | ***European Physical Journal B*** 81(3), 353-362 (2011)

— **Lovro Šubelj** & Marko Bajec | "Community structure of complex software systems: Analysis and applications" | ***Physica A*** 390(16), 2968-2975 (2011)

— **Lovro Šubelj** & Marko Bajec | "Unfolding communities in large complex networks: Combining defensive and offensive label propagation for core extraction" | ***Physical Review E*** 83(3), 036103 (2011) | **Faculty award**

— **Lovro Šubelj**, Štefan Furlan & Marko Bajec | "An expert system for detecting automobile insurance fraud using social network analysis" | ***Expert Systems with Applications*** 38(1), 1039-1052 (2011) | **National award**

— Bojan Klemenc, Peter Ciuha, **Lovro Šubelj** & Marko Bajec | "Visual and aural: Visualization of harmony in music with color" | *IPSI BgD Transactions on Internet Research* 7(1), 48-53 (2011)

— **Lovro Šubelj**, David Jelenc, Eva Zupančič, Dejan Lavbič, Denis Trček, Marjan Krisper & Marko Bajec | "Merging data sources based on semantics, contexts and trust" | *IPSI BgD Transactions on Internet Research* 7(1), 18-30 (2011)

PUBLICATION PREPRINTS

— **Lovro Šubelj** | "Computing well-balanced spanning trees of unweighted networks" | e-print *arXiv:2205.06628v3*, pp. 18

— **Lovro Šubelj** & Marko Bajec | "Clustering assortativity, communities and functional modules in real-world networks" | e-print *arXiv:1202.3188v1*, pp. 21

CONFERENCE PUBLICATIONS

— Vid Stropnik & **Lovro Šubelj** | "Predicting successful passes in football: Benchmark dataset and GNN ablation study" | In: *Proceedings of the 20th International Conference on Network Science **NetSci*** (Maastricht, Netherlands, 2025), p. 1

— Vincent Traag & **Lovro Šubelj** | "Fast label propagation algorithm for community detection" | In: *Proceedings of the 18th International Conference on Network Science **NetSci*** (Vienna, Austria, 2023), p. 1

— Nejc Rožman, Marko Corn, Gašper Škulj, Janez Diaci & **Lovro Šubelj** | "Emergence of a scale-free network topology in a blockchain-based shared manufacturing" | In: *Proceedings of the 3rd International Conference on Blockchain Computing and Applications BCAA* (Tartu, Estonia, 2021), pp. 172-178

— **Lovro Šubelj** | "Spanning trees that preserve network distances" | In: *Proceedings of the 1st Joint Sunbelt and NetSci Conference **Networks*** (Washington D.C., USA, 2021), pp. 270-271

— Luka Naglić & **Lovro Šubelj** | "War pact network model: A generative model of networks that shrink" | In: *Proceedings of the 4th European Social Networks Conference **EUSN*** (Zurich, Switzerland, 2019), p. 240

— **Lovro Šubelj**, Ludo Waltman, Vincent Traag & Nees Jan van Eck | "Intermediacy of publications" | In: *Proceedings of the 17th International Conference on Informetrics and Scientometrics **ISSI*** (Rome, Italy, 2019), pp. 1288-1300

— **Lovro Šubelj**, Ludo Waltman, Vincent Traag & Nees Jan van Eck | "Intermediacy of publications" | In: *Proceedings of the 5th International Conference on Computational Social Science **IC^{2}S^2*** (Amsterdam, Netherlands, 2019), pp. 1-3

— **Lovro Šubelj**, Ludo Waltman, Vincent Traag & Nees Jan van Eck | "Uncovering important intermediate publications" | In: *Proceedings of the 38th INSNA International Social Network Conference **Sunbelt*** (Utrecht, Netherlands, 2018), p. 1

— **Lovro Šubelj** | "Convex skeleton: Generalization of a network spanning tree" | In: *Proceedings of the 1st NetSci Workshop on Large and Rich Network Structures **LaRichNet*** (Paris, France, 2018), p. 1

— **Lovro Šubelj**, Ludo Waltman, Vincent Traag & Nees Jan van Eck | "Intermediacy of publications" | In: *Proceedings of the 13th International Conference on Network Science **NetSci*** (Paris, France, 2018), p. 1

— Tilen Marc & **Lovro Šubelj** | "Three forms of convexity in graphs and networks" | In: *Proceedings of the 2nd European Conference on Statistical Network Science **COSTNET*** (Palma de Mallorca, Spain, 2017), p. 54

— Marko Mišić, Dražen Drašković, **Lovro Šubelj** & Marko Bajec | "Parallel implementation of the label propagation method for community detection on the GPU" | In: *Proceedings of the 26th International Electrotechnical and Computer Science Conference ERK* (Portorož, Slovenia, 2017), pp. 359-362

— **Lovro Šubelj** & Tilen Marc | "On convexity in complex networks" | In: *Proceedings of the 8th International Conference on Complex Networks **CompleNet*** (Dubrovnik, Croatia, 2017), pp. 14-16

— **Lovro Šubelj**, Nees Jan van Eck & Ludo Waltman | "Comparison of methods for clustering citation networks" | In: *Proceedings of the 2nd International Conference on Network Science X **NetSci-X*** (Wroclaw, Poland, 2016), p. 1

— **Lovro Šubelj** | "Exploratory and predictive tasks of network community detection" | In: *Proceedings of the 10th International Conference on Network Science **NetSci*** (Zaragoza, Spain, 2015), p. 1

— **Lovro Šubelj**, Dalibor Fiala & Marko Bajec | "Consistency of citation topology of bibliographic databases" | In: *Proceedings of the 10th International Conference on Network Science* **NetSci** (Zaragoza, Spain, 2015), p. 1

— **Lovro Šubelj** | "Large network community detection in practical scenarios" | In: *Proceedings of the 5th International Workshop on Social Network Analysis* **ARS** (Capri, Italy, 2015), p. 78

— **Lovro Šubelj** & Marko Bajec | "Network group discovery by hierarchical label propagation" | In: *Proceedings of the 1st European Social Networks Conference* **EUSN** (Barcelona, Spain, 2014), p. 284

— **Lovro Šubelj**, Zoran Bosnić, Matjaž Kukar & Marko Bajec | "Automatization of the stream mining process" | In: *Proceedings of the 26th International Conference on Advanced Information Systems* **CAiSE** (Thessaloniki, Greece, 2014), pp. 409-423

— **Lovro Šubelj**, Slavko Žitnik & Marko Bajec | "Who reads and who cites? Unveiling author citation dynamics by modeling citation networks" | In: *Proceedings of the 9th International Conference on Network Science* **NetSci** (Berkeley, California, USA, 2014), p. 1

— **Lovro Šubelj**, Gregor Weiss, Neli Blagus & Marko Bajec | "What coins the bitcoin? Exploratory analysis of bitcoin market value by network group discovery" | In: *Proceedings of the 9th International Conference on Network Science* **NetSci** (Berkeley, California, USA, 2014), p. 1

— Neli Blagus, **Lovro Šubelj**, Gregor Weiss & Marko Bajec | "Large networks grow smaller: How to choose the right simplification method?" | In: *Proceedings of the 9th International Conference on Network Science* **NetSci** (Berkeley, California, USA, 2014), p. 1

— Slavko Žitnik, **Lovro Šubelj**, Marko Janković, Bojan Furlan, Dražen Drašković, Nemanja Kojić, Marko Mišić & Marko Bajec | "Iterative end-to-end information extraction based on linear models" | In: *Proceedings of the 22nd International Electrotechnical and Computer Science Conference ERK* (Portorož, Slovenia, 2013), pp. 47-50

— Miloš Pavković, Dražen Drašković, **Lovro Šubelj**, Slavko Žitnik, Dejan Lavbič, Marko Janković, Jelica Protić & Boško Nikolić | "Intelligent techniques for searching Internet forums" | In: *Proceedings of the 22nd International Electrotechnical and Computer Science Conference ERK* (Portorož, Slovenia, 2013), pp. 85-88

— **Lovro Šubelj**, Marko Bajec & Neli Blagus | "Group extraction for real-world networks: The case of communities, modules, and hubs and spokes" | In: *Proceedings of the 8th International Conference on Network Science* **NetSci** (Copenhagen, Denmark, 2013), pp. 152-153

— Neli Blagus, Marko Bajec & **Lovro Šubelj** | "Preserving properties under simplification of real-world networks" | In: *Proceedings of the 8th International Conference on Network Science* **NetSci** (Copenhagen, Denmark, 2013), p. 166

— **Lovro Šubelj** & Marko Bajec | "Model of complex networks based on citation dynamics" | In: *Proceedings of the 2nd WWW Workshop on Large Scale Network Analysis* **LSNA** (Rio de Janeiro, Brazil, 2013), pp. 527-530

— Slavko Žitnik, **Lovro Šubelj**, Dejan Lavbič, Aljaž Zrnec & Marko Bajec | "Collective information extraction using first-order probabilistic models" | In: *Proceedings of the 5th Balkan Conference in Informatics BCI* (Novi Sad, Serbia, 2012), pp. 279-282

— **Lovro Šubelj** & Marko Bajec | "Software systems through complex networks science: Review, analysis and applications" | In: *Proceedings of the 1st KDD Workshop on Software Mining* **SoftMine** (Beijing, China, 2012), pp. 9-16

— Dejan Lavbič, Slavko Žitnik, **Lovro Šubelj**, Aleš Kumer, Aljaž Zrnec & Marko Bajec | "Traversal and relations discovery among business entities and people using semantic web technologies and trust management" | In: *Proceedings of the 10th International Baltic Conference on Databases and Information Systems DB&IS* (Vilnius, Lithuania, 2012), pp. 11

— **Lovro Šubelj**, Slavko Žitnik, Aljaž Zrnec, Aleš Kumer, Bojan Klemenc, Dejan Lavbič & Marko Bajec | "Properties of large real-world networks and some applications" | In: *Zbornik 19. konference Dnevi slovenske informatike DSI* (Portorož, Slovenia, 2012), pp. 10 | In Slovene

— Aljaž Zrnec, Dejan Lavbič, **Lovro Šubelj**, Slavko Žitnik, Aleš Kumer & Marko Bajec | "NoSQL databases" | In: *Zbornik 19. konference Dnevi slovenske informatike DSI* (Portorož, Slovenia, 2012), pp. 10 | In Slovene

— Marko Bajec, Štefan Furlan, Aleš Kumer, **Lovro Šubelj**, Slavko Žitnik & Dejan Lavbič | "Supervizor+" | In: *Zbornik 3. konference Informatika v javni upravi IJU* (Brdo pri Kranju, Slovenia, 2011), pp. 6 | In Slovene

— **Lovro Šubelj** & Marko Bajec | "Generalized network community detection" | In: *Proceedings of the 1st ECML PKDD Workshop on Finding Patterns of Human Behaviors in Network and Mobility Data* **NEMO** (Athens, Greece, 2011), pp. 66-84

— **Lovro Šubelj**, Neli Blagus, Štefan Furlan, Bojan Klemenc, Aleš Kumer, Dejan Lavbič, Aljaž Zrnec, Slavko Žitnik & Marko Bajec | "Complex networks analysis: Introduction and applications" | In: *Zbornik 2. konference Informatika v javni upravi IJU* (Brdo pri Kranju, Slovenia, 2010), pp. 10 | In Slovene

— Slavko Žitnik, Bojan Klemenc, Dejan Lavbič, **Lovro Šubelj**, Štefan Furlan, Aleš Kumer, Aljaž Zrnec, Neli Blagus & Marko Bajec | "Trends in intelligent data retrieval from heterogeneous data sources" | In: *Zbornik 2. konference Informatika v javni upravi IJU* (Brdo pri Kranju, Slovenia, 2010), pp. 12 | In Slovene

— **Lovro Šubelj** & Marko Bajec | "Unfolding network communities by combining defensive and offensive label propagation" | In: *Proceedings of the 1st ECML PKDD Workshop on the Analysis of Complex Networks* **ACNE** (Barcelona, Spain, 2010), pp. 87-104

— Bojan Klemenc, Peter Ciuha, **Lovro Šubelj** & Marko Bajec | "Visual and aural: Visualization of harmony in music with color" | In: *Proceedings of the Symposia on Internet Related Research VIPSI* (Tivat, Montenegro, 2010), pp. 6

— **Lovro Šubelj**, David Jelenc, Eva Zupančič, Dejan Lavbič, Denis Trček, Marjan Krisper & Marko Bajec | "Merging data sources based on semantics, contexts and trust" | In: *Proceedings of the Symposia on Internet Related Research VIPSI* (Amalfi, Italy, 2010), pp. 13

— **Lovro Šubelj**, Štefan Furlan & Marko Bajec | "Detecting fraud based on the analyses of social networks" | In: *Zbornik 16. konference Dnevi slovenske informatike DSI* (Portorož, Slovenia, 2009), pp. 10 | In Slovene

— Giovanni Godena, Janez Tancek, Igor Steiner, David Čuk, **Lovro Šubelj**, Jože Grilj & Peter Kosin | "LiteBatch: A tool for batch process control on the PLC platform" | In: *Zbornik 5. konference Avtomatizacija v industriji in gospodarstvu AIG* (Maribor, Slovenia, 2007), pp. 51-56 | In Slovene

BOOK CHAPTERS

— **Lovro Šubelj** | "Label propagation for clustering" | In: *Advances in Network Clustering and Blockmodeling* (Wiley, New York, 2020), pp. 121-150

PRESS COVERAGE

— Mojca Vizjak Pavšič | "Zakaj je Drnovšek premagal Bulca" | *Delo* (February 21, 2019) | In Slovene

— Mojca Vizjak Pavšič | "NetSlo'17 o znanosti 21. stoletja" | *Delo* (February 9, 2017) | In Slovene

— **Lovro Šubelj** & Jernej Ule | "Bruci, vstopate v razburljivi del življenja. Lp, vaš profesor" | *Delo* (October 1, 2014) | In Slovene

— Uroš Škerl Kramberger | "George ne bo shodil brez države" | *Dnevnik* (March 28, 2013) | In Slovene

PATENTS & APPLICATIONS

— **Lovro Šubelj** & Marko Bajec | "The process for allocation of computational resources in networks of distributed devices" | *Slovenian Institute of Intellectual Property* SI-24553-A (Ljubljana, Slovenia, 2015), P-201300392, pp. 5 | In Slovene

— **Lovro Šubelj**, Slavko Žitnik, Dejan Lavbič, Aleš Kumer & Marko Bajec | "Combining heterogeneous data sources of data processing devices" | *Slovenian Institute of Intellectual Property* (Ljubljana, Slovenia, 2013), P-201300263, pp. 7 | In Slovene

SERVICE TO PROFESSION

SCIENTIFIC AFFILIATION

2020 —	*Slovenian Association for Computing Machinery SACM*
2020 —	*Association for Computing Machinery ACM*
2015 —	*Slovenian Network Science Society* **NetSlo**
2014 —	*Network Science Society* **NetSci**
2010 —	*Slovenian Informatics Society SDI*
2009 —	*Slovenian Artificial Intelligence Society SLAIS*

JOURNAL EDITORIAL

2021 —	***Entropy***	Topic editor
2017 —	***PLoS ONE***	Academic editor
2015 —	*Journal of Computer Science and Engineering*	Editorial board

JOURNAL ADVISORY

2024	*Journal of Computational Science* (Elsevier)	Reviewer
2016 | 24	**PLoS ONE** (Public Library of Science)	Regular reviewer
2023	*Journal of Classification* (Springer)	Reviewer
2019 | 23	**Quantitative Science Studies** (MIT Press)	Regular reviewer
2014 | 20 | 22	**Scientific Reports** (Nature Publishing Group)	Regular reviewer
2014 | 21	**Social Network Analysis and Mining** (Springer)	Regular reviewer
2020	**Journal of the Royal Society Interface** (Royal Society Publishing)	Reviewer
2016 | 17 | 20	**Scientometrics** (Springer)	Regular reviewer
2016 | 17 | 20	**Journal of Informetrics** (Elsevier)	Regular reviewer
2015 | 18 | 20	**Entropy** (Multidisciplinary Digital Publishing Institute)	Regular reviewer
2017 | 19	**Journal of Complex Networks** (Oxford University Press)	Regular reviewer
2018	**IEEE Access** (IEEE)	Reviewer
2012 — 18	**Physica A** (Elsevier)	Regular reviewer
2017	**European Physical Journal B** (Springer)	Reviewer
2017	*Italian Journal of Applied Statistics* (Padua)	Reviewer
2017	*Journal of Computer Science and Engineering* (Peertechz)	Reviewer
2017	*Communications in Mathematical and in Computer Chemistry* (MATCH)	Reviewer
2016	**Social Networks** (Elsevier)	Reviewer
2016	**Expert Systems with Applications** (Elsevier)	Reviewer

2016	*IEEE Transactions on Neural Networks and Learning Systems* (IEEE)	Reviewer
2015	*IEEE Transactions on Cybernetics* (IEEE)	Reviewer
2015	*Neural Computing and Applications* (Springer)	Reviewer
2014	*Journal of Systems and Software* (Elsevier)	Reviewer
2014	*Modern Physics Letters B* (World Scientific)	Reviewer
2013	14	*International Journal of Modern Physics C* (World Scientific)	Regular reviewer
2013	***Advances in Complex Systems*** (World Scientific)	Reviewer
2013	***Knowledge-Based Systems*** (Elsevier)	Reviewer
2012	*Chinese Physics B* (IOP Publishing)	Reviewer
2011 — 15	*Journal of Computer Science and Technology* (Springer)	Regular reviewer
2010	*International Journal of Information System Modeling and Design* (IGI Publishing)	Reviewer
2010	19 — 21	*Uporabna Informatika* (SDI)	Regular reviewer

CONFERENCE COMMITTEE

2025	*International Conference on Network Science* **NetSci**	**Program committee**
2017 — 25	*Slovenian Conference on Network Science* **NetSlo**	**Organizing committee**	With many others
2023 — 25	*International Conference on Web Search and Data Mining* **WSDM**	**Program committee**
2022 — 24	*ECML PKDD Workshop on Mining and Learning With Graphs* **MLG**	**Program committee**
2023	24	*International Conference on Complex Networks and their Applications* **CNA**	**Program committee**
2022	23	*The Web Conference* **Web**	**Program committee**
2022	*Student Computing Research Symposium* **SCORES**	**Organizing committee**	With many others
2021	*International Conference on Modeling and Analysis of Complex Systems and Processes MACSPro*	**Program committee**
2021	*The Web Conference* **Web**	**Local volunteers chair**
2015	16	*Networking Slovenian Networkers MSN*	**Organizing committee**	With many others
2014 — 19	*International Conference on Information and Software Technologies ICIST*	**Program committee**
2014 — 18	*International Conference on Research Challenges in Information Science RCIS*	**Program & poster committee**
2014 — 18	*International Conference on Information Technologies and Information Society ITIS*	**Program committee**
2012	18	*International Baltic Conference on Databases and Information Systems DB&IS*	**Program committee**
2017	*International Electrotechnical and Computer Science Conference ERK*	**Program committee**
2009 — 11	15	*International Conference on Advanced Information Systems* **CAiSE**	Additional reviewer

CONFERENCE ATTENDANCE

2014	15	18	22	23	25	*International Conference on Network Science* **NetSci**
2017 — 20	23	24	*Slovenian Conference on Network Science* **NetSlo**
2014	19	23	*European Social Networks Conference* **EUSN**
2022	23	*Learning on Graphs Conference* **LoG**
2021	*The Web Conference* **Web**
2021	*International Joint Sunbelt and NetSci Conference* **Networks**
2016	17	20	*European Conference on Statistical Network Science* **COSTNET**
2017	*International Conference on Complex Networks* **CompleNet**
2016	*International Conference on Network Science X* **NetSci-X**
2015	17	*International Workshop on Social Network Analysis* **ARS**
2015	16	*Networking Slovenian Networkers MSN*
2013	*International World Wide Web Conference* **WWW**
2012	*SIAM International Conference on Data Mining* **SDM**
2012	*ACM SIGKDD International Conference on Knowledge Discovery and Data Mining* **KDD**
2009 — 11	*European Conference on Machine Learning & [...] Knowledge Discovery [...]* **ECML PKDD**
2015	16	*International Conference on Information Technologies and Information Society ITIS*
2012	*Balkan Conference in Informatics BCI*
2009	12	*Dnevi slovenske informatike DSI*
2010	*Informatika v javni upravi IJU*
2009	*Summer School on the Analysis of Patterns AP*

TEACHING EXPERIENCE

LECTURER

ADVANCED TOPICS IN NETWORK SCIENCE
University of Ljubljana | Faculty of Computer and Information Science
PhD students | Elective course | With **Jure Leskovec**
Oct 2015 — Sep 2020

[INTRODUCTION TO] NETWORK ANALYSIS
University of Ljubljana | Faculty of Computer and Information Science
YouTube | `http://bit.ly/2I2dQBS`
MSc students | Mandatory course
Oct 2015 — Sep 2025

PROGRAMMING 2
University of Ljubljana | Faculty of Mathematics and Physics
YouTube | `http://bit.ly/3jRSS5B`
BSc students | Mandatory course
Oct 2018 — Sep 2025

INTRODUCTION TO NETWORK ANALYSIS IN PYTHON
University of Ljubljana | Faculty of Computer and Information Science
GitHub | `http://github.com/lovre/netpy22`
Academics and professionals | Workshop
Sep 2019 | Dec 2019 | Dec 2021 | Jan 2022 | Dec 2022 | Oct 2024

TEACHING ASSISTANT

MACHINE LEARNING WITH GRAPHS
University of Ljubljana | Faculty of Computer and Information Science
BSc and MSc students | Elective course | Lecturer **Jure Leskovec**
Oct 2013 — Sep 2025

INTRODUCTION TO INFORMATION SYSTEMS
University of Ljubljana | Faculty of Computer and Information Science
BSc students | Mandatory course | Lecturer **Dejan Lavbič**
Oct 2015 — Sep 2016

FUNDAMENTALS OF DATABASES
University of Ljubljana | Faculty of Computer and Information Science
BSc students | Mandatory course | Lecturer **Marko Bajec**
Oct 2011 — Sep 2022

DATABASES 1
University of Ljubljana | Faculty of Computer and Information Science
BSc students | Mandatory course | Lecturer **Marko Bajec**
Oct 2008 — Sep 2011

THESIS ADVISORY | BSc , MSc & PhD Theses

— **Mark David Longar** | "The influence of the relational schema on the performance of graph neural networks" | BSc thesis (University of Ljubljana, Faculty of Computer and Information Science & Faculty of Mathematics and Physics, 2025)

— **Vid Stropnik** | "An analysis of player-formation graphs for predicting football passes" | MSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2024)

— **Matej Kalc** | "Automobile fraud detection with machine learning on graphs" | MSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2024) | With **Marija Gorenc Novak**

— **Gregor Ažbe** | "Automatic invoice data extraction" | MSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2024) | With **Slavko Žitnik**

— **Mark Bogataj** | "Leakage localization in city water distribution network" | MSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2024)

— **Andraž Matkovič** | "The contribution of temporal information in the computation of brain functional connectivity when assessing its association with interpersonal differences in behaviour" | **PhD thesis** (University of Ljubljana, Faculty of Arts, 2024) | With **Grega Repovš**

— **Ermin Omeragić** | "Classification of financial transactions in accounting using graph neural networks" | MSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2023)

— **Maruša Oražem** | "Modeling product stickiness in a grocery store" | MSc thesis (University of Ljubljana, Faculty of

Computer and Information Science, 2023)

- Bisera Nikoloska | "Network representational learning for classification of patients with neurological disorders" | BSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2023) | With **Andrej Kastrin**
- Primož Gabrovec | "Use of social network analysis algorithms on international projects applicants' data" | BSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2023) | With **Zoran Bosnić**
- Romi Koželj | "Modeling the time evolution of seismic activity using network analysis" | MSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2022) | With **Jurij Bajc** | **Prešeren award**
- Žiga Kokelj | "Comparison of tainting analysis methods in Bitcoin network" | MSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2021)
- Luka Kavčič | "Intermediacy of nodes in networks and applications in scientometrics" | MSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2021)
- Ilya Makarov | "Methods of network embeddings and their applications" | **PhD thesis** (University of Ljubljana, Faculty of Computer and Information Science, 2021)
- Iza Jerman Slabe | "Predicting hunting success of wild animals in Primorska region" | BSc thesis (University of Ljubljana, Faculty of Computer and Information Science & Faculty of Mathematics and Physics, 2021)
- Sara Oblak | "Fraud detection in telecommunications using network analysis" | BSc thesis (University of Ljubljana, Faculty of Computer and Information Science & Faculty of Mathematics and Physics, 2021)
- Tim Poštuvan | "Adaptive graph neural network training objective for link prediction" | BSc thesis (University of Ljubljana, Faculty of Computer and Information Science & Faculty of Mathematics and Physics, 2021)
- Šimen Ravnik | "Sagittal pelvic orientation feature analysis for predicting degenerative diseases" | BSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2021)
- Damir Varešanović | "Comparison of algorithms for network community detection based on label propagation" | BSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2021)
- Jure Repe | "Predicting problem difficulty in bouldering" | BSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2019)
- Simona Malenšek | "Analysis of human symptoms-disease network" | BSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2019)
- Žiga Babnik | "Song similarity analysis based on lyrics, ratings and meta data" | BSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2019)
- Nina Mrzelj | "Link prediction in heterogenous networks by embedding nodes in the vector space" | MSc thesis (University of Ljubljana, Faculty of Computer and Information Science & Faculty of Mathematics and Physics, 2019)
- Elizaveta Chernenko | "Network determinants of conflict in business organization" | MSc thesis (National Research University, Faculty of Social Sciences, 2019)
- Robert Dovžan | "Predicting the click-through rate of ads using factorization machines" | BSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2019) | With **Davorin Kopič**
- Luka Androjna | "Optimization of conversions in programatic advertising" | BSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2019) | With **Andraž Tori**
- Matic Tribušon | "Properties of sports competitions and relation to market value" | MSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2018) | With **Erik Štrumbelj**
- Tadej Matek | "Anomaly detection in computer networks using higher-order dependencies" | MSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2017)
- Petra Smole | "Analysis of course co-enrollment at the Faculty of Computer and Information Science" | BSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2016)
- Rok Fortuna | "Automated trading system using machine learning and technical analysis of trading" | BSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2016) | With **Matjaž B. Jurič**
- Angelina Temelkovska | "Comparison of attributes for predicting online reviews on Amazon" | BSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2016)
- Vasil Krstev | "Predicting performance of football teams using network analysis" | BSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2016)
- Kristijan Mirčeta | "Extracting temporal knowledge from events in news articles" | BSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2015)
- Žiga Vučko | "Predicting categories of news articles using meta-data from the Web" | BSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2015)

THESIS ASSISTANCE | BSc & PhD Theses

- Neli Blagus | "Effective simplification of complex real-world networks" | **PhD thesis** (University of Ljubljana, Faculty of Computer and Information Science, 2016) | Advisor **Marko Bajec**
- Slavko Žitnik | "Iterative semantic information extraction from unstructured text sources" | **PhD thesis** (University of Ljubljana, Faculty of Computer and Information Science, 2014) | Advisor **Marko Bajec**
- Matjaž Hribernik | "Predicting the outcome of badminton matches based on network analysis" | BSc thesis (University of

Ljubljana, Faculty of Computer and Information Science, 2014) | Advisor **Marko Bajec**
- — **Igor Jončevski** | "Predicting business ownership based on board collaboration networks" | BSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2014) | Advisor **Marko Bajec**
- — **Nejc Gašperin** | "Web application for commuters" | BSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2012) | Advisor **Marko Bajec**
- — **Slavko Žitnik** | "Intelligent data retrieval from arbitrary data sources" | BSc thesis (University of Ljubljana, Faculty of Computer and Information Science & Faculty of Mathematics and Physics, 2012) | Advisor **Marko Bajec**
- — **Mitja Kuščer** | "Random networks generation using machine learning method" | BSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2009) | Advisor **Marko Bajec**
- — **Tomaž Kuralt** | "Autonomous system for data networks integration" | BSc thesis (University of Ljubljana, Faculty of Computer and Information Science, 2009) | Advisor **Marko Bajec**

PROJECT EXPERIENCE

WISDOM LABS, D.O.O. | KNOWLEDGE GRAPHS
University of Ljubljana | Faculty of Computer and Information Science
Development of methods and algorithms for analysis of knowledge graphs
Industry funded project | Project leader
Nov 2021 — Jan 2023

COSTNET | STATISTICAL NETWORK ANALYSIS
University of Ljubljana | Faculty of Computer and Information Science
European cooperation for statistics of network data science
EU COST action | Management committee substitute
May 2016 — May 2020

ARRS | IMMIGRATION AND INTEGRATION
Faculty of Information Studies in Novo mesto
Understanding immigration and integration through social dynamics
ARRS basic project | Project member
Sep 2017 — Apr 2018

PETROL, D.D. | BUSINESS NETWORK ANALYSIS
University of Ljubljana | Faculty of Computer and Information Science
Development of methods and algorithms for network analysis in large company
Postdoctoral research project | Project leader
Jan 2014 — June 2015

CELTRA, D.O.O. | ADS ANOMALY DETECTION
University of Ljubljana | Faculty of Computer and Information Science
Development of methods and algorithms for anomaly detection in mobile ads service
Industry funded project | Project leader
Apr 2014 — Mar 2015

STREAM MINING ENVIRONMENT
University of Ljubljana | Faculty of Computer and Information Science
Development and implementation of programming environment for stream mining
Research project | Project leader
Sep 2012 — Mar 2014

ISKRATEL, D.O.O. | HIGHWAY TRAFFIC SIMULATION
University of Ljubljana | Faculty of Computer and Information Science
Development and implementation of simulation environment for highway traffic
Industry funded project | Package leader
Jan — June 2012

OPTILAB, D.O.O. | INSURANCE FRAUD DETECTION
University of Ljubljana | Faculty of Computer and Information Science
Development of methods and algorithms for fraud detection in automobile insurance
Industry funded project | Package leader
Jan 2008 — June 2010

INEA, D.O.O. | Batch Process Automation
Jožef Stefan Institute | Department of Systems and Control
Implementation of methods and algorithms for batch process automation
Industry funded project | Student work
July 2006 — June 2008

Medical Signal Analysis
Jožef Stefan Institute | Department of Communication Systems
Implementation of methods and algorithms for signal analysis in medicine
Research project | Student work
July 2005 — Sep 2005

IT & PROGRAMMING SKILLS

General purpose languages: Java | Phyton | C/C++
Scripting languages: JavaScript | R | shell
Query languages: SQL | NoSQL | XQuery
Markup languages: XHTML | XML | CSS
Declarative languages: Prolog
Numeric computation: Matlab
Symbolic computation: Mathematica
Digital typesetting: TEX | LaTeX

LANGUAGES

Slovene | Native speaker
English | Fluent
Croatian | Basic
German | Very basic

REFERENCES

Jure Leskovec | **Stanford University**, Computer Science Department
Marinka Žitnik | **Harvard University**, Department of Biomedical Informatics
Ludo Waltman | **Leiden University**, Centre for Science and Technology Studies
Vladimir Batagelj | University of Primorska & Institute of Mathematics, Physics and Mechanics
Ljupčo Todorovski | University of Ljubljana, Faculty of Mathematics and Physics
Marko Bajec | University of Ljubljana, Faculty of Computer and Information Science

I was born on March 7, 1986 in Ljubljana. I am a citizen of Slovenia.