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
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 2023

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

— 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 Naglič & **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 dense spanning trees of unweighted networks" | e-print *arXiv:2205.06628v1*, pp. 13

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

CONFERENCE PUBLICATIONS

— 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 IC²S²* (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

2023	*Journal of Classification* (Springer)	Reviewer
2019	23	**Quantitative Science Studies** (MIT Press)	Regular reviewer
2016	23	**PLoS ONE** (Public Library of Science)	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

2023	24	*International Conference on Web Search and Data Mining* **WSDM**	Program committee
2022	23	*The Web Conference* **Web**	Program committee
2022	23	*ECML PKDD Workshop on Mining and Learning With Graphs* **MLG**	Program committee
2023	*International Conference on Complex Networks and their Applications* **CNA**	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
2017 — 20	*Slovenian Conference on Network Science* **NetSlo**	Organizing committee	With many others
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	*International Conference on Network Science* **NetSci**
2017 — 19	23	*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 2024

Programming 2
University of Ljubljana | Faculty of Mathematics and Physics
YouTube | `http://bit.ly/3jRSS5B`
BSc students | Mandatory course
Oct 2018 — Sep 2024

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

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 2024

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

— **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.