



**Fakulteta za  
informacijske študije**  
Faculty of information studies



# **RESEARCH PORTFOLIO**

## **2017**





Faculty of information studies in Novo mesto (FIS) is an independent public higher education institution. Located in Novo mesto, a major industrial centre in Slovenia and Southeast Europe, we strive to take the leading regional role in education and research in computing and social sciences, exchanging knowledge with business environment and public administration.

The Faculty has about 300 students at BA, MA and PhD levels, 70 members of the academic staff, and 10 members of administrative staff.

As of 2013 when we purchased our **High Performance Computer (HPC)**, we are a part of the regional and European HPC landscape. We are also associated with the PRACE consortium (Partnership for Advanced Computing in Europe), the key European high-performance computing alliance.

While pursuing excellence in teaching and research, our institution has a strong project orientation, with over 70% of its budget coming from research and development projects at national and international level.

Our projects so far include:

- 2013-2015 “Creative Core: Simulations”, four sub-projects: ‘Simulating bio-inspired technological networks’, ‘Categorization and simulation of document flows’, ‘Simulation of business processes’, ‘Simulation in logistics, production systems and service systems’. EU and European regional development fund: **999,000 EUR**,
  - 2013-2016 “Complex Networks”. Slovenian research agency: **494,000 EUR**,
  - 2012-2015 “Development of a quality system at FIS”. EU and Slovenian Ministry of Education, Science and Sport: **243,000 EUR**,
  - 2015-2018 “Complex Oscillatory Systems: Modeling and Analysis”. EU (H2020 Marie Skłodowska-Curie actions): **235,000 EUR** (total consortium funding 3,879,000 EUR),
  - 2014-2020 “Online support for development of project proposals - S4P”. Slovenian research agency: **121,000 EUR**,
  - 2013-2016 “Unraveling Biological Networks”. Slovenian research agency: **120,000 EUR** (total consortium funding 150,000 EUR),
- in addition to over 30 smaller projects where our financing is below 100,000 EUR.

As for our research philosophy, we believe that key scientific breakthroughs will come along the interdisciplinary interface between social and computational sciences. As detailed on the pages that follow, our competences include computational modeling, simulation and analysis in various domains of natural, social and data sciences, while the our backgrounds range from computer science, mathematics and physics to social sciences and economics.

We are interested in applying for all project calls whose scope broadly aligns with our scientific interests. You are kindly invited to express your interest for collaboration at [project.office@fis.unm.si](mailto:project.office@fis.unm.si)



## Biljana Mileva Boshkoska

### Education

- 2013: **PhD in Computer Science**, Jožef Stefan Institute, Slovenia. Thesis: From qualitative to quantitative evaluation methods in multi-criteria decision models.
- 2008: **MSc in Electrical Engineering**, Ss. Cyril and Methodius University, Macedonia. Thesis: Comparison of SVM regression models for prediction of parameter concentrations of ambient air.
- 2001: **BSc in Electrical Engineering**, Ss. Cyril and Methodius University, Macedonia. Thesis: Control of a finger joint production line with SIMATIC S7-300 - a software aspects.

### Research Interests

- Decision support systems, specifically ranking of qualitative multi-attribute decision options.
- Modelling of environmental systems.
- Process and Knowledge management, specifically developing simulation models for public and private health institutions.

### Publications

1. M. Bohanec, P. Boškosi, Đ. Juričić, B. Mileva-Boshkoska, Copula-based decision support system for quality ranking in the manufacturing of electronically commutated motors, *Journal of intelligent manufacturing* 26(2) (2015), 281-293.
2. P. Boškosi, A. Debenjak, Đ. Juričić, B. Mileva-Boshkoska, Dependence among complex random variables as a fuel cell condition indicator, *Journal of power sources* 284 (2015) 566-573.
3. T. Damij, N. Damij, F. Jelenc, B. Mileva-Boshkoska, Abdominal surgery process modeling framework for simulation using spreadsheets, *Computer methods and programs in biomedicine* 21(1) (2015), 1-13.
4. L. Šubelj, M. Bajec, B. M. Boshkoska, A. Kastrin, Z. Levnajic, Quantifying the consistency of scientific databases. *PLoS ONE* 10(5) (2015), e0127390.
5. M. Kos, T. Mesti, B. Mileva-Boshkoska, J. Ocvirk, M. Tekavčič, The cost of systemic therapy for metastatic colorectal carcinoma in Slovenia: discrepancy analysis between cost and reimbursement, *Radiology and oncology*, 49(2) (2015), 200-208.



## Blaž Rodič

### Education

- 2004: **PhD in Information Systems Management**, University of Maribor, Slovenia. Thesis: Distributed simulation support with mobile agents and XML.
- 2002: **MA in Information Systems Management**, University of Maribor, Slovenia. Thesis: Agents for the connection of distributed simulation models.
- 1999: **BSc in Organizational Informatics**, University of Maribor, Slovenia. Thesis: Security of the information system of Dolenjska banka d.d.
- 1995: **BSc in Electrical Engineering**, University of Ljubljana, Slovenia. Thesis: Overview of modern solutions for LAN/MAN telecommunications networks.

### Research Interests

- Development of new and original methods and tools for simulation and modelling (continuous and agent-based).
- Solutions for real-life optimization problems in manufacturing, transport/logistics and service systems within the regional and national economy.
- Development of multi-agent simulation models of societal and organizational systems.

### Publications

1. T. Kanduč, B. Rodič, Optimisation of machine layout using a force generated graph algorithm and simulated annealing, *Int Jour Sim Modelling* 15(2) (2106), 1726-4529.
2. B. Rodič, T. Kanduč, Optimisation of a complex manufacturing process using discrete event simulation and a novel heuristic algorithm, *Intl Jour Math Mod Meth Appl Sci* 9 (2015), 320-329.
3. B. Rodič, A. Baggia, Dynamic airport ground crew scheduling using a heuristic scheduling algorithm. *Int Jour Appl Math Infor* 7 (2013), 2074.
4. B. Rodič, G. Vukovič, B. Završnik, G. Miglič, Issues in introducing training needs analysis in Slovenia's public administration. *Transylv rev admin sci* 37E (2012) 155-171.
5. B. Rodič, Issues of collaboration in a virtual environment. In: Levnajić (ed.). *Facing ICT challenges in the era of social media*. Peter Lang, 2014.



## Borut Lužar

### Education

- 2013: **PhD in Mathematics**, University of Ljubljana, Slovenia. Thesis: Edge colorings and partitions.
- 2008: **BSc in Mathematics**, University of Ljubljana, Slovenia. Thesis: Injective colorings of graphs.

### Research Interests

- Graph colorings and related optimization problems.
- Structural properties of special classes of graphs (planar graphs, fullerenes, hypercubes).
- Graph-theoretic properties of complex networks, (parallel) algorithms.

### Publications

1. M. Cygan, Jian-Feng Hou, Ł. Kowalik, B. Lužar, Jian-Liang Wu, Planar Linear Arboricity Conjecture, *J. Graph Theory* 69(4) (2012), 403-425.
2. D. Kral', M. Krnc, M. Kupec, B. Lužar, J. Volec, Extending fractional precolorings, *SIAM J. Discrete Math.* 26(2) (2012), 647-660.
3. M. Knor, B. Lužar, R. Škrekovski, I. Gutman, On Wiener index of common neighborhood graphs, *MATCH Commun. Math. Comput. Chem.* 72(1) (2014), 321-332.
4. B. Lužar, Z. Levnajić, J. Povh, M. Perc. Community Structure and the Evolution of Interdisciplinarity in Slovenia's Scientific Collaboration Network. *PLoS ONE* 9(4) (2014), e94429.
5. J. Kranjc, B. Lužar, M. Mockovčiaková, R. Soták, On a generalization of Thue sequences, *Electron. J. Combin.* 22(2) (2015), R33.



## Borut Rončević

### Education

- 2003: **PhD in Sociology**, University of Ljubljana, Slovenia. Thesis: Models of developmental strategies.
- 2000: **MA in European Social Policy Analysis**, international consortium programme conducted at National University of Ireland, Maynooth (Ireland), Roskilde University (Denmark), University of Ljubljana (Slovenia). Thesis: Entrepreneurship: The role of structural funds facilitating SME development.
- 1999: **BSc in Sociology**, University of Ljubljana, Slovenia. Thesis: The impact of the third sector in contemporary welfare states.

### Research Interests

- Sociological theory and economic sociology, with a special emphasis on social systems theory and cultural political economy.
- Particular research topics include socio-cultural factors of development, regional systems of innovation, ethnicity/minorities and social costs of gambling.
- Research employed a variety of research methods, including fuzzy-set qualitative comparative analysis, statistical analysis, interviews and focus groups, as well as media content analysis.

### Publications

1. F. Adam, I. Bernik, B. Rončević, A Grand Theory and a Small Social Scientific Community: Niklas Luhmann in Slovenia, *Studies in East European Thought* 57(1) (2015), 61-80.
2. M. Makarovič, J. Šušteršič, B. Rončević, Is Europe 2020 Set to Fail? The Cultural Political Economy of the EU Grand Strategies, *European Planning Studies* 22(3) (2014), 610-626.
3. D. Modic, B. Rončević, Regional Systems of Innovations as Social Fields, *Sociology and Space* 49(191) (2011), 313-333.
4. M. Makarovič, B. Rončević, Towards the Strategies of Modern Societies: Systems and Social Processes, *Innovation: The European Journal of Social Sciences* 23(3) (2010), 223-239.
5. F. Adam, B. Rončević, Social Capital: Recent Debates and Research Trends, *Social Science Information* 42(2) (2003), 155-183.



## Dolores Modic

### Education

- 2013: **PhD in Sociology**, School of Advances Social Sciences in Nova Gorica, Slovenia. Thesis: New Aspects of Intellectual Property Protection in the Context of Innovation Systems.
- 2014: **M.Phil. in Law**, University of Ljubljana, Slovenia. Thesis: Separate opinions at the ECHR (with special emphasis on separate opinions of national judges).
- 2006: **J.D./LL.M in Law**. University of Ljubljana, Slovenia. Thesis: Constitutional Reform of the Lord Chancellor in Great Britain.

### Research Interests

- Technology Transfer, Licensing and IPR Commercialization, Innovations and Innovation Systems.
- Intellectual Property Rights and Optimization of Intellectual Property Rights Processes.
- Human Rights Law and IP Law.

### Publications

6. D. Modic, N. Damij. "Own-it": Managing Intellectual Property Processes via the Activity Table in Creative Industries, In: Information Systems and Management in eMedia and Entertainment (ed: A. Lugmayr, E. Stojmenova, K. Stanoevska, R. Wellington), Springer 2016.
7. B. Rončević, D. Modic. Social fields of technological innovations. In: Global trends and regional development (ed: N. Genov). New York: Routledge 2012.
8. D. Modic, M. P. Feldman, J. Changoluisa. The time lag in university technology transfers – a micro-level licensing data analysis. Presentation at the IP Statistics for decision-makers 2015 OECD Conference, Vienna 2015.
9. B. Rončević, D. Modic. Regional systems of innovations as social fields. Sociologija i prostor, 49(191) (2011), 313-333.



## Kristina Ban

### Education

- 2013-present, **PhD student in Informatics**, Faculty of Information studies in Novo mesto, Slovenia. Thesis: A systematic comparison of network alignment algorithms: towards optimal aligner for PPI networks.
- 2013: **MSc in Informatics**, University of Rijeka, Croatia. Thesis: Memory Java applet.
- 2011: **BSc in Informatics**, University of Rijeka, Croatia. Thesis: Data modelling and preparation before programming.

### Research Interests

- Fundamentals of complex systems, modeling social and biological complex networks.
- Algorithmic aspects of network analysis, specifically network alignment.
- Computational linguistics, language and information networks, culturomics.

### Publications

1. K. Ban, I. Ivakić and A. Meštrović, A preliminary study of Croatian Language Syllable Networks, Mipro SP (2013), 1697-1701.
2. K. Ban, A. Meštrović, S. Martinčić-Ipšić, Initial Comparison of Linguistic Networks Measures for Parallel Texts, ITIS 2013 (2013).





## Matej Makarovič

### Education

- 1999: **PhD in Sociology**, University of Ljubljana, Slovenia. Thesis: Coordination of complexity as a problem of societal evolution.
- 1995: **MA in Sociology and Politics**, Lancaster University, UK. Thesis: Political subsystem in postcommunist modernisation.
- 1993: **BA in Sociology**, University of Ljubljana, Slovenia. Thesis: Political system in a decentric Society.

### Research Interests

- Sociological theory, political sociology and societal development.
- The studies of democratic mechanisms related to the social risks, as well as political and societal steering under the conditions of high complexity.

### Publications

1. T. Golob, S. Kristovič, M. Makarovič, European transnational social fields and identifications: the significance of transnational participation and structured positions in the individual and national context, *European Journal of Science and Theology*, 10(5) (2014), 1-20.
2. M. Makarovič, J. Šušteršič, B. Rončević, Is Europe 2020 Set to Fail? The Cultural Political Economy of the EU Grand Strategies, *European Planning Studies* 22(3) (2014), 610-626.
3. T. Golob, M. Makarovič, *Feeling European: transnational participation and identification*, Vega Press (2012).
4. M. Makarovič, B. Rončević, Interethnic relations in a systemic context: minorities in media and education in Slovenia, *Gesellschaftliche transformationen* 17 (2010).



## Matevž Tomšič

### Education

- 2002: **PhD in Sociology**, University of Ljubljana, Slovenia. Thesis: Stabilisation of democracy and developmental performance of post-socialist societies.
- 1999: **MA in Sociology**, University of Ljubljana, Slovenia. Thesis: Formation of political elites in postsocialist societies.
- 1996: **BA in Sociology**, University of Ljubljana, Slovenia. Thesis: Culture or politics: dilemmas of intellectuals in central and eastern Europe.

### Research Interests

- Quality of governance.
- The role of political actors, especially political (and other) elites.
- The character of political system.
- Democratisation and societal development.
- Media content analysis.

### Publications

1. L. Prijon, M. Tomšič, Elites, ideologies and crisis in Slovenia, *Raziskave in razprave* 6 (2) 2013.
2. U. Vehovar, M. Tomšič, Quality of governance in "Old" and "New" EU member states in a comparative perspective, *Sociológia* 44(3) (2012).
3. F. Adam, M. Tomšič, The dynamics of elites and the type of capitalism: Slovenian exceptionalism?, *Historical Social Research* 37(2) (2012).
4. M. Tomšič, *Elites in Post-Communist Societies*, Vega Press (2011).
5. F. Adam, P. Kristan, M. Tomšič, Varieties of capitalism in Eastern Europe (with special emphasis on Estonia and Slovenia), *Communist and Post-Communist Studies* 42(1) (2009).



## Nadja Damij

### Education

- 2006: **PhD in Information Management**, University of Ljubljana, Slovenia. Thesis: Modelling and simulation of business processes using the upgraded TAD methodology.
- 2005: **MPhil in Knowledge Management**, University of Salford, UK. Thesis: Virtual business: A myth or reality.
- 2003: **MSc in Managing Information Technology**, University of Salford, UK. Thesis: eLearning: an ingredient for success or just another new thing on the market?
- 2001: **BSc in Economics**, University of Ljubljana, Slovenia. Thesis: Modelling of the transit process in the Kovinotehna company using TAD and UML methods.

### Research Interests

- Process management, specifically developing process-oriented Tabular Application Development (TAD) methodology and linking it with analysis of business processes in public health organisations.
- Knowledge management, specifically developing knowledge concepts within the context of methodology for public and private health institutions.
- Information systems development.

### Publications

1. N. Damij, P. Boškoski, M. Bohanec, B. Mileva-Boshkoska, Ranking of business process simulation software tools with DEX/QR hierarchical decision model, PLoS ONE 11(2) (2016), e0148391.
2. J. Agrež, N. Damij. Knowledge dynamics assessment in complex organizational systems : a missing person investigation case study. Central European Journal of Operations Research 23(3) (2015), 527-545.
3. B. Mileva-Boshkoska, T. Damij, F. Jelenc, N. Damij. Abdominal surgery process modeling framework for simulation using spreadsheets. Computer methods and programs in biomedicine 21(1) (2015) 1-13.
4. N. Damij, Z. Levnajić, V. Rejec Skrt, J. Suklan, What motivates us for work?, Intricate web of factors beyond money and prestige. PLoS ONE 10(7) (2015), e0132641.
5. F. Tasevska, T. Damij, N. Damij. Project planning practices based on enterprise resource planning systems in small and medium enterprises - a case study from the Republic of Macedonia. Int jour proj manag 32 (2014) 529-538.



## Riste Škrekovski

### Educations

- 2000: **PhD in Mathematics**, University Ljubljana, Slovenia. Thesis: Graph coloring.
- 1998: **MSc in Mathematics**, University of Ljubljana, Slovenia. Thesis: Flows and coverings of graph.
- 1994: **BSc in Computer Science**, University of Ljubljana, Slovenia. Thesis: Application of graph algorithms in design of database.

### Research Interests

- Graph theory and graph coloring.
- Mathematical chemistry.
- Various aspects of theoretical computer science.
- Graph-theoretic models of complex networks.
- Mathematics & Art.

### Publications

1. T. Kaiser, M. Stehlík, R. Škrekovski, Replication in critical graphs and the persistence of monomial ideals, *Journal of combinatorial theory* 123(1) (2014), 239-251.
2. P. Gregor, R. Škrekovski, V. Vukašinović, On the mutually independent Hamiltonian cycles in faulty hypercubes, *Information sciences* 236 (2013), 224-235.
3. M. Cygan, M. Pilipczuk, R. Škrekovski, On the inequality between radius and Randić index for graphs. *MATCH Communications in Mathematical and in Computer Chemistry* 67(2) (2012), 451-466.
4. P. Gregor, R. Škrekovski, On generalized middle-level problem. *Information sciences* 180(2) (2010), 2448-2457.
5. T. Kaiser, D. Král, R. Škrekovski, X. Zhu, The circular chromatic index of graphs of high girth. *J. Comb. Theory* 97(1) (2007), 1-13.



## Urška Fric

### Education

- 2014-present: **PhD student in Sociology**, School of Advanced Social Studies, Nova Gorica, Slovenia. Thesis: Structuration of industrial symbiosis networks.
- 2013: **MSc in logistics**, University of Maribor, Slovenia. Thesis: The impact of cargo handling on industrial paper roll damage in transport chain.
- 2011: **BSc in logistics**, University of Maribor, Slovenia. Thesis: Analysis of combined and integral form of transport.

### Research Interests

- Socio-cultural factors of industrial symbiosis
- Structuring of industrial symbiosis networks
- Industrial symbiosis networks analysis

### Publications

1. U. Fric, Socio-cultural factors of industrial symbiosis: conceptualization and research approach. *Int jour energy environ* (2016), 70-76.
2. U. Fric, Transformation of ecological aspects of industrial symbiosis in post-industrial society, *Res soc change* (2015), 327-356.
3. U. Fric, Socio-cultural aspects and barriers of industrial symbiosis - the good, the bad and the ugly: which ones matter and why? In: J Strouhal (Ed.), *Economics, law and political science: proceedings of the 4th International conference on economics, political and law science*, Rome, Italy, 2015.
4. U. Fric, Researching socio-cultural aspects of industrial symbiosis, 4th International conference on economics, political and law science. In: J Strouhal (Ed.), *Economics, law and political science: proceedings of the 4th International conference on economics, political and law science*, Rome, Italy, 2015.
5. N. Damij, U. Fric, B. Rončević, The role of social research in optimization of ICT tools for management of industrial symbiotic networks, In: X. Zhuang, C. Guarancia (Eds.), *Recent researches in applied informatics: proceedings of the 6th International Conference on Applied Informatics and Computing Theory*, Salerno, Italy, 2015.



## Zoran Levnajić

### Education

- 2009: **PhD in Theoretical Physics**, Jožef Stefan Institute, Ljubljana, Slovenia. Thesis: Modular gene dynamics and network theory at mesoscopic scale.
- 2005: **MSc in Mechanical Engineering**, University of California, Santa Barbara, USA. Thesis: Ergodic partition theory and visualization of invariant sets and resonances in discrete dynamical systems.
- 2002: **BSc in Physics**, University of Trieste, Italy. Thesis: Visualization of invariant sets in dynamical systems.

### Research Interests

- Modeling and analysis of complex systems in nature and society.
- Mechanisms of self-organization in complex dynamical systems.
- Inverse problems of network reconstruction from empirical data.

### Publications

1. A. Guazzini, D. Vilone, C. Donati, A. Nardi, Z. Levnajić, Modeling crowdsourcing as collective problem solving, *Scientific Reports* 5 (2015), 16557.
2. L. Šubelj, M. Bajec, B. M. Boshkoska, A. Kastrin, Z. Levnajić, Quantifying the consistency of scientific databases. *PloS ONE* 10(5) (2015), e0127390.
3. Z. Levnajić, A. Pikovsky, Untangling complex dynamical systems via derivative-variable correlations, *Scientific Reports* 4, 5030 (2014).
4. Ö. N. Yaveroglu, N. Malod-Dognin, D. Davis, Z. Levnajić, V. Janjić, R. Karapandža, A. Stojmirović, N. Pržulj, Revealing the Hidden Language of Complex Networks, *Scientific Reports* 4, 4547 (2014).
5. Z. Levnajić, A. Pikovsky, Network Reconstruction from Random Phase Resetting, *Physical Review Letters* 107, 034101 (2011).