

APPLICATION: „Danubius Young Scientist Award 2016” (Dr. Aleš Zamuda, Slovenia)

A) SUMMARY OF THE SCIENTIFIC WORK

Doctoral dissertation - PhD received 19 May 2012

ZAMUDA, Aleš. *Differential evolution for parameterized procedural woody plant models reconstruction*, at [University of Maribor](http://dkum.uni-mb.si/Dokument.php?id=30084), 2012. XXII, 164 pp., <http://dkum.uni-mb.si/Dokument.php?id=30084>. [COBISS.SI-ID 16001302]

Doc. dr. Aleš Zamuda is affiliated with the **Faculty of Electrical Engineering and Computer Science** at **University of Maribor**, where he is included in teaching at different undergraduate and postgraduate studies. Also, he is additionally employed on a research programme **P2-0041 Computer Systems, Methodologies, and Intelligent Services** at the faculty, which is funded by Slovenian Research Agency. He is an active member of **Institute of Electrical and Electronics Engineers (IEEE)** and **IEEE Computational Intelligence Society**.

Scientific excellence and innovative approach of the academic work

Dr. Zamuda researches in the meta-heuristics [SWEVO2015] and algorithms within computer science, applying them over various natural and economic *state-of-the-art geographically unbound and Danubian region bound challenges*. As confirmed by **400 Scopus citations** from various application domains [FRAI2016], his work is **referred to by researchers globally, from several different research fields**, including the energy sector [APEN2015]. He introduced an environmental framework for ecosystem simulation (see [INS2013] in the CV below) in fast rendering and animation of forest ecosystems (see Fig. 1), on real terrain data of hillsides nearby Maribor at Slovenian vicinity to Austria, thereby utilizing several ecological models and programming a novel visualization engine. In the spatial modeling of trees, he introduced automatic reconstruction of tree geometry from natural images [INS2014], hereby laying path for an ever-more emerging meta-heuristical approach to geometry and morphology evolution for natural objects [ASOC2011], modeling of which is also actively tackled by other researchers in the Danube region.

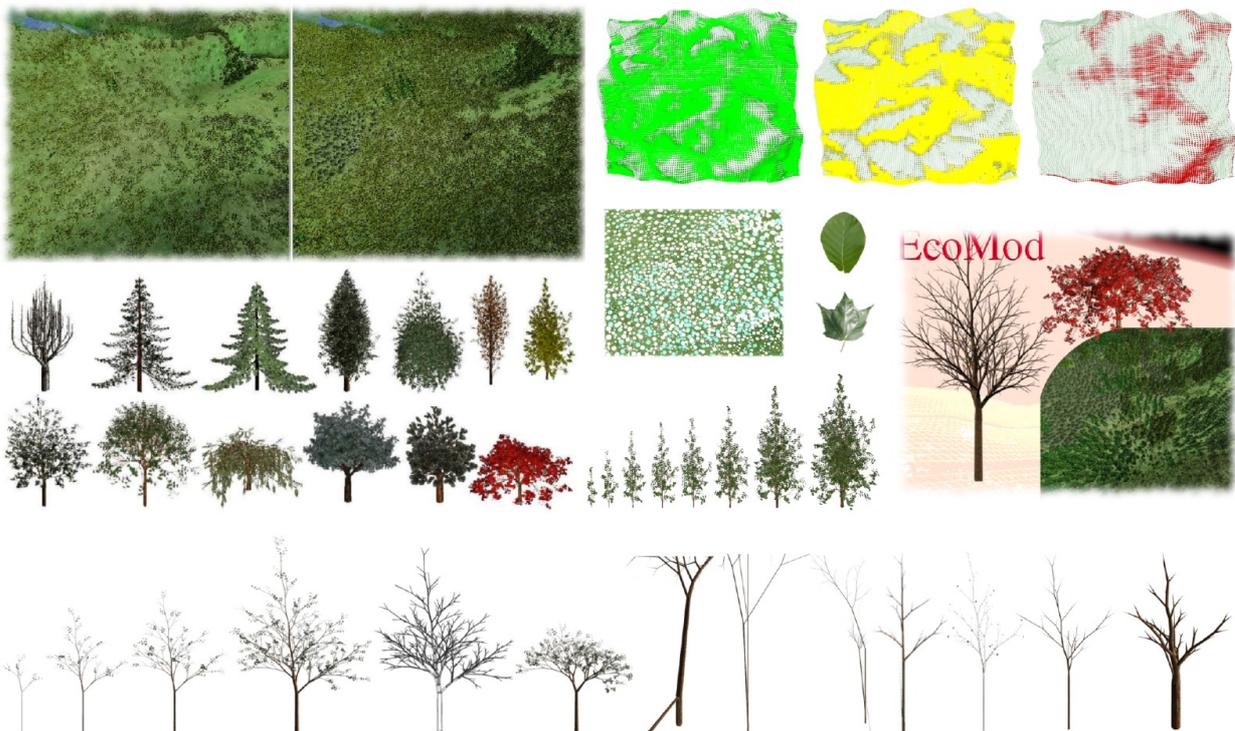


Fig. 1: Graphical abstract of the artificial life and ecological models (EcoMod) research, published in [ASOC2011, INS2013, INS2014]. Top of the figure: enhanced environmental framework model for ecosystem simulation with various new terrain factors models. Bottom of the figure: the novel approach in computer vision and first spatial tree geometry reconstruction for animation.

Thematic relevance of the scientific work for issues/problems of the Danube region

Spatial morphological reconstruction is a major challenge, because it usually computes millions and greater scale of data nodes in a time stream and also includes large-scale computation [INS2013]. As an example of spatial structures in nature are tree models. These are important in forestry, one of most promising sectors for urgent further development of Slovenian economy provided by a high forest coverage of the country and EU recommendations. The developed spatial tree models are used in landscape visualizer, which can also animate afforestation simulation, e.g. after a catastrophe. Forests in Slovenia witness catastrophes such as fires and a recent sleet catastrophe, after which spontaneous afforestation takes place due to certain laws.

Use of procedural models enables a very compact representation of tree structure and its features. The parameters of a procedural model can also be stored in a digital archive for later analysis. From a parameterized model, geometrical models are obtained, which are useful for rendering and analysis (measuring crown, base trunk, wood mass). From the viewpoint of virtual worlds, the archived tree models are useful in virtual landscapes, for historic archiving (virtual heritage) and augmented reality.

Relevance of the scientific work beyond the national borders

Dr. Zamuda also introduced several enhancements to evolutionary algorithms [SWEVO2015], especially the world-champion level algorithm family, the differential evolution, attaining several top ranking positions in these world-competitions on evolutionary algorithms during several years at IEEE Congress on Evolutionary Computation [CEC2007/8/9/10/12]. The algorithms were ranked at IEEE CEC world competitions on performance assessment of evolutionary algorithms, where they several times from 2007 to 2010 were ranked among 5 best performing algorithms. See also below on EcoMod application and the Relevance of the scientific work beyond the national borders.

Potential of the candidate (for example: integration in international networks, participation in scientific projects, publication history, experience in teaching)

The applicability of the results of his research is seen in numerous publications that take these results directly from his published articles in the international literature and compare their own results or just use his proposed mechanisms for new domains. Since his research deals with meta-heuristics, especially **differential evolution**, which currently forms practically the most popular family of evolutionary algorithms, application of the results are already found in many areas of research and industry, both in the public, private, and military sector. The potential results of research in the short term is seen especially in improvements for number of applications and meta-heuristics absorbing knowledge presented in his scientific publications. He is also an **editor at Frontiers in Robotics and AI**, featuring **Evolutionary Optimization and Robotics Intelligence**. The main consideration of his research, spatial reconstruction of trees, has potential applicability both in the domain of **computer animation, computer-aided forestry**, as well as **robot vision, design of natural objects**, and **energy production**. Besides regular teaching at University of Maribor, a **video overview of his research is available through an invited set of lectures online**, from the publisher IGI Global, under the series of InfoSci videos at: <http://www.igi-global.com/video/differential-evolution-large-scale-optimization/14887>.



Meeting leaders of IEEE Young Professionals, with IEEE President-Elect (New York, staff). (Iceland, April 2016)

Participation in scientific projects

His funded research projects include primarily work on P2-0041 funded research unit programme by **Slovenian Research Agency**, where his publications are awarded as some of the most important socio-economic and research achievements of the program. The **P2-0041** is also the funder of the research on differential evolution and modeling trees using automatic reconstruction. Within a **EU FET grant** received by H. Hamann, project “**Florarobotica**”, he contributed on the paper [FRAI2016] (see below). Another work with industry is on projects for private companies, such as optimization of advanced production planning in logistics (PKP INEA, 2015) and package submission labeling with computer vision (**PKP RECA**), funded by the **Slovene Human Resources Development and Scholarship Fund** (each project 22,250.00 € in total). He also received travel grants from EU mechanisms, such as **COST** and Erasmus/**Erasmus+**, to travel to scientific meetings (**Forest-based Platform Technology Congress 2013** and [EUROCAST2015]) or lecturing at foreign universities (University of Las Palmas de Gran Canaria and University of Alicante), where he also collaborates with their research groups on joint research and publications (i.e. glider path planning and document understanding optimization).

The **EcoMod** application developed by dr. Zamuda [ASOC2011, INS2013, INS2014] is selected as **the most important socio-economic and research achievements** of the national research program P2-0041: Computer systems, methodologies and intelligent services (COBISS.SI-ID 16116758 and 16157206).

Dr. Zamuda as one of youngest academia received a **bronze award** from University of Maribor for **extremely important successes and achievements in scientific research and educational field and in the development of the profession and for personal contribution to the reputation of the faculty**. More awards are listed in the CV, and at labraj.feri.um.si/en/EcoMod#Awards. The EcoMod application was also cited in the global (US, EU, China) patents:

1) **Microsoft Corporation patents**: Andreas Heil, Mark Peasley, Vassily Lyutsarev: **Use of scientific models in environmental simulation**. International patents *US 8229718 B2*, *US 20100161295 A1*, *CN 102265259 A*, *EP 2368183 A2*, *WO 2010075458 A2*, *WO 2010075458 A3*.

2) **Commonwealth Scientific And Industrial Research Organisation**: Xavier Raymond Richard Sirault, Jurgen Fripp, Anthony Paproki. **Method and system for characterising plant phenotype**. International patents *US20140294247 A1, CA2858166A1, EP2788958A1, WO2013082648A1*.

Some of his scientific research on reconstruction and evolutionary optimization yielded the following original results:

- design of an algorithm for iterative reconstruction of a tree model [ASOC2011],
- design of a new model and tree renderer, allowing fast animation and sequencing of evolved instances, [INS2013]
- design of an algorithm for rendering projections of a procedural tree [ASOC2011],
- algorithm for comparison of optimized three dimensional models to reference projections [ASOC2011],
- design of comparison metric with emphasis on topological details of trees [ASOC2011],
- use of multi-objective optimization in design of decision system for evaluation of reconstructed models [CEC2012a],
- usage of self-adaptive differential evolution in reconstruction approach [ASOC2011, INS2014],
- fixed vector encoding of auxiliary matrix parameters within procedural model [ASOC2011, INS2014],
- algorithms for tree features segmentation and extraction from photographic input material [INS2014], and
- several differential evolution mechanisms [SWEVO2015], developed in different domains (such as constraint optimization, multi-objective optimization [CEC2007, CEC2012a], co-evolution [CEC2008], local search [CEC2008], and changing population size [SWEVO2015, CEC2013a]).

Further on, dr. Zamuda applied the meta-heuristics to oceanography and underwater robotics (Fig. 2), enhancing operational capabilities of **oceanic underwater gliders (oceanic underwater drones)** by optimizing their path trajectory between autonomous communication intervals on ocean-scale missions [ASOC2014, ASOC2016].

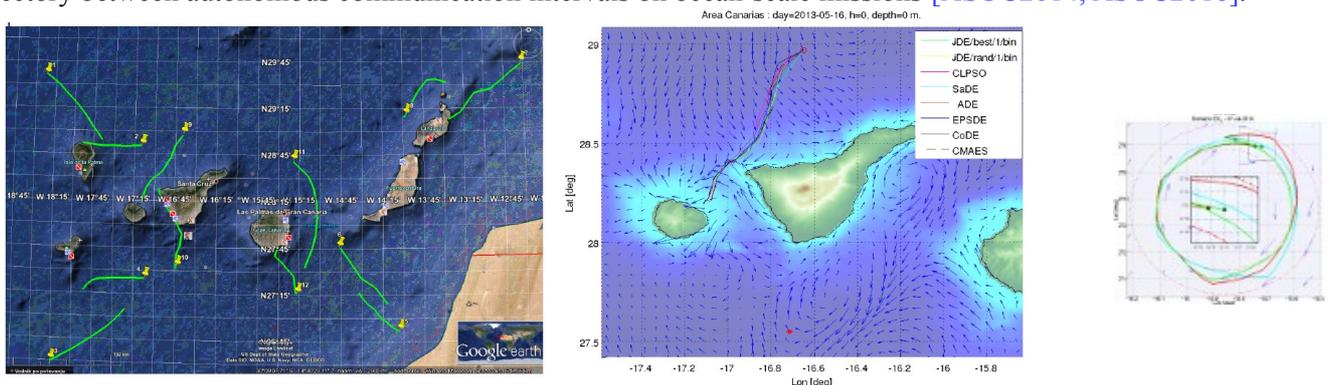


Fig. 2: Ocean glider (autonomous robotic underwater vehicle) path planning using state-of-the-art DE (several researchers from Danube region (co)-work on autonomous vehicles, also oceanic).

Moreover, dr. Zamuda also applied **differential evolution in hydro and thermal power plant scheduling and emission planning** (Fig. 3), **surpassing by far current state of research results from literature** [APEN2015]; the underlying real-data project was carried on real data in part on river Drava. His research is also in useful and applied to other industrial challenges optimization, ranging from nano-materials, chemical engineering, circular antenna design, space probe missions trajectory planning, economic power transmission planning and other [SIDE2012]. Indirect utility of his work is in other areas of computational intelligence, as well as in the field of parallel computing and systems control, his publications work is referred to by a more than 700 Google Scholar citations.

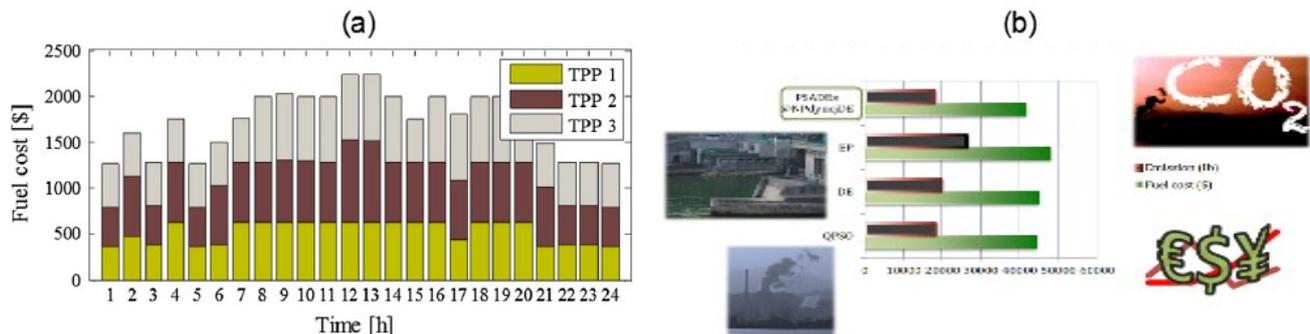


Fig. 3: Hydro and thermal power plants production (a) and emission (b) planning optimization using DE (work is very relevant for the Danube region, the underlying projects are carried out for some main industry companies for the Drava river part). [APEN2015]

B) STATEMENT EXPLAINING THE RELEVANCE OF THE WORK FOR THE DANUBE REGION AND AS APPROPRIATE THE RELEVANCE BEYOND NATIONAL BORDERS

Doc. dr. Aleš Zamuda conducts thematically relevant scientific work for issues/problems of the Danube region, including researches in the meta-heuristics and algorithms within computer science, applying them over various natural and economic state-of-the-art Danubian region bound and globally responsive challenges. As shown through his scientific excellence and innovative approach of the academic work, he is researching artificial life and hybrid societies; he introduced an environmental framework for ecosystem simulation in fast rendering and animation of forest ecosystems, featuring real terrain data of hillsides nearby Maribor, thereby utilizing several ecological models and programming a novel visualization engine. In the spatial modeling of trees, he introduced automatic reconstruction of tree geometry from natural images, hereby laying path for an ever-more emerging meta-heuristical approach to geometry and morphology evolution for natural objects, modeling of which is also actively tackled by other researchers in the Danube region, with who he meets regularly at scientific meetings, where he also sits in different committees. He also introduced several enhancements to evolutionary algorithms, especially the world-champion level algorithm family, the differential evolution, attaining several top ranking positions in these world-competitions on evolutionary algorithms during several years at IEEE Congress on Evolutionary Computation. Further on, he applied the meta-heuristics to oceanography and underwater robotics, enhancing operational capabilities of oceanic underwater gliders by optimizing their path trajectory between autonomous communication intervals on ocean-scale missions, together with University of Las Palmas de Gran Canaria, where he under the umbrella of Industry 4.0 also helped establishing a research laboratory by ITQ GmbH. Moreover, he also applied differential evolution in hydro and thermal power plant scheduling and emission planning, surpassing by far current state of research results from literature; the underlying real-data project was carried on real data in part on river Drava and the project is submitted for funding consideration by KIC InnoEnergy. His research is also useful and applied to other industrial challenges optimization, ranging from nano-materials, chemical engineering, circular antenna design, space-probe missions trajectory planning, economic power transmission planning, and other. Indirect utility of his work is in computational intelligence, as well as in the field of parallel computing and systems control, his publications work is referred to by over 700 Google Scholar citations.

He won numerous national and international awards. Also, his work is selected as the most important socio-economic and research achievements of the national research program P2-0041 "Computer systems, methodologies and intelligent services" and as one of youngest professionals he received a bronze award from University of Maribor for extremely important successes and achievements in scientific research and educational field and in the development of the profession and for personal contribution to the reputation of the faculty.

C) CURRICULUM VITAE INCLUDING PUBLICATION LIST OF THE CANDIDATE

Family name, First name: **Zamuda, Aleš** Date of birth: 23. 4. 1982 Nationality: Slovenian

Researcher unique identifier(s): ORCID **0000-0002-3340-5624**, Research ID E-9728-2010

Web site: <http://www.aleszamuda.si>, <http://labraj.feri.um.si/zamuda>

MEMBER: Institute of Electrical and Electronics Engineers (IEEE) - today, IEEE is the world's largest association of technical professionals with more than 400,000 members in chapters around the world (**integration in international networks**)

SCIENTIFIC CITATIONS - **Scientific excellence of the academic work**

SCOPUS: **400** (h-index 11), Google Scholar: **711** (h-index 13, i-10 index 18)

EDUCATION - **Potential of the candidate**

2012 Ph. D. in computer science, University of Maribor (UM), Slovenia
2008 M. Sc. in computer science, University of Maribor (UM), Slovenia
2006 B. Sc. in computer science, University of Maribor (UM), Slovenia

WORK POSITIONS - **Potential of the candidate**

2014 – **Assistant Professor** (Docent), UM, Faculty of Electrical Engineering and Computer Science
2006 – Teaching Assistant, UM, Faculty of Electrical Engineering and Computer Science
before 2006 student-paid works (laboratories at UM and other companies), see <http://cv.aleszamuda.si>

FELLOWSHIPS AND AWARDS - **Scientific excellence and innovative approach of the academic work**

2016 nomination: **Eni Award 2016** (decision pending, nominated by staff)
2012 gold medal at **SIIF, Seoul** (2012)
2011 most important scientific results of national research programme P2-0041 at UM FEECS
2012 most important socio-economic results of national research programme P2-0041
2007–2010 several Top 5 rankings at **IEEE CEC** world competitions on Evolutionary Algorithms;
2007 **IEEE Region 8 Student Paper Competition vice champion**
2008 Andrej Perlach UM research award
2006–2014 **four UM FEECS research awards**; UM bronze award for research, education, and profession
2006 – research group member: 0796-001 Computer Architecture and Languages Laboratory
2007 – international research society member: **IEEE Computational Intelligence Society**
other several other national awards (available at <http://aleszamuda.si/w/awards>)

NATIONAL AND INTERNATIONAL TEACHING ACTIVITIES - **Potential of the candidate**

2006 – University of Maribor, FEECS, courses 1) Connectible Systems and Intelligent Services, 2) Heterogeneous Computer Systems, 3) Programming I, 4) System Administration, 5) Computer Architectures, 6) Application Services; advised 8-course pedagogic team projects Network Games and Mobile Games (national TV filmed), resulting in over dozen advised B. Sc. student diplomas.
2012/13/15/16 ERASMUS invited lecturer at University of Las Palmas de Gran Canaria, Spain
2013 ERASMUS invited lecturer at University of Alicante, Spain

ARTICLE PUBLICATIONS IN JOURNALS - **Scientific excellence and innovative approach of the academic work, Thematic relevance of the scientific work for issues/problems of the Danube region, Relevance of the scientific work beyond the national borders, Potential of the candidate**

1. [APEN2015] GLOTIĆ, Arnel, **ZAMUDA, Aleš**. Short-term combined economic and emission hydrothermal optimization by surrogate differential evolution. *Applied energy*, ISSN 0306-2619, 1 March 2015, vol. 141, pp. 42-56, doi: 10.1016/j.apenergy.2014.12.020. [COBISS ID18347030] **JCR IF=5.613 (Q1)**

Relevance of the scientific work beyond the national borders: The co-author is now affiliated at Siemens, Austria (Power System Planning, Scheduling and Forecasting)

Thematic relevance of the scientific work for issues/problems of the Danube region: this study covers the issue of energy scheduling in Danube region, with emphasis on hydrothermal power plants, water reservoirs balancing, and consideration of thermal power plant pollution minimization at combined energy production on state level

2. [INS2014] **ZAMUDA, Aleš**, BREST, Janez. Vectorized procedural models for animated trees reconstruction using differential evolution. *Information sciences*, ISSN 0020-0255. [Print ed.], Sep. 2014, vol. 278, pp. 1-21, doi: 10.1016/j.ins.2014.04.037. [COBISS.SI-ID 17793558] **JCR IF=4.038 (Q1)**

3. [INS2013] **ZAMUDA, Aleš**, BREST, Janez. Environmental framework to visualize emergent artificial forest ecosystems. *Information sciences*, ISSN 0020-0255. [Print ed.], Jan. 2013, vol. 220, pp. 522-540, doi: 10.1016/j.ins.2012.07.031. [COBISS.SI-ID 16157206] **JCR IF=3.893 (Q1)**

4. [ASOC2016] ZAMUDA, Aleš, HERNÁNDEZ SOSA, José Daniel, ADLER, Leonhard. Constrained differential evolution optimization for underwater glider path planning in sub-mesoscale eddy sampling. *Applied soft computing*, ISSN 1568-4946. May 2016, vol. 42, pp. 93-118, doi: 10.1016/j.asoc.2016.01.038. [COBISS.SI-ID 19316502]
Relevance of the scientific work beyond the national borders: EU-scale collaboration JCR IF=2.810 (Q1)
 5. [ASOC2014] ZAMUDA, Aleš, HERNÁNDEZ SOSA, José Daniel. Differential evolution and underwater glider path planning applied to the short-term opportunistic sampling of dynamic mesoscale ocean structures. *Applied soft computing*, ISSN 1568-4946, Nov. 2014, vol. 24, pp. 95-108, doi: 10.1016/j.asoc.2014.06.048. [COBISS.SI-ID 17953046]
Relevance of the scientific work beyond the national borders JCR IF=2.810 (Q1)
 6. [ASOC2011] ZAMUDA, Aleš, BREST, Janez, BOŠKOVIĆ, Borko, ŽUMER, Viljem. Differential evolution for parameterized procedural woody plant models reconstruction. *Applied soft computing*, ISSN 1568-4946, 2011, vol. 11, iss. 8, pp. 4904-4912, doi: 10.1016/j.asoc.2011.06.009. [COBISS.SI-ID 15175446] **JCR IF=2.612 (Q1)**
 7. [IJSS2013] BREST, Janez, KOROŠEC, Peter, ŠILC, Jurij, ZAMUDA, Aleš, BOŠKOVIĆ, Borko, SEPESY MAUČEC, Mirjam. Differential evolution and differential ant-stigmery on dynamic optimisation *problems*. *International Journal of Systems Science*, ISSN 0020-7721, 2013, vol. 44, no. 4, pp. 663-679, doi: 10.1080/00207721.2011.617899. [COBISS.SI-ID 15354390] **JCR IF=1.579 (Q1)**
 8. [SOCO2011] BOŠKOVIĆ, Borko, BREST, Janez, ZAMUDA, Aleš, GREINER, Sašo, ŽUMER, Viljem. History mechanism supported differential evolution for chess evaluation function tuning. *Soft computing*, ISSN 1432-7643. 2011, vol. 15, no. 4, pp. 667-683, doi: 10.1007/s00500-010-0593-z. [COBISS.SI-ID 13985046] **JCR IF=1.880 (Q1)**
 9. [SWEVO2015] ZAMUDA, Aleš, BREST, Janez. Self-adaptive control parameters' randomization frequency and propagations in differential evolution. *Swarm and evolutionary computation*, ISSN 2210-6502, Dec. 2015, vol. 25, pp. 72-99, doi: 10.1016/j.swevo.2015.10.007. [COBISS.SI-ID 19030550] **ScienceDirect HOT25 SNIP=5.220 (Q1)**
 10. [FRAI2016] H. Hamann, Y. Khaluf, J. Botev, M. Divband Soorati, E. Ferrante, O. Kosak, J.-M. Montanier, S. Mostaghim, R. Redpath, J. Timmis, F. Veenstra, M. Wahby, A. Zamuda. Hybrid Societies: Challenges and Perspectives in the Design of Collective Behavior in Self-organizing Systems. *Frontiers in Robotics and AI* (editors: ZAMUDA, A., HERNÁNDEZ SOSA, J. D.), 2016, vol. 3, no. 14. DOI 10.3389/frobt.2016.00014. **(JCR pending, 2000+ reads/month)**
- Relevance of the scientific work beyond the national borders: [FRAI2016] - EU-scale collaboration, with highly cited authors, several also from Danube region; participation in scientific projects – this work was done under EU FET grant, project “Florarobotica”, granted to first author (H. Hamann)**
11. [INF2015] ZAMUDA, Aleš, MLAKAR, Uroš. Differential evolution control parameters study for self-adaptive triangular brushstrokes. *Informatica*, ISSN 0350-5596, June 2015, vol. 39, no. 2, pp. 105-113. [COBISS.SI-ID 18828310] **(JCR indexed)**

SELECTED SCIENTIFIC INTERNATIONAL CONFERENCES PUBLICATIONS

Relevance of the scientific work beyond the national borders

1. [WCCI2016a] ZAMUDA, Aleš, HERNÁNDEZ SOSA, José Daniel, ADLER, Leonhard. Improving Constrained Glider Trajectories for Ocean Eddy Border Sampling within Extended Mission Planning Time. *IEEE World Congress on Computational Intelligence (IEEE WCCI), Vancouver, Canada*, 24-29 July 2016 (accepted paper).
2. [WCCI2016b] ZAMUDA, Aleš, MLAKAR, U. Tiled EvoLisa Image Evolution With Blending Triangle Brushstrokes and Gene Compression DE. *IEEE World Congress on Computational Intelligence (IEEE WCCI), Vancouver, Canada*, 24-29 July 2016 (accepted paper).
3. [EUROCAST2015] ZAMUDA, Aleš, HERNÁNDEZ SOSA, José Daniel. Underwater glider path planning and population reduction in differential evolution. V: QUESADA-ARENCIBIA, Alexis (ed.). *EUROCAST 2015: Fifteenth International Conference on Computer aided systems theory*, February 8-13, 2015, *Las Palmas de Gran Canaria, Spain*. [S. l.: s. n., 2015], pp. 274-275.
4. [SDE2014] BREST, Janez, ZAMUDA, Aleš, FISTER, Iztok, BOŠKOVIĆ, Borko. Some improvements of the self-adaptive jDE algorithm. V: *IEEE Symposium on differential evolution, SDE 2014*, December 9-12, 2014, *Orlando, Florida, U.S.A.* 2014 *IEEE symposium series on computational intelligence : proceedings*. Piscataway: IEEE, cop. 2014, pp. 73-80. [COBISS.SI-ID 18361622]
5. [BIOMA2014] MLAKAR, Uroš, BREST, Janez, ZAMUDA, Aleš. Differential evolution for self-adaptive triangular brushstrokes. V: *Student Workshop on Bioinspired Optimization Methods and their Applications - BIOMA 2014*, 13 September 2014, Ljubljana. ŠILC, Jurij (ur.), ZAMUDA, Aleš (ur.). *Bioinspired optimization methods and their applications : proceedings of the Student Workshop on Bioinspired Optimization Methods and their Applications - BIOMA 2014*, 13 September 2014, Ljubljana, Slovenia. Ljubljana: Jožef Stefan Institute, 2014, pp. 105-116. [COBISS.SI-ID 18089494]
6. [CEC2013a] ZAMUDA, Aleš, BREST, Janez, MEZURA-MONTES, Efrén. Structured population size reduction differential evolution with multiple mutation strategies on CEC 2013 real parameter optimization. V: [2013 IEEE CEC], June 20-23, 2013, *Cancun, Mexico*. *IEEE Congress on Evolutionary Computation*. [S. l.: IEEE, cop. 2013, pp. 1925-1931. [COBISS.SI-ID 17008150] **Relevance of the scientific work beyond the national borders – collaboration with co-author from Mexico**
7. [CEC2013b] BREST, Janez, BOŠKOVIĆ, Borko, ZAMUDA, Aleš, FISTER, Iztok, MEZURA-MONTES, Efrén. Real parameter single objective optimization using self-adaptive differential evolution algorithm with more strategies. V: [2013 IEEE CEC], June 20-23, 2013, *Cancun, Mexico*. *IEEE Congress on Evolutionary Computation*. [S. l.: IEEE, cop. 2013, pp. 377-383. [COBISS 17007126]
8. [CEC2012a] ZAMUDA, Aleš, BREST, Janez. Tree model reconstruction innovation using multi-objective differential evolution. V: *IEEE World Congress on Computational Intelligence, Brisbane, Australia*. *IEEE WCCI 2012*. [S. l.: IEEE, 2012], *IEEE CEC*, pp. 575-582. [COBISS.SI-ID 16116758]

9. [CEC2012b] BREST, Janez, BOŠKOVIĆ, Borko, ZAMUDA, Aleš, FISTER, Iztok, SEPESY MAUČEC, Mirjam. Self-adaptive differential evolution algorithm with a small and varying population size. V: IEEE World Congress on Computational Intelligence, **Brisbane, Australia**. IEEE WCCI 2012. [S. l.: IEEE, 2012], IEEE CEC, pp. 2827-2834. [COBISS.SI-ID 16116502]
10. [SDE2011] BREST, Janez, ZAMUDA, Aleš, FISTER, Iztok, BOŠKOVIĆ, Borko, SEPESY MAUČEC, Mirjam. Constrained real-parameter optimization using a differential evolution algorithm. V: IEEE SSCI2011 symposium series on computational intelligence, **Paris, France**: proceedings. Piscataway: IEEE, cop. 2011, pp. 9-16. [COBISS.SI-ID 14952214]
11. [BIOMA2010] ZAMUDA, Aleš, BREST, Janez, BOŠKOVIĆ, Borko, ŽUMER, Viljem. Woody plants model recognition by differential evolution. V: FILIPIČ, Bogdan (ur.), ŠILC, Jurij (ur.). Bioinspired optimization methods and their applications : proceedings of the Fourth International Conference on Bioinspired Optimization Methods and their Applications, BIOMA 2010, 20-21 May 2010, Ljubljana, Slovenia. Ljubljana: Jožef Stefan Institute, 2010, pp. 205-215. [COBISS.SI-ID 14126102]
12. [CEC2010] BREST, Janez, ZAMUDA, Aleš, FISTER, Iztok, SEPESY MAUČEC, Mirjam. Large scale global optimization using self-adaptive differential evolution algorithm. V: IEEE World Congress on Computational Intelligence, **Barcelona, Spain**, July 18-23, 2010. WCCI 2010 Proceedings. [S. l.]: IEEE, cop. 2010, CEC IEEE, pp. 3097-3104. [COBISS.SI-ID 14281238]
13. [CEC2009a] ZAMUDA, Aleš, BREST, Janez, BOŠKOVIĆ, Borko, ŽUMER, Viljem. Differential evolution with self-adaptation and local search for constrained multiobjective optimization. V: 2009 IEEE Congress on Evolutionary Computation, IEEE CEC 2009, 18th to 21st May 2009, **Trondheim, Norway**: programme & abstracts. Piscataway: IEEE, 2009, pp. 195-202. [COBISS.SI-ID 13217558]
14. [CEC2009b] BREST, Janez, ZAMUDA, Aleš, BOŠKOVIĆ, Borko, SEPESY MAUČEC, Mirjam, ŽUMER, Viljem. Dynamic optimization using self-adaptive differential evolution. V: 2009 IEEE Congress on Evolutionary Computation, IEEE CEC 2009, 18th to 21st May 2009, **Trondheim, Norway**: programme & abstracts. Piscataway: IEEE, 2009, pp. 415-422. [COBISS.SI-ID 13217814]

AWARD: IEEE Computational Intelligence Society CEC 2009 Evolutionary computation in dynamic and uncertain environments competition Winning entry certificate

15. [BIOMA2008] BREST, Janez, ZAMUDA, Aleš, BOŠKOVIĆ, Borko, GREINER, Sašo, SEPESY MAUČEC, Mirjam, ŽUMER, Viljem. Self-adaptive differential evolution with SQP local search. V: FILIPIČ, Bogdan (ur.), ŠILC, Jurij (ur.). Bioinspired optimization methods and their applications: proceedings of the Third International Conference on Bioinspired Optimization Methods and their Applications, BIOMA 2008, 13-14 October 2008, Ljubljana, Slovenia. Ljubljana: Jožef Stefan Institute, 2008, pp. 59-69. [COBISS.SI-ID 12707862]
16. [CEC2008a] BREST, Janez, ZAMUDA, Aleš, BOŠKOVIĆ, Borko, SEPESY MAUČEC, Mirjam, ŽUMER, Viljem. High-dimensional real-parameter optimization using self-adaptive differential evolution algorithm with population size reduction. V: IEEE World Congress on Computational Intelligence, **Hong Kong**, June 1-6, 2008. WCCI 2008 Proceedings. [S. l.]: IEEE, 2008, pp. 2032-2039. [COBISS.SI-ID 12328982]
17. [CEC2008b] ZAMUDA, Aleš, BREST, Janez, BOŠKOVIĆ, Borko, ŽUMER, Viljem. Large scale global optimization using differential evolution with self-adaptation and cooperative co-evolution. V: IEEE World Congress on Computational Intelligence, **Hong Kong**, June 1-6, 2008. WCCI 2008 Proceedings. [S. l.]: IEEE, 2008, pp. 3719-3726. [COBISS.SI-ID 12329238]
18. [CEC2007] ZAMUDA, Aleš, BREST, Janez, BOŠKOVIĆ, Borko, ŽUMER, Viljem. Differential evolution for multiobjective optimization with self adaptation. V: CEC 2007: 2007 IEEE Congress on Evolutionary Computation : 25-28 September 2007, **Singapore**. Piscataway: Institute of Electrical and Electronics Engineers, 2007, pp. 3617-3624. [COBISS.SI-ID 11730710]
19. [EUROCON2007] ZAMUDA, Aleš, BREST, Janez, GUID, Nikola, ŽUMER, Viljem. Modelling, simulation and visualisation of forest ecosystems. V: The International Conference on Computer as a tool, **Warsaw, Poland**, September 9-12, 2007. Region 8 Eurocon 2007: proceedings. Piscataway, NJ: IEEE Service Center, [2007], pp. 2600-2606. [COBISS.SI-ID 11643926]

AWARD: "IEEE certifies that Aleš Zamuda has been awarded second place in the 2007 Region 8 Student paper competition for presentation"

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OTHER PUBLICATIONS 20+ national slovenian publications and other book chapter publications

Reviewer for scientific journals (most JCR Q1, 30+ journals) - integration in international networks :

Applied soft computing, Engineering applications of artificial intelligence, IEEE Transactions on evolutionary computation, Natural computing, Neural computing & applications, Neurocomputing, Swarm and evolutionary computation, Applied energy, Applied mathematical modelling, IEEE Transactions on cybernetics, Information sciences, International Journal of Biodiversity and Conservation, Mathematical problems in engineering, Remote sensing, Soft computing, African journal of business management, Applied mathematics and computation, Computational optimization and applications, Indian Journal of Engineering & Materials Sciences, Informatica, Journal of algorithms and optimization, Journal of Applied Mathematics, Journal of computers, Journal of Ecology and the Natural Environment, European journal of operational research, IEEE Transactions on industrial electronics, IEEE Transactions on systems, man and cybernetics, IEEE computational intelligence magazine, Journal of software engineering and applications, Memetic computing, International Journal of Systems Science, Journal of industrial and management optimization - the ISSN numbers are available at <http://bib.aleszamuda.si>.

50+ scientific conferences committees member - integration in international networks : AR4MET (**Bali**: 2015; **Batam** 2016), BIOMA (Ljubljana: 2014, 2016), CEC (**Singapore**: 2007; **Hong Kong**: 2008; **Trondheim**: 2009; **Barcelona**: 2010; **New Orleans**: 2011; **Vancouver**: 2016), CSOC (On-line: 2015, 2016), ERK (Portorose: 2010), EUROGEN (**Glasgow**: 2015), FABE (**Mykonos Island**: 2015), FUTURECOMP (**Venice**: 2014; **Nice**: 2015; **Rome**: 2016), IACIET (**Jaipur**: 2014), ICACCI (**Greater Noida**: 2014; **Aluva**: 2015), ICAISC (**Zakopane**: 2014, 2015, 2016), ICCME (**Athens**: 2015), ICEM (**Rome**: 2010; **Marseille**: 2012), ICIT (**Dubai**: 2014), ICOA (2015), IPIC (**Orlando**: 2015), ISNN (**Saint Petersburg**: 2016), PPSN (Ljubljana: 2014; **Edinburgh**: 2016), SASO FAS*W SOCO (**Augsburg**, 2016), SEMCCO (**Chennai**: 2010, 2011), SIRS (**Trivandrum**: 2015), SPICES (2015), SSCI SDE (**Paris**: 2011; **Singapore**: 2013; **Orlando**: 2014; **Cape Town**: 2015), WMSCI (**Orlando**: 2015, 2016).



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prospere defendit dissertationem, quae inscribitur

**Diferencialna evolucija za rekonstrukcijo
parametriziranih proceduratnih drevesnih modelov**

Universitas studiorum Mariborensis ei titulum academicum

doctor in campo artis computatoriae et informaticae

confert atque omnia iura, quae inde emanant, tribuit

Numerus: CM

In Maribor, die XIX mensis Iunii anno MMXII

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