09.05.2018

CHRISTINA YU. BRESTER
M.Sc., Candidate of Technical Sciences

Personal

Date of birth: 17 February 1991
Place of birth: Sosnovoborsk, Krasnoyarsk region, Russian Federation
Gender: Female
Citizenship: Russian Federation
Current residence: Kuopio, Finland

Education and degrees awarded

2016: Candidate of Technical Sciences
Siberian Federal University and Institute of Computational Modeling of Siberian Branch of Russian Academy of Sciences, Krasnoyarsk, Russia
Dissertation: *Cooperative Evolutionary Method for Multi-objective Optimization in Speech Analysis Problems*

2014: M.Sc. in System Analysis and Control (with honors)
Reshetnev Siberian State Aerospace University (SibSAU), Krasnoyarsk, Russia
Major subject: Data Science and Modeling

2012: B.Sc. in System Analysis and Control (with honors)
Reshetnev Siberian State Aerospace University (SibSAU), Krasnoyarsk, Russia
Major subject: Data Science and Modeling

Other education and training

Participation in "Leonhard-Euler Scholarship Program", 2013-2014 (DAAD, Germany): Internship at the Ulm University, working on Master thesis under the joint Russian-German supervision

Linguistic skills

Mother tongue: Russian
Other languages: English (fluent)

Current position

Doctoral student, grant researcher: the EDUFI Fellowship (CIMO) by the Finnish National Agency for Education, 01.02.2018 – 31.10.2018
University of Eastern Finland, Kuopio
Department of Environmental and Biological Sciences
Research in the field of epidemiology: automated design of mathematical models to predict cardiovascular diseases

Previous work experience

2017-18: Docent
Department of Higher Mathematics, Reshetnev Siberian State University of Science and Technology (former SibSAU), Krasnoyarsk, Russia

Lecturing in higher mathematics for engineering and economics students (mathematical analysis, linear algebra and analytical geometry)

2016-17: Senior Lecturer
Department of Higher Mathematics, Reshetnev Siberian State Aerospace University (SibSAU), Krasnoyarsk, Russia
Lecturing in higher mathematics for engineering and economics students (mathematical analysis, linear algebra and analytical geometry)

2015-16: Visiting Research Fellow
University of Eastern Finland, Kuopio, Finland
Research in the field of epidemiology: automated design of mathematical models to predict cardiovascular diseases
Grant of the Ministry of Education and Science of the Russian Federation to do research abroad

2014-16: Doctoral Study
Reshetnev Siberian State Aerospace University (SibSAU), Krasnoyarsk, Russia
Development and investigation of multi-objective optimization evolutionary algorithms, automated design of artificial neural networks

2012-15: Junior Research Fellow
Reshetnev Siberian State Aerospace University (SibSAU), Krasnoyarsk, Russia
Data analysis, data mining, working on international projects, implementing novel algorithms, writing scientific papers

2012-13: Analyst
Siberian Integration Systems, Krasnoyarsk, Russia
Analyst of Software Development: meeting with clients, writing requirements for software, presentations for clients, software testing

Research funding as well as leadership and supervision

EDUFI Fellowship: a start-up grant for doctoral level students for 9 months, **2018** (13 500 EUR)

Presidential Fellowship: Grant of the Ministry of Education and Science of the Russian Federation to do research abroad for 10 months, **2015-2016** (14 830 EUR)

Project leader: "Cooperative multi-objective evolutionary algorithms in dynamic system identification problems", Presidential Fellowship for young scientists to perform advanced research in priority areas of the Russian economy, **2018-2020** (11 725 EUR)

Project leader: "Automatic segmentation of the heart's left ventricle in magnetic resonance imaging based on the clustering approach" №16-41-243036, Russian Foundation for Basic Research, Government of Krasnoyarsk Territory, Krasnoyarsk Region Science and Technology Support Fund, **2016-2018** (12 850 EUR)

Project leader: "Speech-based speakers and speakers' personal characteristics recognition", Foundation for Assistance to Small Innovative Enterprises, Russia, **2014-2016** (5 715 EUR)

Team member: Joint Russian-Slovenian research project "Evolutionary and Bio-Inspired Algorithms Based Efficient Control of Cyber-physical Systems & Internet of Things", **2016-2018**, SibSAU – Maribor University (Slovenia), Slovenian Academy of Science project BI-RU/16-18-040

Team member: "Development of algorithms and approaches for improving the quality and speed of data mining technologies design by means of data reduction" №16-31-00349, Russian Foundation for Basic Research, **2015-2016**

Team member: "Self-configuring intelligent technologies based algorithms for the computer-aided design of highly reliable systems for analysis, decision support and control of rocket engine fire tests", **2014-2016**, State Assignment Project 2.1889.2014/K

Team member: "Distributed self-configuring multi-agent technologies of intelligent information nets design and control", **2014-2015**, governmental contract № 14.574.21.037

Team member: "Models and algorithms of data mining systems with adaptation mechanism for solving of modeling and optimization problems in complex technical systems" - grant of the President of the Russian Federation (MK-5391.2014.9), **2014-2015**

Team member: Joint Russian-German research project "Distributed intelligent systems of multilingual information processing in dialogue telecommunication systems", SibSAU – Ulm University (Germany), **2011-2013**, governmental contract № 11.519.11.4002

Team member: Joint Russian-German research project "Models and algorithms for the automated design of hardware-software complexes of multilingual information intelligent processing in distributed high-performance systems of space mission", SibSAU – Ulm University (Germany), **2011-2013**, governmental contract № 16.740.11.0742

Merits in teaching and pedagogical competence

Mathematics Courses: **Mathematical Analysis, Linear Algebra and Analytical Geometry**, 2016-2018: lecturing for engineering and economics students, Department of Higher Mathematics, Siberian State University of Science and Technology, Krasnoyarsk, Russia

Awards, prizes and honours

2018 – Award of the Head of Krasnoyarsk city for the high contribution to scientific research, Krasnoyarsk, Russia
2017 – Russian Presidential Fellowship for young scientists to perform advanced research in priority areas of the Russian economy, 2018-2020
2015 – Russian Presidential Fellowship for research stay abroad, 2015-2016
2015 – State Award of Krasnoyarsk region for the high contribution to scientific research, Krasnoyarsk, Russia
2013 – Winner of the competition in "Leonhard-Euler Scholarship Program" (DAAD, Germany, 2013-2014)
2013 – Russian Presidential Scholarship for outstanding students, 2013-2014
2013 – Laureate of the All-Russian competition of students in the area of System Analysis, Moscow, Russia, the 1st team place

Other academic merits

Chair at the Fifth International Workshop on Mathematical Models and their Applications 2016 (IWMMA2016), Krasnoyarsk, Russia (Student Session)

Scientific and societal impact of research

Publications:
Over **60** research papers in journals and conference proceedings (over **25** papers in English and over **35** papers in Russian).
List of the selected *peer-reviewed* scientific articles:

1. **Brester Ch.,** Ryzhikov I., Semenkin E., Kolehmainen M. On Island Model Performance for Cooperative Real-Valued Multi-Objective Genetic Algorithms. Advances in Swarm and Computational Intelligence. 2018. – *In press*

2. **Brester Ch.,** Ryzhikov I., Semenkina O. Generic scheme of a restart meta-heuristic operator for multi-objective genetic algorithms. International Journal on Information Technologies & Security, № 2 (vol.10), 2018. – *In press*

3. Ryzhikov I., **Brester Ch.,** Semenkin E. Inverse Mathematical Modelling of Hexadecane Disintegration Reaction with Cooperative Multi-Objective Genetic Algorithms. Lecture Notes in Electrical Engineering. 2018. – *In press*

4. Ryzhikov I., **Brester Ch.,** Semenkin E. A Multi-Objective Approach with a Restart Meta-Heuristic for the Linear Dynamical Systems Inverse Mathematical Problem. International Journal on Information Technologies and Security, No. 1 (vol. 10), 2018, pp. 93-102

5. **Brester Ch.,** Ryzhikov I., Semenkin E. Multi-objective Optimization Algorithms with the Island Metaheuristic for Effective Project Management Problem Solving. Organizacija (Journal of Management, Information Systems and Human Resources), vol.50, no. 4, 2017, pp. 364-373.

6. **Brester Ch.,** Ryzhikov I., Semenkin E. On performance improvement based on restart meta-heuristic implementation for solving multi-objective optimization problems. Advances in Swarm Intelligence, 2017, pp. 49-56. DOI: 10.1007/978-3-319-61833-3_3

7. Ryzhikov I., **Brester Ch.,** Semenkin E. A novel linear time invariant systems order reduction approach based on a cooperative multi-objective genetic algorithm. Advances in Swarm Intelligence, 2017, pp. 23-30. DOI: 10.1007/978-3-319-61833-3_6

8. Ryzhikov I., **Brester Ch.,** Semenkin E. Multi-objective dynamical system parameters and initial value identification approach in chemical disintegration reaction modelling. In Proceedings of the 14th International Conference on Informatics in Control, Automation and Robotics (ICINCO 2017), 2017, vol.1, pp. 497-504. DOI: 10.5220/0006431504970504

9. Stanovov V., **Brester Ch.,** Kolehmainen M., Semenkina O. Why don't you use Evolutionary Algorithms in Big Data? IOP Conference Series: Materials Science and Engineering, 2017. DOI: 10.1088/1757-899X/173/1/012020

10. **Brester Ch.,** Ryzhikov I., Semenkin E. Restart operator for multi-objective genetic algorithms: implementation, choice of control parameters and ways of improvement. International Journal on Information Technologies and Security, no. 4 (vol. 9), 2017, pp. 25-36.

11. **Brester Ch.,** Semenkin E., Sidorov M. Multi-objective heuristic feature selection for speech-based multilingual emotion recognition. Journal of Artificial Intelligence and Soft Computing Research, vol. 6, no. 4, 2016, pp. 243-253.

12. **Brester Ch.,** Kauhanen J., Tuomainen T.P., Semenkin E., Kolehmainen M. Comparison of two-criterion evolutionary filtering techniques in cardiovascular predictive modelling. Proceedings of the 13th International Conference on Informatics in Control, Automation and Robotics (ICINCO'2016), Lisbon, Portugal. Vol. 1, 2016, pp. 140-145.

13. Semenkina M., Akhmedova S., **Brester Ch.,** Semenkin E. Choice of spacecraft control contour variant with self-configuring stochastic algorithms of multi-criteria optimization. Proceedings of the 13th International Conference on Informatics in Control, Automation and Robotics (ICINCO'2016), Lisbon, Portugal. Vol. 1, 2016, pp. 281-286.

14. **Brester Ch.,** Semenkin E. Cooperative Multi-Objective Genetic Algorithm with Parallel Implementation. Advances in Swarm and Computational Intelligence. Part I, LNCS 9140, 2015, pp. 471–478.

15. Sidorov M., **Brester Ch.,** Schmitt A. Contemporary stochastic feature selection algorithms for speech-based emotion recognition. Proceedings of INTERSPEECH 2015, Dresden, Germany, 2015, pp. 2699-2703.

16. **Brester Ch.,** Semenkin E., Sidorov M., Semenkina O. Multicriteria neural network design in the speech-based emotion recognition problem. Proceedings of the 12th International

Conference on Informatics in Control, Automation and Robotics (ICINCO'2015), Colmar, France. Vol. 1, 2015, pp. 621–628.

17. **Brester Ch.,** Semenkin E., Sidorov M., Kovalev I., Zelenkov P. Evolutionary feature selection for emotion recognition in multilingual speech analysis. Proceedings of IEEE Congress on Evolutionary Computation (CEC2015), Sendai, Japan, 2015, pp. 2406–2411.

18. **Brester Ch.,** Semenkin E., Sidorov M. Acoustic Emotion Recognition: Two Ways of Features Selection based on Self-Adaptive Multi-Objective Genetic Algorithm. Proceedings of the 11th International Conference on Informatics in Control, Automation and Robotics (ICINCO'2014), Vienna, Austria. Vol. 2, 2014, pp. 851–855.

19. Sidorov M., **Brester Ch.,** Minker W., Semenkin E. Speaker State Recognition with Neural Network-based Classification and Self-adaptive Heuristic Feature Selection. Proceedings of the 11th International Conference on Informatics in Control, Automation and Robotics (ICINCO'2014), Vienna, Austria. Vol. 1, 2014, pp. 699–703.

20. Sidorov M., **Brester Ch.,** Minker W., Semenkin E. Speech-Based Emotion Recognition: Feature Selection by Self-Adapted Multi-Criteria Genetic Algorithm. Proceedings of the 9th edition of the Language Resources and Evaluation Conference (LREC), Reykjavik, Iceland, 2014, pp. 3481-3485.

Two manuscripts are submitted:

1. **Brester Ch.,** Kauhanen J. Tuomainen T.P., Voutilainen S., Rönkkö M., Ronkainen K., Semenkin E. Kolehmainen M. Evolutionary methods for variable selection in epidemiological modeling of cardiovascular diseases. BioData Mining, 2018.

2. **Brester Ch.,** Ryzhikov I., Tuomainen T.P., Voutilainen A., Semenkin E., Kolehmainen M. Multi-objective approach for Support Vector Machine parameter optimization and variable selection in cardiovascular predictive modeling. The 15th International Conference on Informatics in Control, Automation and Robotics (ICINCO'2018), Porto, Portugal, 2018.

3. Ryzhikov I., **Brester Ch.,** Semenkin E., Kolehmainen M. On linear dynamical system inverse modeling problem: multi-objective evolution-based approach. The 15th International Conference on Informatics in Control, Automation and Robotics (ICINCO'2018), Porto, Portugal, 2018.

Patents:
11 state patents for software systems are received

Distribution of research results:
The developed software has been used in two IT-companies, Krasnoyarsk, Russia