

Dr Živana Jakovljević



Personal data

Address:

University of Belgrade
Faculty of Mechanical Engineering,
Kraljice Marije 16,
11120 Belgrade 35, Serbia

E-mail:

zjakovljevic@mas.bg.ac.rs

Nationality:

Serbian

Research or academic title

Full Professor

Research field/area

Mechanical engineering /
Manufacturing Automation,
Cybersecurity, Machine Learning,
Cyber Physical Systems, Industrial
Internet of Things, Distributed
Control, Intelligent Sensing
Systems, Intelligent Manufacturing
Systems, 3D vision systems, and
non-stationary signal processing

Languages

Serbian, English, French, German

Education

- 2010** | **Doctor of technical sciences (PhD - Mech. Eng.)**
University of Belgrade - Faculty of Mechanical Engineering,
Department of Production Engineering
Dissertation title: Learning and context sensitive recognition of part mating process in robotized assembly
- 2004** | **Magister Scientiae – MSc - Mech. Eng. (four semesters & thesis-research prerequisite to PhD)**
University of Belgrade - Faculty of Mechanical Engineering,
Department of Production Engineering
Thesis title: Application of wavelet transform in recognition of non-stationary phenomena in manufacturing technologies
- 1999** | **Dipl.-Ing. (ten semesters with diploma work)**
University of Belgrade - Faculty of Mechanical Engineering,
Department of Production Engineering
Thesis title: Educational machine tool with parallel mechanism

Employment

- Jan 2001- Present** | **Full Professor (since February 2021)**
University of Belgrade - Faculty of Mechanical Engineering,
Department of Production Engineering
Laboratory for Manufacturing Automation
- 1999-2000** | **Head of technical department**
Poimex d.o.o. Belgrade

Experience in competitive public calls in previous 5 years

MISSION4.0

Project name: *Deep machine learning and swarm intelligence-based optimization algorithms for control and scheduling of cyber-physical systems in Industry 4.0 - MISSION4.0*, Grant: 6523109 **Relevant Project for MCSecurity**

Funding source: Science Fund of the Republic of Serbia

Implementation period: 2020-2022.

Awarded grant amount: 199,949.18 EUR

Project PI: Zoran Miljković

Role of Živana Jakovljević: Work Package Leader

Number of citations (excluded self-citations, source: Scopus)

576

Hirsch index (excluded self-citations, source: Scopus)

12

Other information

2015- Head of Laboratory for Manufacturing Automation at University of Belgrade – Faculty of Mechanical Engineering;

2020- Coordinator of M.Sc. study program Industry 4.0 at University of Belgrade – Faculty of Mechanical Engineering;

2021- Vice-Dean at University of Belgrade – Faculty of Mechanical Engineering;

2016- European Commission H2020 and Horizon Europe Expert for evaluation and monitoring of proposals in ICT and MSCA calls;

2022- Expert of the EURAMET (The European Association of National Metrology Institutes) participating in the evaluation of proposals in the Metrology Partnership Calls;

2020- Expert of the Ministry of Education, Science and Technological Development of the Serbian Government participating in the evaluation of bilateral project proposals;

2021- Expert of the Czech Science Foundation for the evaluation of project proposals

Author/editor of books:

- Pilipovic, M., **Jakovljevic, Z.**, Manufacturing Automation, Faculty of Mechanical Engineering, Belgrade, 2017, ISBN: 978-86-7083-927-4 (university textbook in Serbian)

KEY RESULTS OF MISSION 4.0:

Journal papers:

1. Lesi, V., **Jakovljevic, Z.**, Pajic, M., **IoT-Enabled Motion Control: Architectural Design Challenges and Solutions**, IEEE Transactions on Industrial Informatics, Vol. 19, No. 3, pp. 2284-2294, 2023, ISSN: 1551-3203, DOI: 10.1109/TII.2022.3202175, <https://ieeexplore.ieee.org/document/9869313> (Science Citation Index-Web of Science® – IF = 12.3 (2022) → M21a; source KoBSON) **Relevant Publication for MCSecurity**
2. Nedeljkovic, D., **Jakovljevic, Z.**, **CNN based method for the development of cyber-attacks detection algorithms in industrial control systems**, Computers and Security, Vol. 114, paper no. 102585, 2022, ISSN: 0167-4048, DOI:10.1016/j.cose.2021.102585, <https://www.sciencedirect.com/science/article/pii/S0167404821004089> (Science Citation Index-Web of Science® – IF = 5.6 (2022) → M21; source KoBSON) **Relevant Publication for MCSecurity**
3. Lesi, V., **Jakovljevic, Z.**, Pajic, M., **Security analysis for distributed IoT-based industrial automation**, IEEE Transactions on Automation Science and Engineering, Vol. 19, No. 4, pp. 3093-3108, 2022, ISSN: 1545-5955, DOI:10.1109/TASE.2021.3106335, <https://ieeexplore.ieee.org/document/9528498> (Science Citation Index-Web of Science® – IF = 5.6 (2022) → M21; source KoBSON)
4. Markovic, V., **Jakovljevic, Z.**, Budak, I., **Automatic recognition of cylinders and planes from unstructured point clouds**, Visual Computer Vol. 38, pp. 4329-4352, 2022, ISSN: 0178-2789, DOI: 10.1007/s00371-021-02299-9, <https://doi.org/10.1007/s00371-021-02299-9> (Science Citation Index-Web of Science® – IF = 3.5 (2022) → M22; source KoBSON).
5. Nedeljković, D., **Jakovljević, Ž.**, Miljković, Z., Pajić, M., **Detection of cyber-attacks in systems with distributed control based on support vector regression**, Telfor Journal, Vol. 12, No. 2, pp. 104-109, 2020, ISSN 1821-3251, eISSN 2334-9905, DOI: 10.5937/telfor2002104N, http://journal.telfor.rs/Published/Vol12No2/Vol12No2_A6.pdf

Conference papers:

6. Nedeljković, D., **Jakovljević, Ž.**, **GAN-based Data Augmentation in the Design of Cyber-attack Detection Methods**, In 9th International Conference on Electrical, Electronics and Computing Engineering

- **Jakovljević, Z.**, Petrovic, P. B., Contact States Recognition in Robotized Assembly, Faculty of Mechanical Engineering, Belgrade, 2011, ISBN: 978-86-7083-750-8 (scientific monograph in Serbian)
- Majstorovic, V., **Jakovljević, Z.**, eds, Proceedings of 5th International Conference on Advanced Manufacturing Engineering and Technologies, Lecture Notes in Mechanical Engineering, Springer Heidelberg, 2017, ISBN: 978-3-319-56429-6

Reviewer in over 20 scientific journals including IEEE Transactions on Mechatronics, IEEE Transactions on Automation Science and Engineering, IEEE Transactions on Industrial Electronics, IEEE Transactions on Industrial Informatics.

- (IcETRAN 2022), pp. 651-656 (ISBN: 978-86-7466-930-3), Novi Pazar, Serbia, 6-9 June 2022, https://www.etrans.rs/2022/zbornik/CD-ZBORNIK_ETRAN_22.pdf
7. **Jakovljević, Ž.**, Nedeljković, D., **Cyber security in continuous-time controlled systems – overview of the results within the project of MISSION4.0**, 43rd JUPITER Conference, Proceedings – CD (in Serbian), pp. 1.07-1.16, Belgrade, Serbia, 4-5 October, 2022, http://cent.mas.bg.ac.rs/jupiter/zbornik_2022.pdf
 8. **Jakovljević, Z.**, Nedeljković, D., **Distribution of Control Tasks to Smart Devices in Industrial Control Systems: a Case Study**, In 8th International Conference on Electrical, Electronics and Computing Engineering (IcETRAN 2021), pp. 585-590 (ISBN: 978-86-7466-894-8), Stanišići, Bosnia and Herzegovina, 8-10 September 2021, https://www.etrans.rs/2021/zbornik/Proceedings/Zbornik_Proceedings.pdf
 9. Nedeljković, D., **Jakovljević, Ž.**, **Implementation of CNN based algorithm for cyber-attacks detection on a real-world control system**, In 14th International Scientific Conference MMA 2021 – Flexible Technologies, pp. 119-122 (ISBN 978-86-6022-364-9), Novi Sad, Serbia, 23-25 September 2021, <http://www.mma.ftn.uns.ac.rs/files/MMA2021-PROCEEDINGS.pdf>
 10. Nedeljković, D., Stanojević, S., Puzović, R., **Jakovljević, Ž.**, **Integration of production resources into the Manufacturing Execution System using OPC-UA**, In 13th ETIKUM conference (in Serbian), pp. 65-68 (ISBN 978-86-6022-387-8), Novi Sad, Serbia, December 2021 (M63).
 11. **Jakovljević, Z.**, Nedeljković, D., **Cyber Physical Systems in Manufacturing Engineers Education**, In 11th International Conference on Machine and Industrial Design in Mechanical Engineering, Scopus indexed book of the Springer Series Mechanisms and Machine Science, with the title Machine and Industrial Design in Mechanical Engineering – Proceedings of KOD 2021, pp. 735-743 (eISBN: 978-3-030-88465-9), DOI: 10.1007/978-3-030-88465-9, <https://www.springer.com/gp/book/9783030884642>, 2021
 12. **Jakovljević, Ž.**, Nedeljković, D., Ševarlić, F., Puzović, R., **Communication between manufacturing resources using OPC-UA standard**, In 42th JUPITER Conference, Proceedings – CD (in Serbian), pp. 4.1-4.12 (ISBN 978-86-6060-055-6), Belgrade, Serbia, 6-7 October 2020, http://cent.mas.bg.ac.rs/jupiter/zbornik_2020.pdf

13. Nedeljković, D., **Jakovljević, Ž.**, Miljković, Z., **Image classification based on convolutional neural networks**, In 42th JUPITER Conference, Proceedings – CD (in Serbian), pp. 4.13-4.23 (ISBN 978-86- 6060-055-6), Belgrade, Serbia, 6-7 October 2020, http://cent.mas.bg.ac.rs/jupiter/zbornik_2020.pdf
14. Nedeljković, D., **Jakovljević, Ž.**, **Cyber-attack detection method based on RNN**, In 7th International Conference on Electrical, Electronics and Computing Engineering (IcETRAN 2020), pp. 726-731 (ISBN 978-86-7466-852-8), Belgrade, Serbia, 28-29 September 2020, https://www.etrans.rs/2020/ZBORNIK_RADOVA/Zbornik_book/Zbornik_tekst_outlines_komplet_min.pdf
15. Nedeljković, D., **Jakovljević, Ž.**, **Integration of Smart Vision Sensor into Manipulator Control System using OPC-UA**, In 28th Telecommunications Forum (TELFOR 2020), (ISBN 978-0-7381-4244-9, eISBN 978-0-7381-4243-2), Belgrade, Serbia, 24-25 November 2020, <https://ieeexplore.ieee.org/abstract/document/9306524>

Technical solutions:

16. Nedeljković, D., **Jakovljević, Ž.**, **Deep learning based cyber-attack detection algorithm for energy-limited cyber-physical systems** (In Serbian), Technical solution, January 2022 **Relevant Algorithm for MCSecurity**

Datasets:

17. Nedeljković, D., **Jakovljević, Ž.**, **New datasets obtained from experimental installations with centralized control** (Version v.2.0) [Data set]. Zenodo, <http://doi.org/10.5281/zenodo.5514351>, 2021. **Relevant Dataset for MCSecurity**

Additional 3 publications relevant for MCSecurity (2 are listed as key references 1 and 2 of MISSION4.0)

1. **Jakovljević, Z.**, Lesi, V., Pajic, M., **Attacks on Distributed Sequential Control in Manufacturing Automation**, IEEE Transactions on Industrial Informatics, Vol. 17, No 2, 2021, pp 775-786, ISSN: 1551-3203, DOI: 10.1109/TII.2020.2987629, <https://ieeexplore.ieee.org/abstract/document/9068503> (Science Citation Index-Web of Science® – IF = 11.648 (2021) → M21a; source KoBSON) **Relevant Publication for MCSecurity**
2. **Jakovljević, Z.**, Lesi, V., Mitrovic, S., Pajic, M., **Distributing Sequential Control for Manufacturing**

Automation Systems, IEEE Transactions on Control Systems Technology, Vol. 28, No. 4, 2020, pp. 1586-1594, ISSN: 1063-6536, DOI: 10.1109/TCST.2019.2912776,

<https://ieeexplore.ieee.org/document/8709962> (Science Citation Index-Web of Science® – IF = 5.956 (2020) → M21; source KoBSON)

Relevant Publication for MCSecurity

3. Jokic, A., Khazraei, A., Petrovic, M., **Jakovljevic, Z.**, Pajic, M., **Cyber-Attacks on Wheeled Mobile Robotic Systems with Visual Servoing Control**, 2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), *Detroit, MI, USA, 2023*, pp. 6342-6348, doi: 10.1109/IROS55552.2023.10341376. **Relevant Publication for MCSecurity**

Additional 4 projects relevant for MCSecurity

- | | |
|------------------------|--|
| 2018 -
2019 | Babić, B., Miljković, Z., Jakovljević, Ž. , et al. <i>An Innovative, Ecologically Based Approach to the Implementation of Intelligent Manufacturing Systems for the Production of Sheet Metal Parts</i> , Grant: TR-35004, Project funded by Ministry of Education, Science and Technological Development of the Government of the Republic of Serbia |
| 2020–
2023 | Popović, V., Babić, B., Miljković, Z., Jakovljević, Ž. , Petrović, M., et al. <i>Integrated research in macro, micro, and nano mechanical engineering – Deep learning of intelligent manufacturing systems in production engineering</i> , Project financed by the Ministry of Education, Science and Technological Development of the Serbian Government, under the contract number 451-03-68/2022-14/200105 |
| 2017 -
2021 | Zrnić, N., Jakovljević Ž. , Mišković, Ž., et al. <i>Implementation of Dual Education in Higher Education of Serbia / DualEdu</i> , Grant: TR-35020, Project funded by European Commission within Erasmus+ program |
| 2011 -
2017 | Petrović, P. B., Pilipović, M., Hodolič, J., Jakovljević, Ž. , et al. <i>Smart Robotic Systems for Customized Manufacturing</i> , Grant: TR-35007, Project funded by Ministry of Education, Science and Technological Development of the Government of the Republic of Serbia |

Additional 3 products, services related to MCSecurity (2 are listed as key references 16 and 17 of MISSION4.0)

1. Jugović, Z., **Jakovljević, Ž.**, Bjekić, M., Božić, M., Rosić, M., ***Four axis NC machine for welding***, Technical solution, University of Belgrade, Faculty of Mechanical Engineering, 2014 (*NC machine*)
2. Petrović, P., B., Miković, V., **Jakovljević, Ž.**, ***Portable micro-robot for welding and plasma cutting***, Technical solution, University of Belgrade, Faculty of Mechanical Engineering, 2010 (*portable robot with Cartesian structure*)
3. Petrović, P., B., **Jakovljević, Ž.**, Miković, V., Pilipović, M., ***Robotic laser measurement system for dimensional metrology in production lines and reverse engineering***, Technical solution, University of Belgrade, Faculty of Mechanical Engineering, 2009 (*robotic system based on robot arm*)