

CURRICULUM VITAE

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Date: 3rd of April 2024

Bio and interests

Coming from the background in telecommunications and signal processing, his main research interests presently lie at the intersection of pattern recognition, computer vision and remote sensing. Since 2010 he has worked on several national and EU funded research projects related to precision agriculture and applications of information technologies to agriculture and environmental research. He has served as a reviewer for several academic journals including Pattern Recognition, IEEE TNNLS, IEEE TGRS, Remote Sensing of Environment and Remote Sensing ([link](#)). He was appointed as national representative in the COST action [CA17134](#) - *Optical synergies for spatiotemporal SENSing of Scalable ECophysiological traits* (SENSECO), and was one of the secondary proposers of the newly started COST action [CA22136](#) - *Pan-European Network of Green Deal Agriculture and Forestry Earth Observation Science* (PANGEOS). Member of the IEEE Geoscience and Remote Sensing Society and Society for Industrial and Applied Mathematics.

Faculty web page: <http://www.ftn.uns.ac.rs/1417836913/branko-brkljac>
<https://www.ktios.ftn.uns.ac.rs/professori/branko-brkljac/>

ICONIC centre: <https://iconic.ftn.uns.ac.rs/faculty-members/>

Personalia

Date of birth: 1986

Place of birth: Belgrade

Citizenship: Republic of Serbia

Languages

- Serbian - native
- English - fluent (C1)
- German - proficient (B2)

University degrees

- Doctor of Philosophy in Electrical and Computer Engineering
 - 20th of October 2017, University of Novi Sad (mentor: prof. Dejan Vukobratović)
 - Thesis: *Pattern recognition with sparse representation of covariance matrices and covariance descriptors*
- Master of Science in Electrical and Computer Engineering
 - 13th of September 2010, University of Novi Sad (mentor: prof. Vladimir Crnojević)
 - Thesis: *Detection of humans in images by using LBP-HOG features and SVM classifier*
- Bachelor of Science in Electrical and Computer Engineering
 - 10th of September 2009, University of Novi Sad (mentor: prof. Željko Trpovski)
 - Thesis: *OFDM (Orthogonal Frequency Division Multiplex) transmission simulations*

Academic affiliations

15.03.2023 –	Associate professor, Department of Power, Electronic and Telecommunication Engineering (DEET), Faculty of Technical Sciences (FTN), University of Novi Sad
14.03.2018 – 14.03.2023	Assistant professor, Department of Power, Electronic and Telecommunication Engineering (DEET), Faculty of Technical Sciences (FTN), University of Novi Sad
01.01.2016 – 13.03.2018	Teaching and research assistant, Chair of Telecommunications and Signal Processing (KTIOS), Faculty of Technical Sciences (FTN)
01.01.2011 – 31.12.2015	Research associate, BioSense Center, Faculty of Technical Sciences (FTN), University of Novi Sad

Awards and acknowledgments

- 2018 Publons peer review award - "for placing in the top 1% of reviewers in Engineering on Publons' global reviewer database, during the 2017-2018 Award year"
- 2012 and 2018 NVIDIA hardware academic grant
- 2010 Diploma for the best student of promotion at the Department for Power, Electronic and Telecommunication Engineering;
- 2010 Telenor foundation – Award "prof. Ilija Stojanović" for the contribution to the field of telecommunication engineering in the category of the best student paper;
- 2010 Scholarship of the „The state of Exit" foundation, Exit festival, Novi Sad;
- 2009 Scholarship of the German academic exchange service (DAAD);
- 2010 University award for the overall results achieved during the studies;
- 2007, 2008, 2009 University of Novi Sad award for achieved student results during the year;
- 2008-2010 Scholarship of the Republic foundation for young talents, Serbian Ministry of Youth and Sport;

- 2007-2008 Scholarship of the Republic foundation for the development of science and art youth;
- 2006-2007 Scholarship of the Serbian Ministry of Education and Sport.

Participation in International Research Projects

- **PANGEOS (2023-2027)**, COST action CA22136 – *Pan-European Network of Green Deal Agriculture and Forestry Earth Observation Science*; Secondary proposer and national representative in the Management Committee;
- **INSECTAI (2023-2027)**, COST action CA22129 – *Using image-based AI for insect monitoring & conservation*; National representative in the Management Committee;
- **SENSECO (2018-2022)**, COST action CA17134 – *Optical synergies for spatiotemporal SENSing of Scalable ECOphysiological traits*; National representative in the Management Committee;
- **SMART4ALL (2020-2023)**, H2020 Grant agreement ID: 872614 – *Selfsustained cross border customized Cyberphysical System Experiments for capacity building among European stakeholders* - H2020-EU.2.1.1. - INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Information and Communication Technologies (ICT), Innovation Actions Smart Anything Everywhere (SAE), member of the digitized agriculture task force (DATF), technical coach
- **HARMONIC (2018-2021)**, ERA.NET – *Collaborative strategies of heterogeneous robot activity at solving agriculture missions controlled via intuitive human-robot interfaces*; researcher and WP leader;
- **BENEFIT (2017-2020)** – *Boosting the telecommunications engineer profile to meet modern society and industry needs*, Erasmus+ KA2 Capacity Building (ID 585716-EPP-1-2017-1-AT-EPPKA2-CBHE-JP); researcher;
- **QoSTREAM (2012-2016)**, FP7 IRSES Project – *Video quality driven multimedia streaming in mobile wireless networks*; researcher;
- **INNOSENSE (2013-2016)**, FP7-REGPOT, ID 316191 – *Reinforcement of BioSense Center – ICT for Sustainability and Eco-Innovation*, researcher;
- **BALKANGEONET (2010-2013)**, FP7-ENVIRONMENT, ID 265176 – *Balkan GEO Network – towards inclusion of Balkan countries into global Earth observation initiatives*, researcher
- **REMSIS (2009-2011)** – *Remotely controllable variable message signalization system – real time traffic video surveillance*, EUREKA (ID 4924)

Participation in National Research Projects

- **III 43002**, *Biosensing technologies and global system for continuous research and integrated biosystem management*, national project, Integrated interdisciplinary research, 2011-2019, researcher;
- **III 44003**, *Integrated system for detection and estimation of forest fire development through critical parameters monitoring in real time*, Integrated interdisciplinary research, 2011-2019, researcher;

- **Monitoring using remote sensing in agriculture, hydrology and forestry** – *Detection of crop types and control of irrigation network maintenance*. Research project for Provincial secretariat for agriculture water management and forestry, Autonomous province of Vojvodina, Serbia. 2013, researcher;

Professional training

- 26.10.2020 License of the Directorate of Civil Aviation of the Republic of Serbia for the management of unmanned aircraft (UAV), certificate number CD 0130/20.
- 19.10–26.10.2020 HCIA-AI Serbia Training course for use of Huawei infrastructure.
- 16.10.2018 Serbian training on the use of the C3S Climate Data Store, organized by the Wageningen University.
- 20.10.2018 Training Center for Education in Novi Sad, courses: "By motivation to functional knowledge" and "Outcome planning of course materials", certificate number 09/2018.
- 09/20–09/22 2017 „Training school on big data processing and analytics in the internet of everything era”, ICT COST Action IC1406 High-Performance Modelling and Simulation for Big Data Applications, <http://chipset-cost.eu/> ;
- 03/30–03/31 2015 „Big Data Era in Sky and Earth Observation”, Belgrade meeting, TD COST action TD1403, <http://bigskyearth.eu/> ;
- 09/01–09/23 2014 **Visiting researcher** at the „Department of telecommunications and information processing“ (TELIN), **Universiteit Gent, Belgium**, <http://telin.ugent.be/telin/> ;
- 08/27–08/29 2014 iTWIST'14 – international Traveling Workshop on Interactions between Sparse models and Technology, Namur, Belgium;
- 11/04 2013–01/31 2014. **Visiting researcher** at the „Department of applied mathematics “, **Stellenbosch University, Stellenbosch, South Africa**. QoSTREAM project - Video Quality Driven Multimedia Streaming in Mobile Wireless Networks, <http://www.dsp.sun.ac.za/>, <http://appliedmaths.sun.ac.za/> ;
- 10/13–10/20 2010 Study visit to the “Centre for intelligent dynamic communications”, University of Strathclyde, Glasgow, Scotland, UK, <https://www.strath.ac.uk/engineering/> ;
- 09/01–10/23 2009 Intensiv8 - language course at Goethe-Institut, Berlin, Germany;
- 2005 Basic training MD2-1 for CAD software CATIA v5, IBM Dassault Systemes.

Memberships in technical societies

- IEEE, since 2009
- Society for industrial and applied mathematics, since 2014
- ICONIC (Centre for intelligent communications, networking and information processing), founder, since 2018
- IADF TC (Image analysis and data fusion technical committee), since 2018
- IAPR TC3 (TC on neural networks and computational intelligence), since 2018.
- IAPR TC7 (TC on remote sensing and mapping), since 2018.

University courses (currently teaching)

- “Digital image processing in animations “, undergraduate program “Animation engineering”: **2018-2024**, course ID EK421Z.
- “Fundamentals of machine vision”, graduate program “Mechatronics”: **2018-2024**, course ID H1420.
- “Computer Vision”, graduate program “Power, electronic and telecommunication engineering “: **2018-2024**, course ID EK522.
- “Video technologies”, undergraduate program “Electrical engineering“: **2021-2024**, course ID EOS338.
- “TV and video technologies”, undergraduate program “Power, electronic and telecommunication engineering“: **2024-** , course ID EK469.
- “Image and video processing for autonomous driving”, undergraduate program “Distributed resources and electrical systems in vehicles“: **2021-2023**, course ID EMS215.
- “Machine vision”, graduate program “Artificial Intelligence and machine learning“: **2021-2024**, course ID EAI021.
- “Multimodal perception of human and machine” graduate program “Artificial Intelligence and machine learning“: **2021-2024**, course ID EAI042.

Reviewer for academic journals

- *Pattern Recognition*, ISSN: 0031-3203, Elsevier (Comp. Science, Artificial Intelligence: 25/145)
- *IEEE Transactions on Neural Networks and Learning Systems*, ISSN: 2162-237X, IEEE (Comp. Science, Artificial Intelligence: 14/145)
- *Applied Intelligence*, ISSN: 1573-7497, Springer (Comp. Science, Artificial Intelligence: 48/145)
- *Journal of Applied Remote Sensing*, ISSN: 1931-3195, SPIE (Remote Sensing: 29/33)
- *Remote Sensing*, ISSN 2072-4292, MDPI (Imaging Science & Photographic Technology: 12/33)
- *Remote Sensing of Environment*, ISSN: 0034-4257, Elsevier (Remote Sensing: 2/33)
- *IEEE Transactions on Geoscience and Remote Sensing*, ISSN: 0196-2892, IEEE (Imaging Science & Photographic Technology: 5/28)
- *IEEE Geoscience and Remote Sensing Letters*, ISSN: 1545-598X, IEEE (Engineering, Electrical & Electronic: 74/275)
- *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, ISSN: 1939-1404, IEEE (Imaging Science & Photographic Technology: 6/28)
- *ISPRS Int. Journal of Geo-Information*, ISSN: 2220-9964, Elsevier (Remote Sensing: 20/33)
- *Drones*, ISSN: 2504-446X, MDPI (Remote Sensing: 18/57)
- *Transactions of the Institute of Measurement and Control*, ISSN: 0142-3312, SAGE (Automation & Control Systems: 49/65)

- *IEEE Transactions on Biomedical Circuits and Systems*, ISSN: 1932-4545, IEEE (Engineering, Biomedical: 26/97)
- *Information*, ISSN: 2078-2489, MDPI
- *Journal of Imaging*, ISSN: 2313-433X, MDPI
- *Optical Engineering*, ISSN: 0091-3286, SPIE (Optics: 85/100)
- *Journal of Electronic Imaging*, ISSN: 1017-9909, SPIE (Imaging Science & Photographic Technology: 26/28)

Selected publications

Journal papers

- Brestovački L., Golubović M., Bajić J., Joža A., **Brkljač B.**, Rajs V. (2024) "A Low-cost Raspberry Pi based imaging system for analysis of fiber specklegram sensors", *Optical and Quantum Electronics*, accepted for publication, Vol. -, No -, pp. -, ISSN: 0306-8919, DOI: - (Engineering, Electrical & Electronic: 125/275; IF 2022: 3.0)
- Kalušev V., Popović B., Janev M, **Brkljač B.**, Ralević N. (2023) "Measure of similarity between GMMs based on autoencoder-generated Gaussian component representations ", *Axioms*, Vol. 12, No 6: 535; pp. 1-21, ISSN 2075-1680, DOI: 10.3390/axioms12060535 (Mathematics, Applied: 68/268; IF 2022: 2.0)
- Krstanović L., Popović B., Janev M., **Brkljač B.** (2023) "Feature map regularized CycleGAN for domain transfer", *Mathematics*, Vol. 11, No 2: 372, pp. 1-21, ISSN: 2227-7390, DOI: 10.3390/math11020372, (Mathematics; 23/330, IF 2021: 2.4)
- Krstanović L., Popović B., Janev M., **Brkljač B.** (2022) "Bootstrapped SSL CycleGAN for asymmetric domain transfer", *Applied Sciences*, 2022, Vol. 12, No. 7: 3411, pp. 1-17, ISSN 2076-3417, DOI: 10.3390/app12073411 (Engineering, Multidisciplinary: 38/91, IF 2020: 2.679; Physics, Applied: 73/160, IF 2020: 2.679)
- Radosavljević M., **Brkljač B.**, Lugonja P., Crnojević V., Trpovski Ž., Xiong Z., Vukobratović D. (2020) "Lossy compression of multispectral satellite images with application to crop thematic mapping: a HEVC comparative study", *Remote Sensing*, Vol. 12, No 10, pp. 1-33, ISSN 2072-4292, DOI: 10.3390/rs12101590 (Remote Sensing: 9/30, IF 2019: 4.509; Imaging Science & Photographic Technology: 8/29, IF 2020: 4.848)
- **Brkljač B.**, Janev M., Obradović R., Rapaić D., Ralević N., Crnojević V. (2014) "Sparse representation of precision matrices used in GMMs", *Applied Intelligence*, Vol. 41, No 3, pp. 956-973, ISSN 0924-669X, DOI: 10.1007/s10489-014-0581-6 (Computer Science, Artificial Intelligence: 32/115, IF 2012: 1.853)
- Crnojević V., Panić M., **Brkljač B.**, Čulibrk D., Ačanski J., Vujić A. (2014) "Image processing method for automatic discrimination of hoverfly species", *Mathematical Problems in Engineering*, Vol. 2014, No 1:986271, pp. 1-12, ISSN 1024-123X, DOI: 10.1155/2014/986271 (Engineering, Multidisciplinary: 23/90, IF 2012: 1.383; Mathematics, Interdisciplinary Applications: 29/93, IF 2012: 1.383)
- Crnojević V., Lugonja P., **Brkljač B.**, Brunet B. (2014) "Classification of small agricultural fields using combined Landsat-8 and RapidEye imagery: case study of northern Serbia", *Journal of*

Applied Remote Sensing, Vol. 8, No 1:083512, pp. 1-18, ISSN 1931-3195, DOI: 10.1117/1.JRS.8.083512 (Remote Sensing: 22/28, IF 2014: 1.183; Imaging Science & Photographic Technology: 12/23, IF 2012: 0.876)

Conferences

- **Brkljač B.**, Antić B., Mitrović Z. (2022) "Potential of embedded vision platforms in development of spatial AI enabled CPS", *11. Mediterranean Conference on Embedded Computing (MECO'2022)* collocated with: International Conference on Cyber-Physical Systems and Internet-of-Things (CPSIoT'2022), IEEE Serbia and Montenegro Section, Budva, Montenegro, 7-10. June, 2022
- Filipović V., Panić M., Brdar S., **Brkljač B.** (2021) "Significance of morphological features in rice variety classification using hyperspectral imaging ", *12. International Symposium on Image and Signal Processing and Analysis (ISPA 2021)*, Zagreb: IEEE, 13-15 September, 2021, pp. 171-176, ISBN 978-1-6654-2639-8, DOI: 10.1109/ISPA52656.2021.9552086
- **Brkljač B.** (2020) "Image compression in Earth observations – an application oriented insight from the lossy perspective", *1. South East Europe Space Conference - SEEUNIVERSE*, Beograd: Serbian office for space sciences, research and development (<https://www.seeuniverse2020.rs/agenda>), 30 Sept.-02 Oct., 2020; *Publ. Astron. Obs. Belgrade* No. 101 (2021), 69, ISSN: 0373-3742
- Radosavljević M., Adamović M., **Brkljač B.**, Trpovski Ž., Xiong Z., Vukobratović D. (2019) "Satellite image compression based on high efficiency video coding standard - An experimental comparison with JPEG 2000", *4. Conference on Big Data From Space - BiDS'19*, Publications office of the European Union (European Space Agency, SatCen, Joint Research Centre, DLR), Munich, Germany, 19-21. February, 2019, pp. 257-260, ISBN 978-92-76-00034-1, DOI: 10.2760/848593
- **Brkljač B.**, Antić B., Mišković D. (2019) "A perspective on semantic analysis of urban environments based on image and audio processing ", *5. International Acoustics and Audio Engineering Conference - TAKTONS*, Novi Sad: Radio Television of Vojvodina and TAKTONS; Faculty of Technical Sciences, University of Novi Sad; Serbian section of the Audio Engineering Society; 6-9 novembar, 2019, pp. 13-14, ISBN 978-86-6022-223-9
- Nikolić T., Radišić D., Arok M., Mirč M., **Brkljač B.**, Lugonja P., Brdar S. (2019) "Land cover change, population size and body condition of endangered rodent species in agricultural landscape ", *6. European Space Agency Living Planet Symposium*, Milano: European Space Agency, 13-17th May, 2019, pp. 273-273,
- **Brkljač B.**, Trpovski Ž. (2018) "On the role of ML estimation and Bregman divergences in sparse representation of covariance and precision matrices ", *26. International Telecommunications Forum*, TELFOR 2018, Telecommunications Society Serbia, ETF Beograd, IEEE, Beograd, 20-21st November, 2018, pp. 361-368, ISBN 978-1-5386-7170-2, DOI: 10.1109/TELFOR.2018.8611844
- **Brkljač B.**, Nikolić T. (2018) "Land surface temperature estimation at the global scale using satellite observations ", *2. Congress of Metrologists - Measurement Systems 2018*, Faculty of Technical Sciences, University of Novi Sad, 27th November, 2018, pp. 1-9, ISBN 978-86-6022-122-5
- **Brkljač B.**, Lugonja P., Minić V., Brdar S., Crnojević V. (2017) "Data enrichment of Sentinel-2 and Landsat-8 surface-reflectance measurements for agriculture oriented services ", *3. Earth*

Observation Open Science Conference, European Space Agency (ESA), Rome, Italy, 25-28th September, 2017

- **Brkljač B.**, Lugonja P., Trpovski Ž., Crnojević V. (2017) "Analysis of spatial and temporal variability of the solar radiation incidence angle on the example of Landsat-8 satellite images", *11th DOGS – Digitalna obrada govora i slike*, pp. 81-84, FTN-Novı Sad, ETF - Belgrade, EF-Niš, Novi Sad, 22-25th November, 2017, str. 81-84, ISBN 978-86-7892-993-9
- **Brkljač B.**, Lugonja P., Minić V. et al. (2017) "Availability of satellite based digital surface models – Comparison of ALOS-AW3D and ASTER-GDEM data over Serbia", *8th WorldCover Conference*, European Space Agency (ESA), GEO, FAO, Rome (ESRIN-Frascati), 14-16 March 2017
- Lugonja P., Marko O., Panić M., **Brkljač B.** et al. (2017) "Sentinel-2 and Landsat-8 for high-resolution land cover mapping in sustainable agriculture", *8th WorldCover Conference*, European Space Agency (ESA), GEO, FAO, Rome (ESRIN-Frascati), 14-16 March 2017
- **Brkljač B.**, Crnojević V., Lugonja P. (2014) "Land cover classification based on sparse representation of temporal covariance descriptors", *5th International Conference on Geographic Object-Based Image Analysis - GEOBIA 2014*, P – 03, pp. 189-189, Aristotle University of Thessaloniki, Thessaloniki, Greece, 21-24 May 2014
- Lugonja P., **Brkljač B.**, Crnojević V. (2014) "Crop classification by using RapidEye and Landsat 8 satellite", *5th International Conference on Geographic Object-Based Image Analysis - GEOBIA 2014*, P - 01, pp. 187-187, Aristotle University of Thessaloniki, Thessaloniki, Greece, 21-24 May 2014
- **Brkljač B.**, Panić M., Ćulibrk D., Crnojević V., Ačanski J., Vujić A (2012) "Automatic hoverfly species discrimination", *1st International Conference on Pattern Recognition Applications and Methods (ICPRAM)*, Vol. 2, pp. 108-115, SciTePress, PASCAL2 (Pattern Analysis, Statistical Modelling and Computational Learning), AAAI (Association for the Advancement of Artificial Intelligence), ISBN 978-989-8425-99-7, Vilamoura, Portugal, 06-08th Feb. 2012

University textbooks

- Željjen V. Trpovski, **Branko N. Brkljač** (2021) "*Signals and Systems in Telecommunications*", University of Novi Sad, Faculty of Technical Sciences, p.1-456, ISBN 978-86-6022-368-7
- Nosek T., **Brkljač B.**, Despotović D., Sečujski M., Lončar-Turukalo T. (2020) "*Practicum in machine learning*", University of Novi Sad, Faculty of Technical Sciences, p. 1-122, ISBN 978-86-499-0245-9

Former graduate students

Ana Rašić (MSc'23), Dorina Petrović (MSc'23), Katarina Tomić (MSc'22), Mihajlo Kecman (BSc'23), Mikloš Popović (MSc'22), Jana Kudus (MSc'22), Miloš Marković (MSc'21), Vladan Filipović (MSc'21), Nina Pajević (MSc'21), Jovana Jevremov (MSc'21), Tamara Šobot (MSc'21), Miloš Živković (MSc'21), Branislav Ljiljak (P.B.ECE'21), Jelena Mrđen (MSc'20), Marko Adamović (MSc'18)