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**IPPT PAN**

**Institute of Fundamental Technological Research**

**Polish Academy of Sciences**

**List of publications related to the subject of Artificial Intelligence**

**I. Application of AI algorithms to optimal design of engineering systems and classification and clusterization biological and medical data**

1. Marszałek A., Burczyński T., *Forecasting day-ahead spot electricity prices using deep neural networks with attention mechanism*, **JOURNAL OF SMART ENVIRONMENTS AND GREEN COMPUTING**, ISSN: 2767-6595, DOI: [10.20517/jsegc.2021.02](https://doi.org/10.20517/jsegc.2021.02), Vol.1, pp.21-31, 2021.
2. Kuś W., Mrozek A., Burczyński T., *Memetic optimization of graphene-like materials on Intel PHI Coprocessor*, **LECTURE NOTES IN ARTIFICIAL INTELLIGENCE**, Vol.9692, pp.401-410, 2016.
3. Mrozek A., Kuś W., Burczyński T., *Nano level optimization of graphene allotropes by means of a hybrid parallel evolutionary algorithm*, **COMPUTATIONAL MATERIALS SCIENCE**, Vol.106, pp.161-169, 2015.
4. Poteralski A., Szczepanik M., Górski R., Burczyński T., *Swarm and Immune Computing of Dynamically Loaded Reinforced Structures*, **LECTURE NOTES IN ARTIFICIAL INTELLIGENCE**, DOI: [10.1007/978-3-319-19369-4\\_43](https://doi.org/10.1007/978-3-319-19369-4_43), Vol.9120, pp.483-494, 2015.
5. Poteralski A., Szczepanik M., Burczyński T., *Immune Optimal Design of 2-D and 3-D Structures*, **LECTURE NOTES IN ARTIFICIAL INTELLIGENCE**, DOI: [10.1007/978-3-319-19369-4\\_42](https://doi.org/10.1007/978-3-319-19369-4_42), Vol.9120, pp.471-482, 2015.
6. Burczyński T., Poteralski A., Szczepanik M., *Immune and swarm optimization of structures Chapter in: ADVANCES IN EVOLUTIONARY AND DETERMINISTIC METHODS FOR DESIGN, OPTIMIZATION AND CONTROL IN ENGINEERING AND SCIENCES*, Springer International Publishing Switzerland, D.Greiner et al. (eds.), *Computational Methods in Applied Sciences* 36, pp.295-308, 2015.
7. Dziatkiewicz J., Kuś W., Majchrzak E., Burczyński T., Turchan Ł., *Bioinspired Identification of Parameters in Microscale Heat Transfer*, **INTERNATIONAL JOURNAL FOR MULTISCALE COMPUTATIONAL ENGINEERING**, Vol.12, No.1, pp.79-89, 2014.
8. Marszałek A., Burczyński T., *Modeling and forecasting financial time series with ordered fuzzy candlesticks*, **INFORMATION SCIENCES**, Vol.273, pp.144-155,

2014.

9. Beluch W., [Burczyński T.](#), *Two-scale identification of composites' material constants by means of computational intelligence methods*, **ARCHIVES OF CIVIL AND MECHANICAL ENGINEERING**, Vol.14, No.4, pp.636-646, 2014.
10. [Burczyński T.](#), Szczepanik M., *Intelligent optimal design of spatial structures*, **COMPUTERS AND STRUCTURES**, Vol.127, pp.102-115, 2013.
11. Kolodziej J., Khan S.U. and Tadeusz Burczynski (Eds.), *Advances in Intelligent Modelling and Simulation: ARTIFICIAL INTELLIGENCE-BASED MODELS AND TECHNIQUES IN SCALABLE COMPUTING*. Springer 2012.
12. Szczepanik M., Burczyński T., *Swarm optimization of stiffeners locations in 2-D structures*, **BULLETIN OF THE POLISH ACADEMY OF SCIENCES: TECHNICAL SCIENCES**, Vol.60, No.2, pp.241-246, 2012.
13. Długosz A., [Burczyński T.](#), *Multiobjective shape optimization of selected coupled problems by means of evolutionary algorithms*, **BULLETIN OF THE POLISH ACADEMY OF SCIENCES: TECHNICAL SCIENCES**, Vol.60, No.2, pp.215-222, 2012.
14. Bereta M., Burczyński T., *Evolving ensembles of linear classifiers by means of clonal selection algorithm*, **CONTROL AND CYBERNETICS**, Vol.39, No.2, pp.325-342, 2010.
15. Bereta M., Burczyński T., *Artificial immune system based classification of high-dimensional biological data.* ], In: **EVOLUTIONARY METHODS FOR DESIGN, OPTIMIZATION AND CONTROL** (Eds. T.Burczyński and J.Periaux), CIMNE, Barcelona 2009.
16. Bereta M., [Burczyński T.](#), *Immune K-means and negative selection algorithms for data analysis*, **INFORMATION SCIENCES**, Vol.179, No.10, pp.1407-1425, 2009.
17. Bereta M., Burczyński T., *Immune K-means and negative selection algorithm for data analysis*. **INFORMATION SCIENCES**, 179 (2009), 1407-1425.
18. Bereta M., Burczyński T., *Comparing binary and real-valued coding in hybrid immune algorithm for feature selection and classification of ECG signals*. **JOURNAL ENGINEERING APPLICATIONS OF ARTIFICIAL INTELLIGENCE**, 20(5):571-585, 2007.

#### **Guest Editor of Special Issues on AI**

1. Burczynski, T., Cholewa W., Moczulski, W. (Guest editors), *JOURNAL OF ENGINEERING APPLICATIONS OF ARTIFICIAL INTELLIGENCE. Special Issue on Selected Problems of Knowledge Representation*. Vol.17, No. 4, 2004, Elsevier.
2. Burczyński T., Cholewa W., Moczulski W., (Guest editors), *ENGINEERING APPLICATIONS OF ARTIFICIAL INTELLIGENCE: Special Issue on Soft Computing Applications*, Vol. 20, No. 5, 2007, Elsevier
3. Burczyński, T., (Guest editor), *INFORMATION SCIENCE JOURNAL. Special Issue on Artificial Immune Systems*, Vol. 179, Issue 10, 2009 Elsevier.

## II. Publications in the field of Neuroinformatics - information processing and transmission in the brain

1. Pręgoska A., Signal fluctuations and the information transmission rates in binary communication channels, **ENTROPY**, ISSN: 1099-4300, DOI: 10.3390/e23010092, Vol.23, No.1, pp.92-1-12, **2021** **100 pkt.**
2. Paprocki B., Pręgoska A., Szczepański J., Optimizing information processing in brain-inspired neural networks, **BULLETIN OF THE POLISH ACADEMY OF SCIENCES**, Techn., ISSN: 0239-7528, DOI: 10.24425/bpasts.2020.131844, Vol.68, No.2, pp.225-233, **2020** **100 pkt.**
3. Pręgoska A., Kaplan E., Szczepański J., How far can neural correlations reduce uncertainty? Comparison of information transmission rates for Markov and Bernoulli processes, **INTERNATIONAL JOURNAL OF NEURAL SYSTEMS**, ISSN: 0129-0657, DOI: 10.1142/S0129065719500035, Vol.29, No.8, pp.1950003-1-13, **2019** **140pkt.** World Scientific
4. Pręgoska A., Proniewska K., van Dam P., Szczepański J., Using Lempel-Ziv complexity as effective classification tool of the sleep-related breathing disorders, **COMPUTER METHODS AND PROGRAMS IN BIOMEDICINE**, ISSN: 0169-2607, DOI: 10.1016/j.cmpb.2019.105052, Vol.182, pp.105052-1-7, **2019** **100pkt.** Elsevier
5. Pręgoska A., Casti A., Kaplan E., Wajnryb E., Szczepański J., Information processing in the LGN: a comparison of neural codes and cell types, **BIOLOGICAL CYBERNETICS**, ISSN: 0340-1200, DOI: 10.1007/s00422-019-00801-0, Vol.113, No.4, pp.453-464, **2019** **70pkt.** Elsevier
6. Pręgoska A., Szczepański J., Wajnryb E., Temporal code versus rate code for binary Information Sources, **NEUROCOMPUTING**, ISSN: 0925-2312, DOI: 10.1016/j.neucom.2016.08.034, Vol.216, pp.756-762, **2016** 30p. (**140pkt.**) Elsevier
7. Pręgoska A., Szczepański J., Wajnryb E., Mutual information against correlations in binary communication channels, **BMC NEUROSCIENCE**, ISSN: 1471-2202, DOI: 10.1186/s12868-015-0168-0, Vol.16, No.32, pp.1-7, **2015** 25p. BioMed
8. Arnold M.M., Szczepański J., Montejo N., Amigó J.M., Wajnryb E., Sanchez-Vives M.V., Information content in cortical spike trains during brain state transitions, **JOURNAL OF SLEEP RESEARCH**, ISSN: 0962-1105, DOI: 10.1111/j.1365-2869.2012.01031.x, Vol.22, pp.13-21, **2013** 35p. Wiley
9. Paprocki B., Szczepański J., How do the amplitude fluctuations affect the neuronal transmission efficiency, **NEUROCOMPUTING**, ISSN: 0925-2312, DOI: 10.1016/j.neucom.2012.11.001, Vol.104, pp.50-56, **2013** 30p. Elsevier **140 pkt.**
10. Paprocki B., Szczepański J., Transmission efficiency in ring, brain inspired neuronal networks. Information and energetic aspects, **BRAIN RESEARCH**, ISSN: 0006-8993, DOI: 10.1016/j.brainres.2013.07.024, Vol.1536, pp.135-143, **2013** 25p. Elsevier
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12. Szczepański J., Arnold M., Wajnryb E., Amigó J.M., Sanchez-Vives M.V., Mutual information and redundancy in spontaneous communication between cortical neurons, **BIOLOGICAL CYBERNETICS**, ISSN: 0340-1200, DOI: 10.1007/s00422-011-0425-y, Vol.104, pp.161-174, **2011** 25p. Elsevier

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14. Szczepański J., On the distribution function of the complexity of finite sequences, **INFORMATION SCIENCES**, ISSN: 0020-0255, DOI: 10.1016/j.ins.2008.12.019, Vol.179, pp.1217-1220, 2009 32p. Elsevier
15. Nagarajan R., Szczepański J., Wajnryb E., Interpreting non-random signatures in biomedical signals with Lempel-Ziv complexity, **PHYSICA D-NONLINEAR PHENOMENA**, ISSN: 0167-2789, DOI: 10.1016/j.physd.2007.09.007, Vol.237, pp.359-364, 2008 Elsevier
16. Szczepański J., Amigó J.M., Wajnryb E., Sanchez-Vives M.V., Characterizing spike trains with Lempel-Ziv complexity, **NEUROCOMPUTING**, ISSN: 0925-2312, DOI: 10.1016/j.neucom.2004.01.026, Vol.58-60, pp.79-84, 2004 Elsevier
17. Amigó J.M., Szczepański J., Wajnryb E., Sanchez-Vives M.V., Estimating the Entropy Rate of Spike Trains via Lempel-Ziv Complexity , **NEURAL COMPUTATION**, ISSN: 0899-7667, DOI: 10.1162/089976604322860677, Vol.16, No.4, pp.717-736, 2004 MIT
18. Szczepański J., Wajnryb E., Amigó J.M., Sanchez-Vives M.V., Slater M. , Biometric random number generators, **COMPUTERS AND SECURITY**, ISSN: 0167-4048, DOI: 10.1016/S0167-4048(04)00064-1, Vol.23, No.1, pp.77-84, 2004 Elsevier
19. Amigó J.M., Szczepański J., Wajnryb E., Sanchez-Vives M.V., On the number of states of the neuronal sources, **BIOSYSTEMS**, ISSN: 0303-2647, DOI: 10.1016/S0303-2647(02)00156-9, Vol.68, No.1, pp.57-66, 2003 Elsevier
20. Szczepański J., Amigó J.M., Wajnryb E., Sanchez-Vives M.V., Application of Lempel-Ziv complexity to the analysis of neural discharges, **NETWORK: Computation in Neural Systems**, ISSN: 0954-898X, DOI: 10.1088/0954-898X\_14\_2\_309, Vol.14, No.2, pp.335-350, 2003 IOP

### **III. Publications using artificial intelligence methods, with particular emphasis on vision systems and mobile robots**

- [1] Zawidzki M., Szklarski J., Effective Multi-objective Discrete Optimization of Truss-Z Layouts Using a GPU, **APPLIED SOFT COMPUTING** 70, pp.501-512, 2018.
- [2] Szklarski J., Białek Ł., Szałas A., Paraconsistent reasoning in cops and robber game with uncertain information: a simulation-based analysis, **INTERNATIONAL JOURNAL OF UNCERTAINTY, FUZZINESS AND KNOWLEDGE-BASED SYSTEMS** 27(3), pp.429-455, 2019.
- [3] Zawidzki M., Szklarski J., Transformations of Arm-Z modular manipulator with Particle Swarm Optimization, **Advances in Engineering Software** 126, pp.147-160, 2018.
- [4] Będkowski J., Röhling T., Online 3D LIDAR Monte Carlo localization with GPU acceleration, **INDUSTRIAL ROBOT: AN INTERNATIONAL JOURNAL** 44(4), pp.442-456, 2017.
- [5] Będkowski J., Röhling T., Hoeller F., Shulz D., Schneider F.E., Benchmark of 6D SLAM (6D Simultaneous Localisation and Mapping) Algorithms with Robotic Mobile Mapping Systems, **FOUNDATIONS OF COMPUTING AND DECISION SCIENCES** 42(3), pp.275-295, 2017.
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- [7] Chikahiro Y., Ario I., Pawłowski P., Graczykowski C., Holnicki-Szulc J., Optimization of reinforcement layout of scissor-type bridge using differential evolution algorithm, **COMPUTER-AIDED CIVIL AND INFRASTRUCTURE ENGINEERING** 34(6), pp.523-538, 2019.
- [8] Błachowski B., Pnevmatikos N., Neural network based vibration control of seismically excited civil structures, **PERIODICA POLYTECHNICA CIVIL ENGINEERING** 62(3), pp.620-628, 2018
- [9] Dyniewicz B., Bajkowski J.M., Bajer C.I., High-performance simplex space-time finite element algorithm for parallel computations for structural dynamics. **COMPUTERS & STRUCTURES**, 2021 (in press).
- [10] Bajkowski J.M., Dyniewicz B., Gębik-Wrona M., Bajkowski J., Bajer C.I., Reduction of the vibration amplitudes of a harmonically excited sandwich beam with controllable core. **MECHANICAL SYSTEMS AND SIGNAL PROCESSING** 129, pp. 54-69, 2019.
- [11] Wasilewski M., Pisarski D., Bajer C.I. Adaptive optimal control for seismically excited structures. *Automation in Construction* 106, article id 102885, 2019.
- [12] Bajkowski J.M., Dyniewicz B., Bajer C.I. Semi-active damping strategy for beams system with pneumatically controlled granular structure. **MECHANICAL SYSTEMS AND SIGNAL PROCESSING** 70-71, pp. 387-396, 2016.
- [13] Popławski B., Mikułowski G., Wiszowaty R., Jankowski Ł., Mitigation of forced vibrations by semi-active control of local transfer of moments, **MECHANICAL SYSTEMS AND SIGNAL PROCESSING** 157, article id 107733, 2021.

## **V. Publications in the field of biomedical signals classification - Image recognition - Diagnostics with the use of Artificial Intelligence methods**

- [1] Han A.♦, Byra M., Heba E.♦, Andre M.P.♦, Erdman J.W.Jr.♦, Loomba R.♦, Sirlin C.B.♦, O'Brien W.D.Jr., Noninvasive diagnosis of nonalcoholic fatty liver disease and quantification of liver fat with radiofrequency ultrasound data using one-dimensional convolutional neural networks, **RADIOLOGY**, ISSN: 0033-8419, DOI: 10.1148/radiol.2020191160, Vol.295, No.2, pp.342-350, **2020**
- [2] Byra M., Jarosik P., Szubert A.♦, Galperine M.♦, Ojeda-Fournier H.♦, Olson L.♦, Comstock Ch.♦, Andre M.♦, Andre M., Breast mass segmentation in ultrasound with selective kernel U-Net convolutional neural network, **BIOMEDICAL SIGNAL PROCESSING AND CONTROL**, ISSN: 1746-8094, DOI: 10.1016/j.bspc.2020.102027, Vol.61, pp.102027-1-10, **2020**
- [3] Byra M., Dobruch-Sobczak K., Klimonda Z., Piotrkowska-Wróblewska H., Litniewski J., Early prediction of response to neoadjuvant chemotherapy in breast cancer sonography using Siamese convolutional neural networks, **IEEE JOURNAL OF BIOMEDICAL AND HEALTH INFORMATICS**, ISSN: 2168-2208, DOI: 10.1109/JBHI.2020.3008040, pp.1-8, **2020**
- [4] Byra M., Wu M.♦, Zhang X.♦, Jang H.♦, Ma Y-J.♦, Chang E.Y.♦, Shah S.♦, Du J.♦, Knee menisci segmentation and relaxometry of 3D ultrashort echo time cones MR imaging using attention U-Net with transfer learning, **MAGNETIC RESONANCE IN MEDICINE**, ISSN: 1522-2594, DOI: 10.1002/mrm.27969, Vol.83, No.3, pp.1109-1122, **2020**

[5] Jarosik P., Klimonda Z., Lewandowski M., Byra M., Breast lesion classification based on ultrasonic radio-frequency signals using convolutional neural networks, **BIOCYBERNETICS AND BIOMEDICAL ENGINEERING**, ISSN: 0208-5216, DOI: 10.1016/j.bbe.2020.04.002, Vol.40, No.3, pp.977-986, **2020**

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[8] Guo T.♦, Ma Y-J.♦, High R.A.♦, Tang Q.♦, Wong J.H.♦, Byra M., Searleman A.C.♦, To S.C.♦, Wan L.♦, Le N.♦, Du J.♦, Chang E.♦, Assessment of an in vitro model of rotator cuff degeneration using quantitative magnetic resonance and ultrasound imaging with biochemical and histological correlation, **EUROPEAN JOURNAL OF RADIOLOGY**, ISSN: 0720-048X, DOI: 10.1016/j.ejrad.2019.108706, Vol.121, pp.108706-1-10, **2019**

[9] Byra M., Wan L.♦, Wong J.H.♦, Du J.♦, Shah S.B.♦, Andre M.P.♦, Chang E.Y.♦, Quantitative ultrasound and b-mode image texture features correlate with collagen and myelin content in human ulnar nerve fascicles, **ULTRASOUND IN MEDICINE AND BIOLOGY**, ISSN: 0301-5629, DOI: 10.1016/j.ultrasmedbio.2019.02.019, Vol.45, No.7, pp.1830-1840, **2019**

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[11] Byra M., Wójcik J., Nowicki A., Using Empirical Mode Decomposition of Backscattered Ultrasound Signal Power Spectrum for Assessment of Tissue Compression, **ARCHIVES OF ACOUSTICS**, ISSN: 0137-5075, DOI: 10.24425/123916, Vol.43, No.3, pp.447-453, **2018**

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