PROFILE OF THE PERSON AUTHORIZED TO SUPERVISE THE INDIVIDUAL SCIENTIFIC WORK

Title and name: **Mirosław Świercz, D.Sc., Ph.D., Assoc. Prof.**

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Department: **Department of Control Engineering and Electronics**

Area of expertise:

- control engineering:
  - mathematical modeling of dynamic systems,
  - intelligent control algorithms;
- biocybernetics and biomedical engineering:
  - mathematical modeling of biomedical systems,
  - intelligent classification of biomedical data sets,
  - medical signal processing for detection of patient condition,
  - biomedical signal processing and classification;
- artificial intelligence methods and algorithms:
  - fault detection in industrial control systems with the use of artificial engineering and statistical methods,
  - intelligent methods of medical decision support,
  - application of AI in control engineering,
  - methods and algorithms of feature extraction and dimensionality reduction.

Subject of the doctoral thesis (examples):

- application of advanced signal processing methods and AI to fault detection and identification;
- feature extraction and AI approach to classification of data sets;
- using Neural Classifiers for rotor fault diagnosis in induction motors (defended PhD dissertation);
- D-optimal experiment design for estimating parameters of dynamic systems (defended PhD dissertation);
- detection of the selected class of steam boiler failures in a municipal power plant with the use of intelligent classification of the characteristics of signals (defended PhD dissertation);
- the use of non-uniform sampling methods and intelligent signal processing algorithms for the reconstruction of archival sound recordings (defended PhD dissertation).

Required knowledge:

- control theory/control engineering (intermediate level);
- artificial Intelligence methods (neural networks, fuzzy logic, genetic algorithms);
- signal processing (intermediate level)
- mathematical modeling (basic level).

Some scientific publications:

- Swiercz M.: Signal Processing Methods for Fault Diagnostics in Engineering Systems. Signal Processing Symposium (SPSympo), Debe Village, POLAND, June 10-12, 2015.
- Swiercz M.: Detection of parameter changes in a dynamic system with the use of the PCA transform and LVQ neural networks (in Polish). Wiadomosci Elektrotechniczne, 2014 (82), pp. 3-14.
- Swiercz M., Swiat M, Pawlak M, Weigele J, Tarasewicz R, Sobolewski A, Hurst RW, Mariak Z, Melhem ER, Krejza J.: Narrowing of the Middle Cerebral Artery: Artificial Intelligence Methods and

Comparison of Transcranial Color Coded Duplex Sonography with Conventional TCD. Ultrasound in Medicine and Biology, 2010: 36 (1), pp. 17-28.

- Swiat M., Weigele J., Hurst R. W., Kasner S. E., Pawlak M., Arkuszewski M., Al-Okaili R. N., Swiercz M., Ustymowicz A., Opala G., Melhem E. R., Krejza J.: Middle cerebral artery vasospasm: Transcranial color-coded duplex sonography versus conventional nonimaging transcranial Doppler sonography. Critical Care Medicine, vol. 37, No. 3, 2009, pp. 963-968.
- Swiercz M., Kochanowicz J., Weigele J., Hurst R., Liebeskind D. S., Mariak Z., Melhem E. R., Krejza J. Learning vector quantization neural networks improve accuracy of transcranial color-coded duplex sonography in detection of middle cerebral artery spasm - preliminary report. Neuroinformatics, 2008: 6 (1), pp. 279-290.
- Kochanowicz J., Lewszuk A., Kordecki K., Swiercz M., Mariak Z.: Diagnostic cerebral angiography affects the tonus of the major cerebral arteries. Medical Science Monitor, vol.13, suppl. 1 (2007), pp. 55-58.
- Mariak, Z; Krejza, J; Swiercz, M; et al.: Accuracy of transcranial color Doppler ultrasonography in the diagnosis of middle cerebral artery spasm determined by receiver operating characteristic analysis. Journal of Neurosurgery, vol. 96, No. 2, pp. 323-330.