

### Topics for enrolment to PhD studies September 2019

Domain: Electronics engineering, telecommunications and information technologies

Supervisor: Prof. Mihai Ivanovici

1. Multidimensional signal analysis and processing
  - a. Mathematical morphology, fractal models and multi-scale analysis
  - b. Feature extraction for image content analysis
  - c. Color, multi- and hyper-spectral image segmentation
  - d. Knowledge extraction from multidimensional data
  - e. Applications of satellite image analysis (including Sentinel-2) for agriculture
2. Complexity – application to color, multi- and hyper-spectral texture analysis
  - a. Complexity, entropy, chaos
  - b. Color, multi- and hyper-spectral texture characterization
  - c. Texture complexity metrology – definition and assessment of the spatio-chromatic complexity in the context of the CIE technical committee 8-14
3. Digital color image restoration
  - a. Color degradation models and color restoration using non-linear models
  - b. Non-linear vector filtering
  - c. Applications to cultural heritage preservation
4. Electronics systems for signal acquisition and processing
  - a. Color, multi- and hyper-spectral image acquisition systems
  - b. Real-time data acquisition and processing systems for the particle detectors of the ATLAS Experiment at LHC, CERN, Geneva
  - c. Packet processors, parallel computing architectures and specific architectures for real-time data processing

### Bibliography

- R.M. Coliban, M. Ivanovici, "Reducing the oversegmentation induced by quasi-flat zone for color images", Journal of Visual Communication and Image Representation, vol. 53, pag. 281-293, 2018
- O.M. Machidon, M. Ivanovici, "Digital color restoration for the preservation of reversal film heritage", Journal of Cultural Heritage, vol. 33, pag. 181-19, 2018
- R. Coliban, S. Popa, T. Tulbure, D. Nicula, M. Ivanovici, S. Martoiu, L. Levinson, J. Vermeulen, "The Read Out Controller for the ATLAS New Small Wheel", Journal of Instrumentation, volume 11, 2016
- M. Ivanovici, "Color and Multispectral Texture Image Analysis – Models, Features and Applications", Editura Universităţii Transilvania din Braşov, ISBN 978-606-19-0587-4, 2015
- M. Ivanovici, "Computer Network Emulation for Quality of Experience Assessment", Editura Universităţii Transilvania din Braşov, ISBN 978-606-19-0586-7, 2015
- A. Caliman, M. Ivanovici, N. Richard, "Probabilistic pseudo-morphology for grayscale and color images", Pattern Recognition, vol. 47, issue 2, pag. 721-735, 2014
- M. Ivanovici, N. Richard, D. Paulus, "Color Image Segmentation", in Advanced Color Image Processing and Analysis, ed. Christine Fernandez-Maloigne, Springer New York, 2013