20-th Polish Conference on Biocybernetics and Biomedical Engineering

Scientific Program

XXth PCBBE
Kraków, 20-22.09.2017

Conference opening ceremony
Room, date, time   bldg. B-2 aud. 100, Wed. Sep. 20, 10:00 – 10:15

Keynote Lecture	**K1**
Room, date, time	bldg. B-2 aud. 100, Wed. Sep. 20, 10:15 – 11:00
Chairpersons:	*Jacek Waniewski*

Leszek Królicki, *Molecular Imaging Today*

Oral session   **O1 Medical imaging and image processing I**
Room, date, time   bldg. B-2 aud. 100, Wed. Sep. 20, 11:30 – 13:00
Chairpersons: *Anna Korzyńska, Adam Piórkowski*

12   Marek Wodzinski, Andrzej Skalski, Piotr Kedzierawski, Tomasz Kuszewski and Izabela Ciepiela,
      Usage of ICP Algorithm for Initial Alignment in B-Splines FFD Image Registration in Breast Cancer Radiotherapy Planning

16   Juliusz Kulikowski and Malgorzata Przytulska
      Basic Concepts of 3D Morphological Spectra – Generation and Applications

17   Jaromir Przybyło and Paweł Dobosz
      Functional endoscopic sinus surgery with Head Mounted Display and video analysis

22   Bartosz Kopczyński, Paweł Strumiłło and Ewa Niebudek-Bogusz
      Computer analysis of normal and pathological vocal folds oscillations from videolaryngostroboscopic images

106   Antonina Młynarczyk-Kochanowska, Michał Strzelecki, Ernest Jan Bobeff and Dariusz Jan Jaskólski
      Volume estimation of normal and pathological brain structures

112   Jolanta Karpowicz and Krzysztof Gryz
      Variables in the pattern of the personnel exposure to electromagnetic field in magnetic resonance imaging facilities (0.1-7 T) in the context of workplace legislation

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Oral session   **O2 Biomaterials and tissue engineering**
Date, time   bldg. B-2 aud. 140, Wed. Sep. 20, 11:30 – 13:00
Chairpersons: *Dorota Pijanowska, Elżbieta Pamuła*

19   Magdalena Ochab, Andrzej Swierniak, Jerzy Klamka and Krzysztof Puszynski
      Influence of Stochasticity in Threshold Localization on Cell Fate in the PLDE-Model of p53 Module

33   Monika Kurpas and Krzysztof Puszynski
      Simulation Analysis of the Homologous Recombination Repair Distribution over the Cell Cycle

36   Marek Kowal and Józef Korbicz
      Marked point process for nuclei detection in breast cancer microscopic images

39   Kaja Frączkowska, Aleksandra Kaczorowska, Weronika Lamperska, Jan Masajada, Magdalena Przybyło, Halina Podbielska, Tomasz Wróbel and Marta Kopaczynska
      Alterations of biomechanics in cancer stem cells induced by cytostatic drugs used in acute myeloid leukemia

42   Maciej Duda, Magdalena Wawrzyńska, Edyta Wysokińska, Wojciech Kałas, Halina Podbielska and Marta Kopaczyńska
      CD133 antibody biofunctionalized intravascular implant surfaces for cardiovascular applications

98   Magdalena Tomanik, Magdalena Kobielarz, Celina Pezowicz and Jarosław Filipiak
      Laser irradiated biopolymers for scaffolds with controlled degradation properties

Oral session　　　　　　　　　**O3, Biomedical signal processing**
Date, time　　　　　　　　　　　　bldg. B-2 aud. 100, Wed. Sep. 20, 14:00 – 15:30
Chairpersons:　　　　　　　　　　*Józef Korbicz, Piotr Ładyżyński*

7　　Aleksandra Królak
　　Influence of skin tone on efficiency of vision-based heart rate estimation
10　Sławomir Kotyra and Grzegorz M. Wojcik
　　The Station for Neurofeedback Phenomenon Research
14　Sławomir Kotyra and Grzegorz M. Wojcik
　　Steady State Visually Evoked Potentials and their analysis with graphical and acoustic transformation
41　Agnieszka Świerkosz
　　Information coding and decoding using Discrete Wavelet transform
49　Daria Hemmerling, Magdalena Wójcik-Pędziwiatr, Michalina Malec-Litwinowicz, Natalia Grabska and Michał Michalski
　　Parkinson's disease progression monitoring based on voice recordings
54　Michał M. Placek, Marek Cygan, Paweł Wachel and Magdalena Kasprowicz
　　Estimating phase shift using matching pursuit algorithm to assess cerebral autoregulation

Oral session　　　　　　　　　**O4 Medical optics**
Date, time　　　　　　　　　　　　bldg. B-2 aud. 140, Wed. Sep. 20, 14:00 – 15:30
Chairpersons:　　　　　　　　　　*Agnieszka Ulatowska-Jarża, Adam Liebert*

43　Aleksandra Kaczorowska, Iwona Hołowacz, Agnieszka Ulatowska-Jarża, Maciej Duda, Wojciech Kałas, Edyta Wysokińska, Halina Podbielska and Marta Kopaczyńska
　　Photoactive matrix for intravascular photodynamic therapy applications
50　Weronika Lamperska, Kaja Frączkowska, Aleksandra Kaczorowska, Jan Masajada, Halina Podbielska, Tomasz Wróbel and Marta Kopaczyńska
　　Optical tweezers as a powerful tool to study changes in mechanical properties of cancer cells
57　Iwona Hołowacz, Agnieszka Suchwałko, Igor Buzalewicz, Katarzyna Kowal, Halina Podbielska and Agnieszka Ulatowska-Jarża
　　Porous silica materials as photosensitizers carriers
87　Saeed Samaei, Piotr Sawosz, Anna Gerega, Aleh Sudakou and Adam Liebert
　　Combined use of time-resolved near infrared spectroscopy and diffuse correlation spectroscopy in monitoring of brain perfusion and oxygenation
92　Aleh Sudakou, Piotr Sawosz, Anna Gerega and Adam Liebert
　　Optimal selection of wavelengths for estimation of oxy-, deoxy- hemoglobin and cytochrome-c-oxidase from time-resolved NIRS measurements
104　Karolina Bejm, Stanislaw Wojtkiewicz, Piotr Sawosz, Anna Stecka, Nikodem Hryniewicz, Roman Maniewski and Adam Liebert
　　High-resolution optical imaging of cerebral cortex activity during visual stimulation

Accompanying Event　　　　　　**A1**
Room, date, time　　　　　　　　　meet at reception desk Wed. Sep. 20, 14:00
Visit to Krakow Cardiac Research Institute Core Lab

Oral session　　　　　　　　　**O5 Measurements in biology and medicine I**
Date, time　　　　　　　　　　　　bldg. B-2 aud. 100, Wed. Sep. 20, 16:00 – 17:30
Chairpersons:　　　　　　　　　　*Paweł Strumiłło, Władysław Torbicz*

51　Agnieszka Uryga, Agnieszka Kazimierska, Arkadiusz Mielczarek, Michał M. Placek, Paweł Wachel and Magdalena Kasprowicz
　　The relationship between baroreflex sensitivity and cerebral autoregulation during controlled breathing

63   Agnieszka Kazimierska, Agnieszka Uryga, Michał M. Placek, Paweł Wachel and Magdalena Kasprowicz
      Baroreflex sensitivity estimation during postural change in joint time and frequency domain
74   Matylda Żmudzińska, Marcin Inglot, Ewelina Świątek-Najwer, Urszula Zaleska-Dorobisz and Celina
      Pezowicz, *The assessment of Shear Wave Elastography (SWE) application in research of liver mechanical
      properties*
99   Martyna Lachowska, Anna Gerega, Piotr Sawosz, Keith St Lawrence, Laura Morrison, Eric Wright and
      Adam Liebert, *Estimation of brain hemodynamic parameters using multiwavelength time-resolved NIRS
      technique combined with ICG bolus-tracking method*
97   Paula Stępień, Zuzanna Miodońska, Michał Kręcichwost, Paweł Badura, Piotr Zarychta, Marcin Rudzki,
      Jacek Kawa and Ewa Piętka
      Innovative solutions in telecare - activity monitoring of the elderly - summary of the project

Special session	**SS1 Certification system for clinical engineers**
Date, time	bldg. B-2 aud. 140, Wed. Sep. 20, 16:00 – 17:30
Chairpersons:	*Ewa Zalewska, Tadeusz Pałko*

109   Ewa Zalewska and Tadeusz Palko, *Specialization and certification in medical engineering*
901   Tadeusz Palko,
      General information by National Consultant of Ministry of Health in medical engineering.
902   Kazimierz Peczalski, Tadeusz Palko, *Certification of medical engineers in Poland*

Special session	**SS2 70 anniversary of prof. Ryszard Tadeusiewicz**
Date, time	bldg. B-2 aud. 100, Wed. Sep. 20, 17:30 – 19:00
Chairperson:	*Piotr Augustyniak*

Piotr Szymczyk, *Wyższość psa naturalnego nad cybernetycznym*
Tadeusz Juliszewski, *Dom i przyroda*
Wiesław Wszołek, *Ryszard za sterem, nie tylko w rektoracie*
Piotr Augustyniak, *Podróże po świecie*
Joanna Grabska-Chrząstowska, *Kobiety w życiu profesora*
disscussion

Keynote Lecture	**K2**
Room, date, time	bldg. B-2 aud. 100 Thu, Sep. 21, 9:00 – 9:50
Chairpersons:	*Piotr Augustyniak*

Adam Liebert, *Transcranial Optical Measurement of Brain Perfusion and Oxygenation*

Oral session	**O6 Biomechanics and artificial organs**
Date, time	bldg. B-2 aud. 100, Thu. Sep. 21, 10:00 – 11:30
Chairpersons:	*Celina Pezowicz, Marek Gzik*

76   Marta Kozuń and Celina Pezowicz
      The influence of atherosclerosis on the delamination properties of human thoracic aorta
79   Katarzyna Arkusz, Tomasz Klekiel, Grzegorz Sławiński and Romuald Będziński
      *The numerical analysis of the damping properties of soft tissue and bone elements in lumbar-pelvic
      complex under impact load*
82   Klaudia Kozlowska, Miroslaw Latka, Slawomir Budrewicz and Magdalena Koszewicz
      Low-frequency fluctuations of postural sway velocity in Parkinson's disease
108   Sylwia Szotek, Katarzyna Polak-Kraśna, Diana Petryczuk and Celina Pezowicz
      The mechanical properties of the denticulate ligament in different levels of the spine

	Oral session	**O7, Education in biomedical engineering**
	Date, time	bldg. B-2 aud. 140, Thu. Sep. 21, 10:00 – 11:30
	Chairpersons:	*Halina Podbielska, Tadeusz Pałko*

58 Antoni Nowakowski, *Biomedical engineering in Gdansk University of Technology – the follow up*
88 Kazimierz Peczalski and Tadeusz Palko
The theory, practice and needs of the medical engineering in Poland
90 Kazimierz Peczalski, Tadeusz Palko, Natalia Golnik, Elzbieta Slubowska and Krzysztof Lewenstein
The innovative model of education of medical engineers
107 Marek Gzik, Paweł Kostka, Zbigniew Paszenda and Marcin Kaczmarek
Information Systems in Medicine - new specialization in English on Bachelor level, at Biomedical Engineering Faculty of Silesian University of Technology

	Open Lecture	**A2**
	Room, date, time	bldg. B-2 aud. 110 Thu, Sep. 21, 10:00 – 11:30
	Ewa Zalewska, *Integrated Structural and Functional Research on Nervous System*	

	Oral session	**O8 Modeling and computers in medicine**
	Date, time	bldg. B-2 aud. 140, Thu. Sep. 21, 12:00 – 13:30
	Chairpersons:	*Aleksandra Jung, Jacek Waniewski*

15 Piotr Augustyniak, *Localization of Noise Sources in a Multilead Electrophysiological Record*
26 Marta Orłowska, Rafał Jóźwiak and Piotr Regulski
Virtual tooth extraction from Cone Beam Computed Tomography scans
68 Leszek Pstraś and Jacek Waniewski
Mathematical modelling of relative and absolute blood volume changes during haemodialysis
31 Elzbieta Pociask, Magdalena Ślęzak, Kamila Kosińska, Klaudia Proniewska, Krzysztof Malinowski and Piotr Augustyniak, *Image Analysts' eye movement patterns during intravascular OCT interpretation*
96 Urszula Smyczynska, *Application of Kohonen and MLP networks for prediction of 1st-year response to growth hormone treatment in children*

	Special session	**SS3 PSBE (PTIB) award nomination**
	Date, time	bldg. B-2 aud. 100, Thu. Sep. 21, 12:00 – 13:30
	Chairpersons:	*Ewa Zalewska, Marek Darowski*

	Poster session	**P1**
	Date, time	bldg. B-2, room 111, Thu. Sep. 21, 14:30 – 16:00
	Chairpersons:	*Ewa Piętka, Halina Podbielska, Juliusz Kulikowski*

37 Bożenna Kuraszkiewicz, Hanna Goszczyńska and Maria Piotrkiewicz
Application of the method of estimation of afterhyperpolarization duration to assessment of bilateral changes in motoneurons of stroke survivors
100 Kamil Jonak, Paweł Krukow, Justyna Morylowska-Topolska and Hanna Karakuła-Juchnowicz
Duration of untreated psychosis is associated with low-frequency functional connectivity in patients with first-episode schizophrenia
48 Piotr Szymczyk and Magdalena Szymczyk
Wireless communication infrastructure for smarter medical monitoring
5 Paweł Kłeczek, Sylwia Mól and Joanna Jaworek-Korjakowska
The accuracy of H&E stain unmixing techniques when estimating relative stain concentrations
13 Tomasz Leś, Tomasz Markiewicz and Janusz Patera
Automatic detection of cells in FISH images using map of colors and three-track segmentation
93 Robert Cierniak, *Statistical approach to the 3D spiral computed tomography with reduced dose absorbed by patients during examinations*

Keynote Lecture	K3	
Room, date, time	bldg. B-2 aud. 100	Fri. Sep. 22, 9:00 – 9:50
Chairpersons:	*Marek Darowski*	

Hubert Harańczyk, *Physics of fairy-tales*

Oral session	O9 Measurements in biology and medicine II
Date, time	bldg. B-2 aud. 100, Fri. Sep. 22, 10:00 – 11:30
Chairpersons:	*Ludomira Granicka, Jerzy Wtorek*

67 Jarosław Glapiński, Janusz Mroczka and Anna Fijalkowska-Nestorowicz
Identification of the parameters of lung during recruitment maneuver.

69 Jan Juszczyk, Bartłomiej Pyciński, Joanna Czajkowska, Agata Wijata, Marta Galińska, Aleksandra Juraszczyk and Ewa Piętka, *Multimodal data acquisition in monitored biopsy procedure*

89 Kazimierz Peczalski, *The atomic sensors in the Magnetocardiography*

91 Malgorzata Debowska, Jan Poleszczuk, Alicja Wojcik-Zaluska, Wojciech Dabrowski, Mauro Pietribiasi, Andrzej Ksiazek, Wojciech Zaluska and Jacek Waniewski
Impact of hemodialysis on cardiovascular system

94 Joanna Bauer, Ignacy Górecki, Maria Litwin, Agnieszka Migasiewicz and Halina Podbielska
Influence of smartphones usage on the surface temperature distribution of parotid region

Oral session	**O10 Medical imaging and image processing II**
Date, time	bldg. B-2 aud. 140, Fri. Sep. 22, 10:00 – 11:30
Chairpersons:	*Ewa Piętka, Robert Cierniak*

6 Anna Korzynska, Lukasz Roszkowiak, Krzysztof Siemion, Jakub Zak, Karolina Zakrzewska, Anna Samluk, Agnieszka Wencel, Krzysztof Pluta and Dorota Pijanowska
The analysis of the shape of the genetically modified human skin fibroblasts in culture

11 Marek Wdowiak, Tomasz Markiewicz and Szczepan Cierniak
An automatic quantitative evaluation of ladder pattern presented in intercellular spaces in histopathological images of reflux disease specimen stained with desmoglein-3 antibody.

32 Rafał Jóźwiak, Ewa Sobieszczuk, Bogdan Ciszek, Piotr Wolski, Michał Szklarski and Izabela Domitrz
Stroke Bricks - the segments of interests to localize early stages of the ischemia evolution

20 Karolina Nurzyńska, Adam Piorkowski, Marzena Bielecka and Rafal Obuchowicz
Automatical syndesmophyte contour extraction from lateral C spine radiographs

116 Beata Toczyłowska, Małgorzata Chalimoniuk, Małgorzata Michałowska, Paweł Senator, Urszula Fiszer
Serum metabolomics in Parkinson's disease

Open Course	**A3**
Room, date, time	bldg. B-2, room 110, Fri. Sep. 22, 10:00 – 11:30
Adam Liebert, *How to write a successful scientific paper*	

Poster session	**P2**
Date, time	bldg. B-2, room 111, Fri. Sep. 22, 12:00 – 13:30
Chairpersons:	*Joanna Stachowska-Piętka, Marta Wasilewska-Radwańska, Antoni Nowakowski*

4 Marcin Kołodziej, Andrzej Majkowski, Łukasz Oskwarek, Remigiusz Rak and Paweł Tarnowski
Processing and analysis of EEG signal for SSVEP detection

23 Barbara Stankiewicz, Marek Darowski and Krzysztof Jakub Pałko, *Influence of preterm birth, BPD and lung inhomogeneity on respiratory system impedance - Model Studies*

52 Iwona Gruszczyńska, Sławomir Grycuk, Marta Borowska, Paweł Kuć and Piotr Laudański
Analysis of EHG signals to prediction of preterm labor using joint recurrence plots

53 Michał Kręcichwost, Zuzanna Miodońska and Paweł Badura
Acoustic analysis of phoneme /s/ mispronunciations for sigmatism diagnosis

64 Piotr Lachert, Przemyslaw Pulawski, Dariusz Janusek, Daniel Milej, Piotr Sawosz, Michal Kacprzak and Katarzyna Blinowska
Coupling of oxy- and deoxy-hemoglobin concentrations with EEG rhythms during motor task

66 Marta Borowska and Paweł Kuć
Application of Entropy Measures for the Detection of Preterm Labor

71 Sławomir Grycuk, Iwona Gruszczyńska, Marta Borowska, Paweł Kuć and Piotr Laudański
Analysis of EHG signals in order to predict preterm labor using nonlinear dynamics methods

110 Petro Guchek, Karolina Bejm, Piotr Sawosz and Adam Liebert
Data acquisition and preprocessing software for high-density near-infrared spectroscopy device

25 Magdalena Antosiak-Iwanska, Ewa Godlewska, Joanna Kinasiewicz, Krzysztof Dudek, Jerzy Kawiak and Ludomira H. Granicka, *Cryopreservation of cells encapsulated within nano-thin polyelecrolyte coatings*

61 Anna Ciechanowska, Grazyna Hoser, Stanislawa Sabalinska, Jerzy Kawiak, Artur Kaminski and Piotr Ladyzynski, *Preliminary study on the effect of zinc oxide nanoparticles (ZnO) on the properties of the endothelial cells*

62 Marcin Kaczmarek, Zbigniew Paszenda, Witold Walke and Marcin Basiaga
Pitting corrosion resistance of NiTi alloy in simulated physiological solutions

65 Barbara Zagrajczuk, Michal Dziadek, Karol Jartym, Katarzyna Cholewa-Kowlalska and Maria Laczka
The influence of the heat treatment on the chemical activity of the glasses and glass-ceramics from the SiO2-CaO and SiO2-CaO-P2O5 systems

73 Agnieszka Wencel, Karolina Zakrzewska, Anna Samluk, Dorota Pijanowska and Krzysztof Pluta
New Methods for Plating Human Liver Cells

80 Michal Dziadek, Timothy Douglas, Josefien Schietse, Maria Buchweitz, Chris Vervaet, Barbara Zagrajczuk, Katarzyna Cholewa-Kowalska and Andre Skirtach
In vitro mineralization of pectin/bioactive glass injectable composites

84 Joanna Stachowska-Pietka, Jan Poleszczuk, Bengt Lindholm and Jacek Waniewski
Identification of the pathophysiological changes within the peritoneal transport barrier in patients undergoing peritoneal dialysis

85 Monika Drabik, Beata Kazimierczak, Angelika Kwiatkowska, Anna Grzeczkowicz, Magdalena Antosiak-Iwańska and Ludomira Granicka
Composite Membrane with Silver Nanoparticles for Supporting Fibroblastic Cell Growth

95 Katarzyna Wysocka-Król, Joanna Bauer and Halina Podbielska
Supporting role of silver doped silica nanoparticles in antibacterial photodynamic action

44 Maciej Kozarski, Krystyna Górczyńska, Krzysztof Jakub Pałko and Marek Darowski
A hybrid interface to connect an IABP balloon to a circulatory system hybrid simulator to improve its assistance abilities

59 Krzysztof Zieliński, Łukasz Kozarski, Maciej Kozarski and Marek Darowski
Adaptive lung ventilation minimizing the work of breathing

18 Marek Gzik, Wojciech Wolański, Bożena Gzik-Zroska, Kamil Joszko, Michał Burkacki and Sławomir Suchoń, *Analysis of various factors impact on safety of armored vehicle crew during an IED explosion*

78 Magdalena Wojtków and Celina Pezowicz
Mechanical investigation of the annulus-endplate anchorage failure

81 Piotr Borkowski, Jolanta Zuzda, Robert Latosiewicz and Katarzyna Stepaniuk
A prophylactic program in degenerative changes in the hip joint - suggested exercise and equipment

86 Agata Wijata, Marta Galinska, Bartłomiej Pyciński, Jan Juszczyk, Joanna Czajkowska, Dominik Spinczyk and Ewa Piętka, *Computer-aided Detection of 3D Region of Interest for Image-guided Needle Biopsy*

113 Krzysztof Psiuk-Maksymowicz, Damian Borys and Marek Kijonka
Construction of brain atlases based on dataset of Polish adults

34 Marcin Gadamer and Adrian Horzyk
Biologically Inspired Linguistic Habit Graph Networks Used For Text Correction

Conference closing ceremony
Room, date, time   bldg. B-2 aud. 100, Fri. Sep. 22, 13:30 – 14:00