



Zabrze, Poland  
June 23-25, 2025

**10th**

International Conference  
Information Technology in Biomedicine

# Conference program



Silesian  
University  
of Technology



RESEARCH  
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ANNIVERSARY  
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Department of Medical  
Informatics  
and Artificial Intelligence



OŚRODEK  
PRZETWARZANIA  
INFORMACJI  
PAŃSTWOWY INSTYTUT BADAWCZY

# Monday, June 23rd, 2025

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| 08:00 | <b>REGISTRATION</b><br>EHTIC, main hall                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                           |
| 09:00 | <b>OPENING CEREMONY</b><br>Philips Auditorium                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                           |
| 09:15 | <p>KEYNOTE LECTURE<br/>Philips Auditorium</p> <p><b>Artificial- Intelligence-Powered Lab Automation</b><br/> Jan Hansmann<br/> <i>Fraunhofer Institute for Silicate Research, Würzburg, Germany</i></p> <p>Chair: Ewa Piętka</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                           |
| 10:15 | <b>COFFEE BREAK</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                           |
| 10:45 | <p>PLENARY SESSION</p> <p><b>AI and Image Analysis Applications in Medicine</b><br/> Philips Auditorium</p> <p>Chair: Ewa Piętka, Arkadiusz Gertych</p> <p><b>Semantic-Driven Synthesis of Histological Images with Controllable Cellular Distributions</b><br/> <i>Alen Shahini, Alessandro Gambella, Filippo Molinari, Massimo Salvi</i></p> <p><b>Unveiling the Precision: Benchmarking Deep Learning Models for Nuclear Detection and Segmentation Across Diverse Tissue Datasets</b><br/> <i>Natalia Żurek, Arkadiusz Gertych</i></p> <p><b>AI-Driven Glomerular Morphology Quantification: A Novel Pipeline for Assessing Basement Membrane Thickness and Podocyte Foot Process Effacement in Kidney Diseases</b><br/> <i>Michifumi Yamashita, Natalia Piaseczna, Akira Takahashi, Daisuke Kiyozawa, Narihito Tatsumoto, Shohei Kaneko, Natalia Żurek, Arkadiusz Gertych</i></p> <p><b>Efficient Annotation Bootstrapping for Cell Identification in Follicular Lymphoma</b><br/> <i>Adam Krawczyk, Aleksandra Osowska-Kurczab, Sławomir Pakuło, Wojciech Kotłowski, Zaneta Swiderska-Chadaj</i></p> <p><b>Segmentation of Skin Layers on HFUS Images Using the Attention Mechanism</b><br/> <i>Anna Slian, Katarzyna Korecka, Adriana Polańska, Joanna Czajkowska</i></p> <p><b>Automated Evaluation of Lymphoma Treatment Response: Integrating Delta Radiomics and Deep Learning from 2-[18F] FDG PET/CT</b><br/> <i>Jakub Mitura, Rafał Józwiak, Beata E. Chrapko, Oliwia Bachanek-Mitura, Joanna Wybrańska</i></p> |                                                                                                                                                                                                                                                                                           |
| 12:30 | <b>LUNCH</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                           |
| 13:30 | <p>SPECIAL SESSION (IN POLISH)</p> <p><b>Sztuczna inteligencja w walce z rakiem</b><br/> Philips Auditorium</p> <p>Organizator:</p>  <p><b>OŚRODEK PRZETWARZANIA INFORMACJI</b><br/> PANSTWOWY INSTYTUT BADAWCZY</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <p>JUNIOR RESEARCHER SESSION</p> <p><b>Information Technology in Biomedicine</b><br/> EHTIC, Conference Room</p> <p>Chair: Paweł Kostka, Zuzanna Miodońska</p> <p><b>Optimization of Microtomography Scanning of Fixed Paraffin Samples</b><br/> <i>Zuzanna Łazorko, Jan Juszczyk</i></p> |

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|       | <p>Wydarzenie poświęcone promocji wyników projektu<br/> <b>Radiologia wzmacniana AI – wykrywanie, raportowanie i podejmowanie decyzji klinicznych w diagnostyce raka prostaty</b> sfinansowanego z programu INFOSTRATEG I Narodowego Centrum Badań i Rozwoju.</p> <p>Chair: Rafał Józwiak</p><br> <p>Narodowe Centrum Badań i Rozwoju</p> <p>Projekt finansowany przez Narodowe Centrum Badań i Rozwoju w ramach programu INFOSTRATEG I</p>                                                                                          | <p><b>Wound AI: Deep Learning for Chronic Wound Detection and Segmentation</b><br/> <i>Kornel Bujak, Magdalena Chojnacka, Jakub Nalepa, Agata M. Wijata</i></p> <p><b>AI-Powered Healing: Machine Learning Approaches for Chronic Wound Detection</b><br/> <i>Mikołaj Musioł, Jakub Sikora, Hubert Wróbel, Jakub Nalepa, Agata M. Wijata</i></p> <p><b>Influence Analysis of Musical Track with String Instruments on the Basic EEG Signal Waves and Rhythms</b><br/> <i>Anna Miruk-Mirska, Piotr Zarychta</i></p> <p><b>The Influence of Place of Articulation Shift on the Acoustic Features of Retroflex Voiceless Fricative in Preschool Children's Speech</b><br/> <i>Oliwia Skorzevska, Maria Filipek, Magdalena Krycha, Wiktoria Mazur, Zuzanna Miodońska</i></p> <p><b>Computer-Assisted Diagnosis of Child Speech using SVM: A Preliminary Study on Polish Voiceless Retroflex Affricates</b><br/> <i>Maria Filipek, Wojciech Pieniążek, Michał Kręcichwost, Zuzanna Miodońska</i></p> <p><b>ECG Changes in Electronic Cigarette Users Under Rest and Post-Exercise Conditions: A Pilot Study</b><br/> <i>Emmanuel Quiles Martinez, Aleksandra Badura</i></p>                                         |
| 15:00 | COFFEE BREAK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 15:30 | <p>DISCUSSION PANEL (IN POLISH)<br/> <b>Rozwój medycyny cyfrowej – jak usprawnić interdyscyplinarną współpracę?</b><br/> Philips Auditorium</p> <p>Organizator:</p>  <p><b>OŚRODEK PRZETWARZANIA INFORMACJI</b><br/> PAŃSTWOWY INSTYTUT BADAWCZY</p> <p>Chair: Rafał Józwiak, Tomasz Jaworski</p><br> <p>Narodowe Centrum Badań i Rozwoju</p> <p>Projekt finansowany przez Narodowe Centrum Badań i Rozwoju w ramach programu INFOSTRATEG I</p> | <p><b>JUNIOR RESEARCHER SESSION</b><br/> <b>Information Technology in Biomedicine</b><br/> EHTIC, Conference Room</p> <p>Chair: Maciej Gawlikowski, Michał Kręcichwost</p> <p><b>Towards Automatic Recognition of Pain Modality: A Pilot Study on Experimentally-Induced Pain Using Electricity and Pressure</b><br/> <i>Maja Sokołowska, Paweł Mruzek, Marta Biesok, Aleksandra Badura</i></p> <p><b>A Marker-Based System for Objective Facial Movement Assessment in Therapy - Pilot Study</b><br/> <i>Dawid Danecki, Agata Sage, Sebastian Zowada, Zuzanna Miodońska, Andrzej Myśliwiec, Krzysztof Dowgierd, Anna Lipowicz, Ewa Piętka, Michał Kręcichwost</i></p> <p><b>A Software Platform Integrating Wearable Sensors for Home-Based Rehabilitation</b><br/> <i>Jeremiasz Potoczny, Piotr Augustyniak</i></p> <p><b>Assessment of Brain Oxygenation Depending on Music Preferences Using the fNIRS System</b><br/> <i>Hanna Zielonka, Aleksandra Urantówka, Patrycja Romaniszyn-Kania, Damian Kania, Andrzej W. Mitas</i></p> <p><b>Preliminary Segmentation of Cerebrovascular Structures in Computed Tomography Angiography</b><br/> <i>Jakub Gumulski, Jarosław Żyłkowski, Dominik Spinczyk</i></p> |

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|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <p><b>Impact of Cerebrovascular Segmentation Accuracy on Geometric Features in Computed Tomography Angiography Images</b><br/><i>Jakub Gumulski, Jarosław Żyłkowski, Dominik Spinczyk</i></p> <p><b>Facial Surgery Preview Based on the Orthognathic Treatment Prediction</b><br/><i>Huijun Han, Congyi Zhang, Lifeng Zhu, Pradeep Singh, Richard Tai-Chiu Hsung, Yiu Yan Leung, Taku Komura, Wenping Wang, Min Gu</i></p>                                                                                                                                                                                                                                                                                                                                                                  |
| 18:00                                  | <p><b>GALA DINNER</b><br/>Guido Mine, Zabrze</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <p><b>Tuesday, June 24th, 2025</b></p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 09:00                                  | <p>KEYNOTE LECTURE<br/>Philips Auditorium</p> <p><b>Novel sensors and signal processing for ubiquitous mobile EEG</b><br/>Patrique Fiedler<br/><i>Technische Universität Ilmenau, Germany</i></p> <p>Chair: Joanna Czajkowska</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 10:00                                  | <p>PLENARY SESSION<br/><b>AI and Image Analysis Applications in Medicine</b><br/>Philips Auditorium</p> <p>Chair: Massimo Salvi, Dominik Spinczyk</p> <p><b>Automated Determination of Hip Arthrosis on the Kellgren-Lawrence Scale in Pelvic Digital Radiographs Scans Using Machine Learning</b><br/><i>Karolina Nurzynska, Marek Wodzinski, Adam Piórkowski, Michał Strzelecki, Rafał Obuchowicz, Paweł Kamiński</i></p> <p><b>VesselKnife – Software for the Analysis of Tubular Structures in Biomedical Images</b><br/><i>Piotr M. Szczypiński, Artur Klepaczko, Robert Olbrycht</i></p> <p><b>Decision Support System Based on Pattern Detection in Iterative Dermoscopic Screening</b><br/><i>Natalia Salwowska, Aleksander Kempski, Piotr Zielonka, Paweł Pietkiewicz, Damian Borys</i></p> <p><b>Performance Analysis of 2D and 3D Image Features for Computer-Assisted Speech Diagnosis of Dental Sibilants in Polish Children</b><br/><i>Agata Sage</i></p> | <p>WORKSHOP (IN POLISH)<br/><b>Platforma AI4AR</b><br/>Room 012</p> <p>Organizator:</p> <div><p><b>OŚRODEK PRZETWARZANIA INFORMACJI</b><br/>PANSTWOWY INSTYTUT BADAWCZY</p></div> <p>Wydarzenie poświęcone promocji wyników projektu <b>Radiologia wzmacniana AI – wykrywanie, raportowanie i podejmowanie decyzji klinicznych w diagnostyce raka prostaty</b> sfinansowanego z programu INFOSTRATEG I Narodowego Centrum Badań i Rozwoju.</p> <div><p><b>NCBR</b><br/>Narodowe Centrum Badań i Rozwoju</p></div> <p>Projekt finansowany przez Narodowe Centrum Badań i Rozwoju w ramach programu INFOSTRATEG I</p> |
| 11:00                                  | <p><b>COFFEE BREAK</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 11:30                                  | <p>PLENARY SESSION<br/><b>AI and Image Analysis Applications in Medicine</b><br/>Philips Auditorium</p> <p>Chair: Massimo Salvi, Dominik Spinczyk</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <p>WORKSHOP (IN POLISH)<br/><b>Platforma AI4AR</b><br/>Room 012</p> <p>Organizator:</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

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|       | <p><b>Towards the Use of Multiple ROIs for Radiomics-Based Survival Modelling: Finding a Strategy of Aggregating Lesions</b><br/> <i>Agata Małgorzata Wilk, Andrzej Swierniak, Andrea d'Amico, Rafał Suwiński, Krzysztof Fajewicz, Damian Borys</i></p> <p><b>Automatic Skull Reconstruction by Deep Learnable Symmetry Enforcement</b><br/> <i>Marek Wodzinski, Mateusz Daniol, Daria Hemmerling</i></p> <p><b>Factors Influencing the Estimation of Phacoemulsification Procedure Time in Cataract Surgery: Analysis Using Neural Networks</b><br/> <i>Magdalena Jędzierowska, Robert Koprowski, Michele Lanza, Michał Walczak, Anna Deda</i></p> <p><b>Multi-Positive Contrastive Learning-Based Cross-Attention Model for T cell Receptor–Antigen Binding Prediction</b><br/> <i>Yi Shuai, Pengcheng Shen, Xianrui Zhang</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  <p>Wydarzenie poświęcone promocji wyników projektu<br/> <b>Radiologia wzmacniana AI – wykrywanie, raportowanie i podejmowanie decyzji klinicznych w diagnostyce raka prostaty</b> sfinansowanego z programu INFOSTRATEG I Narodowego Centrum Badań i Rozwoju.</p>  <p>Projekt finansowany przez Narodowe Centrum Badań i Rozwoju w ramach programu INFOSTRATEG I</p> |
| 12:30 | <b>LUNCH</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 13:30 | <p>PLENARY SESSION<br/> <b>Biomedical Signal Processing</b><br/> Philips Auditorium</p> <p>Chair: Bartłomiej Stasiak, Dariusz Komorowski</p> <p><b>Artifact Removal Methods for EEG Signal Preprocessing – A Comparative Analysis</b><br/> <i>Markus Deriu, Stanisław Zakrzewski, Bartłomiej Sztyler, Bartłomiej Stasiak, Adam Wojciechowski</i></p> <p><b>Automated Segmentation of Polish Sibilants Using Modified YAMNet Architecture for Computer-Aided Speech Diagnosis in Children</b><br/> <i>Michał Kręcichwost, Paweł Badura, Artur Piet, Abid Hasan, Natalia Moćko, Zuzanna Miodońska, Agata Sage, Marcin Grzegorzek</i></p> <p><b>Evaluation of the linear and nonlinear classifiers for distinguishing between healthy subjects and patients with valvular heart diseases based on electrocardiograms, seismocardiograms, and gyrocardiograms</b><br/> <i>Szymon Sieciński, Marcin Grzegorzek</i></p> <p><b>Supervised Factor Selection in Tensor Decomposition of EEG Signal</b><br/> <i>Stanisław Zakrzewski, Bartłomiej Stasiak, Adam Wojciechowski</i></p> <p><b>Differentiating Characteristics of EMG Signals in Pediatric Muscle Tone Disorders in the Aspect of Evaluating Functional Disturbances in the Stomatognathic System</b><br/> <i>Aleksandra Tuszy, Patrycja Romaniszyn-Kania, Andrzej W. Mitas, Andrzej Myśliwiec</i></p> <p><b>Protein Hot Spot Identification by Means of Classification Methods Employing Wavelet Transform-Based Features</b><br/> <i>Anna Tamulewicz, Ewaryst Tkacz</i></p> <p><b>Assessment of Music in Intrauterine Environment Using Mathematical Model of Sound Attenuation</b><br/> <i>Maria Bieńkowska</i></p> <p><b>Multimodal Approach to Assessing Cognitive Impairment in Patients with Multiple Sclerosis Using qEEG and MRI – Preliminary Report</b><br/> <i>Katarzyna Zawiaślak-Fornagiel, Weronika Galus, Patrycja Romaniszyn-Kania, Daniel Ledwoń, Julia Wyszomirska, Oskar Bożek, Damian Kania, Hannes Oppermann, Aleksandra Tuszy, Joanna Siuda, Andrzej W. Mitas</i></p> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 16:00 | <b>SOCIAL EVENT</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

# Wednesday, June 25th, 2025

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| 09:00 | <p>KEYNOTE LECTURE<br/>Philips Auditorium</p> <p><b>Pathomics in Action: Can We predict Crohn's Disease Recurrence?</b><br/>Arkadiusz Gertych<br/><i>Cedars-Sinai Medical Center, Los Angeles, USA</i></p> <p>Chair: Paweł Badura</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 10:00 | <p>PLENARY SESSION</p> <p><b>Modelling, Simulation, and Therapy Support</b><br/>Philips Auditorium</p> <p>Chair: Michał Strzelecki, Jacek Kawa</p> <p><b>Modelling Changes in Genetic Heterogeneity Using Games with Resources</b><br/><i>Katarzyna Hajdowska, Andrzej Swierniak, Damian Borys</i></p> <p><b>Associative Knowledge Graphs for Efficient Sequence Storage and Retrieval</b><br/><i>Przemysław Stokłosa, Janusz A. Starzyk, Paweł Raif, Adrian Horzyk, Marcin Kowalik</i></p> <p><b>MIInfer: Bridging MetaboAnalyst and Jacobian Analysis for Metabolomic Networks</b><br/><i>Jana Schwarzerova, Erdő Gabor Mate, Jakub Idkowiak, Dominika Olesova, Ales Kvasnicka, Dana Dobesova, David Friedecky, Valentyna Provaznik, Jozef Skarda, Wolfram Weckwerth, Thomas Nägele</i></p> <p><b>Model of Data Acquisition System for the Diagnosis and Treatment Support in Parkinson's Disease</b><br/><i>Mirosław Czak, Andrzej W. Mitas</i></p>                                                                                                                                                                                                                                                                                                                        |
| 11:00 | COFFEE BREAK                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 11:30 | <p>PLENARY SESSION</p> <p><b>Modelling, Simulation, and Therapy Support</b><br/>Philips Auditorium</p> <p>Chair: Daniel Ledwoń, TBA</p> <p><b>Multifunctional Device for Hard-to-Heal Wounds: Pilot Study</b><br/><i>Kinga Kostera, Dominik Jan Dziadek, Wojciech Więclawek</i></p> <p><b>Retinal Thickness Analysis for Genotype-Phenotype Associations in Age-Related Macular Degeneration Risk Assessment</b><br/><i>Anna Wąsowska, Adam Sendeki, Daniel Ledwoń, Patrycja Romaniszyn-Kania, Aleksandra Tuszy, Julia Nycz, Wojciech Więclawek, Anna Boguszewska-Chachulska, Andrzej W. Mitas, Edward Wylęgała, Sławomir Teper</i></p> <p><b>The Use of Vision Therapy in the Treatment of Refractory Amblyopia</b><br/><i>Marcin Jaworski, Patrycja Romaniszyn-Kania, Daniel Ledwoń, Anna Bierzyńska, Marta Świerczyńska, Piotr Jaworski, Dorota Wyględowska-Promieńska, Sławomir Teper, Andrzej W. Mitas</i></p> <p><b>Linguistic-Grammar Profile of Polish Patients with Anorexia Nervosa</b><br/><i>Stella Maćkowska, Katarzyna Rojewska, Dominik Spinczyk</i></p> <p><b>A New Approach to the Statistical Reconstruction Method with Rebinning as a Method of Reducing the Dose in CT Scanners with a Flying Focal Spot</b><br/><i>Piotr Pluta, Robert Cierniak</i></p> |
| 13:00 | LUNCH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 14:00 | <p>CLOSING CEREMONY<br/>Philips Auditorium</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |