

Organizers:



IFMBE



Committee  
of Biocybernetics  
and Biomedical Engineering



Doskonała  
Nauka



Minister of Science  
Republic of Poland

The conference is co-financed from  
the state budget, allocated by the  
Minister of Science under  
the Excellent Science II Programme  
Contract No. KONF/SP/0624/2024/02

Sponsors:



Endorsing Organizations:



# Engineering the Future of Health

# PROGRAM

# NBC 2025 & PCBBE 2025

June 16-18, 2025, Warsaw, Poland

Joint  
20th Nordic-Baltic Conference  
on Biomedical Engineering  
&  
24th Polish Conference on Biocybernetics  
and Biomedical Engineering



<https://www.nbc2025.ibib.waw.pl>

## TABLE OF CONTENTS

Table of Contents .....	2
Welcome Message .....	3
Organization .....	4
International Advisory Committee .....	5
Scientific Program Committee .....	6
Awards.....	7
Scientific Challenge Committee .....	8
Conference Objectives .....	9
Conference Topics .....	10
Conference History.....	11
Conference Information .....	13
Registration Fee and Payment Regulations .....	14
Other Regulations.....	15
General Information.....	16
Arrivals and Departures.....	17
Floor Plan of the Conference Venue .....	18
Social Events (Musical Performance) .....	19
Social Events (Welcome Reception) .....	20
Social Events (Conference Gala).....	21
Scientific Program at a Glance.....	22
Plenary Lectures, Special Symposia, Discussion Panels and Oral Sessions .....	26
Rapid Fire Poster Presentations .....	46
Instructions for Oral Presentations .....	51
Instructions for Rapid Fire Poster Presentations .....	52
Index (Full Paper Number to Presentation Number) .....	53
Index (Abstract Number to Presentation Number).....	55
Personal Data Administrator and Data Processing Information .....	57

## WELCOME MESSAGE

Dear Distinguished Guests, Colleagues and Friends,

It is our distinct pleasure to welcome you to the Joint 20th Nordic-Baltic Conference on Biomedical Engineering and the 24th Polish Conference on Biocybernetics and Biomedical Engineering (NBC 2025 & PCBBE 2025), taking place on June 16–18, 2025, in the vibrant and historic city of Warsaw, Poland.

This joint event marks a unique convergence of two long-standing traditions in biomedical science and technology. It brings together the communities of the Nordic-Baltic region, Poland, and the global biomedical engineering field. Held under the honorary patronage of Prof. Marek Konarzewski, President of the Polish Academy of Sciences, the conference is organized under the common umbrella of the International Federation for Medical and Biological Engineering (IFMBE), the Committee of Biocybernetics and Biomedical Engineering of the Polish Academy of Sciences (CBBE PAS), and the Polish Society for Biomedical Engineering (PSBE).

NBC 2025 & PCBBE 2025 provides a dynamic forum for researchers, clinicians, industry professionals, and students to share cutting-edge scientific achievements and explore emerging trends in biomedical engineering.

The scientific program, shaped by an esteemed International Advisory Board and Scientific Program Committee, upholds the highest academic standards. During the conference, you will have the opportunity to present your innovative work, engage in meaningful dialogue, and build collaborations across disciplines and borders. From academic challenges to industry applications, the conference aims to address a wide spectrum of topics. We welcome contributions on all aspects of medical and biological engineering – from research innovations and educational strategies to gender diversity in BME and the commercialization of scientific discoveries.

We extend our sincere gratitude to all authors, plenary and keynote speakers, reviewers, session chairs, and the members of the scientific and organizing committees for their dedication and hard work. We are also deeply thankful to IFMBE, CBBE PAS, and PSBE for their ongoing support in organizing the conference, setting the scientific program and publishing the proceedings.

The Joint NBC 2025 & PCBBE 2025 promises to be a truly memorable event. Whether you are an academic, an industry expert, or a healthcare practitioner, this conference offers a unique opportunity to connect, learn, and contribute to the engineering of a healthier future.

We look forward to welcoming you to Warsaw in June 2025!

Warm regards,

Prof. Piotr Ladyzynski

On behalf of the NBC 2025 & PCBBE 2025 Chairs and the Organizing Committee

## ORGANIZATION

### Honorary Patronage

Marek Konarzewski      President of the Polish Academy of Sciences

### Organizers

Committee of Biocybernetics and Biomedical Engineering  
Polish Academy of Sciences (CBBE PAS)

Polish Society for Biomedical Engineering (PSBE)

Nalecz Institute of Biocybernetics and Biomedical Engineering  
Polish Academy of Sciences (IBBE PAS)

### Conference Chairs

Adam Liebert      CBBE PAS, Poland

Marek Darowski      PSBE, Poland

Piotr Ladyzynski      IBBE PAS, Poland

### Conference Organizing Committee

Piotr Ladyzynski, IBBE PAS, Poland – Chair

Marta Baranowska	Marek Rudnicki	Barbara Wolff
Hanna Bazior	Anna Stecka	Marcin Woźniak
Justyna Rogalska	Łukasz Wasilak	Krzysztof Zieliński

## INTERNATIONAL ADVISORY COMMITTEE

Adam Liebert, Poland – Chair

Martha Zequera, Colombia – Co-Chair

Metin Akay, USA

Virginia Laura Ballarin, Argentina

Maria Fernanda Cabrera, Spain

Paulo de Carvalho, Portugal

Murilo Contó, Brasil

Marek Darowski, Poland

Yuri Dekhtyar, Latvia

James Goh, Singapore

Thordur Helgason, Island

Mr. Ashenafi Hussein Ababu, Ethiopia

Jari Hyttinen, Finland

Ernesto Iadanza, Italy

Dr. Håvard Kalvøy, Norway

Shankar Krishnan, USA

Igor Lacković, Croatia

Jaanus Lass, Estonia

Lenka Lhotska, Czech Republic

Kang-Ping Lin, Taiwan

Olof Lindahl, Sweden

Arūnas Lukoševičius, Lithuania

Ratko Magjarević, Croatia

Fabiola Marinez, Mexico

Leandro Pecchia, Italy

Subrata Saha, USA

Ichiro Sakuma, Japan

Elliot Vernet, Mexico

Hairomg Zheng, China



## SCIENTIFIC PROGRAM COMMITTEE

Dorota G. Pijanowska, Poland – Chair

Diana Adliene, Lithuania  
Milos Ajcevic, Italy  
Hakan Aldskogius, Sweden  
Iulian Antoniac, Romania  
Piotr Augustyniak, Poland  
Daiva Baltriukienė, Lithuania  
Panagiotis Bamidis, Greece  
Ryszard Białecki, Poland  
Zhivko Bliznakov, Bulgaria  
Hugh Byrne, Ireland  
Marina Cabrin, Italy  
Carmel Caruana, Malta  
Frans Cornelissen, Netherlands  
Gerard Cybulski, Poland  
Todorka Dimitrova, Bulgaria  
Arzum Erdem Gursan, Turkey  
Ivo Fridolin, Estonia  
Birgit Glasmacher, Germany  
Joaquin Roca Gonzalez, Spain  
Ludomira Granicka, Poland  
Julius Griškevičius, Lithuania  
Kārlis-Agris Gross, Latvia  
Lejla Gurbeta Pokvic, Bosnia and Herzegovina  
Marek Gzik, Poland  
Ulrich Hofmann, Germany  
Daoud Robert Iskander, Poland  
Timo Jamsa, Finland  
Tomaž Jarm, Slovenia  
Janusz Jeżewski, Poland  
Ákos Jobbágy, Hungary  
Eliasz Kańtoch, Poland  
Magdalena Kasprowicz, Poland  
Alexei Katashev, Latvia  
Anna Korzyńska, Poland  
Małgorzata Kotulska, Poland  
Michalis Koutinas, Cyprus  
Elena Kozlova, Sweden  
Gunta Krumina, Latvia  
Jaanus Lass, Estonia  
Dorota Lewińska, Poland  
Maria Lindén, Sweden  
Janis Ločs, Latvia  
Roman Maniewski, Poland

Vaidotas Marozas, Lithuania  
Jose Miguel Martin Martinez, Spain  
Winfried Mayr, Austria  
Mario Medvedec, Croatia  
Kalju Meigas, Estonia  
Robert Michnik, Poland  
Valerie Moreno, France  
Tomasz Moskalewicz, Poland  
Bert Müller, Switzerland  
Sergei Nazarenko, Estonia  
Fredrik Nikolajeff, Sweden  
Nicolas Pallikarakis, Greece  
Tadeusz Pałko, Poland  
Elżbieta Pamuła, Poland  
Zbigniew Paszenda, Poland  
Jolanta Pauk, Poland  
Thomas Penzel, Germany  
Ewa Piętka, Poland  
Martins Piksis, Latvia  
Kristjan Pilt, Estonia  
Halina Podbielska, Poland  
Ryszard Pohorecki, Poland  
Dejan Popović, Serbia  
Jevgenijs Proskurins, Latvia  
Elizabeth Aune Ragnhild, Norway  
Marius N. Roman, Romania  
Anatoly B. Rozenfeld, Australia  
Simo Särkkä, Finland  
Heinrich Schima, Austria  
Mário Forjaz Secca, Portugal  
Karsten Seidl, Germany  
Sudesh Sivarasu, South Africa  
Janis Spigulis, Latvia  
Johan Stiens, Belgium  
Paweł Strumiłło, Poland  
Fong-Chin Su, Taiwan  
Andrzej Świerniak, Poland  
Slavik Tabakov, UK  
Sigitas Tamulevičius, Lithuania  
Ewaryst Tkacz, Poland  
Miroslav Trajanovic, Serbia  
Milan Tyšler, Slovakia  
Janusz Wróbel, Poland

## AWARDS

### IFMBE Scientific Challenge Competition

Traditionally, during the IFMBE-sponsored conferences, the IFMBE Scientific Challenge Competition is organized, in which the prizes are funded by the IFMBE Digital Health Division.

During NBC 2025 & PCBBE 2025, the IFMBE Scientific Challenge Competition was entitled "*Segmentation Challenge: Wounds and Markers in Focus*", and its rules and conditions of participation can be found on the conference website at:

<https://nbc2025.ibib.waw.pl/index.php/ifmbe-scientific-challenge-competition/>

Eight teams participated in the IFMBE Scientific Challenge Competition during NBC 2025 & PCBBE 2025. Six solutions will be presented during the Special Symposium, to be held on Wednesday, June 18, 2025 from 11:45 to 13:15 in Lecture Hall A, and two remaining solutions – during the Rapid Fire Poster Presentations 2, on Tuesday, June 17, 2025, from 14:30 to 15:20 in Lecture Hall B.

### Young Investigators Competition

Continuing the long-standing tradition of conferences sponsored by IFMBE, the Young Investigators Competition (YIC) has been organized during the NBC 2025 & PCBBE 2025. The rules and conditions of participation in YIC can be found on the conference website at:

<https://nbc2025.ibib.waw.pl/index.php/young-investigators-competition/>

Two works that were submitted for the YIC Award will be presented during the Oral Session 09 entitled "Modeling Physiological Systems in Health and Disease" to be held on Tuesday, June 17, 2025 from 16:45 to 17:45 in Lecture Hall A.

### The Best Research and the Best Application Full Paper

In order to improve the quality of papers submitted to the conference in the form of full papers and to appreciate the work of the authors, based on the reviewers' assessments, awards will be granted for the best research paper (high scientific level, innovation, high quality of the research conducted) and the best application paper (originality of the study used to solve a significant problem in health care).

### The Best Oral and Poster Presentation Award

During NBC 2025 & PCBBE 2025, the three best oral presentations and the three best poster presentations will be selected from among the works presented.

### Award Ceremony

All award winners will be announced at the Closing Ceremony on Wednesday, June 18, 2025 from 15:40 to 16:15.

## **SCIENTIFIC CHALLENGE COMMITTEE**

Paulo de Carvalho, University of Coimbra, Portugal – Chair

Piotr Foltynski, Nalecz Institute of Biocybernetics and Biomedical Engineering PAS, Poland

Jorge Henriques, University of Coimbra, Portugal

Piotr Ladyzynski, Nalecz Institute of Biocybernetics and Biomedical Engineering PAS, Poland



## CONFERENCE OBJECTIVES

The main objective of the conference is to present the latest achievements of researchers from Poland, the Baltic Sea region, and other parts of the world in the field of biomedical engineering as an interdisciplinary research area. This international scientific event focuses on a wide range of biomedical engineering subdisciplines that integrate engineering, natural and medical sciences to develop and implement new technologies, devices and theoretical tools to support medical diagnostics and treatment.

The interdisciplinary nature of the conference will foster the exchange of perspectives and the integration of achievements and research methods from various scientific fields. Bringing together experts from diverse disciplines—including biomedical engineering, materials science, robotics, electronics, computer science, biology, chemistry and medicine—will create a unique platform for establishing multidisciplinary collaborations. This extensive knowledge exchange will contribute to the development of new research ideas that could lead to groundbreaking discoveries and the advancement of innovative medical solutions.

A key aspect of the conference will also be to establish the international scientific connections, which have the potential to evolve into lasting networks of collaboration. Such international relationships can support securing research funding, developing joint research projects, enhancing publication effectiveness and—critically—implementing developed technologies and solutions in medical practice. In this way, interdisciplinary information exchange will not only support scientific development but will also influence global progress in healthcare and the quality of life for patients.

The conference also aims to disseminate knowledge by:

- providing PhD candidates, students, physicians, and representatives of biomedical technology enterprises – as well as researchers in specific areas of biomedical engineering – with the opportunity to directly engage with the latest scientific research results in all conference-related fields of biomedical engineering;
- familiarizing participants with the greatest challenges and achievements in biomedical engineering across scientific research, education, technology transfer, commercialization and equity in research and innovation (through invited plenary speakers and experts participating in discussion panels);
- preserving the full texts of selected presentations from the event as scientific publications within the Springer book series IFMBE Proceedings and archiving the remaining presentations as abstracts, making these texts available to the international community of biomedical engineers, students and researchers from various specialties either in print or electronic form, who are engaged in or interested in advancements in this interdisciplinary research area. Authors of selected works presented during the event will be invited to prepare and submit manuscripts for publication in the scientific quarterly *Biocybernetics and Biomedical Engineering* (Impact Factor = 5.3), owned by the Institute of Biocybernetics and Biomedical Engineering (IBIB PAN) and published by Elsevier.

By creating a space for the exchange of knowledge, ideas and experiences among scientists, physicians, entrepreneurs, PhD candidates and students from various countries and disciplines, the event will also indirectly fulfil culture-building functions, including: sharing intercultural knowledge, exchanging cultural perspectives, globalizing ideas and cultures—including the international promotion of Polish culture—creating an intellectual community that facilitates understanding among different scientific traditions and building a platform for the exchange of viewpoints that shapes scientific ethics.

## CONFERENCE TOPICS

- Artificial and Bioartificial Organs
- Artificial Intelligence in Healthcare
- Assistive Technologies and Rehabilitation Engineering
- Biochemical Engineering
- Bioinformatics
- Biomaterials
- Biomeasurements
- Biomechanics and Biomedical Robotics
- Biomedical Engineering Education
- Biomedical Sensors and Instrumentation
- Biomedical Signal Processing
- Cellular and Molecular Engineering
- Clinical Engineering
- Health Technology Assessment
- Health Technology Transfer and Commercialization
- Imaging Modalities & Medical Image Fusion
- ICT in Medicine and IoMT
- Medical Image Processing
- Modeling of Physiological and Biological Systems
- Nanotechnology and Nanomedicine
- Neural Engineering
- Neuroinformatics
- Orthopedic Engineering
- Prosthetics
- Regenerative Medicine
- Surgical Techniques
- Tissue Engineering and Organ-on-Chip
- Women in Biomedical Engineering

## CONFERENCE HISTORY

NBC 2025 & PCBBE 2025 is the first event in history that combine the two following conferences: **Nordic-Baltic Conference on Biomedical Engineering** and **Polish Conference on Biocybernetics and Biomedical Engineering**.

### Nordic-Baltic Conference of Biomedical Engineering

The congress series of Nordic Meetings on Medical and Biological Engineering started in January 1970 at the Helsinki University of Technology, Espoo. The congresses were organized with 2 to 3 years intervals, and they were circulating around the Nordic countries. In 1996 the congress was organized at Tampere, Finland. Since the Baltic States had recently received their independence, they were actively encouraged to participate in the congress. Therefore for the congress series, it was given the name Nordic-Baltic Conference of Biomedical Engineering and Medical Physics.

More information about the history of NBC can be found in the following document *“50 Years of Nordic Meetings on Medical and Biological Engineering and Nordic-Baltic Conferences on Biomedical Engineering and Medical Physics”*, which is available at this link:

<https://www.researchgate.net/publication/351918835>

The webpage of the 19th Nordic-Baltic Conference on Biomedical Engineering and Medical Physics, which was held in Liepaja, Latvia, June 12-14, 2023 is available at this link:

<https://nbc2023.lmifb.lv>

Proceedings of a few previous NBC meetings can be downloaded at the following links:

<https://link.springer.com/book/10.1007/978-3-540-69367-3>, 14th Nordic-Baltic Conference on Biomedical Engineering and Medical Physics in Riga, Latvia, June 2008;

<https://link.springer.com/book/10.1007/978-3-642-21683-1>, 15th Nordic-Baltic Conference on Biomedical Engineering and Medical Physics, Aalborg, Denmark, June 2011;

<https://link.springer.com/book/10.1007/978-3-319-12967-9>, 16th Nordic-Baltic Conference on Biomedical Engineering, Gothenburg, Sweden, October 2014;

<https://link.springer.com/book/10.1007/978-981-10-5122-7>, Joint Conference of the European Medical and Biological Engineering Conference (EMBEC) and the Nordic-Baltic Conference on Biomedical Engineering and Medical Physics (NBC), Tampere, Finland, June 2017;

<https://link.springer.com/book/10.1007/978-3-031-37132-5>, 19th Nordic-Baltic Conference on Biomedical Engineering and Medical Physics in Liepaja, Latvia, June 2023.

## Polish Conference on Biocybernetics and Biomedical Engineering

The biannual Polish Conference on Biocybernetics and Biomedical Engineering has been held for over four decades and attracted scientists and professionals from the fields of engineering, medicine, physics, and computer science. The format of the conference is the responsibility of the Committee of Biocybernetics and Biomedical Engineering of the Polish Academy of Sciences (CBBE PAN), which appoints a local organizer for each edition of the event and ensures its high scientific level. The Polish Society of Biomedical Engineering (PSBE) has been actively involved in organizing and sponsoring the Conference since the Society was founded in 1997.

First 19 conferences under the Polish name *Krajowa Konferencja Naukowa „Biocybernetyka i Inżynieria Biomedyczna”* were held in Warszawa (1976), Gliwice (1978), Wrocław (1979), Poznań (1980), Warszawa (1981), Warszawa (1983), Gdańsk (1985), Kraków (1987), Gdańsk (1992), Warszawa (1997), Warszawa (1999), Warszawa (2001), Gdańsk (2003), Częstochowa (2005), Wrocław (2007), Warszawa (2010), Gliwice (2011), Gdańsk (2013), Warszawa (2015).

Since 2017 the conference has been held as an international scientific event under English name Polish Conference on Biocybernetics and Biomedical Engineering (PCBBE). Until today, PCBBE was organized four times in: Kraków (2017), Zielona Góra (2019), Warszawa – online (2021), Łódź (2023).

The webpage of the 23rd Polish Conference on Biocybernetics and Biomedical Engineering, which was held in Łódź, September 27-29, 2023 is available at this link:

<https://pcbbe.p.lodz.pl/>

Proceedings of a few previous PCBBE meetings can be downloaded at the following links:

<https://link.springer.com/book/10.1007/978-3-319-66905-2>, Recent Developments and Achievements in Biocybernetics and Biomedical Engineering. Proceedings of the 20th Polish Conference on Biocybernetics and Biomedical Engineering, Kraków, Poland, September 20-22, 2017;

<https://link.springer.com/book/10.1007/978-3-030-29885-2>, Current Trends in Biomedical Engineering and Bioimages Analysis. Proceedings of the 21st Polish Conference on Biocybernetics and Biomedical Engineering, Zielona Góra, September 25-27, 2019;

<https://link.springer.com/book/10.1007/978-3-030-83704-4>, Biocybernetics and Biomedical Engineering – Current Trends and Challenges. Proceedings of the 22nd Polish Conference on Biocybernetics and Biomedical Engineering, Warsaw, Poland, May 19-21, 2021;

<https://link.springer.com/book/10.1007/978-3-031-38430-1>, The Latest Developments and Challenges in Biomedical Engineering. Proceedings of the 23rd Polish Conference on Biocybernetics and Biomedical Engineering, Lodz, Poland, September 27–29, 2023.

## CONFERENCE INFORMATION

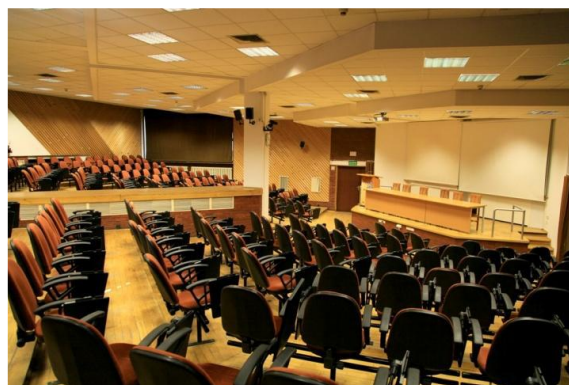
### Conference Secretariat

Prof. Piotr Ladyzynski  
Nalecz Institute of Biocybernetics and Biomedical Engineering  
Polish Academy of Sciences  
ul. Trojdena 4, 02-109 Warsaw, Poland.  
Phone: +48 22 5925942, fax: +48 22 6597030  
e-mail: nbc2025@ibib.waw.pl

### Conference Venue

The Conference will be held at the premises of **the Nalecz Institute of Biocybernetics and Biomedical Engineering and International Centre of Biocybernetics, Polish Academy of Sciences, ul. Księcia Trojdena 4, Warsaw, Poland.**

The Institute is located at the corner of Księcia Trojdena Street and Pawińskiego Street. The main entrance to the Institute is located at Pawińskiego Street and the entrance to the paid parking is located at Księcia Trojdena Street (behind the barrier). The GPS coordinates of the Congress Venue are as follows: N 52° 12' 24" E 20° 58' 42"



### Official Language

English will be the official language of the Congress.  
No parallel translation will be provided.

### Registration and Information During the Congress

Delegates are kindly requested to register at the Central Reception located in the Congress venue at the Nalecz Institute of Biocybernetics and Biomedical Engineering Polish Academy of Sciences, at the beginning of the Conference. Participants will be able to collect their badge and Conference documentation. Central Reception will be open at the following hours:

Monday, June 16, 08:00 – 18:00  
Tuesday, June 17, 08:00 – 18:00  
Wednesday, June 18, 08:00 – 17:00

## REGISTRATION FEE AND PAYMENT REGULATIONS

Delegate Category	Early Bird Fee Until April 7, 2025	Regular Fee April 7 – May 31, 2025	On-site * June 16-18, 2025
IFMBE Members <sup>1</sup>	440 €	490 €	540 €
Non-Members	490 €	550 €	600 €
Students (IFMBE Members) <sup>1, 2</sup>	225 €	265 €	300 €
Students (Non-Members) <sup>2</sup>	250 €	290 €	340 €
One Day	250 €	290 €	340 €
Accompanying Person	250 €	250 €	250 €
One Day with Conference Gala included	340 €	390 €	450 €

\* Due to limited number of places in the welcome reception and conference dinner venues, on-site registration for these events may not be available.

<sup>1</sup> IFMBE members, i.e. paid members of the IFMBE member societies have to provide a proof of membership in order to be eligible for the IFMBE Members fee during registration.

<sup>2</sup> Students have to provide proof of their status from their respective university or institute during registration.

For all regular full registrations, dinner is included in the fee.

### Additional Abstracts/Papers

Two papers per delegate are included in the delegate registration. Third and any consecutive paper are charged at the rate specified below.

Additional Abstracts / Papers	Fee has to be paid before submission
IFMBE Members <sup>1</sup> Students <sup>2</sup>	100 €
Non-Members	120 €

<sup>1</sup> IFMBE members, i.e. paid members of the IFMBE member societies have to provide a proof of membership in order to be eligible for the members' fee during registration.

<sup>2</sup> Students have to provide proof of their status from their respective universities or institutes during registration.

Fees listed in the tables above are inclusive of tax and include VAT.



## OTHER REGULATIONS

### What's Included in Registration Fee

**Delegate and Student Registration fee includes:** up to two submissions (papers / abstracts), admittance to all the scientific sessions, conference kit, coffee breaks, working lunches, welcome reception, and conference dinner (except One Day fee).

**Accompanying Person fee includes:** welcome reception, conference dinner, guided tour of Warsaw.

### Cancellation Policy

If in case of force majeure the conference needs to be cancelled we will refund 80 % of the paid registration fee.

In case of cancellation by the participant, 80 % of the paid registration fee is returned if cancelled by April 30, 2025. After this date, a refund is possible on a case-to-case basis.

Registrations remain valid if the event has to be postponed.

The conference program may be subject to change.

The signed order cancellation request should be sent by registered mail or courier to the following address:

NBC 2025 & PCBBE 2025  
Nalecz Institute of Biocybernetics and Biomedical Engineering PAS  
Trojdena 4, 02-109 Warsaw, Poland

All refunds will be made after the Conference.

In case of bank transfer payment, the reimbursement will be transferred directly to the account that was used to make the payment.

In case of card payment, the reimbursement will be transferred directly to the payment card account.

### Withdrawal from the Agreement

Pursuant to the Consumer Rights Act of May 30, 2014 (Journal of Laws 2014, item 827, as amended) – Article 38, paragraph 1, point 12, the right to withdraw from the agreement concerning the purchase of participation in the NBC 2025 & PCBBE 2025 does not apply.

### Return

Returns are not accepted due to the nature of the services ordered by the participants.

### Warranty Disclaimer

All the best endeavors will be made by the Organizer to implement the program of the NBC 2025 & PCBBE 2025 as it will be announced on the Conference website at <https://nbc2025.ibib.waw.pl>. However, no warranty is given whatsoever that the final program will be in full agreement with the announced one. The Organizer reserve the right to alter or cancel, without prior notice, any of the arrangements, timetables, plans or other items relating directly or indirectly to the Conference, for any reasons beyond the Organizer's reasonable control.

## GENERAL INFORMATION

### Passports and Visas

Foreign visitors from outside the European Union must possess a passport valid for at least the next 6 months. Some congress participants may require visa in order to enter Poland. Please check with your local Polish Consulate or Embassy for details regarding visa and entry requirements.

### Liability

The Congress Secretariat and Organizers cannot accept liability for personal accidents, loss of belongings or damage to private property of participants and accompanying persons, either during or directly arising from the NBC 2025 & PCBBE 2025. Participants should make their own arrangements with respect to health, travel and property insurance before they depart from their country.

### Currency and Credit Cards

The currency unit in Poland is the Polish Złoty (zł or PLN) which is subdivided into 100 grosze (gr). The current average exchange rates to most of the currencies can be checked at <https://nbp.pl/en/statistic-and-financial-reporting/rates/table-a/>. In June 2025 it was about 4.25 PLN for 1 EUR and 3.75 PLN for 1 USD. Delegates may change foreign currency and travelers checks at several banks located in the city center as well as in many exchange bureaus, at the railway station, at the airport or in many others places. International credit cards are widely accepted in hotels, restaurants, cash machines and shops.

### Electricity

Electricity supply is 230 V / 50 Hz. In Poland, the standard E-type and F-type (Schuko) sockets and plugs dominate. Type E is a socket with a grounding pin, while type F has two sources for grounding, which are available opposite each other.



### Climate and Clothing

The weather in June in Warsaw is usually warm and pleasant, however the evenings and nights might be sometimes quite cold. The average daytime temperature varies from 11 degrees to 24 degrees Celsius. There is a possibility of rain, so an umbrella, light raincoat and comfortable shoes are advisable.

### Shopping

Most shops (except for food stores) are open from 11:00 until 19:00 except Sundays when they are closed. Some department stores may open earlier or close later on weekdays as well as on Saturdays.

Polish craftwork is fascinating. Polish souvenirs include glass, hand-woven baskets, paper cut-outs and crystal. One of the most popular souvenirs is amber from the Baltic Sea. Each individual piece can be fashioned into a pendant, ring, bracelet, or earrings. Most highly prized is amber with a prehistoric insect preserved inside, though it is a rare find. Poland is also known for its silver jeweler, which is sometimes combined with amber to create uniquely Polish pieces.

### Food

Poles are known for their hospitality and love of food. Polish meals offer a wide selection ranging from fresh game in season to Baltic herring. Red beet soup or borsch, is well-known, as are Polish sausages (kielbasa) and stuffed cabbage (gołąbki). Dumplings (pierogi) come stuffed with meat, potatoes, blueberries, or sauerkraut and mushrooms. Bigos is a stew of meat and sauerkraut, while roast duck comes stuffed with apples. For dessert, try pastries with poppy seeds, or perhaps a Polish donut filled with preserved fruit (pączek).

## ARRIVALS AND DEPARTURES

### By Air

The Conference Venue is 5 km away from Warsaw Chopin Airport “Okęcie”. It can be reached from Warsaw Chopin Airport by taxi (cost 35-50 Polish Złoty) or by bus no. 175 (the bus stop is located in front of the arrivals hall). A bus ticket for 20 min costs 3.40 Polish Złoty and for 75 min – 4.40 Polish Złoty. It is advisable to buy a ticket before getting to a bus because ticket machines are not present in all the buses. Usually the 20 min ticket is enough if there is no heavy traffic. You should get off the bus at UNIWERSYTET MEDYCZNY 02 stop, cross Żwirki i Wigury street and walk 600 m to the West along Księcia Trojdena Street. Congress Venue is the last group of buildings on the right just at the corner of Księcia Trojdena street and Adolfa Pawińskiego street. Taxi (cost 35-70 Polish Złoty) and bus no. 175 (75 min ticket is required) can be also used to get to the center of the city. There is also a railway connection from Warsaw Chopin Airport “Okęcie” to Warsaw Central Railway Station (Warszawa Centralna).



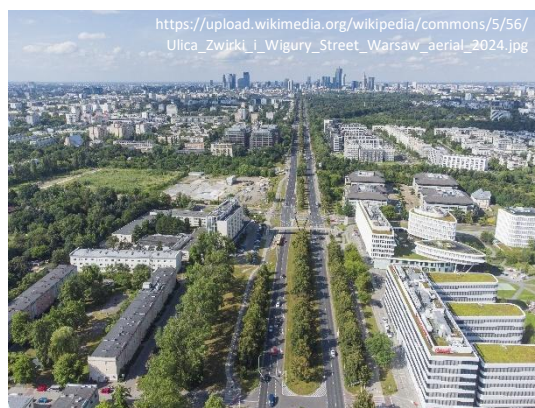
### By Rail



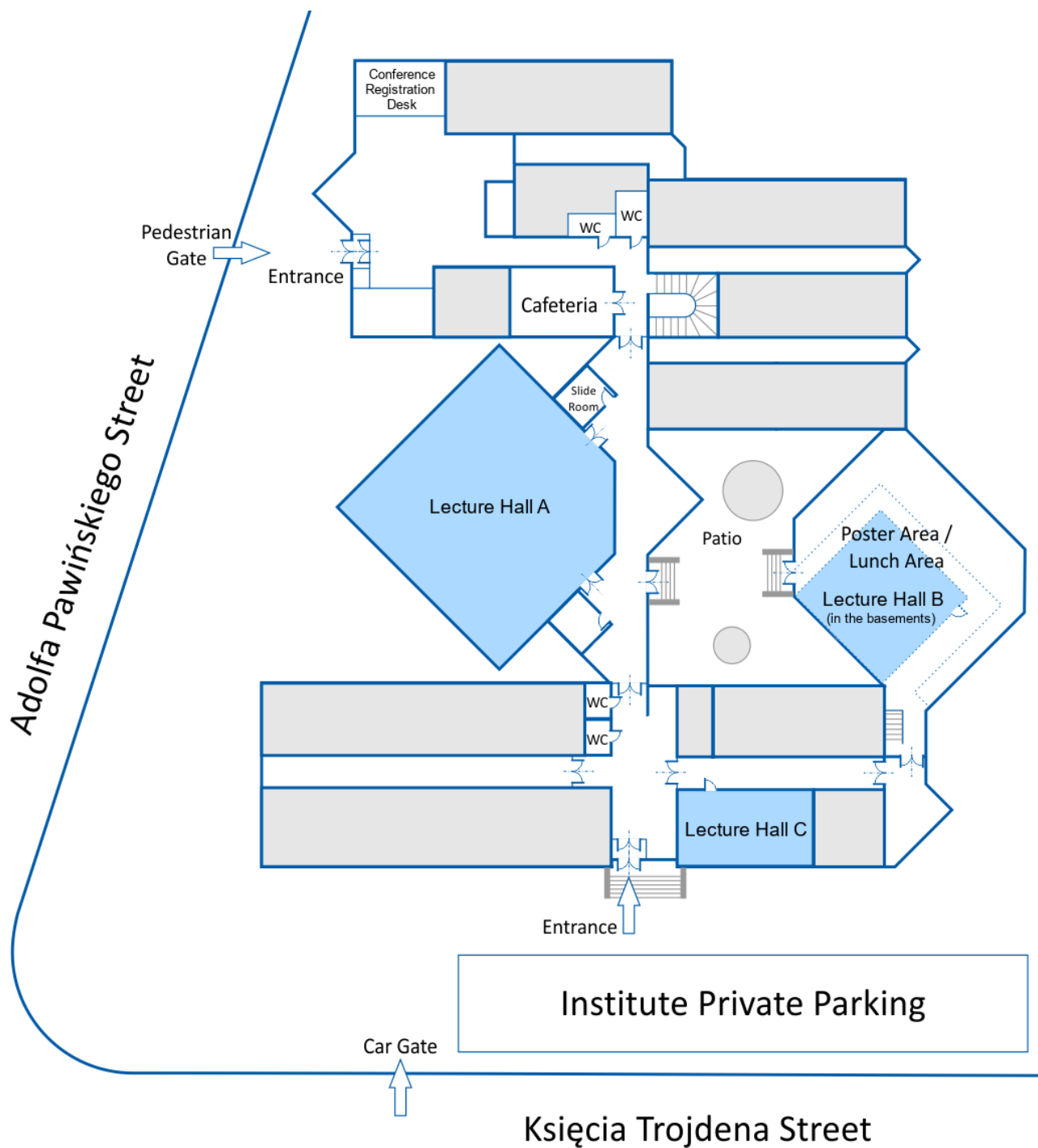
Warsaw Central Railway Station (Warszawa Centralna) is located in the city center at 54 Jerozolimskie Avenue (Aleje Jerozolimskie). Conference Venue can be reached from Warsaw Central Railway Station by taxi (cost 25-40 Polish Złoty).

### By Road

For those traveling from the West, North or South, Warsaw can be reached by car using A2 highway and then S2 Warsaw beltway. You should head to the South (towards Kraków), take Aleja Krakowska exit, turn left onto Krakowska Avenue (Aleja Krakowska) towards city center, after 5 km turn right onto Karola Dickensa street, after 300 m turn left onto Adolfa Pawińskiego street, after 300 m turn right onto Księcia Trojdena street and then after 100 m turn left into the first gate to the paid parking lot in front of the Conference Venue.



## FLOOR PLAN OF THE CONFERENCE VENUE



## SOCIAL EVENTS

### Musical Performance

**During the Opening Ceremony & 50th Anniversary of IBIB PAN**

**Monday, June 16, 2025, 12:15–12:45**

Amok, a string quartet, will provide a musical performance during the Opening Ceremony and 50th Anniversary of IBIB PAN. The program will include music from films, musicals, and other entertainment genres.



"Por una Cabeza" – Tango from the film *Scent of a Woman*

„New York, New York”

„Fly me to the Moon”

“Rehab”

“How deep is your Love”

“What a wonderful World”

“Cobacabana”

“Libertango”





## SOCIAL EVENTS

### Welcome Reception

**LookUp Skyevents, Skyliner building, floors 41-42, ul. Prosta 67**

**Monday, June 16, 2025, 19:45–22:00**



LookUp Events is a new event and conference space located on the top floors of Skyliner – a Warsaw A+ class skyscraper, in the heart of the city, at Rondo Daszyńskiego.

It is characterized by tasteful and spacious interiors, combining modern form, exposing the unique panorama of the city and professional catering service.

A spacious space located on 42 Floor that can accommodate up to 200 people on an area of 270 m<sup>2</sup>.

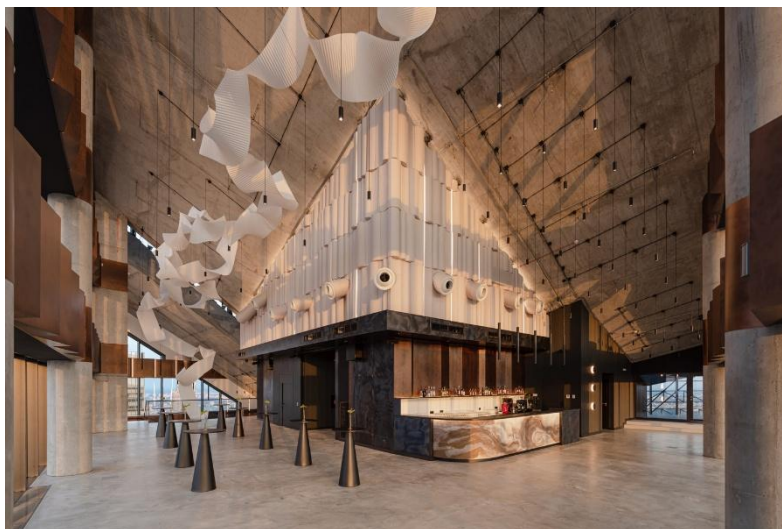
Ideal for organizing conferences or banquets, during which participants will be able to experience a unique view of the panorama of the pulsating city of Warsaw. And all in a modern zone with a loft character.

LookUp space is much more than just a tasteful, modern and functional decor and a breath-taking panorama of the city. This is a unique place on the gastronomic map of the capital.

Thanks to a fully equipped, professional kitchen, Chef Marcin Wojtczak will satisfy the palates of the most demanding guests, which are the participants of NBC 2025 & PCBBE 2025. Based on his

own menu, he will conjure up culinary works of art, which will be complemented by an extensive wine list and a bar guaranteeing unparalleled taste experiences. The menu is served in the form of finger food, a served menu, buffets, a cocktail menu and culinary stations.

LookUp was shortlisted for the Hospitality Design Awards 2024 and won the Restaurant & Bar Design Awards 2024 in the Surface Interior category in Europe.





## SOCIAL EVENTS

### Conference Gala

**Sheraton Grand Warsaw, ul. Bolesława Prusa 2**

**Tuesday, June 17, 2025, 20:00–22:30**



Sheraton Grand Warsaw is ideally located within the walking distance to The Old Town with all its iconic tourist attractions. The Vistula River Boulevards are just a short walk away and the closest neighborhood features an elegant shopping center, numerous boutiques, lively bars and cafes. Sheraton Grand Warsaw joined brand's new premier tier of hotels being renowned for its enticing destination, distinguished design, excellence in service and outstanding guest experiences.

In the interwar period, this place was occupied by a building belonging to the Italian insurance company Riunione Adriatica di Sicurtà, which housed a large cinema called "Napoleon" (renamed "Apollo"). After World War II, a stone with a plaque commemorating Ładysław Buczyński was placed on the square created in place of the destroyed building.

The building, erected in 1994–1996, has seven above-ground and two underground floors. The hotel has 350 rooms (including 267 in the main wing) and about 100 parking spaces.

A plaque commemorating Ładysław Buczyński was placed on the building's façade, replacing the existing commemoration. The previous designation "fighter of the People's Guard" on the new plaque was replaced with the phrase "fighter of the Polish resistance movement".

The hotel was the temporary headquarters of a number of embassies – Kuwait (2003), Luxembourg (2007), Qatar (2008) and the United Arab Emirates (2009).



In 2019, the modernization of the hotel's interior was completed, after which it changed its name to Sheraton Grand.

## **SCIENTIFIC PROGRAM AT A GLANCE**

Monday, June 16, 2025				
Time		Lecture Hall A	Lecture Hall B	Lecture Hall C
09:00	10:00	<b>Oral Session 01</b> Artificial Intelligence in Healthcare: Cardiovascular Applications OP001, OP002, OP003, OP004	<b>Oral Session 02</b> Nanotechnology and Molecular Engineering OP005, OP006, OP007, OP008	<b>Oral Session 03</b> Medical Image Processing OP009, OP010, OP011, OP012
10:00	10:10	<b>Technical Break</b>		
10:10	11:10	<b>Special Symposium 01</b> Integrating Artificial Intelligence in Clinical Engineering: Perspectives For the Future OP013, OP014, OP015, OP016	<b>Oral Session 04</b> Artificial and Bioartificial Organs OP017, OP018, OP019, OP020	<b>EAMBES and IEEE EMBS Symposium</b>
11:10	11:30	<b>Coffee Break</b>		
11:30	13:35	<b>OPENING CEREMONY &amp; 50th ANNIVERSARY of IBIB PAN</b>		
11:30	11:45	<b>Welcoming the Invited Guests and Participants</b> Prof. Adam Liebert, Prof. Marek Darowski, Prof. Piotr Ładyżyński, Chairs of the NBC 2025 & PCBBE 2025		
11:45	12:15	<b>NBC 2025 &amp; PCBBE 2025 Opening Address</b> Prof. Ratko Magjarević, President of the IFMBE		
12:15	12:45	<b>Musical Performance</b>		
12:45	13:10	<b>Lecture: 50 Years of IBIB PAN – The Past That Shaped the Future</b> Prof. Piotr Ładyżyński, Director of the IBIB PAN		
13:10	13:30	<b>Addresses by the Invited Guests</b>		
13:30	13:45	<b>Presentation of the Institute Medals</b>		
13:45	14:45	<b>Lunch</b>		
14:45	15:35	<b>Plenary Lecture 1</b> <i>Using Light Absorption and Laser Speckle Dynamics to Measure Human Brain Function</i> Prof. David A. Boas, PhD, Boston University College of Engineering (USA)		
15:35	16:25	<b>Plenary Lecture 2</b> <i>AI-powered MRI: Towards an Omni Imaging Technology for Brain Mapping</i> Prof. Zhi-Pei Liang, PhD, University of Illinois at Urbana-Champaign (USA)		
16:25	16:45	<b>Coffee Break</b>		
16:45	17:45	<b>Special Symposium 03</b> AI and Deep Learning in Medicine and Biology OP021, OP022, OP023, OP024	<b>Panel Discussion 01</b> IFMBE, Women in Biomedical Engineering: Role Models in Biomedical Engineering	<b>Special Symposium 04</b> Modern Therapeutic Technologies in Medicine OP025, OP026, OP027, OP028
17:45	19:45	<i>Transfer to the Welcome Reception</i>		
19:45	22:00	<b>Welcome Reception</b> <i>LookUp Skyevents, Skyliner building, floors 42, ul. Prosta 67</i>		

Tuesday, June 17, 2025				
Time		Lecture Hall A	Lecture Hall B	Lecture Hall C
09:00	09:50	<b>Plenary Lecture 3</b> <i>European Medical Device CE Mark – Current Challenges and Future Opportunities</i> Dr. Bassil Akra, CEO, AKRA TEAM GmbH (Germany)		
09:50	10:00	<b>Technical Break</b>		
10:00	11:30	<b>Special Symposium 05</b> Diverse Biomaterials, Unified Impact: Biomedical Progress Driven by Innovation  KL01, OP029, OP030, OP031, OP032	<b>Special Symposium 06a</b> IFMBE, Biomedical Engineering Education: Challenges, Digital Health Technology and Learning Methodology  KL02, IP01, OP033, OP034, OP035	<b>Oral Session 05</b> Imaging Modalities and Medical Image Fusion  KL03, OP036, OP037, OP038, OP039
11:30	11:45	<b>Coffee Break</b>		
11:45	13:15	<b>Oral Session 06</b> Biomaterials  OP040, OP041, OP042, OP043, OP044, OP045	<b>Special Symposium 06b</b> IFMBE, Biomedical Engineering Education: Challenges, Digital Health Technology and Learning Methodology  OP046, OP047, OP048, IP02, Panel Discussion	<b>Oral Session 07</b> Biomeasurements  OP049, OP050, OP051, OP052, OP053, OP054
13:15	14:30	<b>Lunch</b>		
14:30	15:20	<b>Rapid Fire Poster Presentations 1</b> Posters No. PP01 to PP25	<b>Rapid Fire Poster Presentations 2</b> Posters No. PP26 to PP49	<b>IFMBE Council of Societies Meeting</b> 14:00 – 15:30
15:20	15:30	<b>Technical Break</b>		
15:30	16:30	<b>Oral Session 08</b> Biomedical Signal Processing: Brain and Physiological Function Analysis  OP055, OP056, OP057, OP058	<b>Special Symposium 07a</b> IFMBE, Students and Recent Graduates Working Group: How Can We Bring Innovation to Socially Impactful Research Through the Effective Use of Emerging  OP059, OP060, OP061, OP062	<b>Special Symposium 08</b> Meet the Editor  KL04, KL05
16:30	16:45	<b>Coffee Break</b>		
16:45	17:45	<b>Oral Session 09</b> Modeling Physiological Systems in Health and Disease  OP063, OP064, OP065, OP066	<b>Special Symposium 07b</b> IFMBE, Students and Recent Graduates Working Group: How Can We Bring Innovation to Socially Impactful Research Through the Effective Use of Emerging  OP067, OP068, OP069, OP070	<b>Oral Session 10</b> Assistive Technologies and Rehabilitation Engineering  OP071, OP072, OP073, OP074
17:45	20:00	<i>Transfer to the Conference Gala</i>		
20:00	22:30	<b>Conference Gala</b> <i>Sheraton Grand Warsaw, ul. Bolesława Prusa 2</i>		

Wednesday, June 18, 2025				
Time		Lecture Hall A	Lecture Hall B	Lecture Hall C
09:00	09:50	<b>Plenary Lecture 4</b> <i>High-Resolution Magnetoencephalography: A New Window to Human Brain Function?</i> Prof. Lauri Parkkonen, PhD, Aalto University School of Science (Finland)		
09:50	10:00	<b>Technical Break</b>		
10:00	11:30	<b>Oral Session 11</b> Artificial Intelligence in Healthcare: Diverse Applications  OP075, OP076, OP077, OP078, OP079, OP080	<b>Special Symposium 09</b> IFMBE, Industry Committee – From Lab to Market: Bridging the Gap in Biomedical Innovation  KL6, OP081, OP082, OP083, OP084	<b>Special Symposium 10</b>  Young Polish Society for Biomedical Engineering Meeting OP085, OP086, OP087, OP088, OP089, OP090, OP091
11:30	11:45	<b>Coffee Break</b>		
11:45	13:15	<b>IFMBE Scientific Challenge Competition</b> Segmentation Challenge: Wounds and Markers in Focus  OP092, OP093, OP094, OP095, OP096, OP097	<b>Special Symposium 11</b>  Biosensing Devices  IP03, OP098, OP099, OP100, OP101, OP102	<b>Special Symposium 12</b> Information Content Analysis in Cardiovascular and Respiratory Systems  OP103, OP104, OP105, OP106, OP107, OP108
13:15	14:30	<b>Lunch</b>		
14:30	15:30	<b>Oral Session 12</b> Biomedical Signal Processing: Cardiovascular, Muscular and Cognitive Signals  OP109, OP110, OP111, OP112	<b>Oral Session 13</b> ICT in Medicine and Health Technology Assessment  OP113, OP114, OP115, OP116	<b>Oral Session 14</b> Neural Engineering and Neuroinformatics  OP117, OP118, OP119, OP120
15:40	15:40	<b>Technical Break</b>		
15:40	16:15	<b>CLOSING CEREMONY</b> Presentation of the Conference Awards		
16:15	17:00	<b>Farewell Snack</b>		

**PLENARY LECTURES, SPECIAL SYMPOSIA,  
DISCUSSION PANELS AND ORAL SESSIONS**



**Monday, June 16, 2025****Oral Session OS01**

Artificial Intelligence in Healthcare: Cardiovascular Applications

Chairs: Virginia Ballarin(Argentina), Piotr Foltynski (Poland)

OP001–OP004

**Lecture Hall A**

- 09:00 – 09:15 **OP001** Automatic Text Classification in Cardiac Risk Management: A Pilot Study  
Jacopo Vitale, Mark C.H. de Groot, Imo Höfer, Leandro Pecchia, Saskia Haitjema, Bram Van Es
- 09:15 – 09:30 **OP002** Echocardiographic Image-Based Classification of Cardiac Amyloidosis: A Proof of Concept  
Maria Elisabetta Pagnano, Martina Sassi, Jacopo Vitale, Margherita A.G. Matarrese, Chiara Cirillo, Filippo Crispino, Giuseppe Limongelli, Leandro Pecchia
- 09:30 – 09:45 **OP003** Custom Attention in Transformer Architectures for Multiclass ECG Beat Classification  
Elia Pattacini, Vaidotas Marozas
- 09:45 – 10:00 **OP004** The Influence of Color on Semantic Ulcer Segmentation Using Deep Learning Models  
Muhammad Usman, Jacek Rumiński

**Oral Session OS02**

Nanotechnology and Molecular Engineering

Chairs: Marta Kopaczyńska (Poland), Kamila Sadowska (Poland)

OP005–OP008

**Lecture Hall B**

- 09:00 – 09:15 **OP005** Zinc Phosphate-Protein Hybrid Nanoflowers as New Local Drug Delivery Systems  
Kornelia Bobrowska, Elżbieta Remiszewska, Aleksandra Głowacka, Piotr Golec, Kamila Sadowska
- 09:15 – 09:30 **OP006** Nanolayer of Monocrystalline Si Towards Nanodosimetry of Electron Radiation  
Gałina Boka, Yuri Dekhtyar, Mirko Rocca, Elizabete Skrebele, Hermanis Sorokins
- 09:30 – 09:45 **OP007** The Role of Sphingosine Kinase 1 Pharmacological Modulation on Crucial Pro/Anti-Apoptotic Proteins in Alpha-Synucleintransduced Cells: The Promising Role of Siponimod and Ponesimod  
Joanna Motyl, Agnieszka Wencel, Kinga Czubowicz, Robert Strosznajder
- 09:45 – 10:0 **OP008** The Insight into the Distinct Molecular Changes Induced by Methylation Inhibitors in Leukemia Cells in Relation to so far Well-Defined Mechanism of Action  
Przemysław Sareło, Aleksandra Kaczorowska, Marlena Gąsior-Głogowska, Anna Licznarska, Kinga Godkiewicz, Ewa Ziolo, Wojciech Kałas, Halina Podbielska, Marta Kopaczyńska

**Monday, June 16, 2025****Oral Session OS03**

Medical Image Processing

Chairs: Zhivko Bliznakov (Bulgaria), Lukasz Roszkowiak (Poland)

OP009–OP012

**Lecture Hall C**

- 09:00 – 09:15 **OP009** An Approach to Create a Computational Model of a Trabecular Bone  
Kristina Bliznakova, Dimitar Trizlov, Nikolay Dukov, Stoyan Ivanov, Zhivko Bliznakov
- 09:15 – 09:30 **OP010** Assessment of Quality of Colorectal Endoscopic Images  
Damian Pawłowski, Andrzej Żelowski, Klaudia Kozłowska, Mirosław Łątka
- 09:30 – 09:45 **OP011** Does Semi-Automatic Segmentation-Based Classification Enable AI-Assisted Detection of Sinusitis in an Equine Model?  
Marta Borowska, Paweł Lipowicz, Hubert Asztęborski, Tomasz Jasiński, Bernard Turek, Małgorzata Domino
- 09:45 – 10:00 **OP012** Surface-Area-to-Volume Ratio as a Diagnostic Indicator in the Assessment of Avascular Necrosis of Femoral Head  
Adam Patalas, Patryk Zych, Kacper Filipek, Paweł Zawadzki

**Special Symposium SE01**

Integrating Artificial Intelligence in Clinical Engineering: Perspectives For the Future

Chair: Fabiola Martinez-Licona (Mexico)

OP013–OP016

**Lecture Hall A**

- 10:10 – 10:25 **OP013** The Impact of Artificial Intelligence in Predictive Maintenance  
Fabiola Martinez-Licona
- 10:25 – 10:40 **OP014** Artificial Intelligence for the Diagnosis and Treatment of Otosclerosis  
Virginia Ballarin
- 10:40 – 10:55 **OP015** Early Prediction of ICU Readmissions Using Machine Learning in a Colombian University Hospital  
Joel Andrés Lerma Pazos, J.E Camacho Cogollo, Jose Leonardo Mojica Peñaranda
- 10:55 – 11:10 **OP016** Artificial Intelligence Challenges for Medical Device Regulation  
Fabiola Martinez-Licona

**Monday, June 16, 2025****Oral Session OS04**

Artificial and Bioartificial Organs

Chairs: Loredana De Bartolo (Italy), Dorota D. Pijanowska (Poland)

OP017–OP020

**Lecture Hall B**

- 10:10 – 10:25 **OP017** Advance in Skin and Liver Tissue Engineering by Using Organotypic Membrane Systems and Mesenchymal Stem Cells  
Simona Salerno, Loredana De Bartolo
- 10:25 – 10:40 **OP018** Characteristics of Dedifferentiated Human Hepatocytes Isolated from Liver Tissues  
Monika Wiśniewska, Małgorzata Jakubowska, Agnieszka Wencel, Dorota Pijanowska, Krzysztof Pluta
- 10:40 – 10:55 **OP019** Tunable Isotropic TPMS-based 3D-Architected Scaffolds for Diabetic Bone Regeneration  
Fátima Morales-Gómez, Fabiola Hernández-Rosas, Araceli Zapatero-Gutiérrez, Erick Ramírez-Cedillo, Josué García-Ávila
- 10:55 – 11:10 **OP020** Patterns of Relative Blood Volume Changes During Hemodialysis  
Leszek Pstras, Mauro Pietribiasi

**Special Symposium SE02**

EAMBES and IEEE EMBS Symposium

Chairs: Giuseppe Fico (Spain)

**Lecture Hall C**

- 10:10 – 10:25 EAMBES: State of the Alliance and Plan for 2025-2026  
Giuseppe Fico
- 10:25 – 10:40 EAMBES Public Affair Working Group  
Leandro Pecchia
- 10:40 – 10:55 EAMBES Outreach and Actions toward Diversity, Inclusiveness and Equity  
TBA
- 10:55 – 11:10 Poland Section IEEE EMBS  
Antoni Grzanka, Paweł Strumiłło

**Monday, June 16, 2025****Plenary Lecture 1****Lecture Hall A**

14:45 – 15:35

**PL1** Using Light Absorption and Laser Speckle Dynamics to Measure Human Brain FunctionProf. David A. Boas, PhD, Professor (BME, ECE) Neurophotonics Center  
Boston University College of Engineering (USA)**Plenary Lecture 2****Lecture Hall A**

15:35 – 16:25

**PL2** AI-powered MRI: Towards an Omni Imaging Technology for Brain MappingProf. Zhi-Pei Liang, PhD, Franklin W. Woeltge Professor Department of Electrical  
and Computer Engineering, and Beckman Institute for Advanced Science and  
Technology University of Illinois at Urbana-Champaign (USA)**Special Symposium SE03**

AI and Deep Learning in Medicine and Biology

Chair: Domènec Savi Puig Valls (Spain), Anna Korzyńska (Poland)

OP021–OP024

**Lecture Hall A**16:45 – 17:00 **OP021** Deep Learning for Centroblast Detection in H&E-Stained Whole Slide Images  
Zaneta Swiderska-Chadaj, Adam Krawczyk, Aleksandra Osowska-Kurczab,  
Sławomir Pakuła, Wojciech Kotłowski17:00 – 17:15 **OP022** Tumor Morphological and Texture Feature Analysis to Classifying the Breast  
Cancer Molecular Subtypes in Digital Mammograms  
Adnan Khalid, Hatem Rashwan, Domènec Puig17:15 – 17:30 **OP023** EGGs: Efficient Gathering and Structuring of Avian Egg Datasets  
Łukasz Roszkowiak, Paweł Pstrokowski, Wojciech Wojcik, Krzysztof Damaziak,  
Anna Korzyńska17:30 – 17:45 **OP024** Reinforcement Learning with Graph Neural Networks for Gene Regulatory  
Network Control  
Andrzej Mizera, Jakub Zarzycki

**Monday, June 16, 2025****Panel Discussion PD01**

IFMBE, Women in Biomedical Engineering: Role Models in Biomedical Engineering

Chair / Moderator: Virginia Ballarin (Argentina)

**Lecture Hall B**

16:45 – 17:45

Li Li (the United Kingdom)

Dorota G. Pijanowska (Poland)

Leila Gurbeta Pokvic (Bosnia &amp; Herzegovina)

Anna Stecka (Poland)

**Special Symposium SE04**

Modern Therapeutic Technologies in Medicine

Chair: Zbigniew Paszenda (Poland)

OP025–OP028

**Lecture Hall C**

16:45 – 17:00 **OP025** Strategies for Surface Coating of Implants in the Cardiovascular System  
Anna Taratuta, Zbigniew Paszenda, Marcin Basiaga

17:00 – 17:15 **OP026** Modification of Titanium Surfaces with Circular and Hexagonal TiO<sub>2</sub> Nanotubes  
Katarzyna Arkusz, Aleksandra Jędrzejewska, Ewa Paradowska, Mieczysław Jurczyk

17:15 – 17:30 **OP027** Analysis of the Possibility of Using the UR10e Cobot in Neurological Treatment  
Sławomir Suchoń, Wojciech Wolański, Robert Michnik, Michał Burkacki, Miłosz Chrzan, Hanna Zadoń, Piotr Szaflik, Justyna Szeffler-Derela, Dagmara Wasiuk-Zowada

17:30 – 17:45 **OP028** Mental Workload and the Task Allocation for Collaborative Robot Systems with an Industry 5.0 Human-Centered Perspective - an Experimental Study  
Anita Pollak, Sławomir Suchoń, Miłosz Chrzan, Michał Burkacki, Marek Ples, Patrycja Romaniszyn-Kania, Małgorzata Kożusznik

**Tuesday, June 17, 2025****Plenary Lecture 3****Lecture Hall A**

09:00 – 09:50 **PL3** European Medical Device CE Mark – Current Challenges and Future Opportunities  
Dr. Bassil Akra, CEO, AKRA TEAM GmbH (Germany)

**Special Symposium SE05**

Diverse Biomaterials, Unified Impact: Biomedical Progress Driven by Innovation

Chairs: Elżbieta Pamuła (Poland), Patrycja Domalik-Pyzik (Poland)

KL01, OP029–OP032

**Lecture Hall A**

- 10:00 – 10:30 **KL01** **Keynote Lecture:** Lipid Nanoparticles as Carriers for Antibacterial Peptides  
Katarzyna Reczyńska-Kolman
- 10:30 – 10:45 **OP029** Biomedical Potential of the Methanolic Leaf Extract of *Verbesina persicifolia*: Antimicrobial Properties and Applications in Wound Healing  
Carlos Alberto López-Rosas, Seojin Han, Margarita V. Saavedra Vélez, José Rafael Alanis Gómez, Fabiola Hernández-Rosas
- 10:45 – 11:00 **OP030** Synergy Between Antibiotics and  $\alpha$ -Linolenic Acid as an Promising Sure for Biofilm Bacterial Infections  
Konrad Kwiecień, Karolina Knap, Dorota Ochońska, Katarzyna Reczyńska-Kolman, Monika Brzychczy-Włoch, Elżbieta Pamuła
- 11:00 – 11:15 **OP031** Silver and Copper Nanoparticles Combined with Alginates for Ovarian Cancer Theranostics  
Patrycja Domalik-Pyzik
- 11:15 – 11:30 **OP032** PEDOT:PSS Composite Integration with PDMS Substrate for Flexible Bioelectronics Applications  
Natalia Zalewska, Izabela Lewandowska, Karolina Cysewska



**Tuesday, June 17, 2025****Special Symposium SE06a**

IFMBE, Biomedical Engineering Education: Challenges, Digital Health Technology and Learning Methodology

Chairs: Nicolas Pallikarakis (Greece), Martha Zequera (Colombia)

KL02, IP01, OP033–OP035

**Lecture Hall B**

- 10:00 – 10:30 **KL02** **Keynote Lecture:** Biomedical Engineering Education – Challenges, Digital Health Technology and Learning Methodology  
Ratko Magjarević
- 10:30 – 10:45 **IP01** An Exploratory Trial on AI-Assisted Collaborative Learning in BME Education  
Nicolas Pallikarakis
- 10:45 – 11:00 **OP033** Introduction of artificial intelligence, big data and data science in biomedical engineering and biomedical informatics  
Lenka Lhotska
- 11:00 – 11:15 **OP034** Convergence in Science and Education: Enhancing Biomedical Research and Teaching Through Digital Innovations  
Anna Korzynska
- 11:15 – 11:30 **OP035** BME Education in Portugal: Insights from the Highest-Ranked Programs and the Role of ANEEB  
Martim Rocha, Margarida Lima

**Oral Session OS05**

Imaging Modalities and Medical Image Fusion

Chairs: Janis Spigulis (Latvia), Piotr Sawosz (Poland)

KL03, OP036–OP039

**Lecture Hall C**

- 10:00 – 10:30 **KL03** **Keynote Lecture:** Development of Connectome MRI Techniques and Their Applications on Neurological Disorders  
Li-Wei Kuo
- 10:30 – 10:45 **OP036** Image Subtraction Versus Data Subtraction to Create the Dose Calibration Curve of Radiochromic Film for Onsite Dosimetry of CT Dose  
Toshizo Katsuda, Nobuyoshi Tanki, Rumi Gotanda, Tatsuhiro Gotanda, Tadao Kuwano, Kouichi Yabunaka
- 10:45 – 11:00 **OP037** Speckle Contrast Optical Spectroscopy (SCOS) for Monitoring of Blood Flow Dynamics in Process of Diabetic Wound Healing Supported with Cold Plasma Therapy  
Sara Fathollah, Stanislaw Wojtkiewicz, Wiktoria Kasprzak, Piotr Sawosz
- 11:00 – 11:15 **OP038** Visible-NIR Multispectral Imaging of Whole-Body Human Skin  
Janis Spigulis, Edgars Kviesis-Kipge, Uldis Rubins, Ilze Irbe, Marta Skrastina, Jekaterina Tihomirova
- 11:15 – 11:30 **OP039** The Development of a Quadrature Surface Coil for Rat Brain MRI  
Cheng-Che Wu, Ming-Jye Chen, Po-Hsun He, Hsuan-Han Chiang, Chang-Hoon Choi, Li-Wei Kuo, Kuan-Hung Cho

**Tuesday, June 17, 2025****Oral Session OS06**

Biomaterials

Chair: Yuri Dekhtyar (Latvia), Katarzyna Arkusz (Poland)

OP040–OP045

**Lecture Hall A**

- 11:45 – 12:00 **OP040** Effect of Titanium-Doped Hydroxyapatite on Biofilm Formation of *Pseudomonas aeruginosa*  
Ángel Rodrigo Ortiz Juárez, Jimena Mariette Robledo Dorantes, Araceli Zapatero-Gutiérrez, Josué García-Ávila, José Rafael Alanis-Gómez, Fabiola Hernández-Rosas
- 12:00 – 12:15 **OP041** Electro-Assisted Nanodiamond Integration into Conducting Polymer as a Possible Drug-Delivery stent Platform  
Karolina Cysewska, Anita Stoppel, Muhammad Saqib, Birgit Paul, Julia Kristin Hufenbach, Joerg Opitz, Natalia Beshchasna
- 12:15 – 12:30 **OP042** Oxygen-Enhanced Hybrid Systems: A New Frontier in Biomedicine  
Agata Lipko, Anna Grzeczkwicz, Monika Drabik, Angelika Kwiatkowska, Tomasz Miłek, Ludomira Granicka
- 12:30 – 12:45 **OP043** Using Backscattered Electrons to Determine Surface Charge on Laser-Treated Titanium Alloys  
Arturs Abolins, Alberta Aversa, Marks Gorohovs, Yuri Dekhtyar, Maris Dortiņš, Lyubomir Lazov, Arturs Mamajevs, Hermanis Sorokins, Edmunds Sprudz
- 12:45 – 13:00 **OP044** Thermal Modification of Hexagonal Titanium Dioxide Nanotubes  
Aleksandra Jędrzejewska, Ewa Paradowska, Mieczysław Jurczyk, Katarzyna Arkusz
- 13:00 – 13:15 **OP045** The Development of (Ca/Zn)CO<sub>3</sub> Microparticles Loaded with Bacitracin as Antibacterial and Osteogenic Materials for Bone Tissue Engineering  
Katarzyna Reczyńska-Kolman, Dorota Ochońska, Monika Brzychczy-Włoch, Elżbieta Pamuła

**Tuesday, June 17, 2025****Special Symposium SE06b**

IFMBE, Biomedical Engineering Education: Challenges, Digital Health Technology and Learning Methodology

Chairs: Nicolas Pallikarakis (Greece), Martha Zequera (Colombia)

OP046–OP048, IP02

**Lecture Hall B**

- 11:45 – 12:00 **OP046** Current Landscape of Biomedical Engineering in Spain: Academic Opportunities, Professional Applications, and Technological Innovation  
Jenny Haro, María Fernanda Cabrera
- 12:00 – 12:15 **OP047** Future Vision: A Strategic Model for Structured Cooperation Between Biomedical Engineers and Medical Physicists for Mutual Benefit  
Carmel J. Caruana, Eric Pace, Sam Agius
- 12:15 – 12:30 **OP048** Combining MRI and Laser Doppler Flowmetry for Measurement of Cerebral Blood Flow in Neurointensive Care  
Stina Mauritzon, Sofie Tapper, Fredrik Ginstman, Anders Tisell, Peter Zsigmond, Karin Wårdell
- 12:30 – 12:45 **IP02** How to Promote Innovation and Entrepreneurship in the Classroom of Undergraduate Students  
Martha Zequera
- 12:45 – 13:15 Panel Discussion

**Oral Session OS07**

Biomeasurements

Chairs: Halina Podbielska (Poland), Tilmann Sander-Thömmes (Germany)

OP049–OP054

**Lecture Hall C**

- 11:45 – 12:00 **OP049** A Blood Pressure Normalization Method for Aortic Pulse Wave Velocity  
Kristina Kööts, Kristjan Pilt, Ivo Fridolin
- 12:00 – 12:15 **OP050** CT Assessment of the Hemidiaphragm Shape in Pleural Effusion and Its Association with Dyspnea  
Anna M Stecka, Katarzyna Faber, Elżbieta M. Grabczak, Marcin Michnikowski, Rafał Krenke, Tomasz Gólczewski
- 12:15 – 12:30 **OP051** Magnetoencephalography in Hearing Threshold Assessment  
Anna Jodko-Władzińska, Michał Władziński, Tilmann Sander, Tadeusz Pałko
- 12:30 – 12:45 **OP052** Digital Measurement Modules for Non-Invasive Monitoring of Physiological Parameters Under Extreme Conditions  
Ewelina Sobotnicka, Jan Mocha, Grzegorz J. Nowak, Grzegorz Badura, Aleksander Sobotnicki, Łukasz Dziuda
- 12:45 – 13:00 **OP053** Analytical Equations for Accurate Sensitivity Factors in Near-Infrared Spectroscopy  
Aleh Sudakou, Stanislaw Wojtkiewicz, Roman Maniewski, Adam Liebert
- 13:00 – 13:15 **OP054** The Advancing Brain Tumor Diagnosis: Vibrational Spectroscopy for Differentiation and Classification of Gliomas  
Marlena Gąsior-Głogowska, Anastasija Krzemińska, Bogdan Czapiga, Marta Kopaczyńska

**Tuesday, June 17, 2025****Oral Session OS08**

Biomedical Signal Processing: Brain and Physiological Function Analysis

Chairs: Gunta Krūmiņa (Latvia), Agnieszka Uryga (Poland)

OP055–OP058

**Lecture Hall A**

- 15:30 – 15:45 **OP055** Event-Related Potentials as Markers of Image Depth Perception  
Mehrdad Naderi, Albina Abdullayeva, Gunta Krumina, Reinis Alksnis, Tatjana Pladere
- 15:45 – 16:00 **OP056** Analysis of the Website Accessibility Influence on the Cognitive Workload of Users With Visual Impairments  
Piotr Zając, Aleksandra Królak
- 16:00 – 16:15 **OP057** Hemodynamic Group Activations From a Multi-Modal Setup Combining OPM-MEG and fNIRS  
Pichaya Tappayuthpijarn, Urban Marhl, Piotr Sawosz, Vojko Jazbinšek, Adam Liebert, Tilmann Sander, Stanislaw Wojtkiewicz
- 16:15 – 16:30 **OP058** Relationship Between Entropy of Heart Rate Variability and Cerebral Autoregulation in Healthy Volunteers  
Agnieszka Uryga, Teodor Buchner, Magdalena Kasprowicz

**Special Symposium SE07a**

IFMBE, Students and Recent Graduates Working Group: How Can We Bring Innovation to Socially Impactful Research Through the Effective Use of Emerging Technologies?

Chairs: Martha Zequera (Colombia), Piotr Ladyzynski (Poland), Anna Stecka (Poland)

OP059–OP062

**Lecture Hall B**

- 15:30 – 15:45 **OP059** Intelligent System for Monitoring Sedentary Behaviour to Support Elderly Care  
Santiago Lynett, Santiago Mesa, Wilder Castellanos, Martha Zequera Díaz, Pilar Castellanos
- 15:45 – 16:00 **OP060** Hybrid Respiratory System Model as a Foundation for Modular Physiological Simulation Framework  
Zofia Knapińska, Krzysztof Zieliński
- 16:00 – 16:15 **OP061** Bridging Innovation and Society: ANEEB Perspective on Emerging Technologies  
Andreia Martins, Diogo Andrade
- 16:15 – 16:30 **OP062** Time-Domain Near-Infrared Spectroscopy: Advancing Brain Oxygenation Monitoring  
Aleh Sudakou, Adam Liebert

**Tuesday, June 17, 2025****Special Symposium SE08**

Meet the Editor

Chairs: Zahra Moussavi (UK), Adam Liebert (Poland)

KL04, KL05

**Lecture Hall C**

15:30 – 16:00 **KL04** **Keynote Lecture:** Meet the Editor of the Medical & Biological Engineering & Computing  
Zahra Moussavi

16:00 – 16:30 **KL05** **Keynote Lecture:** Meet the Editor-in-Chief of the Biocybernetics and Biomedical Engineering: why I reject the manuscripts?  
Adam Liebert

**Oral Session OS09**

Modeling Physiological Systems in Health and Disease

Chairs: Joanna Stachowska-Piętka (Poland), Leszek Pstraś (Poland)

OP063–OP066

**Lecture Hall A**

16:45 – 17:00 **OP063** Linear vs. Nonlinear Diffusion According to Linear Nonequilibrium Thermodynamics  
Jacek Waniewski

17:00 – 17:15 **OP064** Indirect Application of Machine Learning to Estimate Parameters of Cancer Growth and Response to Treatment in Individual Patients  
Jarosław Smieja, Krzysztof Łakomiec, Artur Wyciśłok, Andrzej Świerniak, Krzysztof Fajarewicz

17:15 – 17:30 **OP065** Prognostic Value of Early Interictal Epileptiform EEG Patterns in Ischemic Stroke: A Predictive Model for Functional Outcomes  
Katerina Iskra, Edoardo Ricci, Andrea Bonini, Giovanni Furlanis, Michele Malesani, Paola Caruso, Marcello Naccarato, Paolo Manganotti, Agostino Accardo, Miloš Ajčević

17:30 – 17:45 **OP066** TBA

**Tuesday, June 17, 2025****Special Symposium SE07b**

IFMBE, Students and Recent Graduates Working Group: How Can We Bring Innovation to Socially Impactful Research Through the Effective Use of Emerging Technologies?

Chairs: Martha Zequera (Colombia), Piotr Ladyzynski (Poland), Anna Stecka (Poland)

OP067–OP070

**Lecture Hall B**

- 16:45 – 17:00 **OP067** Development of an Innovative Methodological Model for the Integration of Emerging Technologies in the Development of Medical Devices with Social Impact  
Leslie Yessenia Cieza Huane
- 17:00 – 17:15 **OP068** A Robotic System Integrating the Semmes-Weinstein Monofilament (SWM10g) for Automated Plantar Sensory Evaluation: Novel Approach for Early DPN Detection  
César Augusto Moreno Baracaldo, Martha Zequera Díaz
- 17:15 – 17:30 **OP069** AI-Based Tool to Support Clinical Decisions Using Predictive Factors Derived from Tumor-Infiltrating Lymphocyte Quantification in Breast Cancer  
Shrief Abdelazeez, Alessio Fiorin, Carlos Lopez, Laia Adalid, Marylene Lejeune, Anna Korzynska
- 17:30 – 17:45 **OP070** Deep Learning-Based Classification of Thermograms from Plantar Region  
Santiago Humberto Ramirez Martinez and Martha Zequera

**Oral Session OS10**

Assistive Technologies and Rehabilitation Engineering

Chairs: Lenka Lhotska (Czech Republic), Paweł Strumiłło (Poland)

OP071–OP074

**Lecture Hall C**

- 16:45 – 17:00 **OP071** Vision and Vibration-Based Feedback System to Support Situational Awareness of Uniformed Services Officers  
Mateusz Urban, Ignacy Stencel, Mateusz Sudejko, Szymon Cygan
- 17:00 – 17:15 **OP072** Enhancing Cognitive and Motor Skills through Personalized Digital Games  
Petr Novak, Lenka Lhotska
- 17:15 – 17:30 **OP073** Detection of Limb Movement Related Events from EEG Signals Using ARMA Models  
Bartłomiej Sztyler, Paweł Strumiłło
- 17:30 – 17:45 **OP074** TBA

**Wednesday, June 18, 2025****Plenary Lecture 4****Lecture Hall A**

09:00 – 09:50 **PL4** High-Resolution Magnetoencephalography: A New Window to Human Brain Function?

Prof. Lauri Parkkonen, PhD, Aalto University School of Science (Finland)

**Oral Session OS11**

Artificial Intelligence in Healthcare: Diverse Applications

Chairs: Paulo de Carvalho (Portugal), Fabiola Martinez-Licona (Mexico)

OP075–OP080

**Lecture Hall A**

- 10:00 – 10:15 **OP075** Neurosymbolic AI Approach for Dry and Wet AMD Classification Using OCT Images  
Aleksandar Miladinović, Alessandro Biscontin, Miloš Ajčević, Agostino Accardo, Dario Marangoni, Daniele Tognetto, Leandro Infrerra
- 10:15 – 10:30 **OP076** Estimation of Body Ratios from Low-Resolution, Dual-Energy X-ray Images Using Convolutional Neural Networks  
Kamil Janczyk, Jacek Rumiński, Tomasz Neumann, Aleksandra Szymczyk, Piotr Wiśniewski
- 10:30 – 10:45 **OP077** Genetic Algorithm for Predicting Primary Imatinib Resistance in Locally Advanced or Metastatic Gastrointestinal Stromal Tumors  
Martina Sassi, Jacopo Vitale, Maria Elisabetta Pagnano, Laura Risi Ambrogioni, Margherita A.G. Matarrese, Bruno Vincenzi, Leandro Pecchia
- 10:45 – 11:00 **OP078** Can Machine Learning Models Help Identify Infected Wounds Requiring Antibiotic Treatment?  
Piotr Foltynski, Piotr Ladyzynski, Karolina Kruszewska, Arkadiusz Krakowiecki, Bożena Czarkowska-Paczek
- 11:00 – 11:15 **OP079** Deep Multiple Instance Learning for Automated Tumor Positivity Score Prediction in Non-Small Cell Lung Cancer  
Krzysztof Pysz, Artur Bartczak, Jarosław Kwiecień, Piotr Krajewski, Witold Dyrka
- 11:15 – 11:30 **OP080** Artificial Intelligence Models for Age and Sex Estimation from Electrocardiograms,  
Daniel Albornoz, Cristian Sposato, Gustavo Meschino, Santiago Manzollillo, Virginia Ballarin



**Wednesday, June 18, 2025****Special Symposium SE09**

IFMBE, Industry Committee – From Lab to Market: Bridging the Gap in Biomedical Innovation

Chairs: Piotr Ładyżyński (Poland), Jari Hyttinen (Finland), Martha Zequera Diaz (Colombia)

KL6, OP081–OP084

**Lecture Hall B**

- 10:00 – 10:30 **KL6** **Keynote Lecture:** A Journey of +25 Years in the Ecosystem of Spin-off Creation: A Perspective of the Academic Innovators of ETRO.RDI  
Johan Stiens
- 10:30 – 10:45 **OP081** Bioimpedance Method for Monitoring Chronic Wounds  
Jari Viik, Atte Kekonen, Magdalena Antoszezewska
- 10:45 – 11:00 **OP082** From an Idea to the Product – Brain Optics Quantitative Near Infrared Spectroscopy Device  
Stanislaw Wojtkiewicz, Mateusz Zbik, Adam Linkowski, Michal Waskiewicz, Dominik Domanski, Hamid Dehghani and Piotr Sawosz
- 11:00 – 11:15 **OP083** From Identification of Unmet Clinical Need to Commercialization - Story of Sensing Injection Needle  
Jari Hyttinen
- 11:15 – 11:30 **OP084** Towards Commercialization of an Optical Guidance System for Neurosurgery  
Karin Wårdell, Johan Richter

**Wednesday, June 18, 2025****Special Symposium SE10**

Young Polish Society for Biomedical Engineering Meeting

Chairs: Marek Darowski and The Main Board of the Polish Society for Biomedical Engineering (Poland)

OP085–OP091

**Lecture Hall C**

- 10:00 – 10:12 **OP085** Development of a Neural Network-Based Method for Analyzing Muscle Interactions in Biomechanics and Medical Fields  
Julia Wilk, Cezary Rzymkowski
- 10:12 – 10:24 **OP086** Analysis of the Influence of the Basal Geometry of the Auxetic Layer in the Intervertebral Disc Endoprosthesis on the Distribution of Stress and Strain in the Lumbar Spine Structures  
Martyna Myszograj, Piotr Posadzy
- 10:24 – 10:36 **OP087** Multifunctional Chitosan-Based Hydrogels Enriched with Biologically Active Substances  
Weronika Gura, Szymon Salagierski, Michał Dziadek, Katarzyna Cholewa-Kowalska
- 10:36 – 11:48 **OP088** The Influence of Simulated Microgravity on Cells Cultured on Polymeric Scaffolds and Microspheres  
Barbara Szaflarska, Kamila Walczak, Agata Kołodziejczyk, Elżbieta Pamuła
- 10:48 – 11:00 **OP089** Unsupervised Segmentation of Defective Skulls in Volumetric Data by Using Deep Networks Dedicated to Modality Transfer  
Kamil Kwarciak
- 11:00 – 11:12 **OP090** Multifunctional Alginate-Based Capsules for Theranostic Applications  
Malwina Furgala, Patrycja Domalik-Pyzik
- 11:12 – 11:24 **OP091** Computer Methods to Support Diagnosis and Therapy of Scoliosis Using Spinal Radiograms and Clinical Data  
Anna Berent

## Wednesday, June 18, 2025

### Special Symposium SCC

IFMBE Scientific Challenge Competition – Segmentation Challenge: Wounds and Markers in Focus

Chairs: Paulo de Carvalho (Portugal), Piotr Foltynski (Poland), Jorge Henriques (Portugal), Piotr Ladyzynski (Poland)

OP092–OP097

### Lecture Hall A

- 11:45 – 12:00 **OP092** Advanced Multi-Class Wound Segmentation Using EfficientNet Unet. A Comprehensive Approach to Automated Wound Assessment  
Athanasios Kallipolitis, Melina Tziomaka, Argyrios Zafeiriou, Ilias Maglogiannis
- 12:00 – 12:15 **OP093** Automated Segmentation of Wound and Scale Markers Areas Using a U-Net-Based Neural Network  
Zuzanna Błaszowska, Karolina Dzwonkowska, Piotr Stefański, Piotr M. Szczypiński
- 12:15 – 12:30 **OP094** Towards Efficient Wound Management: An Automatic Deep Learning Model for Accurate Wound Image Segmentation  
Aleksandar Miladinović, Alessandro Biscontin, Andrea Bonini, Francesco Bassi, Simone Kresevic, Alessandra Raffini, Katerina Iskra, Agostino Accardo, Miloš Ajčević
- 12:30 – 12:45 **OP095** Dual-Attention U-Net++ with Class-Specific Ensembles and Bayesian Hyperparameter Optimization for Precise Wound and Scale Marker Segmentation  
Daniel Cieślak, Miriam Reca, Olena Onyshchenko, Jacek Rumiński
- 12:45 – 13:00 **OP096** Wound Area Detection with nnU-Net v2 Architecture  
Franciszek Kubala, Piotr Matusiewicz, Dominik Mika, Dominik Zawlocki, Zbysław Tabor
- 13:00 – 13:15 **OP097** Segmentation Challenge: Wounds and Markers in Focus  
Piotr Potrzebowski, Arkadiusz Karbowski, Kamil Sterniuk, Aleksandra Krajna, Zuzanna Cemka, Krystian Opala, Jacek Rumiński

**Wednesday, June 18, 2025****Special Symposium SE11**

Biosensing Devices

Chairs: Chia Ming Yang (ROC Taiwan), Dorota G. Pijanowska (Poland)

IP03, OP098–OP102

**Lecture Hall B**

- 11:45 – 12:00 **IP03** Introduction  
Dorota G. Pijanowska
- 12:00 – 12:15 **OP098** Silicon Technology Based Sensor Interfacing Circuit Development for Urolithiasis Prevention  
Wen-Yaw Danny Chung, Roozbeh F. Ramezani, Meo Vincent Caya, Angelito Silverio, Yen-Wei Liu, Chia-Ming Yang, Vincent F. Tsai
- 12:15 – 12:30 **OP099** Novel DNA-Based Bioreceptor for Label-Free Lactoferrin Detection  
Agnieszka Paziewska-Nowak, Marcin Urbanowicz, Dorota Pijanowska
- 12:30 – 12:45 **OP100** Selective Capture of Extracellular Vesicles by Peptide- Functionalized Hollow Fiber Membranes  
Loredana De Bartolo, Simona Salerno, Antonella Piscioneri, Sabrina Morelli, Alessandro Gori, Elena Provasi, Paola Gagni, Lucio Barile, Marina Cretich, Marcella Chiari
- 12:45 – 13:00 **OP101** A Controllable and Multifunctional Semiconductor Chip for Neuron Cells for Separation, Culture and Potential Sensing  
Chia-Ming Yang, Leung Sze Tsui, Ping-Han Hsieh, Yu-Fan Xue
- 13:00 – 13:15 **OP102** Development of a Biosensing Flow Cytometry-Based Assay for Predicting Drug Resistance in Leukemia Cells  
Aleksandra Kaczorowska, Wojciech Kałas, Przemysław Sareło, Marlena Gąsior-Głogowska, Ewa Ziolo, Marta Sobas, Halina Podbielska, Marta Kopaczyńska

**Wednesday, June 18, 2025****Special Symposium SE12**

Information Content Analysis in Cardiovascular and Respiratory Systems

Chair: Gerard Cybulski (Poland)

OP103–OP108

**Lecture Hall C**

- 11:45 – 12:00 **OP103** Magnetocardiography Adds Information to Electrocardiographic Recordings  
Kazimierz Pęczalski, Judyta Sobiech, Mateusz Broczkowski, Natalia Jurek, Tadeusz Pałko, Teodor Buchner
- 12:00 – 12:15 **OP104** Information Content of the Electrocardiogram  
Sebastian Wildowicz, Tomasz Gradowski, Igor Olczak, Izabela Ghafour, Aleksandra Bedełek, Maciej Standerski, Teodor Buchner
- 12:15 – 12:30 **OP105** Application of Impedance Cardiography for Differentiating Control Group from subjects with Presyncopal Symptoms During the LBNP Test  
Katarzyna Tessmer, Grzegorz Graff, Gerard Cybulski
- 12:30 – 12:45 **OP106** The Effect of Data Filtering Methods on Heart Rate Asymmetry Measures  
Rafał Pawłowski, Katarzyna Buszko
- 12:45 – 13:00 **OP107** Comparison of Three Methods of Identification the Characteristic Points in Impedance Cardiography Signal  
Milena Chołuj, Bartosz Smigielski, Edward Koźluk, Ewa Michalak, Gerard Cybulski
- 13:00 – 13:15 **OP108** Simulations of Pulmonary Secretion Removal by the Closed Suctioning System in Two Subjects Ventilated by One Ventilator and the Ventil  
Krzysztof Zieliński, Zofia Knapińska

**Oral Session OS12**

Biomedical Signal Processing: Cardiovascular, Muscular and Cognitive Signals

Chairs: Stanisław Wojtkiewicz (Poland)

OP109–OP112

**Lecture Hall A**

- 14:30 – 14:45 **OP109** Cross Evaluation of Diffuse Correlation Spectroscopy and Intravoxel Incoherent Motion MRI in Measuring Tissue Blood Flow  
Neda Mogharari, Kamil Lipinski, Stanisław Wojtkiewicz, Adam Liebert, Michał Kacprzak
- 14:45 – 15:00 **OP110** QRS Detection Based on the Matching Pursuit Algorithm  
Mohammed Owahidur Rahman, Piotr Augustyniak, Elżbieta Olejarczyk
- 15:00 – 15:15 **OP111** Estimation of Cognitive Flow Level During Gait with Metrorhythmic Stimulation Using Physiological Data and Machine Learning  
Patrycja Romaniszyn-Kania, Anita Pollak, Aleksandra Tuszy, Damian Kania, Andrzej W. Mitas
- 15:15 – 15:30 **OP112** Evaluation of Factors-of-Interest in Muscle Phantoms Based on Ultrasonic Data  
Vladislavs Agarkovs, Aleksandrs Sisojevs, Alexey Tatarinov, Tamara Laimiņa

**Wednesday, June 18, 2025****Oral Session OS13**

ICT in Medicine and Health Technology Assessment

Chairs: Tomasz Neumann (Poland)

OP113–OP116

**Lecture Hall B**

- 14:30 – 14:45 **OP113** Detection of Electronic Protected Health Information in DICOM Objects: Rule-Based Methods vs. LLMs  
Dmytro Tkachenko, Milena Sobotka, Antoni Górecki, Jakub Kłopotek-Główczewski, Tomasz Neumann, Jacek Rumiński
- 14:45 – 15:00 **OP114** User Expectations on Wearable Medical Devices in Latvia  
Nadezhda Semjonova, Roberts Malnieks, Alexei Katashev
- 15:00 – 15:15 **OP115** Relationship Between Accelerometer-Based Walking Activity and Subjective Health  
Robert Róžański, Piotr Wiśniewski, Jacek Rumiński
- 15:15 – 15:30 **OP116** Subjective Evaluation of Phantoms in X-ray Breast Imaging Research: Insights from Bulgaria  
Tsvetelina Teneva, Antonio Sarno, Nikolay Dukov, Vasileios Elefteriadis, Zhivko Bliznakov, Panagiotis Papadimitroulas, Kristina Bliznakova

**Oral Session OS14**

Neural Engineering and Neuroinformatics

Chairs: Chih-Wei Peng (ROC Taiwan), Leon Bobrowski (Poland)

OP117–OP120

**Lecture Hall C**

- 14:30 – 14:45 **OP117** Therapeutic Effects of Temporal Interference Stimulation on Post-Stroke Motor Function Recovery: An Animal Study  
Chih-Wei Peng, Chun-Wei Wu, Yu-Ting Li
- 14:45 – 15:00 **OP118** Digital Cognitive Assessments and Smart Environments  
Ankica Babic
- 15:00 – 15:15 **OP119** Creating Structures from Formal Neurons  
Leon Bobrowski
- 15:15 – 15:30 **OP120** TBA



## **RAPID FIRE POSTER PRESENTATIONS**

**Tuesday, June 17, 2025**

**Rapid Fire Poster Presentations RF1**

Artificial Intelligence in Healthcare, Biomaterials,  
Biomedical Sensors and Instrumentation

Chairs: Anna Stecka (Poland)

PP01–PP25

**Lecture Hall A**

- 14:30 – 14:32 **PP01** Control of Scanner Quality and Consistency for Deep Learning Models in Collaborative Digital Pathology  
Shrief Abdelazeez, Lukasz Roszkowiak, Krzysztof Siemion, Antonina Pater, Alessio Fiorin, Carlos Lopez, Laia Adalid, Marylene Lejeune and Anna Korzynska
- 14:32 – 14:34 **PP02** Impact of Input Color Models on Breast Cancer Binary Classification Using CNNs  
Jakub Jaworski, Lukasz Roszkowiak
- 14:34 – 14:36 **PP03** Artificial artifacts detection in raw EEG signal using Neural Networks  
Kacper Filipek, Patryk Zych, Adam Patalas
- 14:36 – 14:38 **PP04** Color normalization in conventional Pap smear images  
Antonina Pater, Lukasz Roszkowiak, Anna Korzynska
- 14:38 – 14:40 **PP05** Development of PES-PUR Scaffolds for Cartilage Tissue Engineering  
Monika Wasyleczko, Cezary Wojciechowski, Judyta Dulnik, Wioleta Sikorska, Andrzej Chwojnowski
- 14:40 – 14:42 **PP06** Polymer-Modified PEO Coating: Corrosion Behavior and Cytotoxicity Assessment  
Barbara Rynkus, Maciej Sowa, Ada Orłowska, Joanna Jaworska, Katarzyna Jelonek, Aneta Samotus, Janusz Szewczenko
- 14:42 – 14:44 **PP07** Development of a Method for Obtaining Blend Degradable Polysulfone/Cellulose Acetate Membranes  
Cezary Wojciechowski, Monika Wasyleczko, Andrzej Chwojnowski
- 14:44 – 14:46 **PP08** Electrospun UV-crosslinked Polyvinylpyrrolidone Fibres Modified with Microspheres for Drug Delivery Systems  
Aleksandra Bartkowiak, Adam Mirek, Marcin Grzeczkwicz and Dorota Lewińska
- 14:46 – 14:48 **PP09** Combination of Cold Helium Plasma with Fluoride Varnish to Improve Enamel Surface Protection  
Sara Fathollah, Hossein Abbasi and Mohammad Sadegh Ahmad Akhouni
- 14:48 – 14:50 **PP10** Design and Experimental Research on a Self-Cleaning Endoscope Cover for the da Vinci Surgical Robot  
Dominika Szuberla, Tadeusz Pałko, Wojciech Świąszkowski, Emilia Choińska, Krzysztof Pałko
- 14:50 – 14:52 **PP11** Electrospun PEDOT:PSS Nanofibers for Flexible Bioelectronics Applications  
Izabela Lewandowska, Karolina Cysewska
- 14:52 – 14:54 **PP12** Study on Catalytic Activity of Lactate Oxidase Nanoflowers  
Kamila Sadowska, Abdelkader Zebda
- 14:54 – 14:56 **PP13** A Novel dsDNA-Based Electrochemical Biosensor for 6 Mercaptopurine  
Anna Sołdatowska, Marcin Urbanowicz, Kamila Sadowska, Dorota Pijanowska
- 14:56 – 14:58 **PP14** Surface-Functionalized Electrodes via Plasma Treatment for Enhanced Detection of *Pseudomonas* Quinolone Signals  
Sunil Luhar, Kamila Sadowska

- 14:58 – 15:00 **PP15** Simultaneous Recordings of Vascular and Neuronal Responses Using 3d Printed Head Casts  
Tilmann H. Sander, Urban Marhl, Pichaya Tappayuthpijarn, Piotr Sawosz, Paul Anders, Stanislaw Wojtkiewicz, Vojko Jazbinšek, Adam Liebert
- 15:00 – 15:02 **PP16** Continuous, Non-Invasive Intra-Abdominal Pressure Monitoring by Transient Radar Methodology  
Salar Tayebi, Ashkan Zarghami, Ali Pourkazemi, Manu L. N. G. Malbrain, Johan Stiens
- 15:02 – 15:04 **PP17** Direct Printed Potentiometric Sensors for pH Monitoring in Body Fluids  
Marcin Urbanowicz, Marek Dawgul, Agnieszka Paziewska-Nowak, Kornelia Bobrowska, Anna Sołdatowska, Dorota Pijanowska
- 15:04 – 15:06 **PP18** Radio Frequency Magnetic Field Detection for Magnetic Hyperthermia: Low-Cost, Lab-Friendly Hardware  
Serhat Ilgaz Yöner, Alpay Özcan
- 15:06 – 15:08 **PP19** Advancing Sweat-Based Wearable Biosensors: Enzyme Stabilization and AI-Driven Correction for Long-Term Multi-Biomarker Monitoring  
Abdelkader Zebda
- 15:08 – 15:10 **PP20** Leveraging Pulse Wave Signal Properties for Coronary Artery Calcification Screening in CKD Patients  
Urszula Białończyk, Leszek Pstras, Małgorzata Debowska, Lu Dai, Abdul Qureshi, Torkel Brismar, Jonaz Ripsweden, Bengt Lindholm, Peter Stenvinkel, Jan Poleszczuk
- 15:10 – 15:12 **PP21** Attention U-Net for Retinal Blood Vessel Segmentation Using Various Color Space Models Channels  
Patrycja Kwiek, Małgorzata Jakubowska
- 15:12 – 15:14 **PP22** Significance of Stable Feature Selection in Classifier Performance Assessment on High-Dimensional Genetic Data  
Tomasz Łukaszuk, Jerzy Krawczuk
- 15:14 – 15:16 **PP23** Application of Artificial Intelligence in Psychiatric Neuroimaging: A Systematic Review  
Ilona Karpiel, Ewelina Sobotnicka, Ana Starcevic
- 15:16 – 15:18 **PP24** The Method of Artificial Membranes Profile Image Construction for AI-Based Porosity Evaluation Tool  
Jakub Zak, Antonina Pater, Monika Wasyleczko, Natalia Najuch, Andrzej Chwojnowski, Anna Korzynska
- 15:18 – 15:20 **PP25** Explainable Estimation of Blood Volume Pulse Signals from Video Sequences Using a Combination of Deep Learning Models and Signal Processing Methods  
Milena Sobotka, Kamil Kopryk, Muhammad Usman, Jacek Rumiński

**Tuesday, June 17, 2025**

**Rapid Fire Poster Presentations RF2**

Medical Image Processing, Biomedical Signal Processing, Artificial Organs,  
Modeling Physiological Systems, Biomeasurements

Chairs: Aleksandrs Sisojevs (Latvia), Krzysztof Zieliński (Poland)

PP26–PP49

**Lecture Hall B**

- 14:30 – 14:32 **PP26** Deep Learning-Based Wound Segmentation Using a U-Net Architecture  
Martinus Boom
- 14:32 – 14:34 **PP27** Unified Wound Detection and Segmentation Using YOLO: An Efficient Approach for Accurate Wound Measurement  
Mahdi Bazargani, Mohammad Javad Heidari, Mehrdad Anvari-Fard, Hamid Soltanian-Zadeh
- 14:34 – 14:36 **PP28** Optimizing the Hemodynamic Response Function in EEG-fMRI Analysis of Focal Epilepsy: A Single-Case Report  
Nikodem Hryniewicz, Rafał Rola, Ewa Piątkowska-Janko, Danuta Ryglewicz, Piotr Bogorodzki
- 14:36 – 14:38 **PP29** The Fractal Scale Variability Index for MRI Images Analysis  
Ewelina Bebas, Marta Borowska, Jolanta Pauk
- 14:38 – 14:40 **PP30** Assessing Blood-Brain Barrier Impairments in Non-Enhancing Multiple Sclerosis Lesions with Perfusion MRI  
Nikodem Hryniewicz, Piotr Bogorodzki, Stefan Gaździński, Ewa Piątkowska-Janko, Kamil Lipiński, Anna Karlińska, Paweł Grieb, Mikołaj Pawlak, Rafał Rola, Danuta Ryglewicz, Iwona Kurkowska-Jastrzębska
- 14:40 – 14:42 **PP31** Influence of the 3D Printing Infill, Pattern and CT kV on the Hounsfield Units for Biomedical Applications  
Nikolay Dukov, Kristina Bliznakova, Yanka Baneva, Zhivko Bliznakov
- 14:42 – 14:44 **PP32** Morphological Analysis of Total Hemoglobin Concentration Pulse Waveform and Its Relationship with Age  
Marta Hendler, Arkadiusz Ziółkowski, Tomasz Sozański, Magdalena Kasproicz
- 14:44 – 14:46 **PP33** Does Functional Brain Stimulation Change the Brain Tissue Scattering?  
Kamil Lipiński, Neda Mogharari, Adam Liebert, Stanisław Wojtkiewicz
- 14:46 – 14:48 **PP34** Utilization of Instantaneous Frequency and Amplitude Obtained via EWT for Motor Imagery Classification  
Patrik Zych, Kacper Filipek, Adam Patalas
- 14:48 – 14:50 **PP35** Nonlinear Analysis of ECG Signals in Arrhythmia Simulated by MPS450 Fluke and Measured with ADS1298 AFE  
Elzbieta Raus-Jarzabek, Elzbieta Olejarczyk
- 14:50 – 14:52 **PP36** Influence of Liner Material Poisson's Ratio on Contact Pressure Distribution in Transtibial Prosthetic Sockets: A Finite Element Analysis Study  
Agata Mrozek-Czajkowska
- 14:52 – 14:54 **PP37** Acid-Base Modelling in Peritoneal Dialysis  
Mauro Pietribiasi, Joanna Stachowska-Pietka, Olof Heimbürger, Jacek Waniewski, Bengt Lindholm
- 14:54 – 14:56 **PP38** Modified Kinetics of Plasma Electrolytes During Hemodialysis After Changing Dialysate Bicarbonate Concentration

- Malgorzata Debowska, Monika Wieliczko, Mauro Pietribiasi, Urszula Bialonczyk, Jolanta Malyszko, John K. Leypoldt, Jacek Waniewski
- 14:56 – 14:58 **PP39** Patient-specific Pulse Wave Propagation Modeling for Improving Vasopressor Therapy in Severe Traumatic Brain Injury Patients  
Kamil Wolos, Leszek Pstras, Urszula Bialonczyk, Malgorzata Debowska, Wojciech Dabrowski, Dorota Siwicka-Gieroba, Jan Poleszczuk
- 14:58 – 15:00 **PP40** Markov Model Simulation of Nicotine Addiction and the Effectiveness of Nicotine Replacement Therapy (NRT)  
Joanna Chwał, Arkadiusz Banasik, Radosław Dzik, Ewaryst Tkacz
- 15:00 – 15:02 **PP41** Spontaneous Breathing and Mechanical Power Management: Toward Safer Ventilation Practices  
Tomasz Urbankowski, Krzysztof Zieliński, Maciej Kozarski, Barbara Stankiewicz, Krzysztof Jakub Pałko, Raman Pasledni, Marek Darowski
- 15:02 – 15:04 **PP42** The Influence of the Ventilation Methods on Respiratory Variables – Model Studies  
Raman Pasledni, Maciej Kozarski, Krzysztof Zieliński, Barbara Stankiewicz, Krzysztof Jakub Pałko, Tomasz Urbankowski, Marek Darowski
- 15:04 – 15:06 **PP43** Model-Based Investigation of the Effect of Multi-Site Arterial Occlusion by Cuffs on the Distribution of Blood Flow in the Arterial Tree  
Kamil Wolos, Leszek Pstras, Malgorzata Debowska, Jan Poleszczuk
- 15:06 – 15:08 **PP44** Ornithine - a Marker for Metabolic Liver Disease  
Elżbieta Remiszewska, Marcin Grzeczkowicz, Dorota G. Pijanowska
- 15:08 – 15:10 **PP45** Serum NMR-Based Lipidomics of Patients with Morbid Obesity  
Beata Toczyłowska, Piotr Kalinowski, Elżbieta Ziemska, Paulina Duda, Michał Grąt
- 15:10 – 15:12 **PP46** Post-Exercise Heart Rate Recovery in Male Soccer Players Under 13 Years Old  
Magdalena Mikielwicz, Jakub Sławomir Gąsior, Kacper Korzeniewski, Robert Makuch, Marcel Młyńczak
- 15:12 – 15:14 **PP47** Novel Approach to Ventilation Therapy of Neonates with Congenital Diaphragmatic Hernia  
Barbara Stankiewicz, Krzysztof Jakub Pałko, Magdalena Mierzewska-Schmidt, Dariusz Madajczak, Marcin Michnikowski, Maciej Kozarski, Marek Darowski
- 15:14 – 15:16 **PP48** Portable NIRS Device for Real-Time Cerebral Oxygenation Monitoring in Aerospace Applications  
Michał Kacprzak, Piotr Sawosz, Anna Gerega, Aleh Sudakou, Kamil Lipiński, Stanisław Wojtkiewicz, Krzysztof Kowalczyk, Łukasz Dziuda, Adam Liebert
- 15:16 – 15:18 **PP49** Seroma Prevention with Hypertonic Irrigation In Breast Reconstructions: A Double-Blind Trial – the SHIELD Trial  
Marcin Ekman, Paulina Cichon, Kamil Drucis, Magdalena Graczyk, Piotr Woźniacki, Jarosław Kobiela

## INSTRUCTIONS FOR ORAL PRESENTATIONS

In most sessions, each oral presentation is allocated a 15-minute time slot. To allow time for Questions & Answers, the presentation itself should not exceed **12 minutes**.

Please note that deviations from the standard 15-minute format may occur, particularly in Special Symposia. Presenters are advised to consult the **Program** to confirm the duration of their specific presentation and to follow the instructions of the session chairperson.

**Strict adherence to the allotted time is required** for all speakers.

### Presentation Setup

- Each lecture room will be equipped with a computer connected to a beam projector and running PowerPoint.
- Slides must be prepared in **16:9 format**.
- Presentations should be uploaded in the **Slide Room** at least **one hour** before the start of the session.
- Presenters are responsible for verifying that their slides display correctly and have been successfully transferred to the appropriate lecture hall.

**Please note:** Personal laptops cannot be connected in the lecture halls.



## INSTRUCTIONS FOR RAPID FIRE POSTER PRESENTATIONS

Each poster presentation consists of two components:

- Oral Rapid Fire Presentation
- Poster display in the Poster Area

### Oral Rapid Fire Presentation

Before discussing posters at the Poster Area, a brief oral presentation (2 minutes per poster, using 1–2 PowerPoint slides in 16:9 format) will be held.

- **Date & Time:** Tuesday, June 17, 2025, from 14:30 to 15:20
- **Location:** Lecture Hall A and Lecture Hall B

Presenting authors are kindly asked to check the Program for

- The number assigned to their poster
- The corresponding Rapid Fire session

PowerPoint presentations must be uploaded in the Slide Room **at least one hour** before the session begins.

### Poster Preparation and Display

- **Poster Format:** A0 size (85 cm wide x 119 cm high), portrait orientation
- **Font Size:** All text should be large enough to read easily – letters should be no smaller than 1 cm in height

#### Mounting Instructions:

- Posters must be mounted by **10:00 on Monday, June 16, 2025**
- Ensure your poster is displayed at the board with the correct number, as listed in the program

Fixing materials will be provided, and onsite staff will be available to assist.

#### Author Availability:

Presenting authors are requested to be available at their posters during coffee and lunch breaks to engage with conference participants.

#### Removal:

Posters must be taken down **after 17:00 on Wednesday, June 18, 2025**. Any posters left behind will be removed and discarded by conference staff.

## **INDEX**

Full Paper Number to Presentation Number

Full Paper No. (EquinOCS)	Presentation No.
001	OP114
002	OP055
003	OP056
004	OP116
005	–
006	OP023
007	–
008	OP003
009	OP052
010	OP075
011	OP015
012	OP019
013	OP043
014	–
015	OP112
016	OP065
017	OP049
018	PP35
019	OP110
020	OP113
021	–
022	–
023	OP004
024	OP076
025	PP31
026	OP006
027	–
028	OP009
029	OP072
030	PP36
031	OP029
032	OP040
033	OP080
034	PP25
035	OP001
036	OP077
037	OP002
038	OP059
039	OP068
040	–
041	OP092
042	OP093
043	OP094
044	PP26
045	OP095
046	OP096
047	OP097
048	PP27

## **INDEX**

Abstract Number to Presentation Number

Abstract No. (EasyChair)	Presentation No.
1	–
2	–
3	OP117
4	OP036
5	OP098
6	–
7	–
8	–
9	OP025
10	OP026
11	PP42
12	KL2
13	PP05
14	PP07
15	OP013
16	–
17	OP044
18	PP08
19	OP084
20	OP038
21	–
22	OP018
23	PP28
24	OP058
25	OP024
26	PP30
27	PP41
28	OP048
29	OP042
30	OP115
31	OP007
32	OP021
33	OP103
34	PP46
35	PP32
36	PP16
37	PP06
38	OP030
39	PP20
40	OP031
41	–
42	OP104
43	OP105
44	PP47
45	PP39
46	OP111
47	OP118
48	OP106
49	PP15
50	PP43

Abstract No. (EasyChair)	Presentation No.
51	KL1
52	OP119
53	OP045
54	OP016
55	PP45
56	KL6
57	OP005
58	–
59	PP12
60	OP027
61	PP17
62	OP099
63	–
64	OP063
65	OP014
66	OP060
67	PP44
68	PP13
69	OP085
70	PP01
71	OP017
72	OP069
73	PP02
74	PP04
75	PP21
76	PP37
77	OP057
78	OP102
79	OP037
80	OP047
81	PP24
82	–
83	PP48
84	PP40
85	OP086
86	PP49
87	OP034
88	OP064
89	OP053
90	OP062
91	–
92	OP039
93	OP081
94	OP028
95	OP100
96	PP33
97	OP082
98	–
99	–
100	PP29

Abstract No. (EasyChair)	Presentation No.
101	OP079
102	OP073
103	OP109
104	PP38
105	PP09
106	OP011
107	OP087
108	OP041
109	OP088
110	OP071
111	PP22
112	–
113	OP089
114	OP054
115	OP010
116	PP11
117	OP032
118	OP090
119	OP091
120	OP008
121	OP078
122	OP020
123	OP051
124	OP067
125	OP070
126	KL3
127	OP101
128	OP108
129	PP10
130	PP19
131	OP107
132	OP050
133	PP34
134	PP03
135	OP012
136	OP083
137	OP033
138	PP14
139	OP035
140	OP061
141	PP18
142	OP046
143	OP022

## PERSONAL DATA ADMINISTRATOR AND DATA PROCESSING INFORMATION

- The administrator of personal data is the by the Nalecz Institute of Biocybernetics and Biomedical Engineering Polish Academy of Sciences (the Organizer) with its seat in Warsaw (Poland), 02-109, at ul. Ks. Trojdena 4.
- Participants of the Conference may contact the Organizer in person (at its registered office), by phone, or by email according to the current contact information ([ibib@ibib.waw.pl](mailto:ibib@ibib.waw.pl), [mcb@ibib.waw.pl](mailto:mcb@ibib.waw.pl), [iod@ibib.waw.pl](mailto:iod@ibib.waw.pl)) available on the website <https://www.ibib.waw.pl/en>.
- The Participant's personal data will be processed for the purpose of fulfilling the Organizer's obligations related to the Joint 20th Nordic-Baltic Conference on Biomedical Engineering and the 24th Polish Conference on Biocybernetics and Biomedical Engineering (NBC 2025 & PCBBE 2025), including processing of payment of the registration fees.
- Submitting personal data and consent to data processing is voluntary but mandatory for registration and participation in the abovementioned Conference.
- Participants' personal data will be stored for 5 years.
- Participants' personal data may be shared with entities and institutions cooperating in organizational and publishing activities, as well as entities affiliated with the Organizer. Beyond this, personal data may only be shared with entities authorized under legal provisions.
- **Participants have the right to:**
  - withdraw consent for data processing (except in the case of personal data that must be kept for administrative, legal or security purposes),
  - access personal data,
  - request rectification of personal data,
  - request deletion of personal data (except where you have registered for our services, we will retain your personal data relating to transactions for accounting purposes),
  - lodge a complaint with the supervisory authority,
  - request the restriction of personal data processing,
  - object to data processing based on specific circumstances when the Organizer processes data on the basis of a legitimate interest,
  - to receive personal data from the Organizer in a structured, commonly used, machine-readable format. The Participant may transfer this data to another data controller or request that the Organizer transfer it directly to another data controller, provided that such a transfer is technically feasible. The right to data portability applies only to data processed based on received consent.
- To exercise the above rights, Participants should contact the Organizer using the methods outlined above.
- The Organizer assures participants that the Organizer makes every effort to implement physical, technical, and organizational measures to protect personal data against accidental or intentional destruction, accidental loss, alteration, unauthorized disclosure, use, or access.

During the registration for the NBC 2025 & PCBBE 2025 each Participant consented to the processing of her/his personal data for the purpose of organizing the 20th Nordic-Baltic Conference on Biomedical Engineering and the 24th Polish Conference on Biocybernetics and Biomedical Engineering (NBC 2025 & PCBBE 2025).

During the registration for the NBC 2025 & PCBBE 2025, in accordance with art. 81.1 of the Act of 4 February 1994 on copyright and related rights, each Participant consented to the publication of her/his image captured during the conferences: 20th Nordic-Baltic Conference on Biomedical Engineering and 24th Polish Conference on Biocybernetics and Biomedical Engineering (NBC 2025 and PCBBE 2025). Each registrant also confirmed that she / he got acquainted with the information clause, which can be found at:

<https://nbc2025.ibib.waw.pl/index.php/information-clause/>.

The above consent concerns the indefinite and non-commercial use of the Participant's image by the Nalecz Institute of Biocybernetics and Biomedical Engineering of the Polish Academy of Sciences, ul. Ks. Trojdena 4, 02-109 Warsaw, Poland, in digital and paper form in the following fields of use: the Institute's website, the Photographer's website and printed and published photos in the Institute's promotional materials.

Participants' personal data will be used to support their experience throughout the conference website, to manage access to their accounts, and for other purposes described in the privacy policy which can be found at: <https://nbc2025.ibib.waw.pl/index.php/privacy-policy/>.



## Organizers:



IFMBE



Committee  
of Biocybernetics  
and Biomedical Engineering

The conference is co-financed from the state budget,  
allocated by the Minister of Science under  
the Excellent Science II Programme  
Contract No. KONF/SP/0624/2024/02



Doskonała  
Nauka



Minister of Science  
Republic of Poland

## Sponsors:



LABSOFT  
NANOTECHNOLOGY EXPERTS

Honorary Patronage  
Professor Marek Konarzewski  
President of the Polish Academy  
of Science

## Endorsing Organizations:



European Alliance for  
**EAMBES**  
Medical and Biological Engineering & Science



<https://www.nbc2025.ibib.waw.pl>

