XXXIII International Conference

CAD IN MACHINERY DESIGN IMPLEMENTATION AND EDUCATIONAL ISSUES

Conference Program

Białystok, Poland
December 11-13, 2025

Under the honorary patronage of:

Professor Marta Kosior-Kazberuk
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Association of Polish Electrical Engineers

CADMD 2025 is organized by

Faculty of Electrical Engineering
Białystok University of Technology
Poland

Fundacja na rzecz rozwoju Politechniki Białostockiej, Poland

Department of Computer Aided Systems
Lviv Polytechnic National University
Ukraine

Faculty of Mechanical Engineering and Robotics
AGH University of Science and Technology
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The Institute of Machine Design Fundamentals
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The CADMD 2025 is focused on the following subjects:

- CAx Applications in Mechanical and Electrical Engineering.
- Engineering Education in CAx Systems.
- Methods and Algorithms in CAD.
- Design and Implementation of MCAD and ECAD Tools.
- CAD Tools in Industry 5.0.
- Theory of Mechanisms and Machines: Modelling, Analysis, and Applications.
- Unmanned Aerial Vehicles, Unmanned Ground Vehicles, and Robotics.
- Mechatronics and MEMS.
- Resonators, Micro-optical Devices, and Microfluidic Devices: MEMS-Integrated Implementations.
- Additive Manufacturing and Reverse Engineering Techniques.
- Engineering Applications of Informatics: Software, Algorithms, and Databases.
- Process Control, Identification, Modelling, and Simulation of Processes and Systems.
- Power Systems and Environmental Protection Facilities.
- AR/VR Technologies in Machinery Design and Engineering Education.

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General information

Conference location

The CADMD 2025 Conference will take place at Białystok University of Technology. The CADMD 2025 conference site is building of the Faculty of Electrical Engineering. Parallel sessions will be held in two rooms on the ground floor (007 and 029)
Address of CADMD 2025 Secretariat:

Białystok University of Technology, Faculty of Electrical Engineering
ul. Wiejska 45D, 15-351 Białystok, Poland

Phone: (++48) (+85) 746 9396
E-mail: cad_md_2025@pb.edu.pl
WWW page: https://cadmd.lpnu.ua/

Registration

The CADMD 2025 Registration Desk is placed in the hall.
The registration desk will be open for registration and information:

- Thursday, December 11 from 9.00 to 10.30 (the ground floor).
- Thursday, December 11 from 10.30 to 15.00 (room 202).
- Friday, December 12 from 9.00 to 12.00 (room 202).

Badges

The participants are kindly requested to wear their badges during conference sessions and lunches.

Any problems?

Please contact personnel at the Registration Desk or other members of the Organizing Committee, if you have any problems.
The conference staff will wear yellow badges.

Conference link:

The link to the combined online/offline sessions will be sent to the participants at the email addresses provided in their abstracts.

Conference program at a glance

Thursday, December 11

CET (Białystok)	EET (Lviv)	Room 007
10.00 - 10.15	11.00 - 11.15	**Introduction and welcome address**
10.15 - 11.15	11.15 - 12.15	**Keynotes Speakers Session**
11.15 - 11.40	12.15 - 12.40	**Coffee break**
11.40 - 13.00	12.40 - 12.00	**Session A**
13.00 - 13.20	14.00 - 14.20	**Coffee break**
13.20 - 14.10	14.20 - 15.10	**Session B**
14:10 – 15:30	15:10 – 16:30	**Lunch**
15.30 - 17.00	16.30 - 18.00	**Session C**
17.00 - 18.00	18.00 - 19.00	**Visits to the laboratories of the Faculty of Electrical Engineering.**

Friday, December 12

CET (Białystok)	EET (Lviv)	Room 007
10.00 - 11.20	11.00 - 11.20	**Session D**
11.20 - 11.40	11.20 - 12.40	**Coffee break**
11.40 - 13.00	12.40 - 14.00	**Session E**
13.00 - 13.20	14.00 - 14.20	**Coffee break**
13.20 - 14.10	14.20 - 15.10	**Session F**
14:10 – 15:30	15.10 - 16.30	**Lunch**
15.30 - 16.30	16:30 – 17:30	**Session G**

Saturday, December 13

CET (Bialystok)	EET (Lviv)	Room 007
10.30 - 11.00	11.30 - 12.00	**Closing of the conference**

Conference Program

Thursday, December 11

10.00 - 10.15 **11.00 – 11.15**	**Room 007**	**Introduction and welcome address**

- **dr. Roman Trochimczuk**
  The Faculty of Electrical Engineering,
  Białystok University of Technology
- **prof. Mykhailo Lobur**
  Department of Computer-Aided Design Systems,
  Lviv Polytechnic National University
- **Bogusław Butryło**
  The Faculty of Electrical Engineering,
  Białystok University of Technology Dean

10.15 - 11.20 **11.15 – 12.20**	**Room 007**	**Keynotes Speakers Session** **Session chair:** Prof. Zbigniew Kulesza

- **Arkadiusz Mystkowski**
  INTELLIGENT AGRICULTURE MACHINE HEALTH MONITORING SYSTEMS AND FAULT DETECTION USING OPTIMIZED NEURAL NETWORKS
- **Milica Petrović**
  DEEP LEARNING-BASED METHODS AND BIOLOGICALLY INSPIRED ALGORITHMS FOR SECURING CYBER-PHYSICAL MANUFACTURING SYSTEMS
- **Piotr Miluski**
  DESIGN AND MANUFACTURE OF ACTIVE OPTICAL FIBERS WITH A RING-SHAPED CORE STRUCTURE
- **Zhuoqi Cheng**
  INTELLIGENT PORTABLE ROBOT CAN INSERT A NEEDLE TO FEMORAL ARTERY AUTOMATICALLY

11.20 - 11.40 **12.20 - 12.40**	**Coffee break**

11.40 - 13.00 12.40 - 14.00	Room 007	**Session A: Modelling of materials and sensors** **Session chair:** Prof. Łukasz Sajewski

- **Bogusław Butryło**
  APPROXIMATED WIDEBAND ELECTROMAGNETIC MODELS OF DISPERSIVE COMPLEX MATERIALS

- **Nataliia Bokla, Tamara Klymkovych, Andrzej Kubiak, Łukasz Ruta**
  INVESTIGATION AND PROTOTYPING OF A MICROFLUIDIC CHIP WITH INTEGRATED ACOUSTIC FIELDS FOR MICROPARTICLE SEPARATION

- **Andriy Holovatyy, Oleh Zachek, Andrzej Łukaszewicz, Volodymyr Senyk**
  DEVELOPMENT OF ULTRASONIC RANGEFINDER WITH IMPROVED MEASUREMENT ACCURACY

- **Hesham Maher Muhammad Muhammad, Bogusław Butryło**
  ELECTROMAGNETIC PHENOMENA IN PIEZOELECTRIC PLANAR SENSOR WITH 2D PERIODIC STRUCTURE

- **Yaroslav Sokolovsky,Mykola Salo, Andriy Kernytskyy, Tetiana Samotii** *NEURAL NETWORK MODELING OF HYGROTHERMAL AND DEFORMATION PROCESSES IN MATERIALS WITH FRACTAL STRUCTURE*

13.00 - 13.20 14.00 - 14.20	**Coffee break**

13.20 - 14.10 14.20 - 15.10	Room 007	**Session B: Unmanned Aerial Vehicles, Unmanned Ground Vehicles, and Robotics** **Session chair:** Prof. Arkadiusz Mystkowski

- **Oleksii Melnyk, Kostiantyn Kolesnyk, Ivan Kozemchuk, Andrzej Łukaszewicz**
  3D MODELING UAV WITH A CARGO DELIVERY SYSTEM

- **Adam Wolniakowski, Vassilis Moulianitis, Roman Trochimczuk**
  SELF-RECONFIGURABLE METAMORPHIC MANIPULATORS

- **Marek Wyleżoł, Małgorzata Muzalewska**
  MANUFACTURING AND VERIFICATION A PROTOTYPE OF AN ORTHOPEDIC IMPLANT FOR ACL TENDON RECONSTRUCTION USING ADDITIVE MANUFACTURING

- **Bohdan Kopchak, Vira Oксentyuk, Adam Kotowski, Andriy Kushnir**
  MECHATRONICS DESIGN OF INDUSTRIAL ROBOT SCARA INCLUDING WITH BLDC EXECUTIVE MOTOR DESIGN PROJECT

- **Vitaliy Mazur, Roman Panchak**
  PROTOTYPE OF A ROBOTIC MOBILE PLATFORM FOR AN AUTOMATED CONTAINERS STORAGE SYSTEM

14.10 - 15.30 **15.10 - 16.30**		**Lunch**

15.30 - 17.00 **16.30 - 18.00**	**Room 007**	**Session C: Engineering Education in CAx Systems, Software and implementation** **Session chair:** Prof. Mykhailo Lobur

- **Arvydas Palevicius, Giedrius Janusas, Kestutis Pilkauskas, Sigita Urbaite**
  3DEXPERIENCE PLATFORM IN FLEXIBLE PATHWAYS OF SECOND CYCLE MECHANICAL ENGINEERING STUDIES

- **Pavlo Denysyuk, Martynov Andrii, Vasyl Ivanyna, Andriy Kernytskyy, Tyshchenko Ivan**
  HARDWARE AND SOFTWARE STAND FOR RESEARCHING SERVOMOTOR PARAMETERS IN ROBOTICS

- **Mykhaylo Melnyk, Andriy Kernytskyy, Ireneusz Czajka, Wojciech Zabierowski**
  DEVELOPMENT OF A SUBSYSTEM FOR AUTOMATED DETERMINATION OF THE SOUND DISPERSION COEFFICIENT OF MATERIALS WITH VARIOUS GEOMETRIC SHAPES

- **Oleh Zherebukh, Ihor Farmaha, Katarzyna Kalinowska-Wichrowska, Dariusz Perkowski**
  ORIENTATION-AWARE ANALYSIS FRAMEWORK FOR REINFORCED COMPOSITE SEGMENTATION FROM CT IMAGES

- **Paweł Madejski**
  CHARACTERIZATION OF POROSITY IN 3D-PRINTED SAMPLES USING MICRO-CT IMAGING

- **Mykhaylo Lobur, Krzysztof Pytel, Dmytro Korpylyov, Vira Oksentyuk, Zhanna Parashchyn**
  ARCHITECTURE OF A HARDWARE-SOFTWARE COMPLEX FOR VISUALIZATION OF HUMAN MOVEMENT BIOMECHANICS IN REAL TIME

- **Roman Trochimczuk, Maciej Śliwonik, Kamil Kondzior, Adam Wolniakowski, Vassilis C. Moulianitis**
  INTEGRATED MODELING AND TOPOLOGY OPTIMIZATION OF A UR5 COBOT-INSPIRED ROBOT KINEMATIC CHAIN WITH A MULTIPLE GRIPPER SYSTEM

Friday, December 12

10.00 - 11.20 **11.00 - 12.20**	**Room 007**	**Session D: Modelling software** **Session chair:** Dr Andrzej Łukaszewicz

- **Vladyslav Yevsieiev, Svitlana Maksymova, Igor Nevliudov, Olena Chala, Kostyantyn Kolesnyk, Roman Filipek, Krzysztof Pytel**
  USING CNN IN ADAPTIVE NEURAL PID FOR SPEED CONTROL IN VARIOUS SOIL TYPES

- **Małgorzata Muzalewska, Marek Wyleżoł, Paweł Łój**
  3D-PRINTED THERAPEUTIC TOYS DESIGNED WITH CAX TOOLS FOR CHILDREN WITH DISABILITIES

- **Andriy Zdobytskyi, Roman Trochimczuk**
  PARAMETRIC DESIGN OF EXOSKELETONS BASED ON PERSONALIZED ANTHROPOMETRIC DATA

- **Dariia Rebot, Volodymyr Topilnytskyy, Serhiy Shcherbovskykh, Tetyana Stefanovych**
  RESEARCH ON THE STRUCTURAL STRENGTH OF A DRY-CLEANING MACHINE FOR ROOT VEGETABLES

- **Mykhaylo Melnyk, Marian Banaś, Olena Stankevych, Anastasiia Mirovska**
  RECOGNITION OF UTILITY METER READINGS USING COMPUTER VISION ALGORITHMS

- **Bohdan Lukashchuk, Ihor Farmaha**
  SUPERPIXEL-AWARE JOINT-EMBEDDING PREDICTIVE PRETRAINING

- **Borys Yevsthneiev**
  SOLVING THE ACOUSTIC WAVE SCATTERING PROBLEM ON IRREGULAR DISTRIBUTIONS

11.20 - 11.40 **12.20 - 12.40**	**Coffee break**

11.40 - 13.00 CET 12.40 - 14.00 EET	Room 007	**Session E: Software and implementation** **Session chair:** Prof. Mykhaylo Melnyk

- **Vladyslav Vysotskyi, Nazariy Jaworski**
  IMPLEMENTATION FEATURES OF A SMART PARKING SYSTEM BASED ON ARDUINO, RASPBERRY PI, AND THE YOLO MODEL

- **Bohdan Karkulovskyi**
  CALCULATION OF MAGNETIC FORCES OF A SPRING-TYPE MICROACTUATOR

- **Mykola Khranovskyi, Andriy Kernytskyy**
  ZERO-KNOWLEDGE DISTANCE PROOFS FOR INTEGER-QUANTIZED FINGERPRINT EMBEDDINGS

- **Yurii Petiak, Danylo Petiak**
  EFFICIENT CV MODELS FOR AR/VR EDGE SYSTEMS

- **Nikita Tarasov, Orest Khamula, Vasyl Tomyuk**
  INFORMATION TECHNOLOGY OF BRAILLE FORMATION BASED ON 3D MODELING AND INTEGRATION OF ARTIFICIAL INTELLIGENCE METHODS

- **Mykhaylo Andriychuk, Yarema Kuleshnyk**
  MODELING THE TRANSFORMATION OF THE EM FIELDS USING QUASIOPTICAL PRINCIPLE

- **Hileta Ivan, Yuliia Hileta, Uliana Marikutsa**
  ARCHITECTURE OF HARDWARE AND SOFTWARE PLATFORMS FOR INDUSTRIAL XR ENVIRONMENTS

13.00 - 13.20 14.00 - 14.20	**Coffee break**

13.20 - 14.10 14.20 - 15.10	Room 007	**Session G: Software and implementation** **Session chair:** Dr Sławomir Romaniuk

- **Yaroslav Sokolovskyy, Maksym Protsyk, Olha Mokrytska**
  PHYSICS-INFORMED NEURAL NETWORK FOR SOLVING OF FRACTIONAL BLOCH EQUATIONS IN MRI SIGNAL MODELING

- **Edem Atamuratov, Nazariy Jaworskyi, Zbigniew Kulesza**
  DEVELOPMENT OF LIGHTNING CONTROL SYSTEM USING DMX PROTOCOL

- **Andriy Oleksievets, Nazariy Jaworski, Maciej Ciężkowski**
  INTELLIGENT PERSONNEL SELECTION SYSTEM BASED ON NLP AND ML

- **Olexander Belej, Nazarii Kril, Iryna Artyshchuk, Natalia Nestor, Nataliia Spas, Yulian Fedirko**
  MODEL THE PROCESS OF PROCESSING MESSAGES BY WIRELESS SENSOR NETWORKS TO DETERMINE THEIR ORIGIN

- **Taras Nazarovets**
  THE IMPROVED MODEL OF CYLINDRICAL ANTENNA FOR CALCULATION OF HUMAN BODY SAR FOR SEATED POSTURE

- **Roman Trochimczuk, Jakub Dacewicz, Adam Wolniakowski, Vassilis C. Moulianitis, Kostiantyn Kolesnyk**
  DESIGN-INTEGRATED MODELING AND OPTIMIZATION OF INNOVATIVE SCARA ROBOT LINKS BASED ON LATTICE STRUCTURES

14.10 - 15.30 15.10 - 16.30	**Lunch**

15.30 - 16.30 16.30 - 17.30	Room 007	**Session H: Software and implementation** **Session chair:** Dr Adam Wolniakowski

- **Pavlo Denysyuk, Rostyslav Kryvyy, Viktoriia Sokhanska, Oleh Matviikiv, Roman Humeniuk, Oleh Novosad**
  ANOMALIES DETECTION SYSTEM IN CLOUD LOGS BASED ON READY-TO-USE MACHINE LEARNING ALGORITHMS

- **Sławomir Romaniuk, Jakub Budnik**
  SAFE FOLLOWING UNDER SUDDEN LEADER MANEUVERS USING DEEP REINFORCEMENT LEARNING

- **Nataliia Huzynets, Iryna Yurchak**
  OBJECT RECOGNITION SYSTEMS BASED ON SINGLE-BOARD COMPUTERS

- **Piotr Prochor, Roman Trochimczuk, Piotr Borkowski**
  SOLID MODELS RECONSTRUCTION OF ANATOMICAL STRUCTURES FROM CT DATA FOR BIOMECHANICAL ANALYSIS

- **Stanislavs Lebid, Rostyslav Kryvyy**
  COMPARATIVE ANALYSIS OF PREDICTION ALGORITHMS FOR ENERGY-EFFICIENT CONTINUOUS GLUCOSE MONITORING SYSTEMS

- **Oleksii Veretiuk, Vasyl Ivanyna, Nazariy Andrushchak**
  NEURAL NETWORK OPTIMISATION WITH USAGE OF ALTERNATIVE DATA TYPE

City of Białystok

1 Campus of Białystok Technical University, Conference site

2 Campus of Białystok Technical University, Student hostel

3 Pastel Hotel

4 Zwierzyniec Hotel

5 Best Western Hotel Cristal

6 Branicki Hotel

7 Energetyk Hotel

8 Titanic Hotel

9 Gołębiewski Hotel

R Railway Station

B Bus station

 Museum

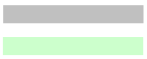
 Theatre, Cinema, Philharmonic

 Monument

H Hotel

 Restaurant

Białystok Technical University - map of the campus

CE	Faculty of Civil Engineering and Environmental Engineering
CS	Faculty of Computer Science
EE	Faculty of Electrical Engineering, Conference center
G1, G2	Gym hall
H	Assistant Hostel
M	Students' club and canteen
ME	Faculty of Mechanical Engineering
R	Rector's Office
T	Tennis-court
□□□□□□□□□□	Student Hostel
	Bus stop
	Parking area
	Internal roads and main paths

Information for participants

Duration of presentations

Regular paper	15 min., maximum 20 min. including discussion
Poster	min. 1 hour

Form of presentations

The presentation can be performed by using an electronic version or with transparencies. For the computer aided presentation the Microsoft Powerpoint and Acrobat Reader are available.

Uploading of presentation

The lecturers are encouraged to use the computer provided by organizers. The usage of the own computer for the presentation is undesirable.
In order to use the computer available in the conference room, the presentation must be written down to the local computer.

Technical equipment

The conference room is equipped with:

- LCD projector,
- computer.

The computers in conference rooms are running with MS Windows operating system.

Meals

Lunches on Thursday and Friday will be served in the “Hotel Pod Herbem”, which is close to the conference site.

Every participant receives some luncheon tickets. The participants are kindly requested to show and deliver the ticket to the operating personnel of the canteen.