

Multiplier Event (ME1) – Edibon International S.A., Madrid, Spain 25 April 2024

Applied research teaching methods for additive manufacturing in industrial design

*Remigiusz LABUDZKI,
remigiusz.labudzki@put.poznan.pl
Poznan University of Technology*



Poznan University of Technology TEAM



PhD Remigiusz LABUDZKI
Assistant Professor/
PUT AMAZE Coordinator



**PhD Student Natalia
WIERZBCKA**
Assistant



PhD Adam PATALAS
Assistant



**PhD Student Pawel
ZAWADZKI**
Assistant



PhD Student Jakub Gapsa



PhD Remigiusz ŁABUDZKI

Assistant Professor/PUT AMAZE Coordinator



Position – senior lecturer in Planning Technology Department of PUT

INTERESTS:

- Technology planning
- CAD/CAM in Manufacturing Systems
- Enterprise Logistics
- Vision Systems in Manufacturing Processes
- Rapid Prototyping techniques in Manufacturing



Experience (projects):

BRIGHT

- Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period

EMERALD

- European network for 3D printing of biomimetic mechatronic systems



PhD student Natalia WIERZBICKA

Faculty of Mechanical Engineering
Institute of Mechanical Technology
Department of Technology Design

Completed higher education:
Biomedical Engineering - Poznań University of Technology,
Faculty of Mechanical Engineering

Topic of doctoral dissertation:
**Tribological properties of polymer- and silicone-based
composites with inorganic additives**



Manager of tribological laboratory

Our device:

- Anton Paar step 700 with the micro-tribo tester MCT³ and the nano-scratch tester NST³
- Brucker UMT Tribometr
- Alemnis In-Sem Mechanical tester
- Fischer Picodentor HM500
- Fischer XRF Spectrometer
- Brookfield Viscometer
- Adhesion tester Positest AT-A
- Microhardness tester FM-700
- 3 original tribology testers



Position – Assistant in Technology Department of PUT

INTERESTS:

- Tribology
- CAD/CAM in Manufacturing Systems
- Rapid Prototyping techniques in Manufacturing
- Robotics
- Biomedical Engineering

Experience (projects):

BRIGHT

- Boosting the scientific excellence and innovation capacity of 3D printing methods in pandemic period

EMERALD

- European network for 3D printing of biomimetic mechatronic systems

CONFERENCE OF BIOMEDICAL ENGINEERING

- Coordinator of the event organized for student by student and University Staff, a conference which aim is to connect the worlds of science, industry and medicine



List of publications from the last 3 years. The total score is 15 items.

1. The friction of the composite based on polyethylene with inorganic additives/ **Natalia Wierzbicka** (WIM), Rafał Talar (WIM), Karol Grochalski (WIM), Adam Piasecki (WIMiFT), Miłosz Węgorzewski and Adam Reiter // Materials – 2023 (140pkt)
2. Influence of dispersed phase content on the mechanical properties of electroless nanocomposite Ni-P/Si₃N₄ and hybrid Ni-P/Si₃N₄/graphite layers deposited on the AW-7075 alloy/ Kazimierz Czapczyk, Paweł Zawadzki (WIM), **Natalia Wierzbicka** (WIM) //Applied Surface Science (140pkt)
3. Tribological properties of hardened surfaces constituted by various methods of mechanical processing / Paweł Zawadzki (WIM), **Natalia Wierzbicka** (WIM), Rafał Talar (WIM), Łukasz Burysz //TRIBOLOGIA - 2021, vol. 298, no. 4, s. 57-72 (70pkt)
4. The Friction of Structurally Modified Isotactic Polypropylene / **Natalia Wierzbicka** (WIM), Tomasz Sterzyński, and Marek Nowicki (WIMiFT)// Materials - 2021, vol. 16, no. 15 (140pkt)
5. Microstructure and Properties of Electroless Ni-P/Si₃N₄ Nanocomposite Coatings Deposited on the AW-7075 Aluminum Alloy / Kazimierz Czapczyk, Paweł Zawadzki (WIM), **Natalia Wierzbicka** (WIM), Rafał Talar (WIM) // Materials - 2021, vol. 14, no. 16 (140pkt)
6. Evaluation of deterioration of engine oil properties in the function of mileage / **Natalia Wierzbicka** (WIM), Dominika Szadkowska, Adam Patalas (WIM), Rafał Talar (WIM), Remigiusz Łabudzki (WIM), Paweł Zawadzki (WIM) // Journal of Physics: Conference Series - 2020, vol. 1426 (40pkt)
7. The construction of an automated bicycle parking / Remigiusz Łabudzki (WIM), Rafał Talar (WIM), Paweł Zawadzki (WIM), Adam Patalas (WIM), **Natalia Wierzbicka** (WIM), Dominika Szadkowska // Journal of Physics: Conference Series - 2020, vol. 1426 (40pkt)

In my free time:



Adam Patalas P.hD. Eng.

E-mail: adam.patalas@put.poznan.pl

Institute of Mechanical Technology
Mechanical Engineering Faculty
Poznan University of Technology



Education:

- 2016/06 – 2022/06 Warsaw University of Technology, PhD, Faculty of Mechatronics, **Biomedical Engineering**
Discipline
- 2015/10 – 2020/09 Poznań University of Technology, PhD studies, 3rd cycle studies
- 2014/03 – 2015/06 Poznań University of Technology, **Mechatronics**, 2nd cycle, master's studies (specialization: Mechatronic Structures),
- 2011/10 – 2015/02 Poznań University of Technology, **Biomedical Engineering**, First-cycle engineering studies,
- 2010/10 – 2014/02 Poznań University of Technology, **Materials Engineering**, First-cycle studies, engineering



Experience (projects):

- Currently – from 2015/10 – Poznań University of Technology – Scientific and teaching assistant at the Technology Design Department: Responsible for the following subjects: Spine and limb prosthetics, Computer-Aided Technology.
- Currently – from 2019/04 - ENforce Medical Technologies Sp. z o.o. – Technologist - Tasks: Development of a vacuum prosthetic socket intended for use with a foot prosthesis; A prototype of a bionic foot and miniaturized conceptual versions of MR dampers were developed; Development, implementation and validation of a stand for determining the characteristics of MR dampers.
- 2017/09 – 2015/10 - Casimir the Great University in Bydgoszcz - Assistant at the Institute of Technology, conducting project classes and seminars on the following subjects: Basics of medical bioengineering, also running laboratories on: Elements of mechatronics, Electrical engineering and electronics, Automation and robotics.



List of publications from the last 2 years. The total score is 33 items.

1. Swathi Raghu, Patrick Hartwich, **Adam Patalas**, Mateusz Marczewski, Rafał Talar, Christian Pritzel, Manuela S. Killian. 2023. Nanodentistry aspects explored towards nanostructured ZrO₂: Immobilizing zirconium-oxide nanotube coatings onto zirconia ceramic implant surfaces Open Ceramics - 2023, vol. 14, s. 100340-1-100340-6
2. Wojciech Smulek, Maria Ratajczak, **Adam Patalas**, Adam Voelkel, Ewa Kaczorek, Mariusz Sandomierski. 2023. Agar composites containing Zinc zeolite infused with Quillaja saponins exhibit improved structural properties and anti-Candida activity Environmental Technology & Innovation - 2023, vol. 32, s. 103278-1-103278-10
3. Paweł Zawadzki, **Adam Patalas**, Remigiusz Łabudzki, Rafał Talar. 2023. Measurement of thermal conductivity of the cortical bone: experimental studies and comparative analysis Journal of Physics: Conference Series - 2023, vol. 2540, s. 012035-1-012035-9
4. Zuzanna Buchwald, Mariusz Sandomierski, Wojciech Smulek, Maria Ratajczak, **Adam Patalas**, Ewa Kaczorek, Adam Voelkel. 2023. Physical–chemical and biological properties of novel resin-based composites for dental applications Polymer Bulletin - 2023, vol. 80, iss. 10, s. 11249-11272
5. Mariusz Sandomierski, Wiktoria Stachowicz, **Adam Patalas**, Karol Grochalski, Wiesław Graboń, Adam Voelkel. 2023. Characterization of Magnesium and Zinc Forms of Sodalite Coatings on Ti6Al4V ELI for Potential Application in the Release of Drugs for Osteoporosis. Materials, vol. 16, iss. 4, s. 1710-1-1710-17 (IF: 3,62)
6. Mariusz Sandomierski, Monika Zielińska, Katarzyna Adamska, **Adam Patalas**, Adam Voelkel. 2022. Calcium montmorillonite as a potential carrier in the release of bisphosphonates. New Journal of Chemistry - vol. 46, iss. 7, s. 3401-3408 (IF: 3,59)
7. Mariusz Sandomierski, Monika Zielińska, Tomasz Buchwald, **Adam Patalas**, Adam Voelkel. 2022. Controlled release of the drug for osteoporosis from the surface of titanium implants coated with calcium titanate. Journal of Biomedical Materials Research Part B, vol. 110, iss. 2, s. 431-437 (IF:3,37)
8. Paweł Zawadzki, Rafał Talar, **Adam Patalas**, Stanisław Legutko. 2022. Influence of Machining Parameters on Cutting and Chip-Formation Process during Cortical Bone Orthogonal Machining. Materials, vol. 15, iss. 18, s. 6414-1-6414-24 (IF: 3,62)



MSc. Eng. Paweł Zawadzki, PhD

Faculty of Mechanical Engineering
Institute of Mechanical Technology
Department of Technology Design

Completed higher education:
Biomedical Engineering - Poznań University of Technology, Faculty
of Mechanical Engineering

Topic of doctoral dissertation:
A method for precise shaping of bone surfaces

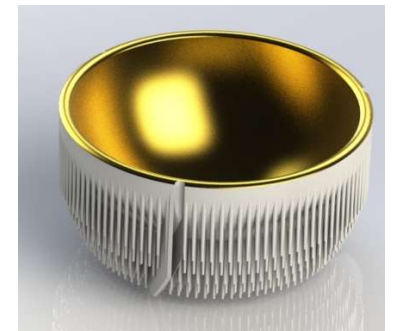
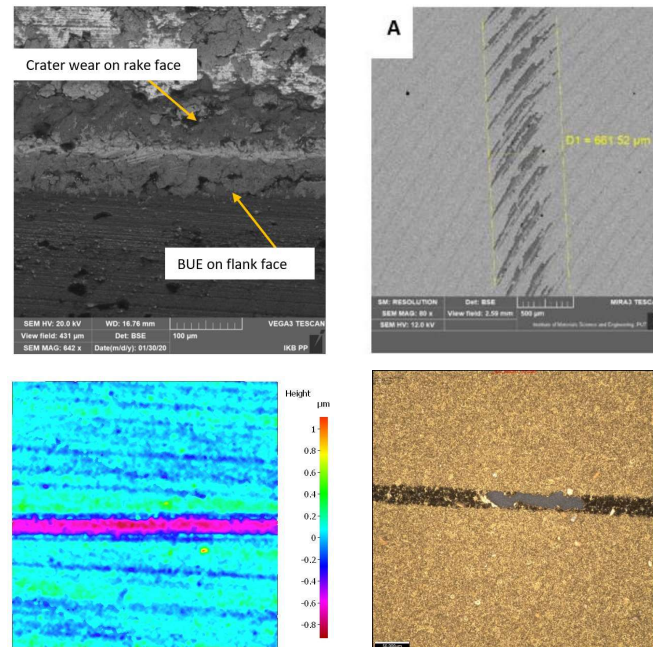


SCIENTIFIC INTERESTS

Biomedical engineering: design of implants and endoprotheses, development of surgical equipment

Machining: biomaterials processing, hard and soft tissue processing, wear of cutting tools

Tribology: biotribology, biomimetics in tribological issues, micro and nanotribology, surface engineering



Scientific articles published in journals such as:

- WEAR
- Scientific Reports
- Journal of Orthopedic Trauma
- PLOS ONE
- Veterinary and Comparative Orthopedics and Traumatology
- Materials
- Journal of Functional Biomaterials

Patents:

- endoprotheses
- surgical instrumentation

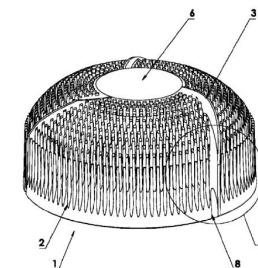
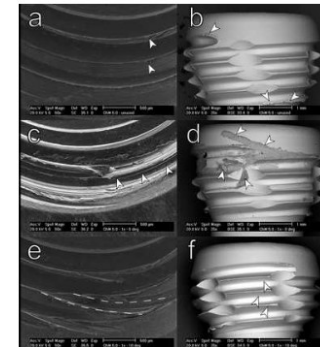
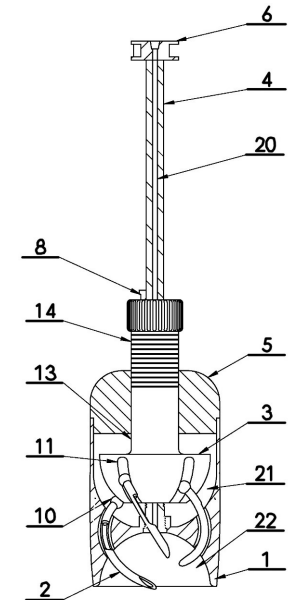


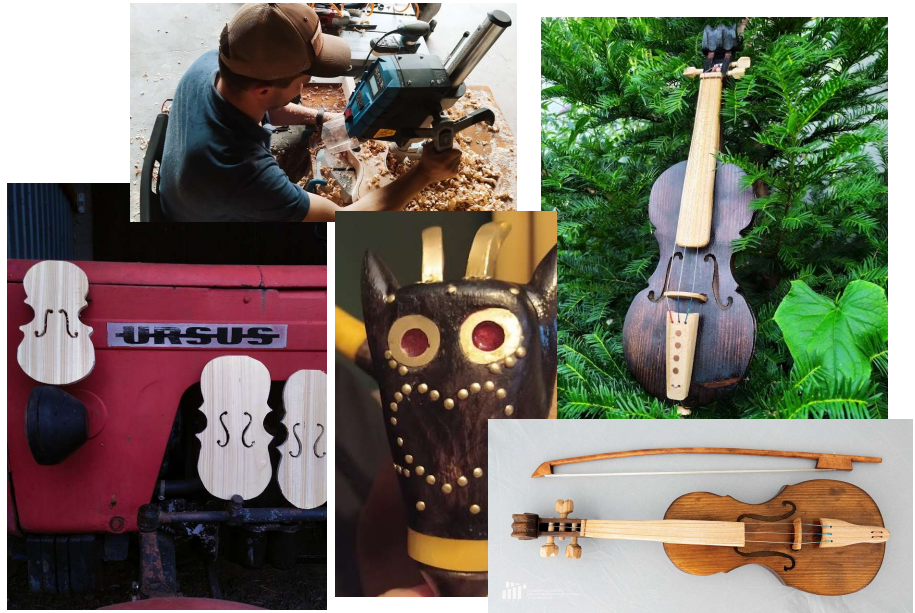
Fig. 5



Polish folk traditions



Production of traditional folk instruments: greater poland bagpipes, violins, drums and basses.



Msc Eng. Jakub Gapsa

PhD Student / Junior Unity Developer

Member of the team working on VR technologies at
Poznan University of Technology,
PhD student at PP Doctoral School (2nd year)
– Faculty of Mechanical Engineering



Experience (projects):

- Contractor in the project "Flexible system for increasing the competences of technical service employees using virtual reality techniques" (beneficiary: Enea Operator) - project completed with the implementation of the system
- VR specialist in the project "Innowacyjne kształcenie elektryków dostosowane do branży energetycznej" (Component III, Institutional cooperation for improving the quality and relevance of vocational education and training (VET) and continuing education, beneficiary: CKZiU Elektryk Nowa Sól) - project completed with implementation of the system
- VR specialist - building the Avatar Scoliosis 3D application in the project "Longitudinal assessment of changes in psychosocial functioning of patients with adolescent idiopathic scoliosis before, during and after treatment. A quantitative and qualitative study." (National Science Center, beneficiary: Medical University of Poznan), an activity completed with the implementation of an application for the study of patients in an orthopedic hospital



“Scoliosis 3D” - A Virtual-Reality-Based Methodology Aiming to Examine AIS Females’ Body Image

<https://doi.org/10.3390/app13042374>

VR specialist, conducting classes and
trainings for students of technical
schools, in the measure "Czas
zawodowców BIS-zawodowa
Wielkopolska"

In my free time:

- board games
- fantasy books
- disc golf





Poznan
University
Of Technology



POZNAN UNIVERSITY OF TECHNOLOGY



WELCOME TO
POZNAN UNIVERSITY OF TECHNOLOGY



POZNAN UNIVERSITY OF TECHNOLOGY



Poznan University of Technology (PUT) was established in **1919** as a **State Higher School of Mechanical Engineering**.

Since 1955 it has been named **Poznan University of Technology**.

One of the leading technical universities in Poland which has become one of the most recognized landmarks of the region.



Great combination of

tradition & innovation



POZNAN UNIVERSITY OF TECHNOLOGY

eunice
EUROPEAN
UNIVERSITY





POZNAN UNIVERSITY OF TECHNOLOGY



European University for Customised Education

- **PUT** – Poznan University of Technology – leader of EUNICE Alliance
- **BTU** – Brandenburg University of Technology Cottbus-Senftenberg
- **UMONS** – University of Mons
- **UC** – University of Cantabria
- **UNICT** – University of Catania
- **UPHF** – Université Polytechnique Hauts-de-France
- **UVA** – University of Vaasa
- **UoP** – University of the Peloponnese
- **IPV** – Polytechnic Institute of Viseu
- **KU** – Karlstad University





POZNAN UNIVERSITY OF TECHNOLOGY

PUT IN NUMBERS

- **9** faculties
- **more than 14** thousand students
(more than 1000 of them are international)
- **more than 40** fields of study
- **8** BSc programs in English
- **22** MSc options in English
- **324** labs
- **2368** employees
- **1342** academic staff
- **more than 2000** places in dormitories





POZNAN UNIVERSITY OF TECHNOLOGY

PUT IN RANKINGS

Poznan University of Technology maintained its position (1201-1500) in **WUR 2024**, achieving 15th place among Polish universities.

WUR 2024 by subject:

- Business and Economics (601–800)
- Computer Science (801–1000)
- Engineering (801–1000)
- Physical Sciences (801–1000)

QS WORLD UNIVERSITY RANKINGS 2024.TOP

GLOBAL UNIVERSITIES: PUT was among 22 Polish universities classified in the list of the best universities in the world and was ranked 5th among Polish technical universities

47 Researchers from PUT are on the list of the world's most cited researchers - top 2% list prepared by Stanford University (in cooperation Elsevier)





POZNAN UNIVERSITY OF TECHNOLOGY

PUT FACULTIES

FACULTY OF ARCHITECTURE

FACULTY OF CIVIL AND TRANSPORT ENGINEERING

FACULTY OF CONTROL, ROBOTICS AND ELECTRICAL ENGINEERING

FACULTY OF COMPUTING AND TELECOMMUNICATIONS

FACULTY OF MATERIALS ENGINEERING AND TECHNICAL PHYSICS

FACULTY OF ENVIRONMENTAL ENGINEERING AND ENERGY

FACULTY OF ENGINEERING MANAGEMENT

FACULTY OF MECHANICAL ENGINEERING

FACULTY OF CHEMICAL TECHNOLOGY



POZNAN UNIVERSITY OF TECHNOLOGY



CAMPUS

- on the banks of the Warta River
- 10 minutes from the Old Market Square
- 5 minutes to Malta Lake



POZNAN UNIVERSITY OF TECHNOLOGY

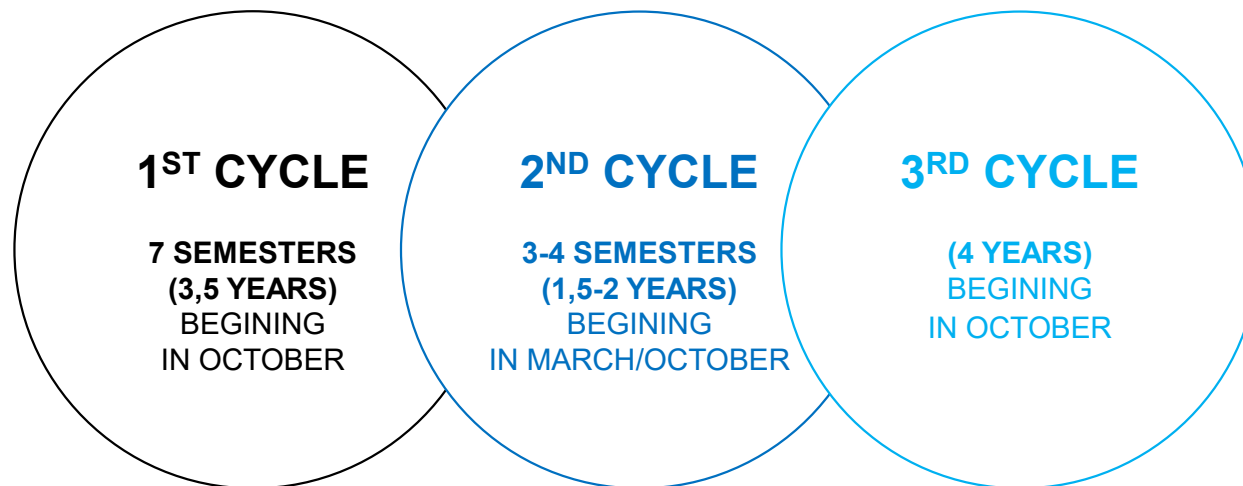
OPENING OF KAKOLEWO CAMPUS (Sept. 2022)





POZNAN UNIVERSITY OF TECHNOLOGY

HIGHER EDUCATION SYSTEM at PUT





POZNAN UNIVERSITY OF TECHNOLOGY

PROGRAMS IN ENGLISH

Currently PUT offers **8 B.Sc. Programs** in English



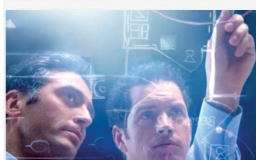
B.SC. PROGRAM IN ARCHITECTURE ›



B.SC. PROGRAM IN AUTOMATIC
CONTROL AND ROBOTICS ›



B.SC. PROGRAM IN ELECTRONICS
AND TELECOMMUNICATIONS ›



B.SC. PROGRAM IN ENGINEERING
MANAGEMENT ›



B.SC. PROGRAM IN CHEMICAL
TECHNOLOGY ›



B.SC. PROGRAM IN SUSTAINABLE
BUILDING ENGINEERING ›



B.SC. IN ARTIFICIAL INTELLIGENCE ›

+ NEW B.Sc. Program in **Biomedical
Engineering**



POZNAN UNIVERSITY OF TECHNOLOGY

PROGRAMS IN ENGLISH

and **22 options at M.Sc. level** in English (1):

- Civil Engineering - Construction Engineering and Management
- Civil Engineering - Structural Engineering
- Computing - Cybersecurity
- Computing - Software Engineering
- Architecture
- Product Lifecycle Engineering
- Chemical Technology - Composites and Nanomaterials
- Electronics and Telecommunications - Information and Communication Technologies
- Engineering Management - Managing Enterprise of the Future (*+Double degree option with Université Lille 1, France*)
- Mechanical and Automotive Engineering - Product Engineering



POZNAN UNIVERSITY OF TECHNOLOGY

PROGRAMS IN ENGLISH

and **22 options at M.Sc. level** in English (1):

- Logistics - Logistics Systems
- Automatic Control and Robotics - Smart Aerospace and Autonomous Systems
- Transport - Sustainable Transport
- Green Energy^{new}
- Artificial Intelligence
- Electrical Engineering - Drive Systems in Industry and Electromobility^{new}
- Electrical Engineering - Electrical Systems in Industry and Vehicles^{new}
- Electrical Engineering - Lighting Engineering^{new}
- Electrical Engineering - Microprocessor Control Systems in Electrical Engineering^{new}
- Electrical Engineering - Smart Measurement Systems^{new}
- Biomedical Engineering^{new}
- Mechatronics^{new}



POZNAN UNIVERSITY OF TECHNOLOGY

COOPERATION WITH INDUSTRY





POZNAN UNIVERSITY OF TECHNOLOGY

PUT INTERNATIONAL STUDENTS COME
FROM OVER **60 COUNTRIES**





POZNAN UNIVERSITY OF TECHNOLOGY

INTERCULTURAL EVENTS

PUT around the world Intercultural Café

Would you like to meet PUT students
from all over the world
and learn about other cultures?

Come along PUT Intercultural Café,
spend great time and expand your horizons!

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<https://www.facebook.com/putpotand>

