Unit: International Centre for Research on Innovative Bio-based Materials (ICRI-BioM), Lodz University of Technology, Poland.

Position: PhD student in Chemical Sciences

Requirements:
We seek a highly motivated and enthusiastic Ph.D. student for a period of 3 years at the International Centre for Research on Innovative Bio-based Materials (ICRI-BioM), Lodz University of Technology. The position is part of the project "NIR-active Multilayer Coatings for Titanium Alloys to disinfect Superbugs" (NIR-CURATOR), financed by the NCN (National Science Centre), Poland.

Principal Investigator of the project: dr hab. Vignesh Kumaravel, prof.uczelni (ICRI-BioM, Lodz University of Technology).

ELIGIBILITY CRITERIA:
- Open to candidates of any nationality and gender.
- Must hold an MSc/MTech degree in one of the following fields: Chemistry, Materials Science, Biotechnology, Biochemistry, Electrochemistry, or related fields.
- Ph.D. student status at the start and during participation in the project.
- Good practical and theoretical knowledge with antibacterial experiments and cell culture experiments.
- Practical knowledge of electrochemistry experiments, nanomaterials fabrication, and characterization techniques.
- Must demonstrate a strong work ethic and enthusiasm for research.
- Active participation in student scientific groups, professional societies, and academic conferences.
- Fluency in spoken and written English.
- Publications in peer-reviewed journals and research internships abroad will be considered advantageous.
- Prior experience in microbiology and electrochemical coating techniques will be considered as valuable assets.
- Knowledge on error analysis and statistical data analysis related to the experimental results.

SCOPE OF WORK:
- Development of nanomaterials and coatings for 3D printed titanium alloys.
- Characterization of materials and coatings using XRD, Raman, XPS, FE-SEM, TEM, and AFM techniques
- Investigation of in vitro antibacterial features of the coatings and materials against selected microbes.
- Investigation of antibacterial mechanisms using appropriate assays and analytical techniques
- Biocompatibility experiments of antibacterial coatings

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NCN competition type: OPUS 28 + LAP
application deadline: 19th September 2025, 6:00 PM (CEST)
Application method: A single PDF via email

Employment conditions:

WE OFFER
Ph.D. scholarship according to the Interdisciplinary Doctoral School (IDS) regulations. An active research environment and a highly motivated group.

THE APPLICATION MUST CONTAIN:
- a brief motivation letter (one page) outlining why you are interested in the position, your CV including your previous research projects, work experience, career goals & a complete list of conference abstracts and/or publications, and Copies of degree certificates and transcripts.

- consent to the processing of personal data according to the following statement: for the purpose of the recruitment process, please attach a declaration of consent to the processing of personal data for recruitment purposes should include the following clause: "I consent to the processing of my personal data for the purposes necessary to carry out the recruitment process in accordance with Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (GDPR)."

HOW TO APPLY
Please attach your application with all supporting documents in English **as a single PDF** file (max 15 Mb) and send it to: vignesh.kumaravel@p.lodz.pl with a subject "**Ph.D. position in the NIR-CURATOR project**"
Deadline for applications: 19th September 2025
Planned date of conclusion of the call: on or before 15th October 2025
Planned start date of the position: December 2025 or later if necessary.

ADDITIONAL INFORMATION
The best candidates will be invited for a 30-minute job interview that will be organized on the Microsoft Teams platform.

The competition may not be settled due to a lack of candidates meeting the requirements. The decision of the Recruitment Committee cannot be appealed. The scholarship is granted according to REGULATIONS FOR AWARDING NCN SCHOLARSHIPS FOR NCN-FUNDED RESEARCH PROJECTS. The NCN research scholarship may be combined with other scholarships and salaries financed from NCN funds awarded under more than one research project, with the reservation that the total amount of scholarships and salaries collected may not exceed 5 000 PLN per month.

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PROJECT OVERVIEW:

3D-printed titanium implants are increasingly employed in orthopaedic surgeries, but they are susceptible to microbial adhesion and biofilm formation. Globally, several patients are affected by these postoperative and implant-associated infections. Treating such infections is challenging and expensive, imposing both economic and physical burdens on patients. Furthermore, the long-term consumption of synthetic antibiotics and the use of antibiotic-coated medical implants contribute to the emergence of antibiotic-resistant microorganisms (superbugs).

According to the European Centre for Disease Prevention and Control (ECDC), antimicrobial resistance is responsible for approximately 33,000 deaths annually in the European Union (EU) and incurs an annual healthcare cost of EUR 1.5 billion (ECDC and WHO report, 2023). Around 4.1 million patients are annually affected by antimicrobial-resistant infections, many of whom experience prolonged hospitalizations and additional treatments, highlighting an urgent need for next-generation implants with highly effective antibacterial coatings.

Considering the serious challenges posed by antimicrobial resistance and the growing demand for personalized orthopaedic implants, especially given Europe's aging population, the NIR-CURATOR project aims to investigate an innovative titanium alloy with inherent antibacterial properties, further promoting its efficiency through a non-invasive near-infrared (NIR) light activated multilayer coating without relying on synthetic antibiotics, drastically reducing the implant-associated infections.

This project will collaborate with complementary skilled teams from Poland and the Czech Republic and result in the fundamental basis for designing the next generation of personalized titanium implants and multifunctional coatings. These implants have the potential to reduce postoperative infections by at least 25%, including those caused by superbugs, without compromising osteogenic features, bioactivity, stability, and mechanical durability.

By utilizing 3D printing, novel coatings, nontoxic antibacterial agents, and computational calculations, NIR-CURATOR will enhance implant performance and reduce the frequency of orthopaedic implant revision surgeries. This research is expected to improve infection control management, enhance the quality of life for society and individuals, lead to cost savings, and decrease Europe's dependence on imported medical devices. The development and application of similar antibacterial coatings in other sectors, including food processing and public transportation, can create new market opportunities and drive economic growth.

In conclusion, the fundamental research on innovative titanium implants and long-term stable antibacterial coatings through the NIR-CURATOR project aims to reform orthopaedic implant technology and address critical public health issues.

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Annex no. 1.1
to The OTM-R POLICY - OPEN TRANSPARENT MERIT-BASED RECRUITMENT

PERSONAL INFORMATION FORM FOR APPLICANTS FOR EMPLOYMENT AT LODZ UNIVERSITY OF TECHNOLOGY

1. First name(s) and family name .....
2. Date of birth .....
3. Contact details .....
4. Education (where required for specific duties or jobs) .....
   .....
   (name of school and graduation date)
   .....
   .....
   (occupation, specialisation, degree, professional title, academic title)

5. Professional qualifications (where required for specific duties or jobs) .....
   .....
   .....
   (courses, postgraduate education, other forms of further development of knowledge and skills)

6. Employment history (where required for specific duties or jobs) .....
   .....
   .....
   .....
   .....
   (employment periods and jobs held at previous employers')

7. Additional personal information, where the right or the duty to disclose it exists under specific regulations .....
   .....
   .....
   .....

....

(place and date) (signature of the applicant)

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Annex no. 1.2
to The OTM-R POLICY - OPEN TRANSPARENT MERIT-BASED RECRUITMENT

Data Privacy Statement for job candidates

1. The administrator of your data processed as part of the recruitment process is Lodz University of Technology (address: 90-924 Lodz, 116 Żeromskiego St., phone: +48 42 631 29 29), represented by the Rector as the employer.
2. At the Lodz University of Technology you can contact the Data Protection Officer at: iod@adm.p.lodz.pl phone: +48 42 631 20 39.
3. Lodz University of Technology will process your personal data to the extent indicated in the labor legislation for the purpose of the current recruitment procedure (Article 6(1)(b) of the GDPR), while other data, including contact data, on the basis of consent (Article 6(1)(a) of the GDPR), which may be revoked at any time.
4. Lodz University of Technology will process your personal data, also in subsequent recruitment of employees, if you give your consent (Article 6(1)(a) GDPR), which may be revoked at any time.
5. If the documents include data referred to in Article 9(1) of the GDPR, your consent to their processing will be required (Article 9(2)(a) of the GDPR), which may be revoked at any time. (Article 22 of the Labor Code and §1 of the Regulation of the Minister of Family, Labor and Social Policy of December 10, 2018 on employee records).
6. Personal data will be disclosed to persons acting under the authority of the controller and having access to personal data, processing them only on the instructions of the controller, unless required by European Union or Member State law.
7. Your data collected in the current recruitment process will be stored until the end of the recruitment process. In the case of your consent to the use of personal data for future recruitment, your data will be used until the end of the calendar year in which the recruitment process for which your application was submitted ended.
8. You have the right to:
    a) the right to access your data and to receive a copy of it;
    b) the right to rectify (correct) your personal data;
    c) the right to restrict the processing of your personal data;
    d) the right to delete your personal data;
    e) the right to lodge a complaint with the President of the Personal Data Protection Office (to the address of the Personal Data Protection Office: 2 Stawki St., 00 - 193 Warsaw)

Information on data requirement: Your submitting personal data to the extent of Article 221 of the Labor Code is necessary to participate in the recruitment procedure. Your provision of other data is voluntary.

.....
(date and signature of the candidate)

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Annex no. 1.3
to The OTM-R POLICY – OPEN TRANSPARENT MERIT-BASED RECRUITMENT

Candidate's consent to personal data processing under Article 7 GDPR

I consent to the processing of my personal data for the purpose and to the extent necessary to carry out the recruitment for the job in accordance with Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data and repealing Directive 95/46/EC (General Data Protection Regulation), publ. Official Journal of the EU L No. 119, p. 1. Consent is voluntary. Failure to give consent entails the inability to participate in the recruitment process. Consent may be withdrawn at any time, but without affecting the legality of the processing of personal data carried out on the basis of consent before its withdrawal.

.....
(date and signature of applicant)

* delete as appropriate

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