NAWA
POLISH NATIONAL AGENCY FOR ACADEMIC EXCHANGE

STER PROGRAMME

KISD

Krakow School of Interdisciplinary PhD Studies <KISD>
invites PhD students and members of the research staff
to attend the series of guest lectures given by:

Prof. Guangyin Yuan

Shanghai Jiao Tong University, Shanghai, China

1. Advancing Biodegradable Mg Alloys for Biomedical Applications: Key Challenges and Solutions

The advances of biodegradable Mg-based alloys for medical application will be reviewed, then the design strategy of the novel patented alloy (JDBM), microstructure, mechanical properties and degradation behavior will be introduced systematically. The in vitro and in vivo experimental results of JDBM alloy as bone implants will be introduced and evaluated in full aspects. The follow-up results of the multi-center clinical trials showed that so far, all patients have no bone resorption phenomena which is caused by rapid degradation of Mg. The fracture healing time of magnesium alloy bone screw is shortened by one third. The patients treated by biodegradable Mg screws will avoid the secondary surgery, thereby saving lots of medical cost.

2. Challenges and Solutions of Biodegradable Zn-based Alloys for Medical Devices

The underlying reasons why challenges existed for the biodegradable zinc-based alloys will be analyzed and discussed in detail and the solutions will be proposed on the basis of the research work from the author group in the past years. Two newly patented Zinc alloys with excellent strength and ductility as well as the good anti-aging properties, will be introduced, including the in vitro and in vivo experimental results.

3. Design and Synthesis of Surface Functional Coating for Biodegradable Metals

Three types of Ca-P coatings patent techniques, i.e. DCPD coating, HA coating, strontium-doped calcium phosphate based composite coatings (Sr-OCP) on biodegradable Mg alloy JDBM bone implants (bone plates and screws, bone tissue engineering scaffolds) will be discussed and how to enhance corrosion resistance and osteogenesis properties. The synthetic process, formation mechanism, corrosion behavior, and biological properties will be introduced systematically, including the clinical application effects. A newly developed patent Mg-P coating on Zinc-based alloy to suppress the excessive release of zinc ions and increase the biocompatibility will be introduced.

Schedule:

1. Monday, **07.07.2025, 10:00 AM**
IMIM PAN, ul. Reymonta 25, 30-059 Kraków
Conference room, 2nd floor

2. Tuesday, **08.07.2025, 10:00 AM**
IMIM PAN, ul. Reymonta 25, 30-059 Kraków
Conference room, 2nd floor

3. Wednesday, **09.07.2025, 10:00 AM**
IMIM PAN, ul. Reymonta 25, 30-059 Kraków
Conference room, 2nd floor

Prof. G. Yuan *is a tenured professor in the School of Materials Science and Engineering at Shanghai Jiao Tong University (SJTU), China. He received his Ph.D. from Southeast University, China and did his postdoctoral research at Shanghai Jiao Tong University. He worked as an associate professor at Shanghai Jiao Tong University in 2002 and as a JSPS researcher at Tohoku University, Japan from 2002 to 2004. He was promoted to professor in 2008. His research fields mainly involve the design of advanced materials and the correlation between the microstructure and properties of metallic materials, especially focused on the research and development of novel biodegradable metals, i.e. biodegradable magnesium-based alloys and biodegradable zinc-based alloys for medical applications. He has published over 150 journal papers, which have been collectively cited more than 9000 times with an H-index 55. He owns 40 patents related to biomedical Mg alloys and Zn alloys and their medical devices. Eighteen patents have achieved industrial transfer. He is currently the deputy director of National Engineering Research Center of Light Alloy Net Forming, China, and Vice Chairman of the Medical Metal Branch of China Society of Biomaterials. He has been awarded some official honorary titles, such as New Century Outstanding Talent of the Ministry of Education, China, and Shanghai's Leading Talent.*

Financial support provided by the ***Polish National Agency for Academic Exchange NAWA*** *under the Programme STER–Internationalisation of doctoral schools, Project no. BPI/STE/2023/1/00027/U/00001*