Newsletter #5

Baltic Biomaterials Centre of Excellence

Absolutely amazing! In just 5 years, we've published 138 scientific papers and already reached 2,499 citations!

Baltic Biomaterials Centre of Excellence (BBCE) project´s main objective is to establish a joint Centre for development of advanced biomaterials based on the long-term strategic cooperation between AO Research Institute Davos, Switzerland (ARI) and Friedrich-Alexander University of Erlangen-Nuremberg, Germany (FAU) on the one hand and Riga Technical University, Faculty of Natural Sciences and Technology Institute of Biomaterials and Bioengineering (RTU IBB), Latvian, Institute of Organic Synthesis (LIOS) and Riga Stradins University (RSU) and Riga Stradins University Institute of Stomatology (RSU IS) on the other hand.

DEVELOPMENT OF BBCE

BBCE had an incredible year in 2024! Between January 2024 and June 2025, we brought our community together for 18 internal consortium meetings to plan the visits and events, and also to discuss the research directions, upcoming articles and overall cooperation. During this time, BBCE members participated in **46** conferences (109 oral/poster presentations), published **64** manuscripts with acknowledgement to BBCE, and submitted **53** research grant applications. Consortium members were also active in disseminating project goals and results to industry members, mainly through participating in exhibitions and meetings with enterprises. We could hear and see BBCE members on the TV and radio interviews, opening new possibilities for further cooperation with other organizations in Latvia. Highlights of the events are:

1. Seven short-term outgoing visits to FAU and ARI and three short-term advanced partner incoming visits to Riga.
2. The summer school organized by FAU provided a lot of new knowledge for Early Stage Researchers.
3. Fifteen long-term visits to ARI and FAU.

Baltic Biomaterials Centre of Excellence Opens State-of-the-Art Facility

The new building of the Baltic Biomaterials Centre of Excellence has officially opened at Riga Technical University (RTU) on 20th of January, 2025. This milestone represents a major advancement in strengthening research infrastructure, expanding the RTU Ķīpsala campus, and establishing a solid foundation for the accelerated growth of biomaterials science, innovation, and personalized medicine in Latvia and Europe.

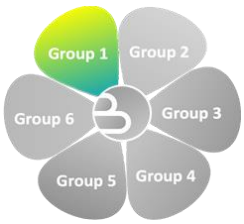
The horizon of future research possibilities has also been greatly expanded with the addition of new cutting-edge scientific equipment. The new facilities house infrastructure that is unique not just to Latvia but also stands out on a broader international stage. Over 20 state-of-the-art devices have been introduced, including a 3D printer for tissue printing, an X-ray microtomograph capable of examining material structures in fine detail without causing damage, and a scanning electron microscope that can measure even nanoparticle coatings, among others.

At the opening ceremony, the scientists were greeted by several distinguished guests, including the Minister of Education and Science, Anda Čakša, the Parliamentary Secretary of the Ministry of Health, Artjoms Uršuļskis, and the Parliamentary Secretary of the Ministry of Economics, Jurģis Miezainis. The visitor ranks were also complemented by Zane Petre, Head of the European Commission Representation in Latvia, and Martin Michellet, the Swiss Ambassador to Latvia.

This project has received funding from European Union's Horizon 2020 research and innovation programme under agreement No 857287

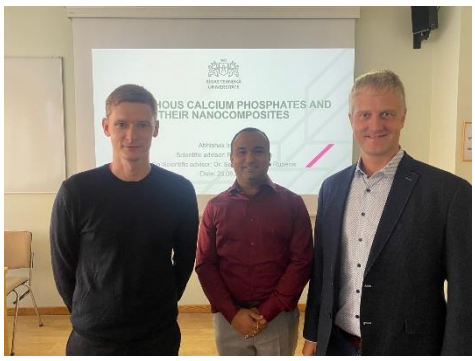
SUCCESS OF 2024

SFG1 - Calcium phosphates and composites achievements

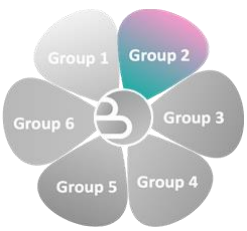


SFG1 proudly celebrates **Abhishek Rajesh Indurkar**, who successfully defended his PhD thesis **"Amorphous Calcium Phosphates and Their Nanocomposites"**. Soon after, he received the Julia Polak European Doctorate Award given by the **European Society for Biomaterials**.

Meanwhile, our SFG1 members presented **their work at renowned conferences**, sharing expertise with the global community, and **publishing 7 high-impact scientific articles** in calcium phosphate-based materials development. Significant efforts were focused on joining the consortia of Important Projects of Common European Interest (IPCEI) Tech4Cure, thus important industry-related research and development is forecast in the coming years.

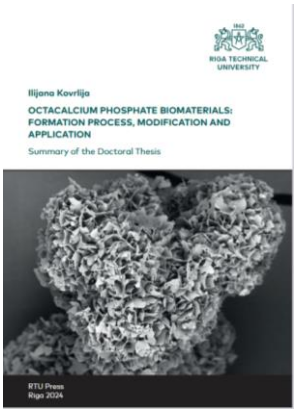


SFG 2 - Drug/ion/cell delivery achievements



SFG2 proudly celebrate **Ilijana Kovrlija**, who successfully defended her PhD thesis "***Octacalcium Phosphate Biomaterials: Formation Process, Modification and Application***".

Soon after, she secured a **prestigious Career Development and Mobility Postdoctoral Fellowship (MedTrain+)**, opening the door to three exciting years of research in Ireland.



Meanwhile, our SFG2 members shone brightly on the international stage — presenting their work at renowned conferences, **sharing expertise with the global community, and publishing 10 high-impact scientific articles**.

Their groundbreaking studies in drug delivery, biomaterial development, and biomaterial–cell interactions continue to push the frontiers of biomedical science.

Together, these accomplishments highlight the passion, dedication, and innovation that drive our group forward.

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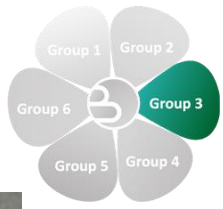
SUCCESS OF 2024

SFG3 - Materials *in vitro* achievements



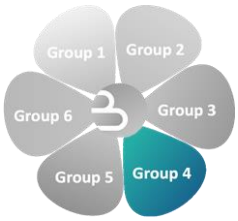
SFG3 proudly celebrates **Karina Egle**, who successfully defended her PhD thesis ***"Development of autologous fibrin matrices for medical application"***. Soon after, she received PostDoc project ***"Development of in vitro model for bone substitute material cellular response evaluation (VIBE)"***

Founded in 2023 by researchers at the BBCE, startup **MetaboNet provides advanced metabolite analysis of biological samples for academia and industry**. The company supports universities, biotech firms, and pharmaceutical companies in generating high-quality data for their research.

MetaboNet is steadily growing as a bridge between academic excellence and industrial innovation. **In 2025, the company became a partner in the European Regional Development Fund project "Development of a cultivation system for complex microbial communities based on the principles of microbial ecology"**, led by the University of Latvia, where Metabonet will contribute with metabolite measurements.

Metabonet team at
Deep Tech Atelier 2025

SFG4 - Kinetics and stability of drug delivery systems achievements



Science: Our team strengthened its scientific footprint with four high-level publications in Q1 journals in pharmacology, plant sciences, and biomaterials. **We also actively contributed to 11 national and international conferences**. Importantly, the introduction of *Anton Paar Dynamic Light Scattering Instrument Litesizer* opened the door for us to launch a new direction in nano–drug delivery systems, expanding our technological capabilities.

Training and Education: At the same time, our researchers expanded expertise through **11 short-term visits – from workshops in Poland, Germany, and the UK to summer schools at FAU** – gaining hands-on training in *Raman, XRD*, and drug delivery systems. These experiences not only advanced our skills but also deepened collaborations across Europe. We also supervised three students who successfully defended their Master's theses, some leading to publications and awards at RSU ISC 2025.

Outreach and Public Engagement: Beyond academia, we engaged the public at Researchers' Nights and RSU Open Doors Day, while also meeting leaders such as **Ursula von der Leyen (President of the European Commission), Latvia's Minister of Health, and U.S. Ambassador Christopher Robinson**. To bring science closer to society, we published popular-science articles on medicinal plants, bees, and the courage to "knock on new doors." Together, these milestones define our biggest success: building knowledge that connects science, collaboration, and society.

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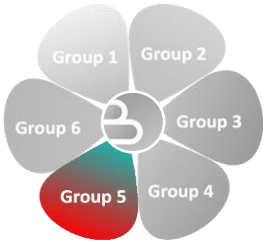
SUCCESS OF 2024

SFG5 - Preclinical biomaterial evaluation achievements



In 2024, SFG5 welcomed two postdoctoral researchers — **Dr. Mingjia Chen and Dr. Mahuya Pakhira** — bringing strong expertise in polymer synthesis and biomaterials.

Ms. Julia Bulatova completed her Master's thesis in Pharmacy and stayed on to prepare for doctoral studies.

Dr. Mingjia Chen

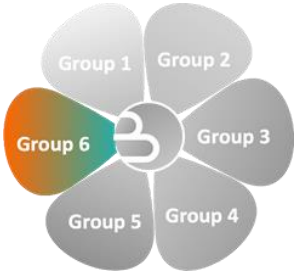
Dr. Mahuya Pakhira

Group members presented at multiple conferences, and to strengthen our research-to-industry pathway, **group leader Antons Sizovs was invited to speak at the Deep Tech Atelier**.

Through BBCE mobility, the team completed targeted trainings: **a short visit on early-stage** IP strategy for biomaterials (patentability, prior-art search, patenting routes) and a **long-term visit focused** on hard-tissue sample processing for histological evaluation.

This year, SFG5 also launched a **collaboration with the Latvian Biomedical Research and Study Centre** and secured a grant to investigate nanoparticle penetration across the endothelial layer in a lung cancer-on-a-chip model.

SFG6 - Clinical evaluation of materials and personalized implant development achievements



ARTICLE IN PRESS

Journal of Cranio-Maxillo-Facial Surgery

"Injectable platelet-rich fibrin for modelling of mandibular lower border defects in bilateral sagittal split osteotomy"

SFG6 **biggest success** in the first semester of 2025 centers on exceptional achievements by our researchers, particularly Miks Lejnieks and Lana Micko.

SFG6 celebrates Lana Micko for her exceptional achievements in maxillofacial surgery research. Lana published in the prestigious Journal of Maxillofacial Surgery her work "Injectable platelet-rich fibrin for modelling of mandibular lower border defects in bilateral sagittal split osteotomy« (J Craniomaxillofac Surg 2025, DOI: 10.1016/j.jcms.2025.07.018).

Miks Lejnieks - he has submitted two research studies for publication. So, fingers crossed!

SFG6 expanded with two talented new members: **Kristiāns Vištarts** (first stage researcher) and **Rihards Dižais** (first stage researcher). SFG6 also welcomes intern Laura Millere from RTU in September 2025.

Educational Impact, Clinical Research Training: **successfully completed the 10-month second version of our Introduction to Clinical Research course**. This comprehensive program strengthens research capabilities across our institution and builds the foundation for future clinical investigators.

SFG6 **published nine scientific studies** in the following areas: Biomaterials and Implant Development; Digital and 3D Treatment Planning; Artificial Intelligence in Dentistry; Reconstructive Surgery and Predictive Biomarkers; Public Health and Cost-Effectiveness in Dentistry.

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BBCE erudition competition «BIO-GO-Higher»

While 20 teams ultimately competed for victory, interest was much higher, with 54 teams entering the selection round.

The most successful team of 2025 – "Cikloheksāns" from Sigulda State Gymnasium, visited AO Research Institute in Davos, Switzerland.

From 18.08.–22.08.2025, team "Cikloheksāns" spent an unforgettable week with BBCE partners - AO Research Institute, Switzerland.

The young people not only learned about the everyday life of researchers, but also participated in laboratory work themselves and gained unique experience in the world of science.

We are proud of their achievements and curiosity!

Follow us on X, Facebook, Instagram and Linkedin!

What are we looking for:

- Cooperation with other institutions
- Cooperation with industry
- New project applications
- Staff mobility and training

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