

Call : vacancy for PhD Candidate

B2BONE

Translational project to improve 3D printed calcium phosphate scaffolds for large bone defects

Funding: Regional Funding Win2Wal (1/10/2022-30/9/2026)

Contact: liesbet.geris@uliege.be

Web: <http://www.biomech.ulg.ac.be/vacancies>

General Information:

The loss of one or more teeth, usually due to trauma or infection, can lead to functional (chewing) or social difficulties. The treatment of choice is to replace the lost tooth with a dental implant. However, in order to be permanent, the placement of implants requires a sufficiently large volume of bone to present. As the loss of a tooth results in bone loss, regeneration of the alveolar bone is a necessary step before the implants can be placed. Clinicians specialized in implantology use bone substitute biomaterials as a basis to guide bone regeneration. Many such biomaterials exist, both from natural and synthetic origin, but effective regeneration of the entire volume remains a challenge due to suboptimal physicochemical properties of the materials.

There is a growing interest in synthetic bone regeneration biomaterials with a customized three-dimensional (3D) shape, perfectly adapted to the patient's bone defect. In the B2BONE project, the academic partners continue a successful collaboration on the development of such novel biomaterials, by merging clinical expertise (Dentistry School d-BRU team of Prof. France Lambert & Dr. Dorien Van hede) with in silico tissue engineering expertise (team of Prof. Liesbet Geris @ GIGA In Silico Medicine). In this previous collaboration, a computer model was developed to optimize the internal design of the 3D printed biomaterial. In vivo experiments in a standard alveolar bone regeneration model demonstrated the superiority of the developed biomaterial over the current clinical gold standard (link: <https://doi.org/10.1002/adfm.202105002>).

In the B2BONE project, the objectives are to continue this research, focusing on improving complex pore architecture, microtexture, 3D printing technology and clinical usability, using a combination of in vitro, in vivo and in silico technologies. In the scope of this project, one PhD position is available for a highly motivated interdisciplinary candidate. The position is shared between the academic partners of the project (located in the same tower of the university hospital of Liège). The candidate will work in close collaboration with 2 postdoctoral researchers also hired on the project, as well as with the colleagues of the Belgian Ceramic Research Centre (BCRC) who are experts in 3D printing and microtexturing of ceramic materials.

Hiring Institution

Hiring institution: University of Liège

Web: <https://www.uliege.be>

Official address:

Université de Liège

Place du 20-Août, 7

4000 Liège – Belgique

Type of contract: temporary (4 years (year contracts))

Job status: full-time

Hours per week: 38 hours

Offer starting date: 01/10/2022

Open Position

Topic: In vitro and in silico modelling of 3D printed ceramic scaffolds

Description: the PhD candidate will be focusing on the influence of the microtexture on cell ingrowth and its interaction with local curvature and material properties. The candidate will start with in vitro experiments on the samples provided by the BCRC to derive relationships between the aforementioned factors (cell culture, fluorescent imaging, qPCR, etc.). These relationships will be implemented in the computational model to explicitly account for microtexture in the in silico analyses. This module will then be integrated in the overall computer model of tissue growth inside the scaffold. Subsequently, the candidate will contribute to the optimisation of the 3D scaffold design, led by the project's postdoctoral researchers, and the analysis of the in vivo experimental results.

Supervision: Prof. France Lambert & Prof. Liesbet Geris

Hosting lab: dBRU, Dentistry School & Biomechanics Research Unit, GIGA in silico medicine

Location:

B34- Quartier Hôpital

Avenue de l'Hôpital, 11

4000 Liège – Belgium

web: <https://www.d-bru.uliege.be/> & <http://www.biomech.ulg.ac.be/>

Benefits

You will be enrolled in the PhD programme of the Medical or Engineering School of the University of Liège (Liège, Belgium), and have the opportunity to learn from team members at both host labs. In addition, you can follow technical and transferable skills training from the GIGA doctoral school. The host labs are highly engaged in the international in silico medicine, biomechanics and tissue engineering communities and frequently participate in international research projects and initiatives.

Successful candidates will be offered up to 48 months full-time employment (in year contracts), with a monthly salary determined by university barema (around 2100 euro net, depending on seniority and family situation). Belgium offers universal health care, subsidized day care, a high standard of living and a vibrant cultural life. Belgium is at the heart of Europe, with fast connections to all major foreign cities.

Eligibility criteria

- Educational Level: Master in biomedical engineering, biomedical sciences, (bio)mechanics or equivalent.
- Required languages: English
- Skills/Qualifications: The candidate should ideally have experimental (cell culture & analysis) and computational (in silico modeling) skills – or at the very least a proven interest in both.
- Eligibility to enrol in the PhD programme of the University of Liège Biomedical Sciences/Engineering School : acquired 240 ECTS of bachelor and master training.

Selection Criteria

The selection committee uses a number of indicators to evaluate the applicant's preparedness, motivation and potential.

1st phase, remote pre-selection:

The Scientific, Technological & Academic excellence will be considered at first, based on:

- Quality of the CV, in general
- Any demonstrated research experience, particularly if supported by evidences such as scientific publications, patents, participation in scientific congresses, ...
- Undergraduate performance: overall, with a special focus on relevant field-specific courses
- Any demonstrated previous recognitions (grants, awards, ...)
- Reference letters provided by professors and senior scientists: Three reference letters are expected. At least two letters must be issued by scholars. The third letter can be provided either by a scholar or by a relevant professional of the industrial sector. Referees are asked to address analytical capabilities, technical proficiency, ability to work independently and motivation/commitment. If your references prefer to send their letters directly to us upon request, mention this clearly in the application.
- Statement of purpose: past research experience, motivation for applying to this particular PhD project, academic fit, contribution of the project to the candidate's future careers plans, ...
- Additional relevant skills (field-specific): demonstrated, e.g. through previous projects, and or through previous participation in scientific contests, trainings, ...

2nd phase, interview(s):

Should the candidate be preselected at phase 1, a second phase will consist in at least one interview through which the motivation, the proactive behaviour, the capacity to work collaboratively, the organizational skills, the communication skills and the capacity to engage in a scientific discussion and manage problems, will be assessed, among other aspects.

The final decision will be the result of a consensus of an evaluation committee that will take into account the results of both recruitment phases 1 and 2. The candidate will be informed of the selection results by email.

Application Process:

All the documents that prove the eligibility of the candidate should be provided. As for the selection process candidates are expected to provide at least the following documents:

- A brief introduction letter (no more than one A4 page) that summarizes the documents and the nature of the information provided for the selection
- A full CV
- The three requested reference letters
- The letter of purpose (no more than two A4 pages)

All documents must be sent by email to the Principal Investigators of the proposed project (Dr. Dorien Van hede – dorien.vanhede@uliege.be and Prof. Liesbet Geris - liesbet.geris@uliege.be) as well as the project manager (Dr. Bernard Staumont – b.staumont@uliege.be) **before 31/08/2022**. The title of the application email should be “B2BONE PhD position U.Liège” in order to ensure correct processing.