



# **BIOSUM**

Interdisciplinary Research School  
in Biomaterials

Gothenburg University and  
Region West Sweden

<http://biosum.org.gu.se/BIOSUM>

# Interdisciplinary Research School in Biomaterials.

**1. Graduate courses** – open to registered graduate students at GU/CTH.

**2. To facilitate mobility** between BIOSUM – international partners, and between academia – companies and public sector.

**3. Support graduate tutors** through discussions, mentorship, courses and seminars.

**4. Seminar series**, hot topics with invited lecturers.

**5. Co-organiser** of international conferences.

## Quality aspects and goals:

- Excellent research environments.
- International exchange.
- Tailor made biomaterials courses.
- Active participation from trade and industry and other external collaborators.
- Structured career planning and follow-up for students and tutors.

## UNIVERSITY-APPROVED GRADUATE COURSES

### Cross Disciplinary Introduction to Biomaterials, 3 ECTS

This course is theoretical in character but with inclusions of laboratory work/laboratory demonstrations. The teaching will be performed as lectures, seminars and with own practical exercises. The course aims to mediate knowledge and insights into:



- Clinical background to biomaterials – needs in medicine..
- Materials classes and their applications.
- Material degradation.
- Human anatomy and physiology.
- Inflammation and wound healing. Host response towards foreign materials.
- Cell biology. Fundamentals on tissues and organs.
- Protein adsorption. Interactions between blood proteins and surfaces.
- Humoral cascade systems behaviour at foreign surfaces.
- Biomaterials related infection.
- Mass transport in soft materials.
- Drug formulations.

## Biomaterials from idea to market, 6 ECTS

The course gives knowledge about the product development process of two fundamentally different types of biomaterials: “hard” materials, such as oral implants, and “soft” materials, such as dippers.

Multidisciplinary competence in materials science, quality control, demands by authorities, market demands, legislation, product demands, etc. will yield insights- and prepare the student for the expectations that are put on product development in food industry, medical-technical products, hygiene, drugs, etc.

## Venture creation and entrepreneurship, 7.5 ECTS

The course offers graduate students a theoretical foundation to business development, and in a systematic practical and theoretical manner increase the value of own innovations or innovations by others.

This implies the understanding and description capabilities of markets of such innovations. The course will also handle ethical issues where market and regulatory demands become balanced against humanitarian and moral values.



## Advanced course in Biomaterials and Regenerative Medicine, 6 ECTS

This is an advanced course in Biomaterials and Tissue Engineering. The course content is a mixture of ordinary lectures, seminars and laboratory work related to stem cell technology and tissue expansion. The course aims to give advanced knowledge in:

- Stem cells. Selection, differentiation and expansion.
- Tendons, cartilage and ligaments.
- Clinical aspects on Tissue Engineering of skin, cartilage and bone.
- Basic stem cell culturing techniques for skin, cartilage and bone.
- Clinical experiences of Orthopaedic- and Spine implants.
- Oral implants.
- Ophthalmologic implants.
- Soft tissues and wound healing.
- Immunology and relation to implants.
- Inflammation adjacent to biomaterials and resulting fibrous encapsulation.
- Angiogenesis adjacent to biomaterials.
- Animal testing models.
- Surface modification techniques with relevance to tissue engineering scaffolds.
- Methods: Free form fabrication, RT-PCR, stem cell culturing techniques
- Pacemaker- and defibrillator systems.
- Coagulation – mechanisms and control of activation pathways.



## Career Possibilities in Industry – Practical Acquaintance, 4.5 ECTS

The aim of this course is to obtain insights to how projects and companies are organized, how career pathways are planned and how a reflection portfolio is established. In the beginning of the course a series of introductory lectures will be held, e.g. concerning project management, company organization, and economy. Thereafter, each graduate student site visits a company during up to two weeks, and the companies with different characters shall be selected. A special focus will be on a “Small Company Pool” in order to catalyse interactions between companies and graduate students.



### supporting trade and industry

#### Small companies

Bohus Biotech  
Arcam AB  
Artimplant AB  
Cellartis AB  
CellMatrix AB  
Doxa AB  
Interface Biotech A/S  
Integrum AB  
Q-Sense AB  
Bactiguard AB  
Tataa AB

#### Bigger companies

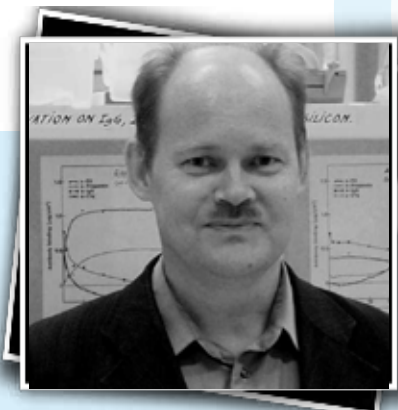
AstraZeneca  
SCA Hygiene Products  
Unilever  
Södra Cell  
Astra Tech AB  
Cochlear LTD  
Gambro AB  
General Electric Health Care  
Mölnlycke Health Care AB  
Nobel Biocare AB  
St Jude Medical AB  
Sandvik AB  
Keystone Dental  
Stryker Trauma

#### Institutes

SP (incl. SIK and YKI)

### Director of BIOSUM

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## BIOSUM

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