

BIOMEDEA II

A Summary of the Warsaw Meeting

Joachim Nagel¹, Jan Wojcicki², Dick W. Slaaf³

¹Department of Biomedical Engineering, University of Stuttgart, Germany, jn@bmt.uni-stuttgart.de

² International Centre of Biocybernetics, Polish Academy of Sciences, Warsaw, Poland,

Jan.Wojcicki@ibib.waw.pl

³Department of Biomedical Engineering, Eindhoven University of Technology, The Netherlands,

dw.slaaf@bf.unimaas.nl

The Bologna movement has triggered an initiative of the Biomedical Engineering community to promote their European Higher Education Area (EHEA) by harmonising the educational programmes, specifying required minimum qualifications and establishing criteria for an efficient quality control of education and life-long learning. In order to promote this process, the European Participation Project BIOMEDEA was initiated in 2004 by Joachim Nagel, together with Dick Slaaf, Jan Wojcicki and colleagues from 40 universities, societies and other institutions with an interest in Biomedical Engineering education, representing 31 European countries. The objective of the project is to develop and establish consensus on European guidelines and protocols for the harmonisation and accreditation of high quality Medical and Biological Engineering and Science programmes, and for the training, certification and continuing education of professionals working in the health care systems. Adherence to these guidelines will insure mobility in education and employment as well as the necessary safety for patients. Three symposia were scheduled to discuss the guidelines and protocols that are being written in the course of the project. The first two meetings with participation from more than 50 universities and societies took place in Eindhoven (December 2004) and Warsaw (BIOMEDEA II, April 15-17, 2005), the third meeting has been scheduled for September 23-25, 2005, in Stuttgart.

BIOMEDEA II: accreditation of biomedical engineering programmes in Europe and a European protocol for the training of clinical engineers

Biomedea II (<http://www.ibib.waw.pl/Biomedea>) took place at the International Centre of Biocybernetics of the Polish Academy of Sciences in Warsaw, Poland. The local organisers were Jan Wojcicki (chairman), Jakub Palko (secretary), Krystyna Deszczynska, and Piotr Ladyzynski. The conference was co-sponsored by the International Centre of Biocybernetics and the International Federation for Medical and Biological Engineering (IFMBE) and had been endorsed by the European Alliance for Medical and Biological Engineering and Science (EAMBES) which has adopted BIOMEDEA as an EAMBES activity.

The goal of the Warsaw meeting was to establish Europe-wide agreement on criteria and guidelines for the accreditation of BME Programmes in Europe, to develop a European Protocol for the training of clinical engineers, and to prepare the BME community for its participation in the European organisations and agencies responsible for quality assurance in higher education.

The Warsaw meeting included workshops on:

1. Guidelines for the accreditation of BME Programmes in Europe: why do we need them and what should they specify? The goal of the workshop was to specify the general requirements of the guidelines. Chair: Dick Slaaf
2. BME core competencies and specialisations that should be recommended in the guidelines for the accreditation of BME programmes in Europe. Chair: Joe Barbenel (University of Strathclyde)
3. Basic competencies in engineering/science, biology and medicine and general competencies including “soft skills” as minimum output requirements for accredited BME programmes. Chair: Jan M. Wojcicki
4. Guidelines for curricula, specifying a flexible framework of BME curricula as a guide for the accreditation of BME programmes. Chair: Joe Barbenel
5. BME/CE training – a European training scheme, with the goal to establish a European protocol for the formation and training of biomedical or clinical engineers working in a hospital environment. Chair: Joachim Nagel

The workshops were based on two documents prepared by the project leader Joachim Nagel:

1. Criteria for the Accreditation of Biomedical Engineering Programmes in Europe, and
2. Draft of a “Protocol for the Training of Clinical Engineers in Europe”.

They were distributed to the conference participants prior to the meeting. Main question was, whether the content of the two papers is acceptable to all parties involved and to agree on necessary changes.

In support of the discussions, the Warsaw meeting also featured the following presentations:

- ✚ Dick Slaaf: Summary of the BIOMEDEA I meeting and review of the 2005 Whitaker Summit
- ✚ Dr. John D. Enderle (University of Connecticut): Accreditation issues for BME programmes undergoing the “ABET Engineering Criteria” review
- ✚ Tadeusz Palko and Natalia Golnik (Warsaw University of Technology): Quality assurance in the Polish higher education system and the influence of the Bologna Process
- ✚ Jan. A. van Alsté and Tycho C. Boersma (University of Twente): Development and implementation of the quality assurance system of the BME educational programme
- ✚ Tycho C. Boersma and Jan. A. van Alsté: Towards an accredited BME programme
- ✚ Maria Laura Costantino (Politecnico di Milano): BME programmes and their accreditation in Italy
- ✚ Göran Salerud (University of Linköping): Towards CDIO based accreditation of engineering programmes in Sweden
- ✚ William Grimson (Dublin Institute of Technology): Comments on the draft of the European CE training scheme
- ✚ John D. Enderle: The University of Connecticut clinical engineering programme
- ✚ William Grimson: The accreditation criteria and procedure for engineering education programmes in Ireland
- ✚ Vera Dammann (University of Applied Sciences Giessen): BME-degrees in Germany - from Diploma to Bachelor/Master, from governmental control to accreditation

Discussions at the workshops were very concentrated and passionate. They even extended into the social events, a visit to the Royal Castle and Old City as well as dinners at Jablonna Palace and in the Royal Castle.

BIOMEDEA II Summary

1. Guidelines for the accreditation of BME Programmes in Europe: why do we need them and what should they specify?

There was general agreement that existing criteria and guidelines for the accreditation of engineering programmes in Europe, such as the EUR-ACE documents, do not cover the special needs of BME programmes and that therefore specific guidelines should be agreed upon. Such guidelines should be based on the commonly accepted, general guidelines for engineering programmes, and should add the necessary core competencies as well as specialisations in Medical and Biological Engineering and Science. They should also outline the basic competencies in engineering/science, biology and medicine and general competencies (soft skills) which are felt to be necessary requirements for a BME degree. The guidelines should satisfy the two purposes of specifying the criteria for accreditation and providing advice to those who want to start a new BME programme, and thus should contain guidelines for curricula, too. Two different basic types of programmes should be defined in the guidelines: research oriented and professionally oriented programmes.

The document should recognise the diversity of BME programmes and not prescribe fixed rules. The goal is to harmonise BME programmes throughout Europe, not to standardize them.

The discussions went into many details of what the guidelines should specify, and the outcome of the workshops will be directly reflected in an updated version of the “Criteria for the Accreditation of Biomedical Engineering Programs in Europe” that will be available for approval at the third BIOMEDEA meeting in Stuttgart.

2. BME core competencies and specialisations

Mainly due to the wide range of BME programmes with different orientations and educational goals, no agreement could be found on a single list of BME core competencies and specializations, which was to be expected. The three discussion groups ended with different suggestions on what to include in such lists that will be worked into the updated accreditation criteria.

3. Basic competencies in engineering/science, biology and medicine and general competencies

Though all discussion groups agreed on the need for basic competencies in engineering/science, biology and medicine as well as general competencies - the so-called soft skills - there was no general agreement on the depth of competencies in the different areas or on the level of detail for the listing in the accreditation criteria. A

small editorial group will work out and propose a solution for the final text to be discussed at the Stuttgart meeting.

4. Guidelines for curricula

There was general agreement that the document “Criteria for the Accreditation of Biomedical Engineering Programmes” should contain guidelines for curricula in order to establish a flexible frame for BME programmes. It was, however, the clear understanding of all discussion groups that these guidelines should not be considered as fixed rules. They should leave the flexibility to individual programmes to maintain their specific character and acknowledge that national laws, conventions, regulations and resources may make it impossible to strictly adhere to the guidelines. Such circumstances should not exclude programmes in those countries from the goal to provide European mobility for students, teachers and employees, unless such deviations would mean a substantial negative impact on the quality of the BME programmes and the qualifications of their graduates.

Though there was no basic disagreement in the curricula that were proposed by the three discussion groups, there were some differences in the ECTS credits or percentages of teaching hours allocated to the different topics in the curricula that need to be reconciled.

CE training – a European training scheme

The document “Protocol for the Training of Clinical Engineers in Europe” was broadly welcomed though there was some concern about the detailed content, the management of the training scheme and the recognition of national diversity. These concerns need to be addressed in an updated version of the document to be discussed at the next BIOMEDEA meeting. Additional issues that need further discussion are the structure of clinical engineering careers, the duration of the training and the criteria for a training centre. There was general agreement that Clinical Engineers should be certified. Certification and continuing education will be discussed at the Stuttgart meeting.

Results

The Eindhoven and Warsaw meetings were important and successful steps towards reaching the goals of BIOMEDEA, i.e. preparing Biomedical Engineering for the European Higher Education Area and removing existing obstacles for the mobility of students, teachers and employees. As an additional aspect, the process of Europe-wide mutual recognition of BME degrees and the certification of Clinical Engineers on a level of high quality education, training and quality assurance, will have a substantial, beneficial impact on patient safety, making sure that CEs are creating a safe environment, a major contribution to the health and well-being of society.

The expected outcomes of BIOMEDEA will be a white paper on BME education, educational methods and best practices in Europe, protocols for the formation, training, certification and continuing education of clinical engineers in Europe, and guidelines for the accreditation of BME programmes in Europe. The International Federation for Medical and Biological Engineering (IFMBE), the main sponsor of BIOMEDEA, will, in cooperation with WHO, as a part of the initiatives of the World Alliance for Patient Safety, set up a global registry of certified clinical engineers with the goal of international mutual recognition of certification, and strive towards making certification and/or registration of clinical engineers mandatory everywhere in the world, based on the same criteria.

Primary goal of BIOMEDEA remains, however, to prepare the BME European Higher Education Area and to find recognition by the national governments throughout Europe, the European Union and the European bodies that are the main players in engineering education and accreditation.

A new project with broad support from the European bodies entrusted by the Bologna countries with the task of establishing European standards and procedures for quality assurance and accreditation in higher education, EUR-ACE (Accreditation of European Engineering Programmes and Graduates) aims at setting up a European system for accreditation of Engineering education with the following main goals: provide an appropriate “European label” to the graduates of the accredited educational programmes, improve the quality of educational programmes in engineering, facilitate trans-national recognition by the label marking, facilitate recognition by the competent authorities in accord with the EU Directives and facilitate mutual recognition agreements. The system will be based on a set of common European standards that will be proposed, tested in a number of countries, refined and tuned, and then tested again in order to achieve the largest consensus. A detailed proposal will also be formulated on how to set up and run the system that must become self-supporting within five years. The project will thus interest several target groups, from higher education decision-makers at the European level to governing bodies of Higher Education (HE) Institutions, from national and local HE authorities to engineering teachers, from professional organisations to employers of engineers. It will be a significant contribution to the

harmonisation of European higher education, and possibly pave the way for analogous initiatives in other professional fields.

BIOMEDEA, and thus the European BME community, has been accepted to represent the specific biomedical engineering issues and interests within EUR-ACE, and to test its specific criteria for accreditation within the project. For the BME community this is a major step forward towards the establishment of EHEA under due consideration of the specific needs of Medical and Biological Engineering and Sciences.