

# **Minutes FBT Mechatronik and Network Meeting „Mechatronics Engineering“ from 16.- 17. Mai 2019 in Heilbronn**

Participants: Dr. Mutaz Ryalat (GJU), Dr. Hani Mohsen (GJU), Stefanie Kirsch (GJU), Prof. Dr.-Ing. Rolf Biesenbach (HS Bochum), Prof. Dr.-Ing. Ansgar Meroth (HS Heilbronn), Prof. Dr.-Ing. Ralph Lindken (HS Bochum), Prof. Dr.-Ing. Martin Loeffler-Mang (HTW Saar), Dipl.-Ing. Ansgar Eckert (FH Wuerzburg-Schweinfurt), Prof. Dr.-Ing. Manfred Lohofener (HS Merseburg), Prof. Dr. Gareth Monkman (HS Regensburg), Stefanie Petrik (HS Heilbronn), GJU Students Anas and Mohammad.

## **Thursday 16<sup>th</sup> of May**

### Session I: Fachbereichstag Mechatronik (all 35 participants)

Welcoming words by the Dean of the Faculty of Mechanics and Electrical Engineering Prof. Dr. Carsten Wittenberg (HS Heilbronn). Prof. Dr.-Ing. Joerg Wild (HS Heilbronn) introduced the agenda to all participants of the Fachbereichstag Mechatronik and Prof. Dr.-Ing. Rolf Biesenbach welcomed GJU participants in particular.

Prof. Dr. Peter Ott (HS Heilbronn) presented the Faculty Mechatronik & Robotik with all offered BA and MA programs and BA courses taught in English. HS Heilbronn is in competition with DHBW (Dual Studies University Baden-Wuerttemberg) but has good collaboration with Technical Universities, e.g. for PhD studies with TU Chemnitz.

Prof. Dr. Nicolaj Stache (HS Heilbronn) gave a presentation about Automotive Systems Engineering (ASE) at BA and MA level with new insights in perception and sensor data interpretation with AI for automotive applications.

Dr. Mutaz Ryalat and Dr. Hani Mohsen (GJU) informed the participants about the Department of Mechatronics at the School of Applied Technical Sciences including staff and student numbers, study programs on BA and MA level, research projects and recent publications. Two GJU students that are currently studying at Hochschule Heilbronn were also introduced.

### Session II: Network meeting SATS Mechatronics (8 participants)

Then a group of network members left the FBT Mechatronik and joined the SATS Network meeting Mechatronics in a separate room. Prof. Dr.-Ing. Ansgar Meroth invited Stefanie Petrik and the two GJU students Anas and Mohammad to join the network discussions. Both students were telling about their experiences in Germany and which courses they were taking at HS Heilbronn, e.g. Signaling in German and English, lab works. As preparation for their German Year they want the Technical language (Fachsprache) to be improved as the German lecture at GJU is not preparing them for BA courses in Germany content-wise. Prof. Lindken (HS Bochum) has mixed experiences with the language level of GJU students, in the first year they were very good but in the second year they performed very low.

Prof. Dr.-Ing. Martin Loeffler-Mang (HTW Saar) was asking why he did not receive students this year. He is facing problems because the course “project management” as practical part of a double-course is not accepted but he suggested that SATS should allow students to take this course. The same problem was faced at Hochschule Heilbronn, “project management” should be accepted at SATS/GJU. Good way to team up is to do project work with German students. Anas and Mohammad made positive experiences.

Dipl.-Ing. Ansgar Eckert (FH Wuerzburg-Schweinfurt) gave a presentation (PPP) about Dual studies at FHWS and Dr. Mutaz wanted to add the list to SATS universities of interest. At HTW Saar so called

“collaborative studies” are offered with a company contract for the students. Prof. Loeffler-Mang explained that his students work based on a contract one day or 10 hours per week with a company that is related to their field of studies. Prof. Ansgar Meroth told about a similar program called “cooperative studies” at HS Heilbronn where students do an apprenticeship 1,5 year before their study, then the first semester is apprenticeship and study semester. These students are better and more motivated. This program allows students to get money and experience but companies only accept students with good grades. Prof. Loheofener emphasized the competitive part of this model, Prof. Lindken said his Dual Studies students are at top university level and his BA graduates do their Master at Ruhr-University Bochum.

Prof. Dr.-Ing. Ralph Lindken (HS Bochum) gave a presentation about the Institute of Thermodynamics. Companies like Volkswagen and BOSCH settle close to the campus in Bochum and they attract students. HS Bochum has a large Engineering Department with 1.500 students, also with Dual Education internally in workshops with apprentice. They have a good equipment at the labs and interesting student projects/start-ups e.g. Solar Car (link) but the number of Mechatronic students is dropping. HS Bochum is expanding to Energy & Environmental Engineering (interesting for interdisciplinary collaboration with GJU School of Natural Resources Engineering and Management).

## **Friday 17<sup>th</sup> May**

### Session I: Fachbereichstag Mechatronik (all 35 participants)

Dr. Jonas Wernz, Managing Director at VDI Düsseldorf (Fachbeirat Ingenieursausbildung) presented the discussion paper of VDI-Quality dialog Apprenticeship of Engineers for upcoming digital transformation. He gave important insights on new ideas and approaches for Curricula concepts for Industry 4.0 and how to further develop the Engineering study plans with Data Science and Data Literacy. His survey included responses from professors and students on the importance of digitalized content in lectures now and in the future focusing on Computer Science (IT landscape, Information and Data Management) and Technology (IT tools). German students emphasize the importance of Digitalization in Technology, Computer Science, Economy and Law but complain that it is not taught intensively enough at lectures and seminars. Push factors are needs from business world (11%) and industry cooperation (20%), active professors (14%), financial incentives (10%). The biggest impediment are professor conservative attitude (56%). Advice by Dr. Jonas Wernz to create a modern and motivating environment at your university to implement a vivid curricula development and put Digitalization on the top of your agenda.

Prof. Peter Eichinger and Prof. Bernhard Hoefig (HS Aalen) held presentation about Innovative Teaching Concepts in Mechatronics at their university. Stifterverband Publication: [Smart Germany](#)

5 steps were implemented:

- 1) Lecture series “Industry Dialog Ind 4.0” for students and company representatives with a different focal point each semester (e.g. Artificial Intelligence (AI), Autonomous Systems, Virtual Augmented Reality, Hololens) → 5.000 participants in 30 lectures
- 2) Further development of curricula, Iteration loops with Industry
- 3) Problem Based Learning process
- 4) Student projects and Bachelor thesis related to digitalization
- 5) Makeathon, Mentoring, Coaching (with trans-disciplinary regard, e.g. invite Designers)

Prof. Peter Eichinger and Prof. Bernhard Hoefig (HS Aalen) invited GJU students and encourage them to participate in the [Makeathon](#) at Gran Canaria. [https://www.youtube.com/watch?v=ur0\\_IfMW5NY](https://www.youtube.com/watch?v=ur0_IfMW5NY)

Examples: Innovative Teaching Concepts → practical cases from industry with direct agile feedback

Mi5 Project: VDMA smart 4i Demonstrator

1. At packaging fair INTERPAK: 36 students built a packing machine in 36 weeks
2. Makeathon with 1<sup>st</sup> Year students: Students develop a prototype in teamwork e.g. how to operate a CAD program
3. Makeathon at Automatica Munich: 124 students from 18 international universities and companies from 8 different countries participate in a joint workshop

→ HS Aalen won the Landeslehrpreis 2017 for Best teaching in Baden-Wuerttemberg

Prof. Dr. Andreas Daberkow (HS Heilbronn) presented E-learning and E-Assessment at the Faculty of Mechanik and Elektronik. Four steps:

- 1) Basic teaching in Mathematics and Physics to deepen the knowledge
- 2) eLearning German/English
- 3) eLearning Business & Economics (eBWL)
- 4) IT tools

Then SWOT Analysis Faculty of Mechanik and Elektronik.

Prof. Dr. Nicolaj Stadel and Prof. Tim Fischer (HS Heilbronn) presented new Teaching tools and methods applicable in Mechatronics lectures. Online tools/tests for Mathematics are included into the lecture. These tests should support professors and students in order to teach and prepare them well. Prof. Dr. Tim Fischer includes Youtube videos, Quizzes and simulations into his lectures such as [www.falstad.com/mathphysics](http://www.falstad.com/mathphysics) ; [www.falstad.com/circuit](http://www.falstad.com/circuit) ; <https://wiki.mexle.hs-heilbronn.de/doku.php?id>

#### Session II: Network meeting SATS Mechatronics (8 participants)

Then the GJU network members met again separately and Stefanie Kirsch gave a presentation about the mobility programs at GJU e.g. Flying Faculty, Staff Mobility Program (Train the Trainer), Student Group Mobility, Erasmus Plus ICM, GJU Summer School. The participants were very interested in joining several programs and work closer with Dr. Hani and Dr. Mutaz in this regard. Prof. Dr.-Ing. Ralph Lindken (HS Bochum), Prof. Dr.-Ing. Martin Loeffler-Mang (HTW Saar) and Dipl.-Ing. Ansgar Eckert (FH Wuerzburg-Schweinfurt) were interested in the Flying Faculty program. Hochschule Heilbronn were interested in further student exchange, Prof. Dr.-Ing. Ansgar Meroth was very happy with the Train-the-Trainer candidate and would accept a new one. His colleague Stefanie Petrik will promote GJU Summer School at HS Heilbronn in order to attract new participants. Prof. Dr.-Ing. Rolf Biesenbach (HS Bochum) will continue his Erasmus project in IoT/Robotics with Dr. Nathir Rawashdeh from SATS.

New members could be attracted to collaborate with SATS/GJU like Prof. Dr.-Ing. Claudia Meiting (HS Augsburg), Prof. Dr. Gareth Monkman (HS Regensburg), Prof. Dr.-Ing. Martin Bothen (HS Aschaffenburg) and Prof. Dr.-Ing. Klaus Duerrkopp (FH Bielefeld).

The next **network meeting 2020** will probably be held separately from the FBT Mechatronik at one of SATS partner universities. Possible host universities are Technical University Hamburg-Harburg (TUHH) or HS Bochum. Another possibility is to organize one SATS network meeting with all three Departments Mechatronics, Mechanical & Maintenance, Industrial Engineering at GJU.