Experience and Possibilities of Cooperation of Higher Education Institutions in the Digital Era

Prof. Dr. Vera Marković

Faculty of Electronic Engineering, Department of Telecommunications, University of Niš
E-mail: vera.markovic@elfak.ni.ac.rs
Outline

• Introduction
• Advanced technologies and new mission of academia
• Activities at the Faculty of Electronic Engineering in Nis
• Example of Serbian-Bavarian university partnerships
• View of further opportunities for collaboration
• Conclusion
City of Niš

Belgrade - 237 km - Niš

Fortress

Faculty of Electronic Engineering

Serbian-Bavarian Higher Education Day, September 23-24, Bamberg
Faculty of Electronic Engineering, Niš

- One of 14 faculties within the University of Niš
- Accredited for 540 freshmen Bachelor students, 320 Master students and 100 PhD students
- More than 150 teaching staff

Teaching/research fields involve:
- computer science and informatics
- telecommunications
- microelectronics
- control systems
- power engineering, etc.
New Phase in the Digital Era

• Big and rapid technology changes are taking place

• Keyword: „SMART“ - everything is going to be smart:
  - smart homes,
  - smart cities,
  - smart vehicles,
  - smart traffic control,
  - smart healthcare, etc.

• Industrial sector: shift from the economy based on traditional industry to an economy based on information technology – fourth industrial revolution - „smart factories“
Economy Based on Information Technology

- Industry 4.0 (INDUSTRIE 4.0 - German strategic initiative through “High-Tech Strategy for 2020”)

- Combination of Cyber-physical systems, IoT, AI, cloud computing, etc.

- Cognitive computing simulates human thought process

- Smart factory becomes a reality

Source: [https://betanews.com/2018/05/04/iiot-adoption-challenges/](https://betanews.com/2018/05/04/iiot-adoption-challenges/)
Smart Technology Needs Competent Graduates

- Higher education needs to adapt to fast changes
- The industry will need universities to provide the right kind of knowledge and skills.
- Effective collaboration between the two sectors - industry and academia – becomes even more important.
- Smart technologies require much more interdisciplinary teaching, research and innovation
- Boosting graduates’ competencies such as: creativity, critical thinking and problem solving, collaboration, teamwork, leadership, etc.
Digital Strategy of Serbia

- Forecasts: “within two decades, 90% of jobs will require some digital proficiency”
- Future workforce needs to be digitally capable

- In 2016, the Government of the Republic of Serbia adopted a “Strategy on development of information technology industry for the period from 2017 to 2020”.

- As a part of the adopted Action plan for the Strategy implementation, significant enhancement of the capacities of Faculty of Electronic Engineering in Nis (FEE) is in progress.
A startup center was built within FEE in 2017 (hosting place for startup companies and student creativity center)
Science and Technology Park

• Construction of a new Science and Technology Park, right next to the faculty building, started this year.

• It will have a 14,000 square meter space and is expected to be completed by March 2020. The value of the investment is over €10 million.

• It will accommodate and foster the growth of startups, high-tech development companies, IT clusters, etc.

• Also, it will be used to train students to use advanced technologies and learn through practice.
Science and Technology Park
Science and Technology Park

Serbian-Bavarian Higher Education Day, September 23-24, Bamberg
Multi-Purpose Annex of the Faculty

• A multi-purpose annex of the FEE building of 7,000 square meter space started in June 2019, also as a part of the Government’s Action plan for IT development

• It will involve laboratories, classrooms, conference rooms, R&D, Spin-off and Start-up companies, work places, etc.

• The annex will provide the best conditions for establishing different research and design centers and for the work of young talents and researchers.
Multi-purpose Annex of the Faculty

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Multi-purpose Annex of the Faculty

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Other activities related to the university within the Serbian action plan for IT development includes:

• Increasing the number of students in higher education institutions, in the field of information technologies

• Projects aimed at the improvements of study programs with a special focus on IT knowledge and competences

• Currently, we are working on enhancing our study program also through Erasmus+ KA2 project „BENEFIT“ (2017-2020) „Boosting the telecommunication engineer profile to meet modern society and industry needs“, [https://www.project-benefit.eu/](https://www.project-benefit.eu/), with several EU and WB university partners.
A Successful Story of Serbian-Bavarian Cooperation

2006 - Start of collaboration – FEE proposal for a TEMPUS project „Development of Master Study Programmes in Telecommunications and Control“, TUM agreed to be a partner.

2007-2009 – Implementation of this TEMPUS project (common work, multiple visits ...)

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A Successful Story of Serbian-Bavarian Cooperation

2011 – application for a bilateral research project “Smart Modeling and Optimization of 3D Structured RF Components”, financed by DAAD and Serbian Ministry for Education, Science and Technological Development.

2012-2013 – Implementation (exchange of researches in both directions, common research activities). Results:

- 2 PhD theses,
- 2 papers published in scientific journals with impact factor
- 14 papers published in conference proceedings.
2015 – proposal for a new bilateral research project
“Advanced Modelling of Noisy Electromagnetic Field Propagation in Highly Integrated Electronic Circuit and System Environments”

2016-2017 – Project implementation. Results:
- 3 papers published in scientific journals
- 6 papers published in conference proceedings.
Serbian-Bavarian Cooperation
- a Successful Example -

2016-2017 – the third bilateral research project resulting from previous collaboration: “Flood prediction and alerting system”,

- 4 papers published in conference proceedings.

2015-2019 – Collaboration within the frame of a COST action. Results:

- 2 papers published in conference proceedings.
Serbian-Bavarian Cooperation
POSSIBLE FIELDS OF COOPERATION

• Teaching: all fields of telecommunications

• Research:
  ➢ Artificial intelligence in telecommunications
  ➢ Modeling and design of communication systems and devices
  ➢ Electromagnetic fields of modern wireless systems: health effects, numerical modelling, monitoring, standards and regulatory aspects
  ➢ Applied electromagnetics
  ➢ Multimedia systems

http://old.elfak.ni.ac.rs/en/departments/telecommunications
Transnational Collaboration for Smart Future

- Smart technology trends will impose the universities to increase innovations and research, university – industry partnership and opportunities for international academic collaboration.

- Different ways, scenarios and funding schemes for academic collaborations

DAAD  
Deutscher Akademischer Austausch Dienst  
German Academic Exchange Service

INTERREG

HORIZON 2020

Erasmus+
Transnational Collaboration for Smart Future

A view of possibilities of SERBIAN – BAVARIAN COLLABORATION in the field of technology development:

• Standard short study/research stays in both ways financed by Serbian or German state funding sources will remain a very good opportunity

• Joint research projects COMPANY ↔ UNIVERSITY TEAM
  (*Interactions between company/university partners could involve a variety of benefits, for example: MSc and PhD projects, trainings, recruitment, branding, etc.*)
• Students’ internships in a company abroad, enabling students to work for a longer period on specific projects

Example:

BMW GROUP
Praktikant (m/w/d) Qualitätsmanagement Fahrdynamik.
Beginn ab Juli 2019 - Dauer ab 4 Monate.

..... Wir bieten Ihnen ein Praktikum im präventiven Qualitätsmanagement an. Die Schwerpunkte Ihrer Tätigkeit bilden Risikoeinschätzungen und der Einsatz von Qualitätsmethoden in der Konzeptphase ....
Opportunities for the international cooperation even beyond the physical presence of the teachers or researchers at one place.

- A shift towards more interactive and collaborative components within higher educational e-learning - for instance, international teams of teachers could collaborate within virtual learning environments.

- Similarly, international teams of researchers can use all means of state-of-the-art communication for their common work without physical gathering and corresponding expenses.
Conclusion

• In the field of engineering, there is even a greater need for the international cooperation

• Variety of collaboration opportunities

• Common research projects aimed at producing innovations for the rapidly-changing industry

• Cooperation on improving the students’ knowledge and skills to be in line with technology and society trends

• Some new forms of cooperation are possible, based on virtual environments

• Faculty of Electronic Engineering is open for all forms of cooperation with Bavarian partners

• Promotion of the cooperation programs and funding possibilities is very important
Thank you for your attention!

Danke für Ihre Aufmerksamkeit!

Hvala na pažnji!