

# Undervisningsportfolio

## 1. Undervisnings-CV: Oversigt over undervisnings- og vejledningsopgaver med angivelse af fagområder, omfang, niveau (BA, kandidat, EVU, Ph.d) samt evt. censoropgaver.

Note: SWS denotes confrontational hours of teaching per week during the semester (usually 15 weeks) and was the terminology used at German universities to specify the "size" of a course (before Bologna). All courses, which have this information have been done for the Department of Applied Informatics at Augsburg University, Germany. All other course have been held at Aalborg University, Denmark. I have been active in several study programs both at bachelor and master level and both at Augsburg University and at Aalborg University.

- Aalborg University: Bachelor Medialogy, Bachelor Robotics, Bachelor Product and Design Psychology, Master Medialogy  
- Augsburg University: Bachelor Multimedia, Bachelor Media and Communication, Master Multimedia, Master (Elite Graduate Program) Software Engineering

### Lectures

1. Complex Software Systems (Bachelor Medialogy, UML/Algorithms) (5 ECTS), 2015-2016
2. Procedural Programming (Bachelor Medialogy/Bachelor Product and Design Psychology, C/C++) (5 ECTS), 2010-2016
3. Robotics Programming (Bachelor Robotics, C/C++/ROS) (5 ECTS), 2014-2016
4. Embodied Interaction (Master Medialogy, 5 ECTS), 2013-2016
5. Artificial Intelligence Programming (Bachelor Medialogy, 3 ECTS), 2010-2012, 2016
6. Software Agents and Playware (Master Medialogy, 5 ECTS), 2010-2012
7. Context-Aware Systems (Master (Elite Graduate Program) Software Engineering, 2 SWS), 2007-2009
8. Human-Computer Interaction (Master (Elite Graduate Program) Software Engineering, 4 SWS), 2006, 2008
9. Fundamentals of Multimedia (Bachelor Multimedia, 4 SWS), 2007-2008
10. User Interface Design (Master Multimedia 2 SWS), 2006
11. Affective Computing (Bachelor Multimedia, 4 SWS), 2005
12. Virtual Humans (Master Multimedia, 2 SWS), 2004
13. Multimodal Interaction (Bachelor Multimedia, 2 SWS), 2003

### Research Seminars

1. Research in Medialogy (Master Medialogy, 5 ECTS), 2012-2016
2. Readings in Medialogy (Master Medialogy, 2 ECTS), 2010-2011
3. Virtual Worlds (Master Multimedia, 2 SWS), 2009
4. Interactive Multimedia Systems (Master Multimedia, 2 SWS), 2008
5. Multimedia Interfaces (Master Multimedia, 2 SWS), 2007
6. Imitation-Based Behavior Generation (Master Multimedia, 2 SWS), 2007
7. Multimodal Corpus Analysis (Bachelor Media and Communication, 2 SWS), 2004-2007
8. Context-Sensitive Systems (Master Multimedia, 2 SWS), 2006
9. Multimodal Mobile Interfaces (Master Multimedia, 2 SWS), 2006
10. Multicultural Man-Machine Interaction (Master Multimedia, 2 SWS), 2005
11. Affective User Interfaces (Master Multimedia, 2 SWS), 2003
12. Multimodal Interaction (Master Multimedia, 2 SWS), 2002

### Practical Courses

1. Collaborative Serious Games (Bachelor Multimedia, 6 SWS), 2009
2. Ubiquitous Second Life Environment (Bachelor Multimedia, 6 SWS), 2008
3. Human-Computer Interaction (Bachelor Multimedia, 4 SWS), 2007
4. Wii-Based Interaction (Bachelor Multimedia, 6 SWS), 2007
5. Virtual Beergarden (Bachelor Multimedia, 6 SWS), 2006
6. Collaborative Multiplayer Games (Bachelor Multimedia, 6 SWS), 2006
7. Chatterbot for Kids (Bachelor Multimedia, 6 SWS), 2006
8. Location-Based Interaction (Bachelor Multimedia, 6 SWS), 2005
9. Affective Computing (Bachelor Multimedia, 4 SWS), 2005
10. Tangible Interaction Bachelor Multimedia, (6 SWS), 2004
11. Virtual Humans (Bachelor Multimedia, 6 SWS), 2004
12. Multimodal Interaction (Bachelor Multimedia, 6 SWS), 2003

### Project Supervision

#### Master level

Note: Projects marked with \* are master thesis projects. In all, I have supervised 29 students during their master thesis so far (23 in Aalborg, 6 in Augsburg).

1. \*Participatory design of a social robot at a nursing home (External partner: Rødekorshjemmet Løgstær), 2015
2. Playful navigation inside the city (External partner: VisitAalborg), 2015
3. \*Geometry learning across modalities (External partner: Skipper Clement International School Aalborg), 2015
4. Gender attribution in computer games, 2015
5. \*Age difference in interpretation of backchannels from a humanoid robot (External partner: SOSU Nord Futurelab,

Liselund Activity Center), 2014

6. \*Comparing Different Robot Embodiments in First Time Meeting Encounters (Externalpartner: SOSU Nord Futurelab), 2014
  7. \*Monsters Eat Art (External partner: Kunsten, Museum for Contemporary Art, Aalborg), 2014
  8. Case study on a Robotic Lamp for Memory Support (External Partner: RødekorshjemmetLøgstør), 2014
  9. Participatory Design for Developing Assistive Technology Supporting Staff and Residents in a Nursing Home (External Partner: Rødekorshjemmet Løgstør), 2014
  10. \*Apps for neurocognitive Rehabilitation (External partner: Brønderslev Neurocenter), 2014
  11. Experiential Astronomy Learning (External partner: Frejlev Skole), 2014
  12. Mobile shape collector (External partner: Skipper Clement International School Aalborg), 2014
  13. GeometryCity - An Educational Location-Aware Math Game (External partner: SkipperClement International School Aalborg), 2014
  14. User Involvement as a Factor of Robots Perceived Intelligence, 2014
  15. Perceiving Emotion From the Movement of a Collection of Non-Humanoid Bodies, 2014
  16. \*Notification System for Context-Aware Applications, 2014
  17. The Effect of Active vs. Inactive Error Correction Using Body Movements in a Non-Humanoid Companion Robot, 2013
  18. Investigating the Potentials of Embodied Agents in Interactive Public Installations (External Partners: Friis Shopping Mall, Aalborg), 2013
  19. Motivating User to Move Between Interactive Public Displays (External Partners: HjørringLibrary, Aalborg Library), 2013
  20. \*Virtual Savannah AI for the Simulation of an Ecosystem (External Partner: AalborgZoo), 2013
  21. \*Simulating Elephant Behavior (External Partner: Aalborg Zoo), 2013
  22. Utilizing Proxemics for an Interactive Game (External Partner: Jumboland Aalborg), 2013
  23. Controlling A Robot Using Physical Collaboration in Multiple Spaces, 2013
  24. Influence of Head Nod Backchannel Signals by a Humanoid Agent, 2013
  25. Developing an AR Game with Social Agents, 2012
  26. The Robot in the Coffee Room - Investigating the Novelty Effect, 2012
  27. FoodApp - A Smartphone App for Creating Awareness of Food Waste, 2012
  28. Investigating Felder-Silverman Learning Style Dimensions in Mobile Language Learning, 2012
  29. \*SHARP - Tele-rehabilitation tool for Speech Therapists, 2012
  30. \*Virtual Savannah 2.0 (External partners: Aalborg Zoo, Sofiendalskole), 2011
  31. \*Monsters at the Museum (External Partner: Kunsten, Museum for Contemporary Art, Aalborg), 2011
  32. \*The Little Painter (External Partner: Kunsten, Museum for Contemporary Art, Aalborg), 2011
  33. \*Neighbor Wars - A Smartphone App for Museums (External Partner: Kunsten, Museum for Contemporary Art, Aalborg), 2011
  34. Modeling Danish Greeting Scenarios with EMMA, an Embodied Conversational Agent (External partners: CNRS/Paris Telecom, French Embassy), 2011
  35. SHARP - Rehabilitation Tool for Speech Therapy for Aphasic Patients (External partner: Sygehus Vendsyssel, Hjørring), 2011
  36. It's Bluffng - Implementing a Dice Game With a Social Robot, 2011
  37. \*Camera Toolset for the Unity Game Engine Supporting Design Professionals (Externalparner: Det Danske Akademi for Digital, Interaktiv Underholdning), 2011
  38. \*CAT: A tool for support and evaluation of children with social behavioral problems (External partner: Børnehuset Kernen), 2011
  39. Prototyping Visual Knowledge Transfer: Developing a Prototype and In-Situ Evaluation in Rural Namibia (External Partners: Polytechnic of Namibia, Det Obelske Familiefond), 2010
  40. aMusement: Cross-Reality Social Games for Museums (External partner: Kunsten, Museum for Contemporary Art, Aalborg), 2010
  41. Virtual Savannah: Interactive Infotainment System for Aalborg Zoo (External partner: Aalborg Zoo), 2010
  42. Error Correcting Soft Keyboards Using Pattern Recognition, 2010
  43. Virtual Golf Trainer: Interactive Multimodal Feedback Generation, 2010
  44. ReActiMagic: Collaborative Mixed Reality Gaming Over a Distance, 2010
- Before 2010 (Augsburg University):
45. \*A plug and play tool for social group behavior for multiagent systems
  46. \*Gesturebased music generation
  47. \*Mobile intercultural training
  48. \*Combining IR tracking with three dimensional acceleration analysis for robust gesture recognition
  49. \*Trainable statistical natural language processing

Bachelor level

1. Sounds of the City (External partner: VisitAalborg, Aalborg Stadsarkiv), 2015
2. Mixed Reality Elephants (External partner: Aalborg Zoo), 2015
3. Detect And Avoid Behavior for UAVs, 2014
4. Spherometry - Pervasive Approach to Visual Computing, 2013
5. Christmas Elf (External partner: Hjørring Library), 2012
6. Fill the Figure (External partner: Jumboland Aalborg), 2012
7. Mirroring User Movements by a Robotic Ball, 2012

8. Intelligent Sphero - Path Planning for a Robotic Ball, 2012
9. Seaworld: Game Control by Head Tracking, 2010  
Before 2010 (Augsburg University)
10. Website for retrieving multimodal corpus data
11. Modeling first meeting encounters in Second Life
12. Participatory design of a tangible live music application
13. Second Life as an evaluation platform for interactive multiagent systems
14. Implementing a gaze model for dyadic interactions with a virtual character
15. Investigating usability effects during the migration of two customer portals
16. Statistical music generation based on harmonics
17. Multimodal generation based on style parameters
18. Modeling and evaluating behavior-based features for MPEG-4 facial animation
19. Generating appropriate non-verbal behavior for polite ECAs
20. Parameterized generation of polite texts
21. Development of a test environment for physiological measurements
22. Emotional self reports with a virtual agent

#### PhD supervision

1. Birgit Endrass, University of Augsburg, Germany: Cultural Diversity for Virtual Characters, Co-supervisor: Prof. Dr. Elisabeth André, Doctoral Degree: 2012
2. Kasper Rodil, Aalborg University, Denmark: Co-Designing Digital Technologies for Cultural Heritage Preservation with Indigenous Peoples in Namibia, Co-supervisor: Prof. Dr. Heike Winschiers-Theophilus
3. Co-supervisor (Mentor) for Christian Pallay, MCTS Technical University Munich, Germany: Revised Turing Test for Measuring Artificial Intelligence, Supervisor: Prof. Dr. Klaus Mainzer, Start: 2015

#### PhD assessment

1. Chair of assessment committee; PhD student: Søren Tranberg Hansen, DTI/Aalborg University, Denmark: Robot Games for Elderly { A Case Based Approach, Supervisor(s): Prof. Thomas Bak, Prof. Hans-Jørgen Andersen, PhD Awarded: 2011
2. Chair of assessment committee; PhD student: Jacob Madsen, Aalborg University, Denmark: User Experience in Augmented Reality for Cultural Heritage Preservation (tentative title), Supervisor: Assoc. Prof. Claus Madsen
3. Nick Degens, University of Wageningen, The Netherlands: To Boldly Go ...: Designing an Agent-Based Intercultural Training Tool, Supervisor(s): Prof. Adrie J. M. Beulens, Assoc. Prof. Dr. Gert-Jan Hofstede, PhD Awarded: 2014

#### Censoring duties (IT&Cognition)

Master theses at SDU and KU

Master course on Gesture and Language at KU

Bachelor course on Communication and Cognition at AU

## **2. Studieadministration: Oversigt over studieadministrative opgaver, eksempelvis medlem af studienævn, studieleder, semesterkoordinator, fagkoordinator, akkreditering m.v.**

Since 2010, I'm the coordinator of the last two semesters of the Medialogy master program (MED9 and MED10). Since 2021, I also coordinate the ninth semester of the Robotics master program. The semester coordinator is the main contact person for the students and refers to the study board. The coordinator is responsible for planning, monitoring and evaluation of the teaching activities and meets on a regular basis with the student representatives.

## **3. Universitetspædagogiske kvalifikationsforløb: Oversigt over gennemførte universitetspædagogiske kursusforløb, PBL-kurser, workshops, udviklingsprojekter, kollegial supervision o.l.**

## **4. Anden form for kvalificering: Konferencedeltagelse, debatindlæg, oplæg m.v. i relation til uddannelse, "Undervisningens dag", o.l.**

## **5. Undervisningsudviklingsforløb og undervisningsmateriale: Oversigt over medvirken til udvikling af nye moduler, undervisningsmateriale, uddannelser, e-learning, samarbejde med eksterne samarbejdspartnere o.l.**

#### Teaching concept

In order to engage students in courses, seminars, projects, I rely on two main pillars, a research-based approach to education on all levels (including bachelor) and a real-life component in the form of external partners whenever possible. This is apparent from the list of project supervisions (see Section 3.4) that most of the time include external partners from

industry or the public sector such as museums, schools, or health care institutions. To qualify for a project with external partners, students have to go through a rigorous assessment of their proposals, which in the end have to incorporate both a research and an application component. To ensure a peer-based quality control, I established regular cross-semester research meetings with all groups supervised by me in a given semester (usually 5-8). Additionally, I started to promote the benefits of continuous engagement in a specific research topic, resulting in excellent results for the students accepting this chance of pursuing a topic over more than one semester. Examples include the Virtual Savannah collaboration with Aalborg Zoo (runner up at VentureCup Denmark) or the Social Robotics collaboration with Løgstør Rødekorshjemmet, which both resulted in a number of joint publications.

Aalborg University's educational strategy is build up on the ideas of problem-based learning (PBL) while still running a traditional semester structure in the study programs. This often hinders communication between related projects and also across disciplines. In order to establish cross-semester fertilization of student projects and draw students into ongoing research at the department, we have started to experiment with integration of student projects across semesters in a research group structure. For example, we ran this structure for all student projects that worked with citizens with brain damage, allowing us to pool groups from ROB4, MED6, MED8, and MED10. This research group structure is thought of as an incubator for high level student research across semesters creating:

- Synergy: Students participate in a research group environment where all members focus on similar topics.
- Research Skills: Students are pushed to a perspective change of their projects from products to scientific inquiry that produces new knowledge and is embedded in larger contexts.
- Expertise: Students get the opportunity to learn from each other and engage in long term perspectives in their projects.
- Networking: Projects are done in collaboration with external partners. Students will have the opportunity to present their work outside the university and interact with real contexts for their research.

On top of this successful approach, our group has established what we call the International Track inside the master program. The general idea is to prepare students for careers in international contexts and teams by engaging them in project work that requires to spend half a year abroad during their master studies. To this end, we propose projects in collaboration with some of our international partners, students start working on the topics in MED8/ROB8, go abroad in MED9/ROB9 and then do their master thesis at home or abroad. This initiative was a bit challenged by Covid 19 but is planned to resume with the current cohort in Spring 2022.

This initiative is based on formal agreements with the partner universities, e.g. Erasmus+ or memorandum of agreements.

For instance, our Robotics student Casper Mariager went on internship at Honda Research Institute Japan in relation to our collaboration agreement in the Social Intelligent Robotics Consortium to work on Honda's new tabletop robot Haru. He continued with this work in his master thesis afterwards. Another example is our Medialogy student Emilie Arendttrup that started working on topics around VR and intangible cultural heritage in MED7, then went to Namibia during MED9 and MED10 to work with our colleagues from NUST with indigenous groups in the framework of an Erasmus+ agreement.

Recently, we started participating in two new initiatives to further interdisciplinarity and internationalization, bringing STEM and SSH closer together. ABRA (Artificial Biology, Robotics, and Art) develops the curriculum for an Erasmus joint master program, which the consortium will apply for in 2023. Moreover, we are part of a consortium that develops a curriculum for a Nordic master in Wearable Intelligence that should be established between Finland, Sweden and Denmark in 2024.

## **6. Nominering til og/eller modtagelse af undervisningspriser.**

## **7. Evt. personlige refleksioner og initiativer: Personlige overvejelser knyttet til undervisning og vejledning, ønsker til og planer for pædagogisk videreudvikling, planer for opfølgning på undervisningsevalueringer m.v.**

## **8. Andet.**

Please send me an email (matthias AT create.aau.dk) if you actually have read this page.