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My field of expertise lies in degradation and lifetime of solar cells based on organic and hybrid semiconductors, with focus on characterization and stabilization. With my research I aim to contribute to the solutions of the global environmental and climate challenges, by developing environmentally-friendly renewable energy technologies.
I have introduced additive-assisted photochemical stabilization of organic solar cells and was one of the contributors to the round-robin investigations that re-defined the lifetime figure of merit and constituted ISOS protocols for stability testing of perovskite solar cells (PSC).

Education

2009 - 2014	Dr. rer. nat. (Ph.D.) from Institute of Physics, Experimental Physics I, Ilmenau University of Technology (TUI), Germany - Mentors: Prof. Gerhard Gobsch, Dr. Harald Hoppe; Focus: Degradation and stabilization of organic solar cells
2002 - 2009	MSc in Electrical engineering (grade average: A), University of Zagreb, Faculty of Electrical Engineering and Computing, Croatia

Scientific timeline

2017 - present	Assistant Professor at NanoSYD, OPV Group at Mads Clausen Institute, SDU; Focus: Degradation and stabilization of organic and perovskite solar cells
2017	Research Stay at Institute of Problems in Chemical Physics of Russian Academy of Science, Chernogolovka – group of Prof. Pavel Troshin (1 month) Light-Induced Electron Spin Resonance (LESR) for OPV degradation
2014 - 2017	Postdoc at NanoSYD, OPV Group at Mads Clausen Institute, SDU OPV stability, Nanostructured flexible and semitransparent OPV
2012	Ph. D. student exchange (I-CAMP 2012) at University of Colorado, Boulder, USA / National Renewable Energy Laboratory, Golden, USA – groups of Prof. Ivan Smalyukh and Dr. Garry Rumbles (1 month) Organic and nanostructured photovoltaics
2008	Exchange stay at the Ångström Laboratory, Uppsala University, Sweden – Prof. Arne Roos & Prof. Charlotte Platzer-Björkman (6 months) Optical Materials (smart windows), Solar Energy: Technologies & Systems (CIGS cells)

Project funding

2020 - 2024	DFF FTP Research Project 2 (co-PI) "Tuning the Photostability of Organic Photovoltaic Components" (6,2 mil. DKK), SDU with Prof. Kurt V. Mikkelsen (PI, KU), Prof. Mogens Brøndsted Nielsen (KU), Prof. Peter R. Ogilby (AU)
2017 - 2019	Villum Fonden Research Project Grant (co-PI) "Mechanical and Photochemical Stabilization of Flexible Organic Solar Cells" (6 mil. DKK), SDU with Prof. Roland Resel (TU Graz), Prof. Heinz Sturm (Federal Institute for Materials Research and Testing Berlin), Prof. Anne L. Skov (DTU), Prof. Peter R. Ogilby (AU)
2015 - 2017	DFF FTP Individual Postdoc Grant (PI) "Stabilization of Organic Solar Cells by Ternary Blending Active Layers with Stabilizing Additives" (2.4 mil. DKK), SDU with Dr. Dai Zhang, Eberhard Karls University of Tübingen and Dr. Lee J. Richter, National Institute of Standards and Technology, USA
2017	COST action MP1307 Short Term Scientific Mission “Light-Induced Electron Spin Resonance Spectroscopy Investigations of Degradation Mechanisms of OPV Cells” with Prof. Pavel Troshin, Institute of Problems in Chemical Physics of Russian Academy of Science
2012 - 2013	Thuringian State Graduate Stipend, (Thüringer Landesgraduiertenförderung), TUI

Awards

2020	L'Oréal-UNESCO For Women in Science International Rising Talent Prize
2019	L’Oréal-UNESCO For Women in Science Prize
2019	Hot Manuscript of 2018 of Energy & Environmental Science (IF:30) for "Reconsidering Figures of Merit for the Performance and Stability of Perovskite PV"
2017	Highlight of 2016 of IOP Journal of Physics D for “Long-term stabilization of organic solar cells using UV absorbers”
2012	I-CAM fellowship for I-CAMP 2012 school, University of Colorado - Boulder/NREL
2011	Best Poster Award of Polymer Degradation Discussion Group Meeting for “Morphological degradation of polymer/fullerene solar cells” Positions

Positions of trust

Referee of scientific journals (Scientific Reports, Applied Physics Letters, Journal of Photonics for Energy, Thin Solid Films, and more)
Reviewer of scientific proposals (STSM proposals for EU COST action)
Scientific Book Editor (World Scientific Reference of Hybrid Materials)
Academic semester coordination (SDU)
Conference co-organizer (International Summit on Stability of Organic and Hybrid Solar Cells ISOS 2021, nanoGe Fall Meeting 2020, DTU-SDU Summerschool on Photovoltaics 2020, 100% Climate Neutrality Conference 2019, EU Marie Curie ITN Thinface workshop 2014)
Invited talks presenter (Sede Boqer Symposium on Solar Electricity Production 2019, Ben Gurion University of the Negev, Israel; Summer School on Molecular Dynamics and Chemical Kinetics 2019, Copenhagen University, Denmark; Lecture at the Royal Danish Academy of Sciences an Letters 2019; International School on Hybrid and Organic Photovoltaics 2018, University of Rome Tor Vergata, Italy)

Supervision

Co-supervisor of 1 PhD student (SDU) and 6 MSc students (TUI, SDU). Unofficial day-to-day supervisor of 2 European ITN Marie Curie and 1 SDU2020 PhD student. In charge of Lifetime measurements and FTIR (Fourier Transform IR Spectroscopy) training for our research center staff.
Received Pedagogical training (SDU Adjunktpædagogikum, 2019) with accent on PhD supervision

Materials (SDU), Electronics 1 (SDU); Introductory physics (TUI), Measurements in photovoltaics and renewable energy technologies (TUI), Mechatronic Experts in Teams (SDU), Discover the Mechatronics Development Process - Semester Project (SDU), Microproject (SDU)

Teaching experience & training

Courses taught

Electronics 1 (SDU; 2. semester bachelor 2018, 2019, 2020) - lecturer
Mathematics for Signals and Systems (SDU, 3. semester bachelor 2019, 2020) - lecturer
Expert in Teams (SDU; 5. semester bachelor 2018) - laboratory supervisor
Materials (SDU; 1. semester bachelor 2017) - lecturer
Microproject (SDU; 3. semester master 2017) - laboratory supervisor
Discover the Mechatronic Development Process (SDU; 1. semester bachelor 2017) - laboratory supervisor
Introductory Physics "Physikalisches Grundpraktikum" (TUI; 1. and 2. semester bachelor 2012, 2013) - laboratory supervisor

For all of the courses that I lecture at SDU, I am responsible for the coordination, planning and the choice of teaching content, as well as composing and evaluating final examinations and running assignments.

Semester coordinator (SDU; 1.semester bachelor Mechatronics and Innovation & Business 2017)

Formal and informal teacher training

Lecturer training program (SDU; 2017-2019)
Questioning – how it can support learning, teaching and assessment (SDU; 2017)
Public speaking and presentations skills (SDU; 2017)
Teaching and learning with social media / Teaching with 365 programs: Teams, Yammer and Sway (SDU; 2017)

Teaching philosophy

In the following, I will describe my teaching philosophy, divided into three levels of teaching professionalism [1]. My goal is to ensure that my classroom provides an all-inclusive atmosphere that enables students to feel motivated to participate in the building their understanding of the course topics, as well as their overall skills, knowledge and competences, as required by the curriculum.

Planning –finding a way through supercomplex world using research-based teaching
In the light of Barnett et al. [2], it is of great importance that academia recognizes the needs of the "supercomplex world" of the modern society, in which the university educational programs have to fit in between the requirements that are set by the state authorities, labor market, academia and students. Being a lecturer at SDU, this is already to a great extent acknowledged in the SDU DSMI model approach. The striving towards performativity (as described by Lyotard et al. [3]), in which the disciplines are no longer supported within the educational system unless they prove their use-value in the global market, can be clearly identified within the curriculum of the mechatronics studies which I teach. Educational-disciplinary elements aligned with the business-industrial sector, such as problem-solving are strongly emphasized both within SDU's BEng and BSc in engineering programs, where the courses consist of 1:3 ratio of academic to project-oriented content. In such a framework, educational-corporate "core skills", such as conducting oral presentations of the projects, developing written communicative skills, leadership skills and teamworking, are being developed. In general, business-industrial sector has a strong continuous presence in the course of the study of our students, starting by advising the study course contents (thus introducing pedagogical-educational elements in which new performativities are called

forth, requiring learning new technologies in order to develop new understanding and address current state-of-the-art topics), providing internships and shorter study projects (thus bringing in specific corporate-instrumental research topics to make sure that the elements important for the business sector are addressed by the curriculum), all the way to being involved in the actual courses as stakeholders and supervisors on semester project courses. Even in the later study semesters of MSc and PhD studies, the business-industrial sector has a strong influence on the very epistemological aspect, as the research topics offered to the students strongly depend on the available funded projects. As in the current scheme, the university itself does not provide funding that would cover the industry non-related basic research, the research topics and directions are mostly defined by the funding agencies, whose support is largely reserved for the applied science projects with direct link to business-industry sector (as opposed to the fundamental science research which in itself deepens and widens the overall scientific understanding, without immediate direct relevance to the business-industry). As a teacher, I see my role to aid the students position themselves in the supercomplex world. This I envisage being done by strengthening the required performative aspects of curriculum in two main points: making use of novel technologies of pedagogy to create a more performative aura around the subjects I teach, thus making the course more interactive and appealing to the students and thus increasing the students' retention of the presented topics (pedagogical-technological); and developing self-monitoring skills in the students, by building reflexive capacities which enable students to engage themselves in continuous self-learning, even once they have finished the formal education, thus making it possible to continuously reconstitute themselves professionally through their lifespan according to the constantly evolving needs in the business-industry-academia world. Another important aspect that teaching should provide is alignment with the research. Following the classification given by Healey et al. [4] and Griffiths et al. [5], I can identify different aspects of research-based teaching in the different courses that I teach. Research-led type, in which the students are taught the research findings as the subject content, is predominant in lower bachelor semester subjects in which it is required that the students learn the fundaments of the disciplines, such as Materials or Electronics. In these courses, the research aspect comes in the form of giving students examples from my research field related to the course curriculum. These types of courses focus on getting the students acquainted with the basic concepts of their studies, so in this case, I don't see a benefit to engage them in extensive paper discussions or deeper experimental work. However, I am of the opinion that it is important, from the beginning, to start building the awareness about the processes involved in research-oriented construction of knowledge in the subject - which also well aligns with the DSMI model project-based learning courses such as 1st semester Discover the Mechatronic Development Process and 5th semester Experts in Teams. In these subjects, the students are supervised in how to identify scientific problems, develop their methodology of solving it, conduct different experiments to verify the methodology and evaluate the outcomes, thus complying with research-based learning (where students learn as researchers, by undertaking inquiry-based activities) as well as with research-oriented learning (in which the students are taught about the processes of constructing knowledge and the researcher ethos is being developed in students). At the higher semesters, the master courses (Microelectronics) as well as a part of PhD supervision, students have acquired a higher level of knowledge and also understanding of the research processes, thus my teaching can take a research-tutored form (in which specific parts of curriculum are learned through discussions of current research papers) and research-based (in which the students undertake experiments that further contribute to the current state-of-the-art understanding of the subject, and publish their findings in scientific journals).

Practice – my role as a teacher

The first teaching I was assigned to at SDU, was as a substitute teacher for a colleague on maternity leave, so I started with teaching before taking part in the Lecturer Training Program (LTP). Thus, I instinctively modeled my lectures similarly to the lectures I had as a student. My two SDU courses, Materials and Electronics 1 are fact-based [6] and require from the students to know and understand the fundamental key engineering concepts. Now that I have gained more overview of the basic pedagogical and teaching concepts, I would characterize my initial teaching as lecture-based frontal instruction, in which the theoretical key concepts are presented by me, followed by an exercise sequence in which the presented theory is applied and solutions calculated – first independently by the students, and then followed by my elaboration. After familiarizing myself with the teacher development analysis of Kugel [7], this style seems to be usual for the beginner teachers. As described there, indeed my focus has so far been on the self and the academic content of the subject, i.e. the first two stages of Kugel's development. This is also somewhat a consequence of the student evaluations, which main comments were to work on speaking skills and on assuming more authority in the classroom. Thus my current efforts so far were to enhance the learning experience of my students by developing my role of "teacher as a performer" [8], including mastering the body language, leading of my voice and clear wording of the messages, in order to maximize the students' understanding of what is said in class. Some of the physical aspects of good public speaking (breathing techniques for strengthening the voice [9][10], "power posing" for gaining authority over the audience [11]) is something that can be practiced and prepared prior to the classes. However, some other aspects, e.g. speaking slower, allotting time during the lecture for taking notes, and making long enough breaks after posing a question to allow more students to think and answer [8], are rather time-costly, and in order to incorporate them into the lessons, a choice has to be made: either to provide a rather basic understanding of a wide set of topics, or investing more time on deepening the understanding of a limited set of topics [8] by a variety of different means ("buckshot" approach [7] – telling the theory, including multimedia for visual explanation, practical hands-on exercises etc.). The main problem with the first is that the students might become oversaturated by the fast-moving concepts presented and their attention dwindles. On the contrary, the second one is most probable to activate the highest fraction of students, as the "buckshot" will target the majority of the different preferred learning styles of the different students. In this sense, I see the need to develop my second teaching role, aligned with the second Kugel's transition from "teaching a subject" to "facilitate students' learning". Within this, my goal is to increase the level of students'interaction by implementing various class activities. Some ideas that I would like to implement include: case-based learning in which the material is learned in a process of solving a practical question [12], think-pair-share sessions and Kahoot! quizzes coupled onto the standard exercise solving with the aim of increasing the participation of students [6][13], voting system ("clickers") for receiving instant feedback on whether the just presented

topic was well understood [14], 1-minute papers for summarizing the day's session for easier students' recollection of the main lecture points [13], course forum where students can ask any questions that stayed unclear. With this, I believe that the optimum for the students will be obtained by merging good presenting skills ("teacher as a performer") with plenty of classroom activities with the goal of coaching the students towards a good understanding of the topic ("teacher as a coach").

Reflection – (self)evaluation for continuous development

I see evaluation as the main ingredient needed for the growth and development of teaching. It comes in different forms; those that I have come across so far can be divided into three main groups: self-reflection, students' feedback, and colleagues' feedback. Self-evaluation comes somewhat naturally, in parallel with the lecture session – it is impossible to pre-plan how successfully will the planned activities be received by the students (as each student group is made of individuals with different pre-knowledge, abilities and learning style), so one realizes what functions well and what should be handled differently only after the lecture is done. Another important source for self-evaluation I find in running assignment and exam results of the students, as it gives a qualitative indication of how well the different topics were understood and by how large a fraction of students. Student evaluation comes in the form of a standard quality assurance scheme at our department- two written surveys (mid-term and end-of-semester) and one final group discussion. Additionally, I find it useful to spontaneously ask the students straight after each lecture for suggestions on improvement. This enables me to focus my efforts and prioritize improving the points which the students themselves find important. Of course, these suggestions are to be taken cum grano salis and take into account the possibility of students' subjectively colored critique (e.g. negotiating lower assessment criteria to reduce their learning efforts, or being overly negative upon receiving a bad grade). Finally, I find it most useful to learn from my colleagues and LTP supervisors ("peer observation" in Bamber et al. [15], "critical friend" in Horst et al. [16] and "collegial supervision" in Leth Andersen et al. [17]). Regardless of the subject, all teachers have common goals – grab the attention of students, find the best way to present topics, motivate students to study regularly. Therefore, from time to time, I attend my colleagues' lectures and engage in discussing our teaching experiences.

References

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