Teaching portfolio

1. Teaching CV: A list of teaching and supervision tasks, including specification of academic fields, scope, level (bachelor, master, continuing education, PhD). Please state the teaching method used (e.g. lecture, class teaching, exercises, supervision, examination, coexamination, distance teaching, internet-based teaching and evaluation of teaching). Please also indicate the language of instruction.

Courses:

PhD and master courses:

•Electrochemistry, PhD general course, 2.5 ECTS, Aalborg University, Aalborg, 2025, 15 students, in English, role: Teacher of responsible.

•Materials Chemistry, 5 ECTS, Aalborg University, Aalborg, 2023, ca. 30 students, in English, role: 2 lectures + exam. •Physical Chemistry of Materials, 5 ECTS, Aalborg University, Aalborg, 2023-, ca. 30 students, in English, role: Teacher of responsible, 12 lectures + exam.

Biosensor section in Instrumental Chemical Analysis (Course ID 26317), Technical University of Denmark, Lyngby, 2021, 5 ECTS, ca. 20 students, in English, role: 1 lecture + wrap-up. Note: I develop the teaching materials by myself based on my research in electrochemical biosensors, conveying the research frontier in glucose biosensor to the students.
Presentation and Discussion of Research and Literature within Inorganic Chemistry and Materials Science (Course ID

26970), Technical University of Denmark, Lyngby, 2021, 5 ECTS, ca. 10 students, in English, role: 1 lecture. Note: I present a lecture on enzymatic bioelectrochemistry by converting my research into presentation materials.

•Master special course: Evaluation of the anti-biofouling effect of the nanoporous gold, Technical University of Denmark, Lyngby, 2021, 10 ECTS, 1 student, in English, role: supervising in the lab.

•Master special course: Electrochemical detection of dopamine on nanoporous gold, Technical University of Denmark, Lyngby, 2021, 5 ECTS, 1 student, in English, role: supervising in the lab.

•Chemistry at the Nanoscale (Course ID 26290), Technical University of Denmark, Lyngby, 2018-2025, 5 ECTS, ca. 10 students, in English, role: 1 lecture for teaching week 10; lab demonstrator for the electrochemistry of cytochrome c and atomic force microscope.

Bachelor courses:

•Physical Chemistry 3 (CH4004), University of Limerick, Limerick, 2014-2018, ca. 20 students, in English, role: lab demonstrator for 5 lab exercises.

•Physical Chemistry 4 (CH4005), University of Limerick, Limerick, 2014-2018, ca. 20 students, in English, role: lab demonstrator for 6 lab exercises.

•Physical Chemistry (CH4054), University of Limerick, Limerick, 2014-2018, ca. 20 students, in English, role: lab demonstrator for 6 lab exercises.

•General Chemistry 1 (CH4701 / CH4721), University of Limerick, Limerick, 2014-2018, ca. 50 students, in English, role: lab demonstrator for 4 lab exercises.

Student supervision:

Problem based learning (PBL) student groups, Aalborg University, since 2023:

•Three 8th semester PBL group, 2025 Spring, 8 students.

•One 7th semester PBL group: Investigating (Co/Zn)ZIF-62 as an alternative to noble metal-based electrocatalysts for use in OER in the production of green hydrogen, 2024 Autumn, 5 students.

•Three 2nd semester PBL groups, 2024 Spring, 15 students.

•One 8th semester PBL group, 2024 Spring, 5 students.

•Two 8th semester PBL groups, 2024 Spring, 10 students.

•One 7th semester PBL group: Optimization of the oxygen evolution reaction using amorphous ZIF-62(M) (M=Zn,Co) glass as an electrocatalyst, 2023 Autumn, 5 students.

•One 8th semester PBL group: An electrochemical sensor for uric acid, based on electropolymerized poly(3,4ethylenedioxythiophene) (PEDOT), 2023 Spring, 1 student.

Master students:

•Emil Bjødstrup Nielsen, September 2024- June 2025, Thesis title: Electroenzymatic NADH regeneration by redox polymer-immobilized enzymatic system, Aalborg University, Aalborg

•Johanne Stagsted Kristensen, September 2023- June 2024, Thesis title: Cyclodextrin modified hydrogels for mediated enzymatic bioelectrodes, Aalborg University, Aalborg

Zhengyang Shan, September 2022- January 2023, Thesis title: The effect of number of layers of nanoporous gold films on their electrochemical behaviors, Technical University of Denmark, Lyngby

•Pia Tønnes Jakobsen, February 2021- August 2021, Thesis title: Aptamer-based electrochemical thrombin measurement, Technical University of Denmark, Lyngby

PhD students:

•Two as co-supervisor (2023-) at Aalborg University, Aalborg

1. Yu Qian, November 2023-November 2027, Thesis title: The use of electricity-stimulated stem cells for chronic wound.

2. Emil Riis Wolfhagen, September 2024-August 2028, Thesis title: TBD.

•Three as co-supervisor (2018-2022) at Technical University of Denmark, Lyngby

1. Wei Huang, September 2017-December 2020, Thesis title: Transition metal-based composites for oxygen evolution electrocatalysis and lithium ion storage.

2. Xiaomei Yan, September 2018-December 2021, Thesis title: Electrochemical studies of redox active molecular and enzyme monolayers on nanostructured electrode surfaces.

3. Fangyuan Diao, September 2018-March 2022, Thesis title: Prussian Blue Analogues and Their Derivatives for Water Splitting Reactions.

Examinator/censor:

Opponent of Ayesha Kousar's PhD thesis entitled Electrochemistry and Surface Properties of Nanostructured Carbon Electrodes and Interfaces, School of Chemical Engineering, Aalto University, Finland (August 2024)
Pre-examiner of 2 PhD theses, School of Chemical Engineering, Aalto University, Finland (March 2023, September 2022)
Chairperson of the PhD defense of 3 students, Technical University of Denmark, Lyngby (2021-2022)

Dissemination/outreach:

•Gave a lecture at Synergi projekt med UCN with with primary school teachers, on Sep. 26, 2023.

•Gave a lecture at Coloplast A/S, entitled Electrochemical biosensor: a well-known but rapidly evolving technique, on Apr. 20, 2023.

•Together with a journalist, we wrote a newspaper article entitled How to power all your devices – using your own body, published on Jun 13, 2019, in The Irish Times.

•I wrote a newspaper article entitled These snowy branches are actually gold? published on Dec. 14, 2015, in The Science of Christmas Supplement, Irish Independent.

2. Study/programme administration and management: Experience in programme management and coordination. A list of study administration tasks, e.g. study board membership, chair of study board, semester or course coordinator, accreditation tasks, etc. Experience in planning teaching activities. Experience in programme development. Participating in committees and commissions etc. on education issues.

Participated 2025 curriculum revision of Chemistry education, Aalborg University, Aalborg
Coordinator of the 9-10th Semester for chemical engineering and chemistry students, Aalborg University, Aalborg, 2023-

3. Formal pedagogical training: A list of completed courses in university pedagogy, PBL courses, workshops, academic development projects, collegial guidance and supervision, etc. Written assessment from the course in university pedagogy for assistant professors. Participation in conferences on pedagogy and didactics. Please enclose any documentation of the above, such as course certificates, references, etc

In 2023, I have finished University Pedagogical Programme for assistant professors at Aalborg University, Aalborg.
In 2022, I have participated University Teacher Training Programme such as Course 1 - Teaching Lab, Supervision of large Projects, at Technical University of Denmark, Lyngby.

4. Other qualifications: Conference contributions and attendance, contributions to debates, scientific articles on pedagogical issues etc. Peer supervision, editorials, mentoring experience or other types of competence development activities.

Scientific article: Junjun Tan*, Xinxin Xiao; Harness first principles thinking in problem-based learning for chemical education, Journal of Chemical Education 2025, 102, 2, 943-947.

5. Pedagogical development and research: Development of new courses, teaching materials, teaching methods, examination types or other types of pedagogical development. Didactic and pedagogical research. Cooperation with external collaboration partners.

•In 2025, I developed a new PhD general course on electrochemistry. We attracted 16 PhD students from several Danish universities like AAU, AU, SDU and DTU. The 3-day course blends theory lectures, hand-on lab experiments and also PBL group work. A new structure of combining theory, lab work and group work was practiced, exposing fundamental electrochemistry to students.

•In my 2023 AAU pedagogical report entitled "Reflective practice to promote new teacher's understanding of problem based learning (PBL)", I have implemented a simple frame for reflective practice taking advantage of teaching blog, online questionnaire, and supervisor observation. There are many interesting findings as the outcomes of my project. The major ones are: (1) As educated in the PBL context, our AAU students are good at group work, peer learning, as well as giving

constructive feedback. (2) Students' learning is motivated by multiple factors, including the content setting, teaching quality, and exam setting. (3) There are many mismatches between reflections of my own and students'. This highlights the substantial difference between the teaching by the teacher and the learning by the students.

6. References on your teaching skills from superiors or colleagues. Teaching evaluations and any teaching awards received.

Course evaluations to the two courses Physical Chemistry of Materials and Electrochemistry, of which I am the teacher of responsible, are attached.

7. Personal reflections and initiatives: Here you may state any personal deliberations as regards teaching and supervision, any wishes and plans for further pedagogical development, plans for following up on student feedback/evaluations, etc. Personal reflections on your own pedagogical practice, including objectives, methods and implementation. This should include an analysis and a reasoned description of your pedagogical activities in relation to your pedagogical understanding and student learning. Thoughts on the teaching method at Aalborg University (which is largely based on group-organised project work and problem-based learning)

My vision is to facilitate research-oriented teaching. New knowledge and experimental setups generated during my research activities will be converted into new educational materials for students at AAU/BIO. We are presently facing global challenges in healthcare and energy. The global demand for solving multi-dimensional problems is also re-shaping how we educate students in universities. I would like to explicitly highlight the significance of interdisciplinary education, which greatly improves students' understandings in the challenges and equips them the skills to solve the problems. I have research experiences in electrochemistry, bioelectrochemistry, materials science, physical chemistry, and analytical chemistry. This multidisciplinary vision is an important aspect that I apply in chemistry education at various levels. My vision in classroom lecturing is to promote student-centered approach. My vision in supervising student projects is to expose students with multidisciplinary skills.

8. Any other information or comments.

Type your answer here...