



Christian Frydendahl

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My research utilizes **device physics** and **nanooptics** to develop new **optoelectronic** device concepts and platforms. This includes applications such as optical modulators, photodetectors, molecular/chemical sensors, as well as digital memory and neuromorphic computing devices. My work includes **nanofabrication**, **optical design/simulation**, **optical spectroscopy**, and **optoelectronic characterization** to design, develop, and measure devices from scratch, often utilizing the convenient and low-cost 2D materials platform to assemble complex material heterostructure junctions and merging them with nanooptical elements such as metasurfaces, plasmonic resonators, or nanophotonic waveguides to enhance light-matter interaction.

Employment experience:

- 01/06/24 – Current: **Postdoc, Villum Fellow**
Aarhus University, Department of Physics and Astronomy
Group of Prof. Yong Chen
- 01/06/22 – 31/05/24: **Postdoc, Carlsberg Reintegration Fellow**
University of Southern Denmark, The Faculty of Engineering
Group of Prof. Sergey I. Bozhevolnyi
- 01/03/18 – 31/05/22: **Postdoc, Carlsberg Internationalization Fellow**
The Hebrew University of Jerusalem, Department of Applied Physics
Group of Prof. Uriel Levy

Education:

- 15/09/14 – 06/06/18: **PhD, Nanooptics/plasmonics**
Technical University of Denmark, Department of Photonics Engineering
Supervisors: Assoc. Prof. Nicolas Stenger, Assoc. Prof. Andrei V. Lavrinenko, and Prof. N. Asger Mortensen
- 20/08/11 – 29/11/14: **MSc, Physics**
Aarhus University, Department of Physics and Astronomy
Thesis Supervisor: Prof. Philip Hofmann
- 12/08/08 – 23/08/14: **BSc, Physics**
Aarhus University, Department of Physics and Astronomy
Thesis Supervisor: Prof. Helge Kragh

Research grants (main PI):

- 01/06/24 – 31/05/26: **The Villum Foundation**, Villum Experiment, 1.998.700 DKK (~268.000 euros)
“LUMINA – Light-based Neuromodulation in Novel Material Artificial Neurons”
Individual grant to cover equipment and salary for a postdoc for 2 years at AU.
- 01/06/22 – 31/05/24: **The Carlsberg Foundation**, Reintegration Fellowship, 1.354.000 DKK (~181.984 euros)
“2D-PLASWAVE – 2D Material Light Sources for Plasmonic Waveguides”
Individual fellowship to cover salary costs during my postdoc at SDU for two years.
- 01/03/19 – 28/02/22: **The Carlsberg Foundation**, Internationalisation Fellowship, 750.000 DKK (~94.120 euros)
“HEROD – vdW Heterostructures for Optical Detection”
Individual grant to cover salary costs for my postdoc at HUJI for two years.

Student Supervision and mentorship:

- 2025 – current: **PhD-student mentor, AU**
I am actively mentoring/co-supervising Ihsan Ahmed Kolasseri in the group of Prof. Yong, assisting with training in experimental methods, data interpretation/analysis, paper writing and planning of experiments.
- 2024: **Bachelor’s thesis supervisor, SDU**
I supervised students Jacob Holm Colding-Jørgensen and Jeppe Janssen during their Bachelor’s thesis project on 2D Material Light Emitting Diodes at SDU.
- 2023 – present: **PhD-student co-supervisor, SDU**
I am co-supervising Martin Nørgaard with Asst. Prof. Vladimir Zenin and Prof. N. Asger Mortensen, as he pursues PhD-studies in the DNRF Center of Excellence POLIMA at SDU.

- 2023: **PhysTek Student Mentor**, SDU
Acted as mentor for 2 new BSc students at the PhysTek study line at SDU.
- 2018 – 2022: **Research Student Mentor**, HUJI
I was involved in mentoring/co-supervision of 3 Master’s students and 6 PhD students during my time at HUJI, with Prof. Uriel Levy as principal supervisor. I provided advice on research work, presentation coaching, writing advice for journal articles, theses, and grant proposals, helping to get started doing peer-review, career planning advice, etc.
- 2016: **Master’s-student co-supervisor**, DTU
I co-supervised student Kristoffer Skaftved Mathiesen with main supervisor Assoc. Prof. Nicolas Stenger during my PhD at DTU.

Teaching:

- 2024: **Teaching Assistant**, “*Calculus Beta*” (BSc, 10 ECTS), AU
Introductory course on calculus and statistics for 1st year physics students at AU. I assisted students with theoretical exercises and corrected their weekly assignments. ~25 students
- 2023: **Guest lecturer**, “*Atomic physics*” (MSc, 5 ECTS), SDU,
Course on introductory atomic physics at SDU, I provided atomic spectroscopy lab exercises and guest lectures. ~20 students
- 2023: **Guest lecturer**, “*Introduction to Nano Optics*” (MSc, 5 ECTS), SDU
2-week summer school on nanooptics and plasmonics organised by Assoc. Prof. J. Cox. I provided lab tours and small exercises for the students, covering nanofabrication, 2D materials, and optical device characterisation. ~15 students
- 2015 and 2016: **Teaching Assistant**, “*Introduction to physics and nano-technology*” (BSc, 10 ECTS), DTU
I assisted students with theoretical exercises during course, organized and conducted an experimental exercise with students. ~80 students
- 2014: **Teaching Assistant**, “*Optical Properties of Solids*” (MSc, 10 ECTS), DTU
I assisted students with theoretical exercises for 2 hours every week and assisted with preparatory work for their oral exam. ~20 students

Invited talks:

- 2025: **International workshop on Emerging Trends in Optics**
“*Nanophotonic applications of 2D materials*”, invited talk on the status of the field

Communication/Public Engagement:

- 2024 – 2026: **Forskningens Døgn speaker**, Bestil en Forsker
“*Nanooptik og plasmonik – manipulation af lys ned på den allermindste skala*”
I participate with lectures on plasmonics and nanooptics for general audiences in Denmark, chiefly aimed at high school students every year during the “Forskningens Døgn” event.
- 2023: **SDU News**, “*Fremtidens computere ligner den menneskelige hjerne*”
Short-form popular science article for general audiences on my research on neuromorphic hardware I helped co-write. **Link:** <https://tinyurl.com/28yub8fy>
- 2014: **Workshop Organiser**, Børnenes Universitet
Organized and conducted an experimental workshop on fibre optics for public outreach event at DTU, aimed at children ages 9-12.

Peer Review Activity (see Web of Science/ORCID for more details):

- **Optica (Formerly OSA):**
Optics Letters, Optics Materials Express, Applied Optics, Optics Express, Photonics Research, Optica
- **American Association for the Advancement of Science (AAAS):**
Science Advances
- **Wiley:**
Nanophotonics (formerly De Gruyter)
- **American Chemical Society (ACS):**
ACS Applied Nano Materials, ACS Photonics
- **American Institute of Physics (AIP):**
Applied Physics Letters
- **Springer Nature:**
Nature Communications, Light: Science and Applications, Plasmonics, Scientific Reports

Appointments:

- **Lab safety coordinator:** QMD-lab, Aarhus University
- **Danish Censorcorps:** Censor appointment for diploma and civil engineering in “*Diplom - Matematik, Fysik og Samfundsfag*” for the period 01-04-26 – 31-03-30

Awards and merits:

- 2022: **Marie Skłodowska-Curie Actions**, Individual Fellowship, Proposal Seal of Excellence.
- 2019: **HUJI Nanocenter**, Nano Artist award. 1000 NIS (~270 euros)
- 2017: **Otto Mønstedts Fond**, Travel grant, 7.500 DKK (~1000 euros)
Travel grant to cover participation in the SPP7 conference, Taipei, Taiwan 2017.