

Curriculum Vitae

PERSONAL DETAILS

Family name, First name: Sandven, Håkon Johan

Researcher unique identifier:

<https://orcid.org/0000-0002-8042-510X>

University website:

<https://www4.uib.no/en/find-employees/Håkon.Johan.Sandven>



Education and key qualifications

2017-2022	PhD in Physics Department of Physics and Technology, University of Bergen, Norway Defended January 28th 2022 Thesis title: Aspects of <i>in situ</i> angular scattering measurements in contrasting waters Supervisors: Børge Hamre & Arne S. Kristoffersen
	Master of Science Division of Electromagnetic Engineering and Fusion Science, Royal Institute of Technology, Sweden
2016	

Current position

2023 - 2026	Postdoctoral researcher (Marie Skłodowska-Curie COFUND fellow, uib.no/seas) Department of Physics and Technology, University of Bergen, Norway
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Previous positions

2023 - 2025	Visiting postdoctoral researcher Department of Physics, University of Strathclyde, United Kingdom I worked on lightscape modeling of the Barents Sea and Arctic Ocean, using a hyperspectral irradiance model developed at UoS. I also contributed to expanding this model with an ice transmittance component.
	Researcher , Nansen Legacy project Norwegian Polar Institute (NPI), Norway
2022 - 2023	I studied optical properties of the Barents Sea water column and their ecological significance, and took part in a research cruise in the central Arctic.
2022	Researcher , BIOICE project Norwegian Polar Institute/University of Bergen, Norway
	I conducted radiative transfer and heat transport modelling of glacier ice undergoing subsurface melting in Antarctica.

RESEARCH ACHIEVEMENTS AND PEER RECOGNITION

Research excellence

My research within marine optics has had two main directions; (1) advanced optical scattering and light propagation, and (2) the changing Arctic lightscape under climate change and its ecological impacts. This work has uncovered key observational gaps hindering predictions of long-term changes and biological responses, which I hope to address through present and future projects.

Research achievements

This list of selected achievements demonstrates my experience in working with scattering measurements and modelling, within Arctic optical oceanography including the strong links between the under-ice lightscape and phytoplankton seasonality, and in interdisciplinary teams.

Peer-reviewed articles related to measurements and modeling of scattering and light propagation

- 1 **Sandven, H.**, Kristoffersen, A. S., Chen, Y. C., & Hamre, B. (2020). In situ measurements of the volume scattering function with LISST-VSF and LISST-200X in extreme environments: evaluation of instrument calibration and validity. *Optics express*, 28(25), 37373-37396. <https://doi.org/10.1364/OE.411177>
I calibrated and evaluated the LISST-VSF, a pioneering scattering instrument, including fieldwork in the Arctic and Svalbard. I discovered major multiple scattering errors affecting the instrument.
- 2 Ugulen, H. S., **Sandven, H.**, Hamre, B., ... & Sætre, C. (2021). Analysis of multiple scattering errors in LISST-VSF volume scattering function measurements using Monte Carlo simulations and experimental data. *Optics Express*, 29(8), 12413-12428. <https://doi.org/10.1364/OE.419116>
Here, I was part of a team developing a Monte Carlo simulation to model the LISST-VSF multiple scattering errors, where I contributed to the model development and with validation measurements.
- 3 Ugulen, H. S., Koestner, D., **Sandven, H.**, ... & Sætre, C. (2023). Neural network approach for correction of multiple scattering errors in the LISST-VSF instrument. *Optics Express*, 31(20), 32737-32751. <https://doi.org/10.1364/OE.495523>
I contributed to a follow-up study where we utilized highly efficient Monte Carlo simulations to develop a neural network correcting the aforementioned multiple scattering errors.
- 4* Tomasi, B., Mulholland, J., Vasiljevic, A., & **Sandven, H.** (2024). Measured Effective Rates for Underwater Optical Communications in the Trondheimsfjord. In 2024 Seventh Underwater Communications and Networking Conference (UComms) (pp. 1-5). IEEE. <https://doi.org/10.1109/UComms64662.2024.10847990>
I had major contributions to a study on underwater optical communication, showing that ambient light may be a major limitation on optical modems in addition to particle-driven beam attenuation.

Peer-reviewed articles related to the Arctic lightscape and bio-optical properties

- 5 **Sandven, H.**, Granskog, M. A., Opdal, A. F., Connan-McGinty, S., Hamre, B., & McKee, D. (2025). Increased light availability in the northern Barents Sea driven by sea ice loss. *Journal of Geophysical Research: Oceans*, 130(6), e2025JC022370. <https://doi.org/10.1029/2025JC022370>
I was the lead author and investigator, utilizing the hyperspectral irradiance model HEIMDALL to assess historical trends in the seasonal lightscape, and conducting sensitivity analysis.
- 6* Koenig, Z., Muilwijk, M., **Sandven, H.**, Lundesgaard, Ø., ... & Granskog, M. A. (2024). From winter to late summer in the northwestern Barents Sea shelf: Impacts of seasonal progression of sea ice and upper ocean on nutrient and phytoplankton dynamics. *Progress in Oceanography*, 220, 103174. <https://doi.org/10.1016/j.pocean.2023.103174>
I contributed significantly to this interdisciplinary study of under-ice phytoplankton dynamics, including processing and analysis of biogeochemical and optical measurements from four cruises.
- 7 **Sandven, H.**, Hamre, B., Petit, T., Röttgers, R., Liu, H., & Granskog, M. A. (2023). Seasonality and drivers of water column optical properties on the northwestern Barents Sea shelf. *Progress in Oceanography*, 217, 103076. <https://doi.org/10.1016/j.pocean.2023.103076>
I processed and analyzed bio-optical measurements from several large research cruises to assess which factors govern light absorption and attenuation in the Barents Sea throughout the year.

Book chapter

- 8 **Sandven, H.**, McKee, D., Hamre, B., & Granskog, M. A. (2025). Light: Polar Night and Midnight Sun. In Reigstad, M., Johnsen, G., & Sundfjord, A. (eds): *The Barents Sea system. Gateway to the changing Arctic*. Fagbokforlaget, 102-116.

I was main author on this subchapter on light in the Barents Sea, covering main factors driving the underwater light regime and discussing how it effects marine ecosystems. I also contributed to two other subchapters in the book—a key resource for researchers, students, and stakeholders in Norway and other Arctic nations.

Scientific presentations and data sets

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Sandven, H. (2024). Light availability in the Barents Sea and Arctic Ocean: Modelling and observations. Arctic Science Summit Week. Edinburgh.

One of many presentations I have held for an interdisciplinary polar and ocean science audience.

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Sandven, H., Granskog, M., Petit, T., Röttgers, R., & Hamre, B. (2023). CDOM and particulate absorption coefficients of sea water in the northern Barents Sea: Nansen Legacy Cruise Q1 (2021703). Norwegian Polar Institute. <https://doi.org/10.21334/NPOLAR.2023.94BE39D0>

This is an example of several data sets I have published after field campaigns, demonstrating my commitment to open science/FAIR.

Peer recognition – Invited talks

How can we remotely observe marine ecosystems in the Arctic Ocean? (27/11/2025). Popular science lecture, “Ocean Science Bar”, Statsraaden Bar/UiB, Bergen.

Sea ice decline in the Barents Sea increases light availability over the last four decades (25/03/2025; online). “Arctic Acoustic and Oceanography Workshop”. Scripps Institution of Oceanography, San Diego.

Strong changes in Barents Sea light availability in last four decades due to sea ice decline (20/09/2024). Internation Symposium/Workshop: “Light as a Key Driver in Marine Ecology”. Dept. of Bio., UiB, Bergen.

Marine optics in darkening Arctic waters (30/11/2021). “Polar Ocean Symposium 2021”, NERSC, Bergen.

In addition to the talks above, I have contributed to a range of conferences, from the Ocean Optics conference (the leading conference in my field) to multidisciplinary arenas like Svalbard Science Conference, Challenger Society Meeting, and Particles in Europe. In several of these, I was accepted for competitive oral presentations.

INTERDISCIPLINARITY, PROJECT AND FIELDWORK EXPERIENCE

Interdisciplinarity

My work is inherently interdisciplinary spanning physics, oceanography, climate science, biology, and sensor technology. This has enabled effective crossdisciplinarity collaboration, such as in the Nansen Legacy project. I currently hold a postdoc in the SEAS program (Shaping European Research Leaders for Marine Sustainability), a highly interdisciplinary program that spans multiple faculties at UiB and trains researchers to bridge natural sciences, sustainability, and environmental studies. I am also a core member of SFI Smart Ocean, a research-based innovation center at UiB, developing wireless underwater sensor networks and smart systems for environmental and industrial applications. My role focuses on improving our capabilities to communicate wirelessly using optical methods and to observe underwater ecosystems and lightscapes, collaborating with both academic and industry partners.

Project management and participation

2020-2028

UiB – **SFI Smart Ocean** (8.1 MEURO, Norwegian Research Council): Leader of WP1.6—Marine Optics (2023-). Conducting optical measurements in coastal and Arctic waters to develop and improve of life under water; testing of optical communication.

2023-2028

NERSC – **Useful Arctic Knowledge** (UAK; 0.85 MEURO, Norwegian Research Council): Project participant. Organizing and participating in fieldwork and research schools; supervising master students in marine optics/ocean technology. **I was part of the proposal writing team.**

2024-2025	UiB – Improved measurements of optical absorption in Norwegian coastal waters (0.08 MEURO, L. Meltzer's Research Fund): Personal grant to purchase improved optical instrumentation and conduct local field campaigns.
2020-2025	UiB – EcoSens (0.69 MEURO, Norwegian Research Council): Project participant. I participated in fieldwork, processing of optical measurements, analysis and manuscript writing.
2018-2025	University of Tromsø – The Nansen Legacy (30.4 MEURO, Norwegian Research Council): Project participant at NPI (2022-2023). Participation in Arctic research cruise, processing and analyzing optical measurements. I led one manuscript and contributed heavily to another.

(1 MEURO = 1 000 000 Euro)

In addition to the above projects, I have contributed to 14 research proposals submitted to competitive calls (by Norwegian, EU, UK, and US funding agencies) that were not selected for funding or are under evaluation. I have also been on an evaluator for a national funding agency.

Field campaigns

Jul-Aug 2025	HiAOOS-2025 Research cruise (Central Arctic Ocean): I conducted optical measurements on ice stations together with two master students, deployed PAR sensors on a mooring and under-ice buoy, and contributed to a novel CTD transect.
Apr 2023	EcoSens2023 Joint cruise (Hardangerfjorden, Norway): I was the cruise leader and organized research activities onboard the ship for three different projects/partners, as well as logistics before and after the cruise.
Jul-Aug 2022	AO2022 Research cruise (Central Arctic Ocean): I conducted extensive bio-optical measurements as part of a comprehensive CTD transect led by NPI, spanning the Amundsen and Nansen Basin.
Aug-Sept 2019	CAATEX Research cruise (Central Arctic Ocean): Here, I measured profiles of the scattering and absorption properties of the Central Arctic Ocean between the North Pole and north of Svalbard.
Jul-Aug 2018	INTAROS Research cruise (Arctic Ocean & Svalbard): I conducted measurements of optical scattering and absorption in Svalbard fjords and the marginal ice zone.

Furthermore, I have also participated in several (10+) smaller fieldwork outings over 1-3 days in Norwegian coastal waters. I have contributed to several published data sets from different field campaigns.

OTHER INFORMATION

Student supervision and teaching activities

Master thesis. Torbjørn W Arbo (main supervisor). August 2025-June 2026.

Master thesis. Karl A Fritze (co-supervisor). August 2025-June 2026.

Instructor in marine optics, UAK Summer School, Bergen, June 2024.

Instructor in “Laboratory Course in Optics” (PHYS263), University of Bergen, November-December 2021.

Instructor in marine optics on the Ocean observing technology and data management (UAK-INTAROS) research school, which included fieldwork in Storfjorden, Svalbard.

Teaching assistant in “Electromagnetism I” (PHYS112), 2016-2019.

Peer-review

I have peer-reviewed several manuscripts for well-regarded journals in my field, including Optics Express, Applied Optics, The Cryosphere, Communications Earth & Environment, and Scientific Reports.