Jon Otto Fossum, PhD

Scientific Director, SCML International
Founder, Soft & Complex Matter Lab
Former Professor of Physics, Norwegian University of Science and Technology (NTNU)

ORCID: 0000-0002-8952-303X
Google Scholar: https://scholar.google.com/citations?user=md2eyScAAAAJ

Research Profile

Senior physicist in soft and complex matter with long-standing contributions to layered materials, clay minerals, and self-organized soft-matter systems. Research combines fundamental soft-matter physics with sustainability-oriented materials science, including confinement and swelling phenomena, gas separation and CO_2 capture, structural coloration, Pickering emulsions, and bio-sourced and earth-abundant material platforms. Extensive experience with large-scale research infrastructures and international collaboration.

Education

- **PhD**, Physics, NTH (now NTNU), Norway, 1983
- **MSc**, Physics, NTH (now NTNU), Norway, 1978

Academic & Research Positions (selected)

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- **Professor of Physics**, NTNU, Norway (2003–2025)
- **Associate Professor**, NTNU, Norway (2000–2003)
- **Researcher,** Risoe National Laboratory, Denmark (1989-1991)
- **Postdoctoral Researcher**, MIT, USA (1985–1989)
- **Postdoctoral Researcher**, University of Sherbrooke, Canada (1984–1985)

Research Leadership & Competitive Funding (selected)

- **Principal Investigator**, *Clay Nanolayers for Encapsulation of Drops or Nanoparticles*
  Researcher Project for Scientific Renewal, Research Council of Norway (2021–2025)
- **Work Package Leader**, *Pickering Emulsions for Food Applications*
  EU MSCA-ITN (2021–2025)
- **Principal Investigator**, *Nanofluids for IOR and Tracer Technology*
  RCN Petromaks2 (2018–2023)
- **Principal Investigator**, *Graphene–NanoClay Hybrid Systems*
  RCN NANO2021 (2016–2023)

- **Principal Investigator**, *CellColor: Cellulose Nanocomposites for Structural Coloration*
  M-ERA.NET (2017–2020)

Overall: leadership or coordination of **20+ national and international research projects** with > **€10M in competitive funding** (RCN, EU, NordForsk, SIU and related programmes).

External Evaluation

In the national research evaluation **EvalNat**, published in 2024, the experimental research activities associated with the Soft & Complex Matter Lab were **ranked as the highest-performing experimental group** within the Department of Physics at NTNU. The evaluation highlighted the group's **publication record**, success in **attracting competitive funding**, **international collaboration**, contributions to **doctoral education**, and the **societal relevance** of its materials-science research profile, notably its focus on earth-abundant and sustainable material platforms.

Selected Publications

1. Pačáková B. *et al.*, *npj 2D Materials and Applications* **9**, 38 (2025).
2. Azmi N. *et al., Talanta Open* **12,** 100500 (2025).
3. Hunvik K.W.B. *et al. Langmuir* **39**, 4895 (2023).
4. Pačáková B. *et al.*, *MRS Bulletin* **47**, 1198 (2022).
5. Michels-Brito P.H. *et al.*, *Science Advances* **8**, eabl8147 (2022).
6. Liljeström V. *et.al., Current Opinion in Colloid & Interface Science* **40**, 25 (2019)
7. Michels L. *et al.*, *Scientific Reports* **5**, 8775 (2015).
8. Rozynek Z. *et al.*, *Nature Communications* **5**, 3945 (2014).
9. Dommersnes P. *et al.*, *Nature Communications* **4**, 2066 (2013).
10. Hansen E.L. *et al.*, *Scientific Reports* **2**, 618 (2012).
11. Khaldoun A. *et al.*, *Physical Review Letters* **103**, 188301 (2009).
12. Fossum J.O., *et al., Europhysics Letters* **74**, 438 (2006).
13. Fossum J.O., *Physica A* **270**, 270 (1999),
14. Fossum J.O., *Journal of Physics C: Solid State Physics* **18**, 5531 (1985).

Full publication record is available via Google Scholar.

Doctoral & Postdoctoral Supervision

- **Postdoctoral researchers supervised:** 12 (NTNU, PUC-Rio de Janeiro)
- **PhD students supervised/co-supervised:** >20 (NTNU, University of Oslo, University of Brasília)
- **MSc students supervised:** >50

Research Schools, Workshops & Community Building

Founder and long-term organizer of international research schools and workshops in soft and complex matter and materials physics, including doctoral schools and advanced training events in Europe and the Americas. These activities have involved leading international speakers, early-career researchers, and interdisciplinary participation, and have contributed to capacity building, doctoral education, and international networking within the field.

Total events organized or co-organized: **20+** (full list available upon request).

Invited Lectures & Keynotes (selected)

Delivered **100+ invited lectures and keynote presentations** at leading international universities, research institutes, and conferences across Europe and the Americas, including Harvard University, MIT, ESPCI Paris, University of Bayreuth, University of São Paulo, and major international meetings in soft matter and materials physics.
Full list available upon request.

Facilities & Research Infrastructure

Regular user of large-scale international research infrastructures including **ESRF**, **ISIS Neutron and Muon Source**, **LNLS**, **Diamond, BESSY, DESY, ALBA** and **MAX IV**, with extensive experience in competitive beamtime applications and facility-based experimental research.

Patents

- **US Patent App. 18/026,683 -** Using nano-functionalized clay minerals for gas separation
- **US Patent App. 18/577,609 (2024)** - Nano-functionalised clay minerals for structural coloration

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Professional Service (selected)

- Evaluation Panel Member, national research evaluations in physics (including Portugal)
- Panel Member, COST Actions (European Cooperation in Science and Technology)
- Editorial Board Member, *Scientific Reports* (Nature)
- Chair, Condensed Matter Physics Division, Norwegian Physical Society

- Reviewer for APS, ACS, MRS, and leading journals in soft matter and materials science

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Societal Relevance & Sustainability

Research focuses on earth-abundant and bio-sourced materials, low-energy processing routes, and self-organization principles relevant to sustainable materials development, gas separation, photonic materials, and bio-derived functional systems.