

# **Supervisor Portfolio for the Doctoral Programme in Biosciences and Drug Research**

## **Cell Biology**

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## **Pharmacy**

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## **Marine Biology**

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## **Biochemistry**

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[Peter Mattjus](#)  
[Tiina Salminen](#)



## Guillaume Jacquemet

**Group:** Cell Migration Lab

**Subject:** Cell Biology

**University:** Åbo Akademi University

**Lab Website:** <https://cellmig.org/>

**CRIS profile:** <https://research.abo.fi/en/persons/guillaume-jacquemet>

### Areas of Expertise

- Cancer cell biology
- Cell adhesion and migration
- Microscopy and live imaging
- Image analysis

### Research Projects

- The role of filopodia during breast cancer progression
- Cancer cell communication via filopodia trans- endocytosis
- Deciphering the mechanisms of pancreatic cancer metastasis
- The role of mechanosensitive calcium channels in melanoma
- The role of TLNRD1 in endothelium homeostasis
- Democratising deep learning for microscopy with ZeroCostDL4Mic

### Special Methodologies & Techniques

- Microscopy (super-resolution microscopy, live imaging, traction force microscopy)
- Image analysis, deep learning, and computer vision
- Cell and molecular biology
- Mass spectrometry (identification of protein-protein interactions using pull-downs and biotinylation-based strategy)
- Zebrafish embryo to study cancer biology
- Flow and perfusion chambers

### Funding & Networks

- Sigrid Juselius Foundation
- Wellcome Trust
- Academy of Finland
- Finnish Cancer Foundation
- Inflames
- Turku Bioscience

### Selected Publications

- TLNRD1 is a CCM complex component and regulates endothelial barrier integrity. *J Cell Biol.* 2024. DOI: [10.1083/jcb.202310030](https://doi.org/10.1083/jcb.202310030)
- CellTracksColab is a platform that enables compilation, analysis, and exploration of cell tracking data. *PLOS Biol.* 2024. DOI: [10.1371/journal.pbio.3002740](https://doi.org/10.1371/journal.pbio.3002740)
- MYO10-filopodia support basement membranes at preinvasive tumor boundaries. *Dev Cell.* 2022. DOI: [10.1016/j.devcel.2022.09.016](https://doi.org/10.1016/j.devcel.2022.09.016)
- TrackMate 7: Integrating state-of-the-art segmentation algorithms into tracking pipelines. *Nat. Methods.* 2022. DOI: [10.1038/s41592-022-01507-1](https://doi.org/10.1038/s41592-022-01507-1)
- Democratising Deep Learning for Microscopy with ZeroCostDL4Mic. *Nat Commun.* 2021. DOI: [10.1038/s41467-021-22518-0](https://doi.org/10.1038/s41467-021-22518-0)



## Outi Salo-Ahen

**Group:** Computer-aided drug design (CADD) group

**Subject:** Pharmacy

**University:** Åbo Akademi University

**Lab Website:** <https://www.pharmscilab.fi/computer-aided-drug-design>

**CRIS profile:** <https://research.abo.fi/sv/persons/outi-salo-ahen>

### Areas of Expertise

- Computer-aided drug design
- Molecular modeling
- Biomolecular simulations
- Computational chemistry/biology and computational pharmaceutics
- Structural bioinformatics
- Immunoinformatics

### Research Projects

- Discovery and design of novel antivirulence agents / antimicrobial compounds / anticancer drugs
- Computational analysis of pharmaceutical materials (e.g., nanoparticles, polymers)

### Special Methodologies & Techniques

- Comparative protein modeling
- Molecular docking
- Molecular dynamics simulations
- Molecular interaction analysis
- Materials science modeling

### Funding & Networks

- Tor, Joe & Pentti Memorial Fund
- Svenska Kulturfonden
- Research Council of Finland
- EU-OPENSCREEN

### Selected Publications

- Microfluidics-Enabled Core/Shell Nanostructure Assembly: Understanding Encapsulation Processes via Particle Characterization and Molecular Dynamics. *Adv Colloid Interface Sci.* 2025. DOI: [10.1016/j.cis.2025.103400](https://doi.org/10.1016/j.cis.2025.103400)
- Insights Into Molecular Interactions and Biological Effect of Natural Stilbenoids at the TRPA1 ion channel. *ChemMedChem.* 2024. DOI: [10.1002/cmdc.202400501](https://doi.org/10.1002/cmdc.202400501)
- Development of Aptamer-DNAzyme based metal-nucleic acid frameworks for gastric cancer therapy. *Nat Commun.* 2024. DOI: [10.1038/s41467-024-48149-9](https://doi.org/10.1038/s41467-024-48149-9)
- Isolation and functional analysis of phage-displayed antibody fragments targeting the staphylococcal superantigen-like proteins. *MicrobiologyOpen.* 2023. DOI: [doi.org/10.1002/mbo3.1371](https://doi.org/10.1002/mbo3.1371)
- The discovery of Zika virus NS2B-NS3 inhibitors with antiviral activity via an integrated virtual screening approach. *Eur J Pharm Sci.* 2022. DOI: [10.1016/j.ejps.2022.106220](https://doi.org/10.1016/j.ejps.2022.106220)



## Riikka Puntila-Dodd

**Group:** Marine ecosystem ecology

**Subject:** Marine Biology

**University:** Åbo Akademi University

**CRIS profile:** <https://research.abo.fi/en/persons/riikka-puntila-dodd>

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## Areas of Expertise

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- Ecosystem modelling
- Ecopath with Ecosim
- Species distribution modelling
- Future scenarios
- Baltic Sea
- Cumulative pressures

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## Research Projects

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- GES4SEAS
- MIMOSA
- Identifying changes in coastal ecosystems – implications to
- Recovery trajectories (RCoF)
- SEADITO

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## Special Methodologies & Techniques

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- Ecopath with Ecosim
- Bayesian networks
- Species distribution modelling
- Integrated trend analysis
- Multivariate analyses

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## Funding & Networks

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- RCoF
- Horizon Europe ICES WGIAB
- Marine modelling network
- Ecopath Consortium
- Beyond shifting baselines-consortium

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## Selected Publications

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- Novelty, variability, and resilience: exploring adaptive cycles in a marine ecosystem under pressure. Ambio. 2025. DOI: [10.1007/s13280-025-02181-1](https://doi.org/10.1007/s13280-025-02181-1)
- Food web robustness depends on the network type and threshold for extinction. Oikos. 2025. DOI: [10.1111/oik.11139](https://doi.org/10.1111/oik.11139).
- Modelling Framework to Evaluate Societal Effects of Ecosystem Management. Sci Total Environ. 2023. DOI: [10.1016/j.scitotenv.2023.165508](https://doi.org/10.1016/j.scitotenv.2023.165508)
- Integrating diverse model results into decision support for good environmental status and blue growth. Sci Total Environ. 2022. DOI: [10.1016/j.scitotenv.2021.150450](https://doi.org/10.1016/j.scitotenv.2021.150450).
- Food-web modeling in the Maritime Spatial Planning Challenge Simulation Platform: Results from the Baltic Sea. Proc Int Simulation and Gaming Ass Conf. 2021. DOI: [10.1007/978-3-030-72132-9\\_25](https://doi.org/10.1007/978-3-030-72132-9_25)



## Peter Mattjus

**Group:** Lipid Transfer Protein Research

**Subject:** Biochemistry

**University:** Åbo Akademi University

**Lab Website:** <https://users.abo.fi/pmattjus/>

**CRIS profile:** <https://research.abo.fi/sv/persons/peter-mattjus>

### Areas of Expertise

- The role of glycolipid transfer proteins in cells
- Glycosphingolipid biosynthesis
- Intracellular glycosphingolipid transport events

### Research Projects

- Glycolipid transfer protein, GLTP interaction with VAP-proteins in the ER exit sites
- The role of GLTP in demyelination
- Intracellular localization of GLTP
- Inhibitors for glycolipid binding proteins

### Special Methodologies & Techniques

- Lipid biochemistry
- Quantitative and qualitative glycosphingo- and phospholipid analysis by high-performance TLC
- Cell and molecular biology
- Fluorescence spectroscopy, steady-state and lifetime
- Radioisotope labeling and lipid metabolism techniques

### Funding & Networks

- Medicinska understödsföreningen Liv och hälsa
- Borgs stiftelse
- COST action SPHINX member

### Selected Publications

- Glycolipid transfer protein knockout disrupts vesicle trafficking to the plasma membrane. *Journal of Biological Chemistry*. 2023. DOI: [10.1016/j.jbc.2023.104607](https://doi.org/10.1016/j.jbc.2023.104607)
- Who moves the sphinx? An overview of intracellular sphingolipid transport. *BBA Molecular and Cell Biology of Lipids*. 2021. DOI: [10.1016/j.bbalip.2021.159021](https://doi.org/10.1016/j.bbalip.2021.159021)
- Glucosylceramide acyl chain length is sensed by the glycolipid transfer protein. *PLoS ONE*. 2018. DOI: [10.1371/journal.pone.0209230](https://doi.org/10.1371/journal.pone.0209230)
- Alteration in the Glycolipid Transfer Protein Expression Causes Changes in the Cellular Lipidome. *PLoS ONE*. 2014. DOI: [10.1371/journal.pone.0097263](https://doi.org/10.1371/journal.pone.0097263)
- Vesicular and non-vesicular transport feed distinct glycosylation pathways in the Golgi. *Nature*. 2013. DOI: [10.1038/nature12423](https://doi.org/10.1038/nature12423)



## Conny Sjöqvist

**Group:** Molecular Ecology Lab

**Subject:** Marine Biology

**University:** Åbo Akademi University

**Lab Website:** [www.connysjoqvist.com](http://www.connysjoqvist.com)

**CRIS profile:** <https://research.abo.fi/en/persons/conny-sj%C3%B6qvist>

### Areas of Expertise

- Plankton ecology and evolution
- Experimental and molecular ecology
- Paleo- and resurrection biology

### Research Projects

- Temperature adaptation in European diatom populations - AWARE
- Hotspots for biodiversity shifts in the Archipelago Sea - BIOSHIFT
- Modeling advanced primary production scenarios in coastal seas - MIMOSA
- Geochemical Dynamics of Seawater-Submarine Aquifer Interactions: Impacts on Coastal Sediments and Ecosystems
- Switching functional roles of gene expression of feeding trait plasticity in a marine key species - GeneMac

### Special Methodologies & Techniques

- Cell cultivation
- Microscopical analyses
- DNA and RNA sequencing
- Population genomics
- Transcriptomics
- Bioinformatics

### Funding & Networks

- Centre for Sustainable Ocean Science
- Swedish Cultural Foundation
- European Molecular Biology Laboratory (EMBL)
- Traversing European Coastlines (TREC)
- Estonian Research Council

### Selected Publications

- Biodiversity of microorganisms in the Baltic Sea: The power of novel methods in the identification of marine microbes. FEMS Microbiology Reviews. 2024. DOI: [10.1093/femsre/fuae024](https://doi.org/10.1093/femsre/fuae024)
- Temperature optima of a natural diatom population increases as global warming proceeds. Nature Climate Change. 2024. DOI: [10.1038/s41558-024-01981-9](https://doi.org/10.1038/s41558-024-01981-9)
- Toward phytoplankton parasite detection using autoencoders. Machine Vision and Applications. 2023. DOI: [10.1007/s00138-023-01450-x](https://doi.org/10.1007/s00138-023-01450-x)
- Strain-specific transcriptional responses overshadow salinity effects in a marine diatom sampled along the Baltic Sea salinity cline. ISME Journal. 2022. DOI: [10.1038/s41396-022-01230-x](https://doi.org/10.1038/s41396-022-01230-x)
- Ecologically coherent population structure of uncultivated bacterioplankton. ISME Journal. 2021. DOI: [10.1038/s41396-021-00985-z](https://doi.org/10.1038/s41396-021-00985-z)



## Silvia Gramolelli

**Group:** Viral Oncogenesis

**Subject:** Cell Biology

**University:** Åbo Akademi University

**Lab Website:** <https://viraloncor.wordpress.com/>

**CRIS profile:** <https://research.abo.fi/sv/persons/silvia-gramolelli/publications/>

### Areas of Expertise

- Gene expression
- Chromatin remodelling
- Viral reactivation from latency
- Cellular transformation

### Research Projects

- Role of somatic mutations in Epstein-Barr virus-induced oncogenesis and drug resistance
- Role of stress-related transcription factors in oncogenic herpesvirus persistence and gene expression
- New diagnostic tools based on DNA nanotechnology to detect viral genomic sequences

### Special Methodologies & Techniques

- Patient-derived organoids
- Lentiviral production and transduction
- Chromatin IP
- Proteomics

### Funding & Networks

- Research Council of Finland
- Sigrid Juselius
- Finnish Cultural Foundation
- Mary & George Ehrnrooth Foundation
- Suomen Tiedeseura
- InFLAMES

### Selected Publications

- Heat shock factor 2 regulates oncogenic gamma-herpesvirus gene expression by remodeling the chromatin at the ORF50 and BZLF1 promoter. PLoS Pathog. 2025. DOI: [10.1371/journal.ppat.1013108](https://doi.org/10.1371/journal.ppat.1013108)
- DLL4/Notch3/WNT5B axis mediates bidirectional prometastatic crosstalk between melanoma and lymphatic endothelial cells. JCI Insight. 2024. DOI: [10.1172/jci.insight.171821](https://doi.org/10.1172/jci.insight.171821)
- Oncogenic Herpesvirus Engages Endothelial Transcription Factors SOX18 and PROX1 to Increase Viral Genome Copies and Virus Production. Cancer Res. 2020. DOI: [10.1158/0008-5472.CAN-19-3103](https://doi.org/10.1158/0008-5472.CAN-19-3103)
- Kaposi Sarcoma-Associated Herpesvirus Lytic Replication Is Independent of Anaphase-Promoting Complex Activity. Journal of Virology. 2020. DOI: [10.1128/JVI.02079-19](https://doi.org/10.1128/JVI.02079-19)
- High tissue MMP14 expression predicts worse survival in gastric cancer, particularly with a low PROX1. Cancer Medicine. 2019. DOI: [10.1002/cam4.2576](https://doi.org/10.1002/cam4.2576)



## Christian Pansch-Hattich

**Group:** Experimental Ecology - Stress Ecology & Ecophysiology

**Subject:** Marine Biology

**University:** Åbo Akademi University

**Lab Website:** <https://pansch-research.com>

**CRIS profile:** <https://research.abo.fi/en/persons/christian-pansch-hattich>

## Areas of Expertise

- Climate change impacts on marine systems; environmental variability & extreme climatic events, heatwaves, climate change refugia, thermal microclimates
- Area: Ecophysiology, thermal ecology, acclimation & adaptation, species interactions e.g., facilitation, mesocosm food webs, invasion ecology, macrophyte-grazer interactions
- Systems: Bivalves, macrophytes (seagrass, Fucus), associated epi- and infauna, crustaceans (Gammarus, Idotea, mudcrabs), phytoplankton

## Research Projects

- PhD S. Rühmkorff: Resilience of Seagrass Ecosystems through Habitat Heterogeneity & Genetic Diversity
- ÅA Stiftelse: SOS - Centre for Sustainable Ocean Science
- Horizon: SEA-Quester - Blue Carbon production, export, & sequestration in emerging polar ecosystems
- Res. Counc. Norway: NORSE - Biodiversity in Northern European Seagrass meadows – drivers, responses, & resilience
- PhD L. Kraufvelin: Impacts of Heatwaves on the Functioning of Temperate Coastal Ecosystems

## Special Methodologies & Techniques

- Combine ecophysiology, acclimation, and adaptation experimental studies with simplified community assessments in mostly experimental approaches
- Using high-throughput incubation units and mesocosms
- Simulating multiple and fluctuating climate change drivers
- High-resolution coastal environmental monitoring

## Funding & Networks

- Funders: EU, Research Council Fi, Svenska Kulturfonden, Stiftelse Åbo Akademi, City of Turku
- Collaborations: Tvärminne Zoological Station at Helsinki University, Turku, University of Applied Sciences – TUAS, Tjärnö Marine Laboratory at Gothenburg University, GEOMAR – Helmholtz Centre for Ocean Research Kiel, Alfred Wegener Institute for polar and marine research (AWI) – Wadden Sea Station Sylt, Leibniz Institute for Baltic Sea Research Warnemünde – IOW

## Selected Publications

- Small-scale thermal habitat variability may not determine seagrass resilience to climate change. *Limnology and Oceanography*. In press
- The interplay of co-occurring ecosystem engineers shapes the structure of benthic communities – a mesocosm experiment. *Frontiers in Marine Science*. 2024. DOI: [10.3389/fmars.2024.1304442](https://doi.org/10.3389/fmars.2024.1304442)
- Marine heatwaves and hypoxic upwelling shape stress responses in a keystone predator. *Proceedings of the Royal Society Biological Sciences*. 2023. DOI: [10.1098/rspb.2022.2262](https://doi.org/10.1098/rspb.2022.2262)
- Environmental variability in aquatic ecosystems: avenues for future multifactorial experiments. *Limnology and Oceanography – Letters*. 2023. DOI: [10.1002/lo2.10286](https://doi.org/10.1002/lo2.10286)
- Editorial: Influence of environmental variability on climate change impacts in marine ecosystems. *Frontiers in Marine Science*. 2022. DOI: [10.3389/fmars.2022.994756](https://doi.org/10.3389/fmars.2022.994756)



## Christoffer Boström

**Group:** Boström's Lab

**Subject:** Marine Biology

**University:** Åbo Akademi University

**CRIS profile:** <https://research.abo.fi/sv/persons/christoffer-bostr%C3%B6m/projects/>

### Areas of Expertise

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- Marine ecology

### Research Projects

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- Digital Waters

### Special Methodologies & Techniques

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- Marine field sampling, mesocosm experiments, field experiments

### Funding & Networks

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- Doctoral Pilot
- Svenska Kulturfonden
- networks Zostera Experimental Network
- Nordic collaboration

### Selected Publications

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- Marine biodiversity loss in coastal waters: evidence and implications for management in Finnish sea areas, northern Baltic Sea, AMBIO 2025. DOI: [10.1007/s13280-025-02185-x](https://doi.org/10.1007/s13280-025-02185-x)
- Shallow coastal bays as sediment carbon and nutrient reservoirs in the Baltic Sea. Estuaries and Coasts 2024 in press
- Assessing the success of marine ecosystem restoration using meta-analysis. Nature Communications. 2025. DOI: [10.1038/s41467-025-57254-2](https://doi.org/10.1038/s41467-025-57254-2)
- The methylome of clonal seagrass shoots shows age-associated variation and differentiation of roots from other tissues. Biochimica et Biophysica Acta. 2025. Vol. 1869, Issue 2. DOI: [10.1016/j.bbagen.2024.130748](https://doi.org/10.1016/j.bbagen.2024.130748).
- Global effects of ecosystem and climate on long-term belowground decomposition in wetlands. Environmental Science & Technology DOI: [10.1021/acs.est.4c02116](https://doi.org/10.1021/acs.est.4c02116)



## Tapani Viitala

**Group:** Pharmaceutical Biophysics

**Subject:** Pharmacy

**University:** Åbo Akademi University

**CRIS profile:** <https://research.abo.fi/fi/persons/tapani-viitala>

### Areas of Expertise

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- Pharmaceutical nanotechnology
- Surface and colloid chemistry
- Physico-chemical characterization
- Drug delivery and targeting
- Biomolecular interactions
- Real-time label-free living cell sensing
- 3D printing

### Research Projects

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- NAP4DIVE: Non-Animal Platform for Nanoparticle-Based Delivery Across the Blood-Brain Barrier Interface with Vehicle Evolution - EU Horizon RIA
- Nordic Pharmaceutical Translation and Innovation - Nordforsk
- MADNESS: Centre of Excellence in Materials-driven solutions for combatting antimicrobial resistance - Åbo Akademi Foundation
- Data integrated platforms for the design, production, and testing of therapeutics (project in Helsinki) - Business Finland

### Special Methodologies & Techniques

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- Multi-Parametric Surface Plasmon Resonance
- Impedance-based Quartz Crystal Microbalance
- LigandTracer
- Waveguide scattering microscopy

### Funding & Networks

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- EU Horizon RIA
- NordForsk
- Åbo Akademi Foundation
- Business Finland

### Selected Publications

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- Semi-solid extruded tablets for personalized pediatric use: Development, Quality control and In-Vitro Assessment of Enteral Tube Administration. European Journal of Pharmaceutical Sciences. 2025. DOI: [10.1016/j.ejps.2025.107122](https://doi.org/10.1016/j.ejps.2025.107122)
- Monitoring silica core@shell nanoparticle-bacterial film interactions using the multi-parametric surface plasmon resonance technique. Smart Medicine 2. 2023. DOI: [10.1002/SMMD.20230012](https://doi.org/10.1002/SMMD.20230012)
- In Vitro Characterization and Real-Time Label-Free Assessment of the Interaction of Chitosan-Coated Niosomes with Intestinal Cellular Monolayers. Langmuir. 2023. DOI: [10.1021/acs.langmuir.3c00728](https://doi.org/10.1021/acs.langmuir.3c00728)
- Protein A/G-based surface plasmon resonance biosensor for regenerable antibody-mediated capture and analysis of nanoparticles. Colloids and Surfaces A: Physicochemical and Engineering Aspects. 2022. DOI: [10.1016/j.colsurfa.2022.130015](https://doi.org/10.1016/j.colsurfa.2022.130015)
- In situ analysis of liposome hard and soft protein corona structure and composition in a single label-free workflow. Nanoscale. 2020. DOI: [10.1039/C9NR08186K](https://doi.org/10.1039/C9NR08186K)



## Kuldeep Bansal

**Group:** Polymeric drug delivery

**Subject:** Pharmacy

**University:** Åbo Akademi University

**Lab Website:** <https://www.pharmscilab.fi/>

**CRIS profile:** <https://research.abo.fi/fi/persons/kuldeep-bansal>

### Areas of Expertise

- Functional Polymers
- Stimuli-Sensitive Polymers
- Targeted and Controlled Drug Delivery
- Polymeric Micelles
- Polymer-Drug Conjugates
- Microparticles
- Amorphous Solid Dispersions
- Polymeric Nanoemulsion

### Research Projects

- Centre of Excellence in Materials-driven Solutions for Combating Antimicrobial Resistance (MADNESS)
- Jasmine PRO: A versatile platform for drug delivery
- Non-Animal Platform for Nanoparticle-Based Delivery across the blood-brain barrier Interface with Vehicle Evolution

### Special Methodologies & Techniques

- Polymer Synthesis and Characterization (NMR, FTIR, GPC, DSC),
- Nanoparticle Synthesis and Characterization (nanoprecipitation, microfluidics, DLS, HPLC, TEM),
- Cell Culture,
- Design of Stimuli-Sensitive Drug Delivery Platforms

### Funding & Networks

- Funding Sources: Stiftelsen för Åbo Akademi, Business Finland, Academy of Finland
- International Networks: Copenhagen University, NIPER (India), UiT The Arctic University of Norway, University College London

### Selected Publications

- Reactive Oxygen Species-Regulated Conjugates Based on Poly (jasmine) Lactone for Simultaneous Delivery of Doxorubicin and Docetaxel, *Pharmaceutics*. 2024. DOI: [10.3390/pharmaceutics16091164](https://doi.org/10.3390/pharmaceutics16091164)
- Poly- $\delta$ -decalactone (PDL) based nanoemulgel for topical delivery of ketoconazole and eugenol against *Candida albicans*, *Nanoscale Advances*. 2024. DOI: [10.1039/D4NA00176A](https://doi.org/10.1039/D4NA00176A)
- Utilizing the allyl-terminated copolymer methoxy (poly(ethylene glycol))-block-poly (jasmine lactone) in the development of amorphous solid dispersions: A comparative study of functionalized and nonfunctionalized polymer, *International Journal of Pharmaceutics*. 2024. DOI: [10.1016/j.ijpharm.2024.124175](https://doi.org/10.1016/j.ijpharm.2024.124175)
- Functional block copolymer micelles based on poly (jasmine lactone) for improving the loading efficiency of weakly basic drugs, *RSC advances*. 2022. DOI: [10.1039/D2RA03962A](https://doi.org/10.1039/D2RA03962A)
- Synthesis and evaluation of novel functional polymers derived from renewable jasmine lactone for stimuli-responsive drug delivery, *Advanced Functional Materials*. 2021. DOI: [10.1002/adfm.202101998](https://doi.org/10.1002/adfm.202101998)



## Zhang Hongbo

**Group:** Functional Materials for Medicine

**Subject:** Pharmacy

**University:** Åbo Akademi University

**Lab Website:** <https://www.pharmscilab.fi/nanoprecisionmed>

**CRIS profile:** <https://research.abo.fi/en/persons/hongbo-zhang>

### Areas of Expertise

- Nanomedicine
- Biomedical Engineering
- Drug Delivery
- Gene Therapy

### Research Projects

- Functional Materials have played a more and more critical role in developing novel treatment methods for different diseases. Our group focuses on designing all kinds of functional materials, at different scales, to solve clinical and biological problems.

### Special Methodologies & Techniques

- We have broad collaborations with hospitals, and most of our projects have clinical doctors involved, and initially, from a real-life clinical question. Our group is multidisciplinary, which involves an interplay between physics, materials science, synthetic organic chemistry, engineering, biology, and medicine. We aim that many of our designs could be clinically applicable in the future, and have a tremendous social impact in treating diseases.

### Funding & Networks

- I am coordinating many projects from the Research Council of Finland, Business Finland, and different foundations. I am also part of many consortium projects, including the InFlame flagship, NAP4DIVE (EU Horizon), Nordic POP, NordicPharmTrain, PII: Printed Intelligence Infrastructure, MADNESS (ÅAU Center of Excellence). As well as the collaboration project with companies, e.g., the joint project with Bayer Oy. I collaborate broadly with Harvard University, USA, and Chinese hospitals.

### Selected Publications

- Development of Aptamer-DNAzyme Based Metal-Nucleic Acid Frameworks for Gastric Cancer therapy. *Nature Communications*. 2024. DOI: [10.1038/s41467-024-48149-9](https://doi.org/10.1038/s41467-024-48149-9)
- An autocatalytic multicomponent DNAzyme nanomachine for tumor-specific photothermal therapy sensitization in pancreatic cancer. *Nature Communications*. 2023. DOI: [10.1038/s41467-023-42740-2](https://doi.org/10.1038/s41467-023-42740-2)
- Therapeutic DNAzymes: From Structure Design to Clinical Applications. *Advanced Materials*. 2023. DOI: [10.1002/adma.202300374](https://doi.org/10.1002/adma.202300374)
- Photothermal Responsive Nanosized Hybrid Polymersome as Versatile Therapeutics Co-Delivery Nanovehicle for Effective Tumor Suppression. *Proc. Natl. Acad. Sci. U.S.A.* 2019. DOI: [10.1073/pnas.1817251116](https://doi.org/10.1073/pnas.1817251116)
- Programmable and Multifunctional DNA-Based Materials for Biomedical Applications. *Advanced Materials*. 2018. DOI: [10.1002/adma.201703658](https://doi.org/10.1002/adma.201703658)



## Eleanor Coffey

**Group:** Protein Kinase Function in Brain

**Subject:** Cell Biology

**University:** Åbo Akademi University

**Lab Website:** <https://bioscience.fi/research/kinase-function-in-brain/>

**CRIS profile:** <https://research.abo.fi/en/persons/eleanor-coffey>

### Areas of Expertise

- Our lab investigates the molecular mechanisms underlying brain disorders, with specialized expertise in the signaling pathways regulated by the protein kinases JNK and LRRK2. We have uncovered novel insights into how these kinases influence anxiety-like behaviors and neuronal death in Parkinson's disease. By integrating animal and cellular models with clinical proteomics, we aim to deepen our understanding of the biology behind these conditions.

### Research Projects

- We focus on Parkinson's disease, using deep proteomic profiling of blood cells to detect pre-symptomatic changes. This includes developing new informatics to decode the "dark proteome" of cohorts like PPMI to identify early biomarkers. We also study depression cohorts to find markers predicting treatment response. Together, this work offers insight into immune cell roles in brain disorders.

### Special Methodologies & Techniques

- Our lab combines fluorescence imaging and proteomics methods with neurobiology, biochemistry, and data science to reach our goals.

### Funding & Networks

- These projects are funded by the Michael J Fox Foundation, the Research Council of Finland, EU ERANET, Immudocs, and Inflames. We participate in international networks in the field of neuroscience, including informatics for neuroscience.

### Selected Publications

- PhosPiR: an automated phosphoproteomic pipeline in R. *Briefings in Bioinformatics*. 2022. DOI: [10.1093/bib/bbab510](https://doi.org/10.1093/bib/bbab510)
- Protein synthesis is suppressed in sporadic and familial Parkinson's disease by LRRK2. *FASEB Journal*. 2020. DOI: [10.1096/fj.202001046R](https://doi.org/10.1096/fj.202001046R)
- JNK1 controls adult hippocampal neurogenesis and imposes cell-autonomous control of anxiety behaviour from the neurogenic niche. *Molecular Psychiatry*. 2018. DOI: [10.1038/mp.2016.203](https://doi.org/10.1038/mp.2016.203)
- Nuclear and cytosolic JNK signalling in neurons. *Nature Reviews Neuroscience*. 2014. DOI: [10.1038/nrn3729](https://doi.org/10.1038/nrn3729)
- Phosphorylation of SCG10/stathmin-2 determines multipolar stage exit and neuronal migration rate. *Nature Neuroscience*. 2011. DOI: [10.1038/nn.2755](https://doi.org/10.1038/nn.2755)



## Markus Öst

**Group:** Eider Research Team

**Subject:** Marine Biology

**University:** Åbo Akademi University

**Lab Website:** <https://www.abo.fi/en/adaptations-to-challenging-environments-in-common-eiders/>

**CRIS profile:** <https://research.abo.fi/en/persons/markus-%C3%B6st>

### Areas of Expertise

- Population- and individual-level responses to increasing predation
- Fitness consequences of behavioural and physiological variation under predation and climate forcing
- Genetic connectivity, gene flow, and diversity during population decline
- Causes and consequences of breeding dispersal, choice of overwintering area, and migration
- Strategies, evolution of animal personality
- Life-history evolution
- Social evolution

### Research Projects

- Ongoing project: Hormonal and genetic adaptations to a changing environment: a longitudinal population study of eiders (funding: Swedish Cultural Foundation in Finland)

### Special Methodologies & Techniques

- Stress physiology: radioimmunoassay of corticosterone and other hormones (prolactin, thyroid hormones)
- Genetics: reduced-representation sequencing (RAD-seq)
- Movement: geolocator tracking
- Morphology and tagging: field measures and colour rings for individual identification

### Funding & Networks

- Academy of Finland, project 128039; 2009-2012.
- Swedish Cultural Foundation, 12 grants (2013-2024).
- Maj and Tor Nessling Foundation; 2009-2011.
- ARONIA 10-Year Jubilee Funds (2010).
- Academy of Finland project 104582; 2004-2007.
- Academy of Finland project 51895; 2001-2003.
- Delta Waterfowl Foundation (USA), 2004-2007.
- Oskar Öflunds stiftelse, 2006-2008.
- Ella och Georg Ehrnrooths stiftelse, 2001.

### Selected Publications

- The effect of climate change on avian offspring production: a global meta-analysis. Proc. Natl. Acad. Sci. U.S.A. 2023. DOI: [10.1073/pnas.2208389120](https://doi.org/10.1073/pnas.2208389120)
- Kin association during brood care in a facultatively social bird: active discrimination or byproduct of partner choice and demography? Mol. Ecol. 2012. DOI: [10.1111/j.1365-294X.2012.05603.x](https://doi.org/10.1111/j.1365-294X.2012.05603.x)
- Winter climate affects subsequent breeding success of common eiders. Glob. Change Biol. 2006. DOI: [10.1111/j.1365-2486.2006.01162.x](https://doi.org/10.1111/j.1365-2486.2006.01162.x)
- Brood size matching: a novel perspective on predator dilution. Am. Nat. 2013. DOI: [10.1086/668824](https://doi.org/10.1086/668824)
- Drivers of within- and among-individual variation in risk-taking behaviour during reproduction in a long-lived bird. Proc. R. Soc. 2022. DOI: [10.1098/rspb.2022.1338](https://doi.org/10.1098/rspb.2022.1338)



## Martin Snickars

**Group:** Husö

**Subject:** Marine Biology

**University:** Åbo Akademi University

**Lab Website:** <https://www.abo.fi/huso-biologiska-station/>

**CRIS profile:** <https://research.abo.fi/en/persons/martin-snicksars>

### Areas of Expertise

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- Coastal water ecology

### Research Projects

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- Marine Waterways -Together with local communities, the Åland Government, Åland Fisheries Center (Guttorp), SLU
- Currently involved in a large national Biodiversea focusing on the restoration of key coastal habitats.

### Special Methodologies & Techniques

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- Ordinary coastal monitoring methods and advanced echosounders and autonomous sonars

### Funding & Networks

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- FIRI, EMBRC

### Selected Publications

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- Physical drivers of epi-and infauna communities related to dominating macrophytes in shallow bays in the Northern Baltic Sea. *Estuar, Coast Shelf Sci.* 2021. DOI: [10.1016/j.ecss.2021.107600](https://doi.org/10.1016/j.ecss.2021.107600)
- Declines in predatory fish promote bloom-forming macroalgae. *Ecol Appl.* 2009. DOI: [10.1890/08-0964.1](https://doi.org/10.1890/08-0964.1)
- Impact of eutrophication and climate change on fish and zoobenthos in coastal waters of the Baltic Sea. *Mar Biol.* 2015. DOI: [10.1007/s00227-014-2579-3](https://doi.org/10.1007/s00227-014-2579-3)
- Essential coastal habitats for fish in the Baltic Sea. *Estuar, Coast Shelf Sci.* 2018. DOI: [10.1016/j.ecss.2018.02.014](https://doi.org/10.1016/j.ecss.2018.02.014)
- Coastal habitats and their importance for the diversity of benthic communities: a species-and trait-based approach, *Estuar, Coast Shelf Sci.* 2019. DOI: [10.1016/j.ecss.2019.106272](https://doi.org/10.1016/j.ecss.2019.106272)



## Annika Meinander

**Group:** Inflammatory Signalling Group

**Subject:** Cell Biology

**University:** Åbo Akademi University

**Lab Website:** <https://www.abo.fi/en/inflammatory-signalling-lab/>

**CRIS profile:** <https://research.abo.fi/sv/persons/annika-meinander>

### Areas of Expertise

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- Post-translational modifications, ubiquitination in particular
- NF-κB signalling pathways
- Apoptotic and non-apoptotic roles of caspases
- Drosophila melanogaster as a model system

### Research Projects

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- Ubiquitination-mediated regulation of inflammation during cell stress and infection
- Targeting ubiquitin signalling in chronic inflammation and inflammation-induced cancer
- Ubiquitin-mediated control of starvation-induced intestinal inflammatory responses
- Caspase-mediated regulation of autophagy in inflammatory signalling
- Modulating caspase activation and immune signalling in intestinal inflammation

### Special Methodologies & Techniques

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- Analysis of ubiquitin modifications in vitro and in vivo
- Drosophila melanogaster as a model system to study cell signalling and immune responses
- Imaging caspase activation in vivo

### Funding & Networks

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- InFLAMES Flagship
- Sigrid Jusélius Foundation
- Swedish Cultural Foundation
- COST Action CA20113/ProteoCure
- International Society of Protein Termini

### Selected Publications

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- Ubiquitin signalling in Drosophila innate immune responses. FEBS J. 2024. DOI: [10.1111/febs.17028](https://doi.org/10.1111/febs.17028)
- Drosophila caspases as guardians of host-microbe interactions. Cell Death Differ. 2023. DOI: [10.1038/s41418-022-01038-4](https://doi.org/10.1038/s41418-022-01038-4)
- Core@shell structured ceria@mesoporous silica nanoantibiotics restrain bacterial growth in vitro and in vivo. Biomater. Adv. 2022. DOI: [10.1016/j.msec.2021.112607](https://doi.org/10.1016/j.msec.2021.112607)
- A M1-ubiquitination facilitates NF-κappaB activation and survival during sterile inflammation. FEBS J. 2022. DOI: [10.1111/febs.16425](https://doi.org/10.1111/febs.16425)
- Drice restrains Diap2-mediated inflammatory signalling and intestinal inflammation. Cell Death Differ. 2022. DOI: [10.1038/s41418-021-00832-w](https://doi.org/10.1038/s41418-021-00832-w)



## Sonja Salovius-Lauren

**Group:** BiodiverSea-group

**Subject:** Marine Biology

**University:** Åbo Akademi University

**Lab Website:** <https://www.abo.fi/en/emb-research/>

**CRIS profile:** <https://research.abo.fi/sv/persons/sonja-salovius-lauren>

### Areas of Expertise

- Marine biodiversity and marine inventories
- Spatial ecology
- Conservation planning
- Marine restoration
- Sediment-biological interactions
- Genetic (molecular markers)
- Studies including connectivity
- Macroalgal-invertebrate interactions
- Marine indicator development
- Macroalgal production related to eutrophication.

### Research Projects

- Biodiversea-project, funded by EU LIFE IP
- Center for Sustainable Ocean Sciences (SOS), Center of Excellence, funded through ÅAU Endowment
- RIKI- project ("Nutrient turnover in the Archipealago Sea") in cooperation with the ELY Center, funded by the Ministry of the Environment
- The Finnish Inventory Programme for Underwater Marine Diversity, VELMU

### Special Methodologies & Techniques

- Marine mapping methods including UW video camera and photography
- Aquarium experiments
- Sediment analysis
- Molecular markers of selected species (charophytes, blue mussels)
- Spatial modeling

### Funding & Networks

- The present funding comes through EU Life, ÅAU endowment, and the Ministry of Environment/ELY-center. Recent funding: Baltic Sea Conservation Foundation, Government of Åland, European Maritime and Fisheries Fund, and the Ministry of Environment

### Selected Publications

- Marine biodiversity loss in Finnish coastal waters: evidence and implications for management. AMBIO. 2025. DOI: [10.1007/s13280-025-02185-x](https://doi.org/10.1007/s13280-025-02185-x)
- Finnish inventory data of underwater marine biodiversity. Scientific Data. 2024. DOI: [10.1038/s41597-024-04092-4](https://doi.org/10.1038/s41597-024-04092-4)
- Invertebrate Responses to Large- and Small-Scale Drivers in Coastal Phragmites australis Beds in the Northern Baltic Sea. Estuaries and Coasts. 2024. DOI: [10.1007/s12237-024-01360-9](https://doi.org/10.1007/s12237-024-01360-9)
- Green algae as bioindicators for long-term nutrient pollution along a coastal eutrophication gradient. Ecological Indicators. 2022. DOI: [10.1016/j.ecolind.2022.109034](https://doi.org/10.1016/j.ecolind.2022.109034)
- Variation in Fucus vesiculosus associated fauna along a eutrophication gradient. Estuarine Coastal and Shelf Science. 2022. DOI: [10.1016/j.ecss.2022.107976](https://doi.org/10.1016/j.ecss.2022.107976)



## Lea Sistonen

**Group:** Sistonen Lab

**Subject:** Cell Biology

**University:** Åbo Akademi University

**Lab Website:** <https://sistonenlab.com/>

**CRIS profile:** <https://research.abo.fi/sv/persons/lea-sistonen>

### Areas of Expertise

- Cell Differentiation
- Cell Stress
- Post-translational Modifications
- Proteostasis
- Transcriptional Gene Regulation

### Research Projects

- HSF-NET: Functional networks regulated by heat shock factors in cell plasticity, Research Council of Finland 2023-27
- Proteostasis driven by HSFs in cell plasticity programs and cancer", Sigrid Jusélius Foundation 2025-28
- Re-programming of gene and enhancer expression in cell differentiation and stress, Liv och Hälsa 2023-26
- Pharmacologic strategy for targeting the main oncproteins and defense systems of HPV-driven cancers, Cancer Foundation Finland 2024-26, together with John E. Eriksson

### Special Methodologies & Techniques

- ChIP-seq
- DNA-protein interaction in vivo and in vitro
- Proteomics
- PRO-seq and RNA-seq, including data analysis

### Funding & Networks

- HSF-NET: Functional networks regulated by heat shock factors in cell plasticity, Research Council of Finland 2023-27
- Proteostasis driven by HSFs in cell plasticity programs and cancer", Sigrid Jusélius Foundation 2025-28
- Re-programming of gene and enhancer expression in cell differentiation and stress, Liv och Hälsa 2023-26
- Pharmacologic strategy for targeting the main oncproteins and defense systems of HPV-driven cancers, Cancer Foundation Finland 2024-26, together with John E. Eriksson

### Selected Publications

- Nuclear talin-1 provides a bridge between cell adhesion and gene expression. *iScience*. 2025. DOI: [10.1016/j.isci.2025.111745](https://doi.org/10.1016/j.isci.2025.111745)
- CBP-HSF2 structural and functional interplay in Rubinstein-Taybi neurodevelopmental disorder. *Nat Commun.* 2022. DOI: [10.1038/s41467-022-34476-2](https://doi.org/10.1038/s41467-022-34476-2)
- HSFs drive transcription of distinct genes and enhancers during oxidative stress and heat shock. *Nucleic Acids Res.* 2022. DOI: [10.1093/nar/gkac493](https://doi.org/10.1093/nar/gkac493)
- Stress-induced transcriptional memory accelerates promoter-proximal pause release and decelerates termination over mitotic divisions. *Mol Cell*. 2021. DOI: [10.1016/j.molcel.2021.03.007](https://doi.org/10.1016/j.molcel.2021.03.007)
- Heat shock factor 2 protects against proteotoxicity by maintaining cell-cell adhesion. *Cell Rep.* 2020. DOI: [10.1016/j.celrep.2019.12.037](https://doi.org/10.1016/j.celrep.2019.12.037)



## Mikael von Numers

**Group:** Mikael von Numers

**Subject:** Marine Biology

**University:** Åbo Akademi University

**CRIS profile:** <https://research.abo.fi/sv/persons/mikael-von-numers>

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### Areas of Expertise

- Island biogeography
- Long-term changes
- Distribution patterns among plants and birds
- Species-environment interactions

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### Research Projects

- My main research interests include long-term changes (among both plants and birds) and biogeographical questions concerning species distribution patterns in relation to the environment.

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### Special Methodologies & Techniques

- Fieldwork, GIS

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### Funding & Networks

- mainly domestic sources such as SKF

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### Selected Publications

- Predation risk and landscape context shape reproductive output of an endangered sea duck from two subpopulations with contrasting predation risk. *J. of Ornithology*. 2023. DOI: [10.1007/s10336-022-02036-6](https://doi.org/10.1007/s10336-022-02036-6)
- Island properties dominate species traits in determining plant colonizations in an archipelago system. *Ecography*. 2020. DOI: [10.1111/ecog.05013](https://doi.org/10.1111/ecog.05013)
- Population changes in the declining Turnstone (*Arenaria interpres*) and other waders in the northern Baltic Sea based on past and current breeding observations. *Ornis Fenn.* 2020. DOI: [10.5181/of.133973](https://doi.org/10.5181/of.133973)
- Refining predictions of metacommunity dynamics by modelling species non-independence. *Ecology*. 2020. DOI: [10.1002/ecy.3067](https://doi.org/10.1002/ecy.3067)
- Distribution patterns and long-term changes in vascular plants of non-littoral areas in the SW archipelago of Finland. Part VII. Poaceae and synthesis. 2017. DOI: [10.5735/085.054.0607](https://doi.org/10.5735/085.054.0607)



## Xiaoju Wang

**Group:** Biomaterials and Drug Fabrication

**Subject:** Pharmacy

**University:** Åbo Akademi University

**Lab Website:** <https://www.pharmscilab.fi/biomaterials-and-drug-fabrication>

**CRIS profile:** <https://research.abo.fi/sv/persons/xiaoju-wang>

### Areas of Expertise

- My research focuses on harnessing the benign properties of bio-enabled plant biopolymers to design sustainable and functional biomaterials for better interfacing with living cells or microbes. To create effective bionanomaterials and soft-matter Biomaterials, my research applies core methodologies such as biopolymer chemical modifications, nanostructured biopolymer synthesis, and self-assembled biocolloidal networks from nano- to macro-scale.

### Research Projects

- MADNESS CoE-Center of Excellence in Materials-driven solutions for combatting antimicrobial resistance, Åbo Akademi University Foundation, 01.01.2024-31.12.2028 (Co-PI; Center director: Prof. Jessica Rosenholm)
- SusCellInk-Sustainable nanocellulose-based bioinks towards diverse material functionalities and therapeutic delivery of bioactive cues, Research Council of Finland (333158), 01.09.2020-31.08.2025, (PI)

### Special Methodologies & Techniques

- Chemical synthesis of nanostructured polysaccharides and polyphenols
- Rheology
- Various additive manufacturing techniques
- Cell-laden 3D bioprinting for fabrication of in vitro models

### Funding & Networks

- Independent PI at CoE-MADNESS, Åbo Akademi University Foundation, 01.01.2024-31.12.2028
- Academy Research Fellow, Research Council of Finland (333158), 01.09.2020-31.08.2025

### Selected Publications

- Photocurable cellulose nanofibers and their copolymers with polyacrylamide as microgels to support 3D cell cultivation. *Nanoscale*. 2025, DOI: [10.1039/D5NR00583C](https://doi.org/10.1039/D5NR00583C)
- Bioprinting Macroporous Hydrogel with Aqueous Two-Phase Emulsion-Based Bioink: In Vitro Mineralization and Differentiation Empowered by Phosphorylated Cellulose Nanofibrils. *Adv. Funct. Mater.* 2024. DOI: [10.1002/adfm.202400431](https://doi.org/10.1002/adfm.202400431)
- Aqueous Two-Phase Emulsion Bioresin for Facile One-Step 3D Microgel-Based Bioprinting. *Adv. Healthcare Mater.* 2023. DOI: [10.1002/adhm.202203243](https://doi.org/10.1002/adhm.202203243)
- Evolution of Self-Assembled Lignin Nanostructure into Dendritic Fiber in Aqueous Biphasic Photocurable Resin for DLP-Printing. *Adv. Funct. Mater.* 2024. DOI: [10.1002/adfm.202315679](https://doi.org/10.1002/adfm.202315679)
- Digital light processing (DLP) 3D-fabricated antimicrobial hydrogel with a sustainable resin of methacrylated woody polysaccharides and hybrid silver-lignin nanospheres. *Green Chemistry*. 2022. DOI: [10.1039/D1GC03841A](https://doi.org/10.1039/D1GC03841A)



## Anna Törnroos-Remes

**Group:** Environmental and Marine Biology

**Subject:** Marine Biology

**University:** Åbo Akademi University

**Lab Website:** <https://sites.abo.fi/centre-for-sustainable-ocean-science/>

**CRIS profile:** <https://research.abo.fi/sv/persons/anna-törnroos-remes>

### Areas of Expertise

- Marine community ecology
- Benthic ecology
- Marine biodiversity and ecosystem functioning
- Arctic benthic ecology, Interdisciplinary marine science

### Research Projects

- Centre for Sustainable Ocean Science ([www.abo.fi/sos](http://www.abo.fi/sos)) - an ÅAU internal Centre of Excellence (Center Lead)
- The Sea ([www.abo.fi/sea](http://www.abo.fi/sea)) - an ÅAU research profile (PI, steering group)
- SEA-Quester ([www.https://sea-quester.eu](https://sea-quester.eu)) - an EU Horizon Europe project (ÅAU PI, Task lead, WP co-task lead)
- PROTECT BALTIC (<https://protectbaltic.eu>) - an EU Horizon Europe project (ÅAU PI, Task lead)
- MARBEFES (<https://marbefes.eu>) - an EU Horizon Europe project (ÅAU PI, sub-task lead)
- Meyer Biodiversity project (ÅAU PI)

### Special Methodologies & Techniques

- Trait-based approaches
- Ecological field experiments
- Reflexive learning
- Art-science approaches

### Funding & Networks

- Major funding sources: EU Horizon Europe, Research Council of Finland, Åbo Akademi University Foundation
- International networks: ICES WGIAB and WGBENT

### Selected Publications

- Diverging benthic trait diversity and drivers across fjord to slope habitats of the high Arctic, Est., Coast. Shelf. Sci., DOI: [10.1016/j.ecss.2024.109086](https://doi.org/10.1016/j.ecss.2024.109086)
- Introduction: towards holistic knowledge of marine environmental changes. in Understanding Marine Changes: Environmental knowledge and methods of research, Edward Elgar, Cheltenham
- The Anatomy of Complex Marine Problems: A Case Study of Decision-making on Archipelagic Aquaculture, in Understanding Marine Changes: Environmental knowledge and methods of research, Edward Elgar, Cheltenham
- Biological traits approaches in benthic marine ecology: Dead ends and new paths. Ecology and Evolution, e9001
- Four decades of functional community change reveals gradual trends and low interlinkage across trophic groups in a large marine ecosystem. Global Change Biology, DOI: [10.1111/gcb.14532](https://doi.org/10.1111/gcb.14532)



## Tiina Salminen

**Group:** Structural Immunology Lab

**Subject:** Biochemistry

**University:** Åbo Akademi University

**Lab Website:** <https://www.abo.fi/en/structural-immunology-lab/>

**CRIS profile:** <https://research.abo.fi/en/persons/tiina-a-salminen>

## Areas of Expertise

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- Protein biochemistry, bioinformatics and Structural biology
- Protein-ligand interactions
- Molecular interaction mechanisms in inflammation, infection and cancer
- Disease-causing genetic variation
- Structure-based drug design
- Targeted diagnostics

## Research Projects

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- Selective treatments against Borrelia infections
- Immunosuppressive SEFIR protein as target against Klebsiella infections
- Expanding toolbox for Clever-1-targeted oncotherapy
- Intercepting Siglec-9 interactions in cancer and inflammation
- Molecular mechanism of collagen-binding integrin activation

## Special Methodologies & Techniques

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- Modern facilities for protein purification and sample quality control
- State-of-the-arts infrastructure for protein crystallization
- Automated imaging of protein crystallization trials
- In-situ diffraction testing
- Infrastructure for Cryo-electron microscopy sample preparation
- Up-to-date infrastructure for computational biology and Scientific IT Support

## Funding & Networks

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- Research Council Finland
- InFLAMES Flagship
- Medicinska Understödsföreningen Liv och Hälsa rf
- Tor, Joe och Pentti Borg Foundation
- 3D-BioInfo Community of ELIXIR
- International Network of Protein Engineering Centres (INPEC)

## Selected Publications

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- Secreted Clever-1 modulates T cell responses and impacts cancer immunotherapy efficacy. *Theranostics.* 2025. DOI: [10.7150/thno.110544](https://doi.org/10.7150/thno.110544)
- Apprehensions and emerging solutions in ML-based protein structure prediction. *Curr. Opin. Struct. Biol.* 2024. DOI: [10.1016/j.sbi.2024.102819](https://doi.org/10.1016/j.sbi.2024.102819)
- Vascular adhesion protein-1-targeted PET imaging in autoimmune myocarditis. *J. Nucl. Cardiol.* 2023. DOI: [10.1007/s12350-023-03371-8](https://doi.org/10.1007/s12350-023-03371-8)
- Klebsiella pneumoniae type VI secretion system-mediated microbial competition is PhoPQ controlled and reactive oxygen species dependent. *PloS Pathog.* 2020. DOI: [10.1371/journal.ppat.1007969](https://doi.org/10.1371/journal.ppat.1007969)
- Structural and Biomolecular Analyses of *Borrelia burgdorferi* BmpD Reveal a Substrate-Binding Protein of an ABC-Type Nucleoside Transporter Family. *Infect. Immun.* 2020. DOI: [10.1128/IAI.00962-19](https://doi.org/10.1128/IAI.00962-19)



## Anne Filppula

**Group:** Translational Drug Research

**Subject:** Pharmacy

**University:** Åbo Akademi University

**Lab Website:** <https://www.pharmscilab.fi/translationaladmeandpharmacodynamics>

**CRIS profile:** <https://research.abo.fi/en/persons/anne-filppula>

### Areas of Expertise

- Pharmacokinetics, ADMET, drug interactions, pharmacogenetics, PBPK modelling

### Research Projects

- Projects mainly related to drug interactions and pharmacokinetic modelling

### Special Methodologies & Techniques

- PBPK modelling

### Funding & Networks

- Borgs fond, Liv & Hälsa

### Selected Publications

- Candesartan Has No Clinically Meaningful Effect on the Plasma Concentrations of Cytochrome P450 2C8 Substrate Repaglinide in Humans. *Drug. Metab. Dispos.* 2024. DOI: [10.1124/dmd.124.001798](https://doi.org/10.1124/dmd.124.001798)
- Hydroxychloroquine is Metabolized by Cytochrome P450 2D6, 3A4, and 2C8, and Inhibits Cytochrome P450 2D6, while its Metabolites also Inhibit Cytochrome P450 3A in vitro. *Drug Metab Dispos.* 2023. DOI: [10.1124/dmd.122.001018](https://doi.org/10.1124/dmd.122.001018)
- Translational aspects of cytochrome P450-mediated drug-drug interactions: A case study with clopidogrel. *Basic Clin Pharmacol Toxicol* 2022. DOI: [10.1111/bcpt.13647](https://doi.org/10.1111/bcpt.13647)
- Comparative Hepatic and Intestinal Metabolism and Pharmacodynamics of Statins. *Drug Metab Dispos.* 2021. DOI: [10.1124/dmd.121.000406](https://doi.org/10.1124/dmd.121.000406)
- Improved predictions of time-dependent drug-drug interactions by determination of cytosolic drug concentrations. *Sci Rep.* 2019. DOI: [10.1038/s41598-019-42051-x](https://doi.org/10.1038/s41598-019-42051-x)



## Jessica Rosenholm

**Group:** BioNanoMaterials group

**Subject:** Pharmacy

**University:** Åbo Akademi University

**Lab Website:** [www.pharmscilab.fi](http://www.pharmscilab.fi)

**CRIS profile:** <https://research.abo.fi/en/persons/jessica-rosenholm>

## Areas of Expertise

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- Development of novel drug delivery systems (DDS) based on new carrier materials e.g. naturally derived & synthetic polymers, inorganic materials, hydrogels, nanoparticulate systems
- Formulation of nanomedicines based on small and large bioactive molecules (small molecule drugs, peptides, proteins, nucleic acids)
- Rational DDS design through physico-chemical characterization linking material attributes to processing and performance (including cellular & bacterial evaluation)

## Research Projects

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- <https://research.abo.fi/en/persons/jessica-rosenholm/projects/>

## Special Methodologies & Techniques

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- Nanotechnologies for drug delivery and imaging
- 2D and 3D printing technologies
- Physico-chemical characterization of nanomaterials

## Funding & Networks

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- Nordic POP (Patient-Oriented Products) University Hub [<https://nordicpop.ku.dk/>]
- Nordic Pharmaceutical Innovation and Translational (NordicPharmaTrain) network [<https://www.uu.se/en/department/medicinal-chemistry/faculty-of-pharmacy/nordicpharmatrain>]
- Finnish Platform for Pharmaceutical Research (FinPharma) [<https://www.helsinki.fi/fi/verkostot/finpharma>]

## Selected Publications

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- Functional enzyme delivery via surface-modified mesoporous silica nanoparticles in 3D printed nanocomposite hydrogels. European Journal of Pharmaceutical Sciences. 2025. DOI: [10.1016/j.ejps.2025.107132](https://doi.org/10.1016/j.ejps.2025.107132)
- Surface Modification of Mesoporous Silica Nanoparticles as a Means to Introduce Inherent Cancer-Targeting Ability in a 3D Tumor Microenvironment. Small Science. 2024. DOI: [10.1002/smss.202400084](https://doi.org/10.1002/smss.202400084)
- Evolving technologies and strategies for combating antibacterial resistance in the advent of the post-antibiotic era. Advanced Functional Materials 2020. DOI: [10.1002/adfm.201908783](https://doi.org/10.1002/adfm.201908783)
- Nanodiamonds for advanced optical bioimaging and beyond. Curr. Op. Coll. & Interf. Sci. 2019. DOI: [10.1016/j.cocis.2019.02.014](https://doi.org/10.1016/j.cocis.2019.02.014)
- Multimodality Imaging of Silica and Silicon Materials in Vivo. Advanced Materials. 2018. DOI: [10.1002/adma.201703651](https://doi.org/10.1002/adma.201703651)



## Diana Toivola

**Group:** Epithelial Biology Lab

**Subject:** Cell Biology

**University:** Åbo Akademi University

**Lab Website:** <https://toivola-lab.org/>

**CRIS profile:** <https://research.abo.fi/sv/persons/diana-toivola>

### Areas of Expertise

- Epithelial cell biology of gastrointestinal organs and related glands including the endocrine pancreas
- Cytoskeletal intermediate filaments protein regulation and function and molecular roles in health and disease, especially simple epithelial keratins and nuclear lamins
- Auto-immune diseases, Inflammatory bowel diseases, type I diabetes) and colorectal cancer
- Mouse disease modelling
- Non-invasive diagnostics development of intestinal diseases

### Research Projects

- Dysregulation of keratins in intestinal inflammation with biomarker potential
- Noninvasive in vitro assays to detect and monitor inflammatory bowel diseases
- A colon-specific mouse model for colorectal cancer
- Keratins as tumor suppressors and guardians of intestinal health
- Beta-cell cytoskeletal keratin 18 and its putative type 1 diabetes-associated variant in beta-cell function

### Special Methodologies & Techniques

- Mouse disease modelling, especially models of colitis, colorectal cancer and diabetes
- Intestinal crypt isolation and organoid culture (mini-gut)
- Isolation of islets of Langerhans and 3D culture
- Beta-cell and colon cancer cell lines
- Microscopy, digital histopathology and fluorescence based imaging methods
- Cell, molecular, biochemical methods
- Immunoassay and non-invasive imaging methods development

### Funding & Networks

- Current funding: InFLAMES flagship, Business Finland, Novo Nordisk Fonden, Medicinska understödsföreningen Liv och Hälsa, Diabetes Research Foundation Finland
- Networks: Intermediate filament community, American Society for Cell biology, Gut Research-community in Finland, Gastroenterology organizations in Finland and USA

### Selected Publications

- Defining a timeline of colon pathologies after keratin 8 loss: rapid crypt elongation and diarrhea are followed by epithelial erosion and cell exfoliation. Am. J. Physiol., Gastro. Liver Physiol. 2024. DOI: [10.1152/ajpgi.00140.2023](https://doi.org/10.1152/ajpgi.00140.2023)
- β-cell keratin 8 maintains islet mechanical integrity, mitochondrial ultrastructure and β-cell glucose transporter 2 plasma membrane targeting. 2024. Am. J. Physiol.-Cell Physiol. DOI: [10.1152/ajpcell.00123.2024](https://doi.org/10.1152/ajpcell.00123.2024)
- Colonocyte keratins stabilize mitochondria and contribute to mitochondrial energy metabolism. 2024. Am. J. Physiol.- Gastrointestinal Liver Physiol. DOI: [10.1152/ajpgi.00220.2023](https://doi.org/10.1152/ajpgi.00220.2023)
- Colonocyte keratin 7 expression is expressed de novo in inflammatory bowel diseases and associated with pathological changes and drug-resistance. Sci. Rep. 2022. DOI: [10.1038/s41598-022-26603-2](https://doi.org/10.1038/s41598-022-26603-2)
- Targeted deletion of keratin 8 in intestinal epithelial cells disrupts tissue integrity and predisposes to tumorigenesis in the colon. Cell. Mol. Life. Sci. 2022. DOI: [10.1007/s00018-021-04081-5](https://doi.org/10.1007/s00018-021-04081-5)



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### Areas of Expertise

- Cell biology of soft tissue (muscle, cardiovascular)
- Cell signaling and Mechanobiology
- Microtissue engineering

### Research Projects

- Hematopoietic stem cell engineering (Making blood)
- Mechanobiology of hematopoietic stem cell niches and the endothelium
- Deciphering mechanisms of soft tissue development and regeneration
- Nanoparticle interactions with biological barriers
- Deciphering mechanisms of tumor-endothelial crosstalk
- Protein-protein crosstalk in cell fate decisions

### Special Methodologies & Techniques

- Microtissue engineering and biomaterials
- Organ on Chips, flow and perfusion chambers, micropatterning, functionalized materials
- Cell and molecular biology
- Mass spectrometry (identification of protein-protein interactions)
- Optogenetic tools and synthetic biology tools
- Zebrafish to study soft tissue development (muscle, cardiovascular)
- Computational simulations of mechanochemical regulation of tissue architecture

### Funding & Networks

- Sigrid Juselius Foundation
- European Research Council and European commission (H2024, Marie Curie Training Network)
- Academy of Finland and Inflames
- Turku Bioscience
- Materials driven regeneration (<https://mdrresearch.nl>)
- Institute for complex molecular systems (<https://www.tue.nl/en/research/institutes/institute-for-complexmolecular-systems>)

### Selected Publications

- Receptor stoichiometry predicts artery-typical vulnerability to altered Notch signaling during smooth muscle differentiation. DOI: [10.1101/2025.05.05.652186](https://doi.org/10.1101/2025.05.05.652186)
- Mechanosensitive interactions between Jag1 and Myo1C control Jag1 trafficking in endothelial cells. DOI: [10.1101/2025.03.27.645426](https://doi.org/10.1101/2025.03.27.645426)
- 2.5D Model for Ex Vivo Mechanical Characterization of Sprouting Angiogenesis in Living Tissue. *J Vis Exp.* 2025. DOI: [10.3791/67641](https://doi.org/10.3791/67641)
- Directing cellular responses in a nanocomposite 3D matrix for tissue regeneration with nanoparticle mediated drug delivery. *Materials Today Bio* 2023. DOI: [10.1016/j.mtbiobio.2023.100865](https://doi.org/10.1016/j.mtbiobio.2023.100865)
- Engineered patterns of Notch ligands Jag1 and Dll4 elicit differential spatial control of endothelial sprouting. *iScience* 2022. DOI: [10.1016/j.isci.2022.104306](https://doi.org/10.1016/j.isci.2022.104306)



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