

# N-PACT Compilation 2022

Norwegian Particle, Astroparticle  
and Cosmology Theory community

## Introduction

N-PACT is a scientific network aimed at all researchers at Norwegian academic institutions (and Norwegians at CERN) working on Theoretical Particle physics, Astroparticle physics, or Cosmology. The network compiles an annual summary of the combined scientific activity of the network members (this document), and runs an annual workshop and an email list: [npact@uis.no](mailto:npact@uis.no).

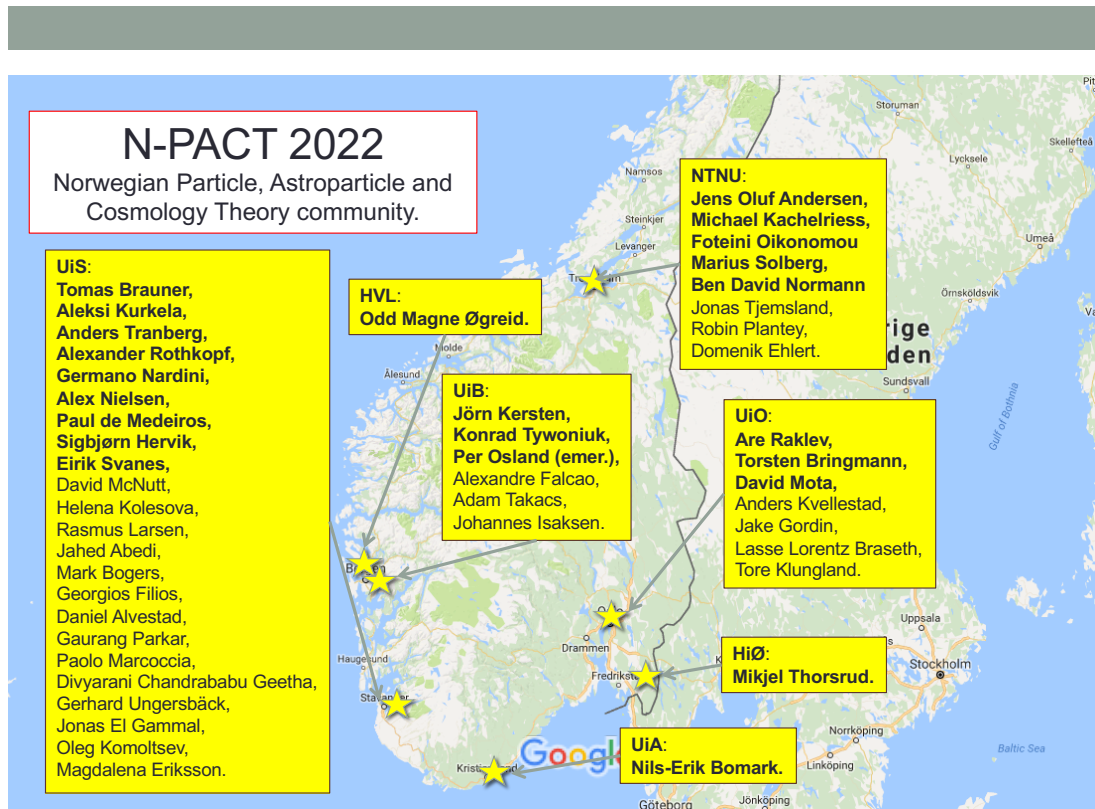


Figure 1: Network members and their affiliations in Norway

## Workshop venues

- 19.-22. June 2017, University of Stavanger,
- 28.-31. May 2018, University of Stavanger.
- 5.-6. August 2019, University of Oslo (Fysikermøte 2019).
- June 2020, University of Agder (cancelled due to COVID-19).
- 25. June 2021, University of Stavanger (Fysikermøte 2021).
- 18.-19. August 2022, University of Stavanger.

## Strategic Documents

N-PACT enters as the official entity for PACT in the Norwegian contribution to the **European Particle Physics Strategy Document** (*Research Plans of the Norwegian Particle, Astroparticle and Nuclear Physics Communities till 2025*). It is stated:

*For Norwegian theory, activities at and in connection with CERN play a major role, but rather than focusing on a specific experiment, the theory community takes a broader view and combines its interest in not only particle physics but also astrophysics and cosmology in the N-PACT theory collaboration. It is important that these theory activities be given an enhanced visibility in the European Strategy Update.*

And in the section devoted to theory research activities, it says:

*The Norwegian community in particle, astroparticle, and cosmology theory (NPACT) is coalescing and is represented here in a single section. A new networking activity has been initiated, connecting all six institutions where theory activities currently exist. As the result of a recent generational turnover, the majority of the network members are newly appointed staff at the six institutions and are of relatively young age (< 50 y). The network is working towards net growth, as well as increasing Norway's participation in CERN theory activities and the Norwegian quota there. To be successful, we see a need for funding opportunities for theory activities distinct from experiments, mirroring the role played by the Theoretical Physics Division at CERN.*

This is then followed by a description of the specific PACT research activities.

## Member profiles

### University of Agder



**Nils-Erik Bomark,  
Associate Professor.**

At UiA since 2015. SUSY phenomenology, NMSSM, Dark Matter. How to teach particle physics non-technically.

### University of Bergen



**Jörn Kersten,  
Professor.**

At UiB since 2014. SUSY phenomenology, self-interacting dark matter, physics of the early universe, cosmology, neutrino physics.



**Konrad Tywoniuk,  
Associate Professor (Group Leader).**

At UiB since 2018. Heavy-ion physics, hard probes (jet quenching, heavy bosons), finite temperature theory, cosmology.



**Johannes Isaksen,  
Ph.D. student.**

At UiB since 2020. Heavy-ion physics, jet quenching.



**Per Osland,  
Professor (emer.).**

At UiB since 1987. Particle phenomenology, Extended Higgs sector, CP violation, Dark Matter.



**Alexandre Falcao,  
Ph.D. student.**

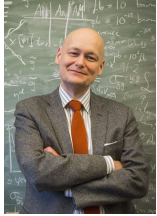
At UiB since 2022. Heavy-ion physics, jet quenching.



**Adam Takacs,  
Ph.D. student**

At UiB since 2019. Heavy-ion physics, jet quenching.

## University of Oslo



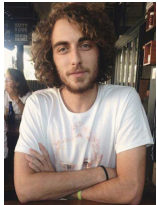
**Are Raklev,  
Professor.**

At UiO since 2010. Particle Phenomenology, SUSY, Dark Matter. LHC, CERN, GAMBIT.



**David Mota,  
Professor.**

At UiO since 2011. General Relativity, Cosmology.



**Jake Gordin,  
Ph.D. student**

At UiO since 2018. General Relativity and Cosmolgy.



**Tore Klungland,  
Ph.D. student.**

At UiO since 2022. BSM theories, scattering amplitudes.



**Torsten Bringmann,  
Professor.**

At UiO since 2013. BSM particle physics and cosmology. Astrophysical probes of dark matter: indirect detection and structure formation. Dark-SUSY, GAMBIT, CTA.



**Anders Kvellestad,  
Postdoc.**

At UiO/Imperial College since 2017. BSM global fits, LHC phenomenology, supersymmetry, two-Higgs-doublet models, machine learning and Bayesian methods. GAMBIT.



**Lasse Lorentz Braseth,  
Ph.D. student.**

At UiO since 2020. Quantum field theory, scattering amplitudes.

## University of Stavanger



**Anders Tranberg,  
Professor.**

At UiS since 2013. Finite temperature and out-of-equilibrium field theory, cosmology, baryogenesis, inflation and gravitational waves. CERN, LISA.



**Tomas Brauner,  
Professor.**

At UiS since 2015. Finite-temperature and -density field theory, phase diagram of QCD, effective field theory, spontaneous symmetry breaking.



**Sigbjørn Hervik,**  
**Professor.**

At UiS since 2009. GR, Modified Gravity, Differential Geometry.



**Alexander Rothkopf,**  
**Professor.**

At UiS since 2018. Lattice QCD, numerical field theory, out-of-equilibrium field theory.



**Alex Nielsen,**  
**Associate Professor.**

At UiS since 2019. Gravitational waves, General Relativity, Black holes



**Germano Nardini,**  
**Associate Professor.**

At UiS since 2018. Cosmological phase transitions, gravitational waves, beyond Standard Model physics.



**Aleks Kurkela,**  
**Associate Professor.**

At UiS/CERN since 2014. Heavy-ion collisions, QCD at finite temperature, density. Compact stars. LHC, CERN.



**Eirik Svanes,**  
**Associate Professor.**

At UiS since 2019. String theory, mathematical physics.



**Paul de Medeiros,**  
**Associate Professor.**

At UiS since 2016. Mathematical Physics, String theory.



**Rasmus Larsen,**  
**Postdoc.**

At UiS since 2020. Lattice field theory, QCD.



**David McNutt**  
**Associate Professor.**

At UiS since 2017. General Relativity, Cosmology.



**Jahed Abedi,**  
**Postdoc.**

At UiS since 2021. Gravitational Waves.



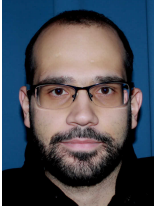
**Helena Kolesova,**  
**Postdoc.**

At UiS since 2018. Finite-temperature field theory, symmetry breaking.



**Divyarani Chandrababu Geetha,**  
**Ph.D. student.**

At UiS since 2021. Electroweak phase transition, Gravitational waves.



**Georgios Filios,**  
**Ph.D. student.**  
 At UiS since 2018. Effective Field Theory, phases of QCD.



**Mark Bogers,**  
**Ph.D. student.**  
 At UiS since 2015. Symmetry breaking in quantum field theory.



**Daniel Alvestad,**  
**Ph.D. student.**  
 At UiS since 2019. Lattice field theory, Monte Carlo simulations.



**Gerhard Ungersbäck,**  
**Ph.D. student.**  
 At UiS since 2021. Non-equilibrium field theory, lattice field theory.



**Paolo Marcoccia,**  
**Ph.D. student.**  
 At UiS since 2019. Gravitational waves.



**Oleg Komoltsev,**  
**Ph.D. student.**  
 At UiS since 2021. QCD phase diagram and neutron stars.



**Gaurang Parkar,**  
**Ph.D. student.**  
 At UiS since 2019. Lattice QCD, Non-equilibrium field theory.



**Jonas El Gammal,**  
**Ph.D. student.**  
 At UiS since 2021. Gravitational waves and phase transitions.



**Magdalena Eriksson,**  
**Ph.D. student.**  
 At NTNU/UiS since 2019. Quantum fields in cosmology.

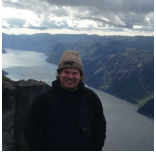
**NTNU, Trondheim**



**Jens Oluf Andersen,**  
**Professor.**  
 At NTNU since 2005. QCD at finite temperature and density: Quark-gluon plasma, finite-density QCD and quark matter, phase transitions.



**Michael Kachelriess,**  
**Professor.**  
 At NTNU since 2005. High energy astrophysics, dark matter, neutrino physics.



**Marius Solberg,**  
**Associate Professor.**

At NTNU since 2016. Works on N-Higgs doublet models, quantum field theory, particle phenomenology.



**Foteini Oikonomou,**  
**Associate Professor.**

At NTNU since 2020. Cosmic Rays, Multi-messenger astrophysics.



**Ben David Normann,**  
**Associate Professor.**

At NTNU since 2021. Non-standard Cosmologies, gravitational lensing.



**Jonas Tjemsland,**  
**Ph.D. student.**

At NTNU since 2019. High energy astrophysics, cosmic antimatter.



**Robin Plantey,**  
**Ph.D. student.**

At NTNU since 2022. BSM physics, Mathematical Physics.



**Domenik Ehlert,**  
**Ph.D. student.**

At NTNU since 2022. High energy astrophysics, Cosmic rays.

### HVL, Vestlandet



**Odd Magne Øgreid,**  
**Associate Professor.**

At HVL since 1999. Works on particle phenomenology, extended Higgs sector, CP-violation.

### HiØ, Østlandet



**Mikjel Thorsrud,**  
**Associate Professor.**

At HiØ since 2014. General relativity, cosmology.

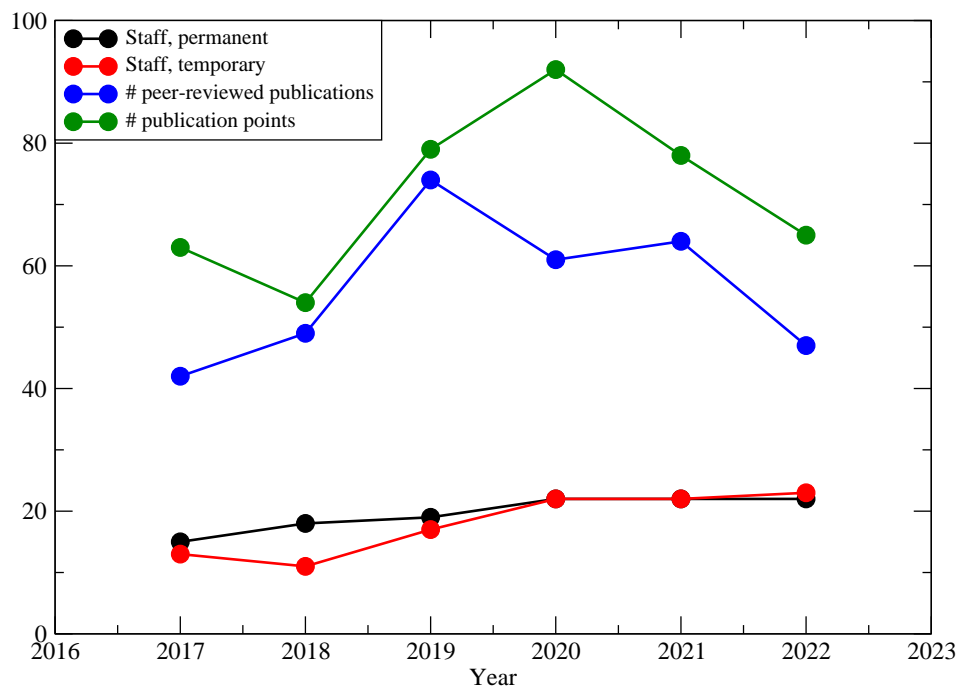


Figure 2: Members (senior and junior), number of publications and publication points over time.

## Combined publication list

### Metrics:

- 47 peer reviewed journal publications, published during 2022.
- 65 publication points, using new formula,

$$\sum \left[ \sqrt{\frac{\text{Authors/affiliations in NPACT}}{\text{All authors/affiliations}}} \times \text{If International} \times \text{Publication level score} \right]$$

where: *If International* is 1 if all authors are Norwegian, 1.3 otherwise; *Publication level score* is either 1 or 3, depending on the journal; *Authors/affiliations* count author/affiliation



combinations (a single author with two affiliations counts twice); and where *All authors/affiliations* for a single publication is capped at 10 (for instance for GAMBIT).

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