



Large Scale Structures Division

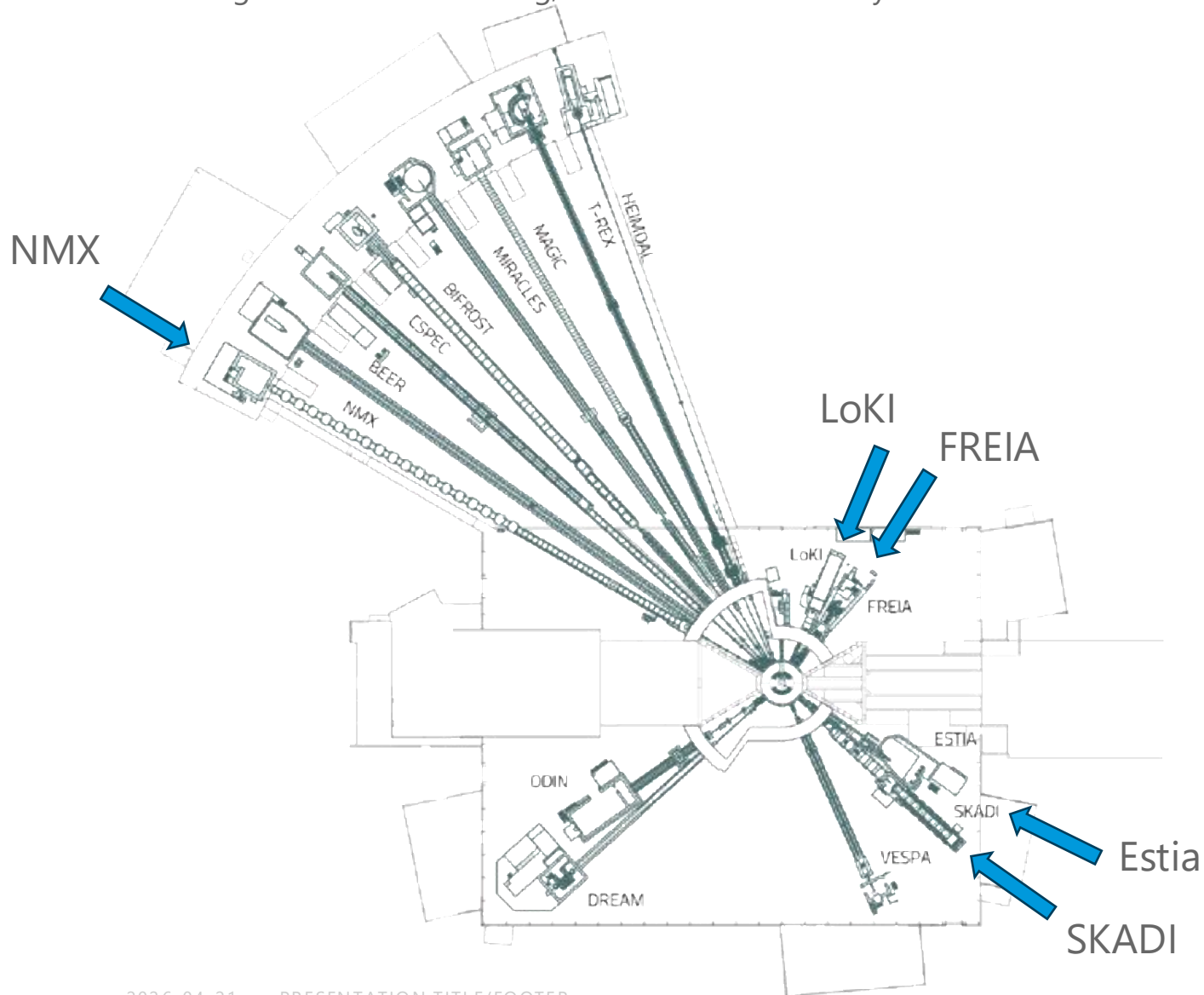
Common STAP Meeting – April 2026

ANDREW JACKSON
HEAD OF LARGE SCALE STRUCTURES DIVISION

2026-04-21

Large Scale Structures Instruments

Small Angle Neutron Scattering, Neutron Reflectometry & Neutron Macromolecular Crystallography



Complete : LoKI
2026 : NMX, Estia
2027 : SKADI, FREIA

Acceleration efforts on FREIA

Working to have all LSS
instruments ready for neutrons
by April 2027

LSS Team at ESS



LoKI (Partner : STFC)

Judith Houston (ESS, Instrument Scientist)

Santiago Bordin (ESS, Instrument Scientist)

Hannah Burrall (ESS, Instrument Ops Engineer)

Clara Lopez (ESS, Engineer - NSS)

SKADI (Partners : LLB & FZJ)

Sebastian Jaksch (ESS/FZJ, Instrument Scientist)

Annika Stellhorn (ESS, Instrument Scientist Polarized SANS)

Tamires Gallo (ESS, Instrument Operations Engineer)

Milan Klausz (HUN-REN, Postdoc Detector Simulations)

Sylvain Desert (LLB, Engineer – NSS)

Computational Instrument Scientists (DMSC)

SANS : Oliver Hammond

Reflectometry : Position Vacant – recruitment soon

NMX : Aaron Finke

Estia (Partner : PSI)

Jos Cooper (ESS, Instrument Scientist)

Grace Causer (ESS, Instrument Scientist)

Felipe Lopes (ESS, Instrument Ops Engineer)

Nicolae Popescu (ESS, Engineer – NSS)

FREIA (Partner : STFC)

Tom Arnold (ESS, Instrument Scientist)

Freia 2nd Instrument Scientist – recruitment ongoing

Emma Hermansson (ESS, Instrument Ops Engineer – May 2026)

Clara Lopez (ESS, Engineer – NSS)

NMX (Partner : LU, EK HUN-REN)

Esko Oksanen (LU/ESS, Instrument Scientist)

Justin Bergmann (ESS, Instrument Scientist/IOE)

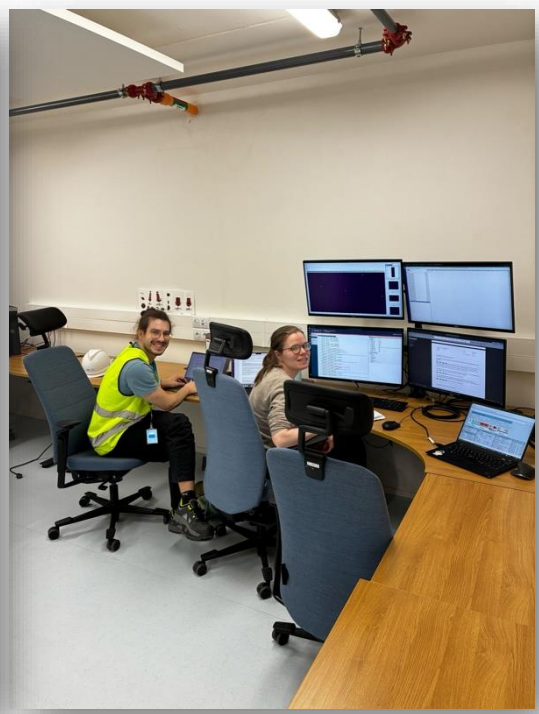
Swati Aggarwal (LU/ESS, Scientist/IOE)

Zoë Fisher (ESS, Crystallisation and Biodeuteration Scientist)

Daniel Lundström (ESS, Engineer – NSS)

LoKI Progress

Getting ready for Hot Commissioning



Tollgate 5 / SAR / iSRR completed and approved

Work on remaining issues ongoing

Testing and installation of additional detectors to complete full scope started.

SKADI Progress

Installation well under way



Cave, Collimator Shielding, and Hutch Installed
Electrical and Utility installation started.
Detector vessel delivered and installed



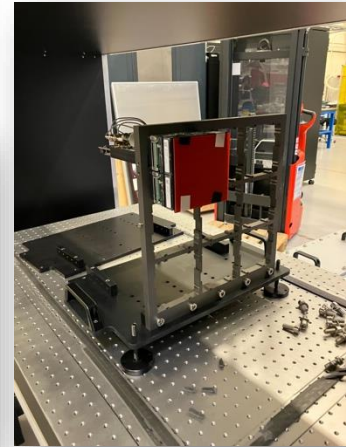
Sample snout and sample area false floor installed



Sample stage delivered and being tested



Detector modules delivered, assembly and testing started at Utgård



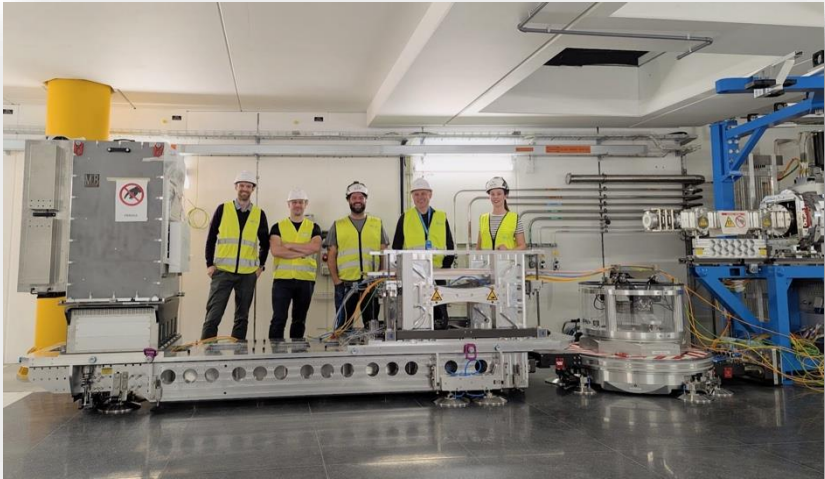
Control hutch fit-out started

TG3 April 30th 2026
TG5/SAR Feb 2027

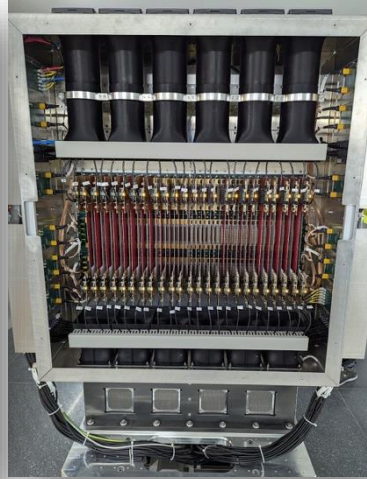


Estia Status

Installation almost complete



Estia team after completion of testing of detector arm



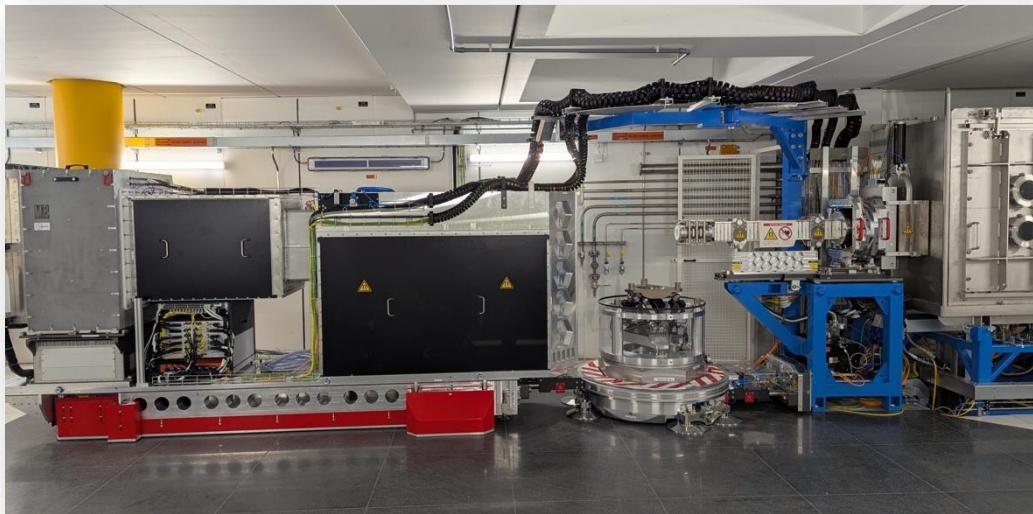
Detector complete, installed, and initial testing with cosmics done



Hexapod installed



Felipe testing the microscope and wire-bonder in the sample prep area



2026-04-21 PRESENTATION TITLE / FOOTER



Control Hutch fitted out

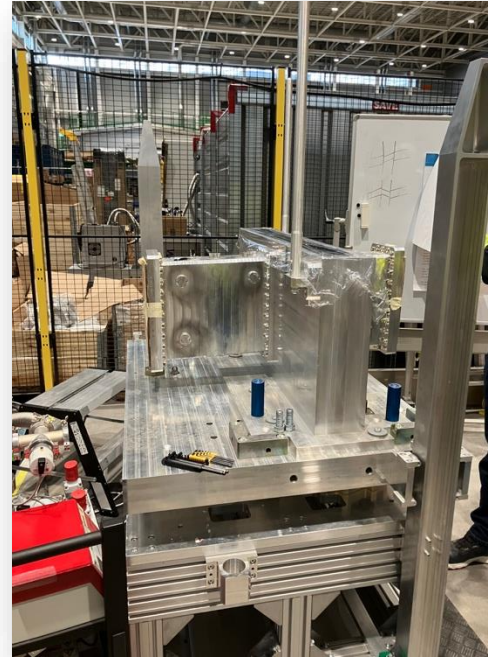


TG3 finalised
Integrated Testing almost complete
TG5/SAR/iSRR in June 2026



FREIA Progress

Installation started



Cave walls and internal crane installed.
Installation of services and false floors ongoing
Choppers balanced, tested, and ready for installation
Detector bench delivered

NMX Status

Installation almost complete



Sample and detector robots installed and undergoing inspection for energisation



Sample prep lab fitted out and operational



Control Hutch fitted out and in use for training and testing

Robots installed and testing under way

Decision to install all detectors before TG5 – previously only one

TG3 complete Jan 2026
TG5/SAR/iSRR late 2026

Postdocs

ESS Early Science Postdocs



Estia

In-operando Studies of Lithium-Ion Batteries

ESS: Jos Cooper, Grace Causer

Collaborators : Robert Weatherup (Oxford)

Postdoc to start in late 2026

LoKI

Rheology of microgels

ESS: Judith Houston

Collaborators: Emanuela Zaccarelli (La Sapienza) and Marco Laurati (Florence)

Postdoc will start in late 2026/early 2027

AMBER MSCA Co-Fund

NMX

Elucidating the mechanism of triose phosphate isomerase

Esko Oksanen (LU/ESS), Lynn Kamerlin (Georgia Tech)

LoKI

Self Assembly of Intrinsically Disordered Proteins Studied with Small Angle Neutron Scattering and Computational Methods

Andrew Jackson (ESS/LU), Marie Skepö (LU)

Postdocs



VR Funded Early Science Consortia (2026-2029) – proposals approved late 2025

Lifecycle of a Lipid Nanoparticle (PI: Margaret Holme, Chalmers)

- Examining the production, delivery, and biological interactions of lipid nanoparticles used as drug delivery agents
- Two postdocs based at ESS with regular periods at consortium labs:
 - Lipid particles under flow (working with Judith Houston and Andrew Jackson)
 - Biological interactions of LNPs (working with Tom Arnold and Sebastian Jaksch)
- Recruitment to start soon

LoKI, SKADI, Estia, FREIA

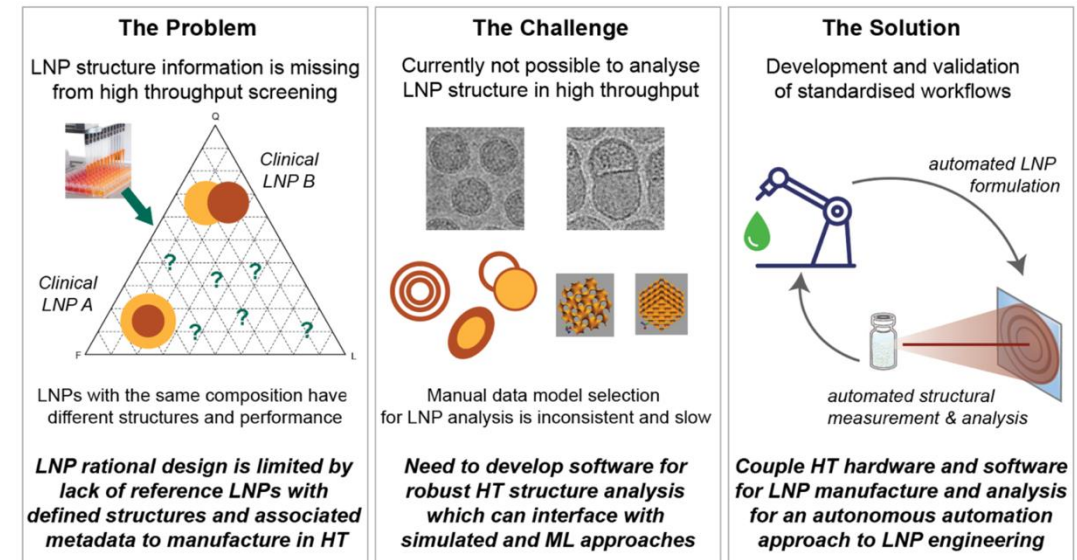


Image : Hanna Barriga, KTH

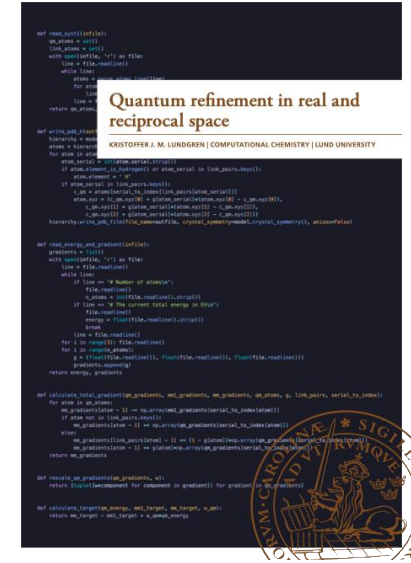
PhD and Masters Projects

co-supervision by LSS staff



Juanita Francis successfully defended her thesis "A Multimodal Lens on Protein assembly"
Lund University
Supervisors : Cedric Dicko, Felix Roosen-Runge, **Andrew Jackson**, Wolfgang Knecht

Kristoffer Lundgren successfully defended his thesis "Quantum refinement in real and reciprocal space"
Lund University
Supervisors : Ulf Ryde, **Esko Oksanen**



Enayet Hossain
"Achieving high temperature lossless transport in 2D magnetic topological insulator heterostructures" – Monash PhD project
Supervisors: Mark Edmonds, **Grace Causer**

Lukas Aniansson
"Defect structure of high-PMA FePd: Impact on X-ray and Neutron Scattering" – LU Masters Project
Supervisors: Elizabeth Blackburn, **Annika Stellhorn**

New Instrument Proposals

Expanding LSS Experimental Capabilities



- **SAGA** – Dedicated surface scattering instrument for 3D studies of interfaces
- **BARN** – Ultrawide SANS/WANS (0.01 to 20 \AA^{-1}) – mesoscale PDF and structured liquids
- **SMÅ** - High throughput SANS (0.004 to 0.8 \AA^{-1}) for industry and parametric studies of formulations
- **ASGARD** – High throughput reflectometer for solid-liquid interfaces
- **NeuStruct** – Structural biology cluster - 2nd NMX with DNP and a dedicated Bio-SEC-SANS (0.004 to 2 \AA^{-1})
- **Yggdrasil** – Polarised SANS/WANS (0.001 to 3 \AA^{-1})
- **IDUN** – guide cluster concept that could support some of the above e.g. SMÅ, Yggdrasil, NeuStruct

Build on existing suite by providing new capabilities and increasing capacity to enable more, and more complex, experiments



Summary

Overall good progress with the instrument projects, but some issues remain

LoKI successfully completed TG5/iSRR, but ...

- readiness for hot commissioning is not the same as readiness for user operations
- there are many technical and operational tasks remaining for the instrument team
- continued preparation for hot commissioning will reveal new issues – but nothing major so far
- partners are formally not involved, but we need to ensure continued knowledge transfer when problems found – we have good continued collaboration from STFC

Estia and NMX almost complete – risk items are motion and PSS

SKADI good progress, but potential further delays with detectors

FREIA accelerating

Recruitments ongoing with good applicant pools

Ongoing research collaboration building for early science success



Questions?