AIMday Big Science Technology
13 October 2021

Hello Big Science facilities

Hej Swedish expertise

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This is how it works

AIMday Big Science Technology is a workshop where research facilities get the chance to discuss their challenges with scientists at Swedish universities and institutes and with representatives from high-tech companies that deliver to Big Science.

Ahead of the event, the research facilities identify the challenges they are facing in a number of categories, and submit them to Big Science Sweden. Workshop teams with the relevant expertise for each category are then put together to discuss the challenges at AIMday Big Science Technology.

We look forward to your contributions and interesting and stimulating discussions. The day promises to open up opportunities for new collaborations and business.

#AIMdayBig ScienceTechnology
#LookingForIndustrialPartners
#GoodCollaboration
#ResearchFacilitiesPlusHigh-techCompanies
#ImportantDiscussions
#GreatAtmosphere
#InnovateWithSweden
#AdvancedTechnologyChallenges
#ExperticeAcademicInstitutes
#BigScienceKnowledgeTransfer
#YesSwedenCan

Hello Big Science facilities

Find solutions for your challenges with the help of Swedish high-tech companies and researchers

To-do list

1. Identify challenges

At this AIMday, the questions are divided into the following categories:

- Materials – Advanced Materials – Advanced Production Methods – Carbon Fibre Material & Composite material – Magnets & Cryo Technology
- Robotics and Remote Handling
- Big Data, Software Development, AI/ML, Control Systems
- Detector Technology & Instrumentation, Diagnostics

2. Submit challenges

Send us your questions
www.aimday.se/big-science-technology-2021/registration-facilities

3. Join the discussions

Register for the workshop
www.aimday.se/big-science-technology-2021/registration-facilities

I work at a research facility. What's in it for me?

At AIMday Big Science Technology the spotlight is on your priority challenges. World-leading expertise will discuss your challenges with you, contributing the latest research and methods in your field. This will be the starting point for fruitful collaborations.

Hej Swedish companies and researchers

Take an active part in the discussions and help develop research facilities. Your expertise is needed!

To-do list

1. Choose interesting challenges to contribute to

The challenges are divided into the following categories:

- Materials – Advanced Materials – Advanced Production Methods – Carbon Fibre Material & Composite material – Magnets & Cryo Technology
- Robotics and Remote Handling
- Big Data, Software Development , AI/ML, Control Systems
- Detector Technology & Instrumentation, Diagnostics

2. Join the discussions

www.aimday.se/big-science-technology-2021/registration-companies-and-researchers

I represent a company. What's in it for us?

You get involved in high-tech discussions and bring your expertise to the table. This can be a start for collaboration with researchers and Big Science facilities.

I'm a researcher. What's in it for me?

The AIMday Big Science Technology provides an opportunity to discuss future projects and find out where your research can be applied in a Big Science context.

Challenges turn into pre-studies and projects in a four-step process

Together we lay the foundation for collaboration between research facilities and experts from industry and academia. One possible outcome from the discussions is to investigate solutions to the challenges in exciting pre-studies.

Challenges identified by the research facilities

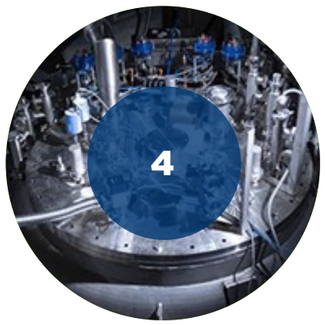
Big Science Sweden is in close contact with the facilities, and compiles the challenges they are facing.

Right expertise around the table

We match expertise from industry and academia and put together qualified discussion groups.

Workshop

Technical experts from the facilities present their challenges. Researchers and representatives from industry present their competencies. Discussion about the challenges, best practice, possible solutions, and collaboration models.



Financing of pre-studies

Big Science Sweden has access to special funding from Swedish universities that can be used for pre-studies. This funding could be the starting point for future cooperation and business.

2019

Looking back

AIMday Big Science Technology 2019

Get inspiration from the interesting challenges identified by CERN and ESS at the AIMday 2019. Researchers and technical experts immersed themselves in around 30 challenges within categories as Advanced materials, Drones, Data handling and Electronics. As a result, five top-quality pre-studies where initiated.

Advanced materials and advanced production methods such as additive manufacturing

- Can we produce thicker sheets or bulk material of grain oriented steel, and steer the grain orientation? (CERN)
- How to produce, cut and polish radiation-hard garnet crystals more efficiently for large detector applications? (CERN)
- How to construct efficiently large and complex detector absorbers from tungsten alloys, whose composition are driven by the physics application? (CERN)
- Radiation hardness on greases: Is there a roller screw/lubricant (dry) system that can withstand the conditions in a radiation environment, and take up to 10MGy? (CERN)
- Is there a method to heavily bend 316L tubes (6mm or 18mm) with nearly no deformation? (CERN)
- Can we design a cooling solution in a vacuum chamber that does not include welded seams? (CERN)

Robotics & remote handling

- How can we make use of drones more efficient and more compatible in terms of flying time and having them work autonomously? (CERN)
- How can we use drones for monitoring in the accelerator tunnels and other hostile environments? (ESS)
- Robotics/Remote handling
- How can we make industrial robots lighter, while maintaining their precision and dynamics? (CERN)
- How can we increase safety for humans in close human/robot collaborations? (CERN)¨
- How can we make robots for cryogenic and UHV environments? (CERN)
- How can we make hyper-redundant robots – think for example “snake-like” robots? (CERN)
- How can we make robots taking care of continues decontamination and cleaning of Big Science facilities? (CERN)
- How can we increase the “human touch” for robots working with humans in Big Science? (CERN)
- How can we increase proprioception in maintenance teleoperation in big science facilities? (CERN)

AI/Big Data/Data handling/Control systems

- How do we optimize the flow of data in machine learning projects? (ESS)
- How do we develop Intelligent Alarm Handling? (ESS)
- How to create a Software Development Ecosystem for Machine Learning (Agile mashine learning)?#2763 How can we develop Artificial Monkey Tuning? (ESS)
- What does tomorrows control rooms look like? (ESS)
- How do we together drive teh development of future Control Systems for Complex Processes (EPICS / Tango)? (ESS)
- How much we shall care to integrate all the data from all the legacy systems upfront - instead of starting with some data and developing a culture for continues analysis involving cross-functional teams? (Lund University)

Electronics

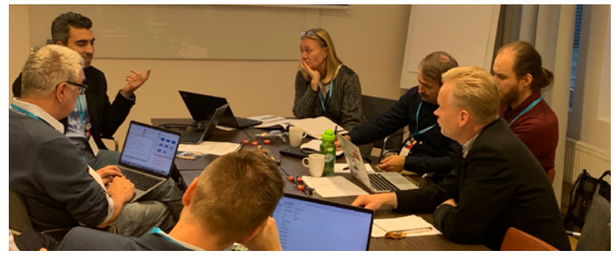
- How do we meet the needs for Big Science when it comes to TCA development (Micro TCA – hardware) and how can we push for our needs to be part of standard TCAs. Energy-efficient processors? (ESS)
- Magnets and Cryo
- What can Sweden do for helping CERN to develop a canted-cos-theta dipole magnet for the LHC?
- How can we develop Superconducting Magnet Energy Storage (SMES) for the LHC at CERN?
- How can we fabricate -53 degrees CO2 cooling systems for the experimental setup at the ATLAS experiment?

big science sweden

Big Science Sweden and AIMday Big Science Technology helped bring together key partners for an exciting collaboration project involving industry and academia.

RESULT
5 top-quality pre-studies

- Robotic arm in carbon fibre
- SMES – Energy storage
- CO2-cooling down to -53°C
- Developing a Swedish cluster for super conducting magnets
- Drones in harsh environments.



One of the pre-studies has now advanced into a major project, with funding of SEK 19 million.

A cluster of technology companies in Småland are collaborating with Uppsala University and Linnaeus University in an EU research and innovation project on superconducting magnets with uses in, for example, Big Science.

The project aims to develop environmental-friendly and energy efficient superconducting magnets, where research and technical development can be combined to boost global competitiveness.

Magnets and cryotechnology were one of the areas of technology discussed at the Big Science Sweden Conference/AIMday 2019, under the title, “What can Sweden do to help CERN develop a canted-cos-theta dipole magnet for the LHC?”.

The discussion during the AIMday initiated a feasibility study on the formation of a Småland cluster to work on superconducting ‘cold’ magnets. The feasibility study concluded with a project application for which funding has recently been awarded. Three high-tech companies and two universities can now work together on an exciting research and development project.

Collaboration partners in the project are Scanditronix Magnet, Ryd-Verken, Vattenskärningsteknik in Vislanda, Uppsala University and Linnaeus University.

The project will run until April 2023, and will combine expertise in research, business, technology, and innovation to compete on a global market.

The project – Disseminating technology for cold magnets to provide access to a wider international market – will be carried out with financial support from the European Regional Development Fund (ERDF) and Region Kronoberg. Collaboration partners in the project are Uppsala University, Linnaeus University, Scanditronix Magnet, Ryd-Verken, and Vattenskärningsteknik i Vislanda.

Contact us at Big Science Sweden

Big Science Sweden is Sweden's official Industrial Liaison Office (ILO), serving as the link between Swedish industry, institutes, academia, and Big Science research facilities. We contribute to the build-up of knowledge, skills, and expertise that drive technological development in Swedish companies, and we help the facilities find appropriate high-tech Swedish suppliers.

www.bigsciencesweden.se

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AIMday by Uppsala University

The workshop will be structured according to the internationally recognised workshop approach called AIMday, developed by Uppsala University. The workshop roots are in the materials science field – bringing expertise from one of Europe's leading centres for materials science out of the labs and into industry.

www.aimday.se

Big Science Sweden is funded by Sweden's largest and most important organisations for supporting and funding Swedish research and high-tech research and growth.

Big Science Sweden is led and operated by a consortium of leading universities, institutes, and industrial network organisations.

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