



**EUROPEAN
SPALLATION
SOURCE**



ESS Executive Advisory Board

November 6th, 2020

LARS BÖRJESSON

2020-11-06

Agenda



1. General update
2. Plan for seminar with top R&D-managers
3. Communications
4. Calendar for meetings 2021
5. End



1. General update

ESS related matters

Joint ESS/MAX Office established

IVA/RISE seminar February 9-10th, 2021

The coming R&D bill/proposal, Dec 10th

Changes in the Executive Advisory Board



Arne Karlsson

New EAB member

Born April 3rd 1958

BA, Stockholm School of Economics

Conducted research in net asset value discount

CEO Hartwig Invest 1988-1993

CEO Atle 1993-1998

CEO Ratos 1999-2012

Chairman Ratos 2012-2016

Chairman SNS 2009-2015

Chairman Svensk bolagsstyrning

Chairman Ecolan

Boards A.P.Moller-Maersk, Einar Mattsson



2. High level industrial day with ABB



Focus on R&D managers

Context: Neutron research at ESS will enable industries to develop smarter and more sustainable solutions. Solutions that will change lives for the better and become tomorrow's global successes.

Purpose: Initiate interaction between ESS and key industry representatives to explore how to capture the full potential.

Host: ABB in cooperation with ESS

Target: Invite 30 R&D managers

Timing: May 2021?

Venue: Corona-safe facility at ABB, Västerås

Schedule: Full day about future needs, ESS potentials and interactive sessions

EAB role: Members to invite guests, participate at the event to host "round table sessions" and for a consecutive EAB meeting/dinner

Agenda:

- Introduction of ESS – capabilities and possibilities
- Facilitator lead dialogue groups with ESS experts and R&D managers in the select areas:

Computing capacity and speed

With research facilitated by ESS, we can achieve giant leaps forward in the technology that drives them.

Energy storage and transformation

Neutron research can help discover new ways of making energy more accessible and sustainable.

The material world

More advanced materials can be engineered as a result of discoveries made in neutron research.

Improving life sciences

New solutions can be developed through understanding how drugs react with proteins, and how structures can be changed.

- Conclusion and next steps



Industry day

(1/2)

Computing capacity and speed

With research facilitated by ESS, we can achieve giant leaps forward in the technology that drives them.

- Advances in storage could make higher volumes of data more accessible at lightning-fast speeds
- New super conductors could mean more powerful computers consume less power
- New materials could make screens sharper, laptops lighter and interfaces more intuitive

At ESS it will be possible to, example:

- Study magnetic properties and the interplay between magnetism and superconductivity.
- Explore material characteristic to develop more efficient energy harvesting.

Possible invitees: Zenuity, Ericsson, Saab (non military), Wasp (Sara Mazur), Possible startup

Energy storage and transformation

Neutron research can help discover new ways of making energy more accessible and sustainable.

- Batteries could be made smaller and more powerful than ever before, while charging faster
- Energy conversion can become more efficient, making sustainable sources more viable
- It will be possible to explore material characteristics to develop more efficient ways of energy harvesting
- Discover and deepen our understanding of sustainable sources like hydrogen-powered fuel cells

At ESS it will be possible to, example:

- Follow the lithium ions in a battery in operandi when it is charging and discharging.
- Optimize materials, improve energy density and number of charging cycles in a battery.

Possible invitees: Northvolt, Powercell, Volvo Personvagnar, Polestar, CEVT, AB Volvo, Scania, Vattenfall, Vestas, E.on, Fortum, Skanska, Possible startup

Industry day

(2/2)



The material world

More advanced materials can be engineered as a result of discoveries made in neutron research.

- Methods to increase longevity and reduce manufacturing costs can be uncovered
- Materials can become lighter and stronger, while being made in a more sustainable way
- Deeper understanding of material composition, life cycles and degradation in ambient conditions
- Unique insights into components in i.e aircrafts and cars result in more efficient and sustainable solutions

At ESS it will be possible to, example:

- Investigate composition, phases micro-structure and stresses in materials in ambient conditions.
- Get a unique insight into real components used in e.g. aircrafts and cars.

Possible invitees: ABB/Hitachi Powergrids, NKT, Boliden, Billerud Korsnäs, SCA, Stora Enso, LKAB, SSAB, Sandvik, Höganäs, SKF, Perstorp, Preem, Borealis, Possible startup

Improving life sciences

Solutions can be developed by understanding how drugs react with proteins, and how structures can be changed.

- Drug delivery can be more efficient from analysing how treatments and proteins interact on a structural level
- Structure-based drug development is more viable, and more likely to be successful at an earlier stage
- Prosthetics and pacemakers can be made to interact with the human body in a more natural way
- Discovering how proteins and enzymes react and interact will further aid treatment development

At ESS it will be possible to, example:

- Help understanding proteins and enzymes.
- Detect hydrogen atoms gives the researchers the possibility to study the interactions between proteins and chemical substances.

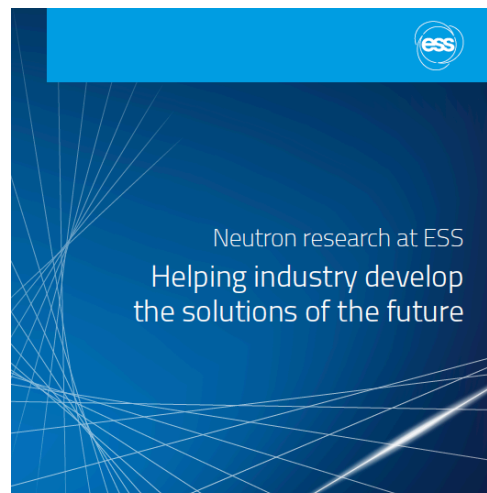
Possible invitees: Astra Zeneca, Sobi, Novo Nordisk, GE Healthcare, Getinge, Saromics, CR Competence, Elekta

Communicating value for industry

Gradual deepening



- Overview film with with example of possibilities (public & Industry)
- Web/brochure with additional proof points (Industry)
- Audience focused web structure under development (Multiple)
- Gradual deepening of proof points and practical industry value in progress (Industry)



Analysing down to the atomic scale

Neutron research has the unique capability to allow research of materials down to the atomic scale, and the increased performance of the beam line at ESS elevates this research to levels never seen before.

The neutrons penetrate materials, and analysing how these neutrons behave during this process allows us to study the structure and dynamics of the atoms and molecules in the material.

This analysis can be done in a number of ways depending on the goal of the research, which is why there will be more than 20 state-of-the-art instruments at ESS.

As neutrons are especially adept at detecting hydrogen atoms, research at ESS is ideal for seeing how enzymes and proteins interact, or how bacteria and viruses respond to drugs. It's even possible, with the methods available at ESS, to look at moving objects in operando, like engines, to discover more about how fluids and fuels are behaving in action.

Neutron scattering is not new science, but the power and precision available at ESS will make us see the world in new ways.

Energy storage and transformation

Making energy more accessible and sustainable is essential, and neutron research can help discover new ways of making this possible.

- Batteries could be made smaller and more powerful than ever before, while charging faster
- Energy conversion can become more efficient, making sustainable sources more viable
- It will be possible to explore material characteristics to develop more efficient ways of energy harvesting

Research can help discover and develop more environmentally friendly energy products, and deepen our understanding of sustainable sources like hydrogen-powered fuel cells.

- Following the lithium ions in a battery in operando when it is charging and discharging will be possible using the instruments at ESS.
- Research will offer the opportunity to optimize materials, improve energy density and increase the number of charging cycles in batteries



Food safety, preservation and yield

Neutron research can help us to better understand proteins, and develop ways to make manufacturing methods more efficient and sustainable.

- Deeper understanding of proteins can lead to improved disease resistance
- Reduced energy consumption in food production and processing can make the industry kinder to the environment
- Study how more complex measures like dairy or juice products behave over time can result in longer lasting products
- Understand more about drought resistance and natural defence systems in plants could lead to discoveries which can be applied to other products and industries
- Closer analysis of what happens to food during production increases understanding, and can ultimately make food stuffs more attractive and more sustainable



Improving life sciences

New drugs and treatment methods can be developed through understanding more about how drugs react with proteins, and how structures can be changed.

- Drug delivery can be made more efficient from analysing how treatments and proteins interact on a structural level
- Structure-based drug development is more viable, and more likely to be successful at an earlier stage
- Prosthetics and pacemakers can be made to interact with the human body in a more natural way
- Discovering more about how proteins and enzymes react and interact will further aid treatment development
- Instruments at ESS will help deepen our understanding proteins and enzymes.
- There will be the possibility to detect hydrogen atoms, which in turn gives the researchers the possibility to study the interactions between proteins and chemical substances.



Computing capacity and speed

Computers are always evolving, but with research facilitated by ESS, we could see giant leaps forward in the technology that drives them.

- Advances in storage could make higher volumes of data more accessible at lightning-fast speeds
- New superconductors could mean more powerful computers consume less power
- New materials could make screens sharper, laptops lighter and interfaces more intuitive
- The study of magnetic properties and the interplay between magnetism and superconductivity made possible by ESS will lead to leaps forward in technology.
- Exploration of material characteristics will facilitate the development more efficient energy harvesting.



The material world

More advanced materials can be engineered as a result of discoveries made in neutron research.

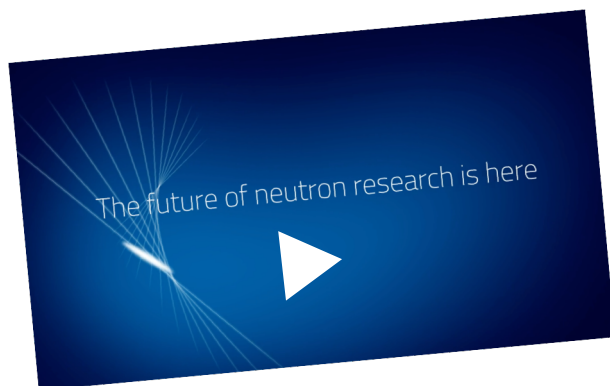
- Methods to increase longevity and reduce manufacturing costs can be discovered
- Materials can become lighter and stronger, while being made in a more sustainable way
- Deeper understanding of material composition, life cycles and degradation in ambient conditions can encourage new approaches
- Unique insights into real components used in essential technology, like aircrafts and cars can result in more efficient and sustainable solutions
- Scientists will be able to get information about the composition, phase microstructure and stresses in materials in ambient conditions by using the unique power of ESS
- It will be possible to get a unique insight into real components used in the things we see and use every day, like aircrafts and cars.



And many, many more

This is just a few examples, but every single industry can benefit from the results of research carried out at ESS. Material research could help find a more durable and sustainable fabric for clothing. Analysis of protein and enzyme behaviour could result in the most advanced fitness and recovery equipment. Archaeological research could help discover new truths about our planet, changing our understanding of everything that came before us.

We are on this journey together. We will make these discoveries together. Together, we are transforming science for generations.





3. Communications

Press ready ready for use

Short bio and picture to be published on ESS webb (we will return for your approval)

Press release ready for use when appropriate – you will get a heads up before disclosure

We hope for photo opportunity at ABB event

PRESSMEDDELANDE – Utkast 1.2

Ledande industrialister knyts som rådgivare till ESS

Forskningsanläggningen European Spallation Source, ESS, etablerar ett Executive Advisory Board med ledande företagsledare och industriföreträdare i syfte att stärka kontakterna till näringslivet och få råd kring hur samarbetet med industrin bäst utformas.

ESS Executive Advisory Board består av följande personer:

Ordförande **Lars Börjesson**, professor Chalmers

Arne Karlsson, styrelseordförande i Ecolean och Einar Mattsson

Bert Nordberg, styrelseordförande i Vestas och TDC

Lena Olving, styrelseordförande i Academic Work och ScandiNova

Björn Savén, grundare av Industri Kapital

Johan Söderström, EVP & Head of Regions EMEA Hitachi ABB Power Grids

- ESS fokus på materialvetenskap och att förbättra material och processer stämmer väl med industrins behov. Därför är det viktigt att vi redan nu etablerar relationer och ökar industrins kunskap om möjligheterna. Då leder investeringen i ESS till nya rön och innovationer som kan bidra till medlemsländernas konkurrenskraft, säger JW, DG på ESS.

ESS öppnar för forskning 2023 och är fullt utbyggd 2025. Då kommer anläggningen, som blir upp till 20 gånger mer kraftfull än sina föregångare, att bestå av 15 instrument som bidrar till att förflytta gränserna för det mänskliga vetandet inom energi, life science, hållbarhet och teknik genom att skapa djupare förståelse för material och molekyler.

Mer information om ESS finner du på <https://europenspallationsource.se/about>

För ytterligare information, var god kontakta:

Martin Sjöstrand, Head of Communications ESS, telefon 072-179 24 94



4. Calendar for meetings 2021

Suggestions

1. Short digital follow-up during Q1/2021:

- Friday March 12, 14-15 CET
- Monday March 15, 14-15 CET
- Friday March 19, 14-15 CET

2. EAB dinner after ABB event in May 2021

3. Possibility to attend to inauguration of Campus with site walk / visit in June – save the date will come as soon as the date is set

4. Physical meeting in Lund, Q3/2021:

- Friday September 3, full day – dinner 2/9
- Friday September 10, full day – dinner 9/9





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