



Wallenberg Initiative
Materials Science
for Sustainability

Materials science that enables a sustainable world

Magnus Svensson

Director Industrial collaboration and WIRA (WISE Industrial Research Arenas)

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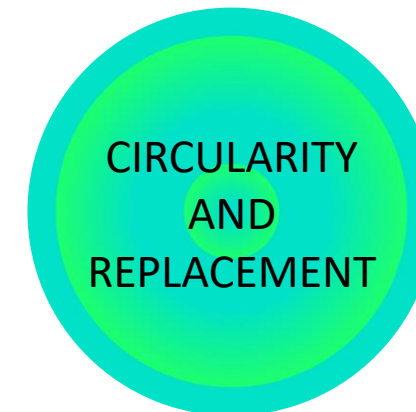
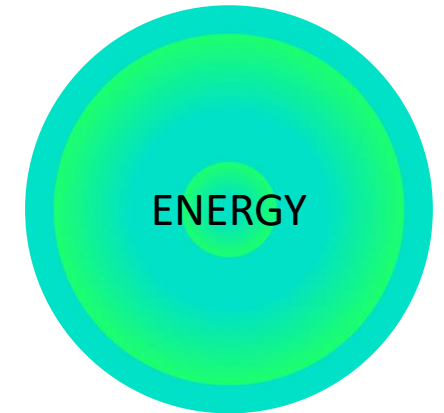
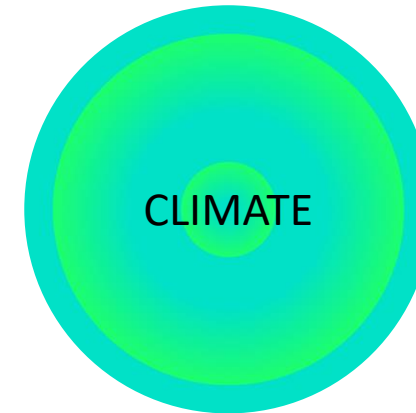


About WISE

A sustainable future through materials science

The Wallenberg Initiative Materials Science for Sustainability (WISE), is a Swedish research program initiated and financed by the Knut and Alice Wallenberg Foundation.

- M€ 270 spanning 2022–2033
- Strategic recruitment of 28 asst/assoc professors
- International guest professor program
- 186 PhD students and 186 postdocs
- Graduate school
- Research and technology platforms
- Research arenas with Swedish industry





ABOUT WISE

Vision & mission

Vision

A sustainable future through materials science.

Mission

Perform materials science research at the international forefront to empower sustainable technologies with positive impact on society and to train future leaders in society, industry, and academia.

ABOUT WISE

Vision & Mission

Goal

Promote transition towards a sustainable society and establish Sweden as a leading nation in the field.

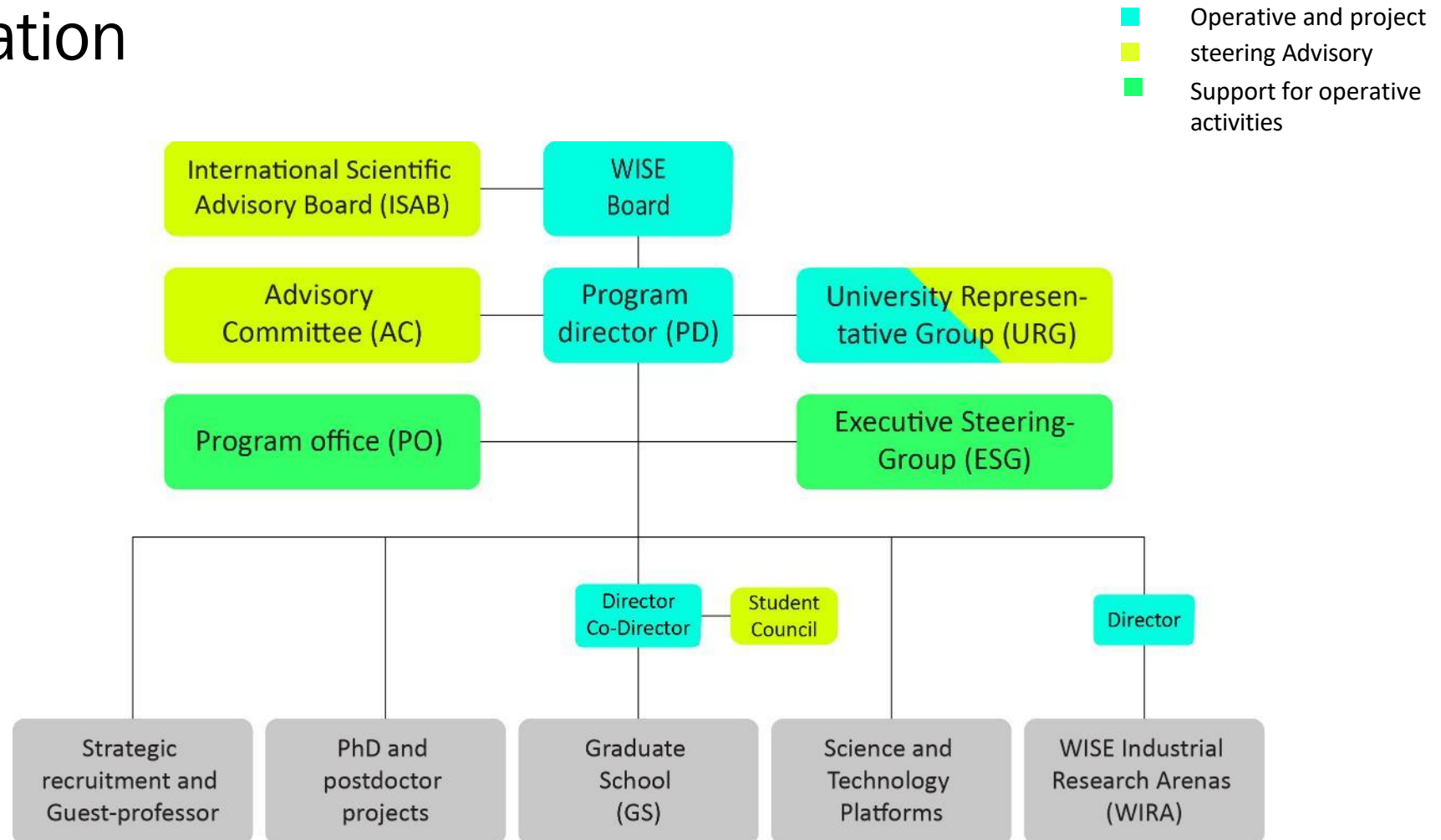
WISE will explore advanced functional materials targeting:

- I. Conversion, storage, and distribution of clean energy
- II. Circular materials replacing rare, energy-demanding, and hazardous materials
- iii. Mitigation, cleaning, and protection of the atmosphere, soil, and water
- iV. Discovery of materials for novel sustainable technologies and applications



WISE Organization

Organization



ESG & Program Office

Directors



Magnus Berggren
Director



Olle Eriksson
Co-director

Program office



Petronella Norberg
Program coordinator



Raquel Lizarraga Jurado
Science writer



Cecilia Colliander
Program controller



Jessica Andersson
Communications officer



Peter Dyreklev
Research coordinator



Erna Delczeg
Research coordinator



Daniel Simon
Research coordinator



Peter Värbrand
Research coordinator



Jennie Jordenlöv
Event coordinator,
Administrator



Nina Grankvist
Research coordinator

WISE Graduate School



Anna Delin
Director WISE Graduate
School



Andreas Larsson
Co-director WISE
Graduate School

WIRA



Magnus Svensson
Director of industrial
cooperation & WIRA

University Representative Group

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University of
Technology**



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Abrahamsson**
The Chemistry and
Biochemistry Department



Paul Erhart
The department of
Physics

**Stockholm
University**



Xiaodong Zou
The department of
Materials and
Environmental Chemistry



Lennart Bergström
The Institute of materials and
environmental chemistry

**KTH Royal
Institute of
Technology**



Lars Kloo
The division of
Applied Physical
Chemistry



Malin Selleby
The department of
Materials Science and
Engineering

**Uppsala
University**



Cecilia Persson
The department of Materials
Science



**Håkan
Rensmo**
The department of Physics
and Astronomy, X-ray
Photon Science

**Linköping
University**



Johanna Rosén
The Institute of Physics,
Chemistry and Biology



Klas Tybrandt
The Institute
of Technology and Natural
Science

**Luleå
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sciences and mathematics



Roland Larsson
The department of engineering
sciences and mathematics

**Lund
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**Anders
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**Kimberly
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Synthesis

Board of Directors — Advisory Committee

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Rådgivare och styrelseproffs



Materials Make Our World



MATERIALS MAKE OUR WORLD

Material science & Technology

Materials science and technology stems from metallurgy and from studies of minerals and ceramics.

More recently:

- Semiconductors.
- Functional materials.
- Biomaterials.
- Polymers.
- Heterostructures.
- Materials with reduced dimension.
- Topological materials and nanomaterials.

MATERIALS MAKE OUR WORLD

Environmental strain

The production and extraction of materials are connected to environmental strain.

Their use is paramount in transforming our world towards a sustainable society.



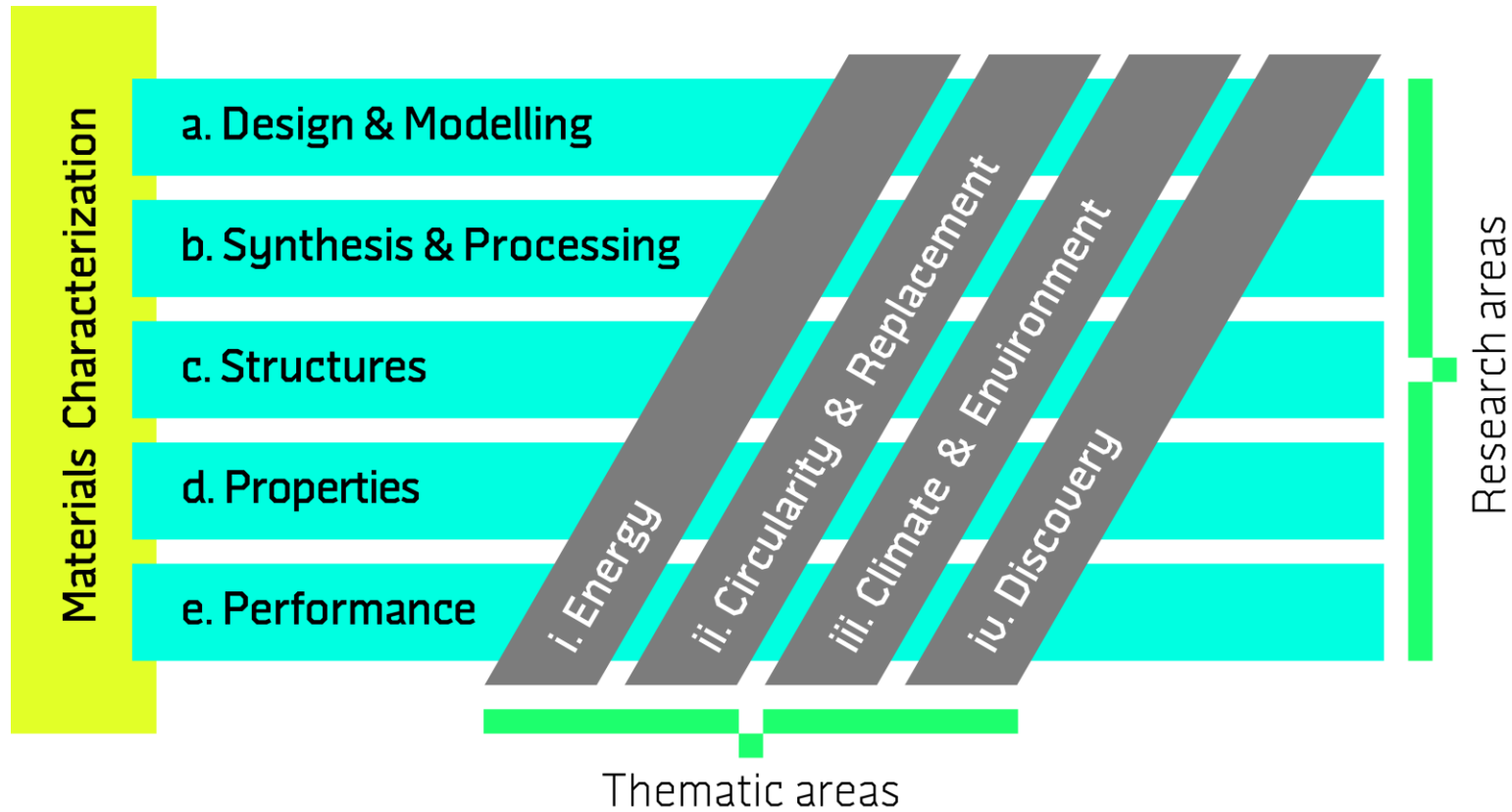
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Program Areas

PROGRAM AREAS

The WISE matrix





Participating Universities

PARTICIPATING UNIVERSITIES



Batteries, thermoelectrics, graphene, MC2 nano-laboratory, electron microscopy



Polymers, theoretical modelling, energy materials, electronic materials, metallurgy



Ceramics, organic energy materials, transmission electron microscopy, additive manufacturing



Nanoscience, sustainable information technologies, green chemistry, fuel cell materials , MAX IV



Organic synthesis, catalysis, environmental chemistry, materials recycling, green chemistry



Solar cells, theoretical modelling, batteries, nano-materials, electrochemistry, Ångström Laboratory



Construction materials, sustainable mining, processes and products, composites



WIRA

WIRA

Vision and Mission

Vision:

- **Relevant** outstanding material science for sustainability with world leading fast industrial/societal uptake.

Mission:

- Provide **environment and facility setups** that enable a continuous flow of expressed needs, challenges, and ideas that promote testing, sharing, and validation of results to bridge fundamental science with societal/industrial needs and relevance.

WISE includes:

- * M€270 spanning 2022–2033
- * Recruiting 28 assistant or associate professors
- * Graduating 186 PhD students and 186 postdocs
- * Science and technology platforms
- * Research arenas with Swedish industry - WIRA
- * Graduate school
- * Guest professor programs

PARTICIPATING UNIVERSITIES



FUNDED BY





NKT facility



WISE-ABB WIRA (example)

WIRA

Prerequisites

- WIRAs are established outside of academia.
- Scientists and engineers from academia and industry jointly explore materials science for sustainability.
- Industry takes the lead
- More than one company
- Formulate a research agenda/challenge (=> project plan)

WIRA

Why?



Academic
excellens



Call for PAPERS
Adara: Jurnal Manajemen Pendidikan Islam
Volume 8, No. 1 Februari 2019

[click for submit](#)

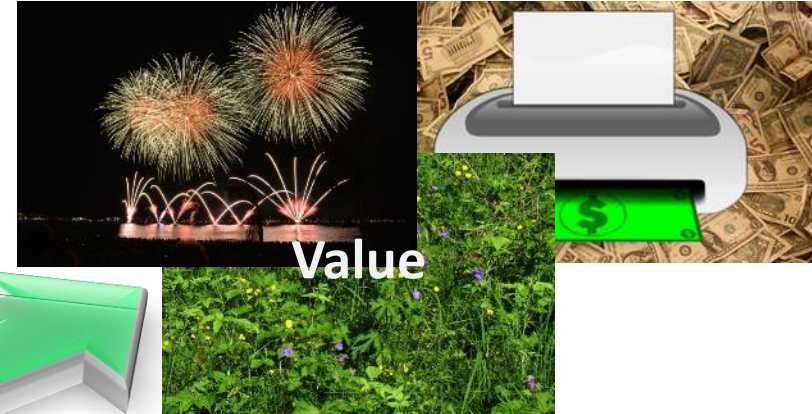
Contact Person:
Ayu Rahayu : 082146830441
Hastutiiana : 085234945206



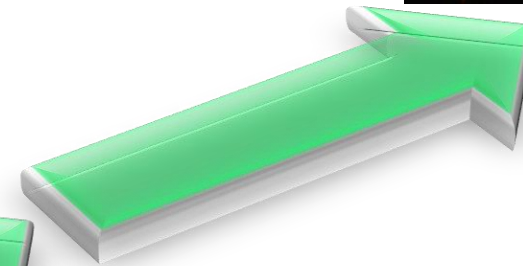
Measure, data collection, publish

WIRA

Why?



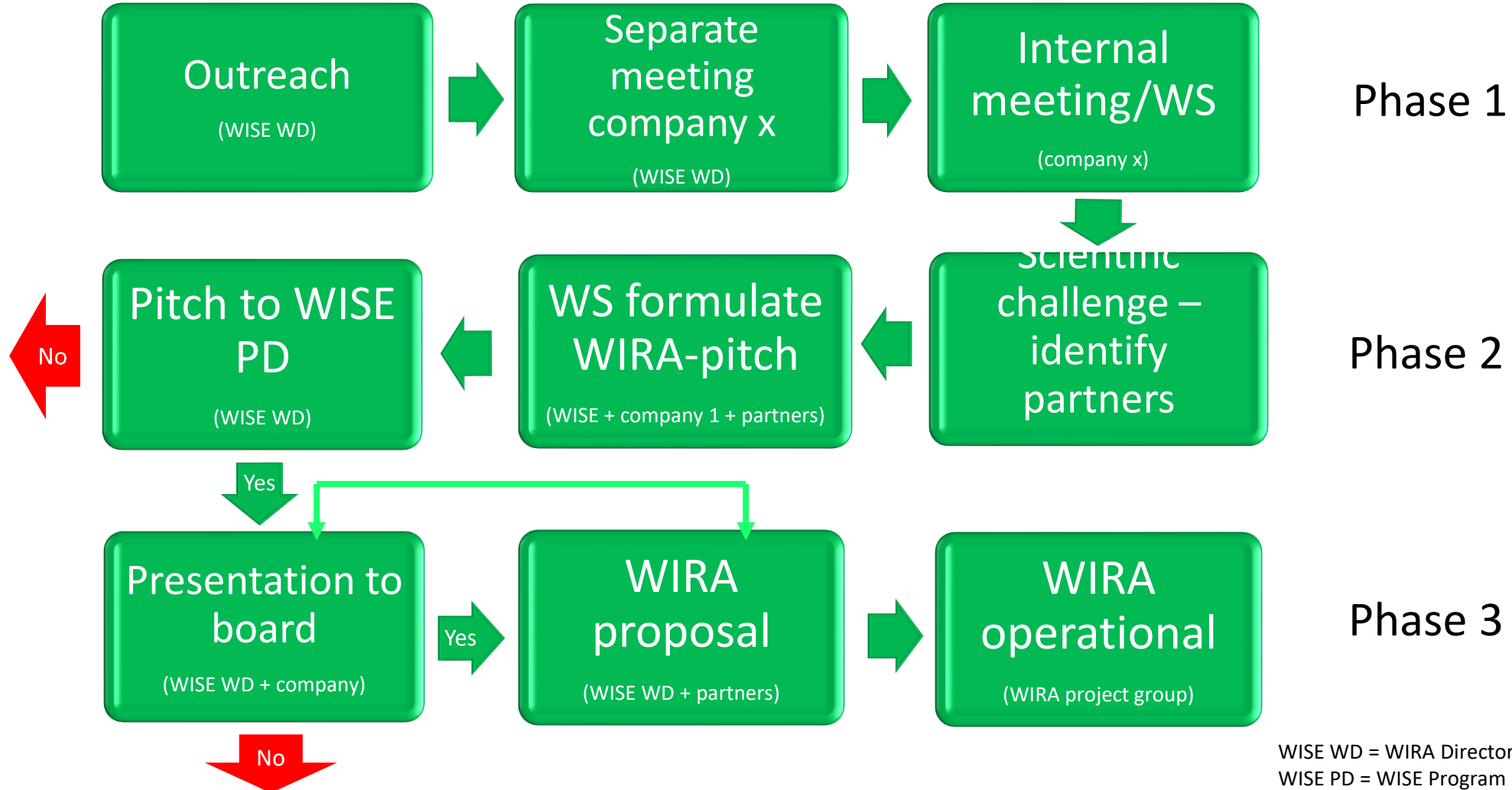
Academic excellens



To be developed in cooperation between industry and academia

WIRA

Process to establish a WIRA



WISE WD = WIRA Director
 WISE PD = WISE Program Director



WIRA

Expected outcome

- Bridging fundamental science with societal/industrial needs and relevance.
- Meeting place to support mutual learning and exchange of needs and knowledge.
- Industrial/societal needs, challenges and opportunities spark new scientific topics.
- Resulting in co-creating research teams.
- World leading fast industrial/societal uptake.

WIRA-SET (Sustainable Electrochemical Technologies)

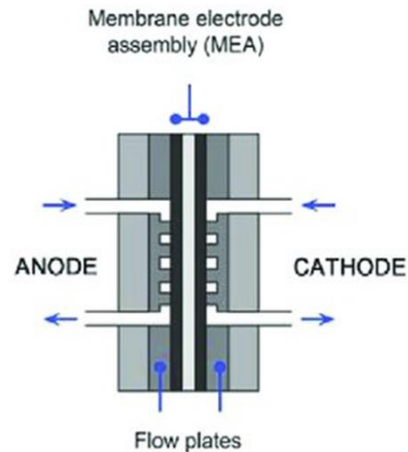
- Goal:
Eliminating the use of critical raw materials (CRM) and per- and polyfluoroalkyl substances (PFAS) in electrochemical technologies

Electrochemical flow cell technologies

Two vessels

Separating membrane

Anodic and cathodic reactions



Challenges

- Sealing and membranes contain PFAS
- Reaction efficiency depending on CRM

Critical materials: "raw materials for which there are no viable substitutes with current technologies, which most consumer countries are dependent on importing, and whose supply is dominated by one or a few producers"



WIRA-SuPRA (Sustainable Polymer Research Arena)

Research areas:

- Raw materials with minimal environmental impact
 - Production with non-fossil resources
 - Manufacturing of components including surface treatment
- Resource efficient design and manufacturing
 - Focus on injection moulding and expanding polymers
- Circular polymers
 - Recycle
 - Design with recycled material

Activities:

- Access to equipment for test and analysis
 - Injection moulding machines, instrumented mould tools, 3D-printers, etc (PTI, Värnamo)
 - Production equipment, mechanical, thermal and surface analysis (Scania, Husqvarna, Thule)
 - Collaboration with CircuLab (SU)
- Meeting place and networking
 - Research groups meeting, biannual event weeks
 - Study trips and lectures for WISE GS

PARTICIPATING COMPANIES AND UNIVERSITIES

FUNDED BY



WISE ip2 call (industrial PhDs
and PDs)

INDUSTRIAL PhD STUDENT AND POSTDOC PROJECTS

Overall aims

Joint industry-academic projects targeting materials science for sustainability

Addressing topics in any or several of the WISE thematic and research areas

(see the “WISE matrix” at wise-materials.org/research/)

Industry, with R&D and operations in Sweden, and a WISE university are invited to apply

Industry investigator and academic investigator are both co-applicants

Twinned industry-academic supervision and project leadership

Knowledge generated and individuals trained in material science for sustainability

Future leadership and skills for industry, academia, and society



INDUSTRIAL PhD STUDENT AND POSTDOC PROJECTS

Project support



PhD student projects (PhD student employed* by industry)

To industry: In total 2.4 MSEK for 4-5 years (100-80% activity level)

To university: Salary for supervision ($\leq 10\%$ with compensation up to 50% for social fees), travel (≤ 10 kSEK/year), and contribution to premises[†] and indirect[†] costs for 4-5 years

Postdoc projects (postdoc employed* by industry)

To industry: In total 1.9 MSEK (2.4 MSEK for SME) for 2–2.5 years (100–80% activity)

To university: In total ≤ 300 kSEK total for 2–2.5 years

* Permanent employment (*tillsvidareanställning*)

[†] According to requisition instructions

INDUSTRIAL PhD STUDENT AND POSTDOC PROJECTS

WISE-ip2 timeline



- 2023-12-11 Call text published at wise-materials.org/opportunities/calls-for-projects/
- 2024-08-12 Call opens for submission
- 2024-11-19 Call closes at 14.00
- 2025-04-15 (prel. date) Decision of accepted projects communicated
- 2025-08-27 (prel. date) All candidates ready to start (individual decision can be made later)
- 2025-08-28 (prel. date) WISE Welcome Meeting (mandatory for new PhDs & postdocs)

Wallenberg Initiative Materials Science for Sustainability (WISE)

For more information, contact:

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Or visit wise-materials.org

PARTICIPATING UNIVERSITIES



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