Stavanger ESREL SRA-E 2025

WELCOME

ESRA

University of Stavanger

SRA EUROPE Society for Risk Analysis

presight ®

proactima

Havtil

Dmaze

GASSCO

Lyse

IFE Institute for Energy Technology

ESRA Norge
Norsk forening for risiko- og pålitelighetsanalyse

TÜVRheinland®
safetec

DNV

Organizing committees

General Chairs:
Prof. Terje Aven, University of Stavanger (UiS), Norway
Associate Prof. Marja Ylönen, UiS

General Co-Chairs:

- Prof. Michael Beer, Leibniz Universität Hannover, Germany, University of Liverpool, UK/Tongji University, China
- Prof. Myriam Merad, CNRS, France
- Prof. Enrico Zio, Mines Paris-PSL University, France and Politecnico di Milano, Italy

Technical Program Committee Chairs: Professors Eirik B. Abrahamsen, Roger Flage and Frederic Bouder, UiS

Local Programme Committee

Scientific committee

2004

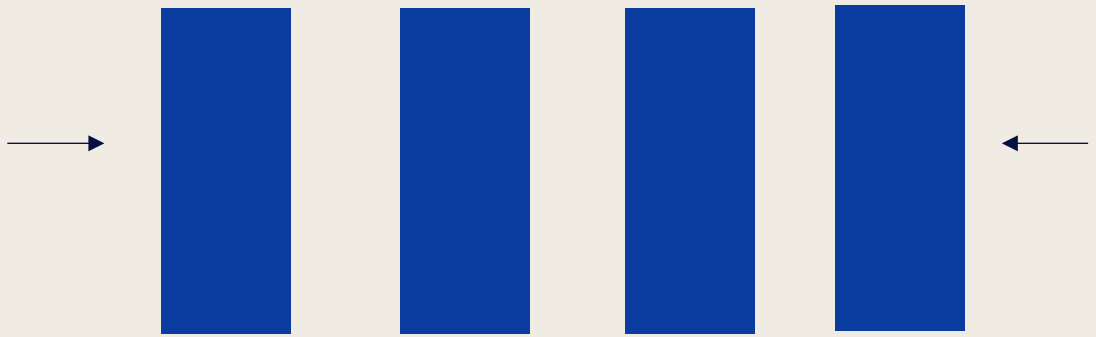
University
of Stavanger

2004

University of Stavanger

2004

Risk management and societal safety



Offshore engineering

- Safety and risk specialization

Bachelor programs

Masters programs

Risk analysis: Risk assessment, risk perception and communication, risk management and governance

Societal safety

PhD program

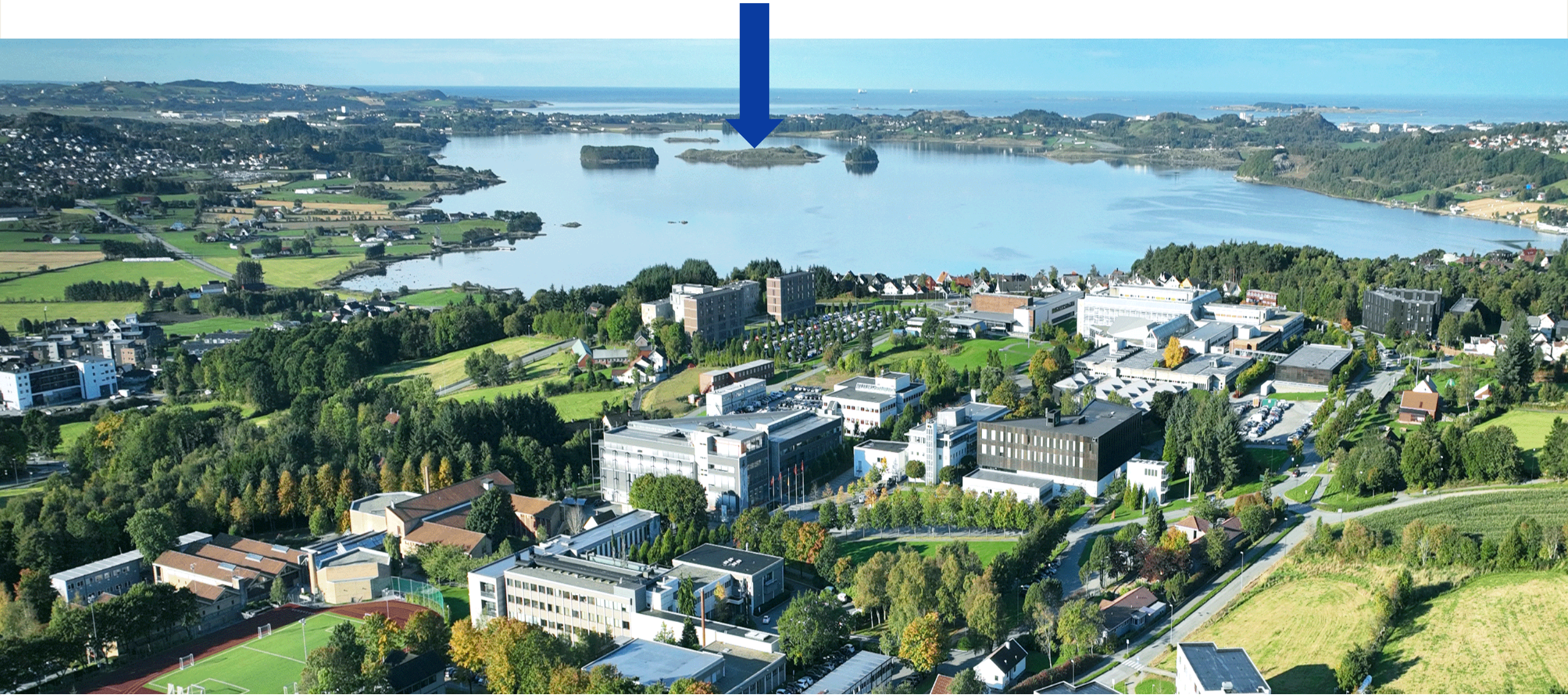
25 professors in risk and safety

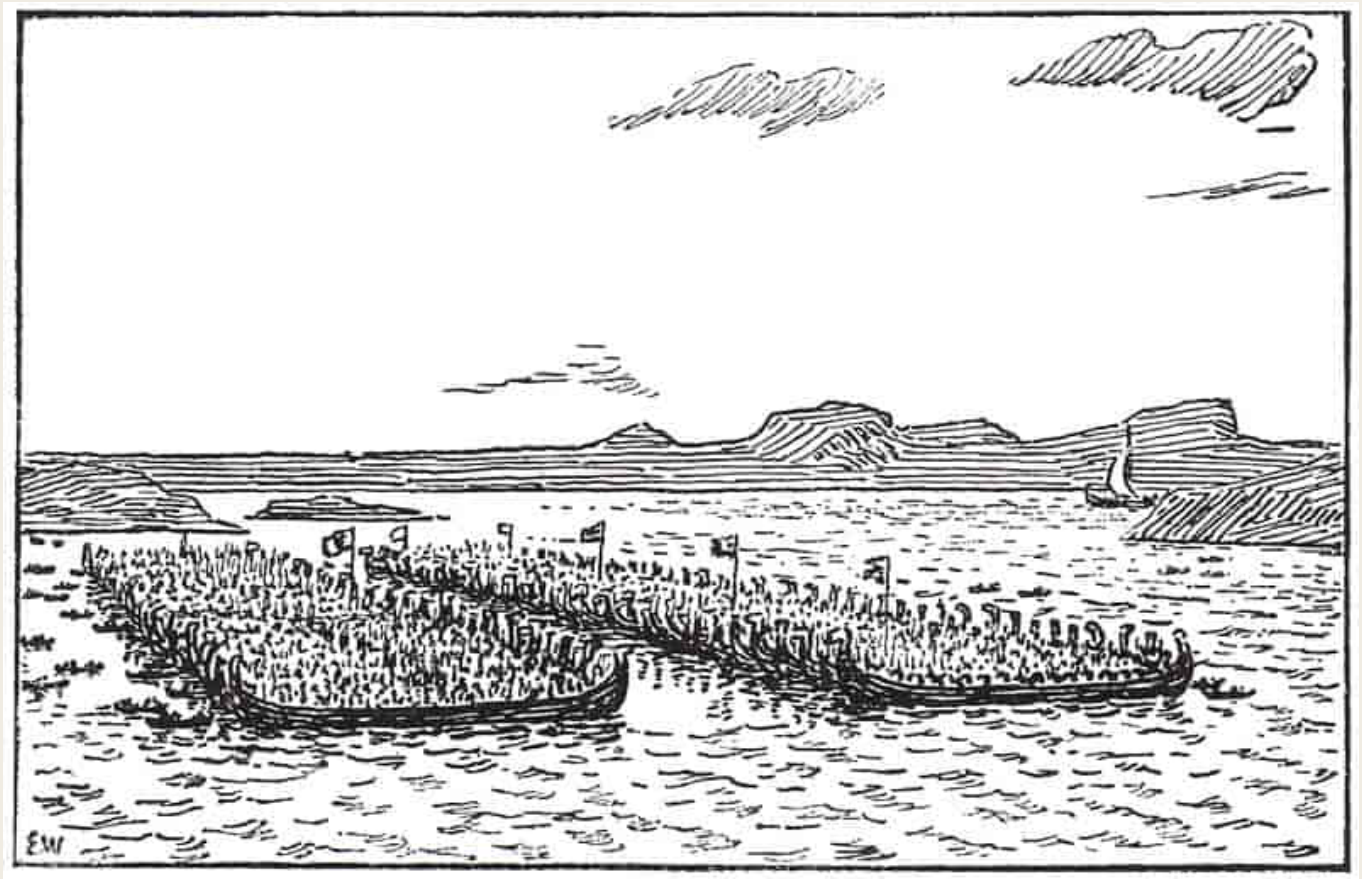
University of Stavanger

City of Stavanger

900 years

Battle of Hafrsfjord 872





Battle of Hafrsfjord 872

Stavanger

The Energy Capital Stavanger

The Pulpit rock

The Kjerag bolt

Risk | Safety, security | Reliability | Resilience | ….

Concepts, principles, models, theories, approaches and methods

Understanding | Assessment | Perception and communication | Management and governance

Generic knowledge and applications - energy, cyber, climate change, …

Opening session

Terje Aven, Conference Chair

Marja Ylönen, Conference Co-chair and President SRA-Europe

Michael Beer, Chair ESRA

Eirik B. Abrahamsen, Program Chair

Breakthroughs in Research

Speakers: Terje Aven, Gudela Grote, Enrico Zio

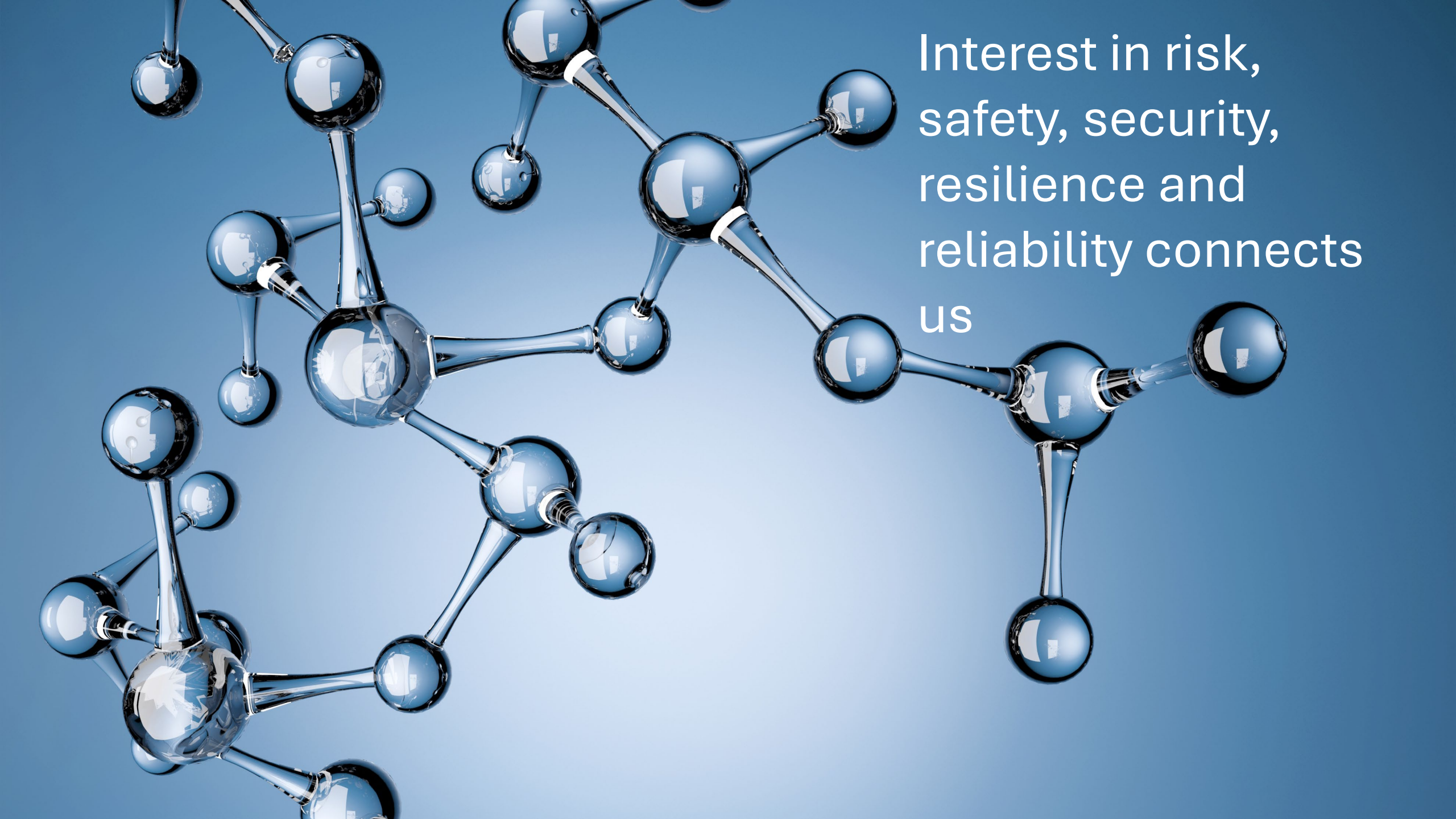
Welcome to joint ESREL-SRA-E 2025 conference!

Edinburgh 2000
Scotland, UK

Valencia 2008
Spain

Stavanger 2025
Norway

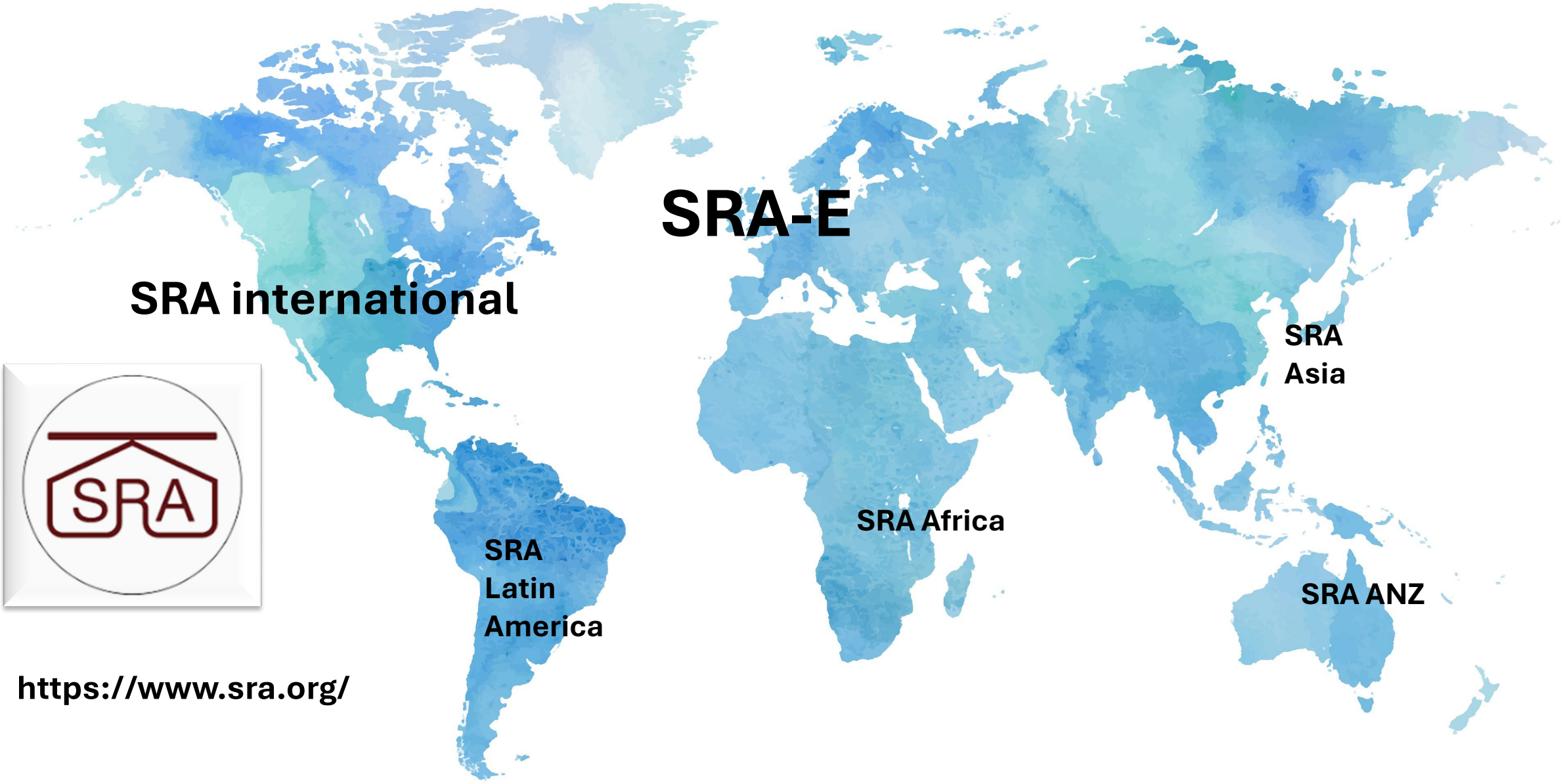
Joint ESREL-SRA-E conferences



Interest in risk, safety, security, resilience and reliability connects us

35th ESREL conference

33rd SRA-E conference



https://www.sra.org/

SRA EUROPE
Society for Risk Analysis

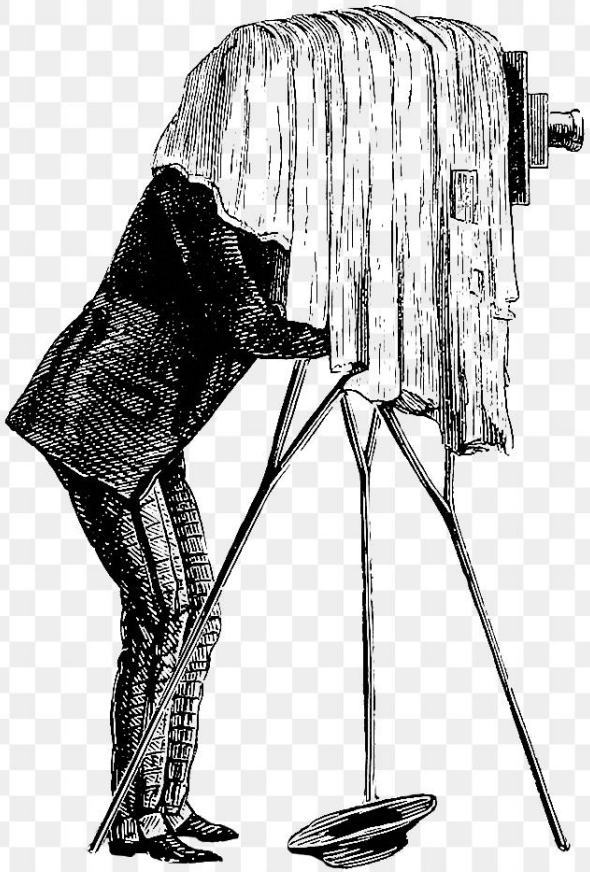
Iceland

SRA-E

https://www.sraeurope.eu/

Chapters:

- Benelux Chapter
- DACHL Chapter
- Iberian Chapter
- Nordic Chapter
- UK Chapter



esrel-srae2025@uis.no

Opening session

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Michael Beer, Chair ESRA

Eirik B. Abrahamsen, Program Chair

Breakthroughs in Research

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On behalf of the

European Safety and Reliability Association

a very warm

Welcome to ESREL 2025

European Safety and Reliability Association

ESREL 2025

ESRA – Parent organization of the ESREL conferences

Visit our webpage https://esra.website/
and check out our exciting activities

We facilitate research, development, innovation, applications, knowledge exchange and collaboration in the fields of risk assessment, safety management, and reliability analysis in a multi-disciplinary environment

Become an active member of ESRA and enjoy attractive benefits

» membership in specialized technical committees
» updates on latest developments and announcements of events and activities
» access to dedicated working groups, reports and developments
» share your research and challenges with the community
» take the lead on dedicated developments
» contribute actively to the further development of the association
» reduced conference fee
» access to funding opportunities by ESRA

Please join us during coffee and lunch breaks if you want to know more details about ESRA and how to become members of the Association

Opening session

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Breakthroughs in Research

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University of Stavanger

Practical information & conference program

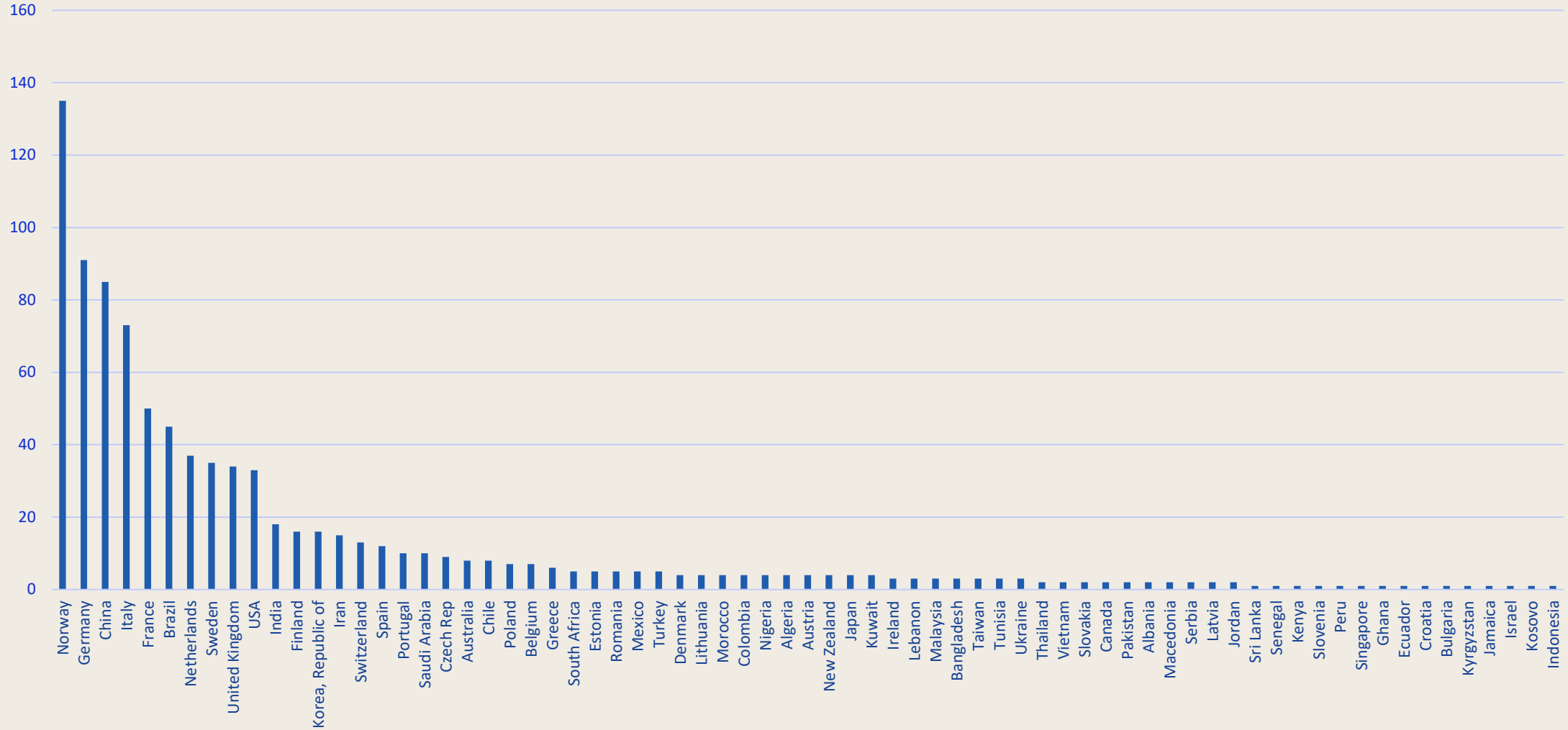
ESREL & SRA-E 2025

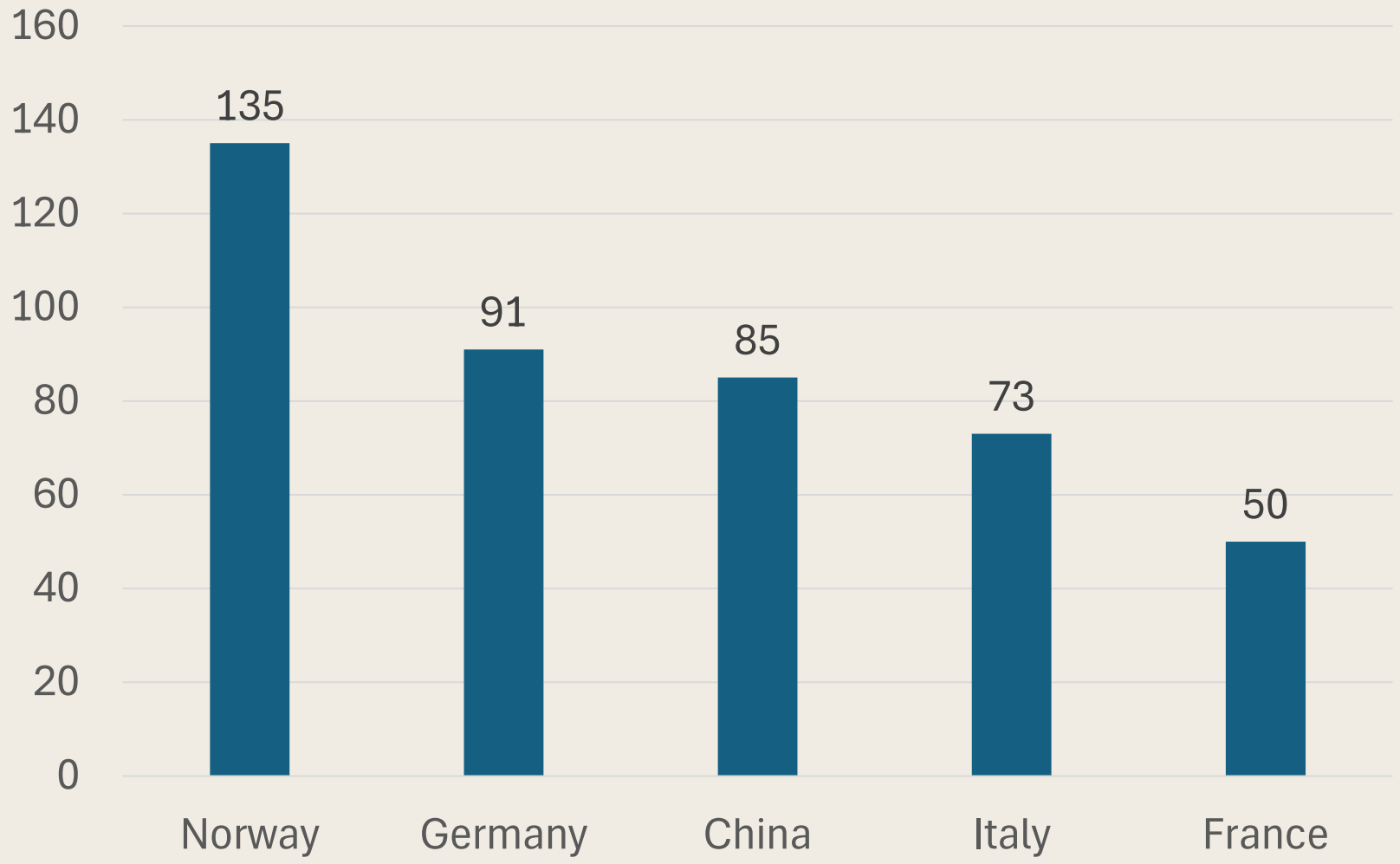
Eirik Bjorheim Abrahamsen, Program chair

Conference participants

900+

Conference participants by nationality




160
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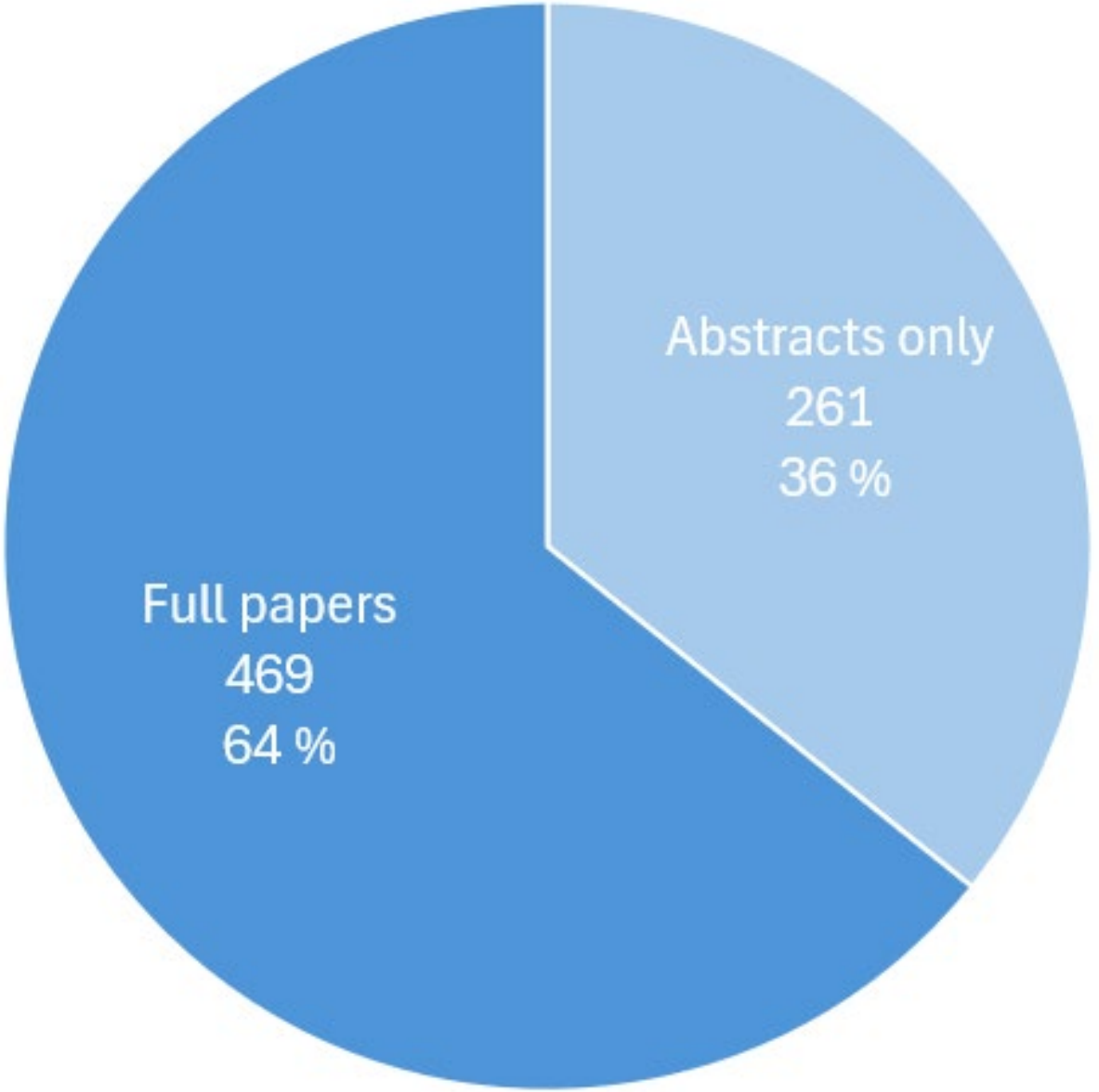
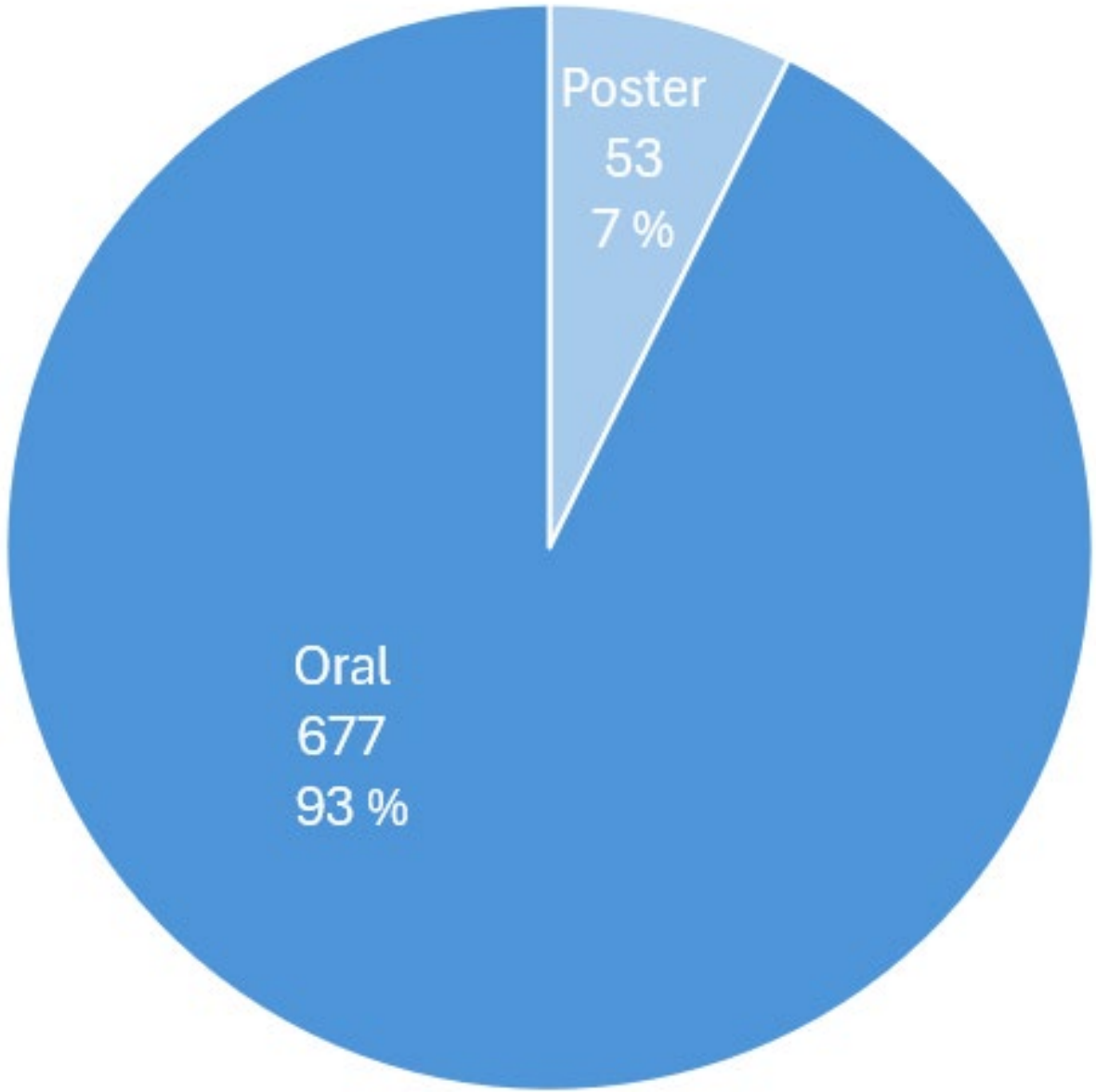
Norway
Germany
China
Italy
France

Contributions

730




Poster
53
7 %
Oral
677
93 %

Conference program

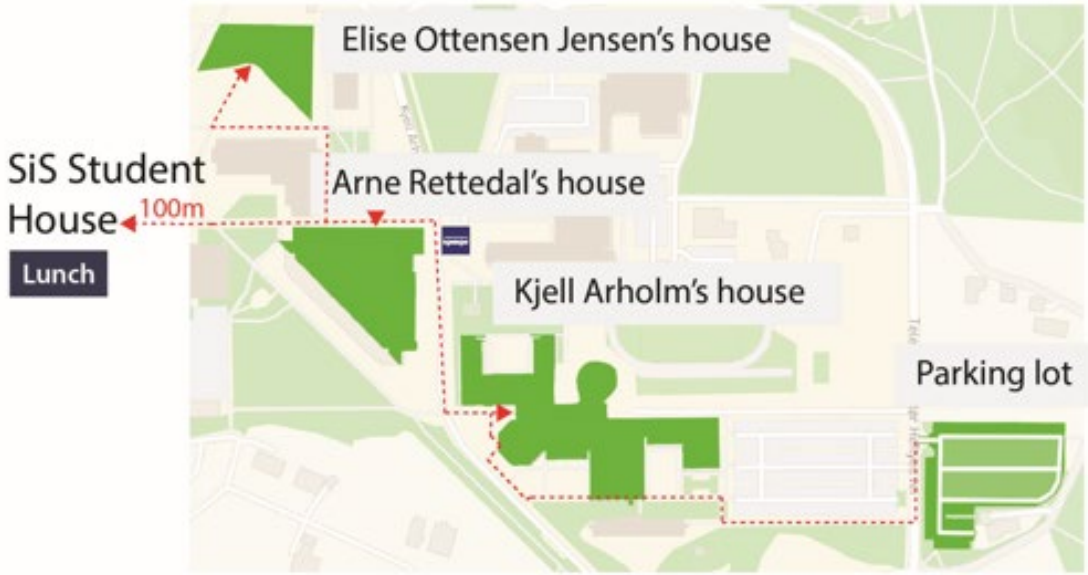
Program

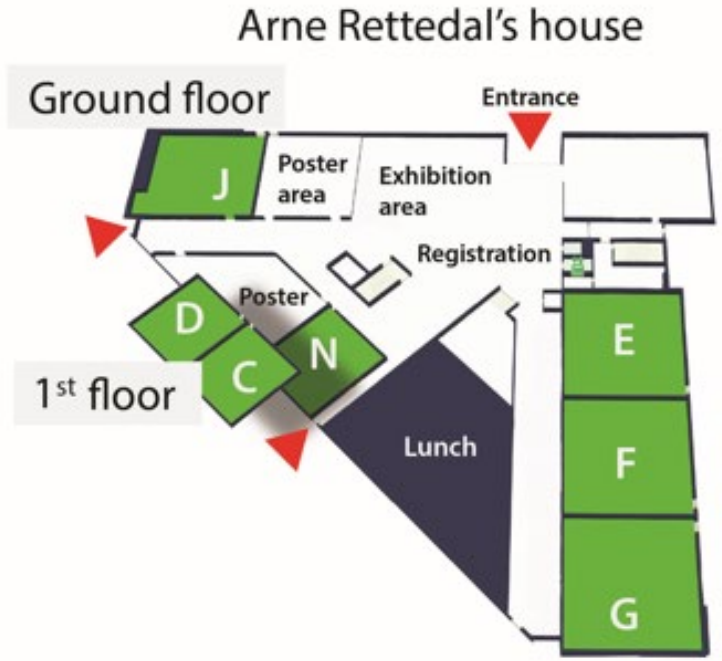
The program is continuously updated on the website

Conference program

	E	F	G	H	I	J	K	L	M	N
Monday 16. June										
Session 1 09:00-10:15	**Welcome Plenary - Personal stories about breakthroughs in research**									
Session 2 10:45-12:00	Risk analysis approaches and methods	Foundations of Safety Science - Ten Years After (Panel)	Climate Change and Extreme Weather Events: Impacts on Critical Infrastructure Risk and Resilience I	Resilience and risk analysis	Miscellaneous I	Reinforcement Learning for RAMS	Risk Analysis and Safety in Machinery	Risk governance I	Advances in Well Engineering Reliability, Integrity and Risk Management I		Cyber security I	Power systems	Hydrogen I	Other applications I
Session 3 13:00-14:15	**Plenary - The Role of Risk Science in the New Geopolitical Security Landscape: Geopolitical tensions, Hybrid threats, Artificial Intelligence, and Beyond**									
Session 4 14:45-16:00	Fundamental issues on safety	The Future of Risk Research: Early Career Researcher perspectives (Panel)	Climate Change and Extreme Weather Events: Impacts on Critical Infrastructure Risk and Resilience II	Reliability analysis I	Probabilistic analysis I	Data-driven predictive maintenance – from sensor measurements to diagnostics/ prognostics to maintenance planning I	Professional practice for improved safety decision making I	Hybrid threats and risk governance between safety and security	Advances in Well Engineering Reliability, Integrity and Risk Management II	Incremental Rollout of New Technologies in Railway Systems Engineering	Cyber security II	Transportation rail	Hydrogen II	Other applications II
Session 5 16:30-17:45	Advances in Test Planning and Design for Lifetime Testing in Reliability Engineering	Sustainability risk management: How can CSRD – Corporate Sustainability Reporting Directive be integrated in "business as usual" risk management? (Proactima, Panel)	Balancing Complexity and Efficiency: Optimal Model Resolution and Granularity in Risk Analysis	Reliability analysis II	Artificial intelligence issues	Data-driven predictive maintenance – from sensor measurements to diagnostics/ prognostics to maintenance planning II	Professional practice for improved safety decision making II	Climate risk governance in the Arctic	Advances in Well Engineering Reliability, Integrity and Risk Management III	Safety and Health in the Offshore Wind Industry	Cyber security III	Food safety	Other applications III	Natural language processing for RAMS applications I
Session 6	**Poster Session**									
Tuesday 17. June										
Session 7 09:00-10:15	**Plenary - Risk assessment for the future: challenges and directions for the research**									
Session 8 10:45-12:00	Risk concept issues	The Social Amplification of Risk: Today and Needs for the Future (Panel)	Bayesian Networks Modelling for Reliability and Risk Assessment	Advances in resilience of energy networks	Physics-Informed Machine Learning for RAMS	Inspection models	Collaborative Intelligence and Safety Critical Systems Applications I	Risk governance II	Oil and gas	Exploring the opportunities and challenges of AI in managing Major Accident Hazards in high-risk	Fire risks	Safety, Reliability and Security (SRS) of Autonomous Systems I	Nuclear safety (IFE) Safety, automation and awareness	WORKSHOP: International Workshop on Energy Transition to Net Zero: Reliability, Risk, and Resilience (ETZE R3)

Rough overview of topic allocation by room	**Room**
Fundamental issues on risk and safety	A, B
Risk perception and communication	B
Risk, resilience, reliability	C, D
Artificial Intelligence. Machine learning	E
Maintenance	F
Human factors. Professional practice	G
Risk management/governance. Disaster risk management. Societal safety/security	H
Applications	
Oil and gas, transportation	I
Several panels	J
Cyber, maritime	K
Autonomous systems	L
Hydrogen, nuclear , civil eng.	M
Workshop on Energy Transition	N


Elise Ottensen Jensen's house
SiS Student House
100m
Lunch
Arne Rettedal's house
Kjell Arholm's house
Parking lot


Arne Rettedal's house
Ground floor
Entrance
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Poster area
Exhibition area
Registration
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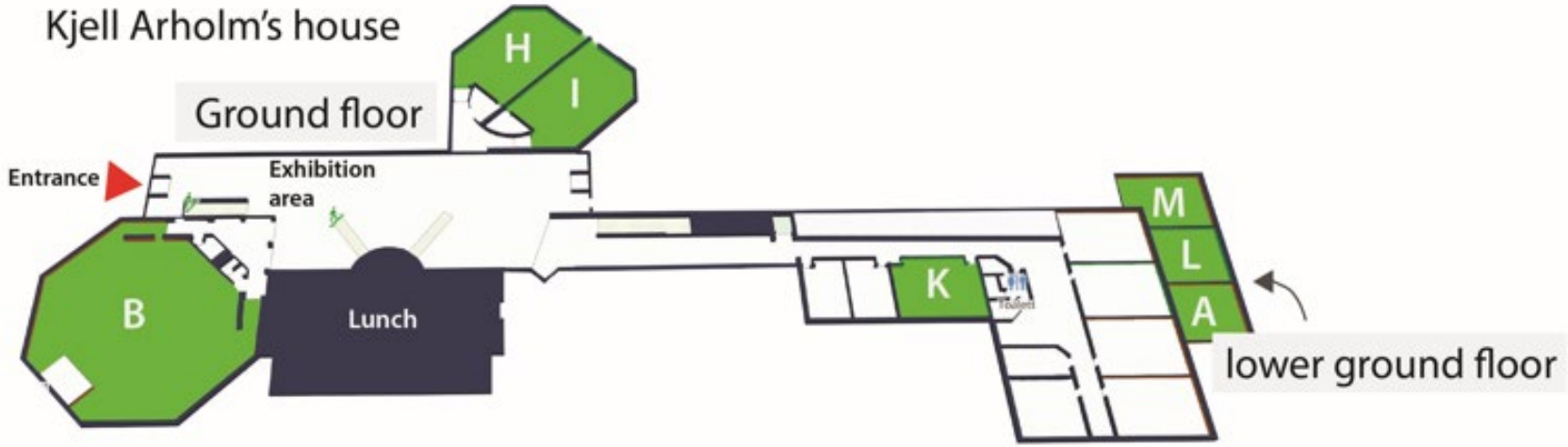
1st floor
Lunch


Kjell Arholm's house
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Exhibition area
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Lunch
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lower ground floor

Room	A	B	C	D	E	F	G	
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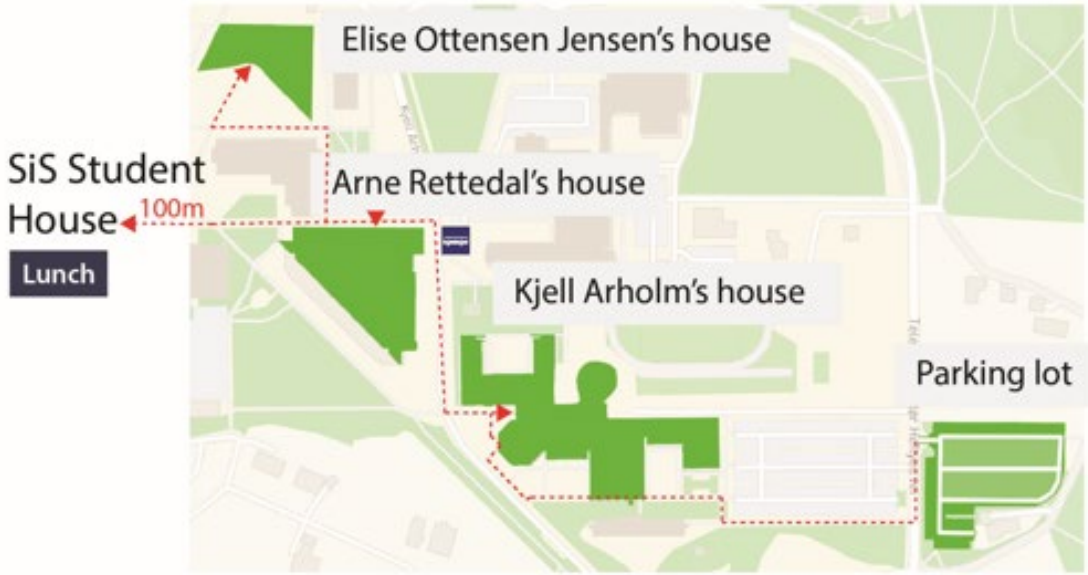
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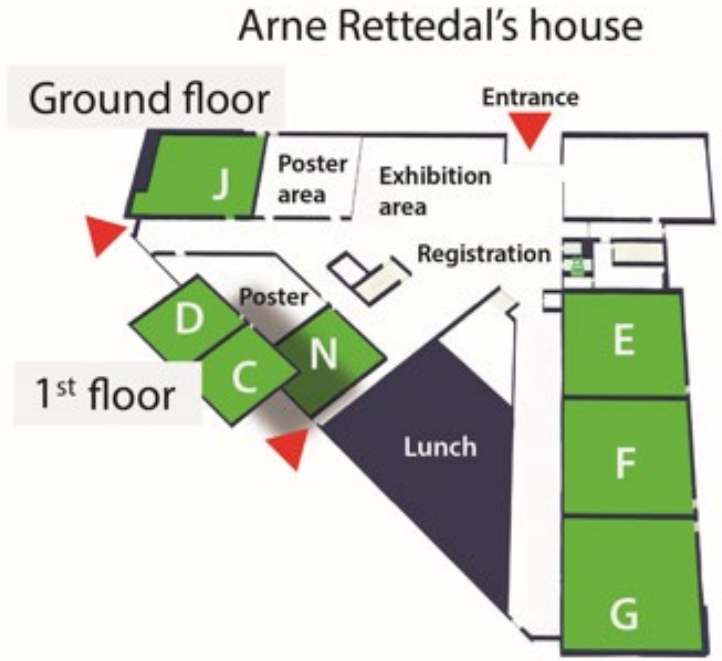
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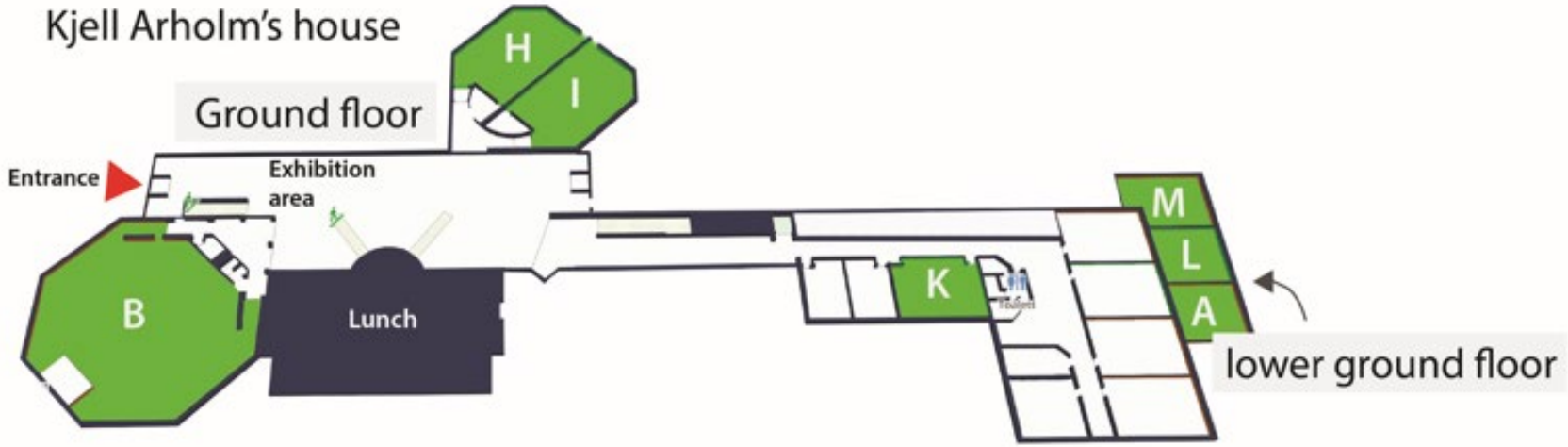
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SIS

LUNCH BUILDING

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LUNCH BUILDING

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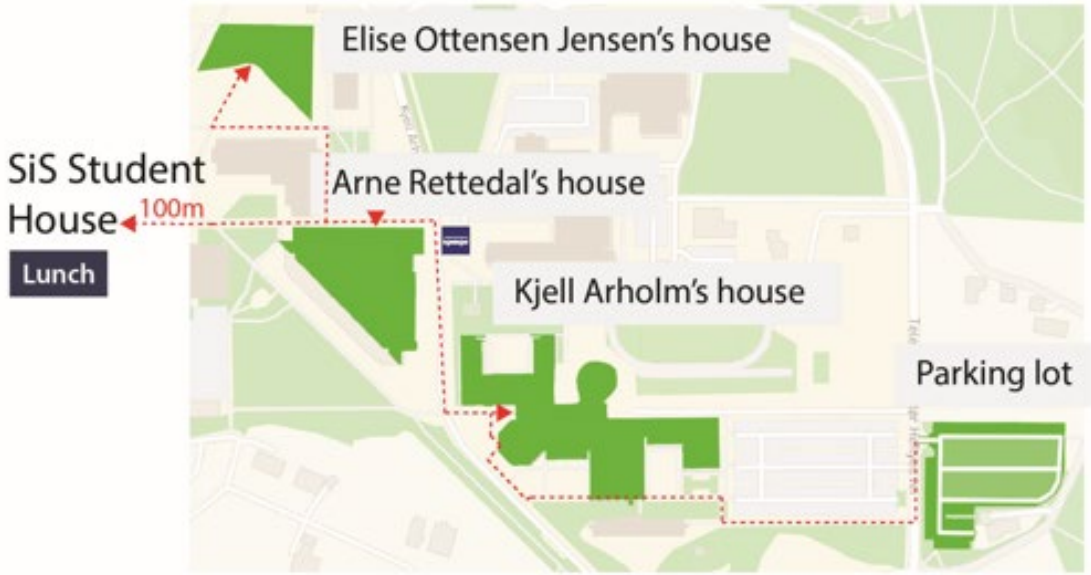
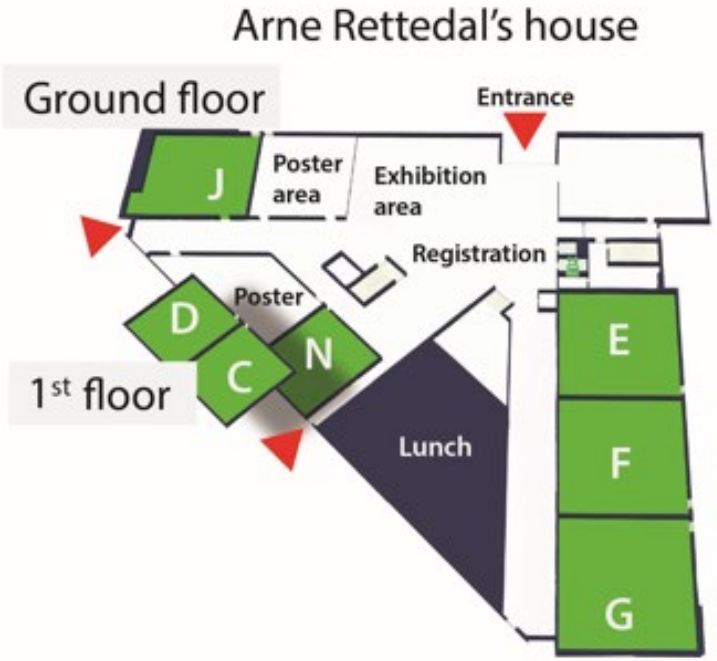
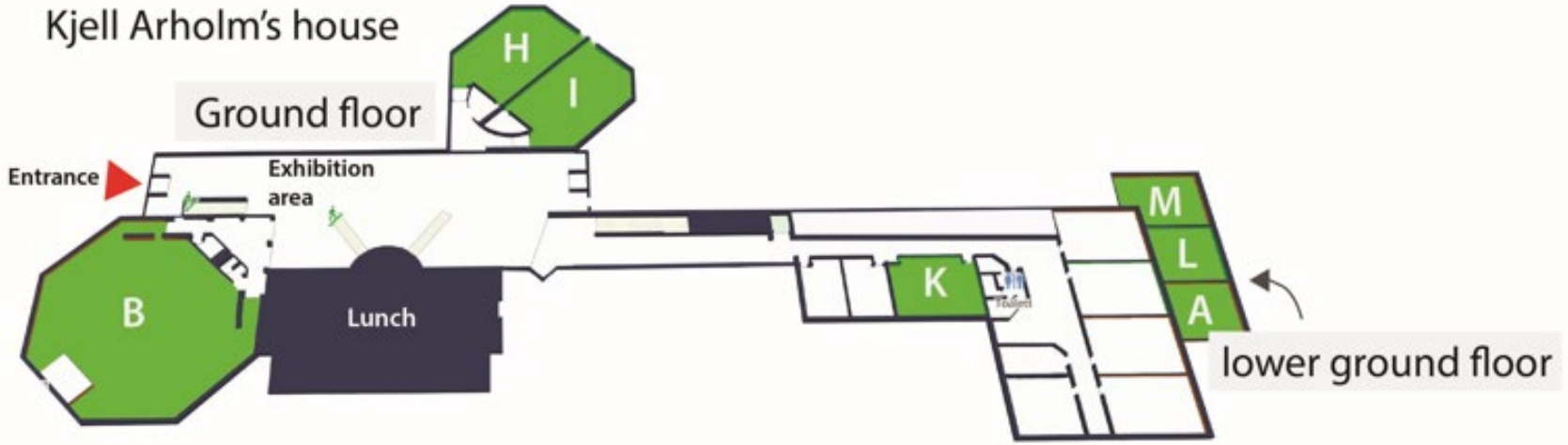
LUNCH BUILDING







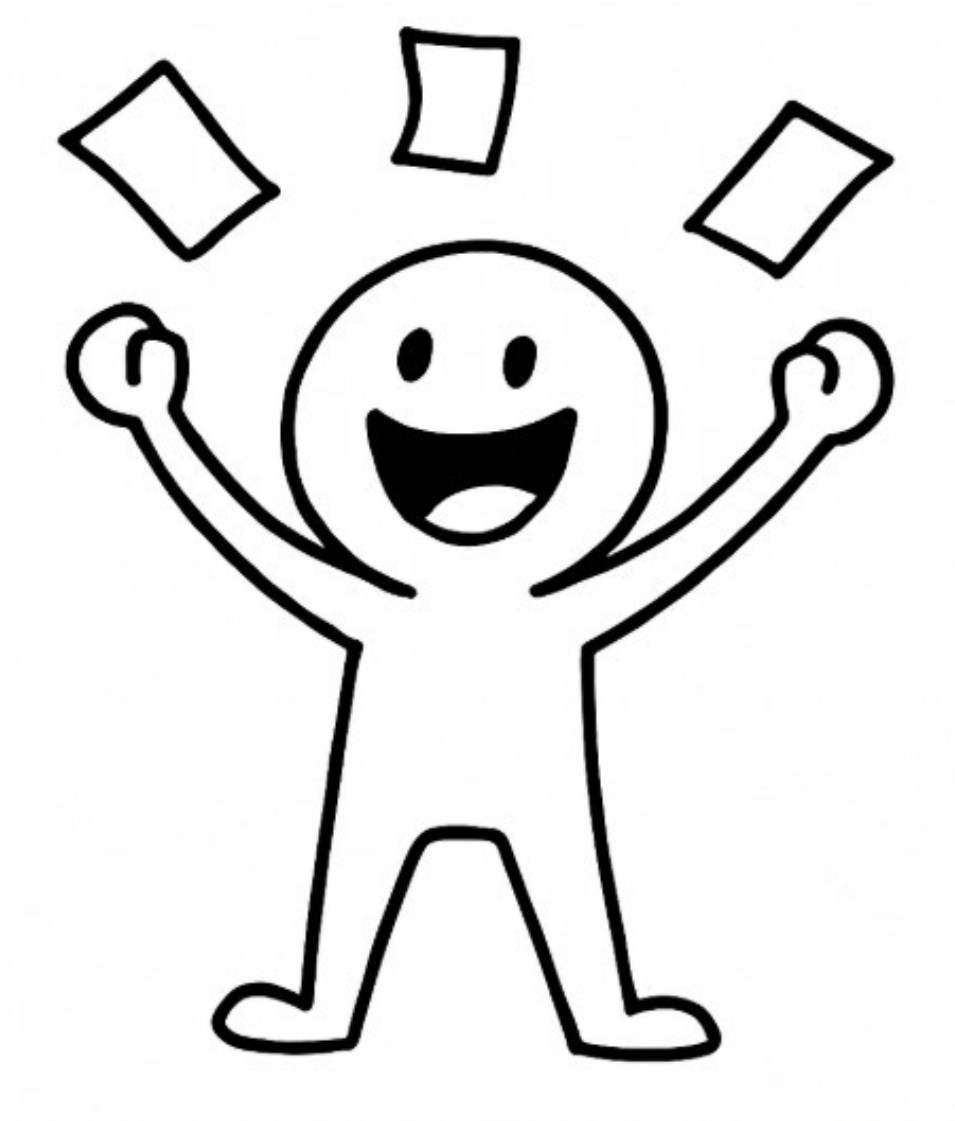
Need help?

- UiS crew wear UiS t-shirts – just ask!
- There is an assistant in every room

Presentations must be ready in advance, as on-site uploads via USB are not possible due to IT policy.

Please send your presentation (if not already submitted) to:
presentations-esrel-srae2025@uis.no

Use the following filename format: [SessionNumber]-[LastName].ppt
Example: 2A-Lambert.ppt



University of Stavanger

Terje Aven

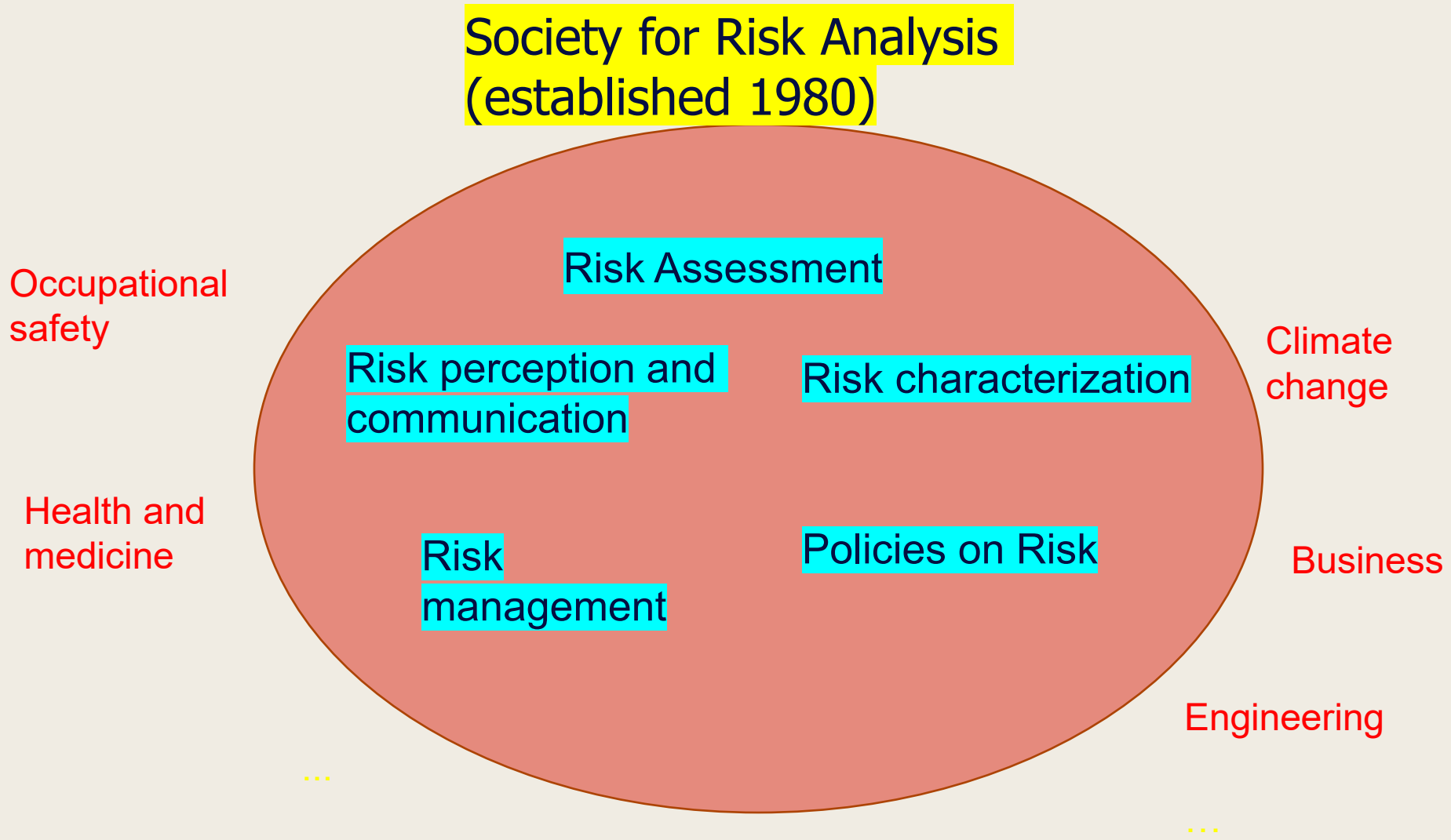
Breakthroughs in research

How did it happen? What was the problem and what was the novel features and ideas? Where did the new insights come from? How important was discussion with other scientists?

Gudela Grote

Enrico Zio

Is there a science of risk?


Society for Risk Analysis
(established 1980)
Risk Assessment
Risk perception and communication
Risk characterization
Risk management
Policies on Risk
Occupational safety
Health and medicine
...
Climate change
Business
Engineering
...

Editorials Risk Analysis 1981 Cumming, Weinberg:

Risk assessment is not a science per se

Risk assessment is not a scientific method per se

The problem: rare events and uncertainties, accurate predictions cannot be made (trans-scientific elements)

There is no discipline of risk analysis

SRA President
Lester B. Lave,
March 1986, SRA Newsletter 6(1)

1990s

Some scholars: There is a field and discipline of risk analysis

Terje Aven
Late 1980s,
early 1990s

Develop study programs in safety and risk

Generic but at the same time linked to applications, first engineering, later societal safety – focus on risk assessment and its use (risk management)

Is there a science of risk?

What is science?

- 2004

Is there a science of risk?

Risk assessment science: Concepts, principles, methods and models to analyze, describe and communicate risk, in a decision-making context

Aven, T. (2004) Risk analysis and science Int. J. of Reliability, Quality and Safety Engineering. 11, 1-15.


Sven Ove Hansson
OBSTACLES
GAP 1
GAP 2
practice
RA

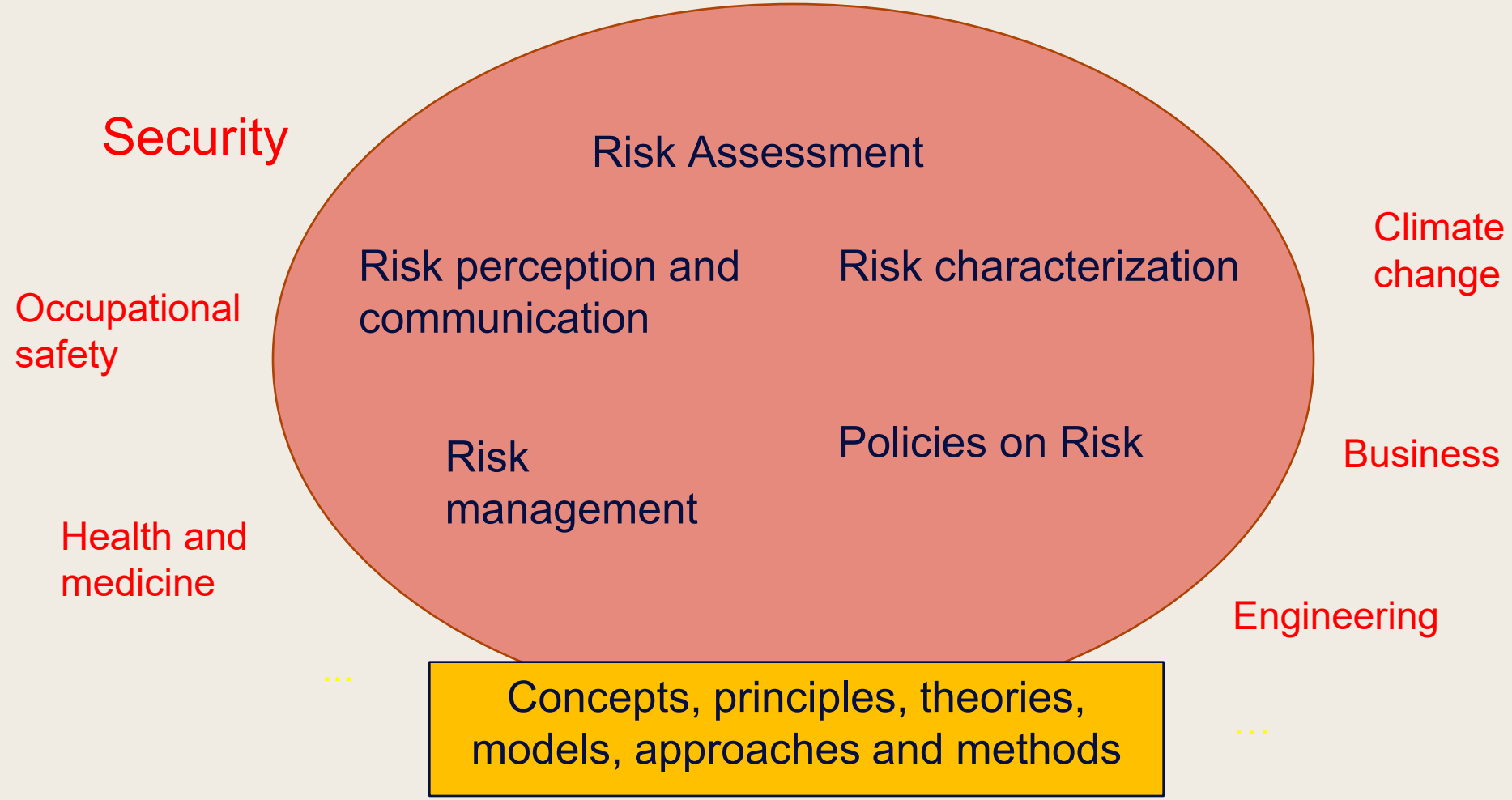
Science (in the broad sense) is the practice that provides us with the most reliable (i.e., epistemically most warranted) statements that can be made, at the time being, on subject matter covered by the community of knowledge disciplines (i.e., on nature, ourselves as human beings, our societies, our physical constructions, and our thought constructions).

Hansson, S.O. and Aven, T. (2014) Is risk analysis scientific? Risk analysis, 34(7), 1173-1183

Aven, T. (2018) An Emerging New Risk Analysis Science: Foundations and Implications. Risk Analysis. 38(5), 876-888.

Risk science is the most justified knowledge on risk understanding, risk assessment, risk communication, and risk management (including risk governance and policies on risk). Risk science is also about the process – the practice - that gives us this knowledge.

Risk science – generic and applied




Sven Ove Hansson
OBSTACLES
GAP 1
GAP 2
practice
RA

Gudela Grote

ETH zürich

Can uncertainty be good (for safety)?

Gudela Grote

How it all started:
Job design for safety – The role of uncertainty and autonomy

- Safety requires control which is easiest to establish by centrally prescribed action in stable situations.
- High-risk operations by definition imply limited predictability and require flexible local action.
- As a consequence, safety management is riddled with concurrent demands on stability and flexibility.
- Autonomy as the presumed enemy of safety is essential for worker motivation and handling uncertainty.

➢ Now what?

Safety-uncertainty-automony tensions can be bridged by loose coupling and cultural norms (Weick, 1976; Orton & Weick, 1990; Weick, 1987; Grote, 2007, 2009, 2020, SRAE 2021)

- "Organizations and their subunits can act on both a technical level, which is closed to outside forces (coupling produces stability), and an institutional level, which is open to outside forces (looseness produces flexibility). This general image is described as the dialectical interpretation of loose coupling." ⚠️
- “(Culture) creates a homogeneous set of assumptions and decision premises which, when they are invoked on a local and decentralized basis, preserve coordination and centralization. Most important, when centralization occurs via decision premises and assumptions, compliance occurs without surveillance.”

⚠ Not to be confused with Perrow's (1984) definition of coupling as a single dimension ranging from loose to tight coupling based on the amount of slack in work processes.

One (big) step further: Not only coping with, but also creating uncertainty for safety? (Grote, SRAE 2013, Safety Science, 2015)

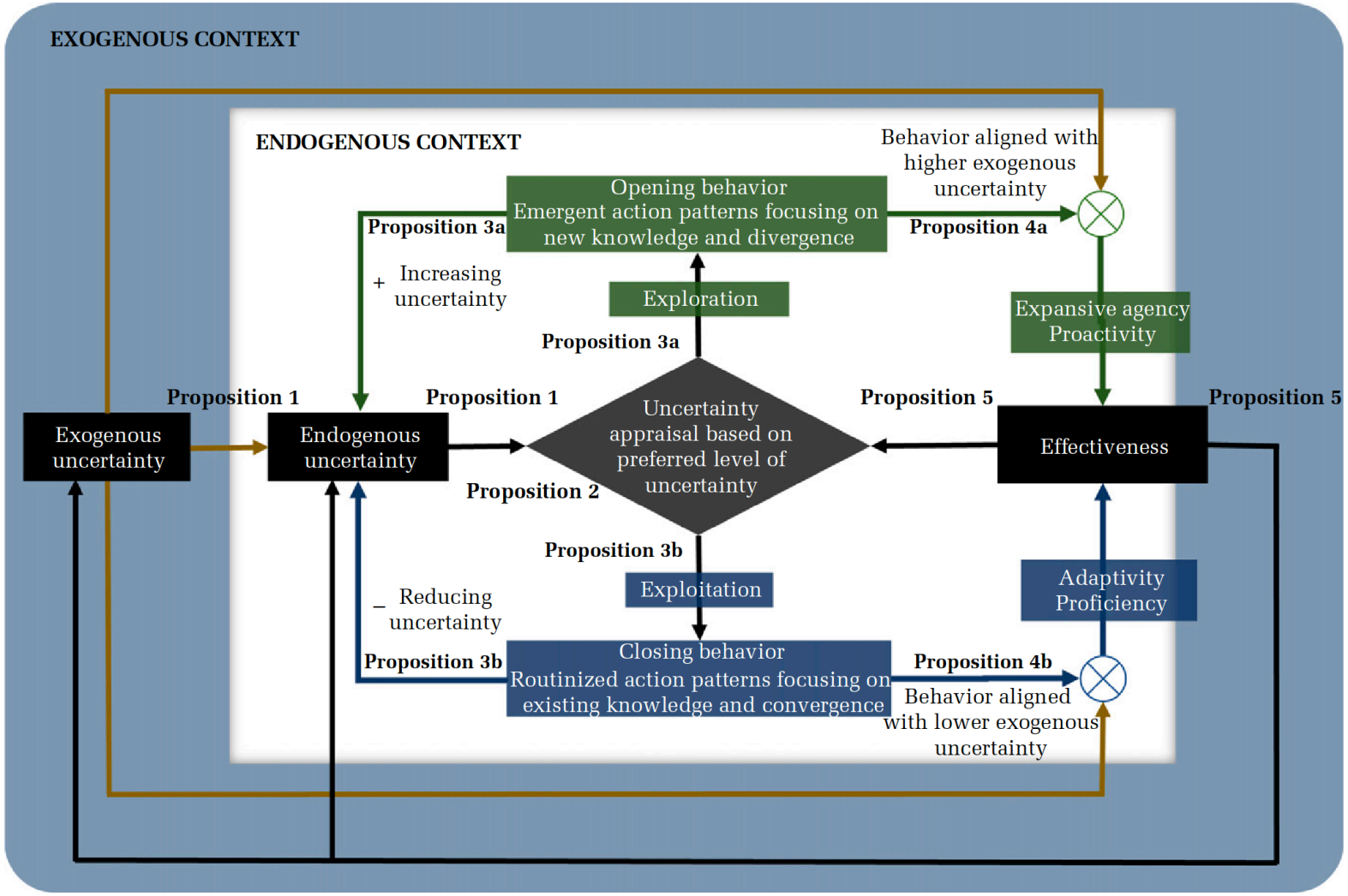
	Reduce uncertainty	Maintain uncertainty	Increase uncertainty
Objective	Stability	Flexibility	Flexibility/innovation
Conceptual approach	Classic risk mitigation	Resilience	Complexity theory
Control paradigm	Central control	Control by delegation to local actors	Control by maximizing options for action
Examples of measures	Standardization; automation	Empowerment	Controlled experimentation

Examples

- Speaking up: Speaking up increases uncertainty for the person themselves and the people they address. (Bienefeld & Grote, 2012; Raemer et al., 2016)
- Flexible rules: Goal rules, process rules, and action rules with decision latitude give autonomy to actors, thereby increasing uncertainty for them in choosing the right course of action. (Grote et al., 2009; Hale & Borys, 2013).

Finding a co-conspirator: Uncertainty regulation model (**Griffin** & Grote, 2020)

FIGURE 1
Model of Uncertainty Regulation



- Individuals (and organizations?) self-regulate to **achieve tasks in parallel to regulating uncertainty** towards a preferred level.
- Uncertainty regulation happens through opening / closing behaviors, which **increase / reduce uncertainty**.
- **Effective performance** results from an **alignment** between task uncertainty and the preferred level of uncertainty.

Is safety really helped by uncertainty regulation incl. uncertainty creation?
Supportive answers by various safety scholars

- Ways forwards in a review of human error literature (Read et al., 2021): "... new understandings of how organizations can support workers, for example by promoting agency in responding to uncertainty".
- Risk governance for "beyond control" (Sugawara, 2024): "Although paradoxical, it may be necessary for the risk governance of complex sociotechnical systems to increase beyond-control deliberately and adequately, instead of minimizing it."
- Interviews with managers on Network Rail decentralization efforts (Nolan-McSweeney et al., 2023): "... the interviews suggested that railway rules and procedures are more ‘fixed’ than ‘flexible’ (...) involving end-users (...) might be a way to gauge where any ‘uncertainty’ may already exist within the system and where this may be explored or exploited."
- Delphi study with safety practitioners (Pilbeam et al., 2025): "... ‘flexible rules’ that support adaptive action and empowerment (...) resemble the notion of principles-based practices identified in the findings of this Delphi study, while the rules-based practices correspond to Dekker’s ‘formalized rules’.
- Analysis of driver interactions with Tesla 'autopilot' (Constantinides et al., 2024): "We show that depending on their uncertainty preferences, humans may explore different modes of AI (...) how humans move between these modes and how the cycle of learning from uncertainty feeds into new AI systems."

A next step to make uncertainty regulation fruitful for safety: "Uncertainty-as-enabling" versus "Uncertainty-as-disabling" mindsets

- Uncertainty: A lack of information or simply "not knowing for sure".
- Mindset: Core assumptions that help individuals to make sense of and interpret experiences, orient them to a particular set of expectations, attributions, and goals, and influence their behavior.
- Uncertainty mindset: Core assumptions about uncertainty that guide individuals' understanding of and response to the uncertainty in their immediate environment.
  - Four facets:

    Uncertainty as fixed / as malleable.

    Uncertainty may be out of one's control or something that can actively be influenced and changed. (Sample items: I cannot control the uncertainty I experience; I can control the uncertainty that I experience.)

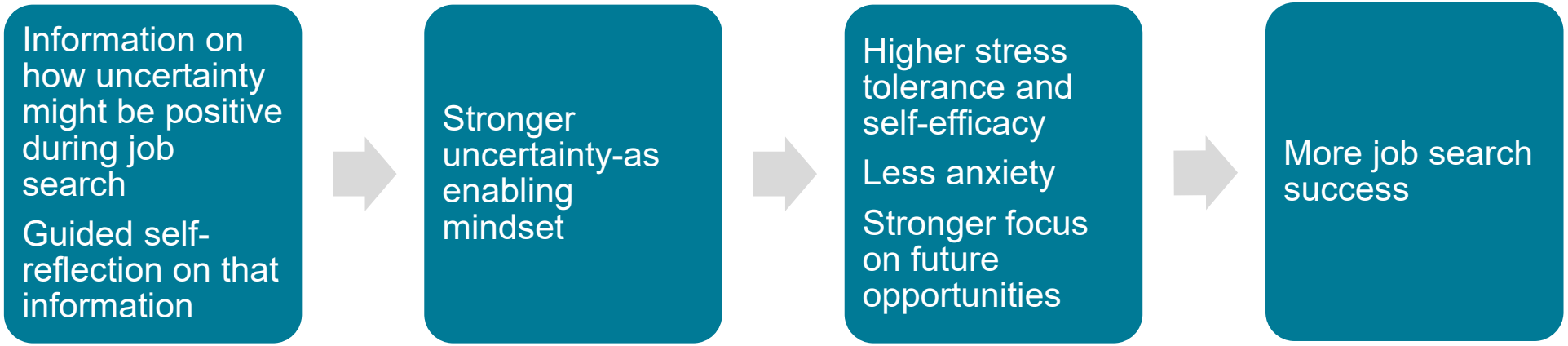
    Uncertainty as threat / as opportunity.

    Uncertainty can threaten successful goal pursuit, but can also be an opportunity for learning, personal growth, and productivity. (Sample items: Uncertainty can inhibit my personal development; Uncertainty can help my personal development.)

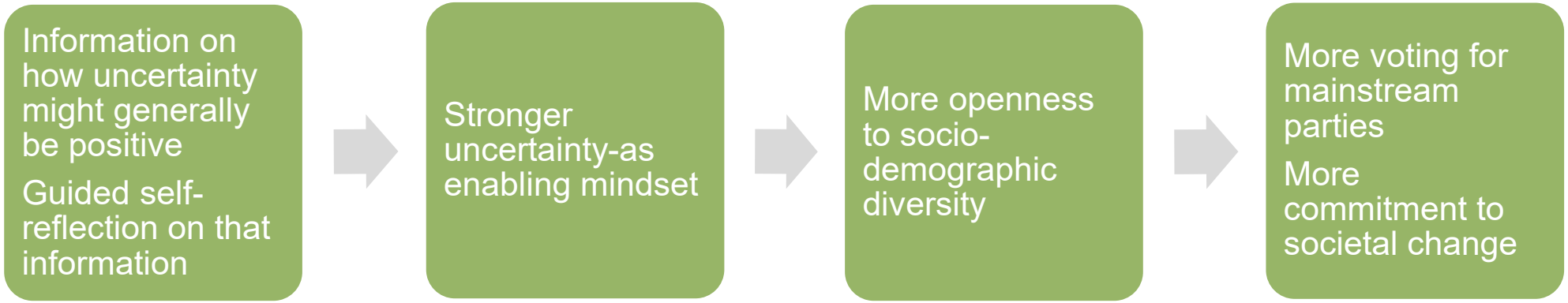
(Crum et al., 2023; Dweck, 2006; Dweck & Yeager, 2019; Galbraith, 1973; Gerlach et al., 2023; Griffin & Grote, 2020; Grote, 2009; Lipshitz & Strauss,1997)

Two examples of how uncertainty mindsets may be changed and with what effects

Uncertainty mindset intervention for job seekers in the canton of Zurich (randomized contolled trial, N=803; Pfrombeck et al., in prep.)



Uncertainty mindset intervention for German voters (randomized controlled trial, N=1086; Takizawa et al., in prep.)



But: How might uncertainty mindsets affect safety?

Hoping for many more collaborations with you to explore this further!

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