



APPLICATION TO HOST THE ISSW 2024

A Merging of Theory and Practice



Location	Tromsø, Norway "Paris of the North"	Activities	Northern lights, whale safaris, biking, trekking, climbing, skiing
Local Organizers	UiT , NVE , NGI , NPRA	Social	Mack the Northernmost brewery, Driv evening social events
Venue	The Edge hotel	Field trips	Kvaløya, Lavangsdalen, Lyngen
Capacity	800 On-site, 5000 Digitally	Conference organizer	PCO
Theme	Managing uncertainty	Facilities	Plenum/meeting rooms, poster stand, live events and trade lobby

*Submitted to the ISSW Steering Committee from the Local Organizing Committee 17 June 2020,
minor updates 25 September 2020 and 26 April 2021.*

1. INTRODUCTION

On behalf of the four primary organizing institutions, UiT, NVE, NGI and NPRA, we herewith proudly apply for hosting the ISSW 2024 in Tromsø, Norway. We greatly admire the work of ISSW and will work passionately to make this the most successful event ever.

Interest and competence in snow and avalanches is growing rapidly in the Nordic countries. Norway and in particular Northern Norway is a dynamic region: New technologies are rapidly adopted, and the effects of climate change are more perceptible than elsewhere due to the Arctic amplification. It will be a perfect location for the ISSW.

Northern Norway is a remote location, and we believe this triggers innovation in terms of how the ISSW is organized. Virtual digital participation will be an important part of the ISSW, allowing people not only to participate but also to actively contribute via web-based communication tools. ISSW 2024 will thus reach a wide range of professionals and practitioners who can participate remotely from their homes, workplaces, lecture halls, or even ski resorts or pubs.

The size of ISSW increases gradually, making it increasingly complex, resource intensive and uncertain. We will limit the number of participants on-site to about 800 and add a large number of virtual participants to keep the event manageable in a smaller mountainous environment and at the same time increasing the outreach of the ISSW.

Digital participation is a step in the right direction in terms of reducing the carbon footprint. The Covid-19 pandemic has shown the need for alternatives and has to a certain extent been technologically enabling for thinking new.

2. PLANNING AND ORGANIZATION

Primary organizing institutions

The primary organizing institutions are four key organizations involved in snow research and avalanche management in Norway:

- University of Tromsø – the Arctic University of Norway (UiT)
- Norwegian Water Resources and Energy Directorate (NVE)
- Norwegian Geotechnical Institute (NGI)
- Norwegian Public Roads Administration (NPRA)

The four partners are large and dedicated organizations with long track records of national and international collaboration in the snow and avalanche communities. UiT is the third largest university in Norway, NVE is the government authority responsible for natural hazards and energy/water resources management, NPRA is the national authority for roads and transportation, and NGI is an independent, private, foundation working in engineering geoscience.

Conference Chair

Rune Engeset from NVE and UiT will manage the Local Organizing Committee (LOC) and be the Conference Chair, while Audun Hetland from UiT will be the Vice-Chair. We will add more Vice-Chairs if necessary.

Local Organizing Committee

The Local Organizing Committee is responsible for both the planning and execution of the Workshop in 2024, including coordination of institutional and private sector funding.

The LOC is composed of:

- Rune Engeset, Section head at NVE and Associate professor II at UiT
- Audun Hetland, Associate professor of Psychology, UiT
- Carsten Roland, Department Chair of Sports Science, UiT
- Andrea Mannberg, Professor of Economics, UiT
- Markus Landrø, Avalanche forecaster at NVE, PhD student UiT, mountain guide
- Aart Verhage, Section head at NVE
- Odd Are Jensen, Geologist NVE
- Dominik Lang, Director of Natural Hazards at NGI
- Håkon Heyerdahl, Head of section for Snow and Rock Avalanches at NGI
- Tore Humstad, Avalanche expert at NPRA and Chairman of NORSKRED
- Solveig Kosberg, Avalanche forecaster at NVE

The roles of the LOC members will be defined and allocated after the decision to host ISSW 2024 is made. We may also add members to LOC, and possibly split the group into a core group and an extended group as was done for ISSW 2018 in Innsbruck. A Professional Conference Organizer (PCO) will be used. The structure of Fernie will be used as a template for the planned roles:

- CONFERENCE CHAIR
- PROGRAM COMMITTEE CHAIR
- SPONSORSHIP CHAIR
- FIELD TRIPS / PUBLIC OUTREACH DAY
- SOCIAL EVENTS
- VOLUNTEERS
- COMMUNICATIONS & MARKETING
- FINANCES – To be done by PCO
- DIGITAL EDGE – To be done by PCO
- CONFERENCE FACILITIES – To be done by PCO
- HOUSING – To be done by PCO
- WEBSITE & GRAPHIC DESIGN – To be done by PCO
- CONFERENCE MANAGER – To be done by PCO

Scientific Committee

A team of scientists and practitioners will be assembled to design the thematic and educational structure of the Workshop, promote participation, invite, and select presentations, and produce and update the program. Again, the structure of Fernie will be used as a template:

- CHAIR OF PROGRAM COMMITTEE
- PRESENTATIONS
- POSTERS
- PANEL DISCUSSIONS
- INTERNATIONAL ADVISORY GROUP
- ABSTRACTS
- SPECIAL ISSUES

Co-organizers and supporting partners

Several organizations have shown interest in locally co-organizing and supporting the ISSW and others will probably join, including:

- [NORCE Norwegian Research Centre NORCE](#)
- [Norwegian People's Aid](#)
- [Norwegian Armed Forces](#)
- [Tromsø Municipality/City, Fire and Rescue](#)
- [Troms and Finnmark County](#)
- [Norwegian Meteorological Institute](#)
- [Norwegian Red Cross](#)
- [Norwegian Police](#)
- [Norwegian Polar Institute](#)
- [Norwegian Avalanche Association](#)
- [Wyssen Avalanche Control](#)

There is also interest from [Sweden](#), [Iceland](#) and [Finland](#) to contribute to the organization, which will make this event a true Nordic effort.

Professional Conference Organizer (PCO)

A professional PCO will be contracted to support the LOC in terms of venue, accommodation, excursions, and registrations, as well as financial accounting, budgeting, reporting, and handling of value added tax (VAT).

Local Steering Committee

A top-level management representative from each of the primary organizing institutions will establish the Local Steering Committee (LSC), after the decision is made to host ISSW 2024.

3. FACILITIES

Venue

The main venue is the Clarion Hotel the Edge, which can host up to 850 participants on the seafront in Tromsø.



Clarion Hotel The Edge, Tromsø, the tall building on the right which resembles a snow profile.

The hotel has a large conference room for plenary sessions and gala dinner, accommodating up to 850 people. The room can be divided into three separate rooms, to host large parallel sessions.



Plenum room at the hotel: 570 m², 850 people in cinema setup, 370 around tables. The room can be divided into three smaller rooms for parallel sessions, accommodating 250 people each.

Meeting rooms

There is one large and four medium sized meeting rooms available, seating 200 (90) and 76 (40) people in cinema (around tables) respectively.



Large and medium size meeting rooms.

Trade show

The hotel lobby is ideal for exhibitors, facilitating 20-30 trade show booths.



Lobby area.

Posters

Posters will be displayed in two of the meetings rooms. Selected posters may also be displayed in the Lobby area.

Audiovisual

All conference rooms have professional AV systems. Facilities for translation services and headsets are available, and we will consider offering translation services if large groups from non-English speaking areas are participating (e.g. French, Italian, Japanese or Russian).

Backup facilities

As a backup, ISSW may be hosted at UiT Campus, in a dedicated and modern building with the following capacity: Auditorium 1 (560 seats, simulcast, livecast), Auditorium 2 (250 seats, simulcast), Auditorium 3 (150 seats), UiT Auditorium 4 and 5 (100+60 seats). Posters and trade show will be in the hallway around Auditorium 1 and 2 (approx. 500 m²) and in the nearby Auditorium Max (approx. 150 m²). The hallway has a canteen facility for serving food, drinks, and snacks. If required, other nearby facilities may be included, but it is nice with a friendly and close campus feeling, rather than spread out. Campus is 15 minutes by taxi (30 minutes by bus) from the airport and 30 minutes on foot from the city center. Everything is located on Tromsø island.

Alternatively, the conference may be hosted at the Marriot hotel, planned to be opened in 2023.

4. COMMUNICATION AND DIGITAL INNOVATION



Digital edge

The PCO and subcontractors will assist in hosting the ISSW, including contributing to the website.

ISSW will be a fully digital conference, which means online participation will be enabled both for participants and presenters. Those travelling to Tromsø and participating in person will experience an unforgettable time, with the opportunity to join social events in a cozy and hospitable environment in a thrilling visit to the Arctic.

There is a growing demand for accommodating fully digital conferences, hence allowing professionals from all over the world to virtually participate while reducing their personal carbon footprint, saving time, and keeping expenses at a minimum. The need for a fully digital event has never been timelier, in the current global Covid-19 pandemic affecting international travel and large gatherings of people.

We will use Vimeo Live Streaming, Microsoft Teams live events or similar, for making presentations, posters, and interaction between participants as efficient as possible.

Technology is advancing rapidly and we are sure that suitable software and set ups for fully digital conferences will be developed and tested in many other venues before 2024 such that we can learn from the experience of others to make this a success. For example EGU quickly changed to digital and web-based solutions in 2020, in response to the corona-restrictions (<https://www.egu2020.eu/>), with lots of positive feedback on how the conference had gone.

We will also use these tools for online courses and learning, reaching far more people than normally achieved at ISSW's.



We plan to have a studio on site, where presenters and participants are interviewed and participate in panel debates. The purpose is partly to create a dynamic and vibrant engagement on site, as well as to make the digital participation much more attractive. Participants from all corners of the world will have the opportunity not only to follow keynote lectures, but also to actively take part in discussions and ask questions to presenters and panels.

Digital participation will also give the opportunity to share knowledge and results outside the standard formats of 20-minute oral presentations or posters, by dropping short films and presentations in a digital Workshop sandbox, which will be on display on dedicated channels electronically.

Web site

A dedicated website will be established early to promote the ISSW and present all relevant information on registration, deadlines, program, logistics, etc.



5. SIDE AND EVENING EVENTS

Daytime events

DRIV is the student concert venue and bar in downtown Tromsø, only a short walk from the Edge hotel.

DRIV will be used for professional selected daytime presentations, targeting all those interested in avalanche rescue, avalanche medicine and avalanche control solutions,



DRIV accommodates up to 800 people

Evening events

DRIV will also be used for selected popular evening presentations, which are open to the public.

- TEDx format presentations for later online publishing.
- “New gear show”. Short presentations from the sports industry followed by the avalanche quiz (Kahoot) with prizes from the industry
- Diva Night for Avalanche Divas / Mac Night for all
- Movie Night.

6. LOGISTICS

Food and beverage

Food and beverages will be offered in the hotel for lunch and during breaks, as well as the banquet. Hot and cold beverages will be served together with small snacks during breaks and be included in the registration.

Lunches and banquet dinner are ordered and charged separately in the booking system.

Lodging at hotels

The conference hotel and its collaborating partners cater for 800 guests. Tromsø city has a large array of hotels with different price categories, with present costs between NOK 1000 and 1500 per night (NOK 9.52 equals USD 1 as per 25 September 2020).

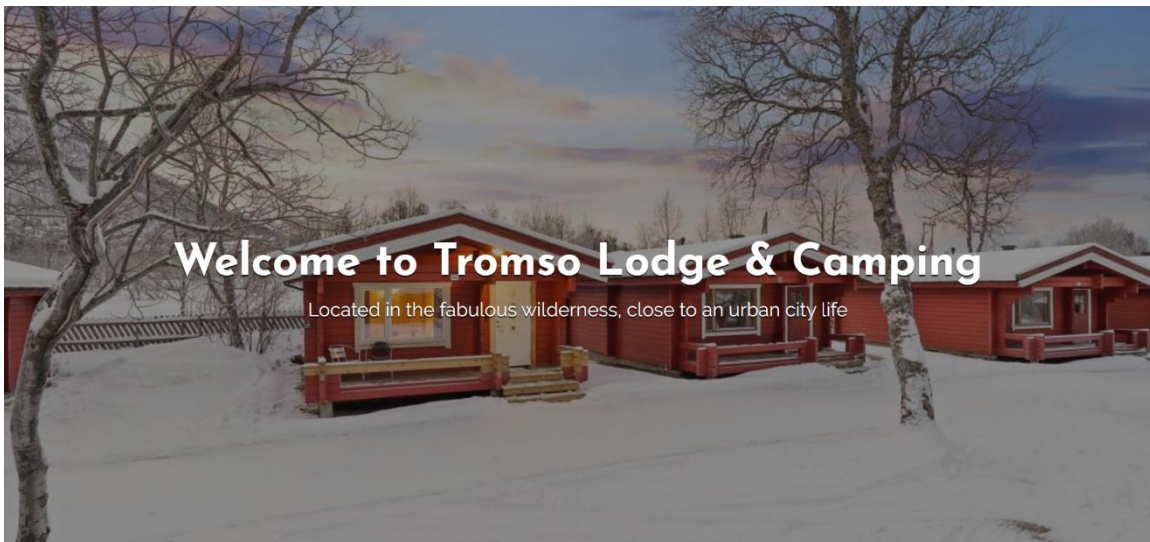
We have collected these prices per night per room included breakfast from relevant hotels in September and October 2024:

Hotel	No. beds	Single (in NOK)	Double (in NOK)
Clarion Hotel The Edge	270	1290	1490
Comfort Hotel Xpress	150	990	1190
Radisson Blu	100	995-1495	NA
Saga	60	1450	1650
Clarion Collection Aurora	90	1340	1540
Clarion Collection With	60	1390	1590

Budget lodging

We have two different options for nearby budget accommodation. Tromsø Lodge and Camping offers self-catering in tents or cabins. There are 58 cabins with different levels of sophistication and catering for 2-5 people each (providing a total of 270 beds). The prices are between NOK 400 and 900 per night per person.

Self-catering is a financially beneficial choice when travelling to Norway. The camp site is about 5 km from the city center. For more information see <https://tromsolodgeandcamping.no/en/>.



Picture from Troms Lodge and Camping.

Another even more economical option for overnight accommodation can be provided in school classrooms.

Transportation

Tromsø is reached by air from Oslo (usually 15 direct flights per day), which connects to international and intercontinental flights. Tromsø is also reachable by boat (Hurtigruta coastal ferry).

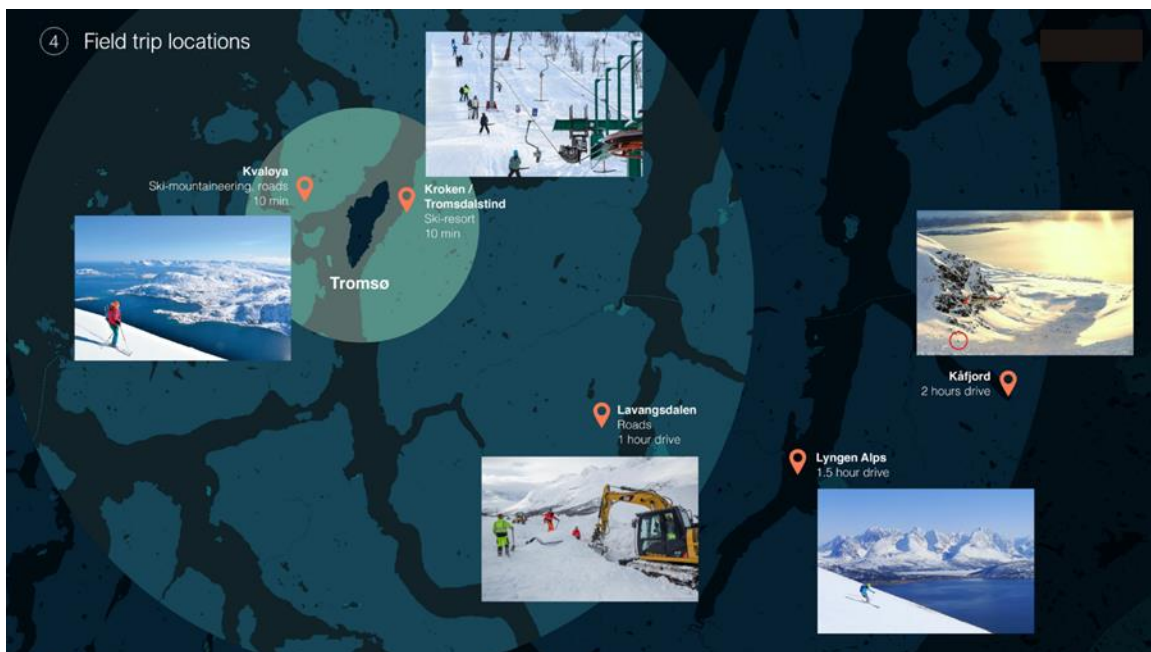
The airport is 5 km from the city center and the workshop venue, which takes 10 minutes by car and 20 minutes by airport express bus. Bus services to and from the university take about 15 minutes.

7. FIELD TRIPS

The Tromsø area has a variety of different sites which are appropriate for outdoor activities, recreation, and cultural experiences. Struggling with the forces of nature, both at sea and under the mountains, fishermen and farmers, and later mountaineers and skiers, have learned to deal with natural hazards and the long polar night.

When staying here, you will be able to feel the same natural forces and experience the ever-changing light conditions and see how the population have adapted to the climate in terms of culture, business, and their daily lives.

We will therefore invite the ISSW participants to see how infrastructure and settlements as well as those pursuing outdoor activities protect themselves against snow avalanches and find their way through sustainability to the extreme, at the outermost edge of Europe.



Many great locations for field excursions (approximate locations shown in illustration).

Professional trips

We plan several options for full-day events as a break in the middle of the Workshop:

- The local ski resort, which has experienced several avalanche accidents including fatalities
- Avalanche-prone highways, which have dedicated avalanche protection program including advanced and autonomous sensor systems such as doppler radar and infrasound systems, active avalanche control and protective constructions. We will also visit avalanche-prone areas where protective measures are still under planning.
- The Tromsø municipality which is part of the Northern Norway Avalanche Monitoring System together with 16 other municipalities. This system consists of snowpack monitoring, local warnings and a large number of detailed contingency and evacuation plans
- Kvaløya, the nearby island which is a popular destination for ski touring and has several avalanche-prone roads
- The University and the University hospital, which is the largest hospital in Northern Norway and has a very active search and rescue unit as well as a large emergency response unit. They are also in the medical frontier for treating hypothermia
- Kongsberg Satellite Services which operates the largest satellite ground station network in the world.
- The Tromsø cable car “Fjellheisen” that runs up to the mountain ledge Storsteinen, 421 m above sea level. From the viewing platform at the upper station, you can enjoy spectacular panoramic views and enjoy a delicious dinner based on local food at the station’s restaurant.
- The Nordnes rockslide location, which has been classified as a high-risk location due to the severe consequences of a catastrophic failure into the fjord. The location is subject to a comprehensive monitoring system.
- The history of hazard mapping and avalanche protection in Tromsø municipality (Tomasjord, Tromsdalen, school, etc)

Activity trips

Before or after the Workshop, as well as during the mid-workshop break, there are options for longer or shorter trips:

- Mountain biking
- Mountain climbing
- Hiking with spectacular views
- Sea kayaking
- Whale safari
- Northern light tours
- Cultural such as museums, brewery, restaurant, fishing industry

8. CONFERENCE PROGRAM

Thematic focus

Our general motto remains **A Merging of Theory and Practice**. We will focus on all sectors within the snow and avalanche world, and at this ISSW we would like to have an emphasis on managing uncertainty: **Managing uncertainty – Are we smart or lucky?**

Uncertainty relates to all parts of snow science (e.g. hazard mapping, forecasting and evacuation, monitoring, early warning systems, modelling), as well as practical, operational and personal assessments and decision-making (e.g. when working or traveling in avalanche terrain).

We will hone the focus towards applicability for practitioners and highlight specific questions and challenges relevant for each topic and session. For each of the main topics there will be a keynote addressing the main challenges and unknowns that need to be resolved in the coming years.

We have started to develop a more detailed program with specific topics (attached in Annex 1 and as this is work-in-progress, we will develop this further and integrate feedback from the ISSW Steering Committee. We will also have to fine-tune the program to cater for digital participation from the different time zones around the world.

Program at-a-glance

	Monday	Tuesday	Wednesday	Thursday	Friday
Morning Session I	Physics	Monitoring& Detection	Field trips	Modelling	Education
Break					
Morning Session II					
Lunch					
Afternoon Session I	Observations	Engineering& Governance		Climate	Forecasting
Break					
Afternoon session II					
Posters& Social hour	Posters	Posters		Posters	Posters
Evening	Movie night Registration*	Mack& Diva night	Gear & quiz night	Banquet	

**registration will also be open on Sunday night, together with an informal icebreaker.*

We will provide a mobile-first website that provides all the detailed information participants require to navigate the conference.

Scientific Program

We anticipate about 1000 submitted abstracts, which we will allocate to oral or poster presentations and develop an attractive workshop program.

Abstracts will be managed by UiT The Arctic University of Norway, the University of Oslo, NVE, NPRA, NGI and several foreign universities and institutions.

We plan to ask for short videos (teasers) and short lists of key new findings and key take-homes for abstract submissions to be considered for TEDx, keynotes or oral presentations, in order to make sure all oral presentations are of high quality.

Keynotes

We suggest keynotes related to each of the main topics. These should address the main challenges within the field/topic including how to handle challenges related to uncertainty. Some examples are:

- What are the main challenges in hazard zoning?
- How can we communicate uncertainty in various settings?
- Local avalanche warning for roads and infrastructure

Abstracts and extended abstracts

We will collect, sort, and select abstracts for the conference based on a peer review process and use the systems successfully used by previous hosts of ISSW.

All accepted abstracts will be made available to the participants with the program.

We will publish the proceedings in collaboration with MSU in the ISSW archive.

We would like the submitting authors to provide extra information along with the abstract to create the best possible program. We may ask authors information, such as “To whom is this useful?” and “What is the take-home from this presentation, in terms of applied use or new knowledge?”. We may also ask authors planning an oral presentation to provide a two-page PowerPoint presentation or a 1-minute video illustrating the problem/challenge and (expected) results of his/her presentation. This may help us to select the most appropriate candidates for oral presentations or evening / open / streaming presentations

Peer-review publications

We will liaise with at least two scientific journals, to provide opportunities for the participants to submit their work for publication in special issues of open access journals,

possibly Cold Regions Science and Technology and Journal of Outdoor Recreation and Tourism. We will encourage open access to the publications corresponding to the ISSW special issues, be it through the choice of fully open access journals or by encouraging authors to enable gold (full open access of the final article) or green (open access to the unformatted accepted manuscript on a public repository). We will pursue the open science and open access publications options, as this is the expected strategy of a likely sponsor, the Research Council of Norway, ref.

<https://www.forskningsradet.no/en/Adviser-research-policy/open-science>.

9. FINANCES

Funding

The organizers plan to contribute USD 50 000, as well as raise more than USD 100 000 from governmental, regional, and local organizations as well as both national and international private companies.

Accounting

The finances will be managed by the PCO, who report regularly to the LOC and LSG. UiT will supervise the PCO and report regularly to the LOC and LSG.

Budget

The budget, prices and accounts will be based in Norwegian kroner (NOK).

We aim to keep registration fees low, at about USD/EUR 350-400 for at-location participation and at about 100 USD for digital participation. However, the actual prices in USD/EUR will depend on the exchange rates.

If the meeting is postponed to 2025, a +5 % budget increase may be incorporated.

Based on the USD-NOK exchange rate on 24 September, 9.52, the following budget is calculated:

ISSW 2024 Tromsø	Currency: NOK	USD-NOK exchange rate
		9.52
Budget	4 474 400	
Result	0	
Income	Excl. VAT	
Sponsors	1 028 160	
Registration fee at-location	2 132 480	800 participants*
Registration fee digital	456 960	600 participants*
Organizers	476 000	
Excursions	380 800	
Total	4 474 400	
Expenses		
Venue conference	1 237 600	4 days at hotel, 800 participants
Welcome reception	380 800	800 participants
Transportation		
PCO	1 047 200	
Communication	952 000	
Human resources	95 200	
Excursions	380 800	
Misc.	380 800	
Total	4 474 400	

*) Cost calculation based on NOK 3 332 per person registration fee for at-location participation and NOK 952 for digital participation. 25 % VAT deductible.

ANNEXES

(Very) preliminary themes for the scientific program

Letters of intent from the organizing institutions (NVE, UiT, NPRA, NGI)

Letter of intent from the Norwegian Avalanche Association (NORSKRED)

(Very) preliminary themes for the scientific program

This is work-in-progress, and the programme will be developed in close cooperation with the ISSW Steering Committee.

This is a very preliminary list as of June 2020. We will also include practical avalanche industry topics such as: avalanche terrain, risk management, search and rescue, explosive, avalanche control, etc, which are the themes that encourage participation from ski patrollers and other field-based practitioners.

1. Physics:

- Snow mechanics / avalanche release
 - What does critical crack length and failure initiation mean for a skier?
 - What does it mean for naturally- released avalanches?
 - What is the importance of snow mechanics for hazard mapping?
- Avalanche dynamics / influence of ambient conditions.
 - How to account for different snowpack conditions in a risk-based hazard assessment?
 - Is there need for more than one avalanche model?
 - How can we express model uncertainty in avalanche hazard zones?
- Avalanche and forest interaction.
 - How does forest influence the snowpack and its mechanical properties with respect to avalanche release?
 - How dense forest is needed to prevent avalanche release?
 - How can we account for the forest effect on avalanche run-out?
 - How do we handle the various uncertainties in spatial forest data (resolution, accuracy, outdated data, etc)?
- Snow hydrology and snow physics
 - How much snow is in the terrain?
 - How does climate change affect hydropower resources?
 - Does a warmer climate change the snowpack energy and mass balance?

2. Observations and case studies

Do we get too much information? What about quality? High quality ↔ large quantities of data?

- Catastrophic events
 - What were the relevant snow properties? What were the snow properties when nothing happened?
 - What was unique of this event, and how common is it really? Weak layer, lots of snow, snow drift, water?
- Skier accidents
 - What was unknown? What was different this time?
- Changes due to climate change
 - Transition from dry snow avalanche to slushflow hazard

3. Instrumentation, monitoring and detection

What is the uncertainty and what are the consequences of uncertainty in observational data?

- Instrumentation
- Remote sensing (satellite, UAV, Geo-phone, GPR)
- Monitoring snowpack properties (snow distribution, distributed snow water equivalent, snow volumes, wetness, weak layers....)
- Detection of avalanche events

4. Modelling

Integral risk-modelling: from snow release to run-out interaction

- Avalanche software tools (dynamical modelling, GIS tools etc)
 - Special session on model implementation?
- Weather modelling and presentation
- Snowpack modelling and presentation

5. Education

- (Needs) for recreationalist – on a need to know basis
 - What recreationalist need to know?
 - Decision optimisation for recreationalists
 - Professionals
 - Snow how requirements
 - Decision-making competence
 - Engineers

6. Decision-making and uncertainty

- Decision-making in high risk environments.
 - Ski areas
 - Workplace safety
 - Road administration
 - Guiding industry
 - Recreationalists
- Risk reduction and decision optimization
 - Decision-making strategies
 - Technology and decision optimization

7. Forecasting

- Regional forecast.
 - Avalanche danger and hazard communication
 - How to reduce uncertainty in avalanche forecasting
 - Forecasting standards
 - Workflow
 - Danger scale
 - Technology
- Object warning.
 - Risk communication,
 - Coping with uncertainty.
 - Residual risk. Risk governance.

8. Engineering and Governance

- Hazard zoning
 - What are the main challenges in hazard zoning?
 - Combining different mitigation strategies-is it possible?
 - Re-zoning yes or no after implementation of mitigation measures.
- Integral hazard and risk assessment
 - How do stakeholders handle uncertainties when applying to real cases?
- Avalanche mitigation
 - Use of explosives in ski areas and along communication lines
 - Effectiveness and the economic efficiency of protection measures
 - Early warning systems



**APPLICATION TO HOST
THE INTERNATIONAL SNOW SCIENCE WORKSHOP**