SYMPOSIUM PROGRAM

Venue of the event

ETH Hönggerberg
Vladimir-Prelog-Weg 1-5/10
Lecture Hall HCI G3/G7
8093 Zürich
Switzerland

Monday - June 17 2024 - Day 1

08:00-09:30	**Registration, Coffee break**
09:00-10:00	**Opening Ceremony** (HCI G3) **Prof. Christian Wolfrum** *(Vice President for Research, ETH Zurich)* **Prof. Ioannis Anastasopoulos** *(Head of the Department of Civil, Environ mental and Geomatic Engineering, ETH Zurich)* **Prof. Robert Boes** *(Head of the Laboratory of Hydraulics, Hydrology and Glaciology, ETH Zurich)*
10:00-10:30	**Keynote by Prof. Robert Ettema,** *Colorado State University (USA)*: Are hydraulic structures designed to handle ice? (HCI G3)
10:30-11:00	Recognition Ceremony for Prof. Willi Hager, *ETH Zurich (Switzerland)* **Keynote by Prof. Willi H. Hager** Hunter Rouse: Hydraulician, leader, historian (HCI G3) Chairperson: **Prof. Robert Boes,** *ETH Zurich (Switzerland)*

Technical Session 1: Physical, Numerical & Hybrid Modeling I (HCI G3)

11:15-11:30	**Submerged flip bucket performance and downstream scour profile – a case study – Prado Dam spillway** Yajayra Diaz / *US Army Corps of Engineers (USA)*
11:30-11:45	**Air entrainment by plunging jets of piano key weirs: hybrid modeling at a laboratory scale** Biruk Belay / *Helmut-Schmidt-University (Germany)*

11:45-12:00	**Composite modeling to detect scale effects in embankment dam breaching due to overtopping** Matthew Halso / *ETH Zurich (Switzerland)*
12:00-12:15	**Characterization of the hydrodynamic behavior of surge shaft's orifices in SNOWY 2.0 power plant** Samuel Vorlet / *EPFL (Switzerland)*
12:15-12:30	**Hydraulic analysis of Snowy 2.0 pumped storage facilities using hybrid models: validating performance and anti-vortex measures** Dr. Azin Amini / *EPFL (Switzerland)*
	Chairperson: **Prof. Brian Crookston,** *Utah State University (USA)*

Technical Session 2: Energy Dissipation (HCI G7)

11:15-11:30	**Development of a spatial jump type stilling basin** Prof. Zulfequar Ahmad / *Indian Institute of Technology Roorkee (India)*
11:30-11:45	**Self-aeration and energy dissipation on concrete gravity dam stepped spill way: hybrid modelling Mark II** Prof. Hubert Chanson / *University of Queensland (Australia)*
11:45-12:00	**A laboratory study on the energy dissipation of a bevel-faced stepped spillway for embankment dam applications** Megh K C / *Utah State University (USA)* Candidate for the Philip H. Burgi Best Paper Award
12:00-12:15	**Rock scour by turbulent jets: a fluid-solid coupled numerical approach** Dr. Erik Bollaert / *AquaVision Engineering Sàrl (Switzerland)*
12:15-12:30	**Hydraulic design of a slotted-grating drop-type dissipation chamber of a flood diversion tunnel** Adriano Lais / *ETH Zurich (Switzerland)*
	Chairperson: **Dr. Daniel Valero,** *Imperial College (UK)*

12:30-13:30 Lunch Break

13:45-14:15	**Keynote by Dr. Isabella Schalko,** *Swiss Federal Institute for Forest, Snow and Landscape Research (Switzerland)*: **From Hazard to Habitat: Understanding Wood's Impact in Fluvial Systems** (HCI G3)
14:15-14:25	**Flash talks for Poster session (HCI G3)** **Numerical modelling of seepage flows under steady and transient states of Singda embankment dam, Manipur, India** Dr. Romeji Ngangbam / *National Institute of Technology Manipur (India)y* **Hydrodynamic forces on boulders in block ramps during flow transitions via numerical CFD simulation** Kimberley Kasischke / *Helmut-Schmidt-University, Hamburg (Germany)*

Real-time monitoring in canal for water resources management of open water area
Cheng-Wei Wu / *National Taiwan University (Taiwan)*
Scalability of model results to nature in the case of static hydraulic waves
Lasse Bauer / *University of Innsbruck (Austria)*
Announcement of the 4th International Workshop on Sediment Bypass Tunnels
Dr. Subhojit Kadia / *Technical University of Munich (Germany)*

Chairperson: **Prof. Stefan Felder,** *UNSW (Australia)*

Technical Session 3: Physical, Numerical & Hybrid Modeling II (HCI G3)

14:30-14:45	**Scaling non-linearities at circular crested weirs: physical modelling & challenges** Prof. Hubert Chanson / *University of Queensland (Australia)*
14:45-15:00	**Predicting uplift pressures and joint flows along a spillway chute** Tony Wahl / *Bureau of Reclamation (USA)*
15:00-15:15	**The effect of installation of assembled boulders downstream of movable weir** Prof. Youichi Yasuda / *Nihon Universi (Japan)*
15:15-15:30	**Effect of bed slope on scour morphology at bridge piers with debris accumula tion** Prof. Stefano Pagliara / *University of Pisa (Italy)*
15:30-15:45	**Air demand comparison between vortex- and plunge-flow drop shafts** Dr. Troy Lyons / *University of Iowa (USA)*
15:45-16:00	**Air-water flow properties in dam-break waves: a sensitivity analysis** Prof. Davide Wuthrich / *TU Delft (Netherlands)*

Chairperson: **Prof. Stefan Felder,** *UNSW (Australia)*

Technical Session 4: Regulation Structures I (HCI G7)

14:30-14:45	**Local scour at spillways: Coping under extreme hydrologic events** Manisha Panthi / *Utah State University (USA)*
14:45-15:00	**Flood protection of Zurich: Physical modelling of the intake structure of a flood diversion tunnel** Andris Wyss / ETH Zurich (Switzerland)
15:00-15:15	**To determine the opening width of a navigable weir in the Meuse by means of flow and nautical simulations during a river flood** Wim Kortlever / *Ministry of Infrastructure and Water Management, Rijkswaterstaat, (Netherlands)*

15:15-15:30 **Impact of bed level changes on overflow at lateral diversion structures using different numerical modelling approaches**
Seline Frei / *ETH Zurich (Switzerland)*

15:30-15:45 **Rapidly varied flow in a complex hydraulic control structure**
Dr. Robert Feurich / *Flow Science Deutschland GmbH, location? (Germany)*

15:45-16:00 **Durability of concrete structures – Inspection of lock chambers**
Dr. Stefan Kubens / *VDZ Technology gGmbH (Germany)*

Chairperson: **Dr. Sean Mulligan,** *VorTech Water Solutions Ltd (Ireland)*

16:00-16:30 Coffee Break, Technical and poster exhibitions

Technical Session 5: Physical, Numerical & Hybrid Modeling III (HCI G3)

16:30-16:45 **Numerical and flume models of bed scour and bridge forces associated with wood or ice accumulation at bridge-waterways**
Dr. Kengo Osada / *National Institute of Technology, Anan College (Japan)*

16:45-17:00 **Study of fluctuating pressures over a steep stepped spillway**
Dr. Juan Pablo Toro / *Universidad Andres Bello (Chile)*

17:00-17:15 **Numerical and physical modelling of a submerged bottom outlet stilling basin**
Ángel Gassó Sánchez / *CEDEX (Spain)*

17:15-17:30 **Testing a smoothed-particle hydrodynamics (SPH) code to solve the hydrodynamics of a bottom intake Coanda screen**
Dr. José M. Carrillo / *Universidad Politécnica de Cartagena (Spain)*

17:30-17:35 **Brief information on the laboratory tour and evening program**
Clara Streule / *ETH Zurich (Switzerland)*

Chairperson: **Dr. Sébastien Erpicum,** *Liege University – HECE (Belgium)*

Technical Session 6: Environmental and Ecological Impacts (HCI G7)

16:30-16:45 **Experimental study on hydrodynamic characteristics and scour in pressure flow conditions under a bridge deck**
Prof. T I Eldho / *Indian Institute of Technology Bombay (India)*

16:45-17:00 **Oxygenation of flowing water with an elbow deflector: physical model**
Pouria Rahmati / *McGill University (Canada)*

17:00-17:15 **Modelling of the thermodynamic regime downstream of Rossens Dam during two floods**
Prof. Michael Pfister / *University of Applied Sciences, Fribourg (Switzerland)*

17:15-17:30	**The impacts of the water intake operation on the hydraulic transients, sediment resuspension and water quality of a large reservoir in Brazil: a case study** Prof. Iran Eduardo Lima Neto / *Federal University of Ceara (Brazil)*
17:30-17:35	**Brief information on the laboratory tour and evening program** Dr. Ismail Albayrak / *ETH Zurich (Switzerland)*
	Chairperson: **Prof. Zulfequar Ahmad,** *Indian Institute of Technology Roorkee (India)*

17:50 -18:40	**Apero and physical model demonstration at the VAW Laboratory**
18:40 -21:30	**Welcome Reception & BBQ at the VAW Laboratory**

Tuesday – June 18, 2024 – Day 2

07:50-08:30	**Registration/IAHR Technical Committee on Hydraulic Structures meeting (HCI G3)**
08:30-09:00	**Keynote by Dr. Russel Gunn,** *Federal Office of Energy, Supervision of Dams (Switzerland)*: **Dam safety and surveillance: concepts and future challenges (HCI G3)**
09:00-09:10	**Flash talks for Poster session (HCI G3)** **Hydro-abrasion resistance of UHPFRC and concrete according to the ASTM C1138 method** Dr. Azin Amini / *EPFL (Switzerland)* **Experimental study on local scour around submerged vanes of different bevel angles** Prof. Zulfequar Ahmad / *Indian Institute of Technology Roorkee (India)* **Application of Artificial Neural Network for predicting peak discharge from breached embankment dam** Merve Okan / *Izmir University of Economics (Turkey)* **Scour in a stratified sand and gravel bed under submerged inclined jet** Angad Sharma / *Indian Institute of Technology Roorkee (India)*
	Chairperson: **Dr. David Vetsch,** *ETH Zurich (Switzerland)*

Technical Session 7: Physical, Numerical & Hybrid Modeling IV (HCI G3)

09:15-09:30	**Boundary conditions for hydraulic structures modelling with OpenFOAM** Dr. Carsten Thorenz / *Federal Waterways Engineering and Research Institute (BAW) (Germany)*
09:30-09:45	**RANS study of hydraulic jumps downstream of sloped channels with incoming fully developed turbulent flows** Dr. Santiago López Castaño / *Waterbouwkundig Laboratorium (Belgium)*

09:45-10:00 **Ice-cover formation at labyrinth weir and its effects on flood discharge behaviors**
Prof. James Yang / *Royal Institute of Technology (KTH) & Vattenfall (Sweden)*

10:00-10:15 **Free surface vortices at intakes: influence of different intake geometries on critical submergence and air entrainment**
Lukas Schneider / *AFRY Switzerland Ltd (Switzerland)*

10:15-10:30 **Discharge characteristics of piano key side weirs**
Sabir Hussain / *Indian Institute of Technology Roorkee (India)*

10:30-10:45 **Towards multi-purpose management of small-scale reservoirs in hilly areas of Hungary**
Dr. István Zsuffa / *VITUKI Hungary Engineering Office Ltd. (Hungary)*

Chairperson: **Dr. David Vetsch,** *ETH Zurich (Switzerland)*

Technical Session 8: Regulation Structures II (HCI G7)

09:15-09:30 **3D-numerical modeling of the complex flood management system at Malvaglia Dam**
Virginia Rossi / *Laboratorium3d (Switzerland)*

09:30-09:45 **Tailwater influence on downstream flow conditions of piano key weirs**
Lisa Besser / *Helmut-Schmidt-University (Germany)*
Candidate for the Philip H. Burgi Best Paper Award

09:45-10:00 **Preliminary analysis of air-water flows on steep slope downstream of piano key weirs**
Dr.Sebastien Erpicum / *Liege University – HECE (Belgium)*

10:00-10:15 **Hydrodynamic pressures on high head – high labyrinth weir walls with considerations for weir wall structural loading – a case study – Prado dam spillway**
Mike Phillips / *US Army Corps of Engineers (USA)*

10:15-10:30 **Comparison of head-discharge relationships from an arced high head submerged labyrinth weir, Prado dam - a case study**
Julie Allen / *US Army Corps of Engineer (USA)*

10:30-10:45 **Investigation of hydraulic stability of boulder weir**
Dr. Pawan Kumar Bhattarai / *Tribhuvan Universi (Nepal)*

Chairperson: **Prof. Mario Oertel,** *Helmut-Schmidt-University (Germany)*

10:45-11:15 Coffee Break, Technical and poster exhibitions

Technical Session 9: Prototype measurements & Special Session: Aerated high-speed flows (HCI G3)

11:15-11:30 **Hydrological measurement for mountain creeks with IoT technique**
Yen-Cheng Lin / *National Taiwan University (Taiwan)*

11:30-11:45 **Effects of Reynolds number on air entrainment characteristics in hydraulic jumps with undeveloped inflow condition**
Dr. Ryugen Satoh / *Nihon University (Japan)*

11:45-12:00 **Preliminary analysis on the effect of tunnel profile transitions on air-demand and flow patterns of low-level outlets**
Simone Pagliara / *ETH Zurich (Switzerland)*

12:00-12:15 **Mitigation measures to prevent cavitation damage in concrete spillways**
Dr. Dan Gessler / *Verdantas, LLC (USA)*

12:15-12:30 **A physical description of air concentration distributions in self-aerated flows**
Dr. Matthias Kramer / *UNSW Canberra (Australia)*

Chairperson: **Prof. Valentin Heller,** *University of Nottingham (UK)*

Technical Session 10: Special Session: Fish Downstream Passage (HCI G7)

11:15-11:30 **f-Curved-Bar Rack – Bypass System: development, planning, construction, and first operational experiences at hydropower plant Herrentöbeli**
Tobias Rüesch / *Wälli AG Ingenieure (Switzerland)*

11:30-11:45 **Design optimization of a trash-rack bar for hydro power plant fish friendly water intakes**
Guillaume Bon / *Université de Poitiers (France)*

11:45-12:00 **Hybrid fish protection system for mitigating fish mortality in hydropower turbines**
Prof. Markus Aufleger / *University of Innsbruck (Austria)*

12:00-12:15 **Quantifying fish response to extreme hydraulic conditions during downstream passage**
Dr. Ianina Kopecki / *SJE - Ecohydraulic Engineering GmbH(Germany)*

12:15-12:30 **Fish downstream passage over weirs at low-head hydropower plants: Field study of total dissolved gas concentrations**
Gabor Süss / *ETH Zurich (Switzerland)*
Candidate for the Philip H. Burgi Best Paper Award

Chairperson: **Dr. Ismail Albayrak,** *ETH Zurich (Switzerland)*

12:30-13:30 Lunch Break

13:45-14:15 **Keynote by Prof. Dr. Michele Palermo,** *University of Pisa (Italy)*
Jet-driven scour processes between past and future (HCI G3)

14:15-14:25 **Flash talks for Poster session (HCI G3)**

Comparative experimental study of three types of spillway energy dissipators
Krishna Kumar Durgam / *Indian Institute of Technology Roorkee (India)*

The importance of sensitivity analysis and model validation to ensure successful post-installation hydraulic evaluation
Vincent Autier / *McMillen, Inc. (France)*

Numerical modeling of fish-friendly angled fine screens with porous media approach
Cuhmur Özbey / *Hacettepe University (Turkey)*

Assessing the impact of debris accumulation around varying configuration of riparian vegetation in dike breaching during extreme flooding events
Dr. Fakhar Muhammad Abbas / *COMSATS University, (Pakistan)*

Methods of releasing environmental flow across a hydraulic structure: a case study of a Ugandan project requiring no or minimal operator control
Dr. Monomoy Goswami / *Central Institute of Technology Kokrajhar (India)*

Chairperson: **Prof. Fabian Bombardelli,** *UC Davis (USA)*

Technical Session 11: Physical, Numerical & Hybrid Modeling V (HCI G3)

14:30-14:45 **Evaluation of computational models for an open channel flow around a suspended cylinder**
Prof. Ram Balachandar / *University of Windsor (Canada)*

14:45-15:00 **Utilization of Artificial Neural Network model for the evaluation of discharge coefficient of a Piano Key Weir**
Dr. Binit Kumar / *Motilal Nehru National Institute of Technology Allahabad, Prayagraj (India)*

15:00-15:15 **Flow around an isolated boulder-like obstacle: effects of modeling approach and Reynolds number**
Yannick Marschall / *ETH Zurich (Switzerland)*
Candidate for the Philip H. Burgi Best Paper Award

15:15-15:30 **Numerical investigation of the impact of density differences on ship**
Dr. Lydia Schulze / *Federal Waterways Engineering and Research Institute (BAW), (Germany)*

15:30-15:45 **Using SpillwayPro to efficiently evaluate new and modified spillway alternatives**
Tony Wahl / *Bureau of Reclamation (USA)*

15:45-16:00 **Flow around a horizontal cylinder placed near a bed: effect of inlet condition**
Prof. Ram Balachandar / *University of Windsor (Canada)*

Chairperson: **Prof. Fabian Bombardelli,** *UC Davis (USA)*

Technical Session 12: Special Session: Large wood risk assessment and management & Special Session: Sediment management techniques (HCI G7)

14:30-14:45 **Multi-lab investigation of the effect of debris composition on bridge clogging during floods**
Lisa Burghardt / *RWTH Aachen University (Germany)*
Candidate for the Philip H. Burgi Best Paper Award

14:45-15:00 **Experimental study on driftwood accumulation at submerged culverts**
Dr. Daan Poppema / *Delft University of Technology (Netherlands)*

15:00-15:15 **Design and optimisation of large wood retention measures for a morning glory spillway**
Dr. Christian Tognacca / *Laboratorium3d (Switzerland)*

15:15-15:30 **Effects of flow guide walls on sediment flushing in peaking hydropower reservoirs**
Stefanie Tietz / *MHYD water and energy solutions (Switzerland)*

15:30-15:45 **Sedimentation in a narrow reservoir under climate change and sediment bypass tunnel operation scenarios**
Sudesh Dahal / *ETH Zurich (Switzerland)*

15:45-16:00 **Multi-factor approach for bedload restoration of dam impacted rivers, application to the Sarine river**
Khalid Essyad / *BG Ingénieurs Conseils SA (Switzerland)*

Chairperson: **Dr. Isabella Schalko,** *Swiss Federal Institute for Forest, Snow and Landscape Research, (Switzerland)*

16:-16:30 Coffee Break, Technical and poster exhibitions

Technical Session 13: Best Practices in Risk Management (HCI G3)

16:30-16:45 **Prediction of dam seepage through a machine learning technique and its application to dam diagnosis**
Hokuto Okabe / *Kobe University (Japan)*
Candidate for the Philip H. Burgi Best Paper Award

16:45-17:00 **Comparison of the evolutions of internal erosion when seepage is at top, bottom or middle part of the homogeneous earth-fill dam built with fine sand and clay mixture**
Merve Okan / *Izmir University of Economics (Turkey)*

17:00-17:15 **Towards automated dam break simulations for rapid hazard screening**
Dr. Daniel Valero / *Imperial College London (UK)*

17:15-17:30 **Applying sustainability principles to the design and construction of hydraulic structures using a structured framework**
Laura Shearin-Feimster / *Schnabel Engineering (USA)*

Chairperson: **Dr. Volker Weitbrecht,** *ETH Zurich (Switzerland)*

Technical Session 14 Special Session: Fish Upstream Passage (HCI G7)

16:30-16:45	**Designing technical upstream fishways capable of adapting to changing environmental conditions** Vincent Autier / *McMillen, Inc. (France)*
16:45-17:00	**Quantifying hydraulic conditions and passage efficiency for an upstream fish passage: a case study from Schiffmühle, Switzerland** Dr. Luiz Silva / *ETH Zurich (Switzerland)*
17:00-17:15	**Providing micro-habitat in pool-weir fish pass by using a brush block: a field study in Dağdelen hydropower plant, Turkey** Dr. Serhat Kucukali / *Hacettepe University (Turkey)*
17:15-17:30	**On the numerical methods for tracking a European eel motion in a closed-conduit system** Islam Abdelghafar / *University of Hull (UK)*

Chairperson: **Prof. Elena Pummer,** *NTNU (Norway)*

17:45 - 18:00 Closing Ceremony

19:15-19:45 Gala Apéro at Restaurant Commihalle, Zurich
19:45-22:00 Gala Dinner at Restaurant Commihalle, Zurich

Wednesday – June 19, 2024 – Day 3

Technical Tour; one-day trip from Zurich by travel car.

It is very important that participants wear shoes suitable for the construction site. Participants wearing trainers or other soft shoes are not allowed to enter the construction site.

07:30 - 08:00	Boarding bus at Sihlquai bus station, Zurich
08:00 - 08:30	Bus ride to Langnau am Albis
08:30 - 10:00	Visiting the existing wood retention rack on the Sihl river and tunnel intake structure under construction in Langnau-Gattikon, Canton of zurich
10:00 - 12:00	Bus ride to Grimsel Hospiz (Canton Bern)
12:00 - 13:45	Lunch at Historical Alpinhotel Grimsel Hospiz
13:45 - 15:00	Visiting the construction site for the replacment of the Spitallamm with a new double-curved dam
15:00 - 16:00	Bus ride to Gadmen
16:00 - 17:00	Visiting the fish lift on Gadmenwasser at the compensation basin Fuhren
17:00 - 19:15*	Return journey to Zurich

(*estimated arrival time)

General information

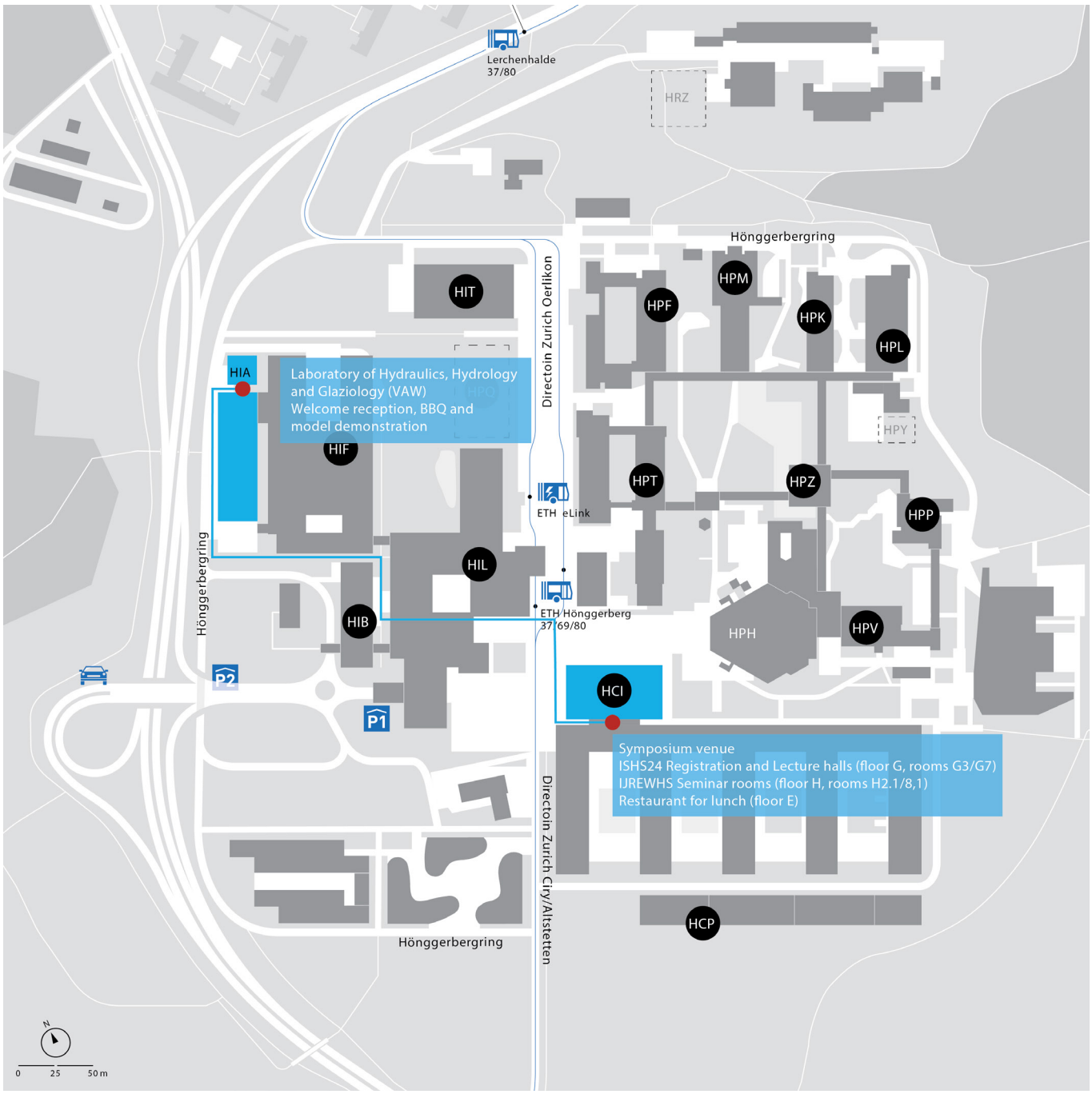
Venue of the Symposium

The Symposium will be held on the modern ETH campus Hönggerberg, 15 minutes and 30 minutes away from the city center and Zurich Airport, respectively. Free Wi-Fi is available throughout the campus. Please use the ‚**eduroam**' Wi-Fi with the credentials of your home univerisity or the ‚**public**' Wi-Fi by creating a guest account.

If you are using public transportation please check out the online timetable of the Zurich Transport Network ZVV. The bus station of the campus is called **ETH Hönggerberg**. Bus number 37, 42, 69 and 80 will reach up to the campus. If you are coming from the city center you may also check out the direct bus ETH-Link from ETH Center to ETH Hönggerberg (is free of charge).

If you are here by car, please use the paid parking spaces P1 or P2 as indicated on the map. Due to high costs we encourage you to come by public transport.

The Symposium takes place in the building HCI in the room G3 and G7 on floor G. The registration office and the coffee break will be in front of those rooms. In the same building on floor E is the restaurant for the lunch break. The IJREWHS workshop takes place in this building as well, floor H, rooms H2.1 and H8.1.



The Laboratory of Hydraulics, Hydrology and Glaciology (VAW) is located at the northern-west corner of the ETH-Campus Hönggerberg in the building HIA. The welcome reception, BBQ and the model demonstration will take place here. Please be aware, that due to several constructi-ons sites the accessibilty is limted. The most direct (and only) way from the symposium venue to the laboratory is indicated by the blue line on the map.

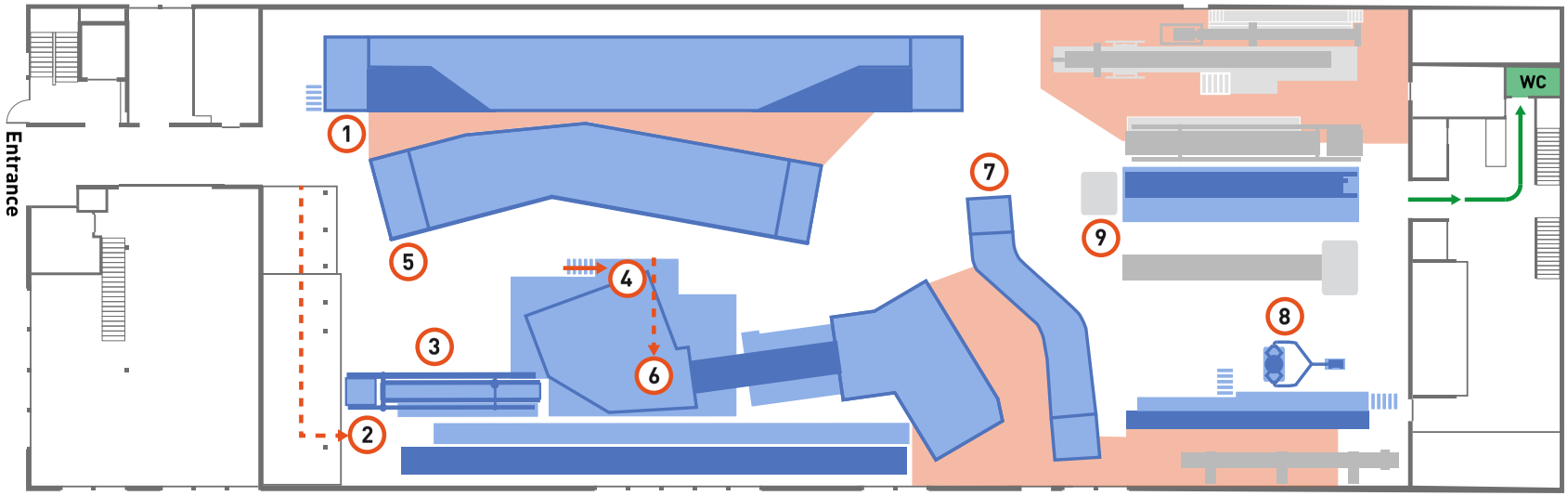
Lab tour

Monday, 17 June, 17:50-18:40

10th International Symposium on Hydraulic Structures

17 -19 June 2024
ETH Zurich
Campus Hönggerberg

VAW Lab tour



1. Hybrid Modelling of Dynamic River Widening
2. Ethohydraulic Flume - Tests Section & Fish Handling Facility
3. High Energy Air-Water Flow on Spillways
4. Applied Project: Open Chute Spillway
5. Applied Project: Scour Formation
6. Ethohydraulic Flume - Observation Room
7. Applied Project: Block Ramp Failure
8. Benchmarking Sensors for Suspended Sediment Monitoring
9. Composite Modelling of Dam Breaching

Gala Dinner at Commihalle

The Commihalle is located in the city center of Zurich, please see here. Take the ETH eLink bus connection to the ETH main building and get out at the bus station 'Haldenegg'. From there it is a five minute walk. The Gala dinner takes place on the 18. June at 19.15. Please make sure that you take the bus from ETH Hönggerberg latest at 18.45 to be there on time.

Meeting Point for Technical Tour

The meeting point for the Technical Tour is located near the main train station of Zurich at the Sihlquai bus terminal. Boarding will start at 7:30 and the departure will be at 8:00. Please be aware that the bus will leave on time to be able to keep to the daily program and please make sure to be at the bus terminal before. The expected time of arrival is 19:15 at the Sihlquai bus terminal.

Contacts

Emergency-Contact to VAW	+41 79 443 16 27
Ambulance	144
Police / Fire	112
Taxi	044 777 77 77 or 044 444 4444

Websites

Symposium	https://ishs2024.ethz.ch
ETH	https://ethz.ch/en.html
VAW	https://vaw.ethz.ch