



October 11, 2021

FRONTIERS IN HYDROPOWER Webinar

Even if Hydropower is the largest worldwide renewable electricity generation technology by capacity, the field is facing major challenges while offering timely opportunities.

This online workshop, organized jointly by the EPFL's Institute of Mechanical Engineering and the EPFL's Energy Center, brings together leading international experts from academia and industry to discuss some of today's most relevant technical topics in Hydropower.

- EPFL ENERGY CENTER (CEN)
- EPFL INSTITUTE OF MECHANICAL ENGINEERING (IGM)

08:30 – 08:40	Opening of the workshop and welcome address <ul style="list-style-type: none">• Pedro Reis, EPFL• Martin Vetterli, EPFL President
08:40 – 08:45	Overview of the program <ul style="list-style-type: none">• Mario Paolone, EPFL• François Gallaire, EPFL
08:45 – 09:35	Panel I: Design challenges of modern and future hydro machines – Chair: F. Gallaire <i>Short presentations (5' each)</i> <ul style="list-style-type: none">• P. Pelz (TU Darmstadt): Physical consistent understanding of hydrodynamic cavitation as fundament for design, operation and availability• G. Cavazzini (University of Padova): Stable part-load operation and fast transition of pump-turbines: the new design challenge• P. Leroy (GE): Design Hydraulic Turbine in the context of flexible operation• A. Beretta (Sulzer): Pump challenges due to flexible power plant operation• J. Necker (Voith Hydro): Impulses for future, long term research• M. Sakamoto (Nippon Koei): Experimental development of Francis turbine for small hydro in Japan• P. Grafenberger (Andritz): Changes in design focus and transposition of model results to prototype• W. Zhengwei (Tsinghua University): Erosion and crack of runners
09:35 – 10:20	<i>Panel discussion with the speakers</i>
10:20 – 10:25	<i>Platform of hydraulic machines - video</i>
10:25 – 10:35	<i>Break ☕</i>

10:35 – 11:00	Panel II: Operational challenges of hydropower stations connected to power grids hosting stochastic renewables – Chair: M. Paolone <i>Short presentations (5' each)</i> <ul style="list-style-type: none">• O. Métais (Grenoble Institute of Technology): Challenges for CFD of hydraulic turbines associated with enhanced flexibility• C. Münch-Alligné (HES-SO Valais-Wallis): Numerical simulations to improve hydropower plants flexibility• E. Vagnoni (EPFL): On the modelling of hydraulic machines operation by data-driven methods for flexible hydroelectric units.• C. Nicolet (Power Vision Engineering): Hydropower plant digital twin for penstock fatigue monitoring
11:00 – 11:30	<i>Panel discussion with the speakers</i>
11:30 – 11:40	<i>Break ☕</i>
11:40 – 12:05	Panel III: Hydropower-hydraulics interface – Chairs: P. Reis and O. Fink <i>Short presentations (5' each)</i> <ul style="list-style-type: none">• R. Boes (ETH Zurich): Challenges in hydropower infrastructure from a civil and environmental engineering perspective• P. Droz (Stucky): Hydraulic structures for hydropower: old or new challenges?• F. Jordan (Hydrique Ingénieurs): The role of digital twins and models for forecasting future hydropower• M. Franca (Karlsruher Institut für Technologie): Future-proof water services: sustainable but secure, adaptable but multi-functional
12:05 – 12:35	<i>Panel discussion with the speakers</i>
12:45	<i>Adjourn</i>