

Press Release

17th International Conference on the Properties of Water and Steam (ICPWS) and International Association for the Properties of Water and Steam (IAPWS) 2018 Executive Committee and Working Group Meetings

Prague, Czech Republic, September 2nd–7th, 2018

Between September 2nd–7th, 2018, 140 scientists and engineers representing 27 countries convened in Prague, Czech Republic for the 17th International Conference on the Properties of Water and Steam (ICPWS) and the annual meetings of the IAPWS Executive Committee and Working Groups. The ICPWS conferences began in 1929 in London, UK and are typically held every fourth or fifth year in conjunction with the annual IAPWS meetings. The purpose of the conference is to connect scientists with the engineers who use their information, providing the researchers with guidance on useful problems and the engineers with the latest research results.

During the conference, over 100 papers were given on the thermodynamic and transport properties of pure water and steam, including aqueous solutions at extreme conditions, the use of film forming substances (FFS) in power systems, the properties of sea water and the properties of heavy water. Areas of application included power cycle chemistry, district heating with condensate recycle, geothermal systems and other high temperature aqueous technologies applicable to steam cycles, and climate modelling.

The IAPWS Gibbs Award is the most prestigious award given by IAPWS and is typically presented at the ICPWS for a distinguished career body of work of interest to IAPWS. This year, the IAPWS Gibbs award was presented to Dr. Roberto Fernandez-Prini from the Instituto de Quimica Fisico del los Materiales, Argentina for "pioneering experimental and modeling work in the thermodynamics of aqueous systems at high temperatures, particularly in systems of interest for power generation".



The IAPWS Helmholtz award is given annually to developing or early career scientists and engineers who are working in a field of interest to IAPWS. It includes an opportunity to attend the IAPWS meeting to present the Helmholtz Award lecture. The award was presented to Dr. Hugues Arcis from the University of Guelph, Canada for "expanding the understanding of high temperature aqueous electrolytes and particularly for measurements of the solubility and heat of mixing of CO₂ in aqueous amine solutions".

Dr. Ingo Weber from Germany was acknowledged as an IAPWS Honorary Fellow for advancing the use of IAPWS formulations in the power industry, and for leadership of the IAPWS Working Group Industrial Requirements and Solutions.

IAPWS, through the various working groups, produces guidelines, technical guidance documents (TGD) and IAPWS certified research needs (ICRN). This information can be found on the IAPWS website at www.iapws.org. Throughout the week, the working groups progressed their activities, which are reported below.

The Working Group on Thermophysical Properties of Water and Steam (TPWS) continues to pursue better knowledge of properties for scientific and industrial applications. This year, the group finalized a new formulation for the thermodynamic properties of heavy water, a fluid of significant practical and scientific interest, replacing the previous IAPWS standard that was developed over 35 years ago. Work is now in progress to replace the similarly old correlations for heavy water transport properties. Additional projects are moving forward on the surface tension of ordinary water and of seawater, and on the self-diffusion coefficient of water over the full range of conditions of interest to science and industry. Sessions of the ICPWS oriented toward thermophysical properties reported, among other things, progress in understanding various scientifically interesting properties of super-cooled water, the use of molecular-level calculations to provide gas-phase properties in aqueous systems, and the use of flexible mixing rules for multi-parameter equations of state to describe vapor-liquid equilibrium in aqueous systems.

The Subcommittee on Seawater (SCSW) continued their aim of deepening ties between IAPWS and the International Bureau of Weights and Measures (BIPM) by holding a series of workshops in which ocean scientists, engineers, and metrologists came together to develop a vision in which key ocean variables would be defined in a consistent and long-term stable manner. The Scientific Committee on Ocean Research (SCOR), the International Association for the Physical Sciences of the Oceans (the two primary non-governmental oceanic science organizations), and IAPWS organized a meeting where JCS members and others came together for the first time since 2013 to discuss strategies for the next five years. Important topics included the development of salinity and oceanic pH definitions that could be linked to the seven variables of the SI (International System of Units), as well as a consistent definition of relative humidity. The meeting was attended by members of the BIPM including Suzanne Picard, the Executive Director of the BIPM's Consultative Committee on Thermometry (a keynote speaker at the conference) and important members of the BIPM's Electrochemical and Relative Humidity working groups.

The main topics of the Industrial Requirements Working Group were CFD calculation using IAPWS formulations, droplet in wet steam flow and engineering requirements. Some items, like measurement technique of wet steam data and new models for low sulfur dew point, are keeping discussion on IAPWS outputs by joint task with other working groups and liaison with other specialists.

The Working Group on Physical Chemistry of Aqueous Systems (PCAS) had discussions on the self-diffusion of water, nuclear power cycle chemistry and silicate chemistry in water treatment. An IAPWS guideline on the Self-Diffusion of Water is in an advanced stage of preparation and another on the volatility and dissociation constants of amines and amine decomposition products, which is of particular interest to the power generating industry, is in the early stages of preparation.

The Power Cycle Chemistry (PCC) working group continues to work intensively on a number of new Technical Guidance Documents (TGDs) and white papers. To complement the existing eight TGDs, four new documents are in the final draft form and are expected to be released within the next year. These

include Guidance for Air In-leakage, Guidance for the use of FFS for Industrial Plants, Guidance on Chemistry in the Generator Cooling System and Guidance for Ensuring the Integrity and Reliability of Demineralized Make-up Water Supply. Additionally, the PCC working group is preparing several white papers that will eventually become TGDs. These include the Use of FFS for Nuclear Plants, Steam Chemistry for Geothermal Plants, Corrosion Products in Flexible (Cycling, two shifting) Plants and, Guidance for HRSG Condensate Polishing Plants.

IAPWS produces Certified Research Needs (ICRN) as guidance for funding agencies and as an aid to people doing research in defining important research. While no new ICRNs were issued this year, eight remain active in a variety of areas related to the properties of water and steam, the properties of sea water and the chemistry of power plants.

IAPWS welcomes scientists and engineers with interest in the thermophysical properties of water, steam, and aqueous systems and in the application of such information to industrial uses. The next IAPWS meeting will be in Banff, Canada from 29th September – 4th October 2019. Further information on meetings can be found at the IAPWS website (www.iapws.org) as it becomes available.

People interested in IAPWS documents and activities should contact the chairman of their IAPWS National Committee (see website) or the IAPWS Executive Secretary, Dr. R. Barry Dooley, bdooley@structint.com. People do not need to be citizens or residents of member countries to participate.

