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IAHR/IWA Joint Specialist Group on URBAN DRAINAGE

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For updated information, please regularly visit our website at:

http://www.iwa-network.org/specialist_groups.php and

<http://www.jcud.org>

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Prepared by the IWA Urban Drainage Specialist Group

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IWA is a registered charity (England) No. 1076690 at Alliance House, 12 Caxton Street, London SW1H 0QS, UK. Tel: +44 (0)207 654 5500; Fax: +44 (0)207 654 5555; E-mail: water@IWAhq.org.uk; Web: <http://www.IWA-network.org>

IAHR is at Paseo Bajo Virgen del Puerto 3, 28005 Madrid, Spain. Tel: +34 91 335 7908; Fax: +34 91 335 7935; E-mail: iahr@iahr.org; Web: <http://www.iahr.org>

1. JOINT COMMITTEE CONTACTS

<p>Dr Jeroen G. Langeveld (Chairman) Delft University of Technology Stevinweg 1 2628 CN Delft THE NETHERLANDS Phone: +31-6-1897 6283 Email: j.g.langeveld@tudelft.nl</p>	<p>Assoc. Prof Haifeng Jia Center for Urban Runoff Control & Stream Restoration School of Environment, Tsinghua University Beijing 100084 CHINA Phone: +86-10-6279242 Email: jhf@tsinghua.edu.cn</p>
<p>Assoc. Prof. David McCarthy (Secretary & Treasurer) Environ. and Public Health Microbiology Lab Dept. of Civil Engineering, Building 60 Monash University Clayton, Vic 3800 AUSTRALIA Phone: +61 3 9905 5068, Fax: +61 3 9905 4944, E-mail: david.McCarthy@monash.edu</p>	<p>Prof Lian Lundy Department of Natural Sciences, School of Science and Technology, Middlesex University The Burroughs London NW4 4BT UNITED KINGDOM Phone: +44 20 8411 6361; Fax: +44 20 8411 5440 Email: L.Lundy@mdx.ac.uk</p>
<p>Dr Vojtěch Bareš Department of Hydraulics and Hydrology Czech Technical University in Prague Thakurova 7 CZ-166 29 Prague 6 CZECH REPUBLIC Phone: +420 224354339 Email: bares@fsv.cvut.cz</p>	<p>Assoc. Prof Tone Merete Muthanna Department of Hydraulic and Env. Engineering Norwegian University of Science and Technology N-7491 Trondheim NORWAY Phone: +47 73594745; Fax: +47 95186817 Email: tone.muthanna@ntnu.no</p>
<p>Assoc. Prof. Dr. Manfred Kleidorfer Department of Infrastructure Engineering University Innsbruck Technikerstrasse 13 A6020 Innsbruck AUSTRIA Phone +43 512 507 62134; Fax +43 512 507 9490 6934 Email: Manfred.Kleidorfer@uibk.ac.at</p>	<p>Dr. Juan Pablo Rodríguez Sánchez Department of Civil and Environmental Engineering Universidad de los Andes Carrera 1 Este No. 19A-40, Edificio ML, Bogotá COLOMBIA Phone: +57 1 339394949 2804; Fax: + 57 1 3324313 Email: pabl-rod@uniandes.edu.co</p>
<p>Prof Patrizia Piro Department of Civil Engineering University of Calabria Ponte Pietro Bucci, Cubo 42/b I-87036 Arcavacata di Rende (CS) ITALY Phone: +39-0984-496546/47, Fax. +39-0984-496546 Email: Patrizia.piro@unical.it</p>	<p>Dr. Annette Semadeni-Davies (vice-treasurer) NIWA Taihoro Nukurangi 41 Market Place, Viaduct Harbour Private Bag 9940 Auckland 1010 NEW ZEALAND Phone: +64 9 375 4532 Email: Annette.semadeni-Davies@niwa.co.nz</p>
<p>Takashi Sakakibara International Division Yachiyo Engineering Co.,Ltd. CS Tower, 5-20-8, Asakusabashi, Taito, 111-8648 Tokyo JAPAN Phone: +81 3 5822 6750; Fax: +81 3 5822 2791 Email: tk-sakakibara@intl.yachiyo-eng.co.jp</p>	<p>Dr Kevin Winter University of Cape Town Dept of Environmental & Geographical Science South Lane 7700 Rondebosch SOUTH AFRICA Phone: +27 21 650 2875; Fax: +27 21 6503456 Email: kevin.winter@uct.ac.za</p>
<p>Prof Karsten Arnbjerg-Nielsen DTU Environment, Urban Water Engineering Technical University of Denmark Miljoevej, Building 115 DK-2800 Kgs, Lyngby DENMARK Phone: +45 4525-1450 Email: karn@env.dtu.dk</p>	

2. CHAIRMAN'S THOUGHTS

Dear friends and colleagues,

I'm very pleased write my first introduction to our Urban Drainage Newsletter as the new chair of the Joint Committee on Urban Drainage (JCUD). It is a great honour to be 13th in succession to some of the great names in the field of urban drainage: Yen, Harremoes, Sjoberg, Marsalek, Ellis, Schilling, Chocat, Rauch, Bertrand-Krajewski, Mikkelsen, Butler and Schütze.

My term as chairman started during the closing session of the extremely well organised 14th ICUD in Prague. During this session, the inevitable and unthinkable happened: Jiri Marsalek resigned from his position as non-voting secretary of the JCUD, a position he has held since ages and my five predecessors in line all came to the stage to thank and honour Jiri for all his time and effort. Fortunately, Jiri gladly accepted being invited to the position of associate member, so we did not lose all of our institutional memory at an instant.

I am more than happy that David McCarthy volunteered to be the first voting secretary after more than 2 decades. As David is also in charge of organising the next ICUD in 2020 in Melbourne, you can expect to hear a lot of us in the years to come.

My first year as new chair will be dedicated to strengthening and modernising the organisation of the JCUD. Thanks to the strong chairmanships of my predecessors, each of them supported by at least equally strong support of Jiri, allowed the other JCUD members to rely on their leadership. In this fast developing world, with support of many forms of social media, it is possible to work effectively as a big team despite large geographical distances. As David announced from his secretary's desk, each of the JCUD members has a dedicated task and clear responsibilities. This does not only allow us to share the workload better, but also facilitates the community to find the right contact person in the JCUD.

The second and third year as chairman I would like to evaluate the large number of WG's that are active under the umbrella of the JCUD. Some WG's are larger and more active than many of the IWA's specialist groups, while other WG's seem to consist of one or two active persons only. As the field of urban drainage is evolving and widening rapidly, we need to make sure that our WG's, or liaisons with other SG's, cover and stimulate these rapid developments. This might result in the founding of new WG's, covering new elements of urban drainage research. One thing we need to take care of is to interest enough young water professionals to be active in our WG's, as the current very high level, both quantitatively and qualitatively, can only be sustained if we can attract the next generation.

And there are more than enough interesting developments in our field. The keynotes held at the ICUD in Prague clearly demonstrate that urban drainage in 2030 or 2040 may be very different from urban drainage in 2018, although we do not know whether this will be off the grid, using blue and green infrastructures or 'just' the digital transformation of the existing urban drainage infrastructure. It is up to us to organise and facilitate the exchange of ideas between researchers and practioners interested in the broad field of urban drainage all over the world.

I look forward to three very interesting, challenging and demanding, but hopefully rewarding years.

Jeroen Langeveld

Chair of the IAHR/IWA Joint Committee on Urban Drainage

3. FROM THE SECRETARY'S DESK

It is with great pleasure that I am writing this report for the first time in this role, as secretary for the JCUD. I wish to express my thanks to the JCUD committee, especially that of our new chair Jeroen, for accepting me to this position. Needless to say, I have big shoes to fill (bigger than Ronald McDonald's actually!) taking over the reins from a Jiri Marsalek who has dedicated decades of his working-life serving this committee as a non-voting secretary. I will try my best to bring the same level of enthusiasm, integrity and dedication that Jiri contributed to the JCUD.

General JCUD information. The Joint Committee on Urban Drainage (JCUD) is an active Specialist Group working under both IWA and IAHR. It has, at present time, 13 voting members, each offering different global perspectives on urban drainage. The JCUD organises, once every three years, the International Conference on Urban Drainage (e.g. 2014: Malaysia, 2017: Czech Republic, 2020: Australia). Furthermore, the JCUD oversees various working groups, many of which organise its own three-yearly conference (e.g. Sewer Processes and Networks; Urban Drainage Modelling etc.). Everyone is most welcome to get engaged in the activities of the JCUD and its working groups. The JCUD attempts to stimulate contacts, exchange and discussion, e.g. by this newsletter (published annually) and by the "urban-drainage" email discussion list (see other call-out box below).

Roles and responsibilities. As announced in the chairman's thoughts, the committee has been slightly restructured so that the load among the committee are more equally weighted and to ensure that our members know exactly whom to contact to seek further information about the specific aspects of the JCUD's activities. To that end, please find a list below of the assigned roles and responsibilities for the JCUD committee members:

- Chair: Jeroen Langeveld
- Secretary: David McCarthy
- Treasurer: David McCarthy and Annette Semadeni-Davies
- Poul Harremoës Award: Karsten Arnbjerg-Nielsen (<2018), Tone Merete Muthanna
- Newsletter: Manfred Kleidorfer
- Webmaster: Haifeng Jia
- IWA connect manager: Kevin Winter
- Young Water Professionals relation officer: Takashi Sakakibara
- Working groups coordinator: Lian Lundy
- Event coordinator: Vojtech Bareš

Should you have any questions about or any suggestions for the JCUD, please do not hesitate to get in contact with me or with any of the JCUD members. It is our desire to facilitate urban-drainage related work in order to contribute to solutions of one of the pressing needs of this world.

Urban drainage email discussion list. The urban drainage email discussion list has been set up in 1998 by David Butler and Manfred Schütze (now managed by Dr Schütze). It is an easy method of getting in touch with urban-drainage researchers and practitioners worldwide (360 members currently). To use the discussion group, you first need to subscribe (to do this, simply email listserv@jiscmail.ac.uk with your first and last name and the text "subscribe urban-drainage"). To send a message to the list, simply insert urban-drainage@jiscmail.ac.uk in your "To:" box and the email will be sent to all members, worldwide. Please do not use for commercial purposes. If you would like more information, visit www.jiscmail.ac.uk/urban-drainage.

Committee Newsletter. This annual newsletter is published to serve the international urban drainage community and meet the requirements of our parental organisations. The main purpose of the newsletter is to facilitate communications and interactions among specialists in our field, rather than to present detailed information. The most recent, and previous, newsletter(s) can be found on our website <http://www.jcud.org>. Both IWA and IAHR now distribute newsletters

only electronically, and place our newsletter on their websites. We also distribute the Newsletter to more than 1,200 colleagues on our JCUD mailing list, which is based on the IWA and IAHR memberships, and participation in ICUD and NOVATECH conferences. Please share your electronic newsletter copy (or the link to our website) with colleagues, or refer them to the IAHR, IWA and JCUD websites. Your comments on this newsletter issue and contributions to future newsletters are most welcome.

Joint Committee Activities. The 2017 annual Committee meeting was held during the 14th ICUD Conference in Prague, Czech Republic on September 10, 2017. The JCUD has also now instigated their first virtual meeting (4th December, 2017), allowing the committee to get together more than just once per year. The highlights of the minutes of these meetings follow.

- **Committee membership and management.** Jiri Marsalek announced his retirement from the JCUD as secretary; many thanks to Jiri and his unparalleled contributions. Thanks go to Manfred Schütze, Elizabeth Fassman-Beck, and Fumiyuki Nakajima, all of which completed their service to the JCUD this year. Special thanks go to Manfred, who served as Chairman for the past three years. Extension of committee membership was awarded to both Haifeng and David. Three new members were elected at the meeting: Manfred Kleidorfer (Austria), Takashi Sakakibara (Japan), and Juan Pablo Rodriguez Sanchez (Colombia). New members are currently being solicited (see next section of newsletter).
- **Working groups.** We heard from most, but not all of the working groups. Those that are not active are encouraged to regain momentum. The JCUD have the following working groups: Data and Models, RTCUDS, SS&PWG, SOCOMA, IGUR, Cold Climate, WUSD, Urban Streams, USWH and Metrology. See Section 5 for detailed reports (where available) and Section 11 for contact details for each group.
- **IWA/IAHR links/affairs.** Jean-Luc Bertrand-Krajewski reported that at the Strategic Council of IWA, specialist group leaders or representatives signed a light contract to develop “United Water” in Future Cities (2050). IWA clusters are active, e.g. the ones on Microbiology, and Alternative Sources of Water. The consultation process for IWA strategic planning will start in October/November 2017 and will last a year. JCUD should participate in this process to ensure that our interests are included in the plan.
- **Reports on conferences.** 14th ICUD. Vojtech reported there are about 700(+) participants and guests, including 600 registrants, from 44 countries. Prior to the conference, there were 5 workshops. IWA Congress in Tokyo. Fumiyuki distributed a congress brochure and mentioned that there was still time to submit workshop proposals. UDM 2018 – Giorgio Mannina presented information on the conference, more than 150 abstracts already received. NOVATECH 2019 – the dates were set – 2-5 July, 2019. A call for papers will be issued in May 2018. SPN 19 in Aalborg, Denmark. IWA World Water Congress & Exhibition 2020 will be held in Copenhagen; more than 100 abstracts and 10 workshop proposals have already been received. ICUD2020, Melbourne – David reports that planning is underway.
- **JCUD Awards.** Poul-Harremoes Award (PHA) – three finalists were listed: Lena Mutzner (Switzerland), Daniel Winkler (Austria) and Steffen Davidsen (Denmark). Congrats to Daniel Winkler for winning in 2017! The career-long achievement awardee was Jiri Marsalek (congrats!) and the mid-career awardee was Jörg Rieckermann (congrats!).
- **Future meetings.** 2018 – in conjunction with the UDM in Palermo, Italy; 2019 – in conjunction with the Novatech conference in Lyon, France; 2020 – in Melbourne,

Australia, in conjunction with the 15th ICUD. The need for allowing the JC members to participate in these meeting by video conferencing was discussed and endorsed by the Committee as an important measure necessitated by limited travel funds and restrictions on releases of greenhouse gases.

Take care,

David McCarthy

JCUD secretary

4. JCUD MANAGEMENT COMMITTEE: Call for NEW member nominations

The Management Committee of the IWA/IAHR Joint Committee on Urban Drainage (JCUD) will have two vacancies later this year and is looking for possible replacements as a part of continuous revitalization of the Committee. Details follow below.

Job description: all members operate in their own way and contribute accordingly. Typical contributions include proposing to organize workshops/conferences and training courses (usually in collaboration with our working groups), organizing or contributing to publications (monographs, or journal review papers), contributing news from their country or region to the Committee's annual newsletter, participating in email discussions, attending JC meetings held annually in conjunction with drainage conferences, and promoting JC activities and visibility in general.

Qualifications: we are looking for colleagues actively involved in any aspect and sector of urban drainage. However, perhaps the most important qualification is having some time to devote to the committee activities and personal initiative in proposing and implementing new activities. One reason why our Committee has been successful in its more than 35 years of operation is our ability to attract highly motivated members to serve on the Committee. The elected candidates must be (or become, within one month of being elected) members of one of the parental organizations (IAHR or IWA), and our statutes allow only one member per country; if your country is already represented on the committee, you may have to wait till there is a vacancy, or even better, simply join in the meantime one of our working groups and start contributing to our efforts that way. The information on Joint Committee and the current membership can be found on our website: www.jcud.org.

Application procedure: you can either nominate yourself for JCUD membership, or you can nominate another person (ideally after establishing their willingness to serve, otherwise this will have to be done by JCUD), and submit electronically the following two documents to the current JC Chairman, Dr Jeroen Langeveld (j.g.langeveld@tudelft.nl), copied to JC secretary Associate Professor David McCarthy (david.mccarthy@monash.edu): (a) A brief CV, and (b) a statement of activities you would like to contribute to the JC programme. Neither document must exceed one page, using a 10-point font or larger.

Deadline: September 2, 2018 The applications received will be distributed to the JCUD members for assessment and voting; the results will be announced sometimes after the JC meeting in Palermo.

5. WORKING GROUP REPORTS

5.1. International Working Group on Data and Models (IWGDM) (Chairman: Dr David McCarthy, Environmental and Public Health Microbiology Laboratory, Monash Water for Liveability, Department of Civil Engineering, Building 60, Monash University, Clayton, Vic 3800, Australia, Phone: +61 3 9905 5068, Fax: +61 3 9905 4944, E-mail: david.mccarthy@monash.edu; Secretary: Prof. Manfred Kleidorfer, Unit for Environmental Engineering, University of Innsbruck, Technikerstrasse 13, 6020 Innsbruck, Austria, Phone: +43 512 507 62134, Fax +43 512 507 62199, E-mail: manfred.kleidorfer@uibk.ac.at); Website: <http://iwgdm.wikispaces.com>

The next big event organized by the International working group on data and models is the 11th International Conference on Urban Drainage Modelling, 23-26 September 2018 in Palermo, Italy (Conference Chair: Prof. Giorgio Mannina).. The conference topics are:

- Drainage and impact mitigation (BMP, LID, CSO quality and quantity, etc)
- Urban hydrologic and hydraulic processes
- Rainfall in urban areas
- Tools, techniques and analysis in urban drainage modelling including Real-Time Control
- Modelling interactions and integrated systems
- Transport and sewer processes including
- Micropollutants and pathogens
- Receiving water quality
- Frontiers in urban drainage
- Water management, society and climate change

Abstract submission is still possible. For further information visit: <https://www.udm2018.org/>

Call for new secretary

This conference will also be the next opportunity for a group meeting. Apart from discussion collaborations, joint-publications and data and model sharing activities, etc. in this meeting the group will vote for a **new secretary**. People interested in this position are invited to contact current chair and current secretary i.e. david.mccarthy@monash.edu and manfred.kleidorfer@uibk.ac.at.

Call for proposals to host the 12th International Conference on Urban Drainage 2021

Another point to be decided at during the group meeting at UDM 2018 is the host for the next conference, the the 12th International Conference on Urban Drainage in 2021. Interested people/groups should contact chair and secretary until 15th of September 2018. During the meeting at UDM applicants should presents their ideas to the group and mention following points: name(s) and affiliation of the main organizers, proposed dates, location and venue, suggested focus and conference format, ideas about type of proceedings, publications.

5.2. The Real-Time Control of Urban Drainage Systems (RTCUDS) Working Group (Chairman: Prof Dirk Muschalla, Graz University of Technology, Institute of Urban Water Management and Landscape Water Engineering, Stremayrgasse 10/I, 8010 Graz, Austria; Phone: +43-(0)316-873-8370, Fax: +43-(0)316-873-8376, E-mail: d.muschalla@tugraz.at , Web: <http://www.sww.tugraz.at>, Secretary: Dr Jeroen Langeveld, Delft University of Technology, Stevinweg 1, 2628 CN Delft, the Netherlands. Phone: +31 6 1897 6283. E-mail: j.g.langeveld@tudelft.nl)

The RTCWG has organised a successful workshop at the 14th ICUD in Prague last year together with the data and models WG. The workshop showed that there is great interest in RTC and that integrated RTC is starting to find real world implementations. In 2018 a Junior Scientist Workshop on integrated modelling and RTC will be organised near Graz, Austria together with the MIUWS working group (modelling integrated urban water systems) which is part of the Modelling, Instrumentation and Automation working group. Contact: Dirk Muschalla: d.muschalla@tugraz.at

Call for new chair and secretary

Dirk Muschalla (chair) and Jeroen Langeveld (secretary) will resign from their position as chair and secretary in September 2018 at the UDM. We welcome two enthusiastic (young) researchers to continue our work and to lead the RTC working group. A RTC WG meeting will be held in conjunction with the UDM in Palermo. Please contact Jeroen Langeveld if you are interested in leading the group as chair or secretary via j.g.langeveld@tudelft.nl

5.3. Sewer Systems and Processes Working Group (SS&PWG) - (Chairman: Dr. Jeroen Langeveld, Delft University of Technology, Stevinweg 1, 2628 CN Delft, the Netherlands. Phone: + 31 6 1897 6283, Email: j.g.langeveld@tudelft.nl ; Vice-Chair/ Chair of next SPN conference: Prof. Jes Vollertsen, Department of Civil Engineering, Aalborg University, Thomas Manns Vej 23, DK-9220 Aalborg, Denmark, Phone: +45 99408504, E-mail: jv@civil.aau.dk ; Secretary: Dr Asbjørn Haaning Nielsen, Department of Civil Engineering, Aalborg University, Thomas Manns Vej 23, DK-9220 Aalborg, Denmark, Phone: +45 9940 9817, E-mail: ahn@civil.aau.dk, website: <http://www.sspwg.org>.

The SSPWG is organizing the 9th International Conference on Sewer Processes & Networks. The conference will be held in late august 2019 in Aalborg – Denmark. See details at the conference webpage www.spn9.dk

5.4. International Working Group on Urban Rainfall (IGUR)

(Chairman: Prof. Simon Beecham, Division of Information Technology Engineering and the Environment, University of South Australia, Room P1-22A, Bld P, Mawson Lakes Campus, Adelaide, Australia; Phone: +61 8 8302 3200; e-mail: simon.beecham@unisa.edu.au. Secretary: Dr. Thomas Einfalt, hydro & meteo GmbH & Co. KG, Breite Strasse 6-8, D-23552 Lübeck, Germany; Phone: +49-451-7027333; Fax: +49-451-7027339; e-mail: einfalt@hydrometeo.de. Group's web site: <http://www.kuleuven.be/hydr/gur>

- A paper “Weather radar rainfall data in urban hydrology” has been published (doi:10.5194/hess-21-1359-2017)
- ISO – ISO/WD 19926-1:2016 (Meteorology — Weather radar — Part 1: System performance and operation) has been published for discussion, open until Nov 2017. TE explained the procedure and invited volunteers to make themselves known. Any person officially taking part in the working group needs to be appointed by the national standards organisation – or be a WMO representative. The upcoming topics for Part 2 of the standard are centred around data quality control and data usage.
- **PLURISK** project (Belgium): funded by the Belgian Science Policy on “forecasting and management of extreme rainfall induced risks in the urban environment” is currently finishing. The project developed methodologies and software (STEPS-BE) for nowcasting of fine-scale extreme rainfall, two-dimensional fine-scale modelling, mapping and nowcasting of inundations in urban areas (InfoWorks-ICM based, complemented by surrogate, conceptual models), socio-economic urban flood risk quantification, urban flood

risk communication and warning, and new sustainable urban flood management strategies (green - blue water; landscape architecture; ecotechnologies). The project focused on selected Belgian cities and aims to support local authorities, which typically have low capacity in setting up risk quantification, forecasting, control and management systems. A final symposium will be held on 4th October, 2017 in Brussels: <http://www.meteo.be/meteo/view/en/32329368>

- New **climate scenarios** have been set up for **Belgium**, which include scenarios for extreme precipitation, design storms for urban drainage applications, and a climate perturbation tool that can be used by end users for perturbing long-term time series of rainfall and other meteorological variables to the climate scenarios. Weblink: <http://www.kuleuven.be/hydr/CCI-HYDR.htm>
- A new EU-H2020 project “BRIGAIID - BRIdges the GAp for Innovations in Disaster resilience” (2016-2020) started. The project focuses on the innovations that increase EU societies’ **resilience against floods, droughts and extreme weather conditions**. KU Leuven (Prof. Patrick Willems) is work package leader for extreme weather related innovations, e.g. innovations that reduce the risk of urban flooding. The project will make an inventory of the innovations, will conduct or support testing of the innovations for their technical performance (in the laboratory or through real field implementation or through model simulations) and social readiness. Also a market analysis will be conducted and, after successful testing, support is given to the development of a business plan and a promotion strategy. Priority is given to nature-based solutions. Weblink: <http://brigaid.eu/>. Innovators who have interest to participate can announce their interest by sending an e-mail to: climate-innovation@brigaid.eu
- Another new EU-H2020 project “PUCS - Pan-European Urban Climate Service” has been launched (2017-2020; Greening the Economy – Innovation Action) to set up a pan-EU service for climate change information reg. changes in extreme rainfall and other meteorological variables. Urban flooding is one of the applications, for which the service will be tested. Several European cities will participate (contact: PW)
- In the **FLoodCitiSense** project, TU Delft are working on early warning services for extreme rainfall for urban water management (3 case cities: Birmingham, Brussels, Rotterdam). They are going to work with citizen observatories and crowdsource information. Marie-Claire ten Velthuis hopes that experiences they collect may be useful for others.
- A highly successful **IGUR workshop** on microwave links of IGUR was held on 10 sept 2017 in Prague with 20 participants. The workshop material will be posted on an open science portal (report by MF)
- Jorge Leandro: In the **BMBF Floodevac** project, DWD (German Weather Service) forecast + hydrological model are applied to the Kulmbach + many maps of possible events have been produced in order to construct an event catalogue of discharges. The project is a collaboration between TU München and 8 other universities and Indian researchers.
- Within a three-year project, TU München + LMU München + computer centre LRZ are producing risk maps of flash flooding for the state of Bavaria.
- Jonas Olsson described the **MUFFIN** project: Multiscale Urban Flood Forecasting Gap hydrology / hydraulics for severe events and high resolution models, including a catalogue of event impacts. This project involves SMHI + Aalborg University + Alto University + TU Delft

The most recent information related to IGUR activities as well as the meeting reports can be found on the group’s website which is regularly updated, see www.kuleuven.be/hydr/gur.

5.5 International Working Group for Water Sensitive Urban Design (IWGWSUD)(Co-Chair: Assoc. Prof. Dr Megan Farrelly, School of Social Sciences, Monash Water for Liveability Centre, CRC Water Sensitive Cities; 20 Chancellors Walk, Monash University, Wellington Rd Clayton VIC 3800; Ph: +61 3 9905 4618, megan.farrelly@monash.edu

Co-Chair: Dr Briony Rogers, School of Social Sciences, Monash Water for Liveability Centre, CRC Water Sensitive Cities; 20 Chancellors Walk, Monash University, Wellington Rd Clayton VIC 3800; Ph: +61 3 9905 2581, briony.rogers@monash.edu

Secretary: Mr Charlie Stillwell, North Carolina State University, Biological and Agricultural Engineering, mstillwell.charles@gmail.com.

The co-Chairs would like to begin by thanking Dr James Shucksmith (Sheffield University) for his efforts as Secretary, and to note that following a call for interested parties to nominate themselves for the position of Secretary, we now welcome final year PhD student, Mr Charlie Stillwell from North Carolina State University. Charlie works with Dr Bill Hunt and focuses on monitoring, modelling and analysing data for local LID/WSUD projects, with the aim of improving design and evaluation.

In 2017, the Working Group continued to develop a number of strategies for increasing the profile and activity of the Working Group. Of note, the co-Chairs convened a pre-ICUD 2017 workshop entitled Water Sensitive Urban Design – Where are we at? (Workshop # 3 ICUD2017, 3rd Sept. Prague). The workshop was very successful with 24 registered attendees from across the Globe engaged in tailored discussion regarding the ‘state of play’ in relation to advancing the adoption of more sustainable urban drainage practices. With support from Monash Water Sensitive Cities and the CRC for Water Sensitive Cities, the workshop drew upon the Water Sensitive City Index Tool to promote discussion and reflection upon current practices. The insights generated at this workshop will provide the basis for a journal article currently under-development by the co-Chairs and with a number of workshop participants. Future workshops are currently in development and are likely to coincide with future notable conferences. Efforts are also underway to form an internal working group committee to develop a proposal for the ICUD2020 Organising Committee with regard to more prominently featuring WSUD within the agenda and to showcase frontier thinking in advancing WSUD practices. Should anyone like to contribute to the discussion regarding this, please get in touch with the Secretary or co-Chairs directly.

In addition, the working group held a membership meeting at ICUD2017 to discuss progress to date around key Working Group Activities – including establishing an internet presence for the group (currently underway) and how we plan to move forward, including establishing a new committee of approx.. 8 individuals to assist in overseeing the broader WG activities. Furthermore, the co-Chairs have also recently engaged in early discussions with the International Water Association’s Cities of the Future program to explore future strategic alignment given the Program’s commitment to advancing water sensitive urban design practices.

5.6 Working Group on Urban Storm Water Harvesting (USWH) – (Chair: Prof Alberto Campisano, Dept. Civil Engineering and Architecture, University of Catania, Viale A. Doria 6, 95125 Catania, ITALY; Phone: +39 0957382730, Fax: +39 0957382748, Email: acampisa@dica.unict.it); Secretary: Dr Matthew Burns, Melbourne School of Land & Environment, The University of Melbourne, Building 379, Parkville, Vic, 3010, Australia. E-mail: matthew.burns@unimelb.edu.au)

Recent activities

- A state-of-the-art review paper on rainwater harvesting systems with the co-authorship of several WG members was recently published in Water Research (DOI:10.1016/j.watres.2017.02.056). The paper discusses important technical, practical, and social issues concerning RWH systems and is expected to be a reference for the field. It can be accessed online or you can request it by contacting Alberto Campisano at acampisa@dica.unict.it.
- WG members contributed to write book chapters (on criteria to design RWH systems) on the recent e-book “Frontiers in Civil Engineering: Water Savings in Buildings”, vol. 2, E. Ghisi ed.), DOI: 10.2174/97816810848311170201. For further details please contact (enedir.ghisi@ufsc.br).
- WG members from the University of Exeter have published a chapter in « Sustainable Surface Water Management: A Handbook for SUDS » (Charlesworth A. and Booth C. eds.). The chapter (Dual purpose rainwater harvesting system design) sets out a methodology for integrating passive control systems within the design of RWH systems in order to maximise their source control.
- The WG components have contributed to the review process of paper submitted to the ICUD 2017 conference in Prague. A specific session on RWH/SWH systems was supported and coordinated during the conference by the WG members.
- A one day training on NCSU Rainwater Harvester Tool was organized in November 2017. Additional info by contacting Kathy deBusk (geekd@longwood.edu)
- Dr. Sarah Ward received a Women in Innovation entrepreneurial support package from Innovate UK to explore the development of her “Rainshare” idea. For major information please go to <https://www.businesswest.co.uk/blog/women-innovation-dr-sarah-ward>

Ongoing projects and activities

- The WG is organizing a specialized workshop within the conferences SWWS2018 (IWA 15th Small Water and Wastewater Treatment systems & 7th Resource Oriented Sanitation to be held in Haifa (Israel) on 14-18 October 2018 (www.swws2018.org.il). For additional information, please contact (matthew.burns@unimelb.edu.au).
- Melbourne University is currently working with a local water authority on the design and implementation of the “Talking Tank Technology”. The idea is that stormwater harvesting systems can receive live rainfall forecasts and release water to the drainage system before the storm arrives. People interested can contact Matthew Burns at (matthew.burns@unimelb.edu.au).
- A project on “Characterising Stormwater in Israeli Cities – Kfar Saba as a case study”, completed its second year and is gearing up to the third rainy season. Within the project four monitoring stations were constructed, each in a different urban land-use. The monitoring stations include: continuous flow measurement in drainage pipes/canals, automatic water sampler, rain-gauge, collection of rainwater (before touching the surface), PLC to control and synchronise the operation of the station's components. For additional information please contact Eran Friedler (eranf@technion.ac.il).
- WG colleagues from South Africa are developing a 4-year long research project (funded by the local Water Research Commission) to investigate the potential of stormwater to mitigate water scarcity in Cape Town. The project includes various stakeholders and industrial partners. Main output will be design guidelines for multi-functional stormwater ponds with water supply as a key component. (Contact person is Neil Armitage, neil.armitage@uct.ac.za).

- Several projects in the USA including pre and post-retrofit monitoring of RWH systems with "smart" passive draw down device; retrofits of abandoned septic tanks into RWH (expect to retrofit 40 tanks through 2017 and 2018); monitoring 5 tanks (5 for hydrology, 4 of the 5 for bacteria (2 control tanks and 2 with additive); issues associated to prevalence and abundance of mosquitoes in rainwater tanks in the southeast US. Contact person: Kathy deBusk (geekd@longwood.edu).

5.7 Working Group on Urban Streams (USWG) - (Chair: Dr Ivana Kabelkova, Department of Sanitary and Ecological Engineering, Faculty of Civil Engineering, Czech Technical University in Prague, Thakurova 7, 166 29 Prague 6, Czech Republic, Phone: +420 2 24321292, email: kabelkova@fsv.cvut.cz.)

2017 activities – the group organized a workshop held at the 14th ICUD in Prague, 2017. The workshop concentrated on the framework for urban streams assessment (stressors and disturbances, biological assessment methods) and included a field trip with active involvement of the participants.

5.8 Working Group on Metrology of Urban Drainage – (Chair: Prof Francois H. L. R. Clemens, Delft University of Technology, Stevinweg 1, 2628 CN Delft, the Netherlands. Phone: +31 15 278 5450, Email: F.H.L.R.Clemens@tudelft.nl)

The working group is being formed; potential members should contact the Chair.

The groups has started working on an IWA report on Metrology in Urban Drainage (editors are Jean-Luc Bertrand-Krajewski and Francois Clemens). For each of the 9 chapter 2 coordinators have been announced. A table of contents is drafted and the first version will be discussed with all contributors during the UDM in Palermo, the planning is to present a final draft during the SPN in Denmark.

6. NEWS FROM IAHR

IAHR Secretariat contacts: IAHR, Paseo Bajo Virgen del Puerto 3, 28005 Madrid, Spain; Tel: +34 91 335 7908; Fax: +34 91 335 7935; E-mail: iahr@iahr.org, URL <http://www.iahr.org>. For more information on IAHR activities and free subscription of the IAHR e-newsletter 'NewsFlash', please contact the IAHR Secretariat: IAHR@IAHR.org

The International Association for Hydro-Environment Engineering and Research (IAHR), founded in 1935, is a worldwide independent organisation of engineers and water specialists working in fields related to the hydro-environmental sciences and their practical application. Activities range from river and maritime hydraulics to water resources development and eco-hydraulics, through to ice engineering, hydro-informatics and continuing education and training. IAHR stimulates and promotes both research and it's application, and by so doing strives to contribute to sustainable development, the optimisation of world water resources management and industrial flow processes. IAHR accomplishes its goals by a wide variety of member activities including: working groups, research agenda, congresses, specialty conferences, workshops and short courses; Journals, Monographs and Proceedings; by involvement in international programmes such as UNESCO, WMO, IDNDR, GWP, ICSU, and by co-operation with other water-related (inter)national organisations.

IAHR publishes **five international scientific journals** from its headquarters in Madrid, Spain and Beijing, China in collaboration with Taylor and Francis and Elsevier – the Journal of Hydraulic Research (which is more scientific), the Journal of River Basin Management, the Journal of Applied Water Engineering and Research (which more practice-oriented and is

published jointly with the World Council of Civil Engineers), the Journal of Ecohydraulics (from 2016) and RIBAGUA - Revista Iberoamericana del Agua (from 2014). In addition the International Journal of Hydro-Environment Research (JHER) is published by the IAHR Asia Pacific Division in collaboration with the Korea Water Resources Association (KWRA) and Elsevier, and IAHR offers its members discounts for several other journals including the Journal of Hydroinformatics, Journal of Sediment Research and the Urban Water Journal.

IAHR publishes a quarterly magazine for its members called **Hydrolink**, and a series of monthly NewsFlash e-Newsletters for the international water community.

IAHR is sponsoring **organization of many conferences** of potential interest to the urban drainage community; for full information, please visit their website www.iahr.org.

One of the most important activities is the bi-annual **IAHR World Congress**, which typically attracts between 800 and 1500 participants from around the World. Based on four main themes, the congress offers technical programmes, seminars, technical workshops, presentations, plenary sessions and social events alike, and the respected Ippen, Kennedy and Schoemaker Awards are presented. This congress is the place for the hydraulic engineering community to meet across borders and exchange experiences, seek advice and get inspired.

The 38th IAHR World Congress "Water: Connecting the World" will be held from 1-6 September 2019 in Panama City, Panama and is organized around 6 themes:

- Hydraulic Structures
- Ports and Coastal Engineering
- Water Management and Hydro-informatics
- Hydro-Environment
- River and Sediment Management
- Climate Change and Extreme Events

More information: <http://www.iahrworldcongress.org/>

7. NEWS FROM IWA

7.1 News from IWA Headquarters

15th IWA Leading Edge Conference on Water and Wastewater Technologies

27 - 31 May 2018, Nanjing, China

The IWA Leading Edge Conference on Water and Wastewater Technologies is designed to be the place where new ideas are introduced and the opportunity is provided to interact with the “best of the best”, which complements the approaches of urban water management between megacities, smaller towns and rural environments, driven by the diversity of climatic conditions and the natural and human environment.

Conference website: <http://iwa-let.org/conference>

IWA World Water Congress & Exhibition 2018

16 – 21 September 2018, Tokyo, Japan

The IWA World Water Congress & Exhibition is the global event for water professionals covering the full water cycle, which brings over 5,500 water, environment and related professionals from more than 100 countries and offers new insights into how pioneering science, technological innovation and leading practices shape the major transformation in water management that is underway.

Register before **30 April 2018** to enjoy the super early bird discount.

Conference Website: <http://worldwatercongress.org>



The 17 IWA Principles for Water-Wise Cities help city leaders ensure that everyone in their cities has access to safe water and sanitation. One of the aims is to ensure that water is integrated in planning and design in cities to provide increased resilience to climate change, livability, efficiencies, and a sense of place for urban communities.

Download the Principles in [English](#), [French](#), [Chinese](#), [Romanian](#), [Swedish](#) or [Spanish](#).

SPACE-O Project integrates state-of-the-art satellite technology and in-situ monitoring with advanced hydrological, water quality models and ICT tools, into a powerful decision support system. This generates real-time, short- to medium-term forecasting of water flows and quality data in reservoirs, used to optimize water treatment plant operations and establish a complete service line from science to the water business sector.

Project website: <http://www.space-o.eu/>

The link to subscribe the project newsletter: <http://eepurl.com/cPTE6j>

IWA Webinars

Nature Based Solutions: Investing in nature from catchment to tap

15 March 2018, 15.00 hrs Central European Time (CET)

Investment in Nature Based Solutions (NBS) in the wider river basin is increasingly seen as a way to address urban water challenges such as floods, shortages in supplies or degradation of water quality. This webinar is the first in a series on the integration of NBS in water systems across scales. The first webinar focuses on the practical approaches of integrating natural infrastructure into the planning and implementation from catchment to consumer.

Register [here](#).

Nature Based Solutions: Green Infrastructure for Water Wise Cities

10 April 2018, 10.00 hrs Central European Summer Time (CEST)

Cities are intrinsically connected and dependent on water resources within and around their basins. Cities can integrate nature into urban infrastructure design.

This webinar focuses on the approaches cities are taking to integrate green infrastructure within the urban areas as well as proactive engagement in managing water resources to provide citizens with a connection to nature in urban landscapes and improve the quality of life.

Register [here](#).

7.1 News From IWA Strategic Council (reported by Jean-Luc Bertrand-Krajewski)

In 2018, IWA will elaborate its next Strategic Plan (SP) for the period 2019-2022. The importance of the Strategic Plan lies on setting the priorities and gives focus on a four year period. It is also a key tool in planning for IWA and for its annual work plans and budgets. It will be publicly shared to inform its stakeholders on its long term goals and objectives.

Specialists Groups have been invited to review the on-going SP 2015-2018 and to propose preliminary ideas and priorities for the SP 2019-2022 during the Specialists Groups Leaders Forum held in Buenos Aires, Argentina on 13 Nov. 2013. A broad consultation period will start in 2018 to collect more feedbacks and suggestions from all IWA members and groups, and especially Specialist Groups. Specialists Groups are key components of IWA and thus also in the definition of the SP, as they are the most active in conferences organisation, knowledge production, publication and dissemination, and also professional training. The JCUD, together with all other SGs, is thus invited to contribute actively to the SP consultation during the coming months, so that IWA strategy and JCUD objectives and activities will be as much coordinated and compatible as possible.

News from IWA SC2SG (Strategic Council Sub-Committee for Specialist Groups)

Jean-Luc Bertrand-Krajewski, former chair of the JCUD (2005-2008), was elected in the IWA Strategic Council in 2010 for 6 years as one of the representatives of the Specialist Groups. Since 2013, he is chair of the Strategic Council Sub-Committee for Specialist Groups (SC2SG). After a two year extension, he will terminate his mandate in both the Strategic Council and the SC2SG after the IWA Congress in Tokyo, Japan in September 2018. It is very important that the JCUD keeps close contact with IWA office and remains visible and active within IWA (participation in the annual SG Leaders Forum, activities during the IWA Congresses, JCUD members active in IWA Programmes like e.g. Cities of the Future, development of collaborations with other SGs, evolution of SGs activities and modes of action, etc.).

7.2 New publications from IWA Publishing

Selected Books

Hydrological Design of Multipurpose Micro-catchment Rainwater Management

Mooyoung Han & DucCanh Nguyen

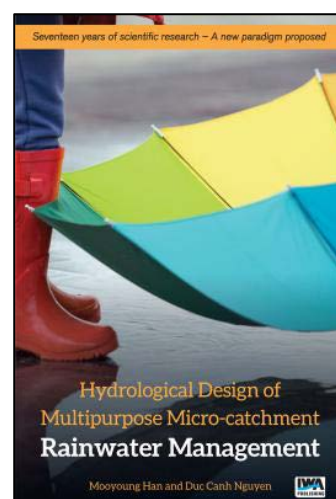
ISBN: 9781780408705

March 2018 • 130 pages • Paperback

IWA Members price: £ 53.00 / US\$ 80.00 / €66.00

<https://www.iwapublishing.com/books/9781780408705/hydrological-design-multipurpose-micro-catchment-rainwater-management-0>

Rainwater as a resource has been underrated due to scientific misunderstandings about its quality, the lack of hydrologic design tools for small catchments, the preference for large infrastructures, and the small number of successful cases reported. This book summarizes 17 years of scientific research, operational monitoring and demonstration projects and details how to transforming from a 'Drain City' to a 'Rain City' may become a viable solution toward Sustainable Development Goal Number 6.



Wealth Creation without Pollution - Designing for Industry, Ecobusiness Parks and Industrial Estates

Brian D'Arcy, Lee-Hyung Kim & Marla Maniquiz-Redillas

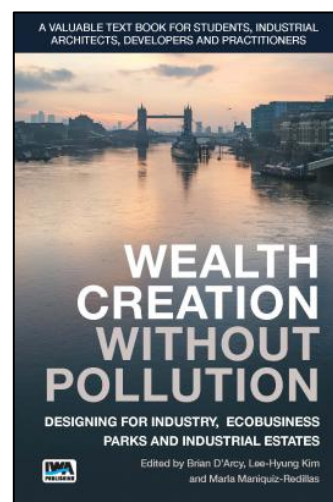
ISBN: 9781780408330

November 2017 • 330 pages • Paperback

IWA Members price: £ 67.00 / US\$ 101.00 / €84.00

<https://www.iwapublishing.com/books/9781780408330/wealth-creation-without-pollution-designing-industry-ecobusiness-parks-and>

This book compiles deliberations by academics and regulators, engaging with industrial and commercial sectors to characterize and quantify environmental problems and identify best practice solutions. Equally important are efforts to explore sufficiently flexible regulatory regimes that offer effective means to prevent pollution and achieve good working environments in which industry and commerce can flourish. This book explores how modern industries are striving towards more sustainable practices, with case studies of impacts and of greener industry practices, as well as philosophical and policy papers.



Dealing with the Complex Interrelation of Intermittent Supply and Water Losses

Bambos Charalambous & Chrysi Lapidou

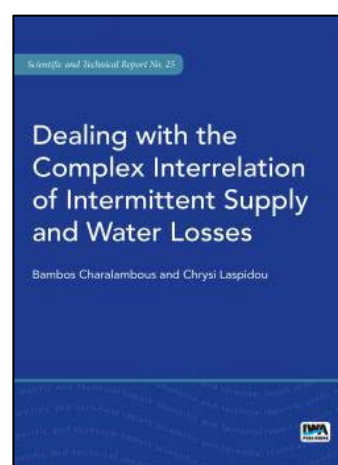
ISBN: 9781780407067

August 2017 • 162 pages • Paperback

IWA Members price: £ 64.00 / US\$ 96.00 / €80.00

<https://www.iwapublishing.com/books/9781780407067/dealing-complex-interrelation-intermittent-supply-and-water-losses>

The book provides a scientific approach into appraising Intermittent Water Supply (IWS) on a global scale. Root causes and implications of IWS are dealt with in a concise manner, detailing reasons for resistance to change towards 24x7 supply. An understanding of water losses in the context of IWS is included, as well as related difficulties in leakage detection and metering. A methodology is presented for transitioning from IWS to continuous supply covering technical, social and communication issues.



Finnish Water Services: Experiences in Global Perspective

Tapio S. Katko

eISBN: 9781780408743

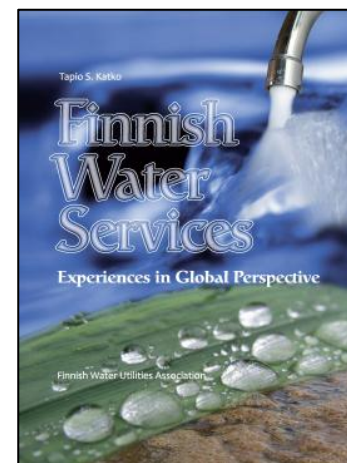
June 2017 • 288 pages • ebook only

IWA Members price: £ 36.00 / US\$ 65.00 / €49.00

<https://www.iwapublishing.com/books/finnish-water-services-experiences-global-perspective>

This latest book by UNESCO Chair holder, Tapio S. Katko, challenges the reader to assess critical sector issues:

- Can 24/7 access to safe drinking water be taken for granted?
- What threats does deterioration of water and sewage networks pose?
- Who are responsible for providing and producing water services?
- Why do many international water-related comparisons rank Finland among the top countries?



Selected journal papers:

Flood forecasting within urban drainage systems using NARX neural network

Yves Abou Rjeily, Oras Abbas, Marwan Sadek, Isam Shahrour, Fadi Hage Chehade
Water Science and Technology, Nov 2017, 76 (9) 2401-2412; DOI: 10.2166/wst.2017.409
<https://doi.org/10.2166/wst.2017.409>

Flood control in an urban drainage system using a linear controller

Pawan Kumar Rai, C. T. Dhanya, B. R. Chahar
Water Practice and Technology, Dec 2017, 12 (4) 942-952; DOI: 10.2166/wpt.2017.102
<https://doi.org/10.2166/wpt.2017.102>

The impact of macropores on heavy metal retention in sustainable drainage systems

Ruth Quinn, Alejandro Dussaillant
Hydrology Research, Feb 2018, nh2018277; DOI: 10.2166/nh.2018.277
<https://doi.org/10.2166/nh.2018.277>

Attribute-based intervention development for increasing resilience of urban drainage systems

Chris Sweetapple, Guangtao Fu, Raziye Farmani, Fanlin Meng, Sarah Ward, David Butler
Water Science and Technology, Feb 2018, wst2018070; DOI: 10.2166/wst.2018.070
<https://doi.org/10.2166/wst.2018.070>

Finalists Poul Harremoës Award

Virtual reality in urban water management: communicating urban flooding with particle-based CFD simulations

Winkler D., Zischg J. and Rauch W. (2018),
Water Science and Technology, Jan 2018, 77 (2) 518-524; DOI: 10.2166/wst.2017.567
<https://doi.org/10.2166/wst.2017.567>

Initial conditions of urban permeable surfaces in rainfall-runoff models using Horton's infiltration

Steffen Davidsen, Roland Löwe, Nanna H. Ravn, Lina N. Jensen, Karsten Arnbjerg-Nielsen
Water Science and Technology, Feb. 2018, 77 (3) 662-669; DOI: 10.2166/wst.2017.580
<https://doi.org/10.2166/wst.2017.580>

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8. REPORT ON THE 14th INTERNATIONAL CONFERENCE ON URBAN DRAINAGE (ICUD), Prague, Czech Republic, Sep. 10-15, 2017

Prepared by V. Bares, I. Kabelkova, J. Marsalek and D. Stransky, February, 2018

Background

ICUD conference series started in 1978, with the first conference held in Southampton, UK. Since then, these triennial conferences were held in twelve cities on five continents, serving a large international clientele. While the 1st ICUD reflected the concerns of that time period, namely, computation of design flows and the sizing of drainage conveyance elements, the following 40 years brought a rapid development of this field, with contemporary topics building on reliable drainage design in the context of sustainable development, societal involvement in the planning process, and preparation for coping with future challenges, encompassing the readiness to deal with impacts of climate change on urban drainage and the need to move drainage objectives beyond the protection of human and aquatic habitats to maximizing ecosystem services provided by urban waters. In this context, the 14th ICUD was held Prague last September, with more than 700 participants following a six day conference program.

Main Findings and Conclusions of the Conference

The preparation of the conference program was an iterative process involving a broad community of experts in the field. Consequently, the list of conventional conference topics (urban hydrological processes; transport and sewer processes; drainage impacts and their mitigation; tools, techniques and analyses; and, water management and society) were expanded for the topic of “special sessions” proposed by the experts in various fields and specialties. With this structure of the conference program in mind, the main findings and conclusions can be identified as follows:

- Urban hydrological processes, encompassing hydrologic and water transport processes in the urban water cycle, and their alterations in a changing climate, keep attracting attention of both practitioners and researchers, with the following trends noted: the need for unconventional monitoring of urban rainfall, e.g. with the help of conventional microwave links, increasing the robustness of climate change information by employing ensembles of climate change models; and, the projection of climate change effects on water quality processes in urban catchments.
- Transport and sewer processes – increased attention is being paid to pollutant transport separation into particulate and dissolved loads, recognizing the immediate impacts of dissolved chemicals on aquatic biota, and also the implication of load fractionation for control measures, with dissolved load removals being more challenging. Hence, it was concluded that conventional descriptions of total pollutant loads do not serve well the needs of stormwater quality considerations, and that particulate and dissolved fractions need to be addressed.
- Drainage impacts – while various types of impacts were recognized in the conference program, there was a strong program component addressing flood risk and flood damages. This interest was driven by the recent occurrence of floods in certain regions, and the need to elucidate two aspects of flooding: (i) Resilience of flood management infrastructure, and (ii) the role of green infrastructure in providing resilient protection of urban areas. Both these fields, and their modelling support, are rapidly evolving to meet the needs of the society.
- Mitigation of urban drainage impacts on urban catchments and their drainage infrastructure received a broad attention of conference participants, as reflected by the number of abstracts submitted in this section and the proposals of special sessions. There continues to be a varied

terminology used in this field, with different terms describing control methods and facilities providing similar services. Such a terminology, e.g. BMPs (best management practices), LID (low impact development), SuDS (sustainable drainage systems), WSUD (water sensitive urban drainage), and GI (green infrastructure) is firmly embedded in various countries and regions, and it is unlikely that, in spite of past efforts, a unified terminology will be adopted. Control measures are employed in “treatment trains”, starting with rainwater collection and harvesting, followed by the application of measures attenuating runoff flows and improving runoff quality to the point, where the receiving waters and their biota are well protected and provide beneficial uses to the urban population. Increasingly, the green infrastructure measures employing plants in the control process are deployed and subject to research with respect to the types of plants and their seasonal performance. Examples of research in this field include green roofs and bioretention; in the latter case, there is also ongoing research on filter media employed in such facilities.

- Tools, techniques and analyses (TTA) – there is a continuing progress achieved in this field, with good collaboration between the academic research community and the private sector refining comprehensive modelling packages, which are broadly used in practice. Increasing availability of sensors for measuring precipitation, flow, and water quality parameters facilitates the collection of better data in support of research. Forecasting runoff and real time control seems to be concentrated in locations, where there is technical support available for this type of work. One field requiring further development is the modelling of runoff control facilities, recognizing that the conventional models are well suited for medium to large scale applications, but high spatial resolution applications to runoff controls require further development and verification in the field.
- Social sciences are relatively new additions to the field of water management. While it strives in some countries and provides valuable input to sustainable urban drainage planning, future cities, transitioning from centralized to distributed infrastructure and services, and development of drainage policies, many challenges remain. One element perhaps inadequately addressed at the conference was the asset management, which is an important aspect of operation of urban drainage systems, particularly with respect to the aging infrastructure and the changing climate. A possible explanation – this is a highly specialized field, which may be better served by specialty conferences, rather than general conferences.

Conference Highlights

- The engagement of a large segment of the international community of urban drainage practice in shaping the conference program and providing quality control through abstract reviews and their placement in the program.
- Featuring “special sessions” proposed and developed by the participants and addressing innovative topics including flood modelling, metrology of urban drainage, UD digitalization, microorganisms in UD, sponge cities program, water sensitive cities, and the modelling of permeable media, including pavements.
- Providing an up-to-date overview of progress in the field of urban drainage, with respect to hydrology of urban areas and the projected changes caused by climate change, distinguishing between particulate and dissolved fractions of pollutant transport and loads, continuing research on drainage impacts on the catchments and their receiving waters (among which floods received much attention lately), the wealth of information on design and performance of runoff control measures, also known as BMPs, LIDs, SuDS, WSUD or GI; progress in measuring techniques and comprehensive models; and inclusion of social sciences in water management.

Poul Harremoes Award

The fifth Poul Harremoes Award (PHA) addressed 200 young researchers to present their work and findings. Three candidates were selected upon the two-round review process. They were invited to present their work in PHA plenary session with new format including professional host and on-stage PHA committee with life reviewing. The winner of PHA 2017 is Daniel Winkler from University of Innsbruck, Austria.



Achievement Awards

Every three years, the Joint Committee on Urban Drainage (JCUD) recognizes outstanding achievements of professionals in our field by bestowing two career achievement awards: One for 'Mid-Career Achievement' (awarded to someone who is part-way through their career and showing important leadership; typically, these nominees will be less than 50 years old) and the other for 'Career Achievement' (awarded to a senior member of our urban drainage community). The winners awarded during ICUD2017 are Joerg Rieckermann, Switzerland for Mid-Career Achievement and Jiri Marsalek, Canada for Career Achievement.



Social and other events

Conference offered broad range of social activities of all types. The standard events included informal Welcome reception and Gala Dinner. The Gala evening contained also an official ceremony with Poul Harremoes Award and Achievement Awards prize giving and was followed up by unofficial Afterparty. Conference Programme provided two new social activities. The Fun/Run Walk with 80 participants was organized at famous Prague Petřín hill with wonderful views on city panorama and was followed up by apero for better hydration and energy restoring. The charity project "waste Water photo gallery" presented the 24 works of three Czech amateur photographers from the field of Urban Drainage at sales exhibition. The exhibition benefit supported The Tapt Tap Orchestra project, which was presented with the live show at Gala Dinner.

Conference programme includes other events as Workshops, Technical Tours and Guided Tours. Five technical workshops were organized prior the conference with 60 participants in total.



Issues from the Conference to be passed onto:

- Practitioners - there is a tremendous wealth of information for dealing with the issues caused by urban drainage and such information should be utilized in planning and designing sustainable urban drainage systems, minimizing adverse impacts on urban catchments and receiving waters, providing beneficial uses of drainage infrastructure (e.g., rainwater harvesting, aesthetic and recreational amenities), and contributing to the general well-being of urban dwellers
- Regulators – there is an opportunity to advance the conventional regulations from flow controls (i.e., related to the predevelopment state) and usually suspended solids, to considerations of dissolved pollutant loads (e.g. metals) and specific sources (traffic, building surfaces).
- Subject of IWA advocacy – continue and economically strengthen the advocacy of future cities, which include sustainable and resilient urban drainage employing both hard and soft infrastructure.

Future research

The topics for future research were implicitly identified in the main findings of the conference and examples of such needs can be restated as follows:

- Urban hydrology: increasing the robustness of assessment of climate change impacts on urban drainage; modern monitoring of urban precipitation
- Water and pollutant transport: distinguishing between particulate and dissolved pollutant loads, and addressing the feasibility of treatment of dissolved pollutants
- Drainage impacts: advance the analysis and understanding of the resilience of flood management infrastructure and the role of green infrastructure in this effort
- Mitigation of urban drainage impacts by implementing BMPs, LIDs, SuDS, WSUD and GI – developing modular control and treatment trains starting with rainwater harvesting, followed by measures attenuating runoff flows and improving runoff quality
- Drainage modelling: advance the modelling of control measures by comprehensive modelling packages, enhanced for capability to model runoff controls in high spatial resolution, and
- Advance socio-economic research on urban drainage issues by developing robust methods and conclusions.

Online Outputs and Follow up Activities

Conference Proceedings and all slide presentations with authors permission (in pdf format) are published at conference password protected cloud space (access through conference homepage www.ICUD2017.org)

Organizers provided also rich Video and Photo gallery. Video gallery contains all sessions organized in Forum Hall including Opening Session, Keynote Lectures, Poul Harremoes Award Session and other standard Oral Sessions. Organizers published also time-lapse videos from each conference day to refresh memories of all participants and other interested people.

Selections of post processed photos are published in rich PhotoGallery (500 pictures), conference participants have also an opportunity to access all photos made during the conference at conference password protected cloud space (1500 pictures).

There are existing publication efforts under way: Journal publications – there is an ongoing effort to publish the selected papers from the conference in Wat. Sci. Tech. (23 papers) and Water Practice and Technology (8 papers)

9. IN THE SPOTLIGHT

In the past years the newsletter contained a section “News from around the world” giving insight into the activities in different countries. The JCUD is now trying to motivate people to publish such information, reports, etc on <https://iwa-connect.org> as we believe this enables faster and easier updates. In the newsletter we would like to continue to present only a few selected projects, case studies, activities, etc. If you are interested to publish your work here or can share a report of an interesting activity, please contact manfred.kleidorfer@uibk.ac.at

8.1 The 23rd EJSW on “Monitoring Urban Drainage Systems” in a nutshell

Prepared by Frank Blumensaat (ETH & EAWAG, Switzerland), Jean-Luc Bertrand-Krajewski (INSA Lyon, France), Francois Clemens and Mathieu Lepot (TU Delft, The Netherlands).

The 23rd European Junior Scientists Workshop (EJSW) on “Monitoring Urban Drainage Systems” was held in Chichilianne, France, on 15th-20th May 2017. It was proposed by the international Working Group on Sewer Systems and Processes (SSPWG) of the IWA/IAHR Joint Committee on Urban Drainage (see www.jcud.org).

Participants & Objective: For the second time and after a successful first workshop edition held in this format (in 2015), 23 participants from 10 countries and nationalities from all over the world (see Photo 1) met in Chichilianne in the French Alps not far from Grenoble. For the period of a week the crowd of motivated PhD students and researchers gathered to exchange ideas, share experiences, learn from each other and – most and foremost – practically work on solving test problems set up by the workshop organisers.



Photo 1: first briefing in front of the Gîte du Mont Aiguille on 15-May-2017.

Similarly to the 2015 edition, the event was greatly supported by the mayor and his community. The technicians of Chichilianne helped out wherever it was needed and the managers of the Gîte du Mont Aiguille (the workshop venue) provided cosy lodging next to excellent cooking accommodating everyone’s individual wishes. Working sessions were held in the city hall meeting room and in the Gîte main room, both made available for free by the municipality.

Workshop content: The technical programme combined longstanding elements from the previous workshop edition and several new sessions. The established format of students presenting and discussing their individual research during morning sessions was kept and – again – proved to be very successful. In particular, the fact that students could openly discuss and comment on each other’s work without interference of their direct supervisors was highly appreciated and allowed a lively discussion. The presented research touched a large variety of technical topics such as: monitoring of rainfall, water level, flow rate, water quality, suspended solids, micropollutants and pharmaceutical residues, deposits in sewers, validation of water quality data, model predictive control, the use of new measurement techniques e.g. “structure

from motion”, “LSPIV” – overall an overwhelming diversity of interesting topics with many novel aspects.



Photo 2: introductory course on experimental design.



Photo 3: on-line monitoring at the treatment wetland.

Next to introductory courses on i) sensors’ technologies, ii) sensor calibration, iii) uncertainty assessment, iv) low-power radio transmission technique (see Photo 2), the planning and the deployment of a self-contained and low-tech monitoring systems was exercised. During these afternoon hands-on sessions – set up in parallel running to have small groups – participants were directly involved in practical field work applications. Many exercises were related to real-life questions concerning the water supply and wastewater management of Chichillianne.

For instance, a prototype application of a low-tech water quality monitoring of the villages’ water supply (a source near the village at higher altitude) was conceptualised and installed to monitor potential faecal contamination due to sheep excretions on the highlands. This workshop exercise has a valuable secondary outcome: it is anticipated to give useful information for the permanent operation of such system which could ultimately secure the village’s water supply.

Furthermore, a water level and a turbidity sensor were installed at the local waste water treatment wetland (see Photo 3) for temporary online monitoring of inflow rate and influent quality. This data was later evaluated and exemplary studied to quantify measurement uncertainty. This way, students identified unexpected peak flows during wet weather (separate system) most likely due to misconnections. To identify (with common sense, historical knowledge) and eliminate them is going to be the mayor’s next objective.

Scientific misconduct and ethical aspects in research were discussed in a special session at the end of the workshop. Participants used the opportunity to debate related issues based on cases and personal experience. It showed that there is largely a broad consensus among the participants, but also a lack of knowledge on how to deal with critical issues when publishing, discussing with supervisors and openly sharing knowledge.



Photo 4: view from the Vercors plateau to the Mont Aiguille.



Photo 5: protected orchid from the category Paphiopedilum.

Social activities: After intense working sessions, Chichillianne and the wonderful region at the Vercors plateau proved to be the perfect spot to relax. Incredible panoramas and history landmarks (see Photo 4), including endemic species of orchids (see Photo 5) and a unique wild life served for inspiring hours outdoors.

All participants as well as village officials and hosts from the Gîte came together at the final evening to enjoy the food tasting of deliciously prepared plants and herbs collected from meadows and woods around the village (see Photo 6). Great support from the locals, a very positive feedback from the participants and the pressing urban water problems in the village itself encourage the organisers to prepare a third hands-on workshop to exchange knowledge between environmental research engineers. See you in Chichillianne in 2019!



Photo 6: food tasting organised by local field guides.

8.2 CEDR Transnational Road Research Programme: preserving, protecting and improving European surface water and groundwater bodies

Lian Lundy (L.Lundy@mdx.ac.uk), Rianne Dröge, (rianne.droge@tno.nl), JanWillem Knight (janwillem.knegt@tauw.com), Tone Muthanna (tone.muthanna@ntnu.no), Jes Vollertsen (jv@civil.aau.dk)

The world population of 7.5 billion is growing at an estimated 80 million people per year. Over 50% of people currently live in urban areas, with the trend towards urban living predicted to continue until the end of the century (UN, 2014¹). The rapid growth of urban areas leads to

¹ United Nations, Department of Economic and Social Affairs, Population Division (2015). World Urbanization Prospects: The 2014 Revision, (ST/ESA/SER.A/366).

increased residential, public and commercial traffic and a continuously growing transportation infrastructure (e.g. roads, highways, motorways and car parks, with associated street furniture such as signs, barriers and street lights). Whilst transport and its associated infrastructure make a major contribution to quality-of-life, it also has an environmental impact in terms of associated pollution emissions. Delivering the benefits of a fit-for-purpose transportation system, whilst mitigating negative environmental impacts under a diverse range of geographies, climates and geologies, is a central challenge to be addressed if a sustainable transport infrastructure is to be delivered.

Road runoff contains a wide range of pollutants generated by traffic (routine and as a result of accidental spills/incidents), road materials and street furniture, as well as contributions from activities associated with road construction, operation and maintenance works. Pollutants frequently detected include particles, metals, salts and polycyclic aromatic hydrocarbons (PAHs). In addition, particles from tyre wear, road markings and the breakdown of litter have recently been identified as a source of micro-plastics to the environment². Such pollutants may be directly deposited or emitted to air where they will settle due to gravitational or precipitation driven processes. The EU Water Framework Directive (WFD, 2000) aims to protect and improve the ecological status of water bodies in order to promote sustainable watershed use. This requires that “good status” should be achieved for all surface and groundwater bodies by 2015 or 2027 at the latest. Although considerable efforts have been made in many Member States to meet these objectives, it is reported in 2017 that 47% of surface waters have not achieved good ecological status (Voulvoulis et al., 2017³). Whilst not generally classified as a key pressure on European water bodies, diffuse pollution loads from the building and operating of road networks are a concern that require better characterisation and mitigation to ensure the requirements of the EU WFD (and other relevant regulations and directives) are met. It is within this context that the Conference of European Directors of Roads (CEDR; an organisation bringing together representatives from 26 European road authorities; www.cedr.eu) is funding a major new initiative to describe and reduce the environmental impacts of the road network and supporting infrastructure and ensure EU WFD compliance (see Figure 1).

Coming under an ‘umbrella programme’ entitled ‘Environmentally Sustainable Roads: Surface- and Groundwater Quality’, three international consortia are collaborating together on three parallel projects funded by CEDR to collate, critique and update (where required) existing knowledge, tools and guidance used by the National Road Authorities (NRA) over a timeframe of 2017-2019. With an overall objective of providing new knowledge on the diffuse pollution risks and mitigation measures in a practical manner for road managers operating under a range of climatic and geological conditions, the overarching goal of all three consortia is to ensure that research outputs are implementable in practice. The three consortia (PROPER, LUNT EvIDenCE and MICROPROOF) address the question of when and how road runoff should be treated to ensure EU WFD compliance during both the construction and operation of the European road network from differing, although complimentary, perspectives. Table 1 gives an overview of the discrete pollutant focus and research questions being addressed by the PROPER (Road runoff pollution management and mitigation of environmental risks), LUNT EvIDenCe

²Horton AH, Svendsen C, Williams RJ, Spurgeon DJ, Lahive E (2017) Large microplastic particles in sediments of tributaries of the River Thames, UK – Abundance, sources and methods for effective quantification Marine Pollution Bulletin 114 (1), 218-226.

³ Voulvoulis, N., Arpon, K.D., Giakoumis, T. (2017). The EU Water Framework Directive: From great expectations to problems with implementation. Science of the Total Environment 575, 358-366.

(Environmental impacts of de-icing chemicals) and MICROPROOF (Micropollutants in Road Run-Off water) projects.

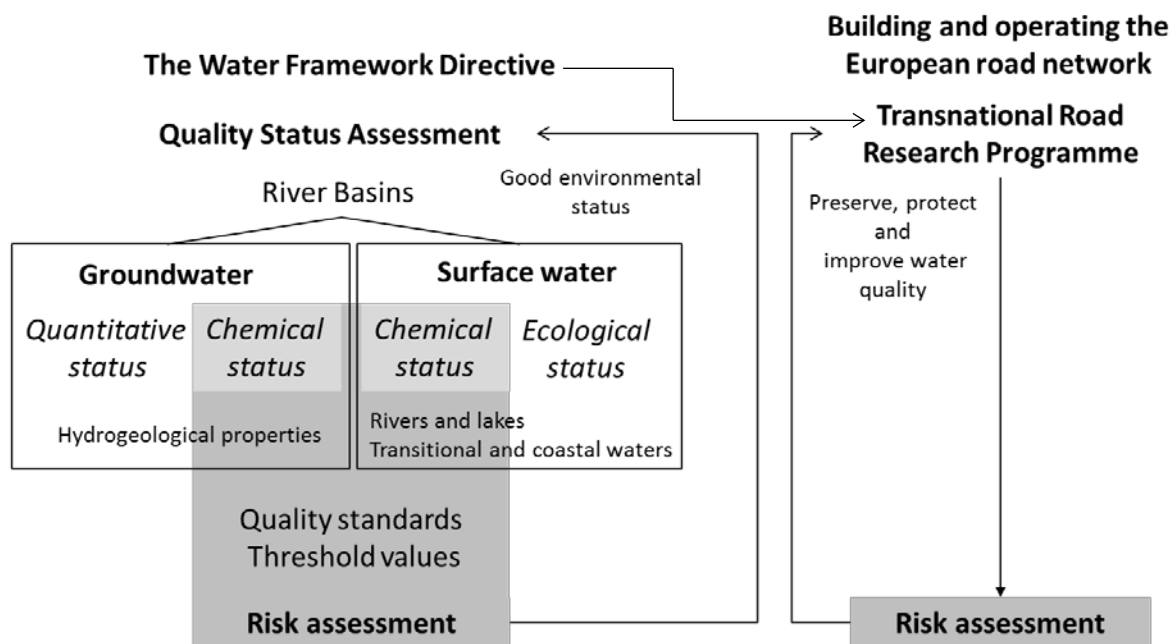


Figure 1. Risk assessment within the EU Water Framework Directive in relation to the CEDR Transnational Road Research Programme (CEDR Call 2016 Water Quality).

Table 1. Overview of the focus and research questions addressed by the PROPER, LUNT EvIDenCe and MICROPROOF consortia

	PROPER¹	LUNT EvIDenCe²	MICROPROOF³
Target pollutants	'Conventional' organic and inorganic pollutants	Conventional and alternative de-icing materials	Organic micro-pollutants and microplastics
Key challenges to be addressed	<p>Can we improve the prediction of pollutant loads generated by roads?</p> <p>Evaluate the 'real world' vulnerability of surface and ground waters to road related pollution.</p> <p>Evaluate the performance of sustainable drainage systems to mitigate pollutant loads during road construction and operation.</p> <p>Develop a user-friendly decision-support tool to assess receiving water vulnerability to traffic pollution</p>	<p>What is 'state-of-the art' re: de-icing applications?</p> <p>What are the chemical and biological risks for aquatic life as a result of these chemicals?</p> <p>Map the vulnerability of European waterbodies to these chemicals using the SaltSmart methodology</p> <p>How well do existing and novel treatment approaches mitigate the impacts of de-icing chemicals?</p>	<p>What do we know about how organic micro-pollutants and microplastics are transferred from roads to water bodies?</p> <p>What environmental risks are posed by these substances?</p> <p>At what concentrations do these risks occur?</p> <p>What is the best way is to treat organic micro-pollutants and microplastics?</p>
Approach to stakeholder engagement	Development of an International Advisory Board consisting of representatives from the NRAs, policy development and environmental protection agencies; its role is to share knowledge, review draft and inform future research outputs	Interviews with NRA representatives to understand current de-icing practices, feedback on and inform development of research outputs	One-to-one meetings with local NRA representatives and stakeholder presentations to discuss outputs and share data
Website	http://proper-cedr.eu/	www.evidence-cedr.eu	www.microproof-cedr.nl

Key: ¹ led by Aalborg University; ² led by TAUW; ³ led by TNO

Recognising that the NRAs hold considerable expertise within their own Member States, each consortia is working within a practitioner-informed risk assessment and management framework, to ensure that existing knowledge is fully utilised and that research outputs are developed in a way that is useful and useable in the field. Within PROPER, the development of an International Advisory Board (consisting of representatives from the NRAs, policy development and environmental protection agencies) was an important initial step. Their role is to share knowledge (current practices, data sets and emerging challenges), review draft deliverables and inform future research outputs. In return, developing / revised approaches are applied to their data sets and PROPER outputs are better placed to meet their needs. Within the project, risk based models used to predict the pollution concentrations and loads in road runoff (e.g. HAWRAT, SELDM and RSS) will be reviewed and the potential to integrate concepts and approaches from air quality models to improve predictions assessed (i.e. enhance our understanding of 'likelihood of occurrence' of target pollutants). Tools to predict receiving water body vulnerability will be applied to field data sets (i.e. update knowledge on the 'level of impact' of road runoff on receiving waters). Both sets of data will be integrated to identify the level of risk associated with runoff generated from a road (during construction or operation phases) discharging to a specific receiving water body. Options to mitigate risks identified as unacceptable will focus around the use of sustainable drainage solutions (risk management phase). Outputs of the above stages will be used to co-develop (with stakeholders) a tool to support address they key question of when, where and how road runoff should be treated.

The core focus within LUNT EvIDenCe is to support NRAs in identifying and mitigating the impacts of de-icing salts and measures on receiving water bodies. Whilst the use of de-icing approaches are essential to enable road networks to function safely under winter conditions, melting snow carries de-icing chemicals into local receiving waters. Elevated salt levels in soils can inhibit the ability of vegetation to absorb both water and nutrients, which can slow plant growth and ultimately affect animal habitats. For example, such degradation affects the ability of these areas to act as buffers against incoming pollutant loads, reduces their biodiversity and associated ecological value. A range of de-icing materials and other road maintenance measures will be grouped by properties e.g. salt-based, physical methods (sweeping, brushing etc.). Each approach has its own benefits, costs and effects, and the selection of which material/methods to use depend on the situation. LUNT EvIDenCe will collate data on the chemical and biological risks posed to aquatic life as a result of alternative de-icing materials/approaches and explore the use of SaltSmart to map the vulnerability of European surface and ground water bodies receiving runoff generate din areas where such approaches are used. Combining literature and existing field data sets will be used to identify geographically relevant boundaries for the selection of de-icing methods and develop practical guidelines for their application. Having considered risks and vulnerabilities, opportunities to reduce the risks identified will involve an assessment of existing and novel treatment approaches to treat alternative de-icing chemicals. Activities at each stage will involve NRA input in the form of thematic interviews with representatives from across Europe to understand challenges and current best practices within the respective countries.

MICROPROOF focuses on enhancing understanding if, and if so how, organic micro-pollutants (e.g. thiazoles, amines) and microplastics are transferred from roads to water bodies, the environmental risks posed by these substances and the measures NRAs should be implementing to ensure identified risks are addressed. The project follows a four-step approach, covering sources, pathways and concentrations, environmental risks and treatment systems. A review of the literature on the sources, concentrations and loads of micro-pollutants and microplastics in road runoff, including quantifying emission factors of organic micropollutants and microplastics from various road and traffic related sources, is the first phase which underpins subsequent tasks. The first of these tasks is to use this evidence base to calculate the predicted

environmental concentrations (PEC) and predicted no-effect concentrations (PNEC) of a selection of substances. The environmental risks associated with identified substances will then be evaluated through the use of calculated PNEC values within a probabilistic risk assessment approach, enabling the probability that a target species will be exposed at a concentration in excess of its PNEC to be quantified. Having considered the risks associated with identified substances, the use of current treatment systems to mitigate these risks is comparatively assessed, directly addressing the question of when and how contaminated runoffs should be treated within several scenarios. The research programme and results developed at each stage will be discussed with NRA representatives through a combination of one-to-one interviews and stakeholder presentations/discussions to share data and exchange ideas.

Whilst operating as three independent consortia on a day-to-day level, the activities of PROPER, LUNT EvIDenCe and MICROPROOF are integrated through several agreed activities to enhance the usefulness and applicability of outputs to stakeholders. For example, all three projects will utilise a common vocabulary (through the co-development of a glossary of terms), will focus on non-urban highways (to enable transport and highway related impacts to be distinguished from those of other urban sources) and exclude coastal / estuarine waters from their current scope. Further, in addition to the stakeholder engagement activities identified above, representatives from each consortium regularly meet with and receive feedback from the CEDR Programme Advisory Board on activities being undertaken to ensure outputs can be readily implemented in the field in a European wide context. Further details on all three projects can be accessed on the project websites (see Table 1) or by contacting the authors. Outputs will be disseminated through the project workshops (described above) and at national and international practitioner seminars and conferences.

Acknowledgements

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10. FUTURE MEETINGS AND CONFERENCES

A table listing the forthcoming conferences and workshops (as of March, 2018) appears below. This table can be also used when planning future JCUD events to avoid conflicting schedules. Even though we strive for accuracy, please **always check the primary sources of information** for possible updates and changes.

Conference or Workshop Name	Location	Event Dates	Submission dates	URL
IWA Leading Edge Conference on Water and Wastewater Technologies	Nanjing, China	24.- 30. May 2018	closed	http://iwa-let.org/
13 th International Hydroinformatics Conference 2018	Palermo, Italy	01.- 06. July 2018	closed	https://www.hic2018.org/
IWA World Water Congress 2018	Tokyo, Japan	16.-21. Sept. 2018	closed	http://worldwatercongress.org/
11 th Int. Conference on Urban Drainage Modelling (UDM)	Palermo, Italy	23.-26. Sept. 2018	10.04.2018	http://udm2018.org
UrbanRain workshop	Pontresina, Switzerland	04.- 08. Dec. 2018	closed	http://www.urbanrain.ethz.ch/
The 10th IWA Specialist Conference on Efficient Urban Water Management	Manila, Philippines	13.-16. Jan. 2019	30.04.2018	https://efficient2019.org/
NOVATECH	Lyon, France	2019	TBA	https://www.novatech.graie.org/
SPN9, 9 th Int. Conference on Sewer Processes and Networks	Aalborg, Denmark	27.- 30.Aug. 2019	TBA	http://spn9.dk/
38 th IAHR World Congress	Panamy City, Panama	01.-06. Sept. 2019	01.09.2018	http://iahrworldcongress.org/
15 th ICUD	Melbourne, Australia	September 2020	TBA	http://www.icud2020.org/

11. WORKING GROUP CONTACTS

Int. Working Group on Data & Models (IWGDM) Web site: http://iwgdm.wikispaces.com	
<p>Chair: Dr David McCarthy Environ. and Public Health Microbiology Lab Monash Water for Liveability Dept. of Civil Engineering, Building 60 Monash University Clayton, Vic 3800 AUSTRALIA Phone: +61 3 9905 5068, Fax: +61 3 9905 4944, E-mail: david.McCarthy@monash.edu</p>	<p>Secretary: Prof Manfred Kleidorfer Unit for Environmental Engineering University of Innsbruck Technikerstrasse 13 6020 Innsbruck AUSTRIA Ph.: +43 512 507 62134, Fax : +43 512 507 62199 E-mail : manfred.kleidorfer@uibk.ac.at</p>
Real-Time Control of Urban Drainage Systems (RTCUDS)	
<p>Chair: Prof Dirk Muschalla Institute of Urban Water Management and Landscape Water Engineering Graz University of Technology Stremayrgasse 10/I 8010 Graz AUSTRIA Ph. +43 316-873-8370, Fax: +43 316 873-8376 Email: d.muschalla@tugraz.at</p>	<p>Secretary: Dr Jeroen Langeveld Delft University of Technology Stevinweg 1 2628 CN Delft THE NETHERLANDS Phone: +31 6 1897 6283 Email: j.g.langeveld@tudelft.nl</p>
Sewer Systems and Processes Working Group (SS&PWG) Web Site: http://www.sspwg.org	
<p>Chair: Dr Jeroen Langeveld Delft University of Technology Stevinweg 1 2628 CN Delft THE NETHERLANDS Phone: +31 6 1897 6283 Email: j.g.langeveld@tudelft.nl</p> <p>Vice-Chair (Chair of SPN9): Prof Jes Vollertsen Department of Civil Engineering Aalborg University Thomas Manns Vej 23 DK-9220 Aalborg DENMARK Phone: +45 9940 8504 Email: jv@civil.aau.dk</p>	<p>Secretary: Dr Asbjørn Haaning Nielsen Department of Civil Engineering Aalborg University Sohngaardsholmsvej 57 DK-9000 Aalborg DENMARK Phone: +45 9940 9817 E-mail: ahn@civil.aau.dk</p>

Working Group on Source Control for Stormwater Management (SOCOMA)	
<p><i>Chair:</i> Gilles Rivard Urban Hydrology Lasalle NHC inc. 9620, rue St-Patrick Montreal (PQ) CANADA H8R 1R8 Phone: +1-514 366-2970, Fax: +1-514 366-2971 E-mail: grivard@lasallenhc.com</p> <p><i>Secretary:</i> Dr Tim Fletcher Melbourne School of Land & Environment The University of Melbourne 221 Bouverie St, Parkville, Vic, 3010, AUSTRALIA Phone: +61 3 8344 0621 E-mail: tim.fletcher@unimelb.edu.au</p>	<p><i>Vice-Chair:</i> Prof Sylvie Barraud INSA Lyon – LGCIE, Bâtiment Coulomb 34 Avenue des Arts F-69621 Villeurbanne Cedex FRANCE Phone: +33 4 72 43 83 88, Fax: +33 4 72 43 85 21 E-mail: sylvie.barraud@insa-lyon.fr</p>
International Working Group on Urban Rainfall (IGUR) Web Site: http://www.kuleuven.ac.be/hydr/gur	
<p><i>Chairman:</i> Prof Simon Beecham University of South Australia School of Natural and Built Environments Bldg P, Mawson Lakes Campus AUSTRALIA Phone: +61 8 830 22357, Fax: +61 8 830 25082 Email: simon.beecham@unisa.edu.au</p>	<p><i>Secretary:</i> Dr Thomas Einfalt hydro & meteo GmbH & Co. KG Breite Strasse 6-8 D-23552 Lübeck GERMANY Phone: +49-451-7027333, Fax: +49-451-7027339 E-mail: einfalt@hydrometeo.de</p>
Urban Drainage in Cold Climate Working Group	
<p><i>Chair:</i> Prof Maria Viklander Dept. of Civil, Mining and Environmental Engineering Lulea University of Technology S-971 87 Lulea SWEDEN Ph.: +46 920 491 634, Fax: +46 920 491 493 E-mail: Maria.Viklander@ltu.se</p>	<p><i>Secretary:</i> Assoc. Prof Tone Merete Muthanna Department of Hydraulic and Environmental Engineering Norwegian University of Science and Technology S.P. Andersens veg 5 7491 Trondheim NORWAY Ph. +4795186817 E-mail: tone.muthanna@ntnu.no</p>
Water Sensitive Urban Design	
<p><i>Co-Chairs:</i> Dr Megan Farrelly & Dr Briony Rogers Department of Social Sciences Faculty of Arts Monash University Wellington Rd Clayton Victoria 3800 AUSTRALIA Ph.: +61 3 990 54618 (Megan) Ph.: +61 3 990 52581 (Briony) E-mail: megan.farrelly@monash.edu or Briony.rogers@monash.edu</p>	<p><i>Secretary:</i> Mr Charlie Stillwell, North Carolina State University, Biological and Agricultural Engineering E-mail : stillwell.charles@gmail.com</p>

Urban Streams	
<p><i>Chair:</i> Dr Ivana Kabelkova Dept. of Sanitary and Ecological Engineering Faculty of Civil Engineering Czech Technical University Thakurova 7 166 29 Prague 6 CZECH REPUBLIC Phone: +420 2 24321292 E-mail: kabelkova@fsv.cvut.cz.)</p>	
Urban Storm Water Harvesting (USWH) Working Group	
<p><i>Chair:</i> Prof Dr Alberto Campisano, Dept. of Civil Engineering and Architecture and Environmental Engineering University of Catania Viale A. Doria, 6 95125 Catania ITALY Phone: +39 (0)95 7382730, Fax: +39 (0)95 7382748 E-mail: acampisa@dica.unict.it.</p>	<p><i>Secretary:</i> Dr. Matthew Burns Melbourne School of Land & Environment The University of Melbourne, Building 379 Parkville, Vic, 3010, AUSTRALIA Phone: E-mail: matthew.burns@unimelb.edu.au</p>
Working Group on Metrology of Urban Drainage (under formation)	
<p><i>Chair:</i> Prof Francois H.L.R. Clemens Delft University of Technology Stevinweg 1 2628 CN Delft The Netherlands Phone: +31 15 278 5450 Email: F.H.L.R.Clemens@tudelft.nl</p>	



IWA Head Office:
Alliance House
12 Caxton Street
London SW1H 0QS
UK

Tel: +44 207 654 5500
Fax: +44 207 654 5555

IWA Global Operational Office:
New Babylon - Den Haag
Anna van Buerenplein 48, 11th floor
2595 DA Den Haag
The Netherlands

General e-mail: water@IWAhq.org
Web site: <http://www.iwa-network.org> Membership e-mail:
members@iwahq.org

Company registered in England No.3597005
Registered Charity (England) No.1076690