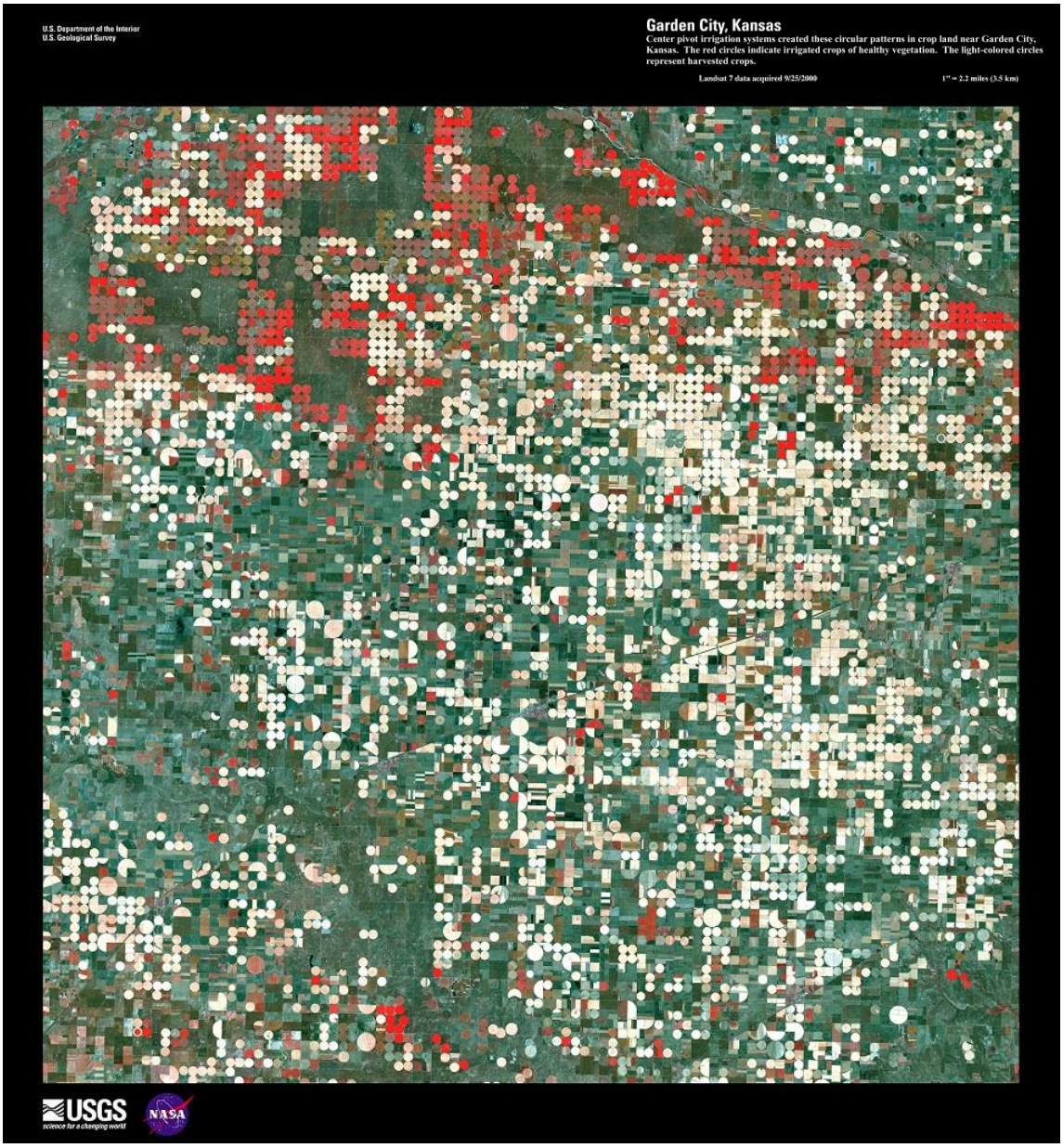
International Association of Hydrogeologists
U.S. National Chapter
Spring 2017 Newsletter

Editors: Leonard Konikow, Gary Robbins



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Cover Photo: Landsat 7 image of Garden City, Kansas, area showing pervasive center pivot irrigation systems, which are generally supplied by well pumpage. The area is experiencing substantial depletion of groundwater storage and declines of the water table. Image from the USGS EROS Digital Image Gallery, Earth as Art series (https://eros.usgs.gov/imagegallery), where high-resolution files are available for downloading.

IAH/U.S. NATIONAL CHAPTER: EXECUTIVE COMMITTEE 2017-2018

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A Note from the Chair

The new year is well on its way as is the USNC for 2017. Our new and expanded board has been working hard to move us forward with the proven base of leadership provided by Vic Heilweil and his team during the past four years.

Several of our members attended the IAH 60th Anniversary Congress in Montpellier, France, in September, 2016, where we learned many things to help guide the USNC in coming years. Dave Kreamer was elected Vice President for Science and Programme, which is a great honor and tribute for the USNC. Please congratulate him and offer your support. Joanne Thompson of the IAH Canadian National Chapter took Dave's place as Vice President for North America (please see her article in this newsletter). One of Vic's goals was to increase attendance at our international congresses and I would like to continue that effort.

This year's congress is going to be September 25-29 in Dubrovnik, Croatia, which is a beautiful place to visit and the program is going to be outstanding. One of the highlights will be the LaMoreaux International Lecture presented by GSA Birdsall-Dreiss Distinguished Lecturer, Ed Harvey, who is Chief, Water Resources Division of the National Park Service. The international lecture is named for the first American President of IAH, Dr. Philip LaMoreaux and his wife Bunnie. Please start now to make plans to attend and increase the USNC's participation.

The USNC has also cosponsored several meetings and/or webinars with AGI. Lenny has done a yeoman's job as our AGI Liaison and is being ably succeeded by Tim Parker and Clint Carney. Vicki and Suzanne have done an excellent job helping to publicize these on the website and social media. Please continue to check these sources for upcoming events and news about the USNC and its members. Also please share this newsletter with your friends and colleagues to spread the news about our chapter. More importantly please thank Lenny Konikow and Gary Robbins for their hard work in preparing the newsletter.

In other international ventures and yet closer to home we are continuing to work with the Canadian National Chapter and the Mexican National Chapter as well as others in South America to develop joint activities. Three upcoming conferences that we are helping to promote are the XVIth World Water Congress in Cancun, Mexico in May, the Characterizing Regional Groundwater Flow Symposium in Calgary, Canada in June and the GeoOttawa Conference in Ottawa, Canada in October. Please see the USNC website for details.

The final item I want to cover in my message from the Chair is that the Early Career Hydrogeologists Network (ECHN) met for the first time at GSA in Denver in September to set the stage for activities for this year. Adam Milewski, Chair; Katie Markovich, Vice Chair; Rory Cowie, Treasurer; and Racha El Kadiri, Secretary are interested to hear from you. The IAH USNC ECHN has a Facebook page, is on LinkedIn, and has a website, so please take time to access these and learn more about how you can participate in ECHN activities.

Many other activities in which the USNC is involved are covered in this newsletter. We welcome your input and would like for you to become even more active in 2017. Hop on board and make the ride even more exciting.

Jim

A Note from the IAH Vice President for North America

My name is Joanne Thompson, and I am the new Vice President for North America for the IAH, taking over the role from David Kreamer. Dave has moved up to the position of Vice President for Science and Programme. I offer my thanks to Dave for his work as VP for North America and wish him well in his new role.

I would like to introduce myself to your chapter. Unlike many on the Council, I am not an academic. I am a consultant, working for an engineering firm just outside of Toronto in Ontario, Canada. The focus of my work these days is assessment of urban development impacts to shallow groundwater flow systems and groundwater/surface water interactions. I have a B.Sc. degree in geology from McMaster University in Hamilton and an M.Sc. in petroleum hydrogeology from the University of Alberta in Edmonton. I had the great pleasure to work there with Dr. Joseph Tóth, who sparked my interest in the IAH as well as regional groundwater flow.

For almost 20 years, I served on the Executive Council of the Canadian National Chapter (CNC) of the IAH. During that time, I had a great opportunity to work with some terrific folks as we built the organization to a strong and vibrant chapter with over 350 members and a healthy bank account. I have not had much interaction with the U.S. chapter executives yet although I have met a number of members. I hope to participate in meetings and conference events and get to know the US chapter better this year.

I certainly recognize that the Canadian chapter faces some of the same challenges as the American chapter. With such large geographic areas to cover and relatively small membership numbers, it is difficult to hold independent meetings and events. For the CNC, partnering with larger organizations for conferences, in particular the Canadian Geotechnical Society, provided us with good opportunities for annual national meetings. Over the last several years there has been more and more communication between the U.S. and Canadian chapters and there was great participation by Canadians and Americans in the 2012 IAH Congress held in Niagara Falls. It sparked interest for holding a joint U.S. national chapter/Canadian national chapter conference, and while challenges of geography, timing and theme continue, I think we will get there eventually.

In the meantime, I will draw your attention to an upcoming symposium on characterizing regional groundwater flow systems to be sponsored by the CNC, and organized by the IAH Commission on Regional Groundwater Flow in cooperation with the IAH Commission on Groundwater and Energy. This will be in Calgary, Alberta in June 2017. For details, please visit: https://regionalgwflow.iah.org/activities/calgary-symposium-2017

Please contact me if you have any questions or concerns. I will support the membership in any way that I can. I would appreciate being kept 'in the loop' on US IAH activities, events and conference involvement – please email at any time at joannethompson@rogers.com. In particular, I am interested in the Early Career Hydrogeologists Network (ECHN) and am excited that a U.S. group has been established.

Cheers,

Jo

Note from the Vice President for Science & Programme: Report on IAH Executive Meeting in Dorchester on Thames, England, March 2-4, 2017

The IAH Executive Council includes the IAH President, Executive Director, Secretary General, Vice President for Finance, and the Vice President for Science and Programme. Invited guests also attend the meetings and provide special reports. The Executive Council covered a wide range of topics at this meeting, and if anyone wants to discuss any of these issues in depth, please do not hesitate to contact me. An Action Plan for 2017 was developed and is being sent to Council representatives.

In rainy old England, the Board welcomed a new Executive Director, Ian Davey, who will be formally taking over on April 1, 2017 from John Chilton, who has done a marvelous job over the last nine years. There is a period of overlap between the two Directors, but Ian is coming up to speed very quickly. Retrospectives and review of past Congresses were on the agenda, as was discussion of the upcoming Congresses in Dubrovnik, Croatia on the 25th through 29th of September 2017 (http://iah2017.org/), and in Daejeon, Korea in September of 2018. Please note the upcoming deadlines for abstract submission. These are absolutely beautiful venues and are shaping up to be informative and first-rate conferences – check out the websites!

The Executive Council reviewed past and projected budgets, the status of our publications (both journal and book series) and appraised our upward membership trend. In North America, we went from 583 members to 671 members, and overall IAH membership increased to 4,169 in 2016. The Executive Council very much wants to support individual national chapters encouraging yearly membership renewal, new membership, and sponsorship of new members from developing countries and students. From our Education Working Group, IAH has developed a Strategic Overview Series, which consists of short, 3-6 page summaries of important groundwater issues (https://iah.org/knowledge/learning-resources) which has become very useful in discussions with decision makers, agencies, and local and global organizations. Other topics addressed by the Executive Council included a review of the status of our Commissions and Networks (if you're new to IAH, check out https://iah.org/groups/commissions-networks) particularly if you'd like to get involved, and National Chapters including the U.S. National Chapter - info at (https://iah.org/groups/national-chapters). New national chapters in the last year were established in Iraq, Turkey, Brazil, Tunisia, and Mongolia, with possible new national chapters to be established in Nepal and Lebanon in the coming year. Income disparity was addressed with new efforts targeted at developing sponsors for specific IAH initiatives. Approximately 250 members and student members from developing countries are supported by IAH and by individual donations of members. The Burdon Network for International Development continues to carry out projects in hydrophilanthropy.

Several years ago a "Forward Look" initiative was begun, with defined goals, benchmarks, and defined milestones. Progress on this initiative has been good. International liaisons with other water groups and global initiatives were also reviewed. IAH liaises with many groups including UNESCO, the World Water Council, the World Bank, and NGWA, and is involved in many global groundwater enterprises. IAH Awards were discussed, which have been established to recognize achievement in groundwater science. Typically IAH awards were only given on the international level, but a new

category of awards from the national chapters has just been established, the National Honorary Memberships.

All told, the Executive meeting was successful, and the future of IAH looks very good. I look forward to the next few years of IAH, and invite all members to engage in our activities and programs!

Dave Kreamer, Vice President for Science and Programme

Updates on IAH/USNC Activities and Items of Interest

Alan Fryar Receives 2016 IAH/USNC International Service Award

Dr. Alan Fryar, Department of Earth and Environmental Sciences, University of Kentucky, was presented with the 2016 International Service Award during the Hydrogeology Division Luncheon at the fall 2016 Annual Meeting of the Geological Society of America, held in Denver, Colorado. The Award recognizes the efforts of hydrogeologists based in the United States who have shown an outstanding commitment to assisting the international community with groundwater-related needs. Selection is based on exceptional work in assisting those outside of the U.S. (particularly in developing countries) with developing, managing, or protecting groundwater resources for public and/or ecosystem benefit.

Dr. Alan Fryar (right) receives plaque for International Service Award from Andy Manning (left).

Alan was selected based on his study of groundwater arsenic in West Bengal, India and other work in Morocco, Turkey, Indonesia, China, Bangladesh, Thailand, India, Saudi Arabia, and Pakistan. He co-developed the ARCHES (Advancing Research & Capacity in Hydrogeologic Education and Science) program, which has trained over 40 graduate students from the Middle East and Southeast Asia (http://arches.wrrs.uga.edu).

Please consider submitting a nomination for a suitable candidate for the 2017 International Service Award. Submission deadline is August 1. Send nominations to Andy Manning (amanning@usgs.gov).

Early Career Hydrogeologists Network (ECHN) Update

Hi Everyone!

We have lots of new and exciting developments from our ECHN. First, we had a good icebreaker event at Wynkoop Brewery during the GSA Meeting in Denver last September. We anticipate doing this event again at the upcoming 2017 GSA Annual Meeting in Seattle. Stay tuned for more details in the coming months.

We are excited to announce the launch of our new website (http://echn-usa-iah.org). It is still being updated so please continue to check back often to see our new changes. We hope it can become a valuable resource to early career hydrogeologists, provide a way to connect with one another, and take part in our ongoing activities.

Speaking of activities, we are looking to formalize our 'find a mentor' program where ECHN members will have a chance to communicate with senior hydrogeologists from academia, industry, and government to help them with career development. Again, please email us at echn.iah.usa@gmail.com if

you are interested in signing up for this program as a mentee or mentor. We are also in the process of creating a database of jobs, building an academic and industry database of hydrogeology professionals for potential graduate school advisors, and updating our social media sites.

We are continuing to identify and recruit Early Career Hydrogeologists into our membership. Please let us know if you meet these criteria so we can include you in membership communications. Contact us at echn.usa.iah@gmail.com or check out our Facebook page (ECHN USA IAH) and LinkedIn Group (ECHN USA IAH). We will continue to develop content so check back often. Please feel free to reach out to colleagues and friends about joining the new ECHN and IAH. In other words, we encourage everyone to join IAH and the ECHN (currently free) to take advantage of these opportunities. Student membership prices for IAH are now only €29.

Sincerely,

Adam Milewski (Chair of ECHN: echn.usa.iah@gmail.com)

IAH Appoints New Executive Manager

IAH recently announced that our present Executive Manager, John Chilton, is retiring after eight years in this role. With his energy, ability and integrity, John has made an enormous contribution to IAH over this period.

Following interviews last December, the Association is pleased to announce that Ian Davey will be joining as our new Executive Manager effective on April 1st. Ian is a hydrogeologist with over 30 years of experience working for the Environment Agency in England. In recent years, this has included project management and advisory work outside of the UK, including Poland, Bulgaria and Turkey.

Ian has been a member of IAH since 1987 and is familiar with IAH activities both through his work as treasurer of the British National Committee for several years and his involvement in the *Forward Look* meeting in Reading in 2010. Although John will be a hard act to follow, the Executive Council is confident that the Secretariat will be in good hands with Ian, and John has kindly agreed to help Ian through the transition period.

American Geosciences Institute's Webinar on Flood Risk

The U.S. National Chapter of IAH was a co-sponsor of the February 8th AGI Policy and Critical Issues webinar, *Assessing, Mitigating, and Communicating Flood Risk*. This webinar featured experts from federal and state government, who discussed recent and ongoing activities coordinated at national and local levels to assess, mitigate, and communicate flood risk. There were 794 registrants and 454 live attendees (that's actually an underestimate because a number of people watched in groups using one account). Registrants signed up from 49 U.S. states (plus DC and Puerto Rico), and over 20 countries. AGI has recorded and posted the webinar, along with the speakers' presentation slides and additional resources, on their website at: https://www.americangeosciences.org/policy-critical-issues/webinars/assessing-mitigating-communicating-flood-risk

USNC Members Attend IAH 43rd Congress

The French and German National Chapters of IAH hosted the 43rd IAH Congress in Montpellier, France, which also celebrated the 60th anniversary of IAH. Several members of the US National Chapter attended and participated. The Congress was a great success, with the technical sessions including over 850 abstracts and having 758 registered participants. There were 290 participants who took part in the excellent field visits into the region surrounding Montpellier.

Dave Kreamer with former IAH Council Member Shammy Puri (left) and incoming IAH President Antonio Chambel (right). *Photo*: Jim LaMoreaux

USNC members Dave Kreamer (left), Tim Parker (center), and Jim LaMoreaux (right). *Photo*: Jim LaMoreaux

U.S. participants on mid-week field trip. From left: Nicole and Jim LaMoreaux, Carol and Jack Sharp, and Carol and Tony Daus. *Photo*: Jim LaMoreaux

Saint Clément Aqueduct (18th century aqueduct in the heart of the city). *Photo*: Adam Milewski

Night time street scene in Montpellier during IAH Congress. *Photo*: Adam Milewski

Water Quality Monitoring Across Sub-Saharan Africa: Quick Lessons from the Field with the Aquaya Institute

Alicea Cock-Estab

The Aquaya Institute (Aquaya) is a non-profit research and consulting organization dedicated to expanding safe water and sanitation access in developing countries through science and innovation. We deliver the knowledge and tools that are required to achieve universal access to safe water and sanitation. Founded in 2005 by university researchers, our goals are to combine the methods and rigor of peer-reviewed academic research with practical applied science that supports the needs of development agencies and implementing organizations.

Many of our research questions and consultancies incorporate the need for global water quality data, including our main on-going research initiative, Monitoring for Safe Water (MfSW). Although universal access to safe drinking water is a priority of the post-2015 Sustainable Development Goals[1], collecting reliable water quality data in low-income settings is challenging. MfSW is dedicated to building institutional capacity for water quality monitoring among water suppliers and public health agencies and we have established research partnerships in six African countries: Ethiopia, Guinea, Kenya, Senegal, Uganda, and Zambia. Monitoring data from our partners show that some improved sources (piped private and public groundwater, rainwater, boreholes, and protected springs and dug wells) are as contaminated as unimproved sources (surface water, unprotected dug wells, and springs) (Figure 1).[2] Therefore, expanding the coverage of regulated water quality monitoring and the use of water quality data are essential for local water safety management.

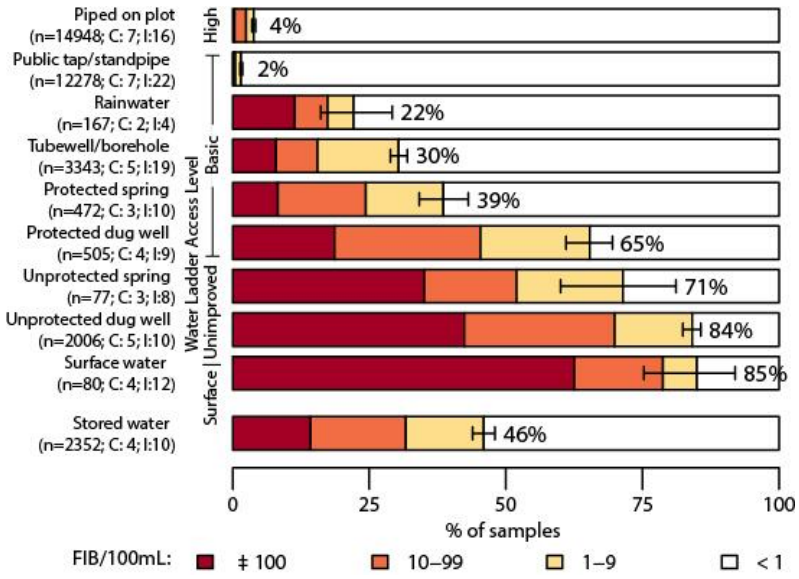


Figure 1: Fecal Indicator Bacteria (FIB) contamination by source type. The water access levels defined by the WHO/UNICEF JMP are shown in the inner y-axis. Details of sample sizes (n), number of countries represented (C), and number of monitoring agencies represented (A) are provided under the source-type information.

Reprinted with permission from Kumpel, E. et al., 2016. Copyright 2016 American Chemical Society.

One method for promoting drinking water safety is the implementation of water safety plans (WSPs), which are based on pro-active risk management approaches from catchment to consumer. Through collaboration with the World Health Organization, Aquaya assessed the impact of WSP implementation in the Asia Pacific region. We identified positive outcomes of WSP implementation, including in

[1] From the United Nations. See http://www.un.org/sustainabledevelopment/sustainable-development-goals/

[2] Kumpel, E., Peletz, R., Bonham, M., Khush, R. (2016). **Assessing Drinking Water Quality and Water Safety Management in sub-Saharan Africa using Regulated Monitoring Data.** *Environmental Science and Technology*. 50,20: 10869-10876.

operations and management practices, increases in water safety-related meetings, and water quality testing activities. Half of the sites reported infrastructure improvements, and many cited increased knowledge and training of water system staff due to WSP implementation.[3] Although there can be major challenges in implementing and measuring the impacts of WSPs, identified benefits can mitigate risks to a water system.

Generally, drinking water safey and water quality monitoring are low priorities in fragile states, or areas of low income that have recently had famine, war, or are otherwise vulnerable. Through assignments with the World Bank and in conjunction with local water suppliers, Aquaya tested water quality in Port Harcourt, Nigeria, for a range of private and public water sources (surface water and groundwater) during the rainy and dry seasons. The goal was to provide information to local governing bodies that will guide water safety management. Port Harcourt lacks substantial piped water infrastructure and residents rely on alternative water sources, including groundwater and commercial packaged water, which are also often contaminated.[4] Drinking water contamination increased from dry to rainy seasons and there were significant associations between fecal contamination of boreholes and the presence of poorly constructed latrines. The deterioratation of water quality in these sources indicated the importance of improving both sanitation infrastructure and water quality treatment.

Through our work in sub-Saharan Africa, we have observed that water and sanitation research in the sector is dominated by American or European-based scientists. There are an increasing number of young Africans studying water and sanitation science in their undergraduate and graduate degrees, but they remain underrepresented among the leading researchers in the field. To address this gap in local research leadership, Aquaya initiated the AquayaLEARN fellowship in 2014. AquayaLEARN (Leading an Empowered African Research Network) provides an opportunity for local graduate students and young professionals to strengthen their water and sanitation research skills by collaborating with Aquaya's international research staff. Through a combination of seminars and experimentation, the AquayaLEARN fellows are mentored by premier researchers dedicated to safe drinking water and better sanitation in Africa. Seminars include research skills such as writing and presenting data, job skills such as communication and time management, and science-specific seminars, including water quality testing methodology and hydrogeology. Research conducted has included, but is not limited to GIS analysis of water quality sampling points, qualitative data analysis on barriers to testing water quality, and assessing the effectiveness of sanitary surveys (Figure 2). Aaron Gichaba, an AquayaLEARN fellow from 2014,

Figure 2: AquayaLEARN fellow, Aaron Gichaba, conducts fieldwork to assess the effectiveness of sanitary surveys.

[3] Kumpel, E., Delaire, C., Peletz, R., Kisiangani, J., Rinehold, A., DeFrance, J., Sutherland, D., Khush, R. (in preparation) **Evaluating Water Safety Plans: Lessons Learned from Assessments in the Asia-Pacific Region.**

[4] Kumpel, E., Cock-Esteb, A., Duret, M., de Waal, D., Khush, R (2016). **Seasonal Variation in Drinking and Domestic Water Sources and Quality in Port Harcourt, Nigeria.** *The American Journal of Tropical Medicine and Hygiene*. Published online November 7, 2016, doi:10.4269/ajtmh.16-0175

conducted sanitary surveys of rural water points in Kisii County, Kenya, such as the open dug well pictured in Figure 2, to understand the relationship of the surveys with the actual water quality. AquayaLEARN provides a hands-on experiential approach in research that will help develop the necessary skills and confidence needed among early career African scientists.

To learn more about The Aquaya Institute and AquayaLEARN, visit our website www.aquaya.org .

AGID Newsletter Reports on Groundwater Depletion in Iran, Saudi Arabia, and China

The recent Geoscience Newsletter issued by the Association of Geoscientists for International Development (AGID) [Dr. Shrikant D. Limaye, Editor], noted that serious groundwater depletion problems have developed in both Iran and Saudi Arabia over the past several decades, and attributes the exacerbation of the problems to mismanagement of limited water resources and flawed agricultural policies. Ancient desert springs were drying up. For example, in discussing the situation in Saudi Arabia, they state, "Half a century ago, Saudi Arabia sat on one of the world's biggest and oldest aquifers, containing an estimated 500 cubic kilometers of water. However, there has been chronic mismanagement of water resources. In one generation most of that massive amount of water has been exhausted, mainly through a seriously flawed agricultural policy." They further state that the aquifer system in northwest China has been experiencing ominous signs like those that Saudi Arabia did a decade ago. Wells are going dry and water tables are dropping fast. The newsletter warns, "A global domino effect has begun. As one country runs low on water, it turns to another, putting more strain on its water reserves. Last year, both China and Saudi Arabia set record-high agricultural imports from the United States. Almarai, one of Saudi Arabia's two main dairy producers, purchased 15 square miles of farmland in the Arizona desert to grow alfalfa for export back to the country. Alfalfa is so water intensive that it requires three to four times more irrigation than wheat. That water comes from the Colorado River, where reservoirs are at an all-time low, threatening the drinking water for Las Vegas, Los Angeles and San Diego." The Newsletter also provides this cautionary note: "The United States has no national plan to monitor the effect these virtual water exports are having on its aquifers."

More information and a link to their newsletter are available on their website at: http://agid-international.org/

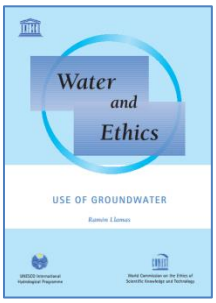
UNESCO Launches Water Information Network System (WINS)

Within the framework of monitoring the Sustainable Development Goals (SDGs), the UNESCO International Hydrological Programme (IHP) launched its Water Information Network System (WINS) on 31 January 2017 at UNESCO HQ, Paris, France. The Water Information Network System is an open source and open access platform that combines geolocalized data. It was developed by UNESCO's International Hydrological Programme to serve as a global reference in the design and support of operations, management, and decision support functions for sound water resources governance. It is also designed to assist Member States in monitoring and implementing the Sustainable Development Goal to "ensure availability and sustainable management of water and sanitation for all" (SDG6). This user-friendly, interactive tool can be used by a wide variety of stakeholders to explore the data and generate customized maps. More information is available at: http://en.unesco.org/ihp-wins

Member News and Notes

Homage to Prof. Ramon Llamas, Water Ethicist

According to a recent blog posting by David Groenfeldt (Water-Culture Institute) on The Water Ethics Network (http://waterethics.org/), the Botin Foundation hosted a celebration in Madrid to honor the career of Prof. Ramon Llamas, former President of IAH and long-time director of the Foundation's Water Observatory, and an early and passionate advocate for water ethics. Prof. Llamas was co-chair of the UNESCO-COMEST initiative on Water and Ethics from 1998-2004, authoring a report on Groundwater Ethics. His interests in ethics were practical; he worked to solve problems of unsustainable water use by identifying basic principles that can lead to more sustainable management (See the Valencia Declaration Annex in his Groundwater report). After the UNESCO program on water and ethics ended in 2004, Prof. Llamas, in his capacity as director of the Botin Water Observatory, sponsored two important symposia on water ethics, which served to maintain a momentum of interest in the topic, within the global water community. The posting concludes with: "Thank-you, Ramon, for your passion, your insights, and your leadership in promoting the study and practice of water ethics!"



Meet the New 2017 IAH/USNC Sponsored Graduate-Student Members

The IAH U.S. National Chapter (USNC) sponsors one-year, graduate-student memberships annually through general funds and through generous individual contributions of our members. This year we are sponsoring five students, nominated by their faculty advisors or professors. The students represent a diverse, ambitious, and accomplished group of graduate students with strong international hydrogeology interests. If you are interested in sponsoring ($39–52/yr) or nominating a student for sponsorship please contact the IAH-USNC Membership Liaison (Devin Galloway, dlgallow@usgs.gov, 916-801-2040).

MAHAWA-ESSA MABOSSANI "ROMEO" AKARA, M.S. Candidate (Hydrogeology), Department of Geography-Geology, Illinois State University (Nominated by: Dr. Eric W. Peterson, Professor [Advisor], Department of Geography-Geology, Illinois State University). makara1@ illinoisstate.edu; http://geo.illinoisstate.edu/hydrogeology/students/

Romeo earned a B.S. in Geosciences from the University of Lome (Togo). He worked for five years with a water-supply drilling company in Togo and has work experience in Ghana. As a Fulbright grantee, Mahawa-Essa's thesis research at ISU concerns the application of seismic refraction methods to determine the effects of tile drainage diversion on the water table in a riparian buffer. Romeo is in his second year of the M.S. Hydrogeology Program at ISU and plans to pursue a Ph.D. His specific areas of interest are aquifer characterization in fractured areas, water resources management and evaluation, and groundwater-flow modelling. His professional goal upon completion of the Ph.D. is to work in the research and development sector, by advancing technologies that ensures a sustainable use of groundwater resources and the resilience to climate change.

MACKENZIE CREMEANS, Ph.D. Candidate (Geology), Department of Geology, University of Kansas (Nominated by Dr. Gwendolyn L. Macpherson, Professor and Director, KU Plasma Analytical Laboratory, Department of Geology, University of Kansas). mackenziecremeans@ku.edu; https://selfgraduate.ku.edu/mackenzie-m-cremeans

In 2014, Mackenzie earned a B.A. in Environmental Geoscience and English Literature from DePauw University. Now, she is a 2014-2018 Madison and Lila Self Graduate Fellow at the University of Kansas. Mackenzie's main research area is in Denmark, where she has worked to characterize groundwater-surface water exchange and contaminant fluxes at a site affected by chlorinated ethenes. To study these interactions, she has designed, fabricated, and validated a new point measurement device to quantify exchange occurring directly at the groundwater-surface water interface. In addition to her research, Mackenzie has worked to develop an outreach program designed to break down barriers between scientists and the public. Upon completion of her degree, Mackenzie hopes to continue working in the research and education sectors while engaging communities in conversations about their local watersheds. To her, membership in IAH presents a great opportunity to engage in the international dialogue surrounding contaminant research.

BENJAMIN (BEN) CURRENS, Ph.D. Candidate (Hydrogeology), Department of Earth and Environmental Sciences, University of Kentucky (Nominated by Dr. Alan Fryar [Advisor], Department of Earth and Environmental Sciences, University of Kentucky). ben.currens@uky.edu; https://ees.as.uky.edu/users/bcu223

Ben completed B.S. degrees (2012) in Earth and Atmospheric Science – Geological Sciences, and Development Sociology from Cornell University, and an M.S. (2016) in Earth and Environmental Sciences at the University of Kentucky where his thesis focused on modeling of oxygen-18 transport in a regional clastic aquifer system. As an NSF Graduate Fellow, he is pursuing a Ph.D. on temporal variability in groundwater recharge, storage, and discharge in karst terrains. Ben has been conducting preliminary studies in central Kentucky, but his main emphasis will be on field studies at the Puding Karst Ecosystem Research Station Guiyang Province, China. His research interests lie primarily within hydrogeology and the response of aquifers to climate change.

KALLE JAHN, Ph.D. Candidate (Geology), Department of Geosciences, The Pennsylvania State University (Nominated by Dr. Tess Russo [Advisor], R.L. Slingerland Early Career Professor, Department of Geosciences, The Pennsylvania State University). klj15@psu.edu; http://www.geosc.psu.edu/content/kalle_jahn

Kalle received a B.A. (2014) in Geosciences from Williams College. He is working with Dr. Russo on hydrogeologic research in South America. Kalle's current research in Brazil and Colombia focuses on the impacts of agricultural intensification on groundwater quality and storage. Kalle looks forward to engaging with local stakeholders and scientists during his graduate career, and views IAH as an excellent resource for networking, workshops, and conferences as he completes international fieldwork and communicates his findings.

NATHAN L. YOUNG, Ph.D. Candidate (Hydrogeology), Department of Geological and Atmospheric Sciences and the Environmental Science Interdepartmental Graduate Program, Iowa State University (Nominated by Dr. William W. Simpkins, Professor [Advisor] and Chair, Department of Geological and Atmospheric Sciences, Smith Family Foundation Departmental Chair in Geology, Iowa State University). Nlyoung23@gmail.com; https://enscigrad.iastate.edu/directory/nathan-young/

Nathan earned a B.A. from Earlham College (2012) with a double major in geology and sociology/anthropology. In 2014, he completed a M.S. in Earth and Environmental Science at Wright State University, where his research involved modeling heat flow in groundwater for geothermal purposes. Nathan's current research focuses on developing and applying an equivalent porous media (EPM)-based method to upscale groundwater flow and nitrate transport in fractured till deposits from large core scale to the watershed scale in Iowa. He is interested in working on till in Denmark, and indicates that he would benefit from becoming more familiar with the broader international IAH community and its research, particularly elsewhere in Europe where fractured till deposits and nitrate contamination are also common. Nathan received one of five Hydrogeology Division Student Research Awards at the 2016 Geological Society of America meeting in Denver.

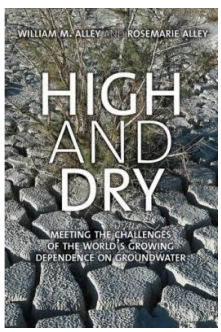
Illangasekare Receives 7th Prince Sultan Bin Abdulaziz International Award for Groundwater

As announced by the InterPore Newsletter (Oct. 28, 2016), Prof. Tissa H. Illangasekare, Colorado School of Mines, and President-Elect of InterPore, is the recipient of the 7th Prince Sultan Bin Abdulaziz International Prize for Water (PSIPW) (http://www.psipw.org/index.php). This is a leading, global scientific award focusing on cutting-edge innovation in water research. It gives recognition to scientists, researchers and inventors around the world for pioneering work that addresses the problem of water scarcity in creative and effective ways. The prize was awarded to Dr. Illangasekare for his work to improve the fundamental understanding of fluid flow and chemical transport in porous media through innovative multiscale experimentation and modeling, leading to the reliable prediction of the long-term fate of pollutants in groundwater systems and the behavior of multiple phase fluids in shallow and deep geologic formations.

His research on the fundamental understanding of the behavior of multiphase fluids in heterogeneous porous media has addressed issues of the permanent storage of CO_2 in deep geologic formations, with particular focus on the trapping of CO_2 and potential leakage to shallow aquifers, mathematical modeling of multiphase flow, the effect of geologic heterogeneity in enhancing capillary and dissolution trapping of supercritical CO_2, and benchmark modeling study of CO_2 gas evolution in groundwater systems.

Congratulations to Dr. Illangasekare.

Former IAH/USNC Director and Wife Team-up on New Groundwater Book



Bill Alley, a former IAH U.S. National Chapter Director, and his wife, Rosemarie, have published a new book, *High and Dry: Meeting the Challenges of the World's Growing Dependence on Groundwater*, published by Yale University Press. A first-of-its kind for a broad audience, the book draws on examples from around the world, including the United States, Canada, Australia, India, and sub-Saharan Africa, to examine groundwater in an engaging narrative format. The book includes stories of people who are making a difference in protecting this critical resource. The Alleys previously coauthored the book *Too Hot to Touch* on the science and politics of nuclear waste.

Collaborative Hydrogeological Research in Italy

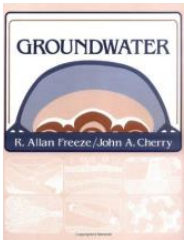
The ISRA/UCONN research team conducting DO alteration testing at the experimental well field at IRSA in Bari, Italy (Dr. Robbins is on the left).

While on sabbatical in Italy in the spring and summer of 2015, Dr. Gary Robbins, Professor of Geology, Department of Natural Resources and the Environment, at the University of Connecticut, conducted joint research with staff of the Consiglio Nazionale delle Ricerche (CNR), Istituto di Ricerca sulle Acque (IRSA) in Bari, Italy. They began testing the use of the dissolved oxygen alteration method as a means to characterize groundwater flow in wells in karstic limestone. This is an approach successfully used by Dr. Robbins in fractured crystalline bedrock wells in Connecticut. To help continue the work and expand joint research into other groundwater related areas, the University of Connecticut and the CNR IRSA developed a memorandum of agreement for academic cooperation in sustainable management of water resources. They presented their initial results at the 2016 European Geophysical Union in Vienna, Austria.

Dr. Robbins also spent a portion of his sabbatical at the Dipartimento di Scienze Geologiche of the University of Roma Tre. UCONN and Roma Tre have developed a formal agreement to promote cooperative research and teaching in natural resources and geosciences between the institutions.

Groundwater News of Interest

"Groundwater" Textbook by Freeze and Cherry Available On-Line



As announced by IAH in December, the classic groundwater textbook, "Groundwater," by Allan Freeze and John Cherry has been made available for downloading by *Hydrogeologists Without Borders*. More information and a link to the pdf files are available at: http://hydrogeologistswithoutborders.org/wordpress/ Their site also includes a blog containing many notes and stories of interest to hydrogeologists. The mission of *Hydrogeologists Without Borders* is to build capacity in emerging regions to provide safe, sustainable water supplies. One of their several goals is to facilitate increased application of sound hydrogeological principles and practices in aid and development programs.

Finnish Radioactive Waste Repository Progress

The Finnish Government granted a construction license for a final underground radioactive waste disposal facility in November 2015. The Radiation and Nuclear Safety Authority in Finland (STUK) has concluded in the decision it issued on November 25, 2016 that the construction of the final disposal facility can start. The decision and the contract that has now been awarded make it possible to launch the first licensed work phases of the final disposal facility as referred to in the construction license. Excavation work started in December 2016. The total length of this project phase will be about two and a half years.

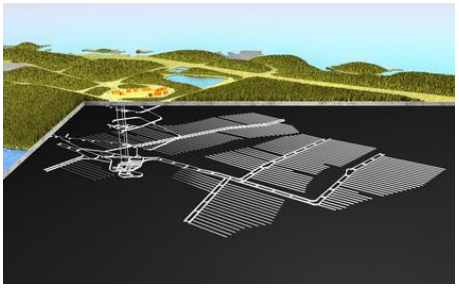


Photo: Posiva Oy

IGRAC Launches GGIS Viewer for DIKTAS Project in Balkan Peninsula

As announced recently by the International Groundwater Resources Assessment Centre (IGRAC), they have launched a new viewer with groundwater information from the Dinaric Karst region of the Balkan Peninsula. This map viewer contains the results from the DIKTAS project (http://diktas.iwlearn.org/) and is part of the Global Groundwater Information System (GGIS: https://www.un-igrac.org/global-groundwater-information-system-ggis). The viewer is designed to provide information to a wide group of stakeholders, like groundwater users and those engaged in the management of the groundwater resources in the region. The Dinaric Karst Aquifer System, shared by several countries and one of the world's largest, has been identified as an ideal opportunity for applying new and integrated management approaches to these unique freshwater resources and ecosystems. This launch is especially timely because the next IAH Congress will be held in Croatia.

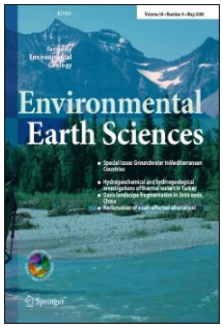
IGRAC's Online Africa Groundwater Atlas

Last September, IGRAC also announced that the British Geological Survey (BGS) has developed the Africa Groundwater Atlas in partnership with the International Association of Hydrogeologists (IAH) Burdon Groundwater Network for Developing Countries and with more than 50 collaborating groundwater experts across Africa. The new online Africa Groundwater Atlas is an introduction to the groundwater resources of 51 African countries, and a gateway to further information. For each of 51 African countries, the Africa Groundwater Atlas provides new overview geology and hydrogeology maps and summaries of the key geological environments and aquifers in each country. There are sections on groundwater status, use and management, including groundwater monitoring, with up to date information on the national organizations involved in groundwater development and management. There is supporting material on geographical setting, climate, surface water, and soil and land cover, with accompanying maps; and finally, there are references and links to more detailed information for those wishing to find out more. Also available is the Africa Groundwater Literature Archive, which enables users to search (geographically and by keyword) and freely access thousands of articles, reports, and other documents about African groundwater.

Global Forest Watch Water

The World Resources Institute recently announced Global Forest Watch (GFW) Water, a global mapping tool that examines how threats to natural infrastructure affect water security throughout the world. GFW Water helps users quickly and easily map watersheds, which are increasingly affected by upstream deforestation, fire, and erosion. GFW Water can help identify cost effective, natural infrastructure solutions for investing in watersheds, such as landscape restoration, which helps solve complex water challenges such as drought, flooding, and water pollution. With GFW Water, one can access spatial data sets, forest-related statistics, and risk scores for all 230 major watersheds around the world. One can also gather data, explore trends, and gain insights about regional opportunities to enhance water security and bolster economic development.

Springer Nature and Journal Editors Team Up in Project for Developing Countries



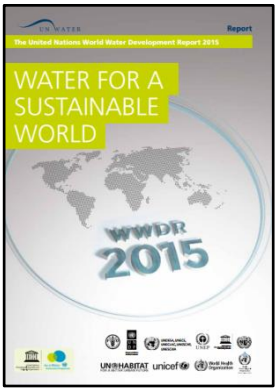
A new initiative started by Springer's journal *Environmental Earth Sciences* will enable people in developing countries to gain access to safe drinking water. For every review completed for a paper in the journal in 2017, Springer Nature will donate one household water filter – on behalf of the peer reviewers of this journal – to the non-profit humanitarian organization "Filter of Hope." The water filters remove the bacteria, protozoa and microorganisms from contaminated water sources making it safe to drink.

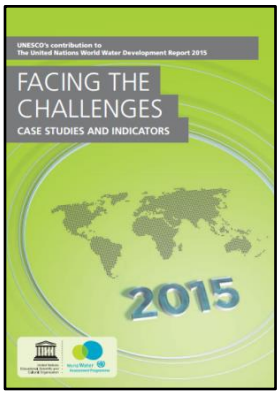
"Springer Nature, its editors, reviewers and staff are pleased to be part of this exciting project. Our reviewers are integral to providing a quality product to our subscribers and we wanted to reward them. They liked the idea of being able to donate to a charitable organization, so we developed a relationship with 'Filter of Hope' as a way for them to contribute," said Jim LaMoreaux, Editor of *Environmental Earth Sciences*. He added, "Students, many from the same universities as the reviewers, travel to developing countries to distribute and educate individual households on how to install filters that will provide clean drinking water. In this way, the reviewers and future generations can contribute to mitigating the global water crisis."

"Filter of Hope – Clean Water for Life" is a non-profit organization that serves people in over 40 countries (http://www.filterofhope.org). Their goal is to change the world through the distribution of highly effective and affordable water filters. Their work depends on global distribution organizations and funding partners that include foundations, corporations, philanthropic families, schools, churches, humanitarian groups and young people all across the world.

Environmental Earth Sciences is an international multidisciplinary journal concerned with all aspects of interaction between humans, natural resources, ecosystems, special climates or unique geographic zones, and the earth. Its aim is to improve and remediate the environment as a habitat for life on earth. More information about the journal is available at http://www.springer.com/journal/12665

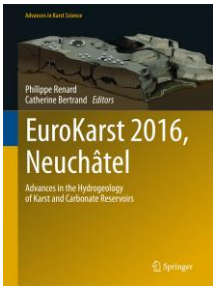
United Nations World Water Development Reports





The 2015 World Water Development Report, "Water for a Sustainable World," demonstrates how water resources and services are essential to achieving global sustainability. Taking account of economic growth, social equity and environmental sustainability, the report's forward-looking narrative describes how major challenges and change factors in the modern world will affect – and can be affected by – water resources, services and related benefits. The report provides a comprehensive overview of major and emerging trends from around the world, with examples of how some of the trend-related challenges have been addressed, their implications for policy-makers, and further actions that can be taken by stakeholders and the international community. A companion report, "Facing the Challenges," presents case studies and indicators. These reports can be downloaded from links on UNESCO's World Water Assessment Programme web page at: http://www.unesco.org/new/en/natural-sciences/environment/water/wwap/wwdr/2015-water-for-a-sustainable-world/

EuroKarst 2016, Neuchâtel: Advances in the Hydrogeology of Karst and Carbonate Reservoirs



This new book includes 35 chapters that present the latest advances in the field of karst hydrogeology and carbonate reservoirs. These include, but are not limited to geomorphology of karst, flow and solute transport in karst; innovative metrology; modeling; speleogenesis and geology of carbonate reservoirs; deep reservoir exploration and production; water management and protection in karst environments; contaminant migration and chemical behavior; hydrochemistry and regional aquifer studies. More information about the content and purchasing the book are available at: http://www.springer.com/gp/book/9783319454641. It is the first in the new book series *Advances in Karst Science*.

The book is an official publication of the EuroKarst 2016 Conference held last September in Neuchâtel, Switzerland. EuroKarst (http://www.eurokarst.org/) offers a platform for professional exchanges between field practitioners and academic researchers. It is the European biennial conference on the hydrogeology of karst and carbonate reservoirs. The Universities of Neuchâtel (Switzerland), Besançon (France), and Malaga (Spain) organize it every two years.

New Book on Oldest Hydrologists of the World

Dr. Jim LaMoreaux is one of 30 authors of the new book, *Oldest Hydrologists of the World: Scientific and Popular Memories*, published under the auspices of the Russian Union of Hydrogeologists (RosGidroGeo). The book presents in a scientific and journalistic form the memoirs of authors from the former Soviet Union, Canada, United States, and China among others. Additionally it addresses ideas for the development of global research in the field of water sciences in the 21st century.

Dedicated to the 70th anniversary of UNESCO, the 60th anniversary of International Association of Hydrogeologists (IAH), and the 110th anniversary of Russian and Belarusian Hydrogeologist G V Bogomolov, the book will be presented in March 2017 at the Third Congress of RosGidroGeo in Moscow, Russia. The chapter written by Dr. LaMoreaux is *Noted Names in Hydrogeology – Dr. Philip E. LaMoreaux – Dr. James W. LaMoreaux*. Copies of the book are available from RosGidroGeo at http://eng.rosgidrogeo.com/ .

Upcoming 2016/2017 Meetings and Conference Notes

GSA Annual Meeting, Seattle, Oct. 22-25, 2017

The 2017 Annual Meeting of the Geological Society of America (GSA) will be held in Seattle, Washington, October 22-25. A highlight will be the Seattle-area geology: Glaciation, deposition, tectonics, crustal deformation, unconformities, erosion, bedrock structures, and drumlins—and of course hydrogeology. The abstract submission deadline will be in July, but an exact date is not yet available. For more information and updates, please go to the meeting website: GSA Annual Meeting 2017. IAH/USNC will hold a business meeting during this Conference, co-sponsor sessions, and have an ECHN get-together—times and locations to be announced. Hope you can attend.

GSA Session to Honor Dr. Jack Sharp

Jack pumps a town well in Poland during 2010 IAH Congress.

John M. (Jack) Sharp, Jr. has been a pillar of hydrogeology in local, regional, national, and international circles for over 40 years, and a long-time active and leadership member of both IAH and GSA. This GSA session at the next Annual Meeting in Seattle, Washington, October 22-25, will honor Jack and his contributions to the field of hydrogeology. The title of the session is "*In Honor of John M. (Jack) Sharp Jr.: Celebrating over 40 Years of Science, Students, and Stewardship*." Jack's career includes numerous contributions to the field of hydrogeology through his scientific developments, his tireless devotion to professional service, and his steadfast commitment as a mentor for future scientists. Contributions are sought in the fields that Jack holds special, including urban hydrogeology, flow in fractured media, regional groundwater flow systems, karst hydrogeology, sustainable yield, groundwater decision support, and groundwater management. Please consider submitting an abstract to help honor Jack's role in advancing the science and practice of hydrogeology. For more information, please contact Marcus Gary <mgary@edwardsaquifer.org> or Wendy Robertson <rober2w@cmich.edu>.

44th IAH Congress, Dubrovnik, Croatia, September 2017

The 44th IAH Congress will be in Dubrovnik, Croatia, Sept. 25-29, 2017. The main theme is "Groundwater Heritage and Sustainability." Nine main congress topics are established under this theme: T1. Groundwater Heritage – Passing Benefits to Current and Future Generations; T2. Sustainable Management of Groundwater Resources; T3. Groundwater Modelling; T4. Groundwater Monitoring – New Approaches; T5. Groundwater in Karst Systems; T6. Coastal and Island Hydrogeology; T7. Groundwater and Dependent Ecosystems; T8. Hydropower and Geothermal Energy; and T9. Mineral Waters and Human Health. **The abstract submission deadline is March 15th,** 2017. Acceptance of abstracts will be posted by 30th April 2017. You can submit Abstracts online via web page http://iah2017.org/abstract-submission/.

Post-congress excursions include visits to famous localities in the Dinaric karst. The city of Dubrovnik is the jewel of Croatian tourism, occupying a spectacular location on the eastern Adriatic coast. The city was declared a World Heritage Site by UNESCO in 1979.The congress will be held at the Dubrovnik Palace hotel—a short distance from the historic center of Dubrovnik, where you can enjoy the renaissance architectural and cultural monuments. More details and updated information are available on the Congress website at: http://iah2017.org/

NGWA 2017 Groundwater Summit:
Instrumental to Your Research and Practice

Join fellow industry professionals from around the world at the National Groundwater Association's (NGWA's) 2017 technical conference, the Groundwater Summit, which will be focusing on "*Instrumental to your research and practice.*" This event will be in Nashville, Tennessee, December 4-7, 2017 in conjunction with NGWA's "Groundwater Week" (formerly referred to as the Expo). The Summit offers opportunities to share your research, knowledge, and expertise and to network.

Abstracts for the Groundwater Summit are sought on topics related to:

- Availability and sustainability
- Broad implications of emerging contaminants to water policy
- Emerging contaminants
- Groundwater and energy
- Groundwater and integrated water management
- Groundwater modeling
- Groundwater monitoring
- Groundwater remediation, including combined remedies
- Integrating science into the consulting business
- Karst hydrology
- Managed aquifer recharge

- Mississippi Alluvial Plain groundwater project
- Surface water/groundwater Interaction
- Water quality and treatment
- Well design and life cycle

See http://groundwatersummit.com/ for more event details and/or to submit an abstract. **Abstracts are due April 28, 2017.**

Characterizing Regional Groundwater Flow System Symposium Calgary, Canada, June 26-28, 2017

The Canadian National Chapter of IAH will host a Symposium on "Characterizing regional groundwater flow systems: Insight from practical applications and theoretical development," organized by the IAH Regional Groundwater Flow Commission (in cooperation with the IAH Commission on Groundwater and Energy). This international symposium will examine the current state of the regional groundwater flow concept, discuss any recent theoretical advancement, and share experiences from applications spanning energy exploration to environmental management. Themes include Water Management (including *Groundwater dependent ecosystems* and *Isotopic and geochemical fingerprinting*), Economic Reserves Exploration (*hydrocarbons, geothermal,* and *ores*), Theory (including *Basin hydrodynamics* and *density effects*), and Waste Disposal (including CO_2 *sequestration* and *Repositories*). This event will include two optional 1-day field excursions in southern Alberta to learn more about the history of Canadian hydrogeology and hydrocarbon exploration. More information is available on the Symposium Website: https://regionalgwflow.iah.org/activities/calgary-symposium-2017

GeoOttawa 2017

The Canadian Geotechnical Society (CGS) in collaboration with the Canadian National Chapter of the International Association of Hydrogeologists (IAH-CNC) is organizing **GeoOttawa 2017**, the 70th Canadian Geotechnical Conference and the 12th Joint CGS/IAH-CNC Groundwater Conference. The conference will be held at the Shaw Centre in Ottawa, Ontario, Canada from Sunday, October 1 to Wednesday, October 4, 2017.

The theme for GeoOttawa 2017 is *"70 Years of Canadian Geotechnics and Geoscience."* The organizers will build on this conference theme throughout the technical program and social activities and plan to remind delegates of the extensive contributions of geotechnical and hydrogeological practitioners to Canada's built form since the Canadian Geotechnical Society was founded 70 years ago. In addition to the technical program and plenary sessions, the conference will include a complement of local tours and short courses.

As Canada's capital, Ottawa is a showcase city of more than one million people. Located in Ontario at the Quebec border, it's a city steeped in culture, with world-class museums and galleries displaying stunning national collections and special exhibitions from Canada and around the world. In addition, as 2017 is Canada's sesquicentennial, Ottawa will be the epicenter of the country's 150th birthday celebrations of which **GeoOttawa 2017** will be sure to be a part. .

GROUNDWATER RESOURCES ASSOCIATION of CALIFORNIA

SGMA CONFERENCE - TOOLS FOR DEVELOPING A GSP
May 3-4, 2017
Modesto, CA 95354
https://www.grac.org/events/64/

A critical step for compliance with California's 2014 Sustainable Groundwater Management Act (SGMA) is the development of a successful Groundwater Sustainability Plan (GSP). This conference focuses on tools and techniques that can support key elements and programmatic considerations for GSP development. The conference program provides policy-makers, stakeholders, regulators, and other government entities, NGOs, consulting professionals and practitioners, growers, and landowners the opportunity to present their work. They will be able to interact and learn about the emerging best management practices (BMPs); quantifying measurable objectives for GSPs under the six criteria defined by the SGMA for groundwater sustainability; and new research on water availability, streamflow depletion, and groundwater dependent ecosystems (GDEs). Featured topics include:

- BMPs for Sustainable Groundwater Management (Groundwater Monitoring Networks; Water Budgets; Hydrogeological Conceptual Models; and Modeling)
- Quantifying GSP Measurable Objectives (Groundwater Data Collection and Uses; Subbasin Baseline Assessment - Methods for Hydrogeological Analysis; Practices, Techniques, and Tools in Hydrologic Modeling; and California's Open and Transparent Water Data Act)
- Water Available for Replenishment (Beneficial Use of Water in Replenishment; Type and Timing of Water Available for Replenishment; and Effects of Climate Change Scenarios on Water Availability)
- Stream Depletion and Groundwater Dependent Ecosystems (Understanding and Quantifying Surface/Groundwater Interactions; GDE Impacts/Mitigation; and Field Methods and Simulation Approaches)
- Legal, Policy and Regulatory Compliance

Other GRA Event Planning Underway: Check www.grac.org for Updates

- Advanced Numerical Modeling Course: May 15-17, 2017
- Geophysics Event: September 2017
- GRA 2017 Conference and 26th Annual Meeting: October 3-4, 2017; Sacramento, CA
- Groundwater Law Symposium: November 2017

World Water Congress

The XVIth World Water Congress (http://www.worldwatercongress.com/) will take place in Cancun, Mexico, May 29 – June 2, 2017. This triennial event, organized by the International Water Resources Association, is one of the principal global water events featuring opportunities for

interdisciplinary presentations, collaborations, and other events. Since 1971, these Congresses have been the breeding ground for major themes and trends in the global water agenda. They have also brought together a large cross-section of stakeholders to share experiences, present new knowledge, and explore implementation of policy decisions around the world. Congresses typically attract 1,000 or more attendees including leading academics from the natural and social sciences, practitioners and industry leaders, policymakers and intergovernmental officials, and students from around the world.

And YES, groundwater resources are a critical component of the Congress agenda. While it may not be explicit, groundwater issues will be incorporated into the various sessions and panels (including High Level Panels) and featured in a number of Special Sessions. Gabriel Eckstein, a long-time member of the IAH-U.S. National Chapter, serves as Chair of the International Scientific Committee and welcomes all inquiries and proposals from IAH-U.S. National Chapter members. He can be reached at gabrieleckstein@law.tamu.edu.

IAH Conference on Groundwater in Fractured Rocks

Grupo Português da Associação Internacional de Hidrogeólogos

GwFR'2017 – International Conference on Groundwater in Fractured Rocks – will be in Chaves, Portugal during June 5-7, 2017. It is organized by the IAH Network on Fractured Rock Hydrogeology and the IAH Portuguese and Spanish Chapters of IAH. The conference aims to join groundwater specialists in fractured rocks worldwide and will have a session dedicated to honor the memory of our colleague Jiri Krásny, who was the main inspirer of these meetings and the founder of the Commission that was the origin of the actual Network. The conference will be in the Forte de S. Francisco Hotel, in Chaves, in North Portugal, in a fractured rock environment, where mineral and thermal waters coexist with water from the phreatic fractured aquifers. The conference will include a field trip in the region. The official language will be English. The abstracts and final papers will be all in English. More information is available at https://portugal.iah.org/gwfr2017

Australasian Groundwater Conference, Sydney, July 2017

The Australian National Centre for Groundwater Research and Training (NCGRT) and the Australian Chapter of IAH are together sponsoring a conference to examine the multi-dimensional challenges affecting the sustainable development of the groundwater resources in the Australasian region. The theme for this Conference is Groundwater Futures: Science to Practice. The conference will be in Sydney during July 11-13, 2017. More information and details are available on the Symposium Website at: http://www.groundwater.com.au/agc17

International Conference on Novel Methods for Subsurface Characterization and Monitoring: From Theory to Practice June 6-9, 2017, Dresden, Germany

The International Conference **NovCare 2017** (Novel Methods for Subsurface Characterization and Monitoring: From Theory to Practice) will take place June 6-9, 2017 at Technische Universität Dresden in Germany. Dresden is a beautiful city on the river Elbe with buildings from the Renaissance, the Baroque, and the 19th century and a must-see city in Germany.

The four-day topical NovCare 2017 conference will bring together environmental researchers and practitioners to discuss the latest developments in subsurface characterization and monitoring. Various topics on exploration and monitoring technologies, data assessment of natural and anthropogenic environmental impacts, as well as data integration into numerical models to improve process understanding will be presented to this broad audience of scientists, consultants, and decision makers.

Further information can be obtained at (www.ufz.de/novcare). Please note the deadline for early registration fees is **April 1, 2017.**

ICGW—International Conference on Groundwater August 28-31, 2017, Bogota, Colombia

The International conference on groundwater – ICGW 2017 – honors the 150th anniversary of the National University of Colombia. It is organized by the School of Engineering, the Bogota Young Professional Network of the International Association for Hydro-Environment Engineering and Research (IAHR YPN Bogotá), and with the support of the International Society for Porous Media (INTERPORE). This meeting intends to present the latest advances in several topical themes, including: Sustainable groundwater management; Aquifer and vadose zone monitoring; Subsurface contamination and remediation; Surface-subsurface water interaction; Aquifer storage and recovery; Flow and transport modeling; Transport and biogeochemical processes; and Management under uncertainty. The abstract submission deadline is March 31, 2017. More information is available at https://www.ingenieria.bogota.unal.edu.co/icgw2017

IAHS 2017 Scientific Assembly: Port Elizabeth, South Africa

The South African National Committee of the International Association of Hydrological Scientists (SANCIAHS) is organizing the 2017 IAHS Scientific Assembly to be held from July 10-14, 2017, in Port Elizabeth, South Africa. The theme of the meeting is "Water and Development: scientific challenges in addressing societal issues," which is particularly appropriate in the context of an IAHS Scientific Assembly meeting being held for the first time in sub-Saharan Africa. South Africa has a rich and varied hydrological history. It has been a research leader in many aspects of hydrology through years of paired catchment and process hydrology research, model development and in the inclusion of scientific knowledge as exemplified by the South African National Water of 1998. SANCIAHS is a strong and active network representing South African hydrologists and has been active for nearly 40 years. SANCIAHS is joined by Waternet, as a major scientific partner, in hosting the 2017 Scientific Assembly. WaterNet is a southern Africa regional network of university departments and research and training institutes active in integrated water resources management.

IAH USNC Website Events Page

Check out the Events page on the IAH/USNC website at http://iah-usa.org/events/. The Events page provides several options for quickly identifying upcoming events. You can find events by looking at a month-to-month calendar (see partial image below) or by choosing the "List" option, which provides event titles, dates, locations, and brief descriptions of upcoming events – especially international events. Also, each web site page shows brief reminders for very important events.

Contributions Invited for the Fall 2017 Newsletter

Do you have an interesting hydrogeologic story? Have you been working at places outside of the U.S. that might be of interest to our members? Have you received an award for your work? Let us know. Please send contributions to the Fall 2017 IAH/USNC Newsletter editor, Gary Robbins, at the following email address: gary.robbins@uconn.edu. Articles are welcome anytime—deadline date in August for the fall issue to be announced. Please send feedback or ideas anytime.

As Gary will soon take over the Editorship duties for our newsletter, I want to say that I've enjoyed working on the past two issues, and hope you've enjoyed reading them. We are looking for a new Assistant Editor to help Gary with future issues. If you would like to volunteer for this position or to nominate a candidate, please contact either Gary or our Chair, Jim.

Lenny

Check out the USNC website at: http://iah-usa.org/

Thank You!