International Association of Hydrogeologists
U.S. National Chapter
Spring 2019 Newsletter
Editor: Gary Robbins

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Cover Photo: The first and only Archimedes turbine generator in the U.S. Located on an old mill pond in Meridan, Connecticut the 11 foot diameter, 20 foot long, 25 ton screw turns at about 30 rpm generating about 190 KW with a drop in head of about 17 feet. Photo by G. Robbins

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

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A Note from the Chair – *Jim LaMoreaux*

Although the year is about a quarter of the way over we still have many exciting activities to come. The highlight of the year will happen September 23-27 when the IAH 2019 International Congress will be held in Malaga, Spain. Prof Bartolome Andreo, President of the Spanish National Chapter, and his team are working hard to organize an excellent conference. Malaga is a beautiful place and it's still early enough to get good prices on airfares and hotels so you and your family can enjoy the Spanish Riviera.

In addition much has occurred since our Fall Newsletter and several other important meetings are upcoming before the year ends. If for some reason you are unable to attend the IAH 2019 Congress the USNC will hold its biannual meeting at GSA 2019 in Phoenix September 22-25. Afterwards we will go to dinner at a nearby restaurant. Everyone is invited to join us for the meeting and for dinner. Recommendations for restaurants are welcome.

In 2018 ten very well qualified graduate students were selected to receive one year memberships in the U S National Chapter (USNC). Board member Devin Galloway has done an excellent job coordinating this activity for us and his efforts are greatly appreciated. Devin has retired after 40 years with the USGS and is resigning his place on the USNC Board of Directors. Please thank Devin for his efforts and reach out to these students to encourage them and the ones we select this year to become full time members. These young people represent future leaders of our organization and are automatically eligible to participate in the Early Career Hydrogeologists Network (ECHN). We are fortunate to have Andy O'Reilly, formerly with USGS and currently Assistant Professor of Geology and Engineering Geology at the University of Mississippi, volunteer to take Devin's place. Please email Andy at aoreilly@olemiss.edu if you would like to help in this effort.

Speaking of ECHN, Adam Milewski and his team are continuing their efforts to expand its membership. They are looking for volunteers to serve as liaisons for the Geological Society of America (GSA) regional section meetings. Also Katie Markowich, ECHN Vice President, along with Andy Manning is organizing a session on Mountain Groundwater for GSA 2019. If any of you are interested in participating in this session or in serving as a liason to GSA regional section meetings please contact Katie at khmarkovich@email.arizona.edu or Adam at milewski@uga.edu. The ECHN will be having another reception this year at GSA to attract new members and give them and existing members an opportunity to network and become friends. Look for the details on their Facebook page (ECHN USA IAH), or their website (echn-usa-iah.org).

Tim Parker and Clint Carney are continuing to represent the USNC with AGI. A full report is included in the newsletter. The IAH USNC is an Associated Society of AGI and as such our members are eligible for discounts at AGI sponsored functions. Gary Robbins recently helped organize the Geoscience & Society Summit in March in Stockholm, Sweden. See our website for future functions and details.

Continuing to expand our contacts in the Americas we are reaching out to Joanne Thompson, IAH Vice President for North America, Diana Allen, President of the IAH Canadian National Chapter and Miguel Rangel Medina, President of the IAH Mexican National Chapter, and Carlo Molana Vice president of the

Colombian National Chapter. Former USNC President Mike Wireman is helping professionals in Cuba research forming a Cuban National Chapter. See articles from some of them in this issue of the newsletter.

Another USNC Past President Vic Heilweil is making contacts for us in South America through his travels for USGS. These activities have the goal of possibly organizing an IAH Congress in the Americas in 2021 or 2022. We are looking for volunteers who may want to spearhead this effort.

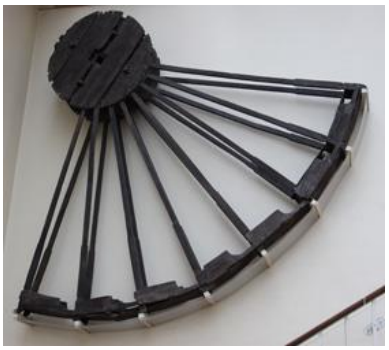
IAH Vice President for Science and Programme, Dave Kreamer, has shared with us Guidance Notes for Organizing an IAH Congress to get a better idea of what is involved.

As you can tell from this Note from the Chair, many people are involved in keeping your national chapter running efficiently. I would like to thank all those mentioned above and many others for their efforts on the USNC's behalf. In this regard Dave Kreamer continues to serve in an ambassadorial role for the USNC carrying our torch internationally. See his article in here also. Let's keep working hard to make the rest of our year successful. Visit the USNC website at iah-usa.org to see how you can become more active. Please share this newsletter with your friends and colleagues and encourage them to become members and thank Gary Robbins for serving as our editor.

Jim

Wanted Articles About You

As the editor of the newsletter, I need your help. Our newsletter is all about informing you of what the organization is doing and providing you with other news in our field that you may find useful. Of course all that is interesting. But it is also an opportunity to get to know each other, to network and to further bond in our mutual love of this field. So I am asking you to help with the next newsletter. Send me a picture of you working with a brief description (name, company, where the picture was taken and what does the picture show you doing). Send me a brief article about some interesting place you are working or visited related to hydrogeology. Have some interesting groundwater related picture? Send that with a description of who took the picture and where. How about a brief article about you for our Members News Section (see below)? Send material to Gary.robbins@uconn.edu See if you can beat this picture—Part of a 1st century water wheel for draining groundwater from the Rio Tinto Copper mine, Spain (Wheel is at the British Museum). Please consider contributing to the Fall issue.



IAH International News

Water Quality Commission

There recently has an interest in forming a new Water Quality Commission for the International Association of Hydrogeologists. If you or your colleagues might be interested in joining such a group contact David Kreamer at dave.kreamer@unlv.edu. More information on current IAH Commissions and networks can be found at https://iah.org/groups/commissions-networks

Contributed by Dave Kreamer

Note from the Vice President for Science and Program

The IAH Executive Committee (IAH President, Secretary General, two Vice Presidents, and the Executive Director and staff) met in Reading, England in February and discussed many different items related to IAH. Financial matters were gone over in detail and IAH yearly budget and expenditures are holding steady and on a good course. IT matters, particularly securing and ensuring the privacy of IAH members were talked about, along with our efforts to increase corporate support for IAH, and continue current and future engagement with national and international groups. The latter includes support of an "International Year of Groundwater" with the United Nations, along with co-sponsorship of groundwater meetings and sessions in international meetings. IAH has a Strategic Overview Series (which are short papers describing aspects of groundwater and society, and can be found on the IAH website) that we plan to translate into other languages. Interestingly, we have begun the start of an initiative to identify "Unsolved Problems and the Future of Hydrogeology", perhaps ending with some visionary publications in that area – contact me if you are interested. Please feel free to join in on any of these efforts that interest you – participation is open to all!

Past and future IAH Congresses were discussed by the Executive Committee in England, along with new proposals for future Congress venues. In addition to our upcoming Congress in September 2019 in Malaga, Spain on the Mediterranean, we plan to have Congresses in Brazil in 2020, and Belgium in 2021. Our publications, including the Hydrogeology Journal and Journal of Sustainable Water Resources Management were discussed in Reading, as well as the progress of IAH Commissions, Networks, and National Chapters. Our Burdon Groundwater Network for International Development continues to distribute groundwater textbooks to early career hydrogeologists and others in sub-Saharan Africa. Several new national IAH chapters are currently being formed, and our ex-U.S. National Chapter President, Mike Wireman is championing an effort to connect Cuban speleologists with our IAH Karst

Commission. Brad Wolaver from the U.S. National Chapter (Jackson School of Geosciences, University of Texas) is putting together a session on "Groundwater and Ecosystems" for the September Malaga, Spain Congress. If you do research on springs and wetlands, this session may be for you.

I hope this note finds you and your colleagues all doing well, following your interests and intellectual curiosities, and continuing to make the world a better place.

Contributed by Dave Kreamer

IAH Regional Groundwater Commission News

We would like to inform you about the recent news and activities which can also be found on the website of the Commission.
Our latest news:

- Special session initiated by the RGFC-IAH at IAH2019, Malaga, Spain, 22–27 September 2019
  The session entitled *Innovative approaches for understanding groundwater flow systems* is under Topic 5 Tools, methods and models to study groundwater.
  The management of groundwater resources receives increasing attention due to the growing importance of groundwater for human, industrial and agricultural water supply, as well as for its role in geothermal energy production. Despite being such a valuable resource, groundwater is suffering from overexploitation and
  contamination. It may further on its own represent a potential source of contamination through e.g. geogenic contamination or anthropogenic activities. The characterization of groundwater flow and its behaviour at different spatial-temporal scales, under natural or anthropogenic driven conditions, requires a deep understanding of complex hydraulic, thermal, geochemical and microbiological processes.
  This session will welcome contributions on advanced and new techniques developed for characterising groundwater flow systems, heat transport, water quality and pollutant fate. Of interest for the session are approaches using hydraulic, temperature, isotope or natural environmental tracer data and numerical modelling for a better understanding of local to regional groundwater flow systems, geochemical patterns, groundwater mixing and ages, or the contamination processes of organic and inorganic pollutants.
  The session is supported by the RGFC-IAH (Regional Groundwater Flow Commission of the International Association of Hydrogeologists) and the EU H2020 ENeRAG (Excellency Network Building for Comprehensive Research and Assessment of Geofluids) project.
  Abstract submission deadline is 31 March 2019.
  Further information: http://www.iah2019.org/

- Join our sessions at the upcoming EGU General Assembly 2019, Vienna, Austria, 7–12 April 2019
  Geofluids as natural resources or sources of contamination: Research and Innovation (supported by RGFC-IAH and ENeRAG Geofluids H2020 project)
  Orals: 8 April (Monday) 10:45-12:30, Room L7, detailed programme
  Posters: 8 April (Monday) 14:00-15:45, Hall A, detailed programme
  Groundwater flow understanding in water management and environmental problems (supported by RGFC-IAH)
  Orals: 12 April (Friday) 8:30-12:30, Room B, detailed programme
  Posters: 12 April (Friday) 14:00-15:45, Hall A, detailed programme

- Join the GAC-MAC-IAH Québec 2019 conference, Québec City, Canada, 12–15 May 2019
  Where geosciences converge. Three geological provinces converge toward Québec City: the Grenville, the St. Lawrence platform and the Appalachians.
  Three geoscientific associations have converged their efforts to organise the GAC-MAC-IAH Québec 2019 conference.
  In May 2019, Canadian and international geoscientists will also converge toward Québec city to be part of it.
  Additional information at https://gacmac-quebec2019.ca/

Contributed by Judit Mádl-Szőnyi and Ádám Tóth

IAH USNC International Service Award

2019 NOMINATION DEADLINE: *AUGUST 1ST*

The IAH USNC seeks to recognize the efforts of hydrogeologists based in the United States who have shown an outstanding commitment to assisting the international community with groundwater-related needs.

Criteria: The award will be presented to one individual each year who has performed exceptional work in assisting those outside of the US (particularly in developing countries) with developing, managing, or protecting groundwater resources for public and/or ecosystem benefit.

Presentation: An engraved plaque will be presented at the Geological Society of America's 2019 Annual Meeting at the Hydrogeology Division Luncheon

Selection Process: Candidates must be nominated by at least one hydrogeologist other than themselves who is a member of either IAH or GSA. 2019 Nominations should be sent to the IAH US National Chapter's GSA liaison Andy Manning (amanning@usgs.gov) by August 1st, 2019. *Please see our website for further details!*

Contributed by Andrew Manning

Other Groundwater News

s **California's Sustainable Groundwater Management Act**

California has historically overdrafted groundwater, especially in its agricultural basins, but with the passage of the Sustainable Groundwater Management Act (SGMA) in 2014, the state committed to local, sustainable management of groundwater resources. This ambitious goal is critical to California's water security, but major questions remain about how to interpret and effectively implement this legislation. The Wheeler Water Institute at the Center for Law, Energy, and the Environment, in the UC Berkeley School of Law has produced a number of policy reports that seek to guide local groundwater sustainability agencies (GSAs), state agencies, and others with a stake in SGMA implementation. These may also be of interest to hydrogeologists, and may have transfer value to other areas. Relevant reports include "Recharge Net Metering to Enhance Groundwater Sustainability," "Navigating Groundwater-Surface Water Interactions under the Sustainable Groundwater Management Act," "Trading Sustainably: Critical Considerations for Local Groundwater Markets Under the Sustainable Groundwater Management Act," and "Unanswered questions for implementation of the Sustainable

Groundwater Management Act." These can be downloaded from links on:
https://www.law.berkeley.edu/research/clee/research/wheeler/groundwater/

The University of California, Agriculture and Natural Resources, publishes peer-reviewed research and news in their periodical, "California Agriculture," which devoted a special issue in early 2018 to California's Sustainable Groundwater Management Act. Articles in this issue focus on governance, sustainability planning, managed aquifer recharge, and modeling surface water-groundwater interactions, among other topics. This special issue can be downloaded from:
http://calag.ucanr.edu/archive/?issue=72_1

Contrtibuted by Lenny Konikow

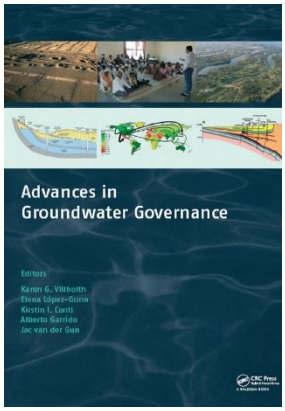
Water, Security, and Conflict

WORLD RESOURCES INSTITUTE

A report on "Water, Security, and Conflict" by Peter Gleick and Don Iceland was recently released by the World Resources Institute (WRI). This paper summarizes the current understanding of water and security threats and their links to conflict, migration, and food insecurity. It is intended for professionals in the defense, diplomacy, and development fields. It reviews the key drivers behind growing water risk, describes and illustrates water and security pathways, and presents approaches for reducing water related risks to global security. It can be downloaded from a link on the following WRI web page: https://www.wri.org/publication/water-security-and-conflict

Contrtibuted by Lenny Konikow

Advances in Groundwater Governance



The International Groundwater Resources Assessment Centre (IGRAC) recently announced that one year after its publication, the book "Advances in Groundwater Governance" has been made open source. This book captures the complex dimensions of groundwater governance and is written by a team of leading experts worldwide with diverging backgrounds. The book provides water professionals, decision-makers, and local stakeholders with a suite of solutions for a heuristic approach to managing this extremely important resource. IGRAC notes that it also focuses on the increasingly important linkages between groundwater and other resources and sectors, and between local groundwater systems and phenomena or action at the international or even global level; case studies illustrate groundwater governance in practice. A pdf of the book can be downloaded from the following link: https://www.un-igrac.org/sites/default/files/resources/files/advances-in-groundwater-governance.pdf

Contrtibuted by Lenny Konikow

News from the IAH Canadian National Chapter

Greetings from the IAH-CNC. Here is a bit of news on IAH-CNC's activities:

IAH-CNC New Board of Directors – 2018 was an election year for the IAH-CNC. New to the Board of Directors are Brian Smerdon, Vice President; Barret Kurylyk, Communications Officer; Gavin Kennedy, Atlantic Rep; Éric Rosa, Québec Rep; Tessa di Iorio, Ontario Rep and Secretary. Returning Board members include Diana Allen, President; Nataliya Tkach, Ontario Rep; Jeff Bell, Manitoba Rep, Nolan Shaheen, Saskatchewan Rep; Frank Magdich, Alberta Rep; and Laurie Welch, BC Rep. The Board also appointed Jim Roy as its new Treasurer.

IAH-CNC Membership and AGM – The IAH-CNC membership in 2018 was 330 members, including 1 Corporate Sponsor and 5 Corporate Memberships. We are currently in the final stages of our membership drive for 2019.

Awards and Scholarships

The 2018 Robert N. Farvolden Award was awarded to Dr. Lawrence (Larry) Bentley, from the University of Calgary. The Farvolden Award honours outstanding contributions to the disciplines of Earth science and engineering that emphasize the role or importance of groundwater. Larry retired from the University of Calgary this year after researching and teaching hydrogeophysics, physical and chemical hydrogeology, and groundwater modeling for several decades. In his oral citation for Larry's Farvolden Award, Masaki Hayashi noted that 'Larry was to the University of Calgary, what Bob Farvolden was to Waterloo'.Dr. Larry Bentley, recipient of the 2018 Robert N. Farvolden Award.**The Tóth Award for the Best Student Paper in Canadian Hydrogeology** was awarded to Kelly Hokanson, a Ph.D. student in the Department of Earth and Atmospheric Sciences at the University of Alberta. Her paper was titled "Shallow groundwater systems in sub-humid, low-relief Boreal Plain landscapes: Interactions between glacial landforms, climate, and topography".

The Tóth Award winner, Kelly Hokanson, and one of the two runners up, Dylan Stafford, along with Brian Smerdon, the IAH-CNC Vice President.

The two runners up for the Tóth Award were: Dylan Stafford, University of Manitoba – "Modelling the Groundwater Flow of the Carbonate Aquifer during Pump Tests of Two Wells in East St. Paul, Manitoba" and Kayla Moore, University of Manitoba –

Dr. Masaki Hayashi delivering his Darcy lecture at GeoEdmonton 2018."A field and numerical study of a tracer test in a gypsum formation beneath a road". **The Darcy Lecture for 2018 –** The IAH-CNC was very proud to have one of our own members (Dr. Masaki Hayashi) as the 2018 International Darcy Lecturer. Masaki has traversed the globe speaking on "Alpine Hydrogeology: The Critical Role of Groundwater in Sourcing the Headwaters of the World". This talk presented his seminal work on mountain groundwater processes based on his many years of work in the Lake O'Hara watershed in Yoho National Park (British Columbia) and his more recent work in other mountain watersheds in the Canadian Rockies.

IAH-CNC Conferences

Resources for Future Generations 2018 – This international conference, held in Vancouver, British Columbia, in June 2018, was the first of its kind and focused on the availability of resources needed to sustain future generations. The conference brought together attendees representing Earth science and engineering research and practice, industry, governments and civil society, and First Nations and Indigenous peoples. There were several groundwater-focussed sessions, some with IAH co-chairs, for example the Groundwater and Unconventional Oil and Gas Resource Development session (Co-chair Laurie Welch, IAH-CNC member and Board member) and the Modelling Integrated Surface-Subsurface Hydrologic Systems for Energy Resource Development and Regulation session (Co-chair Brian Smerdon, IAH-CNC member).

GeoEdmonton 2018 - The GeoEdmonton conference was a great success. Once again we partnered with the Canadian Geotechnical Society. Brian Smerdon, our new Vice President, served on the local organizing committee. The luncheons and banquet were exquisite, as usual, and the local colour night was a hoot!

Coming in 2019 - A joint Geological Association of Canada, Mineralogical Association of Canada and IAH-CNC conference (GAC-MAC-IAH) will be held in beautiful Québec City, from May 12 to 15, 2019. We welcome our international colleagues to join us at this conference.

Contributed by Diana Allen, IAH-CNC President

AGI News

EARTH: Free Subscription Available

"EARTH, The Science Behind the Headlines" is a monthly magazine published by AGI. The digital edition of Earth is now available at no cost to IAH/USNC members as we are an associated society with AGI. To subscribe, go to https://www.earthmagazine.org/

or follow this link: Subscribe for free today

ECHN News

ECHN US Chapter Task Team member, Rachel Rotz, a PhD Candidate at the University of Georgia (UGA) traveled to a remote region of the Simpson Desert in the fall of 2018 to conduct research for her dissertation. The team included scientists, Dr. Bob Craddock and Dr. Alex Morgan, from the Smithsonian Institution, along with Dr. Adam Milewski from the University of Georgia to investigate the formation of longitudinal dunes in the Simpson Desert. Driving in two 4 x 4 vehicles, the team drove for four days to access Lake Caroline after traversing several longitudinal dunes, which rose more than 25 meters from the desert floor and were covered with loose, hematite-coated sand. Rachel bored holes along a transect across the playa lake to understand the relationship between lacustral events, groundwater, and longitudinal dune erosion, as well as characterize the paleoenvironmental history of central Australia in the Late Quaternary.

Rachel Rotz boring a hole to obtain samples for dissertation research.

The vehicles the team used to traverse the desert. Note the ubiquitous hematite-coated sand of the Simpson Desert.

Contributed by Adam M. Milewski

Geological Society of America Annual Meeting

The 2019 National GSA meeting will be held from September 22-25, 2019 in Phoenix, Arizona. There are a number of hydrogeology related technical sessions and a field trip exploring Northern Arizona's springs and karst. Consider submitting an abstract to the IAH USNC sponsored GSA session "T140. Mountain Groundwater" convened by Andrew Manning (USNC treasurer), Lyndsay Ball, and Katherine Markovich (USNC ECHN Vice President). From the conveners: A recent increase in the study of mountain aquifers is providing new insights into these important yet poorly understood

systems. We welcome presentations on mountain groundwater across all scales, utilizing field-based, modeling, and interdisciplinary approaches. Abstract submission closes June 25th. Hope to see you in Phoenix!"
For more information visit: https://community.geosociety.org/gsa2019/connect/events

Contributed by Katherine H. Markovich

Member News and Notes

IAH USNC at AGU

Dr. Jim LaMoreaux, IAH USNC President and Editor of Carbonates & Evaporites, with his Springer collaborator, Dr. Robert Doe at theAGU meeting. . Also shown is Springer Editor Dr. Johanna Schwarz and in the background Sam Upchurch, Tom Scott et al's Book on Karst of Florida. This is one of 12 available in Springer"s Cave and Karst Systems of the World Book Series.

Gary Robbins

New three European Country Study Abroad Course on Ancient Roman Water Systems

Pompeii water distribution tank

Aqueduct in Segovia

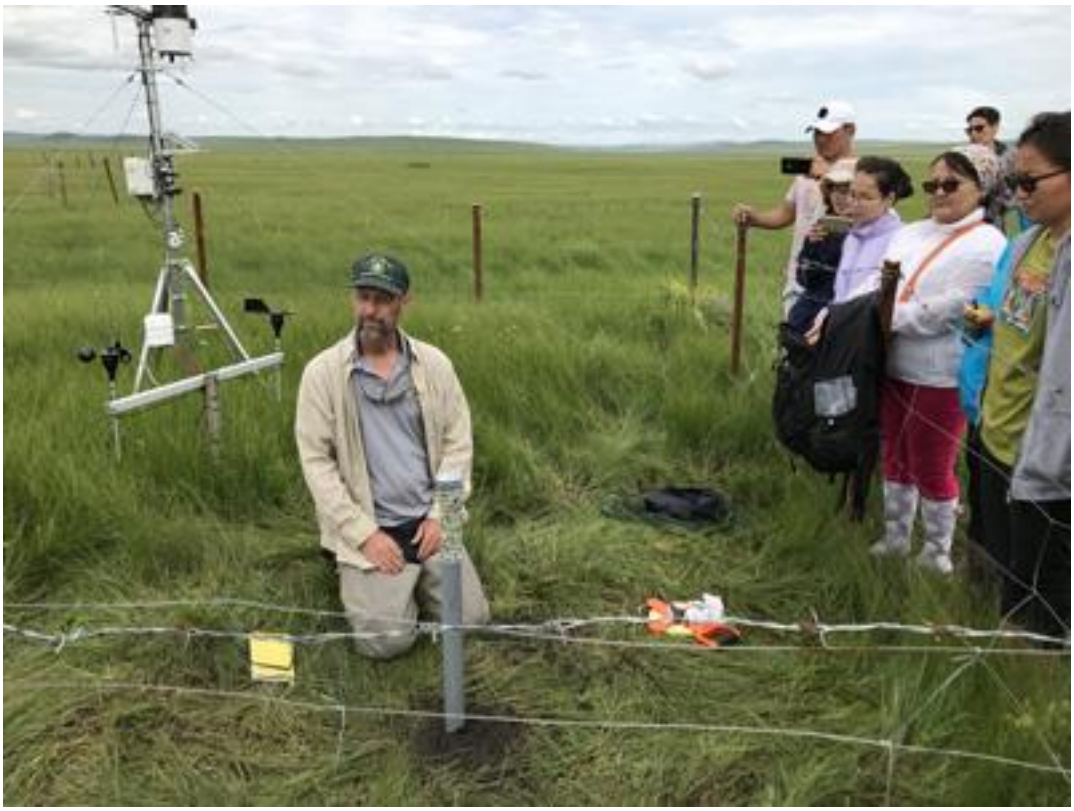
Following his successful, University of Connecticut study abroad Couse *Water Systems of Rome: Ancient to Modern*, Dr. Gary Robbins is developing a new broader study abroad course for science and engineering students with Dr. Amvrossios Bagtzoglou from the Civil and Environmental Engineering Department at UCONN. The six credit course is planned for May-June 2020 timeframe The course entails field excursions to England (London and Bath), Italy (Rome, Pompeii, Ostia Antica, Tivoli and the Apennines) and Spain (Madrid, Segovia, Merida and Proserpina). The course will be open to undergraduates from any university. Contact Gary for more information as it develops (gary.robbins@uconn.edu)

Spring fed bath in Bath

Dam in Prosepina built by Julius Caeser

Joseph Gurrieri

Joe



Guerieri from the US Forest Service in Mongolia instructing Mongolian geoscientists on how to install and monitor a piezometer. It was part of a week-long, field-based wetland training workshop.

The 46th IAH CONGRESS MALAGA SPAIN

View program and registration material at www.iah2019.org. Early bird registration ends June 30, 2019. Hope to meet many of our chapter members there. Be sure to take plenty of pictures and submit choice ones to the editor for the next issue of the newsletter.