Newsletter of the Australian Chapter of the *International Association of Hydrogeologists*

July to September 2017
Volume 33, No. 3

In this issue

International Association of Hydrogeologists Australian National Chapter

The International Association of Hydrogeologists is a professional association for those within disciplines related to groundwater, its occurrence, utilisation, testing and management. IAH is a scientific an educational organisation that is truly international, and was established to foster closer ties, cooperation and information exchange related to the study of groundwater. IAH is non-government and non-profit and has over 4000 members internationally from around 120 countries. The Association is affiliated with the International Union of Geological Sciences (IUGS), and was founded during the 20th International Geological Congress in 1956. By its statutes the IAH is an association of individuals and corporate members, and not a federation of national committees. National groups do, however, organise local meetings and other activities. A proportion of the national committee membership goes to the local organisation to support these activities, the remainder to the international body. The country of the international secretariat is changed every several years. The IAH publishes Hydrogeology Journal, various workshop and conference proceedings and an international newsletter.

The main objectives of the IAH are to promote international and national cooperation between involved scientists and engineers; sponsor international and national technical/management meetings and symposia on hydrogeology; publish hydrogeological reports, papers and maps; establish investigation commissions and working groups to report on special topics; encourage the international application of relevant approaches and techniques for the benefit of the hydrological and human environment.

Our national chapter was founded in 1983 and is one of the most active. Activities tend to be organised locally within each state and territory, but national activities also occur. Each state body has its own meetings, usually monthly. Conferences are held in Australia around every two to three years, and seminars on a more frequent basis.

Membership Requirements: IAH will accept as individual members anyone directly or indirectly engaged in study or research on, or management of water in its various forms related to hydrogeology, if sponsored by two members in good standing. Companies and research organisations can apply for corporate membership. The current membership categories and annual subscriptions for 2015 (see www.iah.org.au) are:

- Member $150
- Online member $130
- Student $55 (full time students)
- Online Student Member $35
- Corporate member $830
- Partial sponsor $165
- Full sponsor $200
- Retired $75

The membership rates reflect a minor increase for 2018, which applies to the print and online membership categories (including sponsor versions), and the Corporate member rate. The student and retired member rates remain unchanged in 2018.

Membership of this professional association is tax deductible in Australia, and individual members are entitled to use ‘MIAH’ (Member of the International Association of Hydrogeologists) after their name.

From the President

As we approach the end of 2017 (already?!), and take stock of the event of the past year, it is clear that IAH Australia is staying busy and accomplishing a lot for a volunteer-based learned society. In this edition of the message from the President, I would like to acknowledge some highlights from the year past, and give some thoughts on the year ahead.

First of all, it has been a pleasure working with the National Committee this year, and I would like to acknowledge and thank the executive members Ian Brandes (Vice President), Ron Colman (Treasurer), Anna Greve (Secretary) and Past President, Chris McAuley, for their service to the IAH this year.

- We bid a warm bon voyage to Anna Greve, who will be taking some time to enjoy life next year and is therefore stepping down from her IAH role 2018. We wish her all the best, and will welcome her back to the IAH upon her return!
- Special thanks to Kyle Horner and Fiona Adamson, for their ongoing and invaluable website and membership support.

Events of the Past Year

It is sometimes difficult for our members to keep abreast of what has kept the National Committee busy all year.

- The highlight of the Australian hydrogeological year in 2017 was the **Australasian Groundwater Conference**, held 11–13 July 2017 at the University of NSW in Sydney. This was the second of the biennial conference series run in conjunction with the National Centre for Groundwater Research and Training.
    - A host request form will be distributed shortly for AGC 2019. The aim is to have a more structured, formalised and transparent process for selecting the next host.
- We hosted several **Distinguished Lecture Series**, including:
    - 2017 Darcy Lecture – Dr Kamini Singha, Colorado School of Mines
    - 2017 Birdsall Dreiss Lecture – Ed Harvey of the US National Parks Service
    - IAH/NCGRT Distinguished Lecturer – Dr Glen Walker (plus local panellists)
- Our key **Advocacy** initiatives included:
    - IAH submission to encourage consideration of a MAR scheme as an alternative to a surface water scheme to supplement the Broken Hill water supply.
    - IAH submission to encourage proactive improvement of the groundwater/bore database in WA.
    - IAH submission to the Productivity Committee on the draft report on National Water Reform, encouraging robust consideration of groundwater resources throughout.
    - IAH submission to Parliamentary Inquiry into Water Use by the Extractive Industry – in progress, with contributions from multiple states over the next two weeks.

- IAH Australia also provides charitable contributions towards less fortunate members in our region and internationally. Some examples include:
    - We currently sponsor 19 international members, and have agreement in principle to take on 10 more in 2018.
    - We are co-sponsoring postgraduate hydrogeology studies for students in Nepal and a Pakistani refugee through the University of Parma in Italy.

Some Thoughts on Membership

We had right around 600 members in 2017, which was a slight rise from 2016, but still well below our high-water mark in 2012. We certainly have some work to do to rebuild our base in the coming years.

We are proposing a small membership rate rise in 2018. While this is never our favourite topic, the following considerations were made in reviewing our current rates:

- Our rates have not changed for 10 years, while IAH International rates have risen in increments each year
- We froze rates in recent years in respect to our members during a difficult employment period for Australian hydrogeologists
- We significantly reduced student membership rates in 2014 to encourage the younger generation to join
- We would like to continue to offer a healthy variety of services and events to our members, well above and beyond what other National Chapters can accomplish
- The proposal is to:
    - Increase the regular member rates by $10, which will apply to standard and online memberships (including full and partial sponsoring members)
    - Corporate memberships will rise in accordance with the IAH International rise
    - Student and retired member rates will stay the same

Rates will be reviewed annually to ensure we continue to strike the right balance of having the means to provide good opportunities and interesting events to our members, support our state branch initiatives, while maintaining affordability.

We are working towards reinstating the “new member referral” policy, whereby new members must have a referral from two current members, to verify that they meet our minimum criteria for membership, and to reduce the potential for new members joining to inappropriately use the IAH brand for lobbying of policy or protest positions – an unfortunate reality in some instances.

Looking to 2018

There are several irons in the fire for 2018, some of which will require some additional hands to make light work for us all. We’ll be actively seeking volunteers to assist with some important undertakings next year:

- The Australian Geoscience Council Convention will run in October 2018. We need to increase our participation with various subcommittees to ensure groundwater is well represented in the Convention. The AGCC will be a

landmark event for Australian Earth Sciences, and increasing our participation will be an early focus for us in 2018

- The role of membership champion has been vacant for the past year. We need a motivated member to coordinate the efforts of the state branches to improve member retention, and grow our new membership
- With a desire to support additional distinguished lecture series in Australia, a dedicated lecture champion is required to assist with scheduling, agency liaison and high-level coordination of the various lectures
- Advocacy, education and "special projects":
    - We have provided submissions on various matters of state and national importance. Please make the National Committee aware of relevant opportunities for IAH Australia to make our voice heard
    - An opportunity exists to offer to update the Australian Standard for Pumping Tests, which is still a 1990 document. There is strong support in principle, which needs to transition to action. A NSW-based leader is required to drive this process
    - What more can we do for groundwater students and early career hydrogeologists? Are there groundwater-related initiatives that would benefit from our support? Do you have a great idea for a local branch event that can become reality with a little backing from the National Committee? We would love to hear your ideas for how we can advance the aims of the IAH in our region!

It has been an honour to serve the IAH in 2017. Best wishes to all our members throughout Australia for a happy, restful and restorative holiday season!

Lange Jorstad

President - Australian Chapter, IAH

National Corporate Sponsors

We gratefully acknowledge the support of our national corporate sponsors.

cdmsmith.com

www.coffey.com

www.arcadis.com

www.jbsg.com.au

www.rockwater.com.au

Membership

Check your state chapter events page on the IAH Australia website (www.iah.org.au) to keep up to date with events and meetings.

IAH membership spans a calendar year.

IAH Australia registration is now closed for the 2017, and will re-open in mid-December for the 2018 membership year. An email notification will be sent out when the registration system is back online.

2017 was another strong year for IAH Australia, with just over 600 registrations across all membership categories. 23 members made optional contributions to sponsor fellow hydrogeologists in emerging economies across the world.

We're taking this opportunity to update the membership database, and we thank everyone who reported bugs and issues over the last year.

We look forward to your continuing support in 2018!

Any inquiries regarding the memberships can be emailed to the IAH membership team membership@iah.org.au.

Current/Lapsed Membership Renewal Process

As a repeat from a previous issue of the newsletter, here's how an inactive member can become active again.

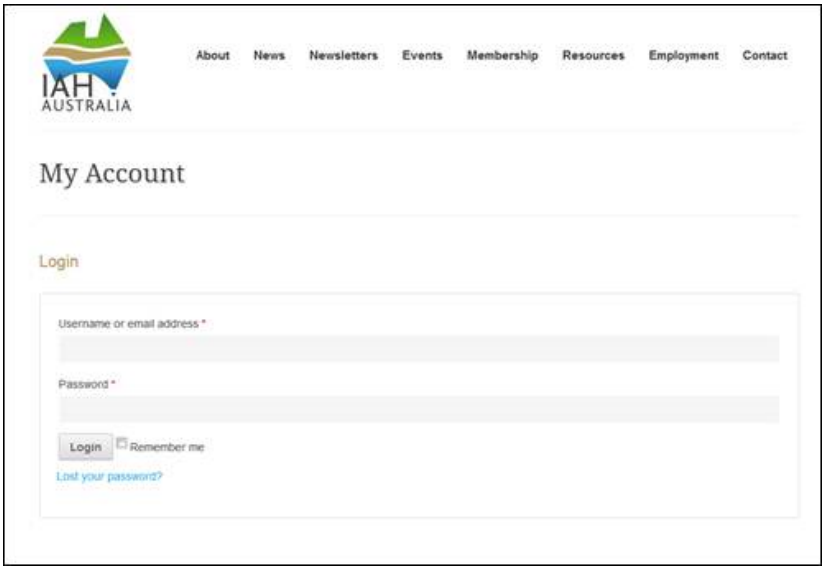
Note that if you were a member in 2016, and **did not receive** a membership renewal email in January 2017, some common issues are listed below:

- The email was intercepted by your **spam filter**. Check your spam folder or quarantine archive for IAH emails, and consider adding the IAH sender details to your safe list.
- Your **email details changed** in the past year (for example, change of employment) and you have not yet updated your email address with IAH. You can update your details at any time through the iah.org.au website, by selecting "My Account" under "Membership", and editing account details.
- **Corporate "firewalls"** at some companies block all suspected incoming spam emails (IAH emails may be classified as "marketing" emails by some systems). Speak with your IT administrator about adding IAH to your corporate safe list, or switch to a personal email account.
- Your membership has **lapsed for more than a year** without renewal, and your details have been removed from our database. You can still use the new membership system to renew your lapsed membership.

Contact membership@iah.org.au with any questions.

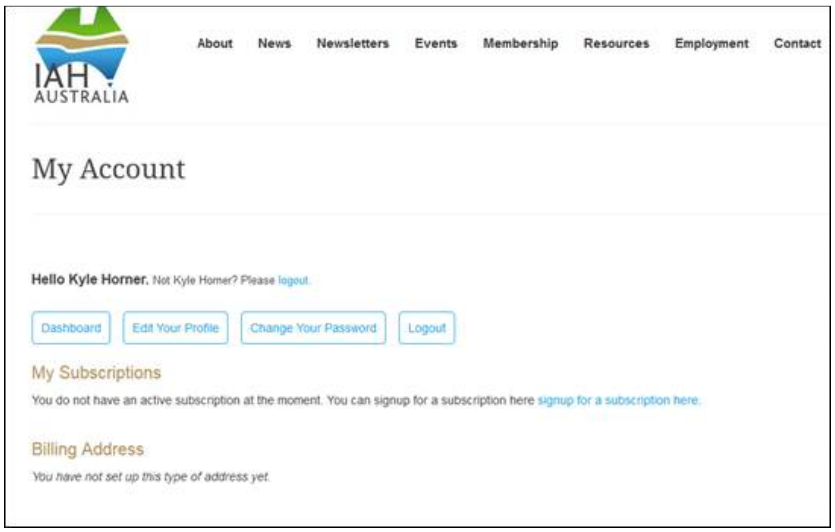
Log into your account page on the IAH website (https://www.iah.org.au/membership/my-account/).

Your username is the email address the email was sent to (which should be the email address you have registered with IAH). If you have forgotten your password, you can reset it using the "**Lost Your Password**" link at the bottom of the page **using the email address the email was sent to**.



Once logged in, you will see your account Dashboard.

Under the **My Memberships** section, click on the link to sign up for a new subscription. This will direct you to a new page where you can select your desired membership category from the options. Details of each membership type can be found at the bottom of the registration page. Once you have chosen your desired category, follow the prompts to finish your membership renewal.



If you have any questions, please do not hesitate to contact the membership team at membership@iah.org.au.

IAH National Committee

President	Dr Lange Jorstad	ljorstad@geosyntec.com
Vice-President	Ian Brandes	ibrandes@rockwater.com.au
Treasurer	Ron Colman	Ron.Colman@royhill.com.au
Secretary	Dr Anna Greve	annakgreve@outlook.com
Past President	Chris McAuley	chris.mcAuley@delwp.vic.gov.au
Membership Secretary and Website	Kyle Horner & Fiona Adamson	secretariat@iah.org.au
Newsletter Champion	Dr Ben Rotter	Ben.Rotter@mottmac.com

Finance Update

Term Deposits as of *30/09/17*	$101,795.11
Cash Account as of *30/09/17*	$59,717.62
Total Cash Balance as of *30/09/17*	**$161,512.73**

Outgoings during the quarter included:

- Associations Insurance (Public Liability) $3,158.41

Date: *16/10/17*

Ron Colman, IAH National Treasurer

National Conferences and Events

Perth:

Dec 4-7 2017

Perth Groundwater School

Includes networking drinks, text book, tutorials & case studies.

IAH, AWA, WIA, SCPA member discount 10%. Use code "Association". 20% discount for groups of two or more and for students.

Australian Groundwater Schools 2017 - Perth

The Australian Groundwater School is vital for Australian professionals working with groundwater. Our flagship course, and the premier course of its type in Australasia, the Australian Groundwater School provides participants with a broad but rigorous introduction to groundwater. Introducing hydrogeology, assessment methods, modelling, managed aquifer recharge, management, governance and more, the course truly encompasses the fundamentals of groundwater.

Scientific, policy and management personnel who want to gain a solid grounding in groundwater should strongly consider attending this course. Lectures, demonstrations and tutorials are given by leading groundwater professionals. Our presenters are experienced hydrogeologists and specialists in both public and private practice, from industry, universities and research agencies.

Progress Towards AGCC 2018

By Bill Shaw, President Australian Geoscience Council

Introduction

This note updates previous advice on how the Australian Geoscience Council's Convention (AGCC 2018) is shaping up, with more information about the program, the next steps by each of the Subcommittees and plenty of suggestions about how you can start to get involved.

Scientific and Technical Program

Chris Yeats has now developed the Program Committee with *convenors* for each of the five scientific themes as follows:

Theme 1: Understanding the Earth - *Professor Dietmar Muller. (University of Sydney)*

Theme 2: Life on Earth – origins and diversity - *Professor Simon George (Macquarie University)*

Theme 3: Resources – discovery, development and sustainability - *Dr Jon Hronsky (Consultant, Western Mining Services)*

Theme 4: Applied Geosciences in the 21st Century – innovation, technology and the future - *Chris Woodfull (Consultant, SRK Consulting)*

Theme 5: Beyond the rocks – geoscience in our society: current application and future trends – *Dr Anna Littleboy (CSIRO)*

Each of the Themes has between 4 and 7 nominated Symposia. There are already constraints on the total number of oral presentations that can be accommodated during the four days of the Convention. In addition to the technical sessions, five one-hour plenary sessions are planned, to cover the following topics:

- Earth Climate – Past and Future
- Life Origins and Evolution
- Resource Security into the Future
- The Future of Geoscience in Our Society

- Applied Geoscience – Geohazards, Risks and Society

There will also be an entire day during the Convention set aside for discussion of the following Big Issues and Ideas:

- Our Energy Security Options – Dirty Words in a Clean World (Coal, Nuclear, Fracking and Alternatives)
- Resource-Driven Development of Northern Australia
- Geoscience Education and New Modes of Communication and
- Smoothing the Impact of Boom and Bust Commodity Cycles.

The current plan for the technical sessions is to run 10 concurrent sessions (nominally 2 at a time per Theme) with 15 minute talks. This equates to 560 speaking slots, or nominally 56 per Theme. Theme Convenors will also have the flexibility to assign longer timeslots for session keynotes should they wish.

We expect that there will be an extensive poster presentation component of this Convention, given the expected number of high-quality abstracts that will be submitted and consequent competition to present at this prestigious event.

Sponsorship

The partnership prospectus is being finalised by Mike Smith's team and discussions are already underway with a number of parties that have expressed interest in supporting our big event. The preliminary program has already generated excitement and interest as a way of blending the important traditional role of broad-themed geoscience conferences with a new approach to focusing on issues that are important to all geoscientists and to the general public.

If your company or organisation is interested in being aligned with the Convention, please consider getting in early while the choice packages and exhibition sites are still available. The new look of the $400 million Adelaide Convention Centre East Building redevelopment is being celebrated with a gala opening at the end of August. AGCC 2018 will be one of the first events to take full advantage of the flexibility this provides.

Field Trips and Workshops

Dale Sims is developing a list of the potential field trips and workshops that we are currently considering. If you are interested in running field trips additional to those already on the following list please let us know:

- Gawler Craton
- Great Ocean Road – volcanics of eastern Victoria
- Flinders Ranges – Fossil Ediacaran Flora
- McLaren Vale – terroir for wine making
- Self-guided Geotourism –the Brachina Gorge trail.

There will be opportunities for our Member Organisations (MOs) to host workshops in their specialist disciplines. A package is being put together to seek expressions of interest so that these can all be fairly evaluated.

Early Career Geoscientists and Volunteers

Genna McDonagh is developing contacts across our eight MOs to provide volunteer coordination and opportunities for innovative ways to connect with the Convention. She is looking for support and engagement, especially in ensuring that we address broad social themes that are important now to all professionals in academia, industry, consulting and government. If you are passionate about diversity, representation, networking, STEM or making a difference, please get in touch through our website.

Education

The AGC Education Subcommittee has been very successful in building support and connections across the full spectrum of geoscience education from Primary School to Professional Development programs. At the recent Australian University Geoscience Educators Network (AUGEN) meeting in Sydney there was strong interest in using our Convention during Earth Science week next year to host their AGM and to champion one or more sessions. This will be an opportunity to see some of the amazing resources that are being developed, such as the work of Michael Roach (University of Tasmania) on precision outcrop photography and 360º imaging for "virtual field trips". There will lots of other interesting technologies and applications being presented.

Advocacy and Media

We are making progress in developing the media strategy and have been recently advised that there will soon be significant further support forthcoming. As we move towards being only a year out, Angela Riganti's team has preparations underway for a media launch and mail-out of our First Circular by all the Member Organisations during September. We are looking to maximise the impact of our event through innovative use of social media, forums, poster sessions and other approaches that Angela's and Genna's teams will develop.

Engagement with Stakeholders

Steve Mackie has developed a fortnightly dot-point summary of progress that goes out to all our stakeholders. You can get on the list by contacting him to see how the Convention is developing at a very granular level. Of course that level of interest means you are so motivated that you are probably already on one of our Subcommittees …

Venue and other practicalities

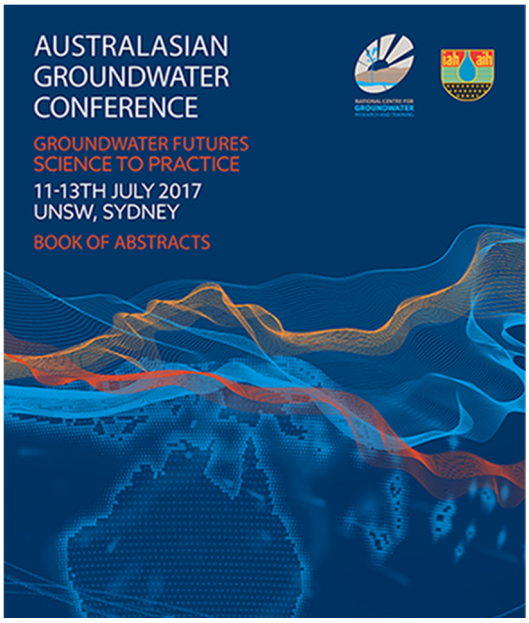
Our Professional Conference Organiser, Carillon is on top of all our contractual requirements and we now have the Adelaide Convention and Exhibition Centre, and appropriate accommodation, booked up sufficiently to enable us to develop all the various scenarios that we can envisage. A visit to the venue is planned for the end of August. Work on the social program that underpins the networking aspects of the Convention is also getting going.

Conclusion

I am still seeking your thoughts on how you would like to get involved. Many years of volunteer work in the AIG, AusIMM, JORC and now the AGC has taught me the huge personal value of commitment and engagement with like-minded professionals.

To let us know your views, what you want out of this Convention, and how you can help make it a success, please get in touch with any member of the Organising Committee at our website: https://www.agcc.org.au/committee

Bill Shaw, on behalf of the Organising Committee.



AGC2017 Book of Abstracts now available

The complete list of oral and poster abstracts for the

2017 Australasian Groundwater Conference, Sydney, 11-13 July 2017

http://nationalcentreforgroundwaterresearchtraining.cmail19.com/t/j-l-uuhuhtd-vlilklidl-f/

Feature News

International Chapter Updates

There are around 40 active chapters spread across the continents and 6 active commissions. IAH members are constantly travelling for work and sharing ideas and broad knowledge with other specialists. External links of interest are also provided for information.

We thought it would be a good idea to liaise with some of the other chapters and see if they have a different approach to similarly experienced problems. We encourage Australian members to visit the following links:

Italian Chapter: Italy Drought, 11 regions poised for state of emergency

https://iah.org/wp-content/uploads/2017/08/PressReleaseIAHItalyJuly2017.pdf

IAH Commission on Groundwater & Climate Change UNESCO-IHP GRAPHIC Programme

http://www.gwclim.org/

IAH-MAR Managed Aquifer Recharge Commission

https://recharge.iah.org/

Tunisian IAH Chapter (Tunisian Committee of Hydrogeology) - Modelling for Sustainable Groundwater Management

http://www.eauetdev.org/workshop-on-modelling-for-sustainable-groundwater-management-oct-23th-27th-2017/

Spanish IAH Chapter - Congress on Groundwater and Global Change in The Western Mediterranean, 6-9 November 2017

http://www.aih-ge.org/index.php/gwm-change-2017/

30-31 Oct 2017 – São Paulo, Brazil - IAH Events - V International Congress on Subsurface Environment

http://www.abas.org/cimas/home/

From the Branches

Australian Capital Territory

IAH ACT BRANCH

2017 Committee:

Chair	Lucy Lytton	Geoscience Australia
Vice Chair/Secretary	Scott Lawson	Office of Water Science
Treasurer	Tim Evans	Geoscience Australia
Student Coordinator	Sharon Gray	Research School of Earth Sciences, ANU
Communications Champion	Stephen Hostetler	Hostetler Hydrogeology
Membership Champion	Laura Gow	Geoscience Australia
Events Coordinating Committee	Tim Evans	Geoscience Australia
	Chris Harris-Pascal	Geoscience Australia
	Peter Hyde	Murray-Darling Basin Authority

Recent Events

10 August 2017 – The Critical Role of Trees in Critical Zone Science: An Exploration of Water Fluxes in the Earth's Permeable Skin – Dr Kamini Singha

Dr Kamini Singha delivered the Darcy Lecture to an enthralled crowd of 35 people at the Sir Harold Raggatt Theatre at Geoscience Australia. The audience really enjoyed the talk as evidenced by the many questions and the discussion generated by the talk. We highly recommend Kamini's talk to everyone.

New South Wales

IAH NEW SOUTH WALES BRANCH

2017 Committee:

Chair	Katarina David	(UNSW)
Presentations Secretary and External Communications	Graham Hawkes	(AECOM)
Treasurer	Tingting Liu	(HydroSimulations)
Secretary	Sean Cassidy	(EMM)
Student and Young Professional Coordinator	Dr Anna Greve	(Glencore)
Meeting Facilitator	Pepijn van Ravensteyn	(WSP Parsons Brinkerhoff)
Internal Communications	Angus McFarlane	(AECOM)
Newsletter Champion	Cassie Turvey	(HydroSimulations)
NSW Sponsorship Champion	Jason Carr	(Arup)
Web Champion	Dr Doug Anderson	(Water Research Laboratory, UNSW)
International Sponsorship Champion	Dr Jay Punthakey	(Ecoseal)
University Liason	Dr Bill Milne-Home	(UTS)
Membership Champion	Ellen Kwantes	(WSP Parsons Brinkerhoff)
National President	Dr Lange Jorstad	(Geosyntec)
National Newsletter Champion	Dr Ben Rotter	(Mott MacDonald)
International Vice President - Australasia	Dr Wendy Timms	(UNSW)
Committee Support	Dr Mark Peterson	(ANSTO)

Local News

Our regular branch meetings continue to be held at the office of WSP Parsons Brinckerhoff (WSP) located in the Sydney CBD on the second Tuesday of each month. Thank you to WSP for supplying the convenient central venue, first class facilities, and food and drinks. IAH NSW branch provides events that span all stages of a career in hydrogeology. Our Student Night event provides a platform for students, and our Young Professional Award that recognises young professionals. For mid to late career hydrogeologists, a forum is provided for technical presentations. This year we also held a Women in Hydrogeology night, where a panel of esteemed female hydrogeologists shared their career stories and experiences.

NSW Sponsors

IAH NSW gratefully acknowledges the contributions of its 2016/17 sponsors. Details of sponsors can be found on the website at http://www.iah.org.au/about/new-south-wales/ nsw/-branch-sponsors.

Our Gold Sponsors are AECOM, Earth Science Information Systems, EMM Consulting Pty Limited, Jacobs, NSW Environment Protection Authority, University of NSW Water Research Laboratory, Water NSW and WSP.

Our Silver Sponsors are C. M. Jewell & Associates, Ecoseal and HydroSimulations.

Recent Events

12th September 2017 – Water and Mining: GSNSW current projects and future direction

Dr Mark Armstrong, manager of Mineral Resource Assessment at the Geological Survey of NSW provided a concise overview of the data collected by the GSNSW and the datasets and tools that are publicly available. GSNSW collects, manages and delivers geological, geophysical, geochemical and geospatial data to inform the government, resource industry and the community about the state's geology and mineral, coal, petroleum and renewable energy resources. The Survey collaborates with other national and international government and scientific bodies to share skills and data, promote coherent information exchange and facilitate the safe and sustainable development of NSW mineral and energy resources for the benefit of all NSW citizens. As the custodians of the State's geoscientific data, GSNSW is in a unique position to help characterise the groundwater systems and the potential impact mining may have in those areas. Mark provided an insight into the current work and possible future directions GSNSW is taking, in collaboration with DPI Water and Water NSW, on improving the understanding and management of the State's water resources.

17th October 2017 – Student Night

Our student night meeting featured talks from three post graduate researchers:

Hydrological signatures of fire on karst vadose zone water, Wombeyan Caves, New South Wales, Australia - Bian Fang, Postgraduate Researcher, Connected Waters Initiative, UNSW

Impacts of wildfire on karst vadose zone is poorly understood owing to the complexity of subsurface environment. Objective of this project is to understand the variation of hydrogeochemical components and drip discharge after a moderate-intensity 10m x10m experimental fire occurring above the shallow Wildman's Cave at Wombeyan, Australia, in May, 2016. Isotopes and elements analysis were applied on drip water collected pre- (from Dec, 2014) and post-fire (to May, 2017). Drip rate has been monitored continuously using acoustic data loggers.

This provides opportunities to broaden the insights into improved fire management in karst environments and a better understanding of the relationship between surface environment conditions and vadose zone hydrology.

Tracing shallow lateral preferential pathways of fluid movement using electrical geophysics - Anthony Finn, Department of Earth and Planetary Sciences, Macquarie University

Assessment of gullies is essential in understanding the effects that this form of erosion has on resource management, urban planning, agricultural productivity and local environmental conditions. Commonly, prediction of gully head cut retreat has been disregarded due to the inherent complexities; this study intends to provide a technique capable of head cut retreat prediction. This investigation proposes the implementation of electrical geophysics (Electrical Resistivity Imaging (ERI) & Frequency Domain Electromagnetics) in relation to positioning of existing gullies to locate shallow conductor's representative of Lateral Preferential Pathways (LPP).

This integration of techniques will lead to the development of informed management decisions necessary to remediate and prevent further damage.

Speleotherms as recorders of groundwater recharge and evaporation - Dr. Monika Markowska, Palaeoenvironmental Researcher, ANSTO

Drylands currently cover ~45% of the Earth's surface, and are predicted to increase under future climate change, encompassing half of global land surfaces by the end of this century (Huang et al., 2016). The balance between evapotranspiration and precipitation determines the potential for groundwater infiltration and speleogenesis, making dryland karst regions particularly suitable to register changes in effective recharge. This study is the first to present two sub-annually resolved dryland 18O stalagmite records from Wellington, SE Australia over the instrumental era (1935-2010 CE), building upon the extensive knowledge of cave processes from current cave monitoring (~6 years at this site).

This study demonstrates that dryland 18O(spel) palaeo-records can provide evidence of past hydrological water balance, through a signal modified from the original 18O(rainfall) input due to karst evaporation.

Other News

Sponsored Student Update

Refugee Student

In 2016, the IAH NSW Chapter undertook an initiative to provide funds for a refugee to study Hydrogeology at the University of Parma. The project was conceived with the desire to provide hope and opportunity to a refugee by providing them with an education in Hydrogeology at the University of Parma. The process involved the Alumni & Friends Association (University of Parma) as Lead Partner, in a wider Partnership involving, the International Association of Hydrogeologists (IAH NSW, Australia and IAH Italy) Chapters, Ecoseal Developments Pty Ltd (Australia) and the Hydrogeocentre of the University of Parma (Italy). The CIAC Onlus (Parma), the Italian Ministry of Interior, as well as some Italian families living in Parma are also be involved in the project. In order to be eligible, the candidates selected a course in Earth Sciences at the University of Parma, with a focus on Hydrogeology.

The selection process started through a national call. The winner was a young refugee from Pakistan, Mr Arif Khan. It took some time to organise the transfer of the student from Trieste to Parma. Mr Arif Khan started his first semester in Earth Sciences at the University of Parma, under the tutorship of prof. Fulvio Celico. However, due to the

problems mentioned above, the Student started his studies one month after the beginning of the first semester.

During the first year, the Student was involved in the following courses: (i) Mathematics, (ii) Chemistry, (iii) Introduction to Earth Sciences (annual course), (iv) Physical Geography, (v) Cartography and GIS, (vi) Mineralogy, (vii) Paleontology, (vii) English. At the end of the first year, the Student passed three exams. Taking into account his problems in fully understanding Italian language, the tutor organised a dedicated course of Italian, thanks to the work of a volunteer professional teacher. Therefore, from January 2017, the Refugee is also studying Italian language obtaining very good results.

The University of Parma provided a student card, linked to a bank account from the Alumni and Friends Association to transfer the fund to the Student.

In a wider perspective, it is important to underline that the integration of the student is rapidly in progress and he is happy to live and study in Parma. He is also studying deeply and improving thanks to the help of some Italian students at University of Parma.

Nepalese Students

IAH NSW is also sponsoring two other students that are studying for their MSc in Hydrogeology at Tribhuvan University in Kathmandu, Nepal. Rasila Koirala and Jinita Shakya are both in their final year and are currently working on their thesis projects.

Jinita and Rasila's thesis involves the evaluation of changes in groundwater (shallow aquifer) recharge potential of NE part of Kathmandu valley due to rapid urbanization. Specific objectives include the preparation of a hydrogeological map of the study area, evaluating groundwater potential in the study area, evaluating basic water quality parameters that can be measured insitu, and delineating the recharge potential areas.

Field data have been collected from 58 dugwells, 7 deep borings, 5 springs, 1 seep and 1 pond during the dry and wet season. Dry season data were collected from 30 March until 11 April 2017 and wet season data were collected from 3 August until 13 August 2017. In the field, water table, well depth and insitu parameters were measured. The sample was taken dipping the bucket down in the well so that correct data will obtain while measuring insitu parameters. The discharge of springs was measured in order to find out the rate of water flow during both seasons. A location map, drainage map, water table map with groundwater flow direction, EC map, DO map of dry and wet seasons have been prepared. The results show that EC is gradually increasing from the NW to SE during dry season whereas EC is gradually increasing from SW to NE during wet season. EC for the dry season ranged from 44 to 1,401 µS/cm and for the wet season it ranged from 142 to 1,463 µS/cm. DO is high at the Changunarayan area as this area possesses Dhunge Dharas and Kuwas whose water will be open to atmosphere and thus gets the greater dissolved oxygen. There is not much difference in DO during dry and wet seasons. DO for dry season ranged from 0.6 to 7.58 mg/l and for wet season it ranged from 0.58 to 6.9 mg/l. The groundwater flow direction in the study area is from NE to SW. Radial flow can also be observed at the Changunarayan and Simkhadagaon areas.

Works still to be completed include creating a water table difference map of the dry and wet seasons and an aquifer distribution map, as well as the collection and preparation of lithological logs.

AGC 2017 Sydney Abstracts

The book of abstracts for the Australasian Groundwater Conference held at UNSW in July 2017 is now available on the IAH website https://www.iah.org.au/resources/agc-abstract-books/. The 2015 conference abstracts are also available.

IAH NSW on LinkedIn

IAH NSW has gained a presence on professional social media site, LinkedIn. The page provides events newsletters and advertisements for hydrogeology positions in the industry.

Northern Territory

IAH NORTHERN TERRITORY BRANCH

2017 Committee:

Chair	Peter Jolly	Jolly Consulting
Vice Chair	Jo Ellis	Power and Water Corp
Treasurer	Position vacant	
Secretary	Steven Tickell	DENR

No news this edition.

Queensland

IAH QUEENSLAND BRANCH

President	Lucy Reading (QUT)
Vice President	Paul Smith (Pacific Environment Ltd)
Treasurer	Zach Van Haaften (QUT)
Secretary	Thomas Neame (Eco Logical Australia)
Communications Manager	Jim Stanley (QUT)
Technical Consultant	Jim Undershultz (UQ)
North Qld Representative	Angela Bush (AGE Consultants)
Other Committee Member	Lindsay Furness (Freelance)
Other Committee Member	Freeternity Rusinga (Aurecon)
Other Committee Member	Kelly Jane Wallis (WSP)

Local News

This year has seen the election of a new Qld Branch executive committee and a series of interesting presentations hosted at Queensland University of Technology (QUT), Brisbane. Other plans include starting an annual "student member" award, hydrogeology field trips and events hosted at sponsors' venues. A new IAH Qld Branch LinkedIn profile has been created to promote IAH events (https://www.linkedin.com/company/iahqld).

Qld Branch Sponsors

Pacific Environment Limited

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Recent Events *(Including content description)*

25th August 2017 – The Darcy Lecture 2017 (Townsville): The Critical Role of Water in Critical Zone Science: An Exploration of

Water Fluxes in the Earth's Permeable Skin - Professor Kamini Singha (Colorado School of Mines).

Earth's "critical zone" — the zone of the planet from treetops to base of groundwater — is critical because it is a sensitive region, open to impacts from human activities, while providing water necessary for human consumption and food production. Quantifying water movement in the subsurface is critical to predicting how water-driven critical zone processes respond to changes in climate and human perturbation of the natural system. While shallow soils and aboveground parts of the critical zone can be easy to instrument and explore, the deeper parts of the critical zone — through the soils and into rock — are harder to access, leaving many open questions about the role of water in this environment.

This presentation opens the black box in the subsurface and sheds light on a few key subsurface processes that control water movement and availability: linkages between changes in evapotranspiration and subsurface water stores, water movement in three dimensions over large areas, and potential control of slope aspect on subsurface permeability. Geophysical tools are central to the quantitative study of these problems in the deeper subsurface where we don't have easy access for observation.

28th August 2017 – The Darcy Lecture 2017 (Brisbane): A Tale of Two Porosities: Exploring Why Contaminant Transport Doesn't Always Behave the Way It Should- Professor Kamini Singha (Colorado School of Mines).

Transport through preferential flowpaths is important in a broad range of scientific disciplines.

In hydrology, the ability to quantify subsurface transport is an issue of paramount importance due to problems associated with groundwater contamination. Observational challenges and complexity of hydrogeological systems lead to severe prediction challenges with standard measurement techniques.

This lecture presents a rock-physics framework, an experimental methodology, and analytical expressions that can be used to determine parameters controlling anomalous solute transport behaviour from colocated hydrologic and electrical geophysical measurements in a series of settings, including groundwater and surface water/groundwater systems. The long-term goals of this work are to contribute toward improving the predictive capabilities of numerical models and enhancing the fidelity of long-term groundwater monitoring frameworks.

15th September 2017 – A review of hydrogeological evidence within the Queensland Land Court decision to approve the Carmichael Mine – Adrian Werner (Professor of Hydrogeology at Flinders University, and a member of the National Centre for Groundwater Research and Training).

The proposed Carmichael coal mine is a controversial project in Queensland's Galilee Basin. It is one of the world's largest coal mines, and is proposed for construction in close proximity to a set of springs that supports endemic ecosystems and that holds great importance to Indigenous Australians. The decision to approve the mine is

underpinned by misconceptions and considerable uncertainty on the back of a few field measurements.

Adrian Werner was an expert witness to the case, and reveals the process that ultimately led to approval on the mine despite critical and fundamental problems with the investigation into potential impacts caused by the mine void.

Friday 13th October – The GISERA research on water impacts of Coal Seam Gas development in NSW- Sreekanth Janardhanan from CSIRO

The Gas Industry Social and Environmental Research Alliance (GISERA) was set up as a partnership between CSIRO and the gas industry, and has been undertaking independent, transparent and trusted social and environmental research for communities in gas development regions since 2011. GISERA's aim is to provide scientific research and information on Australia's growing natural gas industry to community, government and industry alike through the use of industry, CSIRO and government funding independently allocated to research projects by a stakeholder dominated Regional Research Advisory Committee. GISERA has expanded currently undertaking social and environmental research in New South Wales.

Four projects in the NSW water portfolio spanning multiple research disciplines have been scoped and designed in consultation with community, government and industry stakeholders. These projects investigate multiple processes on different scales to comprehensively assess potential risks to groundwater quantity and quality, and build on from previous research undertaken as part of Bioregional Assessments Programme. They undertake focused assessment of reservoir-scale processes, water quality risks from bore delamination, uncertainties in aquifer-scale flow and water balance changes, and monitoring strategies to minimise prediction uncertainties. The outcomes of these projects provide quantitative assessment of risks that the community and other stakeholders have expressed concerns about.

Wednesday 1st November - 2017 IAH/NCGRT Distinguished Lecturer Series - Climate Change and Australian Groundwater: Current State of Knowledge and Future Responses - Dr Glen Walker

South Australia

IAH SOUTH AUSTRALIA BRANCH

2017 Committee:

President	Steve Barnett
Vice President	Neil Power
Membership champion	Tavis Kleinig
Committee member	Russel Martin
Web master/mistress	Fiona Adamson
Modelling Forum	Juliet Wood

Recent Events

5 October 2017 – NCGRT/IAH Distinguished Lecture

Dr Glen Walker presented the inaugural 2017 NCGRT/IAH Distinguished Lecture entitled “Climate Change and Australian Groundwater: Current State of Knowledge and Future Responses” to about 45 people at the Flinders University City Campus. Glen’s address was very informative and thought-provoking, introducing some new concepts and raising important questions. He was joined by other experts in the field (Graham Green and Russell Crosbie) for a wide ranging panel session.

Upcoming Events

Hydrogeology of South Australian basins

A series of half to one-day training courses on the hydrogeology of the major basins in SA are being planned in partnership with DEWNR and the NCGRT. They will be held at the South Australia Drill Core Reference Library at Tonsley Park. The course would include an overview of the stratigraphy of the basin, inspection of representative cores of the sediments (photos of microscope views also), and an overview of hydrogeology of the basin. Data packages containing key reports, 3D surfaces of the tops of various units and water level and salinity contours would also be available for purchase.

The first course will cover the Murray Basin, but the date has yet to be finalised.

Tasmania

No update available in this edition.

Victoria

IAH VICTORIA BRANCH

2017 Committee:

Chair	Alan Wade	Aquade
Vice-Chair	Ben Hall	Eartheon
Secretary	Tara Smith	Jacobs
Treasurer	Anne Northway	EPA
Events Committee	Katy Kijek	Senversa
Communications Champion	Heath Pawley	Golder Associates
Membership Champion	Alexis Valenza	Valenza Engineering
General Committee	Matt Currell	RMIT
	Ben Petrides	Coffey
	Rikito Gresswell	GHD
	Ben Moore	CFA
	Chris Smitt	EHS
	Matthew Hudson	City West Water

Local News

Our regular branch meetings continue to be held alternatively at the Melbourne RMIT City Campus, Senversa and Jacobs Melbourne Branches. Thank you to RMIT, Senversa and Jacobs for supplying the convenient central venues and first class facilities.

Our last VIC Chapter IAH 2016 committee meeting was held on 5th October 2017 at Senversa. Our next committee meeting will be held on 30th November 2017, at Senversa.

Recent Events

September 2017 - PFAS and emerging contaminants in groundwater - Bill DiGuiseppi, Principal Hydrogeologist (Global Emerging Contaminants Leader) at CH2M.

Bio

Bill DiGuiseppi is a principal hydrogeologist and program technology manager with 30 years of experience on hundreds of soil and groundwater investigation and remediation sites. A licensed Professional Geologist and leader of CH2M's Emerging Contaminants Community of Practice, Bill directs a team of professionals in the identification, prioritization and management of chemicals such as 1,4-dioxane,

perfluorinated compounds, 1,2,3-trichloropropane, hexavalent chromium and other critical emerging pollutants.

Bill has led large and complex environmental investigation and remediation projects, published technical articles, provided keynote addresses and chaired sessions at international conferences and co-authored a definitive book on 1,4-dioxane with Tom Mohr. Bill is Vice-Chair for Emerging Issues within the National Environmental Committee of the Society of American Military Engineers (SAME), is Co-Lead for the Remediation Writing Sub-Group for the Interstate Technology Regulatory Council (ITRC) PFAS Project Team, and was invited by the US EPA to provide a 3 hour technical workshop for their 2017 Annual Groundwater Summit in Denver Colorado.

Bill has a BS in Geology from George Mason University in Fairfax Virginia and a MS in Geology from the University of Utah in Salt Lake City Utah.

October 2017 - NCGRT/IAH Distinguished Lecture Series - Climate Change and Australian Groundwater: Current State of Knowledge and Future Responses

Bios:

Dr Glen Walker

Glen Walker has conducted groundwater and salinity research for over 30 years with CSIRO in Adelaide. Specific research interests included recharge and discharge, vegetation and salinity, catchment modelling for salinity management, groundwater-surface water interactions and climate impacts on groundwater. He also led the groundwater component of the Murray-Darling Basin Sustainable Yields project and is a recipient of WE Woods Award for National Excellence in Salinity Research. Since his retirement from CSIRO in 2014, Glen has been consulting with his company, Grounded in Water, and is a member of the Independent Scientific Expert Committee for Coal Seam Gas and Large Coal Mining Development.

Dr Richard Evans

Dr Richard Evans is Principal Hydrogeologist with Jacobs. Rick has 40 years experience in all aspects of hydrogeology, groundwater resource management and groundwater policy development. He has worked on numerous water resource projects throughout Australia and Asia. He undertook a major study for the World Bank on adaptation measures to counter the groundwater related impacts of climate change.

Mr Chris McAuley

Chris McAuley has over 25 years' experience in hydrogeology in government and the private sector. He is the immediate past president of Australian Chapter of the International Association of Hydrogeologists. Chris's key area of interest is the effective and sustainable management of groundwater resources.

Abstract:

The climate shift in south-western Western Australia and the Millennium Drought has highlighted the need to better understand how water resources will be affected by changing climate across Australia. Australia has long experience with managing water resources in a variable climate. This, together with the Water Reform has meant that

Australia is well placed, compared to other countries, to meet the challenges to groundwater management. While the uncertainties associated with the predictions of global climate models can be large, there can be significant risks to groundwater users, groundwater-dependent ecosystems, coastal aquifers and baseflow, without adaptation to changing climate.

These risks are higher for systems that are already stressed from consumptive use and management options are being 'hedged' while the timing and magnitude of climate shifts become clearer. This talk will provide an overview of the results from recent projects around Australia with learnings about recharge and discharge processes and associated management and recommendations made with respect to knowledge gaps and approaches to addressing climate change.

A very interesting talk by Glen, followed by a Victorian viewpoint on the issue by Rick and Chris.

Recording of the talk will be shortly available on the IAH website.

Upcoming Event

November 2017 - IAH Site visit to the Werribee ASR Scheme.

City West Water is developing an Aquifer Storage and Recovery Scheme to store excess recycled water for non-potable supply in Melbourne's western growth area. Operational injection trials are underway to assess key risk factors such as clogging, water chemistry changes and recovery efficiency. IAH is coordinating a site visit to see the site and learn about the scheme and the injection trial.

The visit will be held Wednesday 1st November (09:00 – 11:30).

December 2017 - Phil McCumber – Groundwater and surface water resource in ancient civilisations. Example of the Middle East (5th December 2017)

Western Australia

IAH WA BRANCH

2017 Committee:

Chairperson	Ian Brandes de Roos
Vice Chairperson	Mal McGivern
Secretary	Sarah Bourke
Treasurer	Sandie McHugh
Events team	Rachel Hamilton Adriaan Haasbroek
Communications team	John Enkelmann Giovanni Firmani

Sponsors

IAH WA is proud to be supported by Tech-Source Solutions, Gold sponsors for the 2017 series of technical presentations.

Connecting highly experienced technical service providers to natural resources & mining industry clients

Recent Events

Members survey

Thank you for participating in the IAH WA members' survey. We received a strong result from the recent IAH WA members' survey. After collating the 122 survey responses the top three topic areas are:

1) below water table construction projects in Perth;

2) flagship mining-setting MAR projects; and

3) regional hydrogeology assessments.

IAH WA will use these results to tailor our 2018 technical talks series.

Thanks to all our respondents. Make sure you are at the IAH WA social night on Friday 13 October to see whether you're the winner of the survey prize.

Rising star

Sarah Bourke: Hydrogeology rising star!

IAHWA member Sarah Bourke has won the 2017 UWA Faculty of Science Rising Stars award. This is an annual event showcasing the diverse and exciting research undertaken by early career researchers in the faculty.

Sarah presented a fantastic 3 minute talk on her hydrogeology research "Understanding groundwater discharge: the key to sustainable groundwater use."

Up against wide-ranging presentations on cancer and cardiovascular research, genetics and evolutionary biology, crop efficiency and climate change, Sarah's was named top presentation! Congratulations Sarah!

Recent Events

21 August 2017, Henry Darcy Lecture, Professor Kamini Singha

Another great audience of Hydrogeologists for the Darcy Lecture this year.

Darcy Lecturer Kamini Singha also visited the UWA's Pingelly Farm research facility while she was here in WA.

National Centre for Groundwater Research and Training

For upcoming courses, see http://www.groundwater.com.au/events/training

IAH Publications

Discounted IAH publications in the 'International Contributions to Hydrogeology' and the 'Selected Papers' series can be ordered by Australian IAH members directly from Macmillan Publishers Australia in Victoria.

customer.service@macmillan.com.au or orders@macmillan.com.au

Remember to quote your IAH Membership Number, which entitles you to a substantial discount. If you don't know your IAH membership number contact the Secretariat at: secretariat@iah.org.au