Quaternary Times

Newsletter
November 2020
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AMQUA

Quaternary Times

The American Quaternary Association Newsletter

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…devoted to studying all aspects of the Quaternary Period since 1970

November 2020
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CONTENTS

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Cover: Plain of Six Glaciers near Lake Louise in the Canadian Rocky Mountains, AB. Photo by Gerald David Osborn (2020).

The View from the Moraine: the President's Message

Jack Williams
University of Wisconsin Madison, jwwilliams1@wisc.edu

Hello and greetings from the Moraine (or, the Kettle?). In this pandemic year, I hope this letter finds you and your loved ones well. 2020 has been a difficult and strange year in so many ways. Yet, we also have much to celebrate, not least AMQUA's 50th anniversary.

The meeting abstracts from the 1970 meeting at Montana State University and Yellowstone Park show how early the interdisciplinary foundations for AMQUA were laid: 'A Model of the General Circulation of the Atmosphere and Oceans'; 'Late-Quaternary Vegetation History in Yellowstone Park'; 'Climatic Changes in NW Europe, 14,000 to 9,000 Years Ago'; 'Paleoindian Ecology'; 'A Minimum Age for Maximum Wisconsinan Ice, Southwestern Alberta.' And, for those connecting science to policy, see 'Quaternarians and Environmental Science.'

This year's highly successful Virtual AMQUA (VAMQUA) meeting (https://sites.uw.edu/amqua50/program-online-meeting/), led by Ben Fitzhugh and Erin Williamson of the Quaternary Research Center, achieved virtue from necessity. We all missed the chance to reconnect with colleagues in person, but, by being online, many scientists participated who could never have attended a traditional onsite meeting. And the talks were, quite simply, outstanding. Comparing the VAMQUA talks to those of 1970, one can see the continuity of questions asked, the depth of new knowledge gained, and the excitement of new insights powered by new techniques (e.g., ancient DNA, cosmogenic dating), the careful building of open global proxy data networks, and their integration with advanced models of the Earth system and its subsystems. We now can conduct analyses of power and scope of which the AMQUA scientists of 1970 could only dream.

At the same time, 2020 has spotlit harsh truths. Our society has a long way to go with racial equity and inclusion. The Geosciences are the least diverse of all STEM disciplines. Climate change, a focal theme spanning AMQUA's 50-year history, once an issue of hypothetical future concern, is now a clear and present danger for America and the world.

So, on AMQUA's 50th anniversary, it is worth asking: What is the best of AMQUA, that is worth keeping for its next 50 years? Where could AMQUA be better? For me, the best of AMQUA: First, its founding in a spirit of open interdisciplinarity, and the resulting excitement of the jostling and exchange of ideas across disciplinary lines. Second, its small meetings and fieldtrips with their emphasis on casual scientific conversations between junior and senior scientists and building community. Third, AMQUA's longstanding commitment to supporting early career scientists and particularly women in science, as evidenced by its Gaudreau Award, the strong representation by

women at all levels of AMQUA, and by the distinguished careers of scientists such as Mary Edwards, Lisa Graumlich, Vera Markgraf, Felisa Smith, and Cathy Whitlock, to name just a few.

For AMQUA to continue to grow and thrive for the next 50 years, it must build on these values, while also expanding its circle outwards, to more actively encourage a diverse next generation of scientists. 2020 has taught us that there are many barriers to diversity and inclusion, some hidden in plain view, that require active steps to overcome. See Christine Chen's remarks in this newsletter, for example, on the complicated role played by fieldtrips, which can both build community and also can unintentionally exclude some early career scientists. For those interested in learning more about other hidden barriers, and how to overcome them, I recommend AdvanceGEO (https://serc.carleton.edu/advancegeo/index.html). The broader goal is to ensure that AMQUA remains an open and welcoming forum for Quaternary scientists of all disciplines and kinds.

As a starting point, I have organized an ad hoc Diversity, Equity, and Inclusion committee, drawn from AMQUA's councilors, officers, and members: Yarrow Axford, Christine Chen, Ben Fitzhugh, Laurie Grigg, Chris Hill, Amanda Keen-Zebert, Colin Long, Shaun Marcott, Kendra McLauchlan, Diane Thompson, and myself. This committee is charged with developing concrete recommendations and actions to bring to the AMQUA membership in time for AMQUA 2021. If you are interested in learning more or in contributing help, feel free to reach out to any of us.

I close by reiterating my enthusiasm for AMQUA and its mission. As a testament to the enduring importance of AMQUA, I am the first president elected from the generation of scientists younger than AMQUA itself. I became a Quaternary scientist because I so enjoyed the chance to transcend disciplinary boundaries in pursuit of understanding a deeply complex and ever-changing Earth System. I have always felt that, when I was a student, AGU showed me the world and AMQUA showed me my home. I am honored to help serve AMQUA in this time of transition and growth.

And, as I close, a warm thanks to outgoing President Tom Lowell and past Presidents Sheri Fritz and Alison Smith, for their advice and leadership. And thanks most of all to Colin Long and Chris Hill, for their ongoing service as AMQUA Secretary and Treasurer. AMQUA Presidents come and go, but Colin and Chris have kept the lights on with their many years of service.

Jack

Photo: Jack Williams (2018)

AMQUA Reports

2020 AMQUA Treasurer's Report

Chris Hill, Boise State University, chill2@boisestate.edu

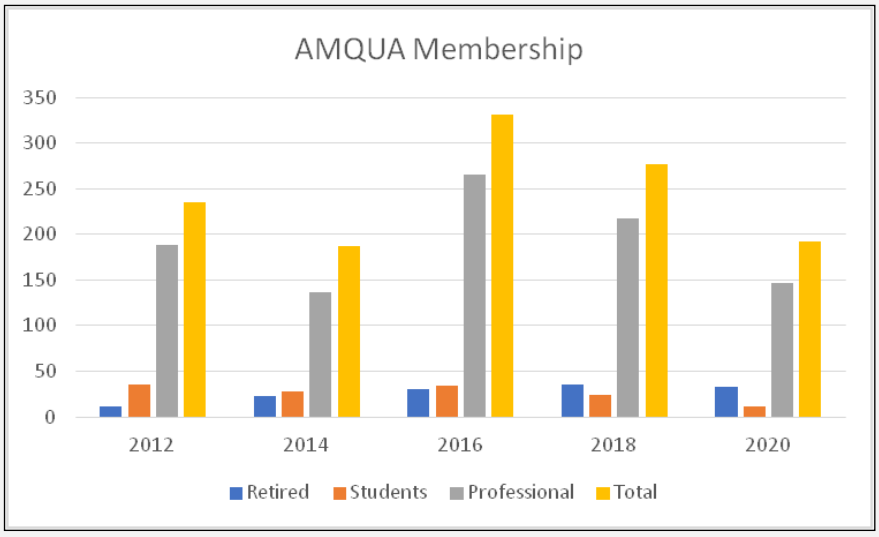
AMQUA has two funds: a general operating fund and a fund for the Denise Gaudreau Award. Revenues are usually mostly from membership payments.

The AMQUA Treasurer is responsible for submitting federal and state reports to maintain the association's non-profit status. The Federal IRS Form 990-N for 2019 was submitted on 21 February 2020 (for the 15 April 2020 due date) and the Annual Report to the Idaho Secretary of State was submitted on 1 July 2019 (for a 31 August 2019 due date).

AMQUA Balances		
(as of 1 June 2020)	General Fund	$47,061.00
	Gaudreau Award Fund	$15,304.30
	Total Balance of AMQUA Accounts	**$62,365.63**
2020 Activity		
Receipts	PayPal	$3,386.00
(as of 1 June, income)	Checks	$118.00
	Total	**$3,504.00**
Expenses 2020	Gaudreau Award	$500.00
(as of 1 June)	Modx Web Site	$120.00
	Total	**$620.00**
2019 Activity		
Receipts	PayPal	$3,639.00
(as of 1 June, income)	Checks	$353.60
	Total	**$3,992.00**
Expenses 2019	INQUA	$4,000.00
(as of 1 June)	Modx Web Site	$117.00
	Total	**$4,117.00**

AMQUA 2020 Membership Report

Chris Hill, Boise State University, chill2@boisestate.edu



AMQUA membership in 2020 is lower than in 2012, 2016, and 2018. This reflects lower active memberships for professionals and students.

AMQUA Council Actions: Updates to AMQUA Constitution and Bylaws

Colin Long, University of Wisconsin Oshkosh, longco@uwosh.edu

While COVID-19 disrupted the planned Biennial meeting in Seattle, it also highlighted a lack of appropriate flexibility in the AMQUA constitution and bylaws regarding the timing and nature of official meetings. The AMQUA Council addressed one of these issues in its meeting on June 15th, 2020 during the Virtual AMQUA meeting this summer. Regarding Biennial meetings, the AMQUA constitution stated that:

Article V. Meetings. The Association shall meet **at least every even calendar year** and as otherwise directed by the Council. The details of the time, place and the number of members required for a quorum shall be specified in the by-laws.

The Council considered and unanimously approved a change in this Article of the Constitution as below:

Article V. Meetings. The Association shall meet **every two years or** as otherwise directed by the Council. The details of the time, place, and the number of members required for a quorum shall be specified in the by-laws.

A similar change in the AMQUA bylaws also needs to be made to allow for flexibility in the frequency of AMQUA Council meetings. However, bylaw changes are made by a vote of the AMQUA membership. A ballot will be distributed to members later this year with the proposed changes in the bylaws. The goal of these changes is to allow for more flexibility in the timing and frequency of meetings to meet unforeseen challenges such as experienced in 2020.

In other action, the Council will update the nomination processes for the Distinguished Career Award and the Denise Gaudreau award. The Council also made a collective commitment toward enhancing diversity in AMQUA leadership, membership, and Quaternary Sciences in general.

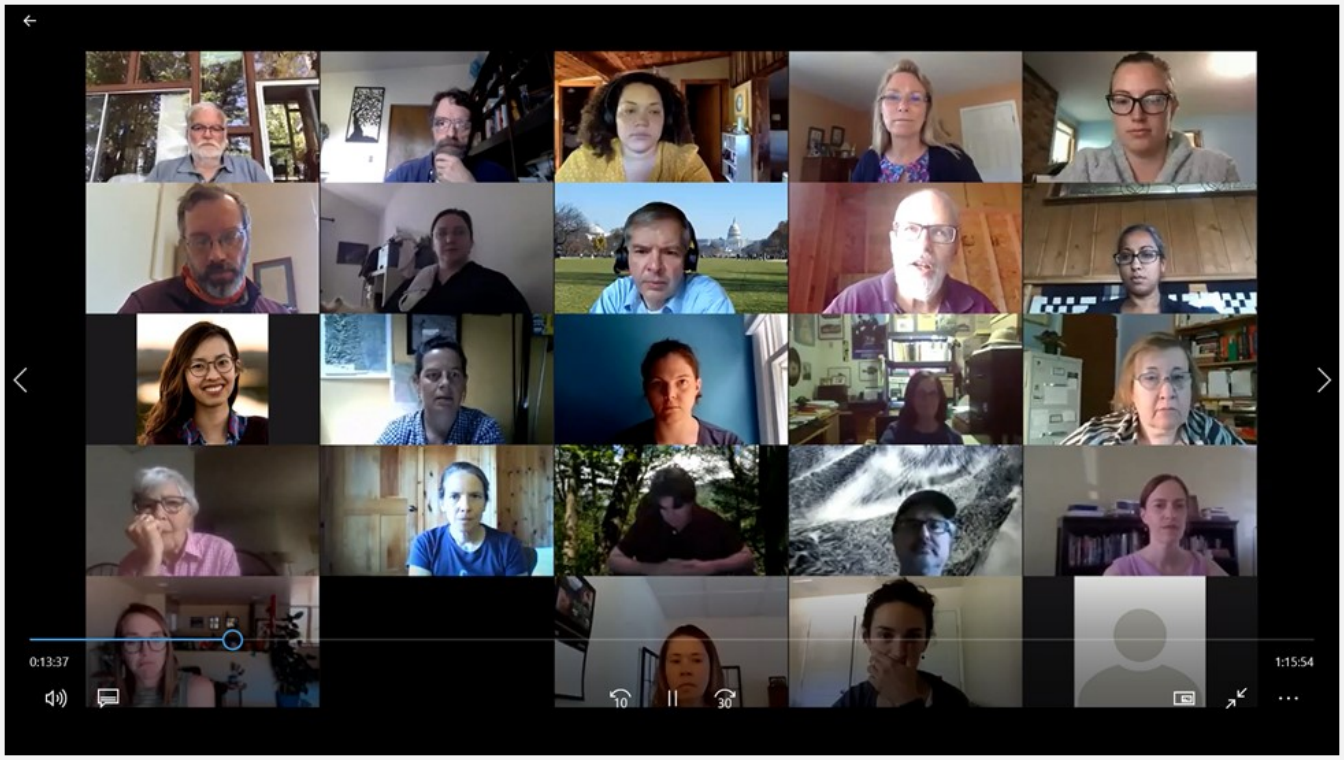
Virtual AMQUA2020

The 50th Anniversary Conference of the American Quaternary Association

Ben Fitzhugh, University of Washington, fitzhugh@uw.edu

As most readers of this newsletter know, *the 2020, 50th Anniversary, AMQUA Conference did not go as planned*… at least not as the organizing committee and UW Quaternary Research Center staff had been planning since the early months of 2019! Like so many other conferences then and since, the novel corona virus pandemic forced us to postpone the in-person AMQUA biennial meeting and re-organize a scaled down virtual meeting in its place. From June 15th to 19th we were thrilled to host the first ever "virtual AMQUA" conference, affectionately referred to as "vAMQUA" by the organizing committee.

Given the unprecedented format, and circumstances leading to vAMQUA, this column provides a brief 'behind the scenes' look at how the meeting came about, a light summary of the meeting itself, a peek at some of the valuable feedback we received following the meeting, and some thoughts on what it could all mean for future AMQUA meetings in 2021 and



Some of the many participants in the AMQUA 2020 Business Meeting and Panel on Inclusiveness and Diversity in Quaternary Science, June 17, 2020

beyond. While my intent is partly to document this unique event for posterity, my greater hope is that the story of our "virtual pivot" proves instructive as we adapt to a transformed future. That is, after all, what Quaternary scholars do… document and interpret the past, to offer insights for the benefit of the future.

The Virtual Pivot
(or, *relearning what every grad student discovers about 'best laid plans'*)

Ironically, or presciently, early on the AMQUA organizing committee (OC) adopted the theme "*Quaternary Futures*" for the 2020 meeting, and our hope was not only to honor the luminous scientific accomplishments of AMQUA members over the first fifty years, but, importantly, to recognize and amplify the promise for the next 50 years … a promise embodied by those still in college or graduate programs or who have only recently launched their professional careers. These are the pioneers of the future, asking new questions, and developing new approaches and techniques to answer unresolved Quaternary puzzles. By mid-February, the OC had lined up most of the keynote speakers divided into a series of panel topics from ancient DNA to Paleo-Floods. Speakers were recruited to discuss cutting edge work framed in terms of Quaternary historiography and the future. We had lined up an exciting keynote program over the conventional 3 days, mixed in with poster sessions, an early career publishing workshop, field trips, and the pinnacle event, the 50th Anniversary Banquet and Award Ceremony.

At the very end of February, with Covid-19 already devastating China and the first cases appearing in the U.S. (just outside of Seattle!), OC members' emails started to raising the outside possibility that the epidemic could interfere with the conference. Within weeks, we had cautioned AMQUA members against making non-refundable travel arrangements. On April 14th we 'pulled the plug' and alerted the membership that the in-person meeting '*Quaternary Futures*' would be suspended until June 2021. In anticipation of that decision, we surveyed the keynote speakers and general members about their interest in an online meeting in place of the in-person event. One month into the pandemic lockdown in the U.S. with the fortunate among us working or studying from home, we suspected that by June we would all be eager for any opportunity to engage intellectually, professionally, and socially. Responses were generally enthusiastic, and we set out to reconfigure the meeting. A new theme emerged as it came together "*Passing the Torch and Turning the Corner*."

The next question was technical. What platform would work best. Ultimately growing experience with (and free institutional access to) Zoom made that an easy choice. In deciding how to structure the meeting, we had to make several strategic decisions. We took advantage of emerging information about what was working and what was not in the early pivot to video commuting and conferencing. "Zoom fatigue" was already a recognized condition, and we were reasonably certain that the best approach would be to limit the duration of sessions to not more than 2 hours. We needed to schedule the sessions at times of the day that would be suitable, especially for members located in different North American time zones, so picked a time straddling mid-day in mid-continent. These two factors drove the decision to stretch the meeting out to five days with 2-hour daily sessions.

In running an online conference the biggest liability is intermittent internet connectivity. To mitigate that difficulty, and to allow presenters the ability to pre-

sent in absentia, we asked all presenters to pre-record a backup version of their talk and upload it 24 hours in advance to a designated online file folder. We circulated instructions in advance with options for recording and uploading the presentations. In almost all cases, the presenters were able to submit these files, and in only one cases did we use a recording, at the wish of the presenter, not out of necessity. We asked speakers to join the Zoom session before their session to test their connectivity and facility working Zoom functions like screenshare. This worked extremely well technically and may also have helped presenters to rehearse their timings. There were no serious technical problems, which may have just been dumb luck, but the preparation surely helped.

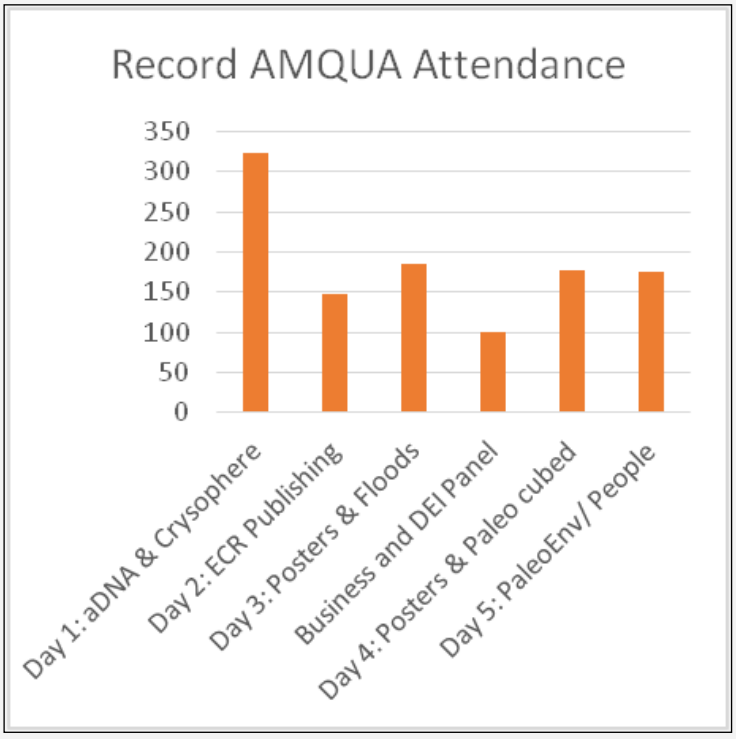
Given the novelty of the approach (and low overhead), we opted not to charge a fee for the meeting and instead ran the registration process through the platform EventBright. That allowed us to give registrants the option to donate to AMQUA to support future student support for meetings. Once registered in EventBright, registrants received a Zoom registration link to receive a meeting URL and password. This system worked very well, and registrants were incredibly generous, donating a total of $1,935 for AMQUA's early career meeting support!

Virtual Surprises
(or, *on what can happen when you inadvertently dissolve barriers*)

The program was structured around one, two-hour regular session per day. Four of those sessions included keynote panels on active Quaternary topics, two also including poster lightning sessions (20 total). On the second day, instead of science talks, the editors and publishers of the AMQUA flagship journal *Quaternary Research* provided a 90-minute Early Career Publishing Workshop with a panel including the journal editors and authors, including early career authors.

Monday morning at 10am PDT, vAMQUA went live. Over the course of that first 2-hour session 322 people joined the meeting, out of a total registration of 348. Biennial in-person meetings typically draw between 100-120 registrants. Attendance in later days was not quite so high but still well above in-person numbers (180 people on average for the other three science panels/poster sessions; 148 for the ECR publishing session; and 101 for the business meeting and DEI panel – an unusual showing for a business meeting!).

On Wednesday afternoon, June 17th, following the AMQUA Business Meeting, a rapidly organized panel was convened to address *Inclusion and Diversity in Quaternary Sciences*.

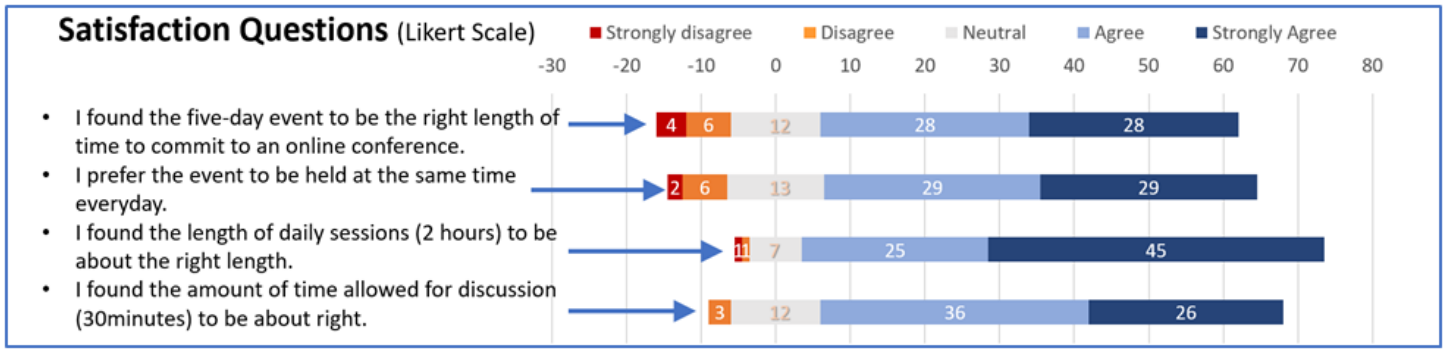


Hosted by Julie Brigham-Grette and featuring critical reflections by Rachel Bernard, Christine Chen, Blair Schneider, and Aradhna Tripati about the challenges still facing our fields such as the historically low representation of people of color and to challenge all members of AMQUA to reflect on the reasons for that failure and what we can do to improve.

Participant Satisfaction Survey
(or, *how three months of lockdown can make a meeting about Earth history feel like a* drink *of cold water in a hot desert*)

From the post-conference survey, most respondents told us that they attended three, four, or all five days of the conference, and more than half had never attended an AMQUA meeting before; a large number of the respondents (~25%) identified as Early Career Researchers; and while the vast majority of participants came from the USA, a surprising number came from countries not traditionally represented at AMQUA meetings (Brazil, Cyprus, France, India, Indonesia, Iran, Mexico, Nicaragua, Singapore, Switzerland, and especially the U.K.). Canada was oddly under-represented in this meeting.

While as organizers we felt the conference went well, and we were relieved that no major technological problems emerged, feedback from the post-conference survey of 79 responses was surprisingly positive; surprisingly because the event was re-organized in less than two months and with technology and a forum new at the time (if not any longer) to the hosts, presenters, moderators, and audience alike.

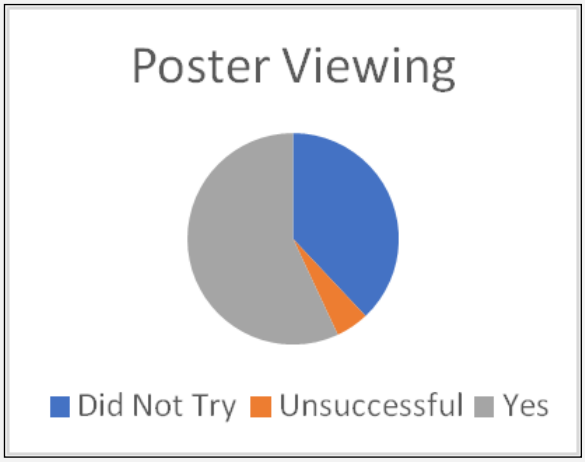


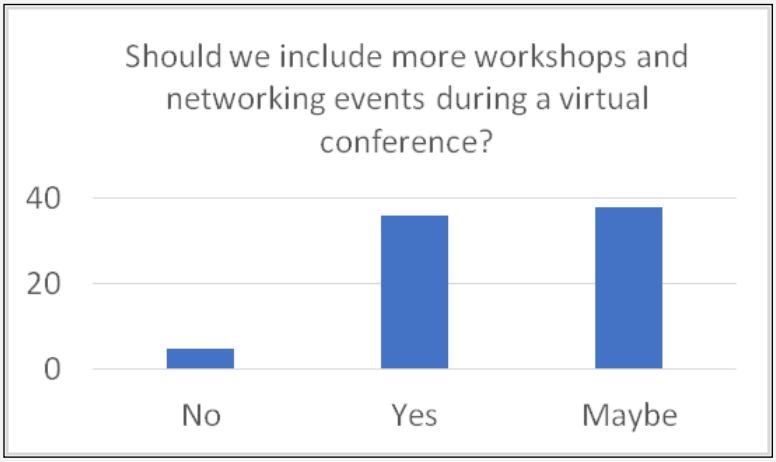
Qualitative responses suggested attendees had generally (and in many cases unexpectedly) positive experiences. Quantitative satisfaction scores overwhelmingly supported the extended days, 2 hour format, time of day and discussion time allocated. In anticipating future online activities, it is instructive that the two-hour sessions format was seen as a good balance for engaging in substance while avoiding burnout, especially as many participants faced dueling responsibilities with family and work while attending from home offices, dining rooms, bedrooms, and kitchens.

Some commenters noted a preference for 4 days of meetings leaving Friday free. Concerns about the time of day related to the challenge of participating from non-American continental time zones, noting either the inconvenience of participating in the European evening, or the middle of the night in East Asia. Anticipating such challenges, we recorded all sessions and posted them on the conference website, where they are still available for viewing.

From both numerical scores and written comments, the area for greatest improvement lies in managing

poster sessions. Posters were posted online before the start of the conference and organizers encouraged attendees to view them in advance of the lighting sessions. Lacking the organizational bandwidth to create interactive poster sessions, we limited interaction to the 10 minute Q&A discussions after each lightning session and encouraged poster viewers to reach out to authors by email to engage further. The lightning sessions were appreciated overall, but poster presenters (primarily ECR) and other attendees expressed a wish for more opportunity for interaction. Without breakout rooms for discussing posters, authors lacked the feedback that makes such sessions rewarding. In the months since the conference, I have learned more about creative ways others have built poster and 'coffee break' sessions into online conferences. New tools have been launched that simulate interactive spaces like conference hallways and poster sessions that might soon break the final obstacle to satisfactory online interactions.





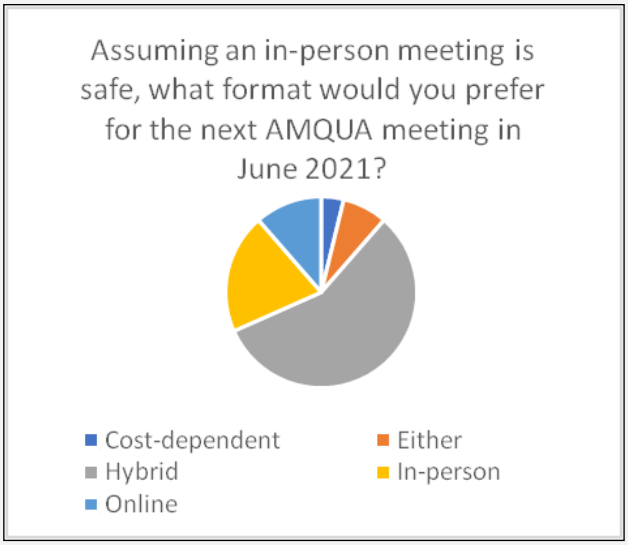
Quaternary Futures
(or, *silver linings in a crazy world*)

Just as major extinction events are often followed by evolutionary acceleration and adaptive radiation in the fossil record, and high-impact crises trigger technological innovation in the archaeological record, I believe that our experiences with the first virtual AMQUA conference hold innovative promise beyond salvaging the opportunity to get together professionally in the Time of Covid. The twin challenges of convening a meeting during a public health pandemic and in the breaking wave of a consciousness raising confrontation of systemic racism in institutional structures of all aspects of society may serve as the catalyst we need to address a range of issues from diversity and representation, climate change, and the very future of AMQUA.

The Diversity, Equity and Inclusion Panel was a high point of the meeting for many of us, and the speakers in that session gave me hope that there are both opportunities and energy for the hard work of exposing and correcting structural impediments and diversifying Quaternary scholarship. As noted in his Presidents column, Jack Williams is leading an energized AMQUA Diversity, Equity, and Inclusion Committee to follow up on the ideas that emerged during and around the panel.

While travel is an important mechanism for scholarly interaction, inspiration and collaboration, it has always struck me as ironic that as scholars of (paleo) environment and (paleo) climate we so readily hop on carbon spewing airplanes and travel for hours or

days and thousands of kilometers to spend just two or three days at conferences. Much of the time, we operate in a jetlagged fog, present a single 10–15 minute talk or poster, binge drink caffeine, and engage in truly meaningful conversations with certainly no more than a dozen others. It is important not to under-estimate the true value of these encounters. Careers are built on the networks created, and science emerges from the collaborations sometimes developed in the corridors and bars of the conference venues.



If we might learn one thing from the expanded attendance of early career, international, and under-represented participants at vAMQUA and similar online events most of us are now finding ourselves on a regular basis, it is that in-person-only events are exclusive, privileged and, if we are being honest (not easy for those of us comfortably habituated to conference-going) only occasionally worth the carbon or cash we sink on them. Online only meetings may not be the whole answer. They come with their own physical, familial and social difficulties, and – importantly – don't yet fully support the social interaction that is considered vital to early career building. With some additional effort we think we can provide greater opportunity for social networking during online events, but we don't think we are yet in a position to abandon physical conferences. The solution, at least for the post-Covid near future may be in finding ways to host hybrid meetings. This is clearly the sentiment of the majority of post conference survey respondents, who identified hybrid meetings as the most desirable way forward.

We hope the world is safe enough by June 2021 to welcome AMQUA to UW for our postponed in-person conference, which will certainly have earned the moniker *Quaternary Futures*. But I believe that finding ways to host hybrid in-person and online AMQUA (and other) conferences promises a virtuous spiral of positive feedbacks. Online and hybrid meetings will allow AMQUA to reach and serve a broader, younger, more diverse, and definitely socially energized community, all while making it possible for participants to save funds and reduce our carbon contribution to the global warming that with the hindsight of our temporal perspective, we recognize is one of the biggest challenges of our time. That is truly a Quaternary Future worth pursuing!

In closing, I want to acknowledge and thank Erin Williamson (UW QRC Program Coordinator) and the other members of the AMQUA 2020 Organizing Committee: Lesleigh Anderson, Brandon, Jorie Clark, Jack Williams, Nick Lancaster, Alexis Licht, Hope Loiselle, Lewis Owen, Kelsay Stanton, and Stephanie Zaborac.

Diversity and Inclusion in Quaternary Sciences

Christine Y. Chen, California Institute of Technology, cychen@caltech.edu

Like many of you, there was a specific moment in my life when I just knew: "Wow, this is amazing. I want to do geology for the rest of my life!" And like many of you, that moment happened during a quintessential field trip in college to Death Valley. It was the first time I'd ever seen mountains. My first time in a desert, sliding down the steep slopes of sand dunes. The first time I'd laid eyes on the ancient redwoods and bristlecone pines that I'd only seen in books and on TV until then.

The landscape was a sight to behold, but what made me fall in love with geology was how intuitive and empowering it felt. I was blown away by the fact that, by simply examining a rock or landscape and applying the powers of observation, you could learn so much about the history of a place. Wave ripples, breccias, alluvial fan systems, cross-cutting relationships – these were all examples of features one could observe and then infer events from the past.

Figure 1. *Students in Chen's freshman class field trip to Death Valley ascend a star dune. October 2009. Photo credit: Christine Y. Chen.*

Geology is, at its core, a discipline that relies on powers of observation. For this reason, I have long felt that Earth sciences, and geology in particular, ought to be one of the most accessible STEM fields: you don't need fancy lab equipment or materials to do it. Geology is something anyone can practice, wherever there are rocks.

So, it was surprising to me when I noticed, early on as an undergraduate, that there was a certain homogeneity to the types of people who were geologists. But that surprise quickly gave way to some personal experiences that could partially explain that observation.

I remember, for my first experience doing field work as an undergraduate, I was given a list of things to bring, and a raincoat was on that list. *A raincoat? Hmm, I don't own one of those… what's a "down" jacket? Why does it have goose feathers? That's weird… how much is this going to cost?*

I remember the exact moment I bought my first down jacket – it was an order of magnitude more expensive than anything I had ever bought myself before, and I was anxious. But my anxiety was soon replaced with pride: the jacket became my most prized possession. I wore it everywhere, even when the weather was too warm for it, because it matched the attire of the graduate students and professors around me, and I desperately wanted to be just like them.

And when I wore my down jacket around the campfire during class field trips, I felt warm, not only because of its insulation, but also because I felt like my jacket was a symbol of my belonging to the group.

Occasionally, I would be on the receiving end of some light-hearted digs at that idea – "real" geologists drink beer, and I don't – and while annoying, these sorts of comments weren't enough to deter me from my goals. But there would be other moments that would surpass mere annoyance, verging on deeply troubling and, at times, hazardous territory.

Figure 2. *Chen sitting next to a campfire in the high-altitude central Andes of northern Chile. January 2015. Photo credit: Justin Stroup.*

I remember a field trip when I twisted my ankle badly, but decided to hide my injury because I didn't want to hold anyone back. I was already being made to feel like a burden for asking for bathroom stops a few times.

I remember a time in the field when someone casually mentioned that we were trespassing on someone's property. I later looked up the local stand-your-ground laws that night, but secretly, not wanting to show the others that I was worried because that wouldn't be very "rugged."

I remember when, in leading my own field season, I had little choice but to choose the white man instead of the woman, because having a man with me in the field would be safer, and also give me the legitimacy to be in the places that I wanted to go.

I remember that last one being particularly upsetting: that, despite all my efforts trying to be a "real" geologist, adopting cultural norms of dress and behavior, I would never be granted the privileges that gave most of my colleagues complete autonomy in their work. Whereas most of my white male colleagues could go virtually anywhere in the world without fear for their physical safety, my research would always be limited to places safe for Asian women. And whereas my white male colleagues would be given respect in these outdoor spaces always without question, I would have to fight for that same respect, over and over again – not only from strangers, but from peers and colleagues around me, too.

I started feeling the weight of my down jacket differently. My closet full of flannel looked strange to me. A closet now full of heavy, stuffy, and uncomfortable things – ill-fitting skins that didn't feel right. Why did I have to assimilate into this culture to have a shot at my dream of becoming a geologist? I wish I could be taken seriously for just being me. But that never worked.

What keeps me up at night is one sad truth: my experience isn't new or unique. Reports have been written over and over again, for longer than I've been alive, about barriers to participation in Earth Science (e.g., Report of the First National Conference on Minority Participation in Earth Science and Mineral Engineering, 1972). And every problem that I described is magnified or experienced differently by our other marginalized community members, for example, our Black, LGBTQ+, and disabled colleagues. And there are stories that I and others cannot tell for fear of retaliation, or not wanting to reopen old wounds in order to prove to others that there's a problem. We are not "complaining" – please believe us when we tell you that something has to change, and that we are long overdue for change.

I will not describe in detail here all the actions institutions and individuals can take to dismantle racism and other biases from the system in which we do science – many such resources exist elsewhere in their

full, unabridged form thanks to the incredible work of diversity and inclusion scholars (e.g., AD-VANCGeo, https://notimeforsilence.org/).

However, I do want folks to reflect on this uncomfortable question: why did it take the deaths of countless Black people, from both police brutality and the differential impacts of COVID-19, for most people in this community to start caring? Our ability to make meaningful, transformative changes – both as a community as well as individuals – will be limited by how well we honestly reckon with that question. Why was status quo was allowed to reign supreme for as long as it did? The answer to these questions should point out which structures, practices, and traditions need dismantling.

I dream of a day when every person, regardless of their background, identity, or ability, has the opportunity to have the same transcendental moment in the field that I and many of you had, where they can say to themselves, "Yes. This is where I'm supposed to be. I was made to do this." I hope you'll help me and others make that happen.

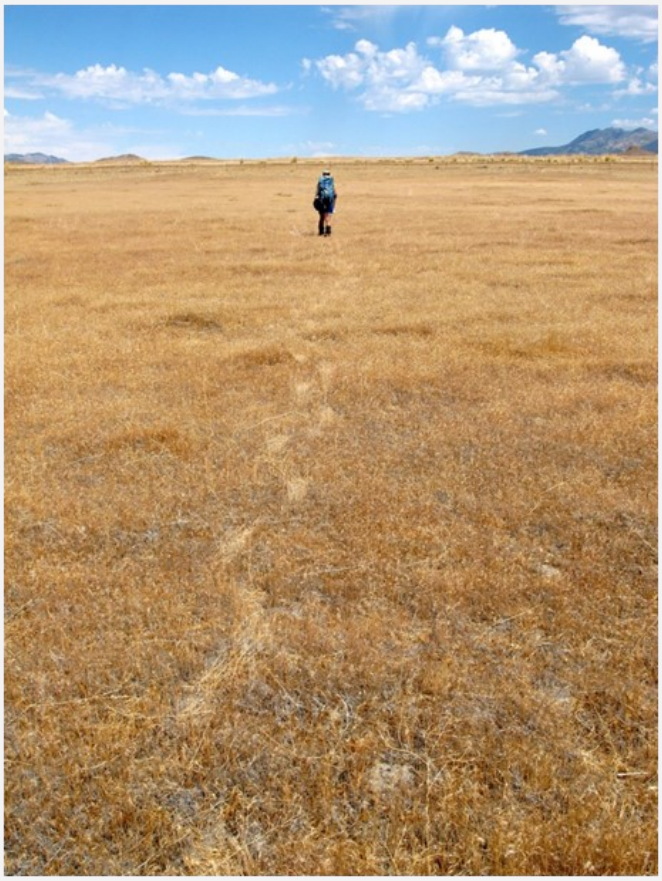


Figure 3. *Chen walks across a golden field of grass somewhere in Utah, while conducting fieldwork for her undergraduate senior thesis. July 2012. Photo credit: Ballard Metcalfe.*

Christine Y. Chen is a postdoctoral researcher in the Division of Geological and Planetary Sciences at Caltech. At the Virtual AMQUA meeting in June 2020, she served as a panelist for the session on Diversity and Inclusion in Quaternary Sciences and spoke about her fieldwork experiences as an early-career, cisgender, non-white geologist. She has modified and abbreviated her remarks from that session here for this newsletter.

AMQUA Awards

2019 Distinguished Career Award
Vera Markgraf

Excerpt from the nomination letter by Cathy Whitlock, Montana State University, whitlock@montana.edu

Vera is classically trained in Quaternary paleobotany with a specialty in the analysis of pollen and plant macrofossils preserved in lake and wetland sediments. She received her PhD in 1968 at the University of Bern working on the history of Alpine vegetation. From there, she worked with the French Atomic Energy Commission and began research in Argentina. Vera accepted a faculty position at the University of Arizona in 1975 and then became a Research Associate in 1981 and later a Research Professor at the Institute of Arctic and Alpine Research at the University of Colorado. Although she retired in 2003, Vera remains active as an *emerita* faculty member at the University of Colorado and as an adjunct faculty member at Northern Arizona University. In 2009, Vera's achievements in Quaternary paleoecology were recognized when she received an Honorary Doctorate from the University of Bern.

2019 AMQUA Distinguished Career Award recipient Dr. Vera Markgraf, Patagonia in 2002. Photo courtesy: Cathy Whitlock.

Over her career, Vera has made major intellectual contributions to our understanding of the Quaternary history of Patagonia, Mexico, Australia, New Zealand, central Europe, and the western U.S. These are evidenced by decades of publications in leading and disciplinary scientific journals, including *Nature*; *Geology*, *Global and Planetary Change*; *Quaternary Science Reviews*; *Quaternary Research*; *Palaeogeography, Palaeoclimatology, Palaeoecology*; *Trends in Ecology & Evolution*, and four important books. The "Pollen Flora of Argentina" (1978) is a classic for palynologists around the world. The two books, edited with Henry Diaz (Cambridge University Press, 1992 and 2000), are go-to references on the historical and paleoclimate impacts of the El Niño-Southern Oscillation. "Interhemispheric Climate Linkages" (Academic Press, 2002) is the first volume to make direct comparisons between the history of North and South America and deserves a second edition.

Vera received nearly continuous funding from various National Science Foundation programs, the National Geographic Society, and NOAA Paleoclimate program. Her success in obtaining external funding is testimony to the high regard of the scientific com-

munity for Vera's research and skill in building international teams to tackle big paleoclimate questions.

Beyond these substantial research accomplishments, Vera is much appreciated and admired for creating a community of North and South American scholars to examine interhemispheric climate change over many time scales with multiple proxy. This effort started as the Pole-Equator-Pole transect (PEP) through the Americas, and then PEP1 was expanded to PEP2 (Australasia) and PEP3 (Europe to Africa). A major goal of the PEP transects was to facilitate development of north-south research partnerships and to foster a unified sense of purpose within the diverse international and interdisciplinary community addressing past global questions. This partnership participated in stimulating scientific meetings that Vera and collaborators organized in Panama, Merida, La Paz, Albuquerque, and elsewhere, and through numerous multi-authored research papers, including the International Climate Linkages volume.

In addition to her scholarly contributions, Vera has mentored some excellent graduate students and postdocs who have gone on to successful careers of their own. Her student PhD student Patricia Fall published the first comprehensive vegetation history of the Colorado Rockies. Lysanna Anderson, now a successful paleoecologist at the US Geological Survey, worked on pollen-climate relations in South America, and Vera's PhD student Ulrich Huber published important early studies on fire history in Patagonia. Vera also informally advised Virginia Iglesias, a student of mine, and this collaboration has led to many publications about the history of the foreststeppe in the eastern Andes.

Vera has always been iconoclastic in her science, and her critical thinking has helped fuel some of the most spirited debates of recent decades. One of the first controversies was her interpretation of spruce in the Swiss Alps, which flew in the face of conventional thinking but has ultimately been proven correct. Then, there were the debates about whether the southern South America experienced a cooling in Younger Dryas time. The evidence now strongly supports Vera's (and Allan Ashworth's) assertation that it did not. She also challenged ideas about the controls of lower treeline in the western U.S. and Holocene changes in convectional storm activity, and the interpretation of *Artemisia* pollen. Throughout her career, Vera has stressed the importance of understanding the ecology of the species, climate variability and not just climate trends, the different response times of paleoclimate proxy, and the value of multiproxy comparisons.

Vera has contributed to the Quaternary discipline in many ways over her career, including co-hosting the Boulder AMQUA in 1984, serving as the biennial program committee leader in Seattle in 1982, and as member of the AMQUA Council. She was co-chair of the IGBP PAGES Executive Committee during a difficult transition period in the organization's history, and she was an active member of LacCore Facility Advisory Committee and COHMAP. Vera was project leader and helped set up the Latin American Pollen Database in 1994, which now resides within Neotomadb.org. Seeking data contributions from different investigators in South America was no easy feat, but Vera had considerable success in getting the enterprise launched.

Her research has greatly advanced our knowledge of the environmental history of Patagonia and other places, her understanding of paleoclimate has led to some of the finest interhemispheric comparisons, and her publications have helped informed conservation strategies. Equally important, Vera has left a lasting legacy on Quaternary science through her leadership in creating of international research networks and her role in mentoring the next generation of paleoecologists.

2020 Distinguished Career Award
Julio Betancourt

Excerpt from the nomination letter by Camille Holmgren, Buffalo State College, holmgrca@buffalostate.edu

During his 30+ years as a Lead Scientist in the United States Geological Survey's National Research Program and an Adjunct Professor at the University of Arizona, Julio Betancourt's vision and leadership has had a continuous and profound impact on the field of Quaternary science.

After enrolling in a PhD program at the University of New Mexico, he realized he was more interested in natural history than anthropology. During this time he helped his friend and fellow archeologist, Mark Wimberley, write a proposal enlisting Tom Van Devender in developing a vegetation history for the Sacramento Mountains using packrat middens. Tom was impressed with the proposal and invited Julio to transfer to the University of Arizona, where he would earn his MS and PhD in Geosciences with minors in Ecology and Evolutionary Biology. Tom also offered Julio a desk at the Desert Laboratory on Tumamoc Hill, a 400-ha ecological reserve and long-term ecological research facility on Tucson's west side. Julio would remain stationed at the Desert Lab for most of his career, until a move to USGS headquarters in Reston in 2013.

He has published a monograph, two books, 20 book chapters, over 160 technical reports and journal articles, given hundreds of presentations and invited departmental seminars, taught workshops and short courses, and maintained an impressive record of service activities.

Julio, along with his colleagues and students, helped develop and synthesize the rodent midden record in North America, and was responsible for discovering and developing it in South America. Although Julio was not the first to discover their utility as a record of Quaternary environmental data, he devoted much of his career to exploring new ways to more fully exploit their potential for reconstructing plant community distributions and dynamics in response to glacial-interglacial changes, tracking of plant migrational histories, testing ecogeographic scaling rules, and as a source of material for ecophysiological, isotopic, and molecular measurements. He has championed their use, trained students on three continents, and built a body of scholarship that has helped shape our understanding of the Quaternary history of the

2020 AMQUA Distinguished Career Award recipient Dr. Julio Betancourt, Shenandoah National Park, 2018. Photo courtesy: Terry Betancourt

American deserts. Indeed, *Packrat Middens: The Last 40,000 years of Biotic Change* remains the definitive authority on the subject.

His first midden study produced a Holocene vegetation history for Chaco Canyon (Betancourt and Van Devender, 1981,1983). Since then, his work has helped show that contrary to long-held assumptions, the Sonoran Desert did not exist during the last glacial period, but assembled from individual elements during the Holocene (Holmgren et al., 2014), detected vegetation invasions down into the upper elevations of hyperarid and plantless Absolute Desert in the Atacama that correspond to monsoonal and pluvial events (Latorre et al., 2000, 2002, 2003, 2005; Diaz et al., 2011), documented with unprecedented resolution the Holocene migration of ponderosa pine in the central Rockies (Norris et al., 2015), measured packrat fecal pellet diameter to temporally test Bergmann's ecogeographic scaling rule (Smith et al., 1995; Smith and Betancourt, 1998, 2003, 2008), measured stomatal density and stable isotopes to understand ecophysiological responses to changes in climate and CO_2 concentrations (Van de Water et al., 1994, 2002; Pendall et al., 1999; Pedicino et al., 2002), and used ancient DNA to determine the dung, diet, and Pleistocene biogeography of a rare rodent in the Atacama Desert of Chile (Kuch et al., 2002) and an extinct ground sloth in Argentina (Hofreiter et al., 2003).

In addition to his work with the midden record, Julio has been involved in wide-ranging research to design, test, and/or apply diverse approaches to the study of Quaternary science. These include the use of stable isotopes, tree rings, hydrological and climatic data, long-term vegetation plots, historical documents and photographs, alluvial stratigraphy, geochemical analyses, and ancient DNA to study the past on annual to millennial time scales. Many of these studies have led to new insights and paradigm shifts. Betancourt has also coined the terms "grassification" to describe the transformation of desert shrublands by invasive grasses (Betancourt, 2015) and "unintentional rewilding" for the introduction of a species without knowing that it had previously been native to that location before going locally extinct (Wilder et al., 2014), and declared "stationarity is dead," (Betancourt, 2012; Milly et al., 2008, 2015).

Betancourt has a long-standing interest in the spatiotemporal dynamics of hydroclimate, ecological disturbances, and plant and animal populations, and specifically in climatically-driven ecological synchrony. His work on ENSO modulation of wildfires in the southwestern U.S. (Betancourt and Swetnam, 1990) helped jumpstart the field of fire climatology. Swetnam and Betancourt (1998) updated southwestern U.S. fire history and extended the research to other ecological disturbances, including the role of climate variability in synchronizing regional insect outbreaks (pluvials) and tree dieoffs (megadroughts) during the past 400 years. This paper garnered Betancourt and his colleague Tom Swetnam the 2001 W.S. Cooper Award by the Ecological Society of America. The citation concluded that, "*There may be no other work that captures the overriding climatic controls on ecosystem dynamics over both short and long time scales as well as this paper does*." More recently, Betancourt has extended this work to the role of climatic dipoles, repeating patterns of large-scaled, antiphased climate variability in driving ecological processes at regional to global scales in both the marine and terrestrial realms (Strong et al., 2015; Zuckerberg et al., 2020).

Betancourt is a firm believer in translational science and has made a point not only of investigating fundamental questions in Quaternary science, but also of applying this knowledge to contemporary issues facing society. For example, many of the records produced over his career provide long-term ecological and environmental baselines for interpreting ongoing

anthropogenic changes, something that is becoming increasingly urgent in light of the impacts of explosive population growth and increasing impacts on the landscape in western North America.

Betancourt co-founded the USA National Phenology Network (usanpn.org), which is aimed at observing and predicting how plants and animals will respond to climate change in the US. He also co-founded the Southern Arizona Buffelgrass Coordination Center, a non-profit entrusted with coordinating research, education, and mitigation of impacts of the invasive grass (buffelgrass.org). In addition, he has leveraged his position as a federal scientist to communicate his findings to government agencies, land managers, and the public. He has worked persistently to bring Quaternary science to a larger audience via numerous press releases, publicly-available datasets and websites, presentations, and radio, video, newspaper, and magazine interviews.

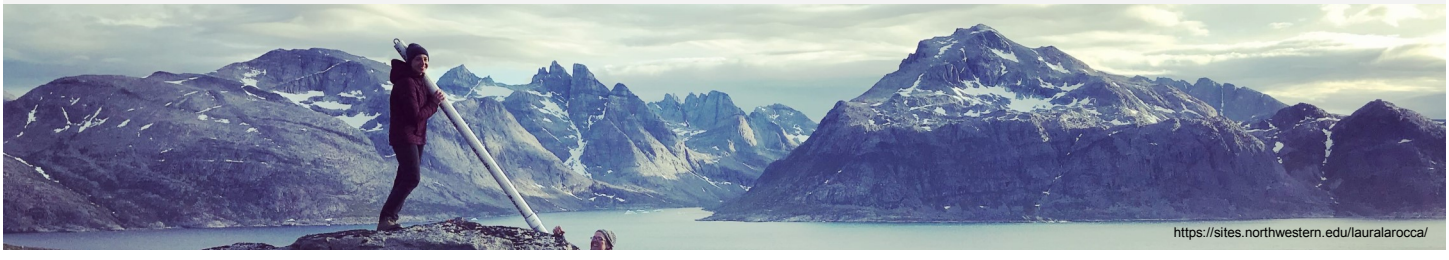
It is clear that Julio's enduring influence will continue to shape the trajectory of the field of Quaternary science, as well as careers of the many individuals who have had the good fortune to interact with him, well into the 21st century. Julio possesses a generous spirit and has been an inspiration, mentor, colleague, and friend to so very many of us in the field. He is a true visionary.

2020 Denise Gaudreau Award
Laura Larocca

Colin Long, University of Wisconsin Oshkosh, longco@uwosh.edu

Laura's research focuses on the recent and Holocene history of South Greenland's glaciers, with special attention to the ~20,000 glaciers peripheral to the Greenland Ice Sheet. Recent warming has caused most of these glaciers to retreat. Although these relatively small glaciers account for ~5.4% of Greenland's total ice volume, they are responsible for up to 20% of Greenland's recent ice loss. Ice loss from glaciers is expected to continue to contribute to sea-level rise throughout the 21st century, with glacier volume projected to decrease by 15 to 85% globally. Yet, current projections of how Greenland's ice may change in the future have large uncertainties, in part due to a lack of knowledge of past, longer-term, change. Laura's work addresses these knowledge gaps through two research projects that explore the recent (~120-year) and Holocene (~10,000-year) history of South Greenland's unstudied glaciers.

2020 Denise Gaudreau Award recipient Laura Larocca. Photo courtesy: https://www.earth.northwestern.edu/our-people/phd-graduate-students/larocca-laura.html

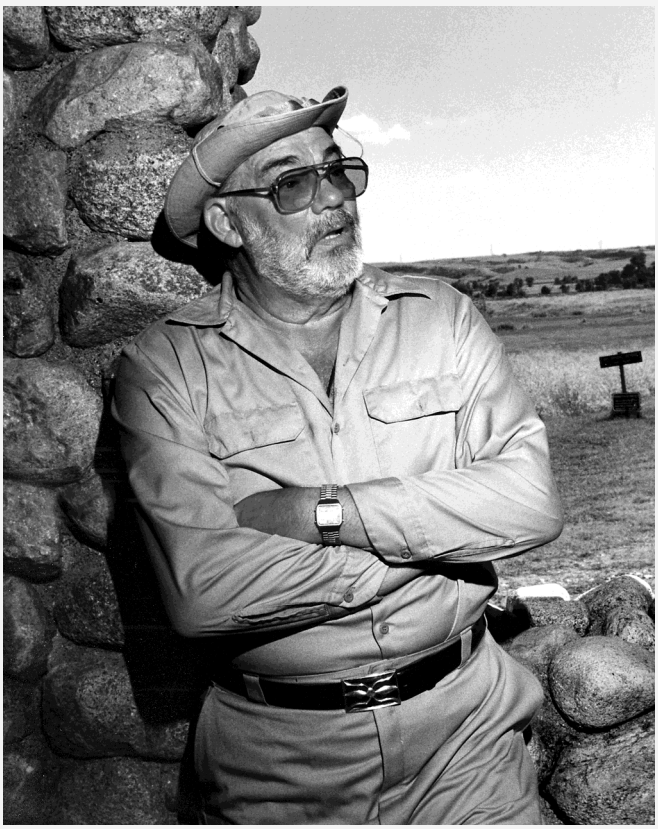


Obituaries

W. Raymond Wood

Robert B. McMillan, University of Missouri, mcmillanr@missouri.edu

W. Raymond Wood, charter member of AMQUA and Secretary from 1972 to 1978, died in Columbia, MO on October 2, 2020 at the age of 89. Wood was born in Gordon, NE on May 18, 1931. He attended the University of Nebraska where he earned his baccalaureate and master's degrees under the guidance of John L. Champ, and in 1961 completed his PhD degree at the University of Oregon under the tutelage of Luther S. Cressman. He taught at the University of Missouri in Columbia from 1963 to 2001, the year he retired. During his tenure Wood served on 83 Master's committees, 36 of which he chaired, and 63 PhD committees, chairing 22 of them.



Ray in the field at Ft. Clark Historic Site in North Dakota.

In 1966, Wood was the principal investigator for an interdisciplinary program entitled "The Archaeology and Paleoecology of the Western Ozark Highlands," that was funded by the National Science Foundation from 1966 through 1968. The program assembled an interdisciplinary group that included Wood (archaeology), C. Vance Haynes, Jr. (geochronology), Peter J. Mehringer, Jr. (palynology), Everett H. Lindsay (vertebrate paleontology), Paul Parmalee (zooarchaeology), and William M. Bass III (physical anthropology). Graduate students central to the project were R. Bruce McMillan (archaeology), James E. King (palynology), and Jeffrey J. Saunders (Vertebrate Paleontology). The interdisciplinary study focused on a deeply stratified terrace deposit abutting against an overhanging bluff shelter, and several artesian springs that accumulated Late Pleistocene and Holocene peats and organic sediments. The strategy was to utilize the spring deposits to develop an environmental record and the archaeological site to create a cultural chronology. The research resulted in several doctoral dissertations and master's theses, a published volume detailing the investigations, and numerous papers in scientific journals.

Wood's first love was the Great Plains along the middle Missouri River. He returned to the region in North Dakota in 1968 where he examined the interrelationships between culture and environment of the Mandan and Hidatsa Indians. The two

tribes were selected because they live on very northwestern margin of effective native maize agriculture in North America. His expertise also extended to the Missouri River fur trade, early mapping of the mid-continent and Great Plains, Lewis and Clark's "Corps of Discovery," and Plains ethnohistory. His graduate students profited from field seminars he taught where cultural and environmental data were analyzed, integrated, and subsequently published.

Wood was active in the Society for American Archaeology, the Plains Anthropological Society, and the Missouri Archaeological Society, among others. He served as editor for the journals of these three organizations. As mentioned earlier, he was a charter member of the American Quaternary Association contributing an abstract for the first biennial meeting in Bozeman, MT in 1970. He was Councilor for Anthropology and Archaeology 1988–1992; and in 2007, he received AMQUA's Distinguished Career Award. He was also honored to receive the Lifetime Achievement Award from the Society for American Archaeology in 2011, and in 1992 he received the Distinguished Service Award from the Plains Anthropological Society. W. Raymond Wood has left a legacy through his extensive publications, both books and journal articles. Recent books include *Prehistoric Man and his Environments* (1976); *Early Fur Trade on the Northern Plains* (1985); *Prehistory of Missouri* (1998); *Archaeology on the Great Plains* (1998); *Karl Bodmer's Studio Art* (2002); *Prologue to Lewis and Clark* (2003); *Twilight of the Upper Missouri River Fur Trade* (2008); *Fort Clark and its Indian Neighbors* (2011); and *A White Bearded Plainsman: the Memoirs of Archaeologist W. Raymond Wood* (2011).

Wood is survived by his wife, Carolee Ramey Wood, his son D. Eric Wood, and his daughter Marigene Holtkamp, all of Columbia, Missouri.

George C. Frison (1924-2020)

Marcel Kornfeld, University of Wyoming, Anpro1@uwyo.edu

George Carr Frison had many roles in his lifetime. To name a few: rancher, navy man, husband, father, teacher, mentor, colleague, and friend. He came to professional archaeology relatively late in life, right around the age of 40, however, his knowledge of archaeology began developing perhaps 10 years earlier. After that short career as an avocational archaeologist along with ranching and after meeting several of his mentors, Frison left ranching, returned to the university and after five short years completed his bachelor's, master's, and doctoral degrees, the latter

Photo courtesy: Marcel Kornfeld

two at the University of Michigan at Ann Arbor.

Upon completing his university schooling, George Frison entered the University of Wyoming as an assistant professor and head of a new, freshly minted department of anthropology. In these developing days of Cultural Resource Management, and given his academic year appointment, as all faculty at University of Wyoming, Frison was offered the role as the Wyoming State Archaeologist, which he performed largely during summer months.

These were seminal times for both the department of anthropology and the state archaeologist's office in Wyoming. It was the development of programs in both institutions and Frison vision played a large role in how these developed in Wyoming. The department of anthropology instituted a master's program within two years of his arrival and began growing in faculty, reaching six within a few years, but that number misses the frequent visiting faculty to fill topical voids. The master's program grew to perhaps 40 students at its height and was well regarded and known as the hands-on program throughout North America and beyond. Frison's University of Michigan background ensured a four field education at both the bachelor and master's levels.

The Wyoming State Archaeologists office developed as a first rate institution, through several reorganizational modes. One the State Historic Preservation Office with two separate departments, the repository of site records and the review and compliance section, and two the Office of the Wyoming State Archaeologist with also two main branches, the state archaeologists office and the survey section. Frison's state archaeologist's duties resulted in copious quantities of fieldwork that blended with his research efforts as a faculty member. The result was enormous opportunities for students to gain field and lab experience during their careers.

During his long career as a professional archaeologist, approximately 1967 to 2020, 53 full years, Professor Frison's research carried him across the state of Wyoming and in near environs, investigating everything from the first Paleoindians to historic forts. Frison received funding from National Science Foundation, National Endowment for the Humanities, the Leakey Foundation, numerous government agencies from state to federal, and as a graduate student the honorable Woodrow Wilson fellowship. Among his numerous award were the AMQUA Distinguished Career award, the Society for American Archaeology Lifetime Achievement award, the Plains Anthropological Society Distinguished Service award, and the Wyoming Archaeological Society Golden Trowel award. In 1997 he was honored with membership in the National Academy of Sciences. George Frison served as officer and president of a number of professional societies, including the Plains Anthropological Society, Society for American Archaeology, and was a councilor of AMQUA. The latter is a testament to the interdisciplinary nature of his approach to research.

Along his long career, he published 18 books and 115 articles, and a few manuscripts with colleagues are still in progress, but his students will remember him as much for his mentorship and the opportunities he gave them.