



CUAHSI Board Meeting Minutes

January 30-31, 2017

Roll Call

- 11 members are present, 10 needed for quorum
- “X” indicates Director is present

Term expires 12/31/2017

Erkan Istanbuluoglu, University of Washington X

D. Scott Mackay, SUNY University at Buffalo X

Kamini Singha, Colorado School of Mines

Scott Tyler, University of Nevada, Reno

Term expires 12/31/2018

Matt Cohen, University of Florida X

David Genereux, North Carolina State University (Chair) X

Gordon Grant, Oregon State University (Chair-elect) X

Erich Hester, Virginia Tech X

Steve Loheide, University of Wisconsin-Madison X

Jeanne VanBriesen, Carnegie Mellon University X

Term expires 12/31/2019

Elizabeth Boyer, Penn State University

Michael Gooseff, Colorado State University

David Hyndman, Michigan State University (past-Chair) X

Holly Michael, University of Delaware X

Al Valocchi, University of Illinois Urbana-Champaign X

Officers & Staff Present: Adam Ward (Secretary), Rick Hooper (CUAHSI), Jerad Bales (CUAHSI), Martin Seul (CUAHSU)

Guests: Norm Chatelier (IBM Service Corps.)

Minutes prepared by Adam Ward

Documents for discussion are archived on the CUAHSI BOD Shared Google Drive

Monday, January 30, 2017

08:00 MST Call to Order

1. Year 4 Budget Overview

1. Hooper introduced the Year 4 budget discussion. Hooper noted that there is a carry-forward that was generated due to adjustment of overhead rates and NSF contracting procedures. Bales and Hooper have discussed the Year 4 and Year 5 budget requests with T. Torgersen (NSF).
2. Hooper reviewed a draft budget for Year 4 totaling about \$2.3M, which includes several items above and beyond Year 3 funding that include hiring a deputy director and staff person, in-house IT support, consultant services for QA/QC and system architecture analyses for the water data center, and subcontracts to several external partners and services. Hooper noted that these expenditures would cause a need for increase in Year 5 because staffing levels would be increased. Hooper reported that the discussion with NSF indicated that CUAHSI must show demand and utilization of the CUAHSI services to justify any funding increase. Bales and Hooper discussed the NSF funding situation which is subject to continuing resolutions.
3. Hooper reported that flat funding for Year 5 would be sufficient to cover current staffing levels, but not any increased staffing levels.
4. Hyndman asked if the NSF review committee would have reviewed this budget prior to the meeting. He requested Hooper to confirm with Torgersen if this budget has been shared or not shared with that committee to adequately prepare for the review.
5. VanBriesen clarified that \$2.3M for Year 4 would mean \$2.3M for Year 5 as “flat funding”. However, this would exceed the original 5-year commitment in the award letter. She expressed concerns that the sum of the 5 one-year awards may exceed the total 5-year award from the cooperative agreement.
6. Grant questioned the optics of an increase in funding in Year 4 to the science community. He expressed concern with increasing funding requests in a time when budgets may be tightening. He suggested that CUAHSI needs to clearly justify these increases to the community and to the NSF.
7. The group transitioned into more detailed discussion of priority areas for 2017, with much of the discussion planned on the Water Data Center (WDC), as much of the educational, training, and meeting efforts will continue as they have in past years.

Water Data Center

- i. Hooper responded that the discussions of the HydroShare and National Water Models at the July 2016 BOD meeting helped define the future direction of CUAHSI. Hooper believes that the HydroShare services will be of high interest to the community. He suggested that CUAHSI promoting a National Water Model could be of concern to the community.
 - a. The group discussed the budget in light of the National Water Model.
 - . Hyndman noted that additional funds from NOAA help support the National Water Model. Hooper noted that the NOAA funds do not currently support a large fraction of CUAHSI base services at this time. Hyndman suggested NOAA may be able to support CUAHSI base funding for the National Water Model effort. Bales suggested that a critical need is for education of the community about how a National Water Model could be useful to individual researchers. Bales indicated benefits of (1) as a national-scale forecasting and (2)

as a research tool for the community to build upon. Bales reported that prototyping is important as a way to demonstrate benefit to the community.

- i. The group discussed the need to increase visibility of CUAHSI at high levels of NOAA, comparable to the way NCAR is supported. Hooper and Bales discussed ways to leverage the WDC to provide data for the National Water Model and as an archival tool for the model runs as a service to researchers. Genereux clarified that the current role of CUAHSI in the National Water Model is primarily in facilitation of the summer institute.
 - ii. Valocchi and Seul discussed opportunities for the HydroShare tool to support National Water Model efforts. The general sense was that the HydroShare tool workflow is not currently set-up for this service.
 - iii. Grant asked about concrete information demonstrating that the National Water Model would be of interest to the research community. Hooper suggested convening a group that would evaluate what a National Water Model means for research and teaching.
 - iv. The group discussed potential use cases for the National Water Model.
 - v. Istanbuluoglu suggested integration with HydroShare would improve use. He also led a discussion of differences between HydroCLM efforts and a National Water Model. One key difference in the climate vs. weather scales. The representation of processes at difference scales is a challenge currently being addressed.
 - vi. Grant suggested the role of CUAHSI is to help the community understand the HydroCLM and National Water Model efforts. He identified this as a key step before CUAHSI should make significant investment in these efforts.
 - vii. Valocchi noted that WRF-Hydro underpins the National Water Model, and perhaps CUAHSI should focus at that level rather than the National Water Model.
 - viii. Bales noted that individuals commonly consider their own needs, sites, models and are most interested in how their needs can be met as individual researchers.
- b. Hooper and Genereux led a discussion of community use of CUAHSI services, including the WDC. Hooper feels that marketing existing CUAHSI services to increase use is important.
 - c. The group discussed the need to hire an internal IT support person, including moving some operations to internally hosted hardware. For example, cloud services are not economical for the HydroShare platform. Seul noted current support is 24-7 on-call support and a limited amount of in-office support on a monthly basis. Seul indicated that more staff coming online would require additional support.
 - d. Bales indicated that a deputy director who is a hydrologic scientist is needed urgently.
 - e. The group discussed the career path for this hire.
 - . Bales expressed a need to ensure continuity of operations in all positions, and this person could play a critical role.
 - i. VanBriesen articulated a need to hire a Development and Operations person to support the current team. She is concerned that the NSF funding uncertainty cannot prevent the function and operation of CUAHSI.
 - ii. The group discussed concern of carryover relative to CUAHSI needs, and the HydroShare support funds that have been included in a currently pending grant proposal.
 - iii. Seul noted hiring could be a process of multiple months to find a skilled worker with interest in this position.
 - f. Hooper clarified that the WDC comes from NSF Instrumentation and Facilities, not directly from the NSF Hydrologic Sciences budget. Mackay noted that it is important to community buy-in to clearly demonstrate where CUAHSI funds originate, as they can be perceived as in

competition with Hydrologic Sciences individual PIs. Hooper suggested this could be clarified with the program managers. Cohen noted it is important for individual PIs to understand CUAHSI as a “facility” vs. CUAHSI as a competitor within a funding program.

- g. With respect to community models, Hooper suggested three key points would be (1) a research-driven agenda, (2) scalable frameworks relevant to scales ranging from global to local, and (3) use-cases that integrate both observational and experimental approaches.
- h. The group discussed the timelines and skill sets required for a Development and Operations staff person. Seul discussed that he has been in contact with a recruiter who is keeping an eye out for an appropriate fit, at no current cost to CUAHSI until a hire would be made.
- i. Hooper noted that future services from the WDC, such as HydroShare, will require different hardware infrastructure for CUAHSI operations. The group discussed possible supercomputing partners for CUAHSI, including the NCSA. One open question is how CUAHSI interacts with other funded organizations who have their own agendas (e.g., NCAR, NCSA).
 - . The group discussed the specialization of different facilities in terms of their hardware infrastructure and architecture, noting that not all facilities are immediately interoperable.
- i. Bales and Seul also led a discussion of storage costs, which are both maintenance of the data set and the I/O of data. Seul and Hooper emphasized identifying the best solution for CUAHSI, rather than adapting CUAHSI operations to meet the infrastructure at a given facility.
- j. Grant initiated a discussion of CUAHSI’s clientele and who is the consumer of CUAHSI services. He suggested that the modeling and data management tools are likely of interest to the operational community rather than individual researchers. He suggested that some agencies would benefit greatly from model-based forecasts. Grant suggested that CUAHSI should broadly consider possible clientele.
 - . Hyndman concurred, noting that public services would likely be viewed as a strength. Hyndman indicated products that spill over from research to public utility would be a win for CUAHSI.
 - i. Hooper suggested agency tie-ins would be a possibility in strategic realms.
 - ii. Bales discussed strategic planning for CUAHSI, including a need to identify CUAHSI’s clear mission, clientele, and how CUAHSI serves that clientele. He noted possible challenges with re-defining or re-scoping CUAHSI activities to emphasize different directions for growth. Bales suggested that the declining budgets of federal agencies may open an opportunity for an external organization like CUAHSI to fill some needs. Bales discussed a variety of agencies and how CUAHSI could fill their needs for expertise in hydrologic science and modeling. He suggested this may be an avenue to improve sustainability of CUAHSI moving forward.
- k. Hooper introduced the ODM2 Admin Pilot project, which focuses on data management for field sensors. The effort is a test of the ODM2 data structure in a variety of use cases, and would directly build upon HydroShare developments and advances.
 - . Valocchi asked about overlap between this activity and CZO data management efforts. Hooper responded that the CZO client is a test-case for CUAHSI software, not a commitment to provide services to the CZO network.
 - i. Grant requested a brief history of the CZO relationship. Hooper noted that HydroServer data were transferred to the WDC. During this process, Hooper was also discussing WDC support with individual data managers for each site and with the CZO national office. In 2015, Hooper approached the CZO national office and NSF about opportunities for

CUAHSI to support the effort, and offered CUAHSI engagement. Hooper has not received a response to this offer. Grant reported that CZO data management is being generally pursued independently by sites, and no sites are approaching CUAHSI to provide services at this time. Bales noted the renewal proposals would be out in 2018.

- I. Hooper reviewed priority development items for the WDC. He noted that usage in terms of uploads and downloads has been relative flat. The approach to increase usage will focus on two key areas. First, expansion of the WDC to include additional data sets, including groundwater (USGS Groundwater, National Groundwater Monitoring Network), climate (hydro-climate data network, SNOTEL, possibly other NOAA data sets), and National Water Quality Portal. Next, the HydroShare tools are being improved for operation and user interface, including a scripting environment that would allow cloud-based analysis and publication of code. Hooper discussed a trade-off between adding data sets to the WDC and development of new services, which is an ongoing challenge.
 - . Bales asked the Board for their input on how important it is to harvest data that already exist in other databases, noting that harvesting additional data sets is slow.
 - i. Hooper noted that growing the data catalog has always been an ambition, but the true costs need to be better constrained.
 - ii. Cohen asked if the absence of some data set has been identified as an impediment to WDC use. Hooper responded that he has anecdotally heard requests for other data. Hooper also noted that national scale data have been a focus because the scope of data acquired is large for the investment in the linkage to the database.
 - iii. Grant asked if CUAHSI's key role is to bundle data. Hooper responded that key advances are a single site to identify data and download it in a uniform format. Grant noted that there is no end to the data that could be harvested, and wondered when there would be an endpoint to harvesting data. Hooper reported that the goal would be for all relevant data to be made available in a single source and format.
 - iv. Valocchi asked about how many university researchers are uploading data given that a number of data management plans cite CUAHSI as the ultimate host of their data. Hooper noted there has not been a large uptick, which is unexpected given the commitments in the data management plans.
 - v. Hooper noted that the services are being extended to host Python scripts that can be executed in the cloud. The goal here would be to help researchers run their analyses in the cloud and download the outputs of analyses rather than the raw data. The group discussed possible use cases for researchers and students who would operate on the HydroShare data rather than on their own machines.
 - vi. Grant again asked if the interactive services are an "if you build it they will come" scenario, where use cases are being hypothesized rather than responding to community needs. He seeks clarify in how likely investments of time and effort are to generate users and utility to the community. Hooper responded that, in general, there isn't much market research being conducted in a formal way. Hyndman suggested regional meetings be used to help solicit feedback on CUAHSI services with a focus on how to get CUAHSI citizens to engage. Genereux suggested the standing committee might also be able to help in this effort. Istanbuluoglu suggested graduate student seed grants that would be hosted at CUAHSI as pilot projects as a way to engage students and advisors in the tools.
 - vii. Loheide suggested that CUAHSI is doing a lot of things with respect to the Water Data Center, and that perhaps there is not clarify in what services are provided. He suggested

users want a single, streamline portal and do not want to see articulation between internal programs and efforts. He suggested that CUAHSI needs a simple, clear message of what CUAHSI does.

- viii. Hester expressed a required activation energy or learning curve required to interact with CUAHSI tools. He suggested lowering the barrier to entry is important.
- ix. Chatelier suggested that the availability of CUAHSI support was excellent in his experience, and the help of CUAHSI staff for training would be useful.
- x. Several people discussed ways to improve the uploading process. Grant described the data publication process as parallel to a chore for users, and suggested that CUAHSI needs to find a way to help motivate users. Lohide suggested “data upload workshops” held at conferences with real-time data uploading and in-person support.
- xi. The group discussed making sure that CUAHSI services clearly solve a problem for researchers, have a clear brand, and show value to the individual users. Chatelier noted that different users will have different needs and perceive different value in the system.

Community Modeling

1. Hooper reviewed commitments this year to host a HydroCLM workshop. Bales noted that there will be a CyberSeminar series focused on HydroCLM coming in the next year, organized by Reinfelder.
2. National Water Model support will continue as it has in past years.

Education & Training

1. The CUAHSI Virtual University will proceed as planned, led by Loheide. Loheide will discuss this in more detail with his committee report.
2. A total of six in-person courses will be hosted in 2017 (listed in Briefing Book). Hooper reported extremely high demand for the NASA Remote Sensing course.
3. Hooper expects 3 Lets Talk About Water grants, 12 Pathfinder grants, and 10 Instrumentation Discovery Travel grants in 2017.

Community Meetings

1. Hooper reported a Hydroinformatics meeting and regional workshops are planned for 2017.

Actions:

1. The Board reiterated their support of the hiring of a Development and Operations Engineer, as authorized in July 2016.

Motion: Approve Resolution #1 as reported below

Motion: Valocchi

Second: Hyndman

Discussion:

1. VanBriesen led a discussion of the budget as-presented relative to possible changes, including any delays in hiring that would adjust the operating budget.
2. Grant discussed the budget in light of the morning’s business. The group discussed flexibility in the budget to reprioritize funds through the year at the direction of the Board of Directors.

3. Loheide asked about possible carry-forward from the perspective of the NSF. Hooper responded that this has not historically caused any issue with the NSF.
4. The group discussed the subcontract to Tufts University that includes support for both Hooper and A. Couch as part of this subcontract.
5. The group discussed possible changes to funding with respect to funding levels at the NSF

Motion to table the motion: Hyndman

Second: Valocchi

Vote: unanimous

Resolution #1: Concurrence on CUAHSI Year 4 Budget

The CUAHSI Board of Directors,

Noting:

1. The budget negotiations with NSF on the 2016 CUAHSI Community Cooperative Agreements (EAR 13-38606),
2. The distribution of these funds to support the services of the Consortium as described in spreadsheet provided to the Board

Recognizing:

1. The formal awarding of funds has not yet been completed

Considering the objectives of the Consortium as laid out in the Interim Strategic Plan.

Concurs with the Year 4 budget request as submitted to NSF

2. Membership

1. The briefing book provides an overview of 2016 Membership dues, and includes a list of members with unpaid dues. Hooper reported that dues payment by members has been strong. The transition to new billing software has caused a glitch, and 54 members are currently unpaid.
2. Genereux reported that he and Hooper have been working to articulate the benefits of membership. They reviewed benefits for IRIS, UNAVCO, and UCAR, and have provided documentation of their findings from websites and email conversations. In discussion with Torgersen, Genereux and Hooper generally found that benefits should be equal regardless of membership status unless dues collected are directly used to subsidize activities. The group discussed prioritization of registration for CUAHSI activities or discounts on registration as tangible benefits to CUAHSI membership.
3. Genereux requested that Emily provide data on registration costs, membership dues, graduate student attendance, and membership account values related to workshops and biennial meetings. He will analyze these data to generate some options for membership benefits.

4. Hooper introduced possible members from international affiliate membership, with a proposal to waive application fees for institutions in World Bank classified Tier 2 nations.
 - a. Hyndman noted international affiliates do not pay annual fees, but often pay an initiation fee.
 - b. Loheide asked about non-participation at annual meetings and how one would be removed from membership. Hooper noted that no mechanism exists to remove existing members.
 - c. Ward briefly reviewed international affiliate participation in annual meetings.
 - d. The group discussed possibilities for requiring a proxy for international affiliates joining with a fee waived to ensure they are represented at membership meetings.
5. Genereux discussed expanding information about membership to more researchers and graduate students. He also discussed using Eos articles or advertisements to raise visibility.
6. Grant suggested targeted engagement of key players in social media to help publicize CUAHSI.

3. Policy Issues

1. Should CUAHSI submit proposal for Software Institute Conceptualization grant?
 - a. Hooper introduced NSF solicitation 17-526 for a Software Institute Conceptualization grant due 11-April-2017. Hooper reported that D. Tarboton expressed an interest in this program. Hooper reported that community buy-in would be an important element, which is potentially demonstrated by the WDC activities and National Water Model.
 - b. The key point for discussion is if CUAHSI should lead such a proposal. CUAHSI policy is that proposals that would be in competition with members required Board of Directors approval. In the past, CUAHSI has required CUAHSI staff to be a PI.
 - c. Valocchi requested details about how the mechanism would work. Hooper reported that the conceptualization grant is a one-year award with a final report. Upon completion, a grantee may be invited to compete for the larger award.
 - d. Genereux noted CUAHSI could support several PIs equally in their efforts, as opposed to leading one team. This is consistent with past CUAHSI practice to remain neutral in these competitions. Valocchi countered that a CUAHSI-led proposal would clearly reflect the community need rather than an individual PI's idea.
 - e. Grant asked what a proposal from CUAHSI would be centered on, from a research or scientific perspective. He suggested alignment of efforts including a number of observatory networks, community models, and data centers as a possible role for CUAHSI. Hooper suggested that a key opportunity would be connecting investigations across scales via a software tools.
 - f. Cohen reviewed the solicitation, and noted that there are also smaller calls available. Hooper stated that HydroShare was funded by these smaller scales.
 - g. Genereux asked if UCAR or UNAVCO had proposed in these spheres. Bales suggested that there is not unanimous agreement in the water science community of how this should be approached. Bales questioned if the entire community would align with this effort, or if it would seem CUAHSI had selected a direction. Bales envisioned that a single, agreed-upon path forward would be necessary for CUAHSI to lead this type of effort.
 - h. Hester expressed concern with CUAHSI leading an effort or supporting only one effort in lieu of other efforts.
 - i. Istanbuloglu asked how this related to the HydroShare2 proposal currently pending. Hooper suggested that HydroShare2 is a research project to develop a software tool,

while an institute would serve a community of science more broadly and over a longer term.

- j. Bales and Hooper expressed concern that CUAHSI would be a leader on a project but not be in control of the grant. As such, Bales or another CUAHSI employee would need to have sufficient control to take primary responsibility for a project. Genereux asked about this issue if CUAHSI were a subcontractor on a project. Hooper responded that this would be hitching CUAHSI's success to the outcomes of a PI. Genereux suggested that CUAHSI would want to have high confidence in and an established relationship with a PI.
 - k. VanBriesen led a discussion of alignment of the effort with various directorates. The group discussed EarthCube as a tie-in to this effort.
 - l. Hyndman asked if CUAHSI currently has the capacity to lead a high-quality effort of this magnitude and on this timeframe. Bales indicated this could be a challenge.
 - m. Genereux clarified that no other community members have approached CUAHSI for support.
 - n. Hooper summarized the discussion that CUAHSI should be a collaborator on proposals when approached, but would not lead a proposal for this call.
 - o. VanBriesen suggested that CUAHSI might conduct a scoping and visioning exercise in the coming year in support of this effort. Grant endorsed VanBriesen's comment, noting that CUAHSI support would lead to possibly scoping of an institute. The group discussed CUAHSI participating more heavily in a proposal for an institute, but not a conceptualization grant.
 - p. Consensus was that CUAHSI should be engaged with this effort, but not leading the conceptualization grant proposal. Hooper and Bales agreed to lead discussions with proposing PIs, identifying ways that CUAHSI could support the effort and use capacity of CUAHSI to engage with the community in areas that are well-aligned with the interim strategic plan.
2. Sustaining NWC Summer Institute
- a. Hooper summarized the 2015 and 2016 National Weather Service summer institutes. For 2017, the NWS would like to continue this activity and has been generally comfortable with existing arrangements. Hooper has been in discussions with the NWS about the future of this program. The general sense was that at the end of each institute – at the time of the capstone program - discussions would be held about future themes and a leadership group identified to host and organize the following year's program. The NWS would identify a theme of interest for the subsequent year, and the group of perhaps 10-20 faculty members attending the summer institute capstone would help identify a leadership team. The invitation to attend and participate in this effort would be open to the community.
 - b. Hooper noted that D. Maidment endorsed this as a strategy to move forward. Hooper requested feedback from the Board on the proposed approach to this project.
 - c. Bales asked if this was primarily an educational activity or a research activity for the NWS, and reported that this was viewed as an educational activity related to the National Water Model.
 - d. Grant asked how the community would evolve to take leadership of this project given the NWS direction that would be included. Bales suggested that building a community of researchers around the National Water Model would likely be an underlying objective.
 - e. Hyndman endorsed the plan as outlined by Hooper. The Board generally endorsed this plan of action.

3. Should CUAHSI endorse/promote myObservatory as data management platform?
 - a. Hooper introduced a request from Y. Rubin for a commercial software product called myObservatory. In the past, CUAHSI agreed that the software could be offered to CUAHSI members at a discounted rate, but this had no formal endorsement.
 - b. The request was that something would be CUAHSI certified, endorsed, or would comply with CUAHSI services. Seul confirmed that the HIS interface is currently supported.
 - c. VanBriesen suggested that confirming compatibility but not endorsing could be an option. The group discussed the opportunity to have staff time spend on validation of compatibility funded by the developer, which would be required for each version.
 - d. Loheide asked if this is a request for advertisement to members or an endorsement.
 - e. Mackay suggested that a standard policy or standard language might be necessary before CUAHSI moves in this direction.
 - f. Chatelier discussed this as a possible revenue stream and a way to increase brand visibility in the space.
 - g. Hooper suggested that there could be opportunity to pursue certification as a revenue stream and useful tool for CUAHSI.
 - h. Chatelier also suggested training on this would build a user community of graduating students, which eventually raise the profile of CUAHSI services.
 - i. Consensus of the group was that CUASHI is not currently prepared to take this action. The Board requested that CUAHSI staff try to understand the compatibility of existing products with CUAHSI. Hooper will assist in this effort.

5. Meeting with Program Officer T. Torgersen

1. Genereux asked if there was any additional information regarding the management review. Torgersen stated that most of the questions had been addressed sufficiently, and that he had communicated all of the necessary information. Hooper noted that data services were a key emphasis, and there were no inquiries around the community services. Torgersen suggested that a balance between the WDC activities and community services may need to be clearly emphasized to the review committee. Torgersen suggested that the group be aware of the dual roles of CUAHSI in community services and WDC services.
2. Hooper asked if the ad-hoc reviews could be shared prior to the review. Torgersen will share them with Hooper.
3. Valocchi asked if the panel members would be known prior to the meeting. Torgersen responded that this would not be the case, but noted there would be overlap in the committee. As such, reflection on the past comments and suggestions and discussion of how CUAHSI activities were guided by this review would be important.
4. Genereux discussed Year 4 and 5 budgets for CUAHSI. He articulated the concern from the community about the balance of funds coming from the Hydrologic Sciences program, and the perception that these funds are taking away from the individual PIs. Torgersen stated that there were historically two grants, one each from hydrologic sciences and one from research infrastructure. The two grants have been merged into a single grant at this time. Hooper reported that the context for the question was to address concern about CUAHSI taking up funds from Hydrologic Sciences during a time when budgets are being cut for the community. Torgersen stated that one of his roles was to balance the research portfolio of the PIs relative to those that serve the community, such as CUAHSI. As such, Torgersen suggested CUAHSI justify how CUAHSI activities support the individual PIs in the community.

5. Hooper discussed engagement of the community with the National Water Model. He suggested that a group of PIs evaluate the utility of the National Water Model and framework as a way to advance hydrologic science. Torgersen indicated that a response by the academy would likely lag any rollout schedule that the NWS has planned. A key question that remains is the business model to keep a National Water Model operational and useful for researchers, noting that a multi-agency collaboration exists to help move this forward.
6. Torgersen indicated that PIs need to be encouraged more strongly to archive their data in HydroShare and the HIS. He expressed some concern that PIs must be able to add their data to the system. He also suggested that a way for the National Water Model to store and access input data and output data is necessary. He used soil moisture as an example, where many tools ranging from remote sensing to individual sensors in the field must be aggregated and assimilated to provide a comprehensive set of data. Torgersen referred to the need for calibration and validation data for the National Water Model as a way to motivate national coverages that will be useful to other researchers.
7. Genereux summarized the discussion of the Software Institute call. Torgersen emphasized the need for any activity to not duplicate efforts of CSDMS activities. Torgersen expressed concern about a CUAHSI-led submittal and if it would be competing with individual PIs. Hooper noted that CUAHSI would likely not lead a conceptualization grant, but would possibly be interested in leading a call for the large funding opportunities if required. Torgersen noted that the 5-year cycle of the S2I2 project requires a business plan that would enable sustained operation without continuation of those funds.
8. The group discussed the logistics of the review meeting given that both Torgersen and R. Kelz are recovering from injuries. Torgersen will join by phone if he is not able to attend in person.

6. Corporate Issues

Standing committees

1. Reports from Liaisons (notes)
 - a. Informatics (MacKay is the Board liaison)
 - i. MacKay reported a successful meeting with an engaged committee. Updates from the most recent meeting are provided below.
 - ii. Members of the committee, with David Tarboton (Utah State University), agreed to investigate the possibility of pursuing opportunities in NSF's Software Infrastructure for Sustained Innovation program.
 - iii. Committee members are providing CUAHSI staff with recommendations concerning CUAHSI adopting the HydroShare platform.
 - iv. Committee members will review external data catalogs to help CUAHSI staff identify the highest priority data from external sources to include in CUAHSI's catalog.
 - v. The committee is chaired by Scott Peckham.
 - b. Instrumentation (Hester is the Board liaison)
 - i. Hester reported a strong committee with interest in activity. He reported strong participation in the Instrumentation Discovery Travel Grant program. Updates from the most recent meeting are provided below.
 - ii. A new chair, Branko Kerkez (University of Michigan), has been elected.
 - iii. New description and guidance for the Instrumentation Discovery Travel Grant program were approved and posted to the CUAHSI website. The new guidance clarified the intent and scope of the program, which was needed due to the

number of grants received that were not competitive at the Fall deadline. The committee also approved an earlier Spring deadline, April 1, so that it is easier for awardees to schedule their field season.

- iv. Two new training classes evaluated:
 - 1. Snow Hydrology (Jessica Lundquist, University of Washington): The committee provided feedback on this proposal, which included specifying instrumentation to be used and field site.
 - 2. Sensor Network Bootcamp in an Urban Environment (Branko Kerkez, University of Michigan): The committee voted to approve this training and it has been scheduled in August, 2017.
- v. Committee is soliciting speakers from other instrumentation facilities (e.g., CTEMPS, WyCHEG) to join the committee on upcoming teleconferences to discuss lessons learned and opportunities in instrumentation to determine where CUAHSI can best support existing community efforts.
- c. Education and Outreach (Loheide is the Board liaison)
 - i. Loheide reported the committee met at AGU 2016. Updates from the most recent meeting are provided below.
 - ii. A new chair, Venkatesh Merwade (Purdue University), has been elected.
 - iii. Committee members support CUAHSI hosting a data-driven education workshop at the CUAHSI office in late 2017.
 - iv. Committee requests usage metrics and an evaluation component be added to the Data-Driven Hydrology Education SERC website.
 - v. Committee recommends running the Specialized Online Hydrology Courses (aka "CUAHSI Virtual University") pilot and evaluating outcomes following the conclusion of the pilot.
 - vi. Committee recommends running Pathfinder Fellowship proposal reviews through the committee, which would relieve Board of Directors and CUAHSI staff from having to recruit a review committee each year.
 - vii. Committee recommends beginning discussions regarding sustainability of the Summer Institute with the National Weather Service and other stakeholders.
- 2. Improving Engagement with Standing Committees
 - a. Hooper introduced a discussion of clearly identifying tangible goals with timely outcomes that advise the Board. He noted that the role of committees has been currently focused on implementation of activities that support CUAHSI's mission, but they are not necessarily providing comprehensive and timely advice to the Board. Hooper posits the engagement in this aspect is due to effort input from the Board and CUAHSI staff.
 - b. Bales indicated a preference for more concrete goals and direction from the Board for standing committees.
 - c. Hooper reported a need for a group to systematically evaluate, for example, options for development in the WDC and strategic planning and prioritization. He encouraged the Board to use these committees as advising.
 - d. Loheide suggested that a facilitator for committees that would help them engage in strategic planning would be useful.

Employment Policies

- 1. Updating employee handbook with new HR Consultant

- a. Hooper noted that Bales is updating CUAHSI HR policies. He recommended that a member of the Board be engaged in this process.
- b. Bales suggested that the policies be updated with respect to recruitment and retention of CUAHSI staff, and developing a clear policy of employment practices and career development.
- c. Hyndman will work with Bales on this effort and keep the Board informed.

Nominations for Officers and Chair Elect

1. Genereux introduced the nominees for Secretary (Ward), Treasurer (A. Sawyer, J. Riley, J. Schmidt), President (Bales), and Chair-elect for the Board (Grant, MacKay). The Board will vote on these tomorrow, as well as an additional member of the Executive Committee.

Presentation by Norm Chatelier

1. Chatelier introduced himself and his role with IBM. He became engaged with CUAHSI through a data management effort related to water supplies in Chile. He shared his experience in discovering the CUAHSI data model, developing a roadmap for its implementation to capture and publicize data, and to engage researchers with the water resource management issues. He discussed an interest in and market for interest in similar projects and programs.
2. Chatelier expressed an interest in helping CUAHSI with marketing and scoping services for the WDC, applying his experience and skillset to helping CUAHSI expand.
3. Grant initiated a discussion of business models and the definition of success for CUAHSI in comparison to for-profit enterprises.
4. Bales discussed Chatelier's role with CUAHSI's Board. Chatelier expressed a capacity to work with CUAHSI's Board as a volunteer, including helping CUAHSI leverage IBM resources when possible. Chatelier has support from his company and manager for these efforts, particularly building upon his past success with CUAHSI. Bales noted that CUAHSI needs help with strategic planning and growth.
5. Loheide requested information about what Chatelier's project in Chile included, and the possible market for similar projects. Chatelier will share his final project report with the group.
6. The group discussed the needs that Chatelier can fill, including a market roadmap, data services, branding, and defining CUAHSI services and clients. Chatelier suggested starting with CUAHSI at a level that helps define CUAHSI's users and their values, identifies needs for each group, and defines a pathway to meet those needs in a prioritized order. Bales articulated the need for a data-driven business model, where decisions are based on quantitative needs.

17:45 MST Adjourn

Tuesday, January 31, 2017

08:00 MST Call to Order

6. Motions related to business from 30-Jan-2017

Motion: Approval of Resolution #2 as documented below.

Motion: Valocchi

Second: Hyndman

Discussion:

Vote: Approved (unanimous)

Resolution #2: APPROVAL OF APPLICATIONS TO BE INTERNATIONAL AFFILIATE MEMBERS

The CUAHSI Board of Directors,

Recognizing: The applicants are from Tier 2 Income countries and thus the initiation fee is waived

Approves: The applications of

1. The Indian Institute of Technology Kharagpur
2. Cadi Ayyad University, Marakkesh, Morocco
3. Suez Canal University, Ismailia, Egypt
4. University of Sis Mohamed Ben Abdellah, Fez, Morocco

to be International Affiliates of the Consortium.

Noting: That the sponsoring universities serve as default proxies for these Affiliate Members if they cannot attend the Annual Membership meetings.

Motion: Approval of Resolution #1 as documented in the minutes from 30-Jan-2017.

Motion: Valocchi

Second: Hyndman

Discussion:

1. Hooper circulated detailed budget with contingency item for items as prioritized if carryforward funds are available.
2. Genereux discussed concurrence as agreement with the budget and prioritization.
3. VanBriesen noted that any contingency funds would be largely directed toward enhancement of Water Data Center activities

Vote: Approve: Istanbuluoglu, Mackay, Cohen, Genereux, Grant, Hester, Loheide, Hyndman, Michael, Valocchi

Opposed: (none)

Abstain: Van Briesen

7. Election of Chair, Officers, Executive Committee Members

1. Election of Chair-elect of the Board of Directors.
 - a. Grant and MacKay made brief statements about their visions for CUAHSI.
 - b. Ward collected and tallied secret ballots, announcing that Grant was elected to the position.
 - c. Hooper noted that Grant would assume the position effective 1-March-2017, immediately following the annual review meeting.
 - d. Hooper led a brief discussion about the composition of the PIs on the NSF award.

2. Election of Executive Committee.
 - a. Genereux reported that the position of one at-large member of the Executive Committee is currently open. Nominations for the position were MacKay and Valocchi.
 - b. Ward collected and tallied secret ballots, announcing that Valocchi was elected to the position.
3. Election of President.
 - a. Genereux reported that J. Bales has been nominated for the position of president.
 - b. Bales was elected by a unanimous voice vote.
4. Election of CUAHSI Secretary.
 - a. Genereux reported that Ward has been nominated for a three-year term for the position of Secretary (2017 – 2020).
 - b. Ward was elected by a unanimous voice vote.
5. Election of CUAHSI Treasurer.
 - a. Genereux reported that A. Sawyer, J. Riley, and J. Schmidt) have been nominated for a three-year term for the position of Treasurer (2017 – 2020).
 - b. Ward collected and tallied secret ballots, announcing that Sawyer was elected to the position.
6. Other business.
 - a. Hooper noted that the Audit Committee needs to be convened to receive the audit on behalf of the membership and subsequently discharge their required duties. The audit committee will report to the Board. He reported a clean audit for 2016.
 - b. Ward discussed the current non-uniform Board classes, wherein there is 1 class of 4 Board members and 1 of 6 Board members. Bales will check the legal requirements to square up the Board classes, as it could require election of a Board member to a non-standard term.
 - c. Meeting Schedules.
 1. Hooper confirmed that Board meetings will be the first Wednesday of each month, 2-3pm EST.
 2. Regularly Executive Committee meetings will be scheduled now that the composition of the Executive Committee is established. The next ExCom meeting will be on 8-Feb-2017, 1-2pm EST.
 3. There will be no Board of Directors meeting for February 2017.
 4. The July 2017 Board of Directors meeting was tentatively set to be located at the CUAHSI Offices in Boston, MA. Hooper will initiate a Doodle Poll to schedule dates for the meeting.
 - d. VanBriesen initiated a discussion of the CUAHSI ByLaws. The group noted several issues to be addressed including international affiliate members, Board of Directors members, and other issues that may be required. VanBriesen, Hooper, and Valocchi will form an ad-hoc committee to review the ByLaws and identify any changes that would be necessary.

8. Management Review and Strategic Planning

1. Invitation to co-sign an open letter from the AAAS on immigration and the free flow of people and ideas in science.
 - a. The Board discussed the role of CUAHSI in representing its constituency, Universities who represent hydrologic sciences. The group discussed the role of CUAHSI as a politically active organization, and analyzed the costs and benefits of co-signing letters

with political positions. The discussion articulated a general position of considering signing such letters where hydrologic science is a core issue and CUAHSI represents technical knowledge.

b. The consensus of the Board was to not sign onto this letter.

2. Strategic planning

- a. Genereux introduced that the remainder of the morning was scheduled for open discussion of CUAHSI strategic planning. The group was keen to engage Chatelier and leverage his expertise.
- b. The group discussed how a business plan for CUAHSI could be developed, including the difference between the market and the customers. The Board identified the role of CUAHSI as largely a service organization, not in competition with private industry nor individual members. One possible persona for CUAHSI is as a standards organization, where CUAHSI sets and maintains standards for the field.
- c. Bales noted that CUAHSI's efforts outside of the WDC are an important part of CUAHSI's identity, and that these services need to be part of any future for CUAHSI.
- d. Chatelier made a presentation about his work with clients in Chile. The presentation served to highlight the development process of execution, operation, and outreach activities that his team implemented with their stakeholders and how to measure progress and outcomes. This presentation motivated discussions about possible clients in governmental and nonprofit sectors.
- e. Genereux initiated a discussion of how CUAHSI would move forward with developing a more sophisticated business model. Chatelier reported that a clear articulation of the future of CUAHSI, with business planning focused on this vision of the future. The group discussed the value of the data model in comparison to the value of the data catalog.
- f. Hooper led a discussion about the recent and future growth of CUAHSI and the WDC. Much of the conversation centered on the value of services that CUAHSI provides as an organization, and how the activity of the group is aligned with value of these.
- g. The group discussed key value added as organizations that need a technology to help them archive, share, and locate data in a consistent, reliable way that includes sufficient meta-data. Hooper articulated value in defining standardized data sets to test models and analyses. He also discussed the need for CUAHSI to identify groups who need these services, which have grown organically in the past (e.g., GLEON).
- h. Hooper articulated the need to clearly define "use cases" that guide the development of data services. Without these cases, the generic mandate to archive and share data is not clearly motivated by these users. The group discussed clearly articulating the problems and limitations that currently exist, prioritizing them, and addressing them to address clear needs. Hooper stated that CUAHSI needs to also help identify these uses cases and highlight the solutions that are being created.
- i. Genereux requested feedback from the Board about what they feel are important elements to include or at least consider in a business plan. This is motivated by a desire to hear from CUAHSI Board members about what the future of the organization should include in a business model.
 - i. Loheide suggested that a diversity of funding sources would lead to a more robust organization, given fluctuations and uncertainties in NSF funding.
 - ii. MacKay suggested CUAHSI's brand was not clear within the community, and that community outreach and education about CUAHSI's activities and missions beyond our membership would be important.

- iii. Istanbulluoglu suggested engagement of researchers outside of the NSF, which would include organizations like NASA, NOAA, and DOE. Hooper discussed an opportunity to identify organizations who currently lack a data management infrastructure as possible user bases.
 - iv. Grant suggested a role for CUAHSI in helping federal and state organizations engage in modeling and forecasting activities, particularly those who are not heavily invested in these capacities.
 - v. Ward suggested engagement of the community in helping guide how the WDC is used, and extracting the needs of individuals. He contrasted the community engagement with the WDC, which is from a small group of users and experts who are pre-disposed to these tools, with the educational activities that engage many members of the community.
 - vi. Hyndman identified a key hurdle of having the community truly engage in the WDC services. The group discussed an “upload-a-thon”. Michael suggested improved tutorials would help. The group identified a need to capture the limitations identified by user experiences and rapidly address them.
 - vii. Michael suggested the composition of the board be considered, with a mind toward bringing in expertise from other disciplines.
 - viii. Cohen suggested that Board members each attempt to upload data themselves or via their group members and provide feedback. The group discussed experiences with data uploads.
 - ix. Genereux summarized the discussion above, and confirmed with Chatelier that these steps were reasonable.
 - x. Loheide suggested the virtual university as an opportunity to build a user base.
 - xi. The group discussed highlighting user success stories, and possibly including a competition for graduate students related to creative use of the system.
 - j. Bales initiated a discussion of the National Water Model and its relevance to the future of CUAHSI.
 - i. Hyndman envisions the model as a component that integrates the community’s observational scientists and modelers.
 - ii. Grant expressed a challenge in identifying his personal entry point to engagement with the National Water Model. He expressed an interest in having a model he could download and run in contrast to a timeseries of predictions.
 - iii. VanBriesen suggested that with a new forecast, new opportunities should emerge. She used an example of a road that regularly floods and being able to forecast hazards.
 - iv. Loheide identified the use of these data in establishing boundary conditions for models.
 - v. Grant suggested CUAHSI develop use cases for the model results and highlight for the community the possibilities that exist.
3. Conference call with T. Torgersen (NSF)
- a. Torgersen discussed the need for a program rotator for the Hydrologic Science program at the NSF. He encouraged the Board to help identify possible candidates and to refer those candidates to him. He suggested experience as a panelist, reviewer, or editor as important experience. A start date would be September 2017 or January 2018, with a typical term of 1-2 years, no more than 3 years. Service may require relinquishment of a PI position on a grant.
4. Planning for the upcoming management review meeting

- a. The group discussed the agenda and plan for the upcoming management review.
 - b. The group also discussed the transition of leadership at CUAHSI. Hooper expects to be in the CUAHSI office 1-2 days per week with a primary focus on helping Martin with management of the WDC project. He expects to taper off this involvement and to be available as-needed to assist Bales during that period.
5. Strategic Planning Activities and Meetings
- a. Hooper suggested the Board consider what strategic planning is required prior to the July meeting, or what preparation is required if this is to be the subject of the July board meeting.
 - b. Bales requested input on the strategic planning process mechanics, elements, and outcomes. Genereux expressed a need to raise visibility of CUAHSI outside of existing members.
 - c. Bales asked if the business plan should be directed at all hydrologists, research hydrologists, or other audiences. These are not mutually exclusive, but could require different strategies.

Motion to adjourn.

Motion: VanBriesen

Second: Valocchi

Discussion: (none)

Vote: Approved (unanimous)

12:10 MST Adjourn