CCC Fall 2016 Council Meeting Notes
Washington, DC
November 2016

Attending: Jim Kurose, Klara Nahrstedt, Vasant Honavar, Ben Zorn, Jennifer Rexford, Randy Bryant, Lorenzo Alvisi, Debra Richardson, Mark Hill, Beth Mynatt, Ann Drobnis, Andy Bernat, Greg Hager, Kathy Yelick, Nina Mishra, Liz Bradley, Dan Lopresti, Peter Harsha, Khari Douglas, Helen Wright, Sampath Kannan

Welcome and Introductions

- Transition for the CCC
    - Time of change
    - Opportunities to get idea out there
- 13 White Papers produced
- We have been playing offense, might need to switch to defense
    - Telling a more valued, richer story to community

Update from NSF CIS and a look forward (Jim Kurose)

- CISE Organization Chart
- $933M FY 2015 Budget
- NSF support of academic basic research
    - Computer Science 82%
- Modest growth across all CISE divisions
    - In 2018 NSF is taking a more aggressive role
- Wireless, virtualization: recent announcements
    - PAWR: Platforms for Advanced Wireless Research
        - Four wireless platforms at scale
        - Smart and connected communities
        - $50M for five years
        - Precompetitive research
- Big Data Spokes of the BDHubs
    - Planning Grants (100K for 1 year)
    - Spokes (1M total for 3 years)
- Smart and Connected Communities (S&CC)
    - New solicitation- NSF 16-610
    - Collaboration between CISE, EHR, ENG, SBE, GEO
    - In new administration- Infrastructure (transportation) is important
        - Important Cyber aspects / role
    - What does it mean to work across disciplines?
        - Timescales
- New TRIPOD Solicitation
    - Collaboration between CISE and MPS
    - “Math centers”

    - Long term collaborations within communities
- CS for ALL
    - $20M
    - It is secure, NSF commitment is rock solid
    - What does “CS for All” mean? Is it a way of thinking? What is a “skill”?
        - It is about access
    - AP exam offered in Spring 2017
    - Interagency working group on the committee of STEM that is co-chaired by agencies heads (France Cordova and Jo Handelsman)
        - Meet once a month
        - To push forward CS for All
- Data Source: HERI
    - Surveys of incoming freshman
    - Slightly uptick of interest of women going into CS (from 2012-now)
    - Nationwide data
    - Good news, need to expand on it
- Additional Activities
    - EHR’s IUSE solicitation called RED
- Advanced CyberInfrastructure
    - National Strategy Computing Initiative
- ACI realignment review
    - OD to CISE in 2013
    - Findings
        - Well managed in CISE
        - Budget has tracked CISE’s
    - Outcomes
        - ACI with remain in CISE
        - New name called “office of advance cyber infrastructure”
        - ACI will continue to serve the entire foundation
    - NSF is discussing the possibility of “green stamps” to buy in bulk
- CER
    - Computing for computer science departments
    - CER got computing infrastructure into computer science departments
- CCC-like Consortiums
    - ECE Department Heads Meetings
        - Similar to CRA
        - Trying to establish a CCC-like consortium
        - CCC should continue to have discussions with them
- NSF Big Ideas
    - Harnessing Data for 21st Century Science and Engineering
    - Shaping the new human- technology frontier
- Partnerships
    - Many dimensions

        - PAWR
        - NSF/SRC: E2CDA
        - NSF/Intel
        - NSF/VMware
- 2016 NITRD R&D
    - Privacy
    - Cybersecurity
    - Artificial intelligence
- International Pressures
    - What europe is doing in cyber and quantum

Updates

- Upcoming events
    - Smart Health, Dec 5-6
    - Sociotechnical Cybersecurity Workshop 1, Dec 12-13
- Big Data Regional Innovation Hubs
    - Positive responses to the program
    - We have may have more funding left to do more related things
    - Klara- NSF program manager is opening the hub to more than just early career
        - Hubs will have a lot of discussion about sustainability. After 3 years the hubs are on their own

Evaluation

- Sent out 2 surveys:
    - Internal survey to 651 previous CCC workshop participants, 100 responses (15.3% response rate)
    - External survey to 220 CRA members, 58 responses (25% response rate)
- Internal results
    - Half of respondents said their participation lead to new collaborations: co-authors on white papers (50%), continued conversations with participants they met from other fields (44%), co-authors on grants (22%)
    - Majority like mix of participants at their workshop, but some thought there could have been more industry and junior faculty
    - Most important CCC activity - visioning workshops (64%)
- External results
    - Majority of respondents (84%) have heard of the CCC
    - Respondents picked the top 3 important CCC activities - visioning workshop (50% said most important), workshop reports, overall networking and community building/white papers (tied)
- CCC Blog: 3-4 posted each week
    - Subscribers have increased 8% since 7/7/15
    - Categories of blog posts - CCC events/website features (36%), announcements (23%), events (17%), hot topics (13%), funding opp. (11%)

    - Liz - Pivot searches for keywords in funding opportunities
    - Top 100 blogs (most visited 11/7/15-11/7/16) - hot topics (37%), CCC events/website features (28%), announcements (19%), events (13%)
        - Lots of hot topics are older and still getting hits. 2nd most popular blog post this year was a post from Greg in 2012
- Post workshop surveys - sent out after each visioning workshop
    - On average 30% of participants fill out survey
    - Majority of respondents either agreed or strongly agreed that “the workshop provided an opportunity for a discussion that would be hard to have without such a forum” and “that there would be useful results from the work”
    - Majority of respondents disagreed or were neutral “that a compelling vision emerged”
    - Survey with the workshop report as well as the with the reimbursement to find out if things have changed with crafted report/vision?
- Translation of the workshop into NSF programs?
    - We mention it anecdotally in evaluation, but occasionally we are mentioned explicitly by someone
- Usually decent diversity by institution and to a lesser extent gender
- Should we survey/collect data about Blue Sky Ideas?
    - Contact people who received it and ask how things changed (5 years out)
- Engagement with industry:
    - Randy - New consortium on AI, Eric Horvitz involved. Get a dialogue going with them
    - Greg - We can’t drive industry but we can have a point of contact with them. ID areas where there is common interest and focus
    - Randy - SRC: came up with the model of putting research funding into universities to get PhDs out
        - If we could get various industry consortia going it would be good for us
    - Greg - AI consortia is open to CCC being a partner to running workshops, ethics in AI, visioning activities etc.
    - Sampath - I would like to see some type of consortium with the big holders of data (Google etc.) to share it with researchers. Come up with mechanisms to protect data and eventually get to the point of sharing it
        - Vasant - BD Hubs had a workshop on sharing data / is working with the companies about data access
    - Beth - is there a convening that we would want to do with CCC alums (Eric, Peter Lee etc.)
        - Liz - we should reach other people, not just our alumni
        - Mark - what do you envision? An annual meeting?
        - Greg - what would be the charter of that group? What are the expectations of the group?
        - Mark - could be good outreach to other communities

        - Greg - are you looking for strategic guidance for the council or a mechanism to provide outreach outside of the council? Both?
            - Beth - more on outreach
            - Debra - alums may not be the best for broader outreach
        - Andy - getting the time for someone we really want will be difficult unless they feel like they are getting real value
    - Sampath - ID 20 conferences and ask them about the great ideas coming through the conferences and spread the word of CCC to the conferences
    - Randy - having Beth go out and give 1 on 1 talks is probably more valuable than getting a group of people in the room at the same time
    - Greg - if we do more is it by doing less somewhere else?
    - NIST and Ignite are in the short term, maybe we offer an avenue for different time scale
    - Partnership on AI did not emerge out of OSTP AI workshop series; independent thought
    - Holly - NIST: Plug in with the materials, construction etc. as computing becomes more involved in that area

Transition Papers:

- There will be a gap for a while with PCAST with the transition
    - Something like PCAST will need to exist
    - PCAST is established by executive order
- NSF director is not a political appointment, deputy director is a political appointment

Task Forces

- AI and Robotics
    - Chairs: Greg and Eric Horvitz
    - Members: Randy Bryant, Vasant Honavar, Maja Mataric
    - 1) Tried to consolidate content on the website
    - 2) “Opportunities in broaders advances in AI” Whitepaper
        - How do you verify properties of an AI system?
        - AI systems in general
            - Visions?
            - Do these systems exhibit behaviors that are predictable?
        - Humans in the loop
    - 3) “Actions for AI transition paper” Transition Paper
        - Consultation papers around AI
    - 4) Partnerships on AI
        - How could CCC interact with this?
        - Collaborations?
- Convergence of Data and Computing Task Force
    - Chair: Vasant Honavar
    - Members: Liz Bradley, Klara Nahrstedt, Holly Rushmeier, Mark Hill, Kathy

    - 1) Symposium series
        - AAAI / CCC organized
        - Series of short talks and panel
        - Livecasts
        - Agency Session- NSF, NIH, DOE
    - 2) Transition Paper - *Accelerating Science: A Computing Research Agenda*
        - Computational lense
        - Foundations of data science
        - Will edit after the symposium next week
    - 3) Other Transition Papers
        - *Big Data and Civic Rights*
            - Done as of 3pm yesterday
        - *Public Health Surveillance for Early Detection and Effective Response*
    - 4) Architecture 2030 Workshop
        - Paper almost done
    - 5) Nanotechnology Workshop
        - Paper almost done
- Computing in the Physical World Task Force
    - Chair: Ben Zorn and Shwetak Patel
    - Members: Kevin Fu, Daniel Lopresti, Klara, Beth, Debra
    - *Smart Cities Smart Communities* Transition Paper
        - Cyber security commission
        - Could also include community colleges?
            - Could serve role of education and employment to smaller communities
    - CPS community drives the smart cities work
    - Libraries used as community centers
        - Infrastructure is already there
    - Service learning courses
        - Get credit for teaching others
    - Most systems are too complex for the average person
        - Need someone to make the first bridging step
        - Bridging technology into area is important
- Privacy Task Force
    - Chair: Cynthia and Sampath
    - Members: Lorenzo Alvisi, John Abowd, Jerry Reiter, Ashwin Machanavajjhala
    - Transition Paper- *Manhattan Project for Census Bureau*
        - Have been working on it
        - Might need to think about other names for this new administration
        - Hard to write because of John's census' connections
        - Might write a blog post to introduce the transition paper

Tom Kalil Visit:

- Tom thanked the CCC for its hard work
    - The speed and agility of the CCC is one of its key assets
    - Set of papers that helped shaped the administration big data R&D initiative and the papers we didn't ask for (e.g. Robotics Roadmap)
- Lots of agencies are stable from one administration to the next (e.g. NSF, DARPA - only director is political appointee)
    - For colleagues of social and behavioral science things will change. Not a priority for some in Congress
- People coming into the new administration that (at least in the past) support science (Newt Gingrich)
    - One of Newt's biggest regrets is that when the doubled NIH budget they didn't double NSF's
    - Not all aspects of science - NASA should not be focusing on earth science, but on human exploration
- This will likely increase spending at the state level - Bush administration didn't invest in stem cells, California had huge initiative
- 2 potential approaches from agencies- that which is not forbidden is allowed vs. doing nothing until being explicitly told. Both at an agencies and individual level
- 3 approaches, active interest vs. active dislike vs. benign neglect
- Interagency collaborations are hard: NSF and NIH have long standing collaboration in computational neuroscience, but many instances where without active encouragement from the White House they don't collab. Not the #1 priority
    - I would focus on ID'ing who is the lead agency than assuming a group of agencies will come together to work on something
- Michael Ledford
    - Innovation component in infrastructure bill - Schumer's Office
- Who do the transition papers go to?
    - Kalil - Big question while you are writing the papers is "Is there an audience for it?"
- Number of papers in post-Moore's law area
    - 2 transition and 2 workshop
        - They have been sent to John Hennessey
    - Council on Competitiveness
    - SIA - Semiconductor Industry Association
    - DARPA and SRC related to the startup effort
    - Get industry collaborators
    - There will be those who say we need an investment initiative to move beyond the limits of silicon CMOS
        - Other ideas - vertical integration could give US competitive advantage
        - Approximate computing, leveraging power
        - Software / Hardware co-design
    - More immediate thing is planting the flag on this issue. There are lots of potential technological pathways - Is this a let a thousand flowers bloom approach or a

couple of ideas that now have enough empirical evidence that they are worthy of a more targeted investment?
        - When a policy maker sees a long list of ideas they think of the “let a thousand flowers bloom approach”
- Actionable AI Paper (Greg)
    - Theory of AI 100 report was here is where the sector is going but it didn’t provide a driving force to those areas
    - If you want to have impact you need a goal, a concrete plan, and actors/mechanisms
    - Take each of the verticals in the AI 100 report and create an actionable agenda that figures out the way to achieve these goals
    - Kalil - 2 possibilities: There could be someone in the white house you could give those to and they will take it and do something, but need a plan if you don’t have the active cooperation of the White House and don’t have a Kalil or Ed Felton
        - Proactively connect with agencies
- Federal government paying for data: Joint-pathology center, DOD has 33 million slides they have been collecting since the civil war. Huge improvements in accuracy by combining machine learning with human judgement
- IARPA agreed to do the Functional Map of the World - overhead imagery of the planet every 24 hours, can you automatically annotate the world by providing training data for all the man-made structures you would like to tag. Relatively low lift if the agency has the data
- Privacy papers
    - Kalil - interesting opportunity with Paul Ryan and Patty Murray: passed bi-partisan legislation to create committee on regulation (?), allow government to pass regulation while protecting privacy
    - Paul Ryan should be interested in the outcome of this work
    - Privacy score equivalent to credit score - use it to make a judgement on my data
    - CDT, EFF
- IoT security and safety paper
    - Increasing complexity of IoT systems and disproportionate ability of people to manage their devices
    - Can’t just look at one dimension, also have to consider who owns the device and consider how to deploy devices safely
    - Something the DOJ has started to do more work with. Has increased interaction with the startup community around this.
        - DARPA more in cyberphysical systems had program called hack-something (?)
        - This device will accept a certain type of communication and no other
    - This is difficult for the government to deal with because it is a horizontal issue rather than a vertical issue. Each agency thinks about it differently
    - John Launchbury
- Labor and workforce around human augmentation

    - NSF has 10 big ideas, 1 on human technology frontier - focusing on work with resonate with the NSF folks working on it
    - Department of labor has not traditionally done research. When they did it was more social science around workforce
    - Matt Gee (University of Chicago) - Data Science for Good; working with Dept of Labor
    - We think this might apply to bringing back manufacturing jobs and retraining
        - The money is primarily allocated at the state level in this area
- One of the challenges is that non-college educated workers have dealt with stalled or declining real wages. Grand challenge: could you give a non-college educated worker training (a skill) that would give him a skill that would put him in middle class in less than N months
    - DARPA - project dominance: Reduce the time to get a technical skill from years to months
        - They had navy members who were outperforming 7-8 year veterans
    - Ken Koedinger (CMU) working on this area
        - Skill based hiring. If you need these skills to do the job, could you reduce the time it takes to acquire
    - Unicorn for the Middle Class - increase wages of 100,000 workers by $10,000
    - Who is the audience? - Employers who are dealing with lots of open jobs or those with lots of aging workers (aerospace industry)
    - Whole new take on vocational education. Can't send everyone to college
    - Coding bootcamps where they don't charge the individual up front, only take a percentage of the first year(s) income - more like equity and less like debt will align incentives with student and school
    - Employer can articulate what the worker needs to do and community can design a way to practice these skill through modeling, simulation, learning tools
    - Ex. if you get to level 60 in world of warcraft you don't need to take a paper test to prove you are good. If you get to a certain level of training you are certified
- Democratizing design for future computing platforms - head of MTO (Bill Chappell) is very interested
- Healthcare surveillance
    - CDC is already interested
    - DARPA and DOD are funding this with defense related interest
    - CDC is looking for help fostering research in this area
    - Paper on computational and statistical methods in this area
    - Some interest in NIH in this
    - Get DOD interested in funding some academic work in this space. Only so much you can get from normal defense contractors
- Applying computer engineering to biological systems
    - At some point you will be able to put in a DNA sequence and get it out immediately
    - How do you control this process? Environmental and health risks

    - Biofoundry approach that involves other national labs. Of interest to the department of energy for biofuels and carbon sequestration
        - Chris Voight - MIT, DARPA PI
- Big Data and civil rights
    - Computational algorithms that learn from data that is explicitly or implicitly racist
    - Remove the membership in S, but membership in S is implicit in the data
    - Is there a better way to title this paper to make it more likely to connect?
        - Kalil - Avoiding oppression by the federal government
    - Weapons of Math destruction is quoted in the paper
    - Would the Open AI team be interested in supporting work in this area?
    - Ford Foundation might be interested
    - NSF might be interested in the technical aspects
    - Need CS and SBE people