

## CCC Council Meeting July 19th, 2018

Participants: Peter Harsha, Suresh Venkatasubramanian, Nina Mishra, Holly Rushmeier, Dan Lopresti, Ken Calvert, Rance Cleaveland, Shwetak Patel, Maja Mataric, Ian Foster, Mark Hill, Ann Drobnis, Liz Bradley, Ronnit Rubinfeld, Greg Morrisett, Juliana Freire, Ben Zorn, Beth Mynatt, Jen Rexford, Nadya Bliss, Keith Marzullo

### General Updates

- Ann - since we last met we have start on our new (third) award. Going to strive to do more in terms of communication and outreach. Been going back and forth with NSF on the communications plan, will share with the council soon
- We submitted a number of AAAS proposals, most accepted except for the ML and fairness one
- Will be hiring a new staff person this year
- When you're out make sure you are talking about the CCC. Contribute to the blog if something interesting in computing happening
- May do a podcast with council members
- Beth - when I'm on the road I try to give a presentation about the CCC and how they could get involved
  - Mark - I'll send out a 2 slide version you can use to add to your scheduled presentation
- Greg - Recommend Jin Yang (CMU) as podcast interviewer
- Ken - just going out and talking to people is part of the communications plan
  - Greg - when I talk to people they're wondering "how do I get on the council"
  - Mark - they can propose a workshop. We have open nominations, but going from nothin to on the council is tough
  - Dan - we also have non-council members helping out on the task forces
  - Point people you talk to to Ann
- Nadya - anytime I go to DARPA or IARPA I bring the CCC materials with me and people are receptive to it

### Task Force Updates

- Mark- Task Forces are not set in stone, sometimes we sunset them. They are not necessarily big, could be targeted.
- Ann- Our TF goal is interest area

- Beth- TF is a way for some council members (and other community members) to focus on particular areas
- Shwetak- could have much smaller TF but have collaborations between other ones
- Ann-This is important for the AI roadmap
- Post Moore's Law Computing
  - Mark- Technology and scaling is slowing down, we need to think about ways to move forward. Have three workshops, two have been completed. The final workshop is on Thermodynamic Computing in January.
  - Ben- Does this relate to synthetic biology?
  - Mark- We want our TF to be broad enough to fit everything but narrow enough to not be overwhelming
  - Ben- Task force without CCC member?
  - Beth- Every activity doesn't need a task force or a CCC representative, BUT it is really hard to have enough cycles to be chair and run a TF AND it is really hard to have a TF without someone on the Council
- Privacy and Fairness
  - Liz- Fair Representations and Fair Interactive Learning in March 2018, report has been written. Editing and sharing it now. Possible workshop on Economics and Fairness workshop.
  - Suresh- I have a few names that I can give you for the econ workshop
  - Liz- TF has struggled with the technical aspects of this topic while keeping it broad enough to be beneficial to the field. Perhaps we have a temporary sunset?
  - Ann- the question is, how do we overlap with AI?
  - Suresh- Do we need to separate out these concerns?
  - Ronnit- We need to be careful about putting TOO much into AI
  - Beth- Kate Starbird's presentation drew a lot of comment, some people want a workshop in her area. How to distribute information and how to make sense of it.
- Cybersecurity
  - Nadya- Biggest focus has been embedded security. We did a number of blog posts this year. Have a joint workshop with USENIX in August. There will be a white paper that will come. We participated in II briefing in January. We also talked about looking into the 5G technology.
  - Greg- 5G, could reach out to Steve Whicker. He was interested. Potential person to ask.
  - Nadya- Electrical engineering folks would also be very valuable

- Keith- cybersecurity and 5G problems are in the area of use cases, this is a rapidly evolving area. We need to have a broader area if we do a workshop in this area.
- Nadya- Could bring in people to identify use cases.
- Greg- Radio level attacks are so different.
- AAAS 2019
  - Cybersecurity: Transcending Physics, Technology, and Society
    - Mark, Zeynep Tufeju, Paul Kocher, Kevin Fu
  - Socio-technical Cybersecurity: It's All About People
    - Ann, Keith, Brian, Rebecca, David Mussington
- Nadya- It is important to continue a security task force, the area that I am deeply concerned about is the area of technical security as related to information. We do not have the technical tools. There is need for graphs folks and image processes folks. Kate Starbird identified the need for psychologists. Identified a research area and create an informed research agenda.
- Greg- Fake news is a big issue and a big security issue, transcends many different modes
- Juliana- These have huge societal impacts. Perhaps we bring in political scientists.
- Peter- If we do this, can we call it something other than "Fake News"? Perhaps "disinformation."
- Ken- Need to think about this from a broader sense and be careful about how we phase this.
- Ronitt- [Hany Farid](#), Senior advisor to the counter extreme...
- Keith - Ran Walzman, also another person
- II
  - Dan- evolution of the cyber-physical systems, we did a lot of things this year... congressional staff briefing, AAAS panel, session at Fall 2017 symposium. Next steps? Michael Dunaway (GCTC) workshop in October.
  - Ben- GCTC has a number of public/private partnerships, this is a way for us to join them and learn more about them. One of the challenge is to engage with the researchers, technical topics that are highly valuable.
  - Ken- NSF interacts with GCTC folks, they don't have funding for anything. They convene people and bring them together. There is a good connection between NSF's Smart and Connected Communities program.
  - Keith- NIST is great at convening
  - Dan- This could fit into the AI roadmap or with other TF.

- Juliana- tools that have sensors, for example they know which kinds of seeds to plant and how to water the plants, what is the problem that they have? There is a much broader range of people that we can access.
- Ann- This is very similar to our final AAAS 2019 panel.
- Greg- This grew out of a big digital agriculture initiative, 70% of fresh water is used for irrigation.
- Ben- Companies are reaching out to retrain people to do AI, how do you bring down the analysis to these people. Uber for tractors in India.
- HTF
  - Shwetak- How do you train and and leverage technology? Workshop on Workshop Training on March 28-29, 2019 in Atlanta, GA
  - Holly- target audience is computing researchers in HCI/Graphics/Haptics/Vision/AR/VR, developers of training materials. Idea is to bring together people who have the workforce training needs. Our next step could be a call for white papers. Perhaps we get out a call for white papers- similar to what we did for the embedded security.
  - Beth- Future of workforce and training, allows us to connect into that workshop
  - Shwetak- Addiction and Opioids. Technology and how to support addiction in general. We could do a round table at the Google Health Conference? Might be hard.
  - Ben- What are the technical things?
  - Maja- Interesting isolation, we created this but it is broader participation than just opioids. Our technologies might have caused some of this but our technologies can help.
  - Keith- increased isolation

#### Views from NSF (Ken Calvert)

- Division director for computer and network systems
- New new division directions: Rance and Henry Kautz
- CISE was presenting on AI to the non-CS science board.
  - What is AI?
  - Are we in an era of hype?
  - What are the challenges?
  - AI RC might be a good idea
  - A panelists noted that engineering has access to a workforce from which academia could benefit
- Select committee on AI that was stood up by DARPA
- Interagency working group under NITRD

- I don't know who is chair the ML/AI subcommittee
- The director has been quoted as saying "AI...has the potential to revolutionize everything"
- Form a nexus to serve as an intermediary between brokers and recipients
- Helping people navigate the offerings in the cloud space - provide expertise
- FY18 is virtually final, though I don't think it is technically final. There is a revision but I don't think CISE will be affected by that
  - CISE is down 1.5% percent
  - 6 research big ideas have \$30 million each
- Programatics - Office of Advanced Cyberinfrastructure has released a [core solicitation on training for advanced cyberinfrastructure](#) - data, compute, all aspects
- Appropo of the digital farming discussion conversation - there was a DCL for EAGERS on Digital Agriculture
- SATC is going to no deadlines. First CISE program to do it
  - A lot of other sciences have gone to no deadlines. Bio and Geo have
  - Thanks to CCC for soliciting input on this for us. 74% positive
  - Holly - How can there be money available fairly for everyone?
  - Ken - the idea is you submit your proposal when it's ready as opposed to 5 minutes before the deadline
  - Ann - I've talked to Nina Amla about it because it's her program directly, but they have ideas for how to make it work - some proposals may get rolled over etc.
  - Ken - from others experiences within NSF they have received less proposals, but higher quality ones
  - Ronitt - it would be helpful to know what is getting funding before submitting my proposal. Some conferences have rolling deadlines, where they release funding once a month
- Convergence accelerators - innovate in organization structure. Emphasis will be on translational research and partnerships
  - Future of work at human frontier and harnessing data revolution will be the first 2
  - Peter - tax on the other directorates to pay for the stuff we like
- Expanding the broaden computing pilot - had a workshop Monday
  - If you don't submit a plan you won't hear anything unless you get an award
  - Desired outcomes - consciousness raising, stimulating the environment, want people plugged into collective impact discussions
- Ideas machine - competition open to everyone to get the next big ideas

- Stay tuned for August
- Might be worth CCC time to submit an idea on behalf of the community
- Ben - you mentioned an SRC for AI. Can you expand on that?
  - Ken - something that came up in the NSB discussion after the panel. There's already an organization for AI I believe, but this could be a way to scale the partnerships
- Maja - I've now served twice on the AAAS fellow committee. Subfields are non-representative of the field. Nominations are frequently "pale, male, and frail"
  - It's really worth it AAAS is great. Politics of becoming a fellow are not intense compared to other organizations
- Holly - Blovatonik (sp?) award. Started an award in Israel and UK

#### Industry Engagement (Ben Zorn)

- Transportation - narrowed focus on autonomous vehicles and city infrastructure
- Greg - CRA has been wrestling for many years with how to engage better with industry. Lots of debate on how to approach this
- Ben - coming from Microsoft I have experience with the problems collaborating with academia
- 2015 Future Industry-Academic Collaboration
  - Highlights: flows - people, ideas, resources
  - Mechanisms: contracting, gifts, skills, shared entities, consortium
  - Best practices: concrete artifacts, embedding, shared IP, datasharing, education
- How do we keep the pipeline full of talent so we can feed the need of these industries?
  - One of the challenges for these companies is getting talent
- Shwetak - I was involved in a meeting with universities that have large sharing programs. I have some of those resources with redacted information
  - Ben - can we host that on the CCC website. Gap analysis?
  - Nina - how do they resolve the IP?
  - Shwetak - that will take the whole meeting to answer. What's the type of research? Open IP, consortium, etc. You pick A, B, or C based on what it is. You have master agreements, but the meat is in the addendum that overrides those master agreement terms
- Transportation
  - Autonomous vehicles - exploding technical sector

- Assumption people won't use cars to intentionally kill people. This may be an incorrect assumption given recent terrorist attacks. Could use algorithms to prevent this?
- Major industrial players
  - Traditional automotive: ford, nissan, etc.
  - IT companies: Waymo, etc.
  - Startups: uber, lyft, many smaller
- Ben - first to file on patents. If you take someone's idea and file first you get the patent. Major concern of industry
- Ben - Uber's core business is not self driving cars, it's selling you a service. If someone else makes a self driving car that Uber can use it doesn't really matter to them. It's in their interest to have the self-driving car either way
- Ben - Can the university be for flexible about what it means for a university to be students?
  - Holly - big visa issues there
  - Ronitt - what do I as a professor get out of this? I read their applications, teach them, worry about their grades but then Google benefits
- Ian - alternative models of what it means to be a faculty member?
- Greg - as industry raids academic ranks for talent, there are increasing number of people working part time - this really hurts the service component of being a professor
- Greg - CRA has been considering a "Peter for industry relations," but can't decide on funding, job responsibilities, etc.
- Beth - frustration around feeling that academia was not working on problems of interest. Academia working on toy or esoteric problems
- Greg - how do we set up a research agenda with industry and academia that is synergistic
  - Holly - conflict of interest problems if a student is working with academia and industry. We wouldn't have a med student also working for Pfizer
- Suresh - facebook has recently been touting their new model to have academics working in their labs
- Ben - IP and publishing is a point of negotiation if you are a researcher
- Holly - how do you know when a student is ready? When they complete the intellectually rigorous coursework of the university or when they solve facebook problem
- Ronitt - we had a conversation about this conflict of interest back when professors would go create a startup and take their students with them
- Shwetak - I think the situation is more dire than people think
- Ronitt - CS is actually more collaborative than other academic communities

- Nadya - this is very much a top tier university issue. Lower ranked universities are raided like this
  - Recently did a Sloan study on Developing successful strategic partnerships with universities, very focused on MIT's and MIT-like problems
- Nina - people shouldn't get a PhD in industry, as they can only be protected for so long before having to do the other stuff in industry that students shouldn't be worrying about
- Greg - CMU has started a program with Google where a PhD student is funded by Google and embedded in the lab there
- Greg - a place like UW has a lot of adjunct professors that come from industry
- Call this a Task force? Working group? Strike team/force?
- Ian - what will this do? Still not clear to me
- Ben - find a group of people to write the 2-pager and capture impacts. Use that as a way to start interacting with people who would be interested in these issue- hear from them on what their positions are. Come up with some kind of consensus and put that in writing

#### AI Roadmap

- NSF came to CCC 2-4 weeks ago and asked us to put together an AI roadmap
- Similar to the Robotics roadmap, which CCC did in 2009 and then led to the National Robotics Initiative
  - NRI 2.0
  - Based on input from a bunch of different people
- Sounds like things are gearing up for a big announcement in 2020
- So we have 1 year to get the roadmap together
- Two people from the community
  - Yolanda Gil
  - Bart Selman
- David- AI is much more than deep learning, the report needs to be very clear
- Lynne Parker and Jason Matheny - involved in NSTC Strategic R&D Plan
- Mark- AI Taskforce this year didn't do anything this year so this is a good next step for them
- Maja- Get people who are not on the CCC on the task force, the council is overbooked
- Liz- Maja, we can use you as a resource. The AI task force shouldn't be a thing with this.... AI Working Group! Getting the small group together is a good start.
- David- We should be there to support Yolanda and Bart.
- Working Group



- Maja
- Liz
- David
- Nina
- Greg H
- Ann- Roadmap will consume a lot of cycles
- David is willing to connect with them
- Liz/Maja- this is very political and there will be some folks who are angry if they are not included
- Ian- DoE is very interested in AI, will this incorporate them?
  - Yes, very much so

### Task Force Going Forward

- Ann- Privacy and fairness task force workshop
- David- How will AI affect the workforce? This is an important topic to consider.
- Liz- should we do our own thing? Or bring this into another? David you could ask Yolanda and Bart what they think of the economics workshops and see if they want us to do it or wait.
  - We could pause this for a few months and see what happens
- Shwetak- what is the notion of the task force?
- Each person's key activities that they want to be involved in
  - Nadya- security integrity
  - Jen- best practices, how universities can structure processes, cloud computing, intra-disciplinary topics
  - Beth- future training area, mental health, healthcare disparities, health learning systems
  - Ben- industry workforce, IoT space, networking systems
  - Juliana- Information topics and AI, big data, could do a big data white paper, how to facilitate translation
  - Greg- industry, information integrity, blockchain, distributed computation,
  - Ronitt- data integrity, information integrity, law and computer science, big data
    - Zero sum protocols
  - Liz- addiction, AI roadmap
    - It would be great to hear from the other disciplines
    - Software 2.0, don't leave these people out of the discussion
  - Mark- Post Moore's Law, keep it but scale it down
  - Ian- How do new computing technologies allow, how do they transform practice?

- Keith- cybersecurity workshop, great idea that came out of it, cybercrime, digital forensics, sensemaking- given the kind of information how do you know what is going on?
- Maja- AI working group, use technology to change human behavior, can we do it without getting in trouble
- Shwetak- Health disparities, mental health addiction, advocacy
- Dan-II, II+AI roadmap, meeting with GCTC leaders, industry
- Holly- lifelong learning and workforce training, having visual communication and links to evidence behind it, information integrity
- Nina- healthcare and machine learning, lot of demand in healthcare and machine learning, what kind of machine learning algorithms can determine
- Suresh- reimagining between privacy and fairness, deployment of machine learning, decision making, how the world changes when you replace and change a system
- David- AI roadmap, blockchain
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#### Jen's Industry talks

- Ken, Chris Ramming, and I had a discussion about distributed data analytics and machine learning about the predicted issues that arise, also looked at domain specific architecture, finally one was security, how do you decompose the different security areas.
- Anyone want to join Jen- Juliana

#### Ann's Notes:

##### Nadya

- security, integrity, combating mis-information; fits in with looking at the abuses of the technology we create
- broadening our engagement with agencies

##### Jen

- industry / academy - best practices part of it
- Role of cloud computing and lowering the barrier to doing that research
- Intra-disciplinary topics within systems (storage, architecture, etc. out of their silos)

#### Jen's other discussions:

systems cross boundaries (networking and systems, but storage isn't part of the conversation; can we reason about the design of entire systems?)

Distributed Data Analytics?

Domain Specific Architectures

Security, how do you decompose which properties are needed

Juliana is interested in large scale processing from a database perspective

Beth

- Future of training content
- Health related topics and the evolution of mental health
- Healthcare disparities
- Health Learning Systems finishing up

Ben

- Industry
- Infrastructure / IoT
- CCC should think about core CS and how the community is being reflected by our activities

Juliana

- Interested in dis-information aspect from analytics standpoint
- Update Big Data White paper
  - Democratizing Data Analysis
- Industry / Academic / Government (Local) Partnerships - how can we facilitate translation so that the work we do can benefit them
- ML starts with Data, and there needs to be cleaning, etc.

Greg

- Industry
- Information integrity is a great focus for the security group
- Emerging Idea of a Richer Notion of Distributed Computation (Crypto contracts are a part of it)

Ronitt

- Information Integrity
- Privacy and Fairness
- Emerging Area between Law and Computer Science
  - Things that we can promise from cryptographic systems can change what we can offer you by law
  - Related to privacy and other issues
- Anything to Big Data

Mark would like to see the theoreticians energize a new area that theoreticians can contribute to

Ronitt - Workshop on Local Algorithms (you have to make a decisions not knowing all of the data)

Suresh - Zero-Sum Protocols for blockchain verification / distributed computation

Liz

- Information Integrity

- Addiction
- AI Roadmapping

Greg - on the AI Roadmapping, we did good about connecting back to the core in robotics roadmap, need to do that for this (systems, PL, etc.)

Mark - software 2.0 out of Stanford

Mark

- In a perfect world, something in Post Moore's Law

Ian

- Computing and science, how do new computing technologies inform science
- AI for Science
  - Big Data, Collaboration (how does that change when dealing with models)
- Post Moore's
- Distributed Data Analytics
- Information Integrity

Keith

- Information Integrity, part of cybersecurity
- Sociotechnical cybersecurity
  - Cyber-criminology, they feel on the outs (Nadya is super interested)
- Sense-Making, as a boundary object, in the context of CS Education, trying to get Computational Thinking in K-12 pipeline and tremendous information is being gathered; how do we understand how things are working
  - Sense making: given some information, how do you figure out what is going on?
    - Dan Russell, Google as a resource
- I-school and I-school Deans - all of these topics fit in with I-Schools

Maja

- Passion to use technology to change human behavior, excited about AI Working Group
- Opioids / Addiction

Shwetak

- Health Disparities
- Mental Health / Addiction (going to do it)
- Industry / Academic Engagement - generalizability and the advocacy wearing both hats

Dan

- Intelligent Infrastructure as it feeds into AI Roadmap and see what happens with NIST GCTC
  - Connections to industry engagement initiative
- Cyber-criminology

- Information Integrity

Holly

- Workforce Training Workshop, subset of tools for communication, which leads to Information Integrity → making people make effective and accurate pictures of what they want to do (Visual Summaries), also goes to Sense Making

Nina

- Intersection of healthcare and machine learning - from detection to early warning that something is going to happen (Jenna Wiens)

Suresh

- How does the world change with the introduction of automated systems
- Technology shaping the world we live in

David

- Interested in context around blockchain; so inter-disciplinary
- Decision Making and how we're about to move very aggressively into this space
- Causality (important that we as a field are aware of)

## Final Thoughts

AI Working Group

Liz, David, [Maja], Nina (Yolanda, Bart)

Industry Working Group

Ben, Greg, [Shwetak], [Jen]

Neo Privacy and Fairness

[Liz], Sampath, Suresh, Ronitt

Cyber crime and Security

Keith, [Dan], Kevin, [Nadya]

Neo Systems and Architecture

Jen, Ian, Mark, (Tom Conte), [Juliana]

Neo Human Tech Frontiers

(Maja, Shwetak, Nina, [Keith]), (Holly, [Beth])

Neo Intelligent Infrastructure

Dan, Beth, (Henning, Michael)

Information Integrity +

Juliana, [Keith], [Greg], Nadya, Beth

Ischool Dean's meeting (Keith Marzullo)

- First part of discussion around values
- Autonomous vehicles
- Greg - Child pornography on a bitcoin makes possession of it illegal once you are aware

Ann - Schmidt Foundation is curious what CS+X could look like and want to fund a white paper competition. I think they just want to use us a platform to get the word out and collect white papers