

**CCC Council Meeting
July 8, 2009
Fairfax Embassy Row
Washington, DC
Meeting Notes**

Main Sections

- **Computing Research in Energy & Transportation**
- **Enhancing our Visioning Activities**
- **Discussion of Strategic Plan and Self-Assessment**
- **Discussion of Visioning Proposals**
- **Health IT**
- **CIFellows Update**
- **NetSE Research Agenda Update**
- **Financial Report**
- **Computing Research in the DoD**
- **NSF Updates**

Computing Research in Energy & Transportation

Steve Koonin

Under Secretary for Science, US Department of Energy

- take direct report of office of science
- chief scientist for all of doe
- chief science advisor to secretary

Overall, Koonin displayed a physicist's focus on simulation; far less interest in sensor networks, intelligent homes, etc.

Areas of responsibility:

1. National Nuclear Security Administration
 - a. nuclear stockpile management without testing
 - b. has been a big success story
 - c. simulation capability has a big impact beyond stockpile but all is classified hence does not have the broad impact that would be desirable
2. DoE is trying to "own" climate change
 - a. research into interventions is essential; if there's a huge risk in not doing anything we should study what might be done and what might result
 - b. mostly modeling
 - c. laboratory studies
 - d. monitoring interventions - sensornets
3. Fusion research
4. Materials
5. Full system modeling of cells

The Energy Labs

1. Stewardship programs
2. Computing in service of solving a problem vs. building computer systems
3. Lab vs. university research

4. High quality peer review is key

Energy

1. Bring strengths of science to bear
2. Simulations
3. Predictions
4. Sensor needs
5. Managing nuclear fuel
6. Impact on greenhouse gases
 - a. Subject connects entire department
7. Most of impact is driven by development not population growth
 - a. Economic development of most of humanity
 - b. Huge drain on world's resources
 - c. Inevitable that US economy comes down towards world level

Enhancing our Visioning Activities

David Tennenhouse

(see attached slides; notes are supplement)

Implementing - Alternative Funding Mechanisms

SRC/MARCO style - industry/government partnership which creates stable funding for research

- Government insists on forward looking vs. immediate problems of direct interest to industry
- Unique due to industry convergence at the time?
- Similar effort for turbines of interest to DoD but then moved into commercial products
- For major research engineering schools, DoD contributes high single digit percentage of entire research budget
- Is there a place to do this in CS?
 - Electrical grid - Waltz
 - Emergency response systems - Robin Murphy
 - Requires serious champions within companies

Meat on the Bones: What's Working and Why?

Theory

- Original theory effort lead to CDI which is very broad
 - original theory folks got left out
 - but much new money has come in
- Our theory effort is nuggets

Big Data

- CCC role was important in moving Randy Bryant's idea from CMU-industry to broader view of a cross-university program

NetSE

- original idea was to get money from instrument funds
- current report is extremely broad

Meet on the Bones: Known Processes

- ISAT studies work
 - produce good content
 - customer does something that they wouldn't have done otherwise so studies have real impact

Visioning: Alternatives to Workshops

- Susan - we must impact the research community around our visioning topics
 - How do we amplify back out?
- ISAT studies are now doing more research so that they can understand enough
- CIFellows - CCC really implemented a program
- Perhaps CCC implements a pilot program or ...
 - what does this look like?
 - grants to start doing work in some field?
- Directed funding
 - hard to see buy in if we hire someone to set agenda
 - is CCC an example of doing this?
 - Ed is really driving process not setting agenda directly
- NRC has letter reports, which are much shorter term, still reviewed carefully
 - CSTB doesn't do this
 - an enhanced version of our transition papers
 - ex. CCC effort in energy area for Jeannette
 - might be able to collaborate with CSTB

What is Success for CCC?

- Different types
 - Big data
 - Robotics
- Cannot do the experiment of seeing what would have happened without CCC

Discussion Ideas

- Hire a former program manager to be a broker between research community and funding agencies
 - EU agenda setting process (frameworks) might be a good model
 - Andrew is going to Europe for a year and is charged with understanding this
 - Budget process
 - can always try and get special projects going
 - for new initiatives must start early
 - Andrew - need to generate ideas for proposals and find folks to do them
 - Ed big issues
 - IT at energy
 - IT within health IT
- Jeannette wants position papers on these topics

Discussion of Strategic Plan and Self-Assessment

Ed Lazowska

The CCC Strategic Plan has been submitted and accepted; the CCC Self-Assessment is on the verge.

Discussion of Visioning Proposals

Fred Schneider

General criteria for funding a proposal were discussed:

- create a new research area
- new funding
- open to additional participants
- trying to coalesce a research community

Health IT

Herb Lin

Chief Scientist, CSTB

joined by

Karin Remington

Director of NIGMS Center for Bioinformatics and Computational Biology

(see attached for Herb's talk)

Karen's remarks:

- NIH is very stove piped with institutes not very incentivized to work together. Director has very little direct budgetary clout to make this happen.
- NIH would fund computing research if they feel that they need the work done and it isn't being done by other agencies. This applies to clinical IT research.
 - ex. but NIH doesn't invest in networking infrastructure
 - but NIH has invested in deployment
 - but not in supporting innovations important to health care IT
 - NIH does not have the right folks to do this
 - but NIH could invest externally as needed
 - must be connected with doctors or bio-medical researchers; makes it difficult for computing folks to collaborate
- Karen feels this "tradition" should change
 - support from office of director that computing research support on its own is important for NIH mission would help
- Many major innovations arise from instrumentation advances due to fundamental physics
- Most of what is ongoing research at NIH is really applications driven
- Individual institutes generally do not have basic research in their mission or culture
- IT efforts within NIH are not populated by top talent
 - and are dominated by medical establishment
- NLM is the fundamental institute involved in IT issues

If there is money to work on this issue, where should the money be placed to do healthcare IT?

- Traditionally NIH saw this as a more commercial effort and was not comfortable guiding it
- If at NIH, office of director

- Perhaps park it in multiple places with a coordinating office
- At NIH is good because they have the subject matter expertise to make sure the right problems are solved
- NIH does good research but on specific diseases

CSTB wants to do follow up studies: IT for outpatient care

Much of what needs doing in health IT is engineering and needs someone overseeing the commercial efforts; NIH has shown no interest.

Herb Lin: need a new institute in health care

Perhaps companies can be driven into the sphere because it's a place to grow.

Agencies are not suited to funding computing initiatives directly.

- Clear national priority for healthcare IT
- Where will it be housed?

We need to have a prepared agenda for how to create such an organization and get it into the public discussion.

Need a research agenda that will impact health care.

- research problems
 - understanding processes

NetSE Research Agenda Update

Ed Lazowska

- Will be rolled out at GENI engineering conference in Seattle at end of July
- NSF, workshop leaders and NetSE Council folks have iterated on leading chapter
- Coming to Council and list from GPO community
- What is future of NetSE Council after shipping this report?
- Issue has been global high-level emphasis on network science vs. engineering research
- Concept is that report is framework under which communities can push their agendas
- Ed
 - FIND program effort has not been successful at generating common effort
 - was supposed to come up with a common architecture for networking efforts
 - great individual research going on
 - GPO viewed as having been really successful
 - BBN has been given money and authority to get folks to work together
 - focused on engineering research so have components to work together; similar to DARPA approach
 - Future network instrument program might be run via GPO or similar
- CCC Council
 - networking community should take on their responsibilities with help from CCC
 - perhaps get some visioning activities going
 - figure out how to maintain connection to GPO
- NetSE Council

- thank them
- disappears after report

CCC Financials

Andy Bernat

Computing Research in the DoD

Zach Lemnios

Director, Defense Research and Engineering (DDR&E)

Immediate goals

- stronger interaction with DARPA
- short term efforts to understand what they need and how we can help them do it
- 4 imperatives
 1. transitioning technology to warfighter to solve today's problem
 - usually a technology barrier to doing this
 - want to take on these hard pieces
 2. preparing for the uncertain future
 - our piece
 - want to make investments for these — 5-10 years out
 - want to hear the big ideas
 3. reducing acquisition risk, time and cost of major programs
 - systems engineering, not just as auditor
 - computing required for modeling, simulation, etc.
 - much of this has been relegated to contractors so expertise has been lost
 - these are very complex models and systems
 4. strengthening the math, science, engineering expertise
- how to allocate dollars across these still being worked on
- needs talent to lead technical efforts more than anything
- DARPA will be changing
- Role of service labs
 - ONR had talented program managers
 - not organization but the people matter
 - we've lost people
 - must come from outside

Examples of things that should have a big impact

- Autonomous systems
 - autonomous forklift; unknowns are tough: unknown centers of mass, unclean environment

Big issue is that DoD has lost attention of top researchers

- Gun shy about coming to DARPA since it's no longer connected
- Need sustained long term people organization with long term funding commitment

MARCO centers

- Need to know why it succeeded
- Funding is important but model is key

How can we move new ideas into execution factor?

- Zach wants more depth on transition papers
 - what will it take to make them happen
 - who is working in these areas
- Wants to talk to people who know where big ideas are forming
 - helps him use resources wisely
- Talk to directors of labs, darpa
- Doors are open
- What are ideas that if we don't act on them we lose out in national security?
- Need to convince people of what difference it will make
- What is the compelling technical idea?
 - who are the people doing it
 - what is the barrier to progress

Getting brief out on what DoD needs are matched to computing community

- All will be hybrids, not pure CS
- All will be systems

Cybersecurity

- Doing a short study to identify technical elements in cybersecurity
- He was briefed on cybersecurity policy report
- Wanted technical backup for this report
- What needs to be in place to secure information on defensive side?
- Not sure of how to handle with universities that won't do secret research
- Internal study but want to broaden after it's rolled out

They have responsibility to open the doors

We have the responsibility to fill seats and bring thought leaders into building

- Built close ties between Lincoln Labs and MIT
 - spent time at CSAIL
 - made connections between groups

NSF Updates

Jeannette Wing

Assistant Director for CISE, NSF

FY09

- CPS RFP got over 600
- Socially intelligent computing RFP due date is September
- CDI is getting more money than originally promised by directorates
- Expeditions now in final decisions, draws most visionary proposals, expect 3 awards but perhaps one additional

Administration priorities

- High risk/high return
- Interdisciplinary research
- Early investigators (CAREER awards, GRFs),
- Grant size & duration

- Areas:
 - economic prosperity creating the industries of the future
 - energy environment sustainability climate change
 - education STEM
 - national security/international affairs
 - evidenced base policy
- All efforts need an economic prosperity focus
 - CPS, IT, data intensive, ...

NITRD reporting on investments in health IT

- Administration interest in how computing can transform how health care is delivered
- Will be an NSF+ workshop in this area

Energy

- Need also to work on coupling of areas and economic impact
- Talking to CSTB on research agenda for computing in energy, climate, sustainability

Broadband stimulus

- National Telecommunications and Information Administration is interested in forward looking
- Grading criteria awards higher bandwidth
- Urban can be under served

A few big ideas

- Energy
 - rely on computational models (beyond PDE)
 - need multi-resolution (spatial, time) models
 - sensors
 - intelligent decision making
 - visualization
 - low power
- Health IT
- Cyberlearning
- CPS
 - lunch on the hill thursday
 - great program, lots of interest

Rhetoric vs. reality

- needs to be able to point to community interest and demands

Division Directors openings

- IIS
- CNS

September 2010 for both

Suggested Snowbird sessions

- Broadening participation
 - departmental strategic plan requirement in each proposal

- how can we improve diversity in departments
- Computing outside the box
 - too much deadline driven research
 - too incremental
 - session on what would it take to break this cycle

How is CCC doing

- Things get done
- Not sure how visioning exercises are going
 - need some prioritization
 - Need to see how valuable visioning is to CISE AD
 - if visioning activity ramps down, would there still be value to CCC?
- Look for funding outside NSF
- Sees council as dealing with stewardship of the field

Visioning

- Must be open process for folks to participate in
- Some of the results are not going to work out
- Aspect of leadership development in all of this
- Can stimulate groups going in areas where it would be good to have one
 - ICT
 - big data
 - energy
- Output of visioning exercises
 - could be output of entire community not just sub-communities
 - reasonable since we are broken into sub-communities
- Need to help folks move into areas where we should be
- Folks work in silos and don't know what's going on outside our areas
- Should we scour field and find what's hot and provide briefings
- CISE runs a zillion workshops