CCC COUNCIL MEETING

July 19th, 2018

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AGENDA

- Thursday, July 19th
  - Welcome and Introductions
  - General Updates
  - Task Force Updates
  - Break
  - View from NSF
  - Industry Engagement
  - Lunch
  - AI Roadmap
  - Task Forces Going Forward
  - Final Thoughts

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INTRODUCTIONS / GENERAL UPDATES

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TASK FORCE UPDATES

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POST MOORE'S LAW COMPUTING NOW

- Co-Chairs Mark Hill (CCC) & Kathy Yelick (was CCC),

  & Member Tom Conte (external, IEEE Rebooting Computing)

- Workshops Run & Report Pending
  - Digital Computing Beyond Moore's Law, 5/18
  - Next Steps in Quantum Computing: CS's Role, 5/18

- Upcoming: Thermodynamic Computing, 1/19
  - Example of NOT conventional, quantum, or neuro-morphic

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POST MOORE'S LAW COMPUTING TO DO

Reasons to Continue (with suggested modifications)

- Problem remains important
- Other areas to explore
- Good connections to IEEE & ECE Department Heads

Potential Topics (per Conte/IEEE RB)

- Analog computing: neuromorphic & FPAAs
- Cryogenic computing (JJs), including performers in the IARPA C3 program
- Reversible &adiabatic computing
- Sensor fusion & sensor networks, including biodegradable sensor nets
- Generalized reconfigurable computing (FPGAs++)

Reasons to Sunset

- Yelick rotated off, Hill CCC Chair
- Good run

Possible People (per Conte/IEEE RB)

- Erik DeBenedictis (Sandia)
- Maya Gokhale (LLNL)
- Todd Hylton (UCSD)

PRIVACY & FAIRNESS: FOCUS AND ONGOING EFFORTS

- Workshop: “Fair Representations and Fair Interactive Learning,” March 2018
  - Alexandra Chouldechova and Aaron Roth, leads
  - Draft of CACM paper currently out for comment
- Interoperability and causality in fairness (tabled for now)
- Economics and fairness workshop in planning stages

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PRIVACY & FAIRNESS: FUTURE POSSIBILITIES

Reasons to Continue (with suggested modifications)

- Privacy & fairness are critical issues in AI, data science, and other growing areas of computing research.
- It is important to keep those issues firmly on the radar screens of policymakers, stakeholders, and the research community.
- Infusion of new perspectives and ideas into the TF

Reasons to Sunset

- Because privacy/fairness overlaps with AI and we're doing a big AI roadmapping effort
- Perhaps put this TF's operations on hold until the results of that roadmapping effort come into focus?
- Could also have this TF join forces with the roadmapping effort...

CYBERSECURITY TF: TODAY

- Embedded security
  - USENIX Workshop August 2018, Baltimore, 50 people
  - White paper, Fall 2018
  - AAAS Panels, February 2019
    - Cybersecurity: Transcending Physics, Technology, and Society
      - Mark Hill, Zeynep Tufekci, Paul Kocher, Kevin Fu
    - Socio-technical Cybersecurity: It's All About People
      - Ann Drobnis, Keith Marzullo, Brian LaMacchia, Rebecca Wright, David Mussington
- Formal Methods
  - Blog post
- 5G
  - Any volunteers to lead?

CYBERSECURITY TF: FUTURE POSSIBILITIES

Reasons to Continue (with suggested modifications)

- Cybersecurity is a critical issue for national R&D
- Industry is not designed to address long-term problems in cybersecurity that are 5-10 years out
- Industry is better set for operational issues and business-driven R&D for 0-4 quarters

Reasons to Sunset

- Cybersecurity is a big tent and covers thousands of researchers
- Consider focused areas of cybersecurity where we can have strategic, long-term impact where other groups are not spending much effort

INTELLIGENT INFRASTRUCTURE FOCUS AND ONGOING EFFORTS

- Evolution of Cyber-Physical Systems. Motivated by rapid advances in smart cities / communities, suggestion of big Federal investments (still TBS).
- Leveraged II CCC whitepapers by many of us.
- Session at CCC Fall 2017 Symposium.
- Congressional staff briefing in January 2018.
- AAAS panel session in February 2018.
- Evolving toward a public safety / disaster response focus. Joint meeting with NIST GCTC leaders planned for October.
- TF for 2017-18: Dan Lopresti and Ben Zorn (co-chairs), Nina Mishra, Jennifer Rexford, Dina Katabi, Henning Schulzrinne.

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INTELLIGENT INFRASTRUCTURE FUTURE POSSIBILITIES

Reasons to Continue (with suggested modifications)

- Intelligent infrastructure only becoming more pervasive.
- Opportunities for interesting and important computing research. E.g., making effective use of vast amounts of real-time data that arise during natural disasters.
- Collaboration with NIST Global City Team Challenge leaders seems to be promising.
- Work to find ways to connect this to opportunities for funding computing research.

Reasons to Sunset

- Hoped-for Federal investments in infrastructure have not developed.
- If/when it does, not clear whether it will support computing research.
- Talents of CCC Council members can be applied to other timely topic areas, e.g., AI.

HTF FOCUS AND ONGOING EFFORTS

- Content Generation for Workforce Training
  - Possible Date: March 28-29, 2019 in Atlanta, GA
  - Steering Committee:
    - Tony DeRose – Pixar, Jessica Hodgins -- CMU/Facebook (President of SIGGRAPH, Blair MacIntyre -- Georgia Tech/Mozilla, Kapil Madathil -- Clemson/Clemson Center for Workforce Development, Beth Mynatt -- Georgia Tech/CCC, Holly Rushmeier -- Yale/CCC
  - Target audience:
    - Computing researchers in HCI/Graphics/Haptics/Vision/AR/VR
    - Developers of training materials
    - Companies in need of workforce training
- Addiction, Opioids

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HTF FOCUS AND ONGOING EFFORTS

- Addiction, Opioids
  - Gaining national attention with investment by NIH, etc. especially around the use of technology and social media
  - Tech companies are starting to develop programs to address addiction (e.g., Google, Facebook)
  - Possible CCC round table at Google Health Conference in November

AI FOCUS AND ONGOING EFFORTS

- Quiet Past Year
- Roadmapping Effort Going Forward

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BREAK

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VIEW FROM NSF

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INDUSTRY ENGAGEMENT: TRANSPORTATION

- Narrowed focus: Autonomous vehicles and city infrastructure
- Context: 2015 Future of Industry/Academic Collaboration
  - Highlights
    - Flows: people, ideas, resources
  - Mechanisms
    - Contracting, gifts, skills, shared entities, consortium
  - Best practices:
    - Concrete artifacts, embedding, shared IP, datasharing, education
- TF for 2018-19: Ben Zorn, Greg Morrisett, <your name here>

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TRANSPORTATION

- Autonomous vehicles - Exploding technical sector
- Major industrial players
  - Traditional automotive: Ford, Nissan, etc
  - IT companies: Waymo, etc.
  - Startups: Uber, Lyft, many smaller
- Technology deeply connected to AI advances
- Why narrow industrial engagement focus?
  - Touch broader industrial community
  - Explore opportunities connected to the vertical
  - Limit effort

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WHAT'S HAPPENED SINCE 2015?

- Many interesting observations from CRA Snowbird
  - Raquel Urtasun, Uber & U Toronto keynote
  - Panel on self-driving cars
  - Panel on industry research
- Observations
  - AI community accelerating publication, arxiv
  - Companies less defensive about IP (Uber ATG, Toronto)
  - Universities more flexible about student/industry arrangements
  - Companies making efforts to extend talent pool
    - For example, Microsoft AI Resident's program
- Is this a one-off (Manhattan Project) or a sea change?

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DRAFT PLAN

- Build core team
- Define annual goals
- Talk/engage with industry connections
- Possible 2-pager to provoke, engage on both industry and academic side
- Plan for larger scale outcome
  - Workshop or white paper

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LUNCH

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AI ROADMAP

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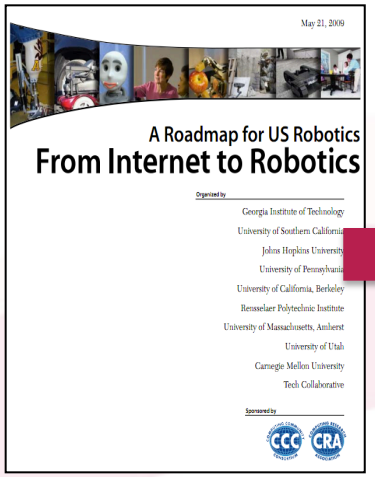
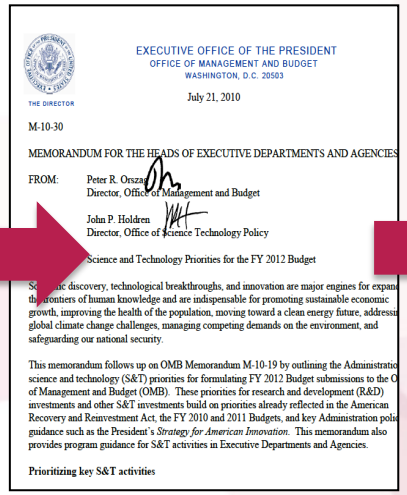
IMPACT: ROBOTICS



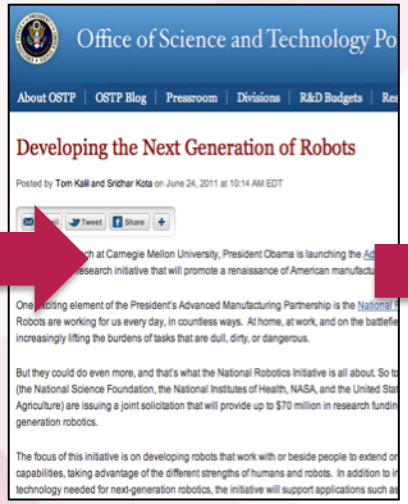
4 meetings during summer 2008

Roadmap published May 2009

Extensive discussions between visioning leaders & agencies



OSTP issues directive to all agencies in summer 2010 to include robotics in FY 12 budgets



National Robotics Initiative announced in summer 2011

2 meetings in Spring, 2016

Report and Congressional Briefing in June, 2016

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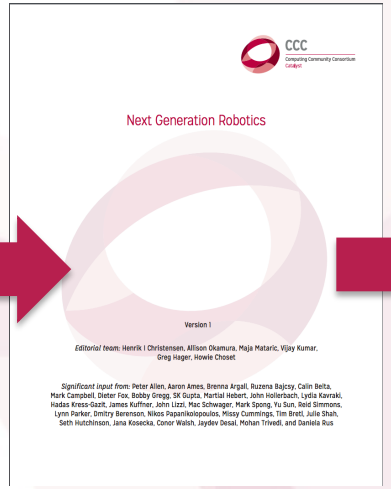
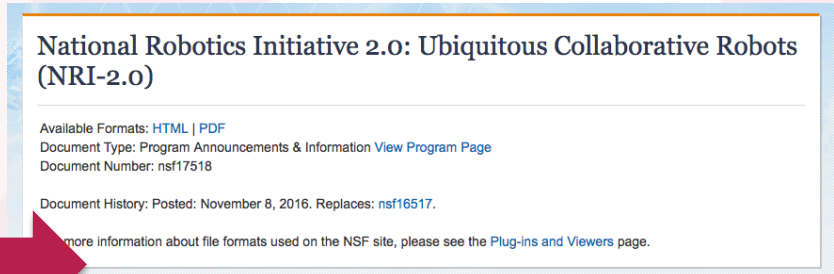
IMPACT: ROBOTICS

2 meetings in Spring, 2016

Report and
Congressional Briefing in
June, 2016



Next Generation
Robotics
published June, 2016



NRI 2.0 announced
November 2016

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AI ROADMAP

- Yolanda Gil and Bart Selman will lead
- Community Effort
- Roadmap due, Spring 2019
- Workshops in Fall

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TASK FORCE DISCUSSION 2 / NEW WORKSHOPS

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FINAL THOUGHTS

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