THE COMPUTING COMMUNITY CONSORTIUM (CCC)

Ann Schwartz Drobnis
Director
adrobnis@cra.org

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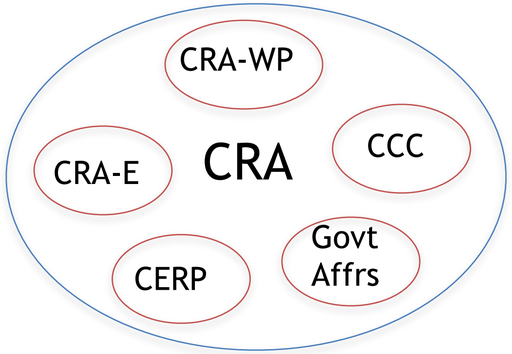
CCC
Computing Community Consortium
Catalyst

THE COMPUTING COMMUNITY CONSORTIUM (CCC)

- Established in 2006 as a standing committee of the Computing Research Association (CRA)
- Funded by NSF under a Cooperative Agreement
  - Third four-year award began in April 2018
- **Facilitates the development of a bold, multi-themed vision for computing research and communicates that vision to stakeholders**
- Led by a broad-based Council
- Staff based at CRA



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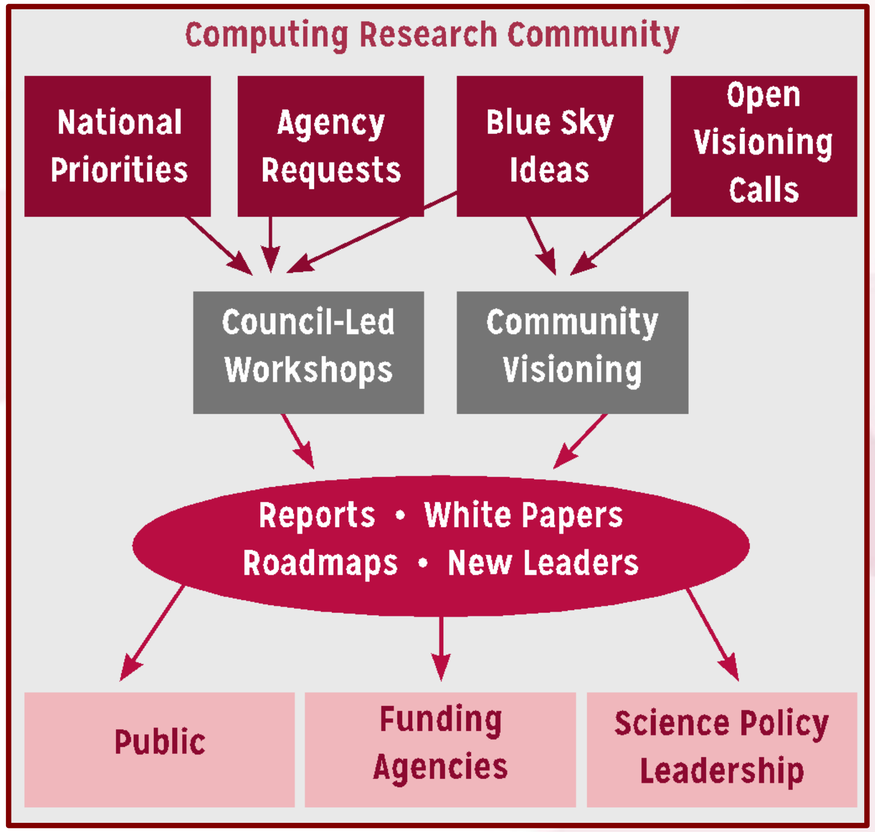
OUR MISSION

Enable the pursuit of innovative, high-impact research that aligns with pressing national and global challenges

- CCC is of, by, and for the computing research community: a responsive, respected, visionary organization that seeks diversity, equity, and inclusivity in all of its activities.
- CCC is a powerful convener that brings together thought leaders from industry, academia, and government to articulate and advance compelling research visions.
- CCC is an effective communicator with stakeholders, policymakers, the public, and the broad computing research community regarding the substance, and the importance, of those visions.

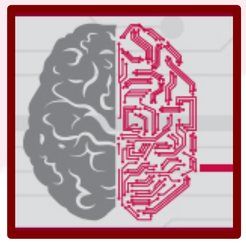
HOW WE DO THIS



- Visioning workshops
- Activities at conferences
- White papers & social media
- Roadmaps & reports
- Biennial Symposium in DC
- Human Development

COMMUNICATION IS KEY

- Visioning workshop outputs: reports, slide decks, briefings, …
- White Papers
  - CCC works with the computing research community to produce timely white papers that inform policymakers and the broader community about issues that are apropos of national priorities
- CCC Blog
  - Provides a continuous stream of information on advances in computing research
  - Opportunities for community to get involved
  - Forum for community discussion
- Website
  - Collection of resources
- Great Innovative Ideas
  - Showcases the exciting new research and ideas generated by the computing research community
- "Catalyzing Computing" Podcast
  - Features interviews with researchers and policy makers about their background and experiences in the computing community.
- Events
  - CCC Symposium, CRA Snowbird, Early Career Researcher Symposium, ...



Evolving Methods for Evaluating and Disseminating Computing Research

The CCC Blog

THE CCC COUNCIL

Chair: Liz Bradley, University of Colorado Boulder
Vice Chair: Dan Lopresti, Lehigh University
CCC Chair Emeritus: Mark Hill, University of Wisconsin, Madison

Terms ending June 2023
- Nadya Bliss *, Arizona State
- Kathleen Fisher, Tufts University
- William D. Gropp, Illinois Urbana-Champaign
- Brian LaMacchia, Microsoft Research
- Melanie Moses, University of New Mexico
- Helen Nissenbaum, Cornell Tech
- Holly Yanco, University of Massachusetts Lowe

Terms ending June 2022
- Sujata Banerjee, VMware
- Elisa Bertino, Purdue University
- Tom Conte, Georgia Tech
- Maria Gini, University of Minnesota
- Chad Jenkins, University of Michigan
- Melanie Mitchell, Portland State University
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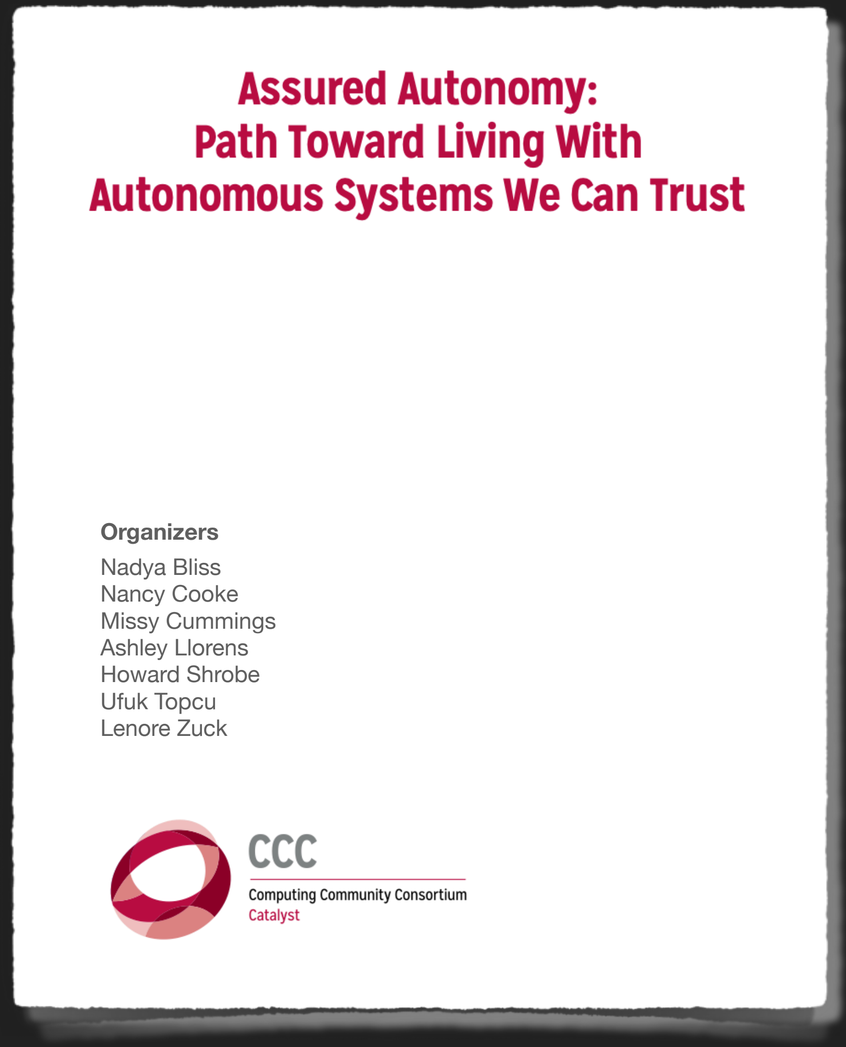
- Ian Foster, University of Chicago
- Ronitt Rubinfeld, MIT
- Suresh Venkatasubramanian, Utah
- David C. Parkes, Harvard
- Shwetak Patel, Univ. Washington

Assured Autonomy:

Path Toward Living With Autonomous Systems We Can Trust

Ufuk Topcu

The University of Texas at Austin



Scan me!

Background

A series of workshops on assured autonomy

- October 2019 — Arlington, VA
- February 2020 — Phoenix, AZ
- July 2020 — Virtual
  + Several separate panels and expert inputs
- Published the report in October 2020

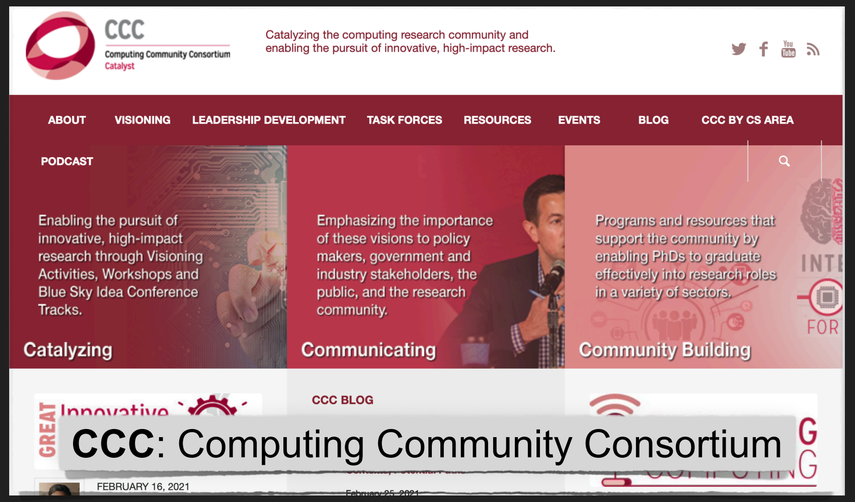
Requested by two Interagency Working Groups of NITRD

- Intelligent Robotics and Autonomous Systems
- Computer-Enabled Networked Physical Systems

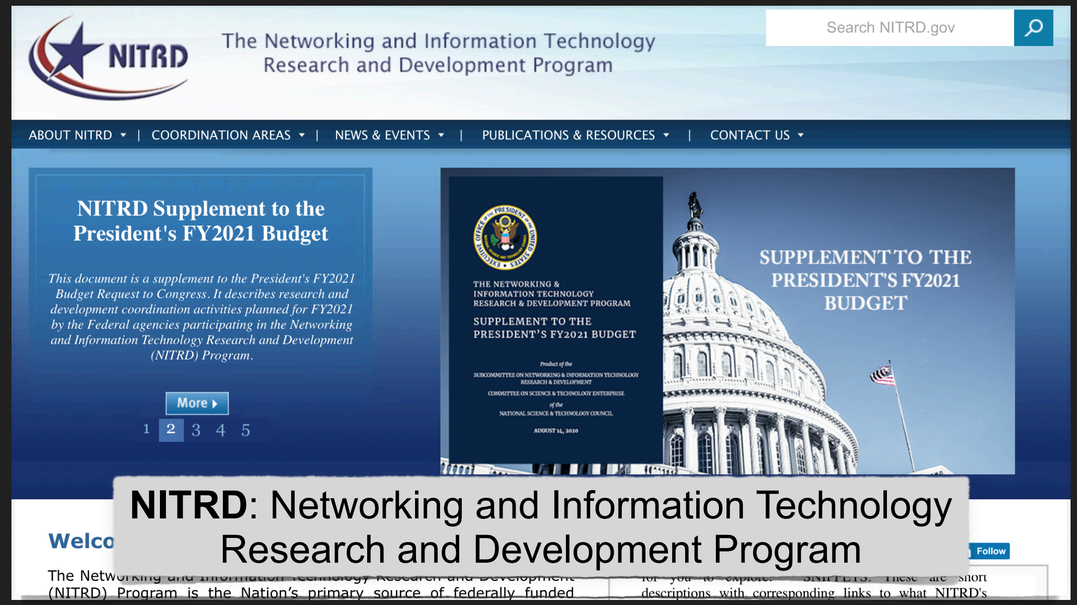
Sponsored by the CCC

Diverse participation

- More than 100 participants
- Academia, industry, government and non-profits
- Broad range of expertise from engineering and computer science to social sciences



CCC: Computing Community Consortium



NITRD: Networking and Information Technology Research and Development Program

Overview of the report

The future has arrived—what do we want the future to be?

Proper assurances that autonomous systems are safe, secure, dependable, privacy-preserving, fair, equitable, accountable, and ethical are key for **positive impact at scale**.

Assured autonomy is about **understanding and mitigating risks** of operating autonomous systems in our society.

- **Too little assurance** — places the public at risk today with little protection from future shocks.
- **Too much assurance** — may stifle innovation while keeping the public safe today but exposing society to future shocks.

How autonomous systems will be managed is **at the crossing of science, technology, society, policy, and governance**.

Major findings

No good can come from autonomy without proper assurance.

Goal is to amplify, augment, enhance and empower humans.

Autonomy is a socio-economic opportunity and challenge.

The public will perceive and be affected by autonomy differently.

Assurance for autonomy requires a major re-think.

The challenges require interdisciplinary approaches.

A coordinated national research strategy is needed.

Better connections between the stakeholders will accelerate progress.

Re-envisioning education and workforce is part of the path forward.

Assurance is context-dependent and not once and for all.

Autonomous systems have a diverse set of vulnerabilities.

Open operation environments amplify the technical challenges.

Means for characterizing the progress and the gaps is needed.

Recommendations

Establish a **“network of institutes on autonomy”**
that will facilitate the necessary re-envisioning in research, education and governance.

Research

- Embrace the interdependency between the challenges.
- Develop a holistic view of these interdependent challenges.

Education and workforce development

- Align priorities with the needs of the industry and government.
- Focus on enabling the students to acquire interdisciplinary skills.
- Broaden and diversify the basis for qualified workforce in autonomy.

Potential roles for the network

- Enable interdisciplinary collaboration beyond what is possible today, including the disciplines that are currently considered to be peripheral.
- Strengthen the cultural and organizational connections between the academia, industry, and government agencies.
- Serve as an objective source of information to the public and the policymakers.

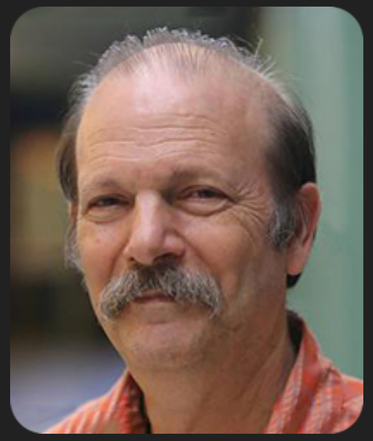
Some steps from here

- Nurture grassroots advocacy for assured autonomy across the R&D landscape.
- **Assured autonomy in NRI 4.0?**

Panel discussion at NRI PI Meeting

Heather Roff
JHU Applied Physics Laboratory

On the importance of embracing the breadth and inter coupling between the many aspects of autonomy with emphasis on societal-level implications

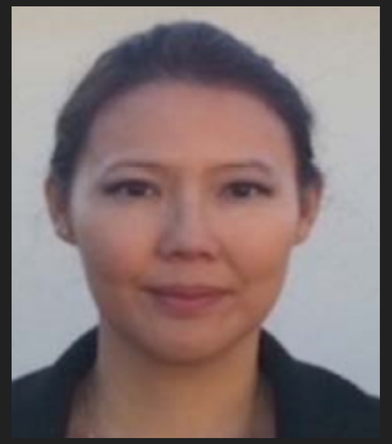


Moshe Vardi
Rice University

On the poor track record of computing community in deserving and gaining public's trust with connections to cybersecurity

Kymie Tan
Jet Propulsion Laboratory

On systematic risk assessment in system engineering and its important for assured autonomy



Missy Cummings
Duke University

On the misalignment between the academia, industry and government