

ASCAC Committee on American Competitiveness

Committee Members

ASCAC Members:

- Jack Dongarra (UTK/ORNL) (chair)
- Tony Hey (STFC)
- Satoshi Matsuoka (RIKEN)
- Vivek Sarkar (GATech)

External Members:

- Greg Bell (Corelight)
- Ewa Deelman (USC/ISI) (vice chair)
- Ian Foster (Argonne/Chicago)
- David Keyes (KAUST)
- Dieter Kranzlmüller (LRZ)
- Bob Lucas (ANSYS)
- Lynne Parker (UTK)
- John Shalf (LBNL)
- Dan Stanzione (TACC)
- Kathy Yelick (UC-Berkeley)



Department of Energy
Office of Science
Washington, DC 20585

Charge Letter

Office of the Director

Professor Daniel A. Reed, Chair of the ASCAC
Senior Vice President for Academic Affairs
Professor of Computer Science and Electrical & Computer Engineering
The University of Utah
201 Presidents Circle, Room 205
Salt Lake City, Utah 84112-9007

Dear Professor Reed:

Thank you for your work as Committee Chair on the Advanced Scientific Computing Advisory Committee (ASCAC's) and for the ongoing review of the collaboration with the National Cancer Institute. The ASCAC recommendations will help us to improve the management of this important program.

As you know, the Administration and Congress have been keenly interested in the recent issues with the supply chain and U.S. competitiveness and innovation. Looking to the future, we want to ensure that the U.S. continues to be a leader in advanced computing, high end computational science and engineering, advanced scientific networks, and the fields and workforce that underpin these efforts.

To that end, we must develop and maintain world-leading capabilities in key technologies, especially microelectronics, high performance computer architectures and software, computer science, applied mathematics Artificial Intelligence, Quantum Information Science; and also provide compelling, inclusive, and equitable opportunities for all those who want to work in this fast paced and ever-changing area of research.

Therefore, I request that ASCAC develop a report to address the following questions:

- How can the Department maintain critical international cooperation in an increasingly competitive environment for both talent and resources? In areas where the U.S. is leading, how can we sustain our roles and attract the best industry and international partners? In other areas, how can the Department build and maintain its reputation as a "partner of choice"? In general, are there barriers that can hinder our ability to form effective and enduring international and industry partnerships?
- Identify key areas where the U.S. currently has, or could aspire to, leadership roles in advanced computing and high-end computational science and engineering, including unique or world-leading capabilities (i.e., advanced scientific facilities, testbeds and networks) or leading scientific and technical resources, such as highly trained personnel and supporting infrastructure. This may include emerging areas or opportunities that offer significant promise for leadership.
- To preserve and foster U.S. leadership roles within reasonable resource constraints, are there particular technical areas or capabilities that could be emphasized? Are there

other technical resources and capabilities that could be leveraged in to achieve these goals, possibly through collaborations within and beyond the ASCR community?

- How can programs and facilities be structured to attract and retain talented people? What are the barriers to successfully advancing careers of scientific and technical personnel in advanced computing, computational science and engineering, and related fields and how can the Department address those barriers? A complete answer to these questions should address how we can ensure that we are recruiting, training, mentoring, and retaining the best talent from all over the world, including among traditionally underrepresented groups within the U.S.

We would appreciate receiving a written report by the Spring meeting in 2023.

If you or the subcommittee chair have any questions, please contact Christine Chalk, Designated Federal Official for ASCAC at 301-903-5152 or by e-mail at christine.chalk@science.doe.gov.

I appreciate ASCAC's willingness to undertake this important activity.

Sincerely,
JOHN
BINKLEY

Digitally signed by JOHN
BINKLEY
Date: 2022.03.22
19:30:31 -0400

J. Stephen Binkley
Acting Director
Office of Science

Four Questions to be Answered

- 1. How can the Department maintain critical international cooperation in an increasingly competitive environment for both talent and resources?**
 - In areas where the U.S. is leading, how can we sustain our roles and attract the best industry and international partners?
 - In other areas, how can the Department build and maintain its reputation as a “partner of choice”?
 - In general, are there barriers that can hinder our ability to form effective and enduring international and industry partnerships?
- 2. Identify key areas where the U.S. currently has, or could aspire to, leadership roles in advanced computing and high-end computational science and engineering, including unique or world-leading capabilities (i.e., advanced scientific facilities, testbeds and networks) or leading scientific and technical resources, such as highly trained personnel and supporting infrastructure.**

3. To preserve and foster U.S. leadership roles within reasonable resource constraints, are there particular technical areas or capabilities that could be emphasized?

- Are there other technical resources and capabilities that could be leveraged in to achieve these goals, possibly through collaborations within and beyond the ASCR community?

4. How can programs and facilities be structured to attract and retain talented people?

- What are the barriers to successfully advancing careers of scientific and technical personnel in advanced computing, computational science and engineering, and related fields and how can the Department address those barriers?
- A complete answer to these questions should address how we can ensure that we are recruiting, training, mentoring, and retaining the best talent from all over the world, including among traditionally underrepresented groups within the U.S.

Committee Activities

- **Committee Formed late July 2022**
- **We had our first zoom call on August 26th**
 - Organized into 4 sub-groups,
 - Developed an overall outline for the report, and
 - Made sub-group assignments
- **Sub-groups are working on initial section draft, due early October**
 - Critical Scientific Areas for Leadership in ASCR
 - Advanced Research Tools
 - Building and Maintaining Strategic Industry and International Partnerships
 - Strategies for Success, Recruitment, and Retention

First Pass Groups

- Critical Scientific Areas for Leadership in ASCR
 - Tony(lead), Lynne, Dan, Greg
- Advanced Research Tools
 - David(lead), Ian, Kathy, John
- Building and Maintaining Strategic Industry and International Partnerships
 - Ewa(lead), Dieter, Jack
- Strategies for Success, Recruitment, and Retention
 - Vivek(lead), Satoshi, Bob

A rough timeframe for producing a first draft in the beginning of October.

Second Pass Groups

We plan to reassign people to sections and further develop the draft.

- Critical Scientific Areas for Leadership in ASCR
 - Kathy(lead), Jack, David
- Advanced Research Tools
 - Lynne(lead), Bob, Dieter, Vivek
- Building and Maintaining Strategic Industry and International Partnerships
 - Dan(lead), Tony, Satoshi, John
- Strategies for Success, Recruitment, and Retention
 - Ian(lead), Ewa, Greg

Report Outline

Executive Summary (2 pages)

- Critical Areas for ASCR
- Strategies for Success

Key Findings and Recommendations (Everyone) (2 pages)

Introduction (2 pages)

Critical Scientific Areas for Leadership in ASCR (10 pages) (Tony(lead), Lynne, Dan, Greg)

- Overview
- Infrastructure, Community, and Sustainability
 - Software Sustainability Center
- Maintain critical international cooperation
 - Why international cooperation is important
- Supply chain issue
- Trusted Electronics

Advanced Research Tools (10 pages) (David(lead), Ian, Kathy, John)

- Applied Mathematics Research
- Computer Science Research
- Computational Partnerships
- Emerging Technologies
- Supercomputing and Network Facilities
- Identify key areas where the U.S. currently has, or could aspire to, leadership roles in advanced computing and high-end computational science and engineering, including unique or world-leading capabilities

Building and Maintaining Strategic Industry and International Partnerships (10 pages) (Ewa(lead), Dieter, Jack)

- How can we sustain our roles and attract the best industry and international partners?
- How to do this in an increasingly competitive environment for both talent and resources?
- How can the DOE ASCR build and maintain its reputation as a “partner of choice”?
- What are the barriers that can hinder our ability to form effective and enduring international and industry partnerships?

Strategies for Success, Recruitment, and Retention (10 pages) (Vivek(lead), Satoshi, Bob)

- How can programs and facilities be structured to attract and retain talented people
- How we can ensure that we are recruiting, training, mentoring, and retaining the best talent from all over the world, including among traditionally underrepresented groups within the U.S.
- What barriers exist to successfully advancing a career and how can the Department address those barriers.
- Need for a mutli-decade roadmap for computational science
- Interplay among basic research, use-inspired research, applied research and industrial research

Conclusions (1 page)

Committee Plans

- **Review and discussion of initial sections, October 2022**
 - Identification of missing information
 - Identification of additional presentations by external experts
- **2nd pass at the report sections, November 2022**
- **Zoom call to review and discuss the 2nd pass, December 2022**
- **In-person committee meeting January/February 2023**
- **Report finalized in time for the Spring ASCAC meeting**