



U.S. DEPARTMENT OF
ENERGY

Office of
Science

Committee of Visitors (COV) Response ASCR Research Division for FY13 - FY15

Applied Mathematics:

- Steven Lee

Computer Science:

- Lucy Nowell

Computational Partnerships:

- Randall Laviolette, Ceren Susut

Advanced Scientific Computing Research

Office of Science, Department of Energy

April 18, 2018

ASCR Research COV Members

- **Susan Gregurick** (Chair), National Institutes of Health
- **Amber Boehnlein**, Thomas Jefferson National Accelerator Lab
- **John Burns**, Virginia Tech
- **Candace Culhane**, Los Alamos National Laboratory
- **John Dolbow**, Duke University
- **Leland Jameson**, National Science Foundation
- **Hans G. Kaper**, Georgetown University
- **Warren Pickett**, University of California-Davis
- **Rajiv Ramnath**, National Science Foundation
- **Amitabh Varshney**, University of Maryland



ASCR Research COV Charge & Timeline

Assess the **efficacy and quality of the FY13-FY15 processes** used to:

- Solicit, review, recommend, and document proposal actions, and
- Monitor active award, projects and programs

Within the boundaries defined by DOE missions and available funding, comment on how the award process has affected:

- The **breadth and depth of portfolio elements**
- The degree to which the program is anticipating and **addressing emerging challenges from high performance computing and DOE missions**, and
- The **national and international standing** of the program with regard to other computational science programs that are also focused on harnessing high performance scientific computing and using massive datasets to advance science

COV Timeline:

[Charge Letter](#) – December 19, 2016

COV Review – October 31 - November 1, 2017 @ Rockville Hilton

[COV Report](#)– February 14, 2018

COV Response – March 16, 2018

ASCR Research COV Report & Recommendations

Overall ASCR Research Summary Findings & Recommendations

- 4 Recommendations

1A. Solicit, review, recommend, and document proposal actions

- 2 Recommendations

1B. Monitor active award, projects and programs

- 6 Recommendations

2A. The breadth and depth of portfolio elements

- 5 Recommendations

2B. The degree to which the program is anticipating and addressing emerging challenges from high performance computing and DOE missions

- 7 Recommendations

2C. The national and international standing of the program with regard to other computational science programs that are also focused on harnessing high performance scientific computing and using massive datasets to advance science

- 2 Recommendations

ASCR Program Elements: Tally & Breakdown of 22 COV Recommendations

COV Recommendations for FY13 - FY15

Program Elements: 1 - Processes & Awards 2 - Portfolio & Impact	Research Division Programs				Tally
	ASCR Overall	Applied Mathematics	Computer Science	Computational Partnerships	
1A. Solicit, Review, Document Actions	1	1	0	0	2
1B. Monitor Active Projects & Programs	1	1	2	2	6
2A. Portfolio Breadth & Depth	0	2	2	1	5
2B. Anticipate & Address Emerging Challenges	2	3	1	1	7
2C. Stature in HPC & Data	0	0	1	1	2
	4	7	6	5	22



1A. Solicit, review, recommend & document proposal actions

Overall ASCR Recommendation:

- COV recommends that PAMS be used to document & archive information from DOE National Laboratories & that PAMS should be used to process & document ASCR pre-proposals.

Applied Math Recommendation:

- COV recommends that targeted solicitations be advertised more broadly to the community. The solicitations should also make it clear what type of work the program will support.

Program Response:

ASCR agrees with this recommendation. Future enhancements to PAMS (including the ones mentioned here) are considered & determined at the Office of Science level & not unilaterally by ASCR. Targeted solicitations are advertised via ASCAC and professional societies (e.g., SIAM, ASA) & will more strongly emphasize the purpose, scope, merit review criteria, & other factors.

1B. Monitor active projects & programs

Overall ASCR Recommendation:

- COV recommends that program managers be given the opportunity to attend a wider range of professional meetings. Such attendance is an effective & efficient way to monitor ongoing projects & assess how sponsored work is being perceived by the research community.

Applied Mathematics Recommendation:

- COV recommends encouraging Early Career awardees to respond to subsequent solicitations.

Computer Science Recommendations (2):

- EXPRESS program and open calls should be explored as strategic tools in the ASCR program toolbox.
- ASCR program should examine a means of increasing the participation of underrepresented demographics & early stage PIs in review panels & potentially in proposals & awards, especially within lead PIs.

1B. Monitor active projects & programs (cont'd)

Computational Partnerships Recommendations (2):

- COV recommends that DOE determine & accumulate measures of success within the program.
- COV recommends that DOE consider using identifiers, such as DOIs, as one method to gauge use & reuse of DOE software, data & other research products.

Program Response:

- ASCR agrees with this recommendation. Program managers will be able to attend more meetings as travel funds become more available. ASCR will continue to look for ways to attract new & early career researchers e.g., in DOE workshops, professional conferences & review panels. ASCR is also participating in a SC-wide working group to promote diversity & inclusion in various ASCR activities. Note that in 2015, PAMS implemented the OMB mandated & Federal-wide Research Performance Progress Report (RPPR) that standardized reporting (measures of success) by PIs. The SciDAC website & SBIR/STTR program facilitate awareness, use & reuse of DOE research products.

2A. The breadth & depth of portfolio elements

Applied Mathematics Recommendations (2):

- COV recommends the program seriously consider extending its breadth by seeking to cover a broad spectrum of topics & supporting a corresponding increase of scientific & technical expertise.
- COV recommends accommodating new & emerging areas of research not specifically tied to extreme-scale computing.

Computer Science Recommendations (2):

- COV recommends that ASCR continues to highly value & prioritize basic computer science research to build a foundation for the groundbreaking activities that will be required in the future.
- ASCR program managers should continue diversity consideration to ensure balance for meetings, reviews & funding decisions for the portfolio.

2A. The breadth & depth of portfolio elements (cont'd)

Computational Partnerships Recommendation:

- COV recommends that SciDAC develop opportunities for new & younger investigators to participate in its programs.

Program Response:

- ASCR agrees with this recommendation. Research portfolio management of programs, topics, areas of expertise & investments levels will continue to be guided by available resources & emerging DOE mission needs. ASCR recently adopted the Basic Research Needs model to improve workshop effectiveness in identifying basic research needs & in engaging the basic research community. The January 2018 workshop Extreme Heterogeneity workshop and Scientific Machine Learning workshop employed this model. For new & younger SciDAC investigators, annual SciDAC PI meetings, SciDAC tutorial websites, and ASCR summer schools (e.g., Argonne Training Program on Extreme-Scale Computing) are excellent venues for presenting work, exchanging ideas, & learning more about the SciDAC program.

2B. Anticipating & addressing emerging challenges from high performance computing & DOE missions

Overall ASCR Recommendations (2):

- COV encourages ASCR to develop a five-year strategic plan. As part of the strategic plan, ASCR should develop strategies for hiring & retaining scientifically trained program managers.
- COV recommends new programs like EXPRESS be advertised more broadly & with increased available funds to initiate new fields of ASCR-related science. ASCR should track Early Career Research & EXPRESS awardees to build the ASCR research community.

Applied Mathematics Recommendations (3):

- Workshops & panels should be continued & expanded as they are effective mechanisms to identify challenges & emerging areas for future DOE missions.
- Program managers should make regular visit to facilities to identify needs of the scientific community & to anticipate future opportunities.
- Program managers should continue & expand efforts to interact with Applied Program Offices.

2B. Anticipating & addressing emerging challenges from high performance computing & DOE missions (cont'd)

Computer Science Recommendation:

- COV recommends a study of methods & ways to make DOE assets - in particular software - findable, available & accessible e.g, DOE CODE.

Computational Partnerships Recommendation:

- COV recommends that ASCR clearly articulate a strategic goal for SciDAC partnerships.

Program Response:

- ASCR agrees with this recommendation. Next steps for strategic planning includes reverse site visits of DOE Labs to Germantown in May 2018. ASCR plans to hire a second Applied Math program manager in 2018, with expertise in emerging areas of scientific computing. High-risk, high-reward research ideas are encouraged through EXPRESS funding announcements & Dear Colleague Letter (e.g., Dec 2017 Quantum Information Science). Early Career & EXPRESS PIs are engaged through workshops, PI meetings, site visits & review panels. DOE open-source software products are made available via the DOE CODE repository or through active development in the SciDAC program.

2C. National & international standing in using high-performance scientific computing & massive datasets to advance science

Computer Science Recommendation:

- ASCR should continue to invest in high quality, enabling computer science research to maintain US leadership both nationally & internationally in areas whose impact continues to increase & support DOE missions.

Computational Partnerships Recommendation:

- ASCR should consider including international reviewers for its programs.

Program Response:

- ASCR agrees with this recommendation. The Workshop on Extreme Heterogeneity is intended to help ASCR secure new funding for computer science research. The ASCR SciDAC program managers are mindful of the balance between US and international reviewers, and the latter are directly recruited by ASCR program managers for the review of the SciDAC Institutes.