

Promoting inclusive and equitable research:

Town hall discussion with sustainability seed projects
and the ECP Broadening Participation Initiative

LSSw Town Hall Meeting 12, May 18, 2023

<https://lssw.io/Meeting12.html>

- **Description:** Collaborating to address urgent challenges in workforce recruitment and retention in the computing sciences is a critical aspect of work in the DOE community. Work is needed to expand diversity and stable career paths, while fostering a community and culture that attract and retain new generations of scientists and research software engineers. In this meeting, representatives from the six seed projects, as well as from the [ECP Broadening Participation Initiative](#), will participate in a panel discussion.
- In opening remarks, the panelists will briefly describe their project's plan for promoting inclusive and equitable research (PIER plan), as well as provide an update on work in three complementary thrusts of the ECP Broadening Participation Initiative. Discussion will continue with questions and answers.
- **Why attend:** To learn about preliminary work and plans to address workforce challenges in DOE computing sciences; to share your insights about challenges, best practices, and opportunities for advancing diversity, equity and inclusion in the DOE computing sciences workforce.

Slides

- Representatives from the ECP Broadening Participation Initiative
 - Suzanne Parete-Koon (ORNL), Paige Kinsley (ANL), Jini Ramprakash (ANL), Mary Ann Leung (Sustainable Horizons Institute), Dan Martin (LBL), Lois Curfman McInnes (ANL)
- David Bernholdt, Argonne National Lab, *COLABS: Collaboration of Oak Ridge National Lab, LBNL, and ANL for Better Software*
- Rafael Ferreira da Silva, Oak Ridge National Lab, *Center for Sustaining Workflows and Application Services*
- Mike Jantz, Oak Ridge National Lab, *STEP: Sustainable Tools Ecosystem Project*
- Keita Teranishi, Oak Ridge National Lab, *S4PST: Sustainability for Node Level Programming Systems and Tools*
- Addi Thakur Malviya, Oak Ridge National Lab, *Open Scientific Software Foundation*
- Lois Curfman McInnes, Argonne National Lab, *PESO: Toward a Post-ECP Software-Sustainability Organization*

ECP Broadening Participation Initiative



LSSw Town Hall

May 18, 2023

ECP Broadening Participation Task Force

Ashley Barker, OLCF
Dan Martin, LBL
Mary Ann Leung, Sustainable Horizons
Lois Curfman McInnes, ANL
Suzanne Parete-Koon, OLCF
Jini Ramprakash, ALCF
Julia White, ORNL
Jim Ahrens, LANL
Erik Draeger, LLNL
Shaun Fomby, ORNL
Yasaman Ghadar, ALCF

Rinku Gupta, ANL
Mahantesh Halappanavar, PNNL
Mike Heroux, SNL
Christopher Kelly, BNL
Paige Kinsley, ALCF
Mark Miller, LLNL
Hai Ah Nam, NERSC
Slaven Peles, ORNL
Damian Rouson, LBL
Dan Turner, SNL
Terry Turton, LANL

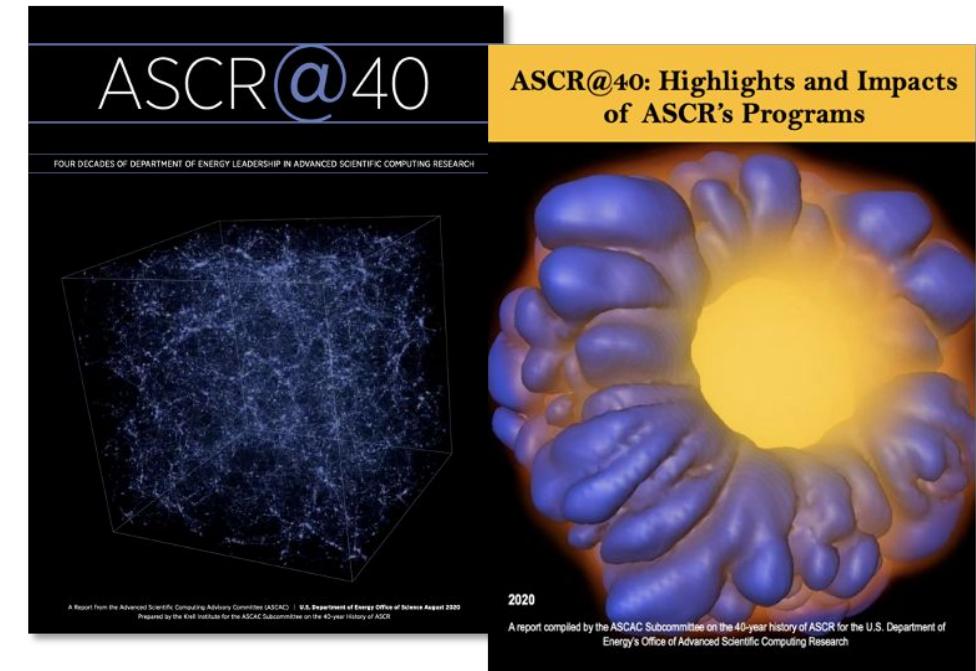
DOE computing sciences provide the foundation of discovery and innovation

ASCR@40: Highlights and Impacts of ASCR's Programs, ASCAC Subcommittee on the 40-year history of ASCR for DOE's Office of Advanced Scientific Computing Research, Hendrickson, Messina et al., 2020:

- Lessons learned
 - A compelling and consistent vision can drive scientific revolutions
 - Diverse funding models are required for diverse and impactful outcomes
 - Workforce investments have been critical**
 - Partnerships are essential
 - Testbeds and platform access funding models are important
- Challenges of the future
 - Technology disruptions
 - Funding balance
 - Software stewardship
 - Broader partnerships
 - Sought-after workforce**
 - New roles for computing to advance science



“The rapid growth of scientific computing and workforce training to fuel it go hand in hand.”



Lesson 3: Workforce investments have been critical.

“Nothing in science is possible without the right set of highly skilled people. ASCR’s vision has been ahead of the ability of academia to adapt. When trying to do things that universities were not yet embracing, ASCR had little choice but to invest in workforce development initiatives to meet its needs ...”

But we face urgent workforce challenges: We must expand the pipeline and workforce for DOE high-performance scientific computing

DOE ASCAC Workforce Subcommittee Letter, Chapman et al., 2014,
<https://doi.org/10.2172/1222711>, states:

“All large DOE national laboratories face workforce recruitment and retention challenges in the fields within Computing Sciences that are relevant to their mission. ... Future projections indicate an **increasing workforce gap and a continued underrepresentation of minorities and females in the workforce unless there is an intervention.**”

The report also states:

“A common theme identified by many labs is that early exposure to the laboratory environment can attract better-qualified students into permanent laboratory roles.”

The report recommends:

“... provide a rich repository of DOE mission-oriented learning materials and engagement opportunities to attract and guide individuals towards careers in areas of DOE need.”

Computing Sciences:

- From ASCAC Workforce subcommittee letter: “We use this term throughout the document to cover multiple areas of importance to DOE including, but not limited to, Computational Science and Engineering. It includes fields such as Algorithms (both numerical and non-numerical); Applied Mathematics; Data Analysis, Management and Visualization; Cybersecurity; Software Engineering and High Performance Software Environments; and High Performance Computer Systems.”
- Also includes Data Sciences, Learning/AI, Networking, Computing Facilities, etc



Image credit: Current and future workforce, R. Giles et al.,
Transitioning ASCR After ECP, Oct 2020

ECP Task Force on Broadening Participation

Partnership among ANL, BNL, LBL, LLNL, LANL, ORNL, PNNL, SNL (including ALCF, NERSC, OLCF)

Task force began in August 2021

- **Bold underline** denotes task force leadership team
- * denotes thrust lead



Jim Ahrens, LANL
ECP ST L3 for Data/Viz,
ALPINE L4



Ashley Barker, OLCF
ECP L3 for Training &
Productivity



Erik Draeger, LLNL
ECP AD L2 deputy



Shaun Fomby, ORNL
ECP Project Controls



Yasaman Ghadar, ALCF
ATPESC Deputy Director



Rinku Gupta, ANL
Argo & IDEAS-ECP projects,
BSSw.io Editor-in-Chief



Mahantesh
Halappanavar PNNL,
ExaGraph L4



Mike Heroux, SNL
ECP ST L2,
IDEAS-ECP co-lead



Christopher Kelly, BNL
CODAR & Lattice QCD
projects



Paige Kinsley, ALCF
*Co-Lead of Intro to
HPC thrust



Mary Ann Leung, Founder
& President, Sustainable
Horizons Institute,
<https://shinstitute.org>



Dan Martin, LBL
ECP AD L3 for Earth &
Space Science
* Lead of SRP-HPC thrust



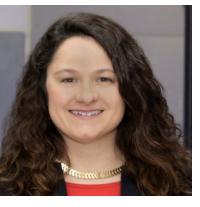
Lois Curfman McInnes
ANL, ECP ST L2 deputy,
IDEAS-ECP co-lead



Mark Miller, LLNL
ALPINE project, lead of
IDEAS-ECP Inclusive
Minute initiative



Hai Ah Nam, NERSC
IDEAS-ECP project,
Coordinator of BSSw
Fellowship Program



Suzanne Parete-Koon, OLCF
* Lead of HPC Workforce
Development & Retention
Action Group



Slaven Peles, ORNL
ExaSGD project



Jini Ramprakash, ALCF
Deputy Director,*Co-Lead of
Intro to HPC thrust



Damian Rouson, LBL
Flang & Pagoda projects



Dan Turner, SNL
Optimization & UQ
Manager



Terry Turton, LANL
ECP ST Integration,
Project Coordinator for
ALPINE, SICM, Cinema



Julia White, ORNL
ECP Technical
Operations Manager



David Brown, LBL
Partnered with M.A. Leung to
establish the LBL Sustainable
Research Pathways Program



Valerie Taylor, ANL
CEO & President, Center for
Minorities and People with
Disabilities in IT, <https://cmd-it.org>

Liaisons from the Computing Research Leadership Council

Vision and mission of ECP Broadening Participation Task Force

- **Vision:** The DOE high-performance computing (HPC) community is a supportive and inclusive culture, where the workforce includes diverse and talented people from underrepresented communities.
- **Mission:** Establish a sustainable plan to recruit and retain a diverse workforce in the DOE HPC community by fostering a supportive and inclusive culture within the computing sciences at DOE national laboratories.
 - **Engage talented people** with the potential for strong skills and interest in HPC **from underrepresented groups**, including:
 - Black or African American, Hispanic/Latinx, American Indian, Alaska Native, Native Hawaiian, Pacific Islanders, women, persons with disabilities, first-generation scholars, people from smaller colleges & universities, and others
 - **Raise awareness of DOE activities and needs** related to scientific applications, software technologies, hardware, and infrastructure;
 - **Provide pathways for interactions**, including training, internships, collaborations, and careers;
 - **Leverage and complement** existing efforts on broader engagement (BE) and diversity, equity and inclusion (DEI) in DOE national laboratories, computing facilities, and the HPC computational science community.

Workforce development activities build on current efforts to broaden participation in HPC



Mary Ann Leung, founder & president of **Sustainable Horizons Institute** (SHI)

Presentation at ASCAC meeting, July 2021



Challenges and Lessons Learned in Expanding Participation in Computational Science and Engineering

Advanced Scientific Computing Advisory Committee

Thursday, July 29, 2021

Mary Ann Leung, Ph.D.

Sustainable Horizons Institute

7/28/2021

The slide features a central graphic composed of various colored rectangles and lines forming a grid-like structure. The words "DIVERSITY", "FAIRNESS", "SUPPORT", and "OPPORTUNITY" are integrated into this structure. The word "INCLUSION" is positioned at the top right of the graphic.

https://science.osti.gov/-/media/ascr/ascac/pdf/meetings/202107/ASCAC_meeting_202107_Challenges_Lessons_Expanding_CSE.pdf

Pioneering multipronged approaches to broaden engagement of underrepresented groups in HPC and computational science. Existing DOE partnerships:

- [Sustainable Research Pathways \(SRP\) Program](#)
- [SIAM CSE Broader Engagement Program](#)
- [2021 BSSw Fellow](#) - Increasing developer productivity and innovation through diversity
- [CRLC seminar series](#)
- Interactions with labs



ECP Broadening Participation Initiative



A multipronged initiative to expand the pipeline and workforce for DOE high-performance computing (HPC)



HPC Workforce Development and Retention Action Group

We are influencing culture in DOE labs and communities to promote the workforce pipeline for — and the retention of — a diverse DOE lab HPC workforce.

We are fostering a community, within



Intro to HPC

We are providing accessible introductory material to HPC — thereby addressing gaps in — and expanding the pipeline of — people with foundational HPC skills.

This becomes a pathway to build experience for (and interest in)



Sustainable Research Pathways for HPC (SRP-HPC)

We are establishing a multilab cohort of students from underrepresented groups (and faculty working with them), who are working side-by-side with ECP teams on world-class HPC projects:

<https://www.exascaleproject.org/hpc-workforce>



Reference: *A multipronged approach to building a diverse workforce and cultivating an inclusive professional environment for DOE high-performance computing*, response to DOE RFI on Software Stewardship, ECP Task Force on Broader Engagement, Dec 2021, <https://doi.org/10.6084/m9.figshare.17192492>

Partnership with **Sustainable Horizons Institute**
<https://shinstitute.org/srp-hpc>



SUSTAINABLE HORIZONS INSTITUTE



Strongly encouraged to apply: Students from (and faculty working with) underrepresented groups (Black or African American, Hispanic/Latinx, American Indian, Alaska Native, Native Hawaiian, and Pacific Islanders, women, persons with disabilities, first-generation scholars, and other underrepresented populations)

Why ECP? Unique multilab partnership across DOE computing sciences (apps / math / CS / facilities)

- Strength in spanning multiple institutions / strength in numbers / network beyond what any individual lab could do
- Proactive outreach and deployment of DOE HPC tools and technologies to communities beyond traditional targets

HPC Workforce Development and Retention:

Influence culture in DOE labs and communities to promote the workforce pipeline for — and the retention of — a diverse DOE lab HPC workforce



HPC Workforce Development and Retention Action Group



Amedeo Perazzo
SLAC



Andreas Kronfeld
Fermilab



Anshu Dubey
ANL



Ashley Barker
OLCF



Bob Robey
LANL



Carol Woodard
LLNL



Chris Oehmen
PNNL



Damian Rouson
LBL



Dan Turner
SNL



Dan Martin
LBL



David Martin
ALCF



Deborah Penchoff
U. of Tennessee



Donald Frederick
LLNL



Elaine Raybourn
SNL



Hai Ah Nam,
NERSC



Hubertus Van Dam
BNL



Jini Ramprakash
ALCF



Jose Manuel Monsalve
ANL



Kathryn Mohror
LLNL



Keita Teranishi
ORNL



Kelsey DiPietro
SNL



Kevin Brown
ANL



Kita Cranfill
ORNL



Lois Curfman McInnes
ANL



Mark Miller
LLNL



Mary Ann Leung
SHI



Meifeng Lin
BNL



Michael E. Papka
ALCF



Miranda Mundt
SNL



Nitin Sukhija
Slippery Rock U.



Paige Kinsley
ALCF



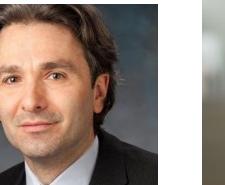
Pedro Valero-Lara
ORNL



Richard Gerber
NERSC



Rinku Gupta
ANL



Slaven Peles,
ORNL



Stefan Wild
LBL



Suzanne Parete-Koon
OLCF



Terry Turton
LANL



Tom Papatheodore
OLCF



Verónica Melesse
Vergara ORNL



Victor Mateevitsi
ALCF



Wael Elwasif
ORNL



William Godoy
ORNL



Yasaman Ghadar
ALCF

Approach: HPC Workforce Development and Retention

- **HPC Workforce Development and Retention (HPC-WDR) Action Group was established in spring 2022. Made up of interested staff from the ECP community and DOE labs**

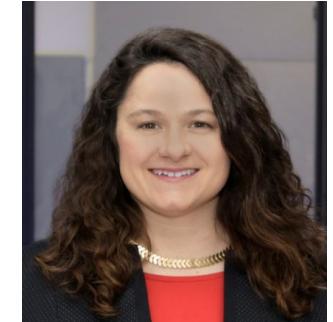
- Foster a community, within the HPC community, who come together on a regular basis to share ideas and best practices and learn from each other
 - Recruit and curate content for 2 key initiatives; develop recommendations and strategies for improvement

- **Leading a webinar series: HPC Workforce Development and Retention**

- Regular webinars (open to all)
 - Topics focus on improving workforce culture (diversity, equity and inclusion)
 - Speakers from DOE labs and broader community
 - Materials from the webinars are curated and archived online

- **Developing a website: Resources for HPC Workforce Development and Retention**

- Curate training, methodologies, best practices, and lessons learned regarding HPC Workforce Development and Retention, thus making resources available online, accessible to the community
 - Version 1.0: <https://hpc-workforce-development-and-retention.github.io/hpc-wdr/>



Lead, Suzanne
Parete-Koon, OLCF



Join the webinars

Approach: HPC Workforce Development and Retention

The screenshot shows the homepage of the HPC Workforce Development and Retention (WDR) website. At the top, there is a black navigation bar with the text "HPC-WDR" on the left and links for "Home", "About", "Community", "HPC Jobs", and "Blog" on the right, along with social media icons for Facebook, LinkedIn, Twitter, and YouTube. Below the navigation bar is a large banner featuring a photograph of a Black man in a yellow jacket working in a server room. Overlaid on the banner is the text "High-Performance and Scientific Computing" and "Workforce Development and Retention Action Group". A subtitle "The future workforce is our mission." is followed by a "Learn More" button. To the right of the banner, the main content area begins with a section titled "Our Mission". This section contains two paragraphs explaining the group's purpose: enabling the DOE National Laboratories to share insights for inclusive and equitable workforce development and retention, and fostering a community for regular sharing of ideas and best practices. Below this, there are two columns: "Latest Blog Posts" on the left and "Announcements" on the right. The "Latest Blog Posts" column includes a post titled "A New Meeting Agenda Item - The Inclusive Minute" from April 8, 2023, and another titled "What Can Mentoring Look Like?" from March 24, 2023. The "Announcements" column features a section about the "US-RSE Conference" taking place October 16-18, 2023, in Chicago, IL, with a link to the conference website.

HPC-WDR

Home About Community HPC Jobs Blog

High-Performance and Scientific Computing

Workforce Development and Retention Action Group

The future workforce is our mission.

Learn More

Our Mission

The High-Performance Computing Workforce Development and Retention Action Group's mission is to enable the Department of Energy National Laboratories and their related computing communities to share their collective insight for inclusive and equitable workforce development and retention for High-Performance Computing.

We foster a community within the DOE High-Performance Computing communities that comes together on a regular basis to share ideas, catalog best practices, and develop recommendations and strategies for improvement.

Latest Blog Posts

Apr 8, 2023

A New Meeting Agenda Item - The Inclusive Minute

What is an Inclusive Minute Briefly (more details later), inclusive practices are about making that...

Mar 24, 2023

What Can Mentoring Look Like?

"Mentoring" likely rings in people's ears as a formalized relationship, such as an apprenticeship. It...

Announcements

US-RSE Conference

The first ever US-RSE Conference, US-RSE23, is happening October 16-18, 2023, in Chicago, IL. The theme of this year's conference will be Software Enabled Discovery and Beyond.

<https://us-rse.org/usrse23/>

ECP EXASCALE COMPUTING PROJECT

Impact of HPC-WDR Action Group

- Via the HPC-WDR Action Group, members of the national labs' computing community regularly share ideas on tackling workforce challenges
- Since March 2022: five webinars focused on developing computing workforce culture
 - Attended by 672 unique people from 10 national laboratories, 38 universities, and 22 businesses
 - Next Webinar: June 22: [ECP Broadening Participation Initiative: Challenges, Gaps, and Opportunities in Computing Workforce Development and Retention](#)
 - Prior webinar:



Join the webinars

Black Lives Count: Toward Accountability in Efforts to Diversify Computing Webinar helped raise awareness that DOE national laboratory diversity data needed to be disaggregated so the intersectionality of underrepresented communities could be revealed. The “underrepresented minorities” category will be disaggregated in 2023.

Black Lives Count: Toward Accountability in Efforts to Diversify Computing



Damian Rouson, Scientist and Group Leader, Lawrence Berkeley National Lab

Intro to HPC:

Address gap in – and expand pipeline of – people with basic HPC skills

Pathway to build experience for (and interest in) advanced programs (ATPESC, CSGF) and HPC careers

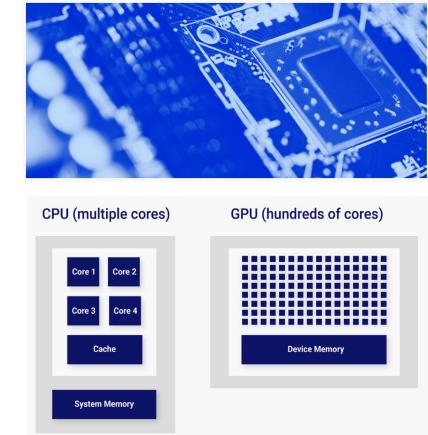


Motivation: Build skills in basic HPC for future workforce

- **Basic HPC skills are prerequisites** for advanced computing programs ([ATPESC](#), [CSGE](#)) and HPC careers. E.g., ATPESC requires
 - MPI / OpenMP / ML experience
 - Experience running on HPC systems

But basic HPC is not typically taught at early stages of students' careers

- Capacity and knowledge of HPC (including scalable AI & analytics) at many institutions is limited
 - Most HPC (including scalable AI & analytics) courses (if) offered are electives
 - Graduation requirements often don't leave bandwidth to take electives
- DOE lab computing complex has expertise, capabilities, and long history of cross-lab coordination on joint efforts



[A gentle introduction to GPU programming](#), M. Rosso and A. Myers, BSSw.io blog article, May 2021

Two-pronged approach for Intro to HPC

Meet students where they are and provide HPC pathways



Co-Lead: Paige
Kinsley, ALCF



Co-Lead: Jini
Ramprakash, ALCF

- **Direct to students approach:** National labs regional “Intro to HPC” Bootcamp
 - One-week intensive HPC/AI course held by national labs, providing exposure to topics that will enhance applications to graduate programs
 - **Target Audience:** advanced undergrads (juniors and seniors), students in gap years, and early grad students in underrepresented groups
 - **Goal:** Collaboratively develop inclusive curriculum across DOE labs, including hands-on HPC, and make material available for community use
- **Through universities:** Intersect workforce needs with capabilities
 - **Target Audience:** MSI faculty in computing and computational science fields
 - **Goal:** Plan and implement MSI Faculty Curriculum Development Program to build modules on HPC/AI that can be incorporated into current course curricula

Developing project-based curriculum with DOE lab staff and running pilot bootcamp Aug 2023 at NERSC; inviting 2 MSI faculty in summer 2023 to build MSI-national lab curriculum program

Sustainable Research Pathways (SRP):

Multilab cohort of students from underrepresented groups (and faculty working with them), collaborating with ECP teams, including mentoring, community building, and promoting inclusion



Build on Sustainable Research Pathways (SRP) at LBL

(ref: [Leung ASCAC presentation](#), July 2021)



David Brown
Mary Ann Leung
Silvia Crivelli

Sustainable Research Pathways Program

- Build relationships centered on research collaborations
- Recruit
 - Faculty working with underrepresented students
 - Students from underrepresented backgrounds
- Provide opportunities for staff scientists
 - Research collaborations
 - Learn/contribute to diversity and inclusion efforts
- Supplement existing D&I Laboratory programs



- Started in 2015 at LBL, has expanded annually
- Steady pipeline of examples of successful pathways to DOE
- Expanded as multi-lab ECP partnership (program summers 2022 and 2023)
- Now expanding to other computational and data science projects through the Computational Research Leadership Council (CRLC)

Berkeley SRP Alumni



Professor Chris Paolini, San Diego State University (HSI)

- Participated in SRP@LBL (2019, 2020, 2021)
 - student Angel Boada all 3 years
- ECP AD Subsurface project with lab mentor David Trebotich
- Team has continued thru SRP-HPC

Alexandra Ballow, Youngstown State University

- First-generation undergraduate in economically challenged community
- Conducted research through SRP@LBL in 2018 in John Wu's group
- Took advantage of SIAM CSE19 BE Lightning Talks to prepare for poster blitz for over 1000 SIAM community members
- Presented research through BE@CSE19; met Ann Almgren (Guided Affinity Group leader); returned to SRP@LBL in 2020
- Presented research at BE@CSE21
- Awarded 2021 DOE Computational Science Graduate Fellowship!

And more ...

Sustainable Research Pathways

Broadening participation of underrepresented groups

<https://shinstitute.org/sustainable-research-pathways-2022>

Collaborate with ECP teams

Two tracks*

- Faculty/student teams
- Students on their own



Addressing a National Imperative

The Exascale Computing Project is an aggressive research, development, and deployment project focused on delivery of mission-critical applications, an integrated software stack, and exascale hardware technology advances.

Application Development



Software Technology



Hardware & Integration



* Students from and Faculty working with underrepresented groups (Black or African American, Hispanic/Latinx, American Indian, Alaska Native, Native Hawaiian, and Pacific Islanders, women, persons with disabilities, first-generation scholars) are strongly encouraged to apply.

Inclusive recruiting: Underrepresented groups wherever they are: historically black colleges and universities (HBCU), hispanic-serving institutions (HSI), community colleges, liberal arts, public/state, high-research institutions



Build relationships based on R&D collaborations, with these goals:

- Jump-start and boost careers
- Foster a welcoming and inclusive HPC community
- Provide learning opportunities to advance diversity, equity, and inclusion
- Normalize inclusion, that is, help people learn how to work together and un-learn biases so that inclusion becomes a normal practice

Explore cutting-edge R&D opportunities at DOE labs, which provide the foundation for exciting careers and broad societal impacts

Students from underrepresented groups (and visiting faculty working with them) whom ECP projects identify and fund separately (e.g., through lab visitor programs) are welcome to join the "SRP Summer Experience" cohort activities.

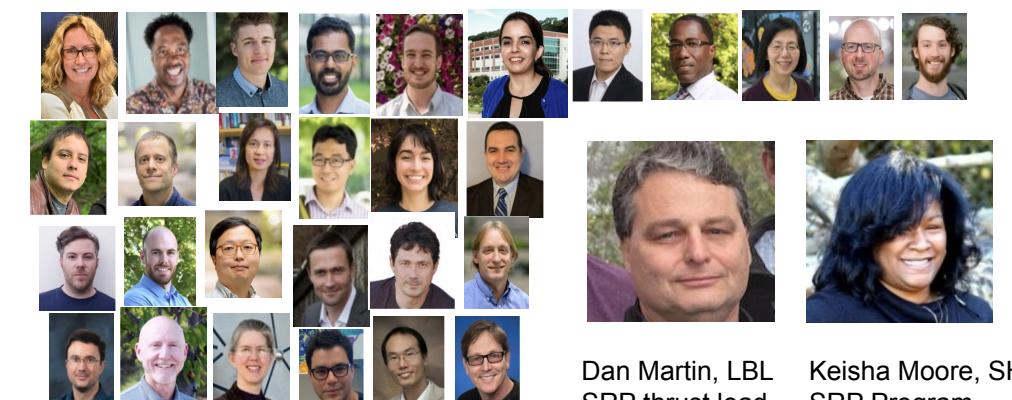
SRP-HPC (for summer 2022)

- **61 participants:** 13 student track, 16 faculty track (+29 students), 3 self-funded students
- 82% of overall participants (and all faculty-student teams) represent at least 1 element of diversity
- Many successful projects: SC posters, continuing relationships
- Mentors/hosts throughout ECP and Facilities community
 - ECP Application Development and Software Technology
- Matches for all participating labs
 - Ames, ANL, BNL, LBL, LANL, LLNL, ORNL, PNNL, SLAC

<https://shinstitute.org/srp-hpc>



SRP-HPC students and faculty, summer 2022



SRP-HPC mentors/co-mentors

Dan Martin, LBL
SRP thrust lead
for ECP

Keisha Moore, SHI
SRP Program
Coordinator

The future of DOE computing sciences depends on sustainable workforce interventions

ECP Broadening Participation Initiative

- Solid start as a multipronged, multilab community partnership to change the culture and demographic profile of DOE HPC
- But we face substantial challenges
 - ECP concludes in 2023
 - Need collaboration across the DOE HPC community (not just ECP)
 - Need sustainability of workforce interventions for DOE HPC
- We welcome all feedback/suggestions/input

How are we addressing recommendations of the 2014 DOE ASCAC Workforce Subcommittee Letter? Chapman et al, <https://doi.org/10.2172/1222711>

"All large DOE national laboratories face workforce recruitment and retention challenges in the fields within Computing Sciences that are relevant to their mission. ... Future projections indicate an **increasing workforce gap and a continued underrepresentation of minorities and females in the workforce unless there is an intervention.**"

We must acknowledge the importance and urgency of DOE HPC workforce challenges

- Expansion of HPC in discovery, decision making & more / Explosion of HPC opportunities in industry / HPC transitions

We must do more: Prioritize sustainable workforce interventions for computing sciences

- Get involved!
 - Whoever you are: early-career, mid-career, senior ... and beyond
- We need a variety of complementary sustained interventions at all levels
 - Beyond (undergrad / grad / faculty) programs – including K-12 education, extracurriculars and outreach
- Including partnerships with other agencies, professional societies, community groups, etc



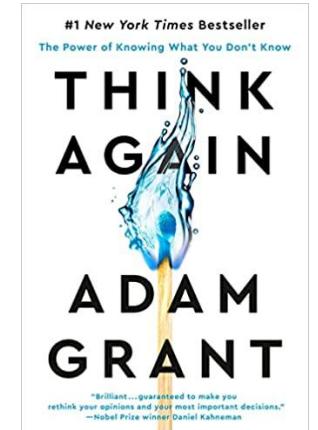
A multipronged initiative to expand the pipeline and workforce for DOE high-performance computing (HPC)



HPC Workforce Development and Retention Action Group
We are influencing culture in DOE labs and communities to promote the workforce pipeline for — and the retention of — a diverse DOE lab HPC workforce.
We are fostering a community within

Intro to HPC
We are providing accessible introductions to HPC — thereby addressing gaps in — and expanding the pipeline — people with foundational HPC skills.
This becomes a pathway to build experience for (and interest in)

Sustainable Research Pathways for HPC (SRP-HPC)
We are establishing a multilab cohort of students from underrepresented groups (and faculty working with them), who are working side-by-side with ECP teams on world-class HPC projects.



Call to Action: Get involved!

Sign up to learn more details and participate in ECP HPC Workforce Development and Retention

Link to the interest Sheet: <https://bit.ly/hpc-workforce-input2023>



A	B	C	D	E	F
1	Community Input on HPC Workforce Issues				
2	this spreadsheet available at https://bit.ly/hpc-workforce-input2023				
3					
4					
	Name	Institution	Email	Want notification about upcoming working sessions (June 2023)?	Interest in participating in the HPC Workforce Development and Retention (HPC-WDR) Action Group (longer term, monthly meetups)
5	Lois Curfman McInnes	ANL	curfman@anl.gov	yes	yes All input is welcome!
6	Suzanne Parete-Koon	OLCF	paretekoonst@ornl.gov	yes	yes Resource for employees that gives career guidance that is not a mentor or HR
7					
8					
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10					
11					
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14					
15					
16					
17					

We welcome all input/suggestions/feedback ... and we encourage involvement of the HPC community ... Let's all work together.

References

- B. Chapman et al., *DOE ASCAC Workforce Subcommittee Report*, 2014, <https://doi.org/10.2172/1222711>
- R. Giles et al., *Transitioning ASCR After ECP*, Oct 2020 Report to the DOE Office of Science, Advanced Scientific Computing Research Program
- *Best Practices for Diversity and Inclusion in STEM Education and Research: A Guide by and for Federal Agencies*, White House Report by National Science and Technology Council, September 2021
- Diversity demographics of the 17 DOE National Laboratories <https://nationallabs.org/staff/diversity/>
- D.L. Brown, S.N. Crivelli and M.A. Leung, *Sustainable Research Pathways: Collaborations Across Communities to Diversify the National Laboratory Workforce*, The Collaborative Network for Engineering and Computing Diversity (CoNECD), Washington, D.C., 2019, American Society for Engineering Education, Paper ID #24706, <https://www.asee.org/public/conferences/148/papers/24706/view>
- M.A. Leung, *Developing Sustainable Methods for Broadening Participation by Transforming Mainstream Science and Technology Communities Through the Normalization of Inclusion*, American Behavioral Scientist, 62(5), 683–691, 2018
- M.A. Leung and C.L. McNeely, *Opening Doors to Communities of Practice: Programmatic Interventions for Inclusion in the Computing Sciences*, Proceedings of Research in Equity and Sustained Participation in Engineering, Computing, and Technology (RESPECT), 2015
- M.A. Leung, D. Rouson, L.C. McInnes, *Increasing Productivity by Broadening Participation in Scientific Software Communities*, BSSw.io blog post, Sept 2020
- M.A. Leung, *Diversity and Inclusion Through Leadership During Challenging Times*, CiSE, Nov-Dec 2020
- T. Whitney and V. Taylor, *Increasing Women and Underrepresented Minorities in Computing: The Landscape and What You Can Do*, Computer, vol. 51, no. 10, pp. 24-31, 2018
- *A Multipronged Approach to Building a Diverse Workforce and Cultivating an Inclusive Professional Environment for DOE High-Performance Computing*, response to DOE RFI on Software Stewardship, ECP Task Force on Broader Engagement, Dec 2021, <https://doi.org/10.6084/m9.figshare.17192492>
- *Transforming Trajectories for Women of Color in Tech*, E. Hammonds, V. Taylor and R. Hutton, editors, National Academies of Sciences, Engineering, and Medicine, The National Academies Press, 2022
- AIP TEAM-UP Task Force, <https://www.aip.org/diversity-initiatives/team-up-task-force>
- M. James and E. Bertschinger et al., The Time is Now Systematic Changes to Increase African American Participation in Physics and Astronomy, <https://www.aip.org/sites/default/files/aipcorp/files/teamup-full-report.pdf>
- J. Towns et al., *XSEDE: Accelerating Scientific Discovery*, Computing in Science & Engineering, vol. 16, Issue 5
- T. Miles, J. Wernert, Julie; L. DeStefano, Longitudinal Evaluation of the XSEDE Campus Champions Fellows Program, <https://www.ideals.illinois.edu/items/123543>

COLABS

Collaboration for Better Software (for Science)

Anshu Dubey, David Bernholdt, Dan Gunter

Kevin Harms, Bronson Messer, Richard Gerber, John MacAuley

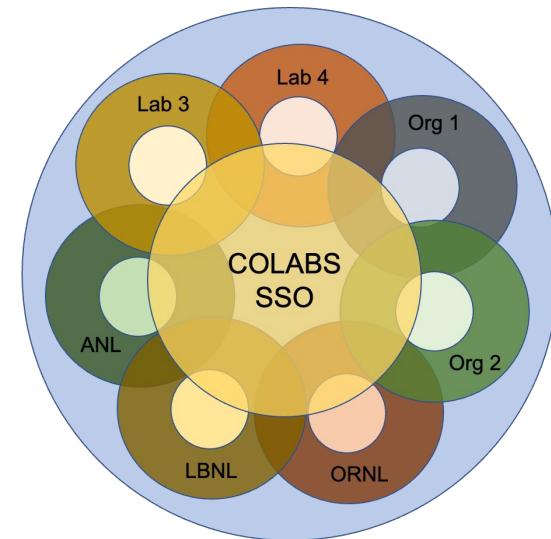
<https://colabs-science.github.io>

About COLABS

COLABS offers comprehensive services in support of scientific software stewardship and sustainability. **Our primary workforce is a cadre of research software engineers (RSEs), who will provide services needed by client projects. We also elevate scientific software development through extensive training and education efforts, as well as advocacy for both better software and for the people responsible for it.** A modest research component on the “science of scientific software” supports the services and training.

Key Services and Activities

- Essential Services – baseline RSE levels of effort to support the specific sustainability needs of the project. Available to all client projects as a specific level of RSE effort.
- Advanced Services – more intensive RSE services for higher-effort stewardship tasks. Allocated based on a lightweight proposal process.
- **Software Developer Training** – providing training on research software engineering topics to COLABS RSEs, client projects, and the larger community to improve awareness and capability for the development of high-quality scientific software
- **RSE Workforce Development** – developing and delivering educational programs (including internships and co-op opportunities) to bring practical scientific software engineering knowledge and experience into university programs, emphasizing underrepresented groups, with the goal of building the DOE RSE workforce. Advocacy for RSEs to institutions and sponsors.
- Research in the science of scientific software – R&D, in the spirit of the SSSDU workshop report, to support improving COLABS services and training and the broader community.



Inclusivity, Diversity, Equity, and Accessibility in COLABS

Focus on recruiting, staffing, and training of RSE staff

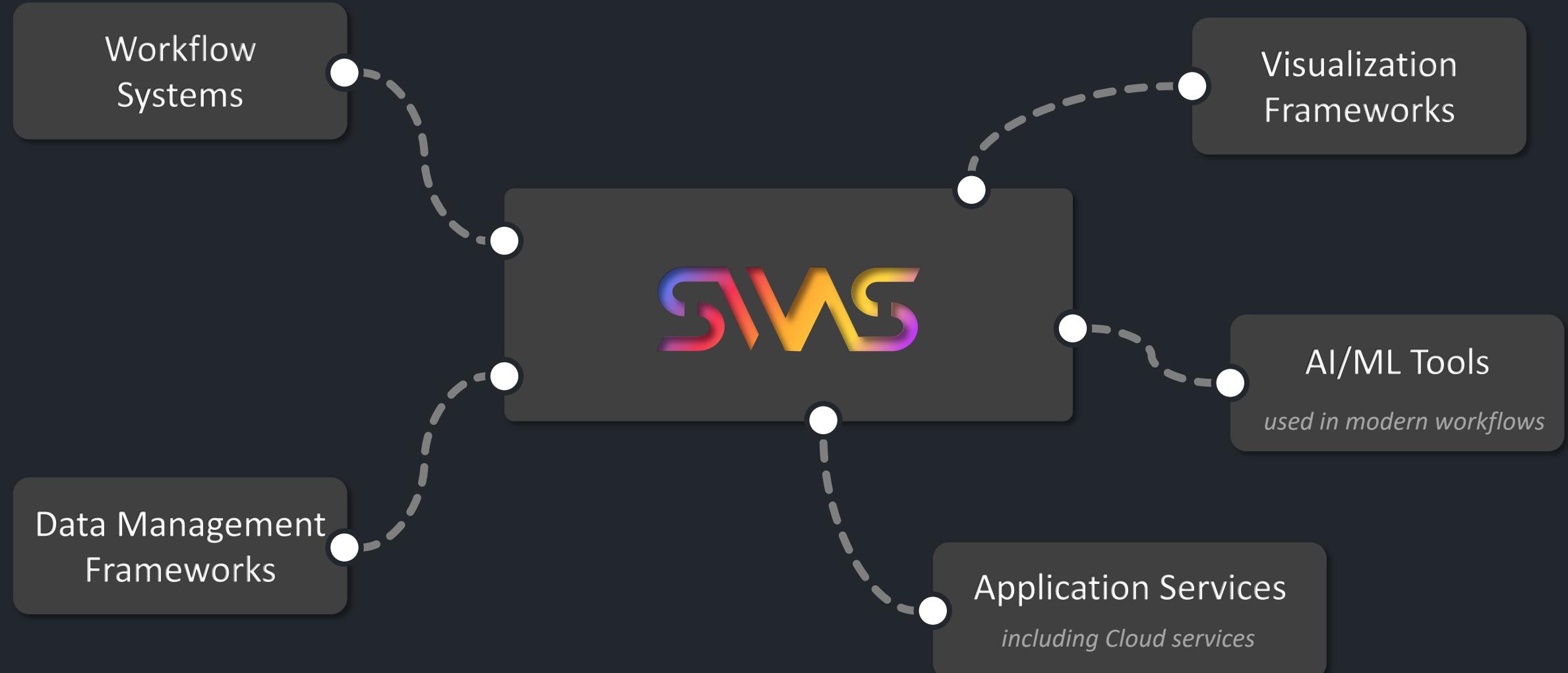
- Education pipeline efforts will include MSI/HBCU institutions and recruit from underrepresented groups, also building personal networks to facilitate
- Internship and co-op programs can focus on underrepresented groups
 - Sustainable Research Pathways as a model
- Reword job postings to be more inclusive, reduce imposter syndrome
- Recruit heavily at MSIs, HBCUs, relevant conferences (e.g., GHC, Tapia), network and advertise postings in venues targeting underrepresented groups
- Diverse hiring team, structured interviews
- Hire for talent and potential rather than pedigree, experience, past career path
- RSE training will include IDEA topics, not strictly technical
 - E.g., community building/management, leading through influence, ally skills, diffusion of innovations, team of teams, etc.



sustaining workflows
& application services

<https://swas.center>

Target Software



What We Offer

SWAS fosters a **collaborative ecosystem** to improve project sustainability in the workflows and application services community through **knowledge sharing and connections**



Promoting Inclusive and Equitable Research

- Engage underrepresented groups
- Recruit talented **underrepresented** students and staff
 - Society of Women Engineers, National Society of Black Engineers, American Association of People with Disabilities, WomenInHPC
- **DEI (diversity, equity, and inclusion) manager**
 - Include topics in workshops and surveys that focus on broadening participation in the workflows community
 - Integrate undergraduate and graduate students from a diverse set of backgrounds
 - DEI statement and code of conduct that outline the responsibilities of participants and our commitment to diversity, equity, and inclusion



sustaining workflows
& application services

<https://swas.center>

Thank you!
Questions?

STEP – Sustainable Tools Ecosystem Project PIER Plan

Presented by Michael Jantz, University of Tennessee
with Terry Jones, ORNL



ORNL is managed by UT-Battelle, LLC for the US Department of Energy

May 18, 2023



ASCR FOA #2844 Informational Meeting

STEP – Strategy

Building An Enduring Ecosystem for Vital Tools



- “STEP will bring together a diverse community of High Performance Computing (HPC) tools developers and stakeholders to **develop plans for the sustainability of the HPC tools ecosystem.**”
- Establishing a series Town Hall meetings for stakeholders across these groups to discuss challenges and strategies for creating a sustainable tools ecosystem
- PIER plan aims to incorporate input from diverse and underrepresented groups in each of these communities in order to ensure representation of different values and demographics.

STEP PIER Plan

- Specific steps in our PIER plan:
 - Reserving part of the seedling funding as travel stipends for diverse and underrepresented people in HPC to attend town hall meetings
 - Asking early career professionals to lead discussions on workforce development at our town halls
 - Meeting with leaders at local HBCUs to identify potential partnerships / collaborations with diverse and underrepresented students and professionals
 - Reaching out to HBCUs located near our town halls to increase attendance of these groups

Sustainable Tools Ecosystem Project (STEP) Team

ROLE	PERSPECTIVE	NAME	ORGANIZATION
Lead-PI	Tools	Terry Jones	Oak Ridge National Lab
Co-Investigator	Tools	James Brandt	Sandia
Co-PI	Tools	Philip Carns	Argonne National Lab
Co-PI	Vendors	James Custer	Hewlett Packard Enterprise
Co-PI	Vendors	Kshitij Doshi	Intel Corporation
Co-PI	Tools	Ann Gentile	Sandia
Co-Investigator	Facilities	Kevin Harms	Argonne National Lab
Co-PI	Tools	Heike Jagode	University of Tennessee
Co-PI	Tools	Mike Jantz	University of Tennessee
Co-PI	Tools	Matthew Legendre	Lawrence Livermore Natl Lab
Co-PI	Vendors	Keith Lowery	Advanced Micro Devices
Co-PI	Tools	John Mellor-Crummey	Rice University
Co-PI	Tools	Barton Miller	University of Wisconsin
Co-PI	Vendors	José Moreira	IBM
Co-PI	Applications	Erdal Mutlu	Pacific Northwest Natl Lab
Co-Investigator	Facilities	Phil Roth	Oak Ridge National Lab
Co-PI	Tools	Sameer Shende	University Oregon
Co-Investigator	Tools	Shane Snyder	Argonne National Lab
Co-PI	Tools	Galen Shipman	Los Alamos National Laboratory
Co-PI	Tools	Devesh Tiwari	Northeastern University
Co-PI	Applications	Theresa Windus	Ames National Lab

S4PST PIER Plan

Keita Teranishi
S4PST Team



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Why Programming Systems?

- Programming systems is where people start CS/CSE
- The first programming language experience often influence your entire career!
- DOE ASCR has unique portfolio in programming systems
 - Variety of programming systems in production and research
 - Needing more effort for workforce retention
- Our PIER idea promotes not only traditional DEI ideas but also DEI in programming system ecosystem
 - Mitigating monoculture
 - Flexibility and Versatility to make our software ecosystem more proactive and robust

Training and Diversity is one of 5 Thrusts in S4PST Seedling Work

- Lead by Damian Rouson (LBL) and Suzanne Parete-Koon (ORNL)
 - Rich experience in DEI and Training
- Many S4PST members have been involved in SRP-HPC and DOE FAIR and RENEW proposals



Training/Outreach

- Engagement with:
 - Training programs at facilities (ALCF, NERSC, OLCF), Conferences, International venues (IHPCSS)
 - DOE Funding for Accelerating Inclusive Research Program
 - DOE Reaching New Energy Science Workforce Program
 - Minority Serving Institutions
 - Undergraduate and High School Students
- Creation of Training Materials
 - From Entry Level to Experts
- Short Introductory Videos
 - 1-5 minutes

Open Scientific Software Foundation

Creating a sustainable future for
scientific software

What is the foundation's mission?

Provide an equitable and resilient center of gravity that enables and supports a thriving and sustainable ecosystem of open source scientific software projects.

Plan for Promoting Inclusive and Equitable Research



This outlines the strategies and plans for promoting diversity, equity, and inclusion in the Open Scientific Software Foundation (OSSF), with a focus on leadership, research, training, outreach, and measurable outcomes.

Plan for Promoting Inclusive and Equitable Research



DEI Values

- The OSSF is committed to promoting a thriving, diverse, inclusive, and equitable community of stakeholders and participants.
- The scientific software community is diverse, with opportunities to better understand and serve changing and dynamic needs.

Plan for Promoting Inclusive and Equitable Research



Current DEI Strategies

- The OSSF partners with Oak Ridge National Laboratory (ORNL), Sandia National Laboratories, and NCSA to address DEI efforts through various initiatives.
- ORNL engages in Early Career fellowship assignments, diversity efforts in recruiting principal investigators and leadership positions, establishment of a Diversity and Inclusion Council, and educational outreach to underrepresented and underserved communities.
- Sandia National Lab participates in the ECP Broadening Participation Initiative, the Black Leadership Committee, and Hispanic Outreach for Leadership and Awareness.
- NCSA supports multiple programs to increase diversity of undergraduate and graduate research students.

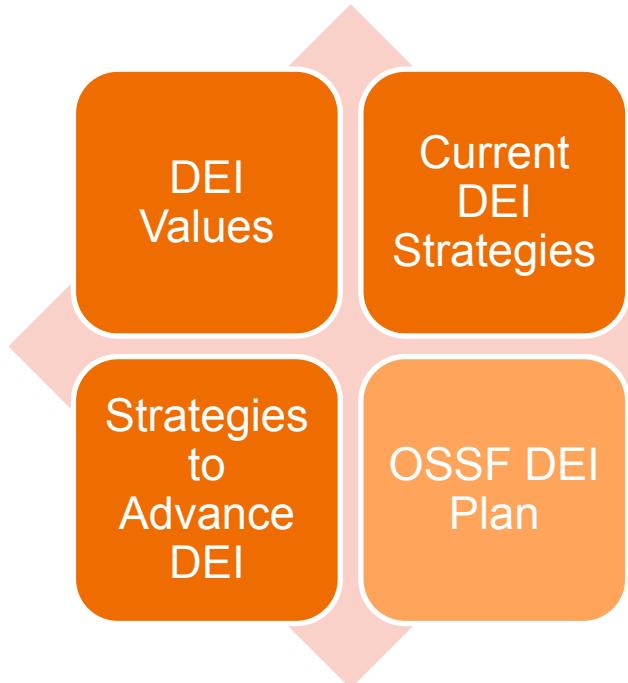
Plan for Promoting Inclusive and Equitable Research



Strategies to Advance DEI

- The OSSF will value and consider diversity and inclusion in leadership, research, training, and outreach efforts.
- The OSSF will enlarge several paths to enhance and expand DEI, including engagement with underserved communities and Minority Serving Institutions (MSIs).
- The DEI plan will utilize the Early-Career fellowship opportunity, leverage Sandia National Laboratories opportunities, diversify talent pools, and promote science and increase accessibility.

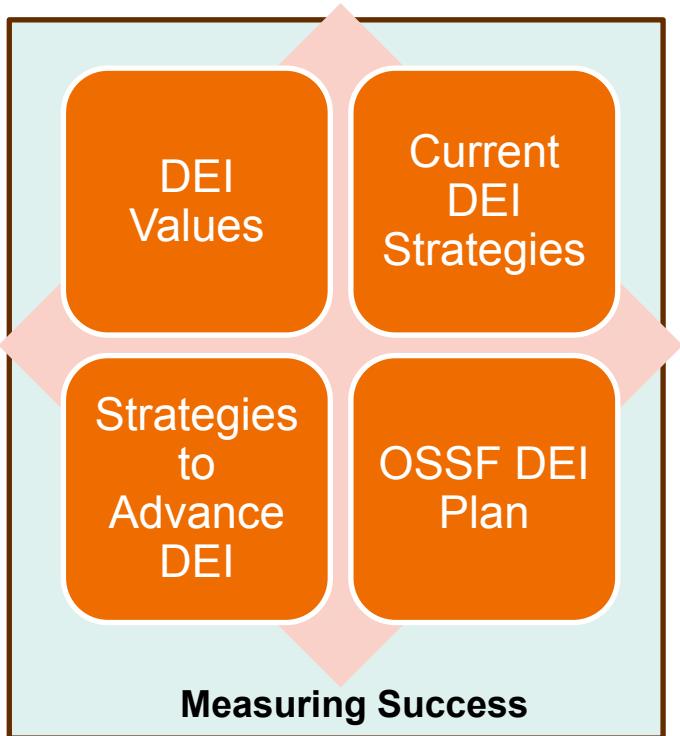
Plan for Promoting Inclusive and Equitable Research



OSSF DEI Plan

- Utilize Early-Career fellowships to train young researchers with a focus on equity.
- Leverage Sandia National Laboratories early career opportunities to grow passion for software sustainability.
- Emphasize diversifying talent pools for recruiting.
- Promote science and increase accessibility to outreach with underserved communities.
- Establish a DEI task force with representatives from partner institutions.
- Leverage OSSF partners' internal efforts related to DEI initiatives and networking resources with underserved communities.

Plan for Promoting Inclusive and Equitable Research



Measuring Evolution and Success

- The OSSF will measure DEI success by tracking program-wide demographics, outreach efforts, and feedback from members.
- Changes in DEI within OSSF will be monitored using demographic evaluations, center-wide surveys, and anonymous concerns portal.
- The DEI task force will work to inform the status and direction of DEI efforts and to gauge the need for evolving and updating strategies.

Thank you!

We welcome your feedback and involvement!

Our Team

Greg Watson,
Oak Ridge
National
Laboratory



**Addi Thakur
Malviya,** Oak
Ridge National
Laboratory



Daniel S. Katz,
University of
Illinois Urbana
Champaign



**Dana
Robinson,** The
HDF Group



**Elaine
Raybourn,**
Sandia National
Laboratories



Bill Hoffman,
Kitware, Inc.



John Kellerman,
The Eclipse
Foundation, Inc.



Clark Roundy,
The Eclipse
Foundation, Inc.



Additional Material

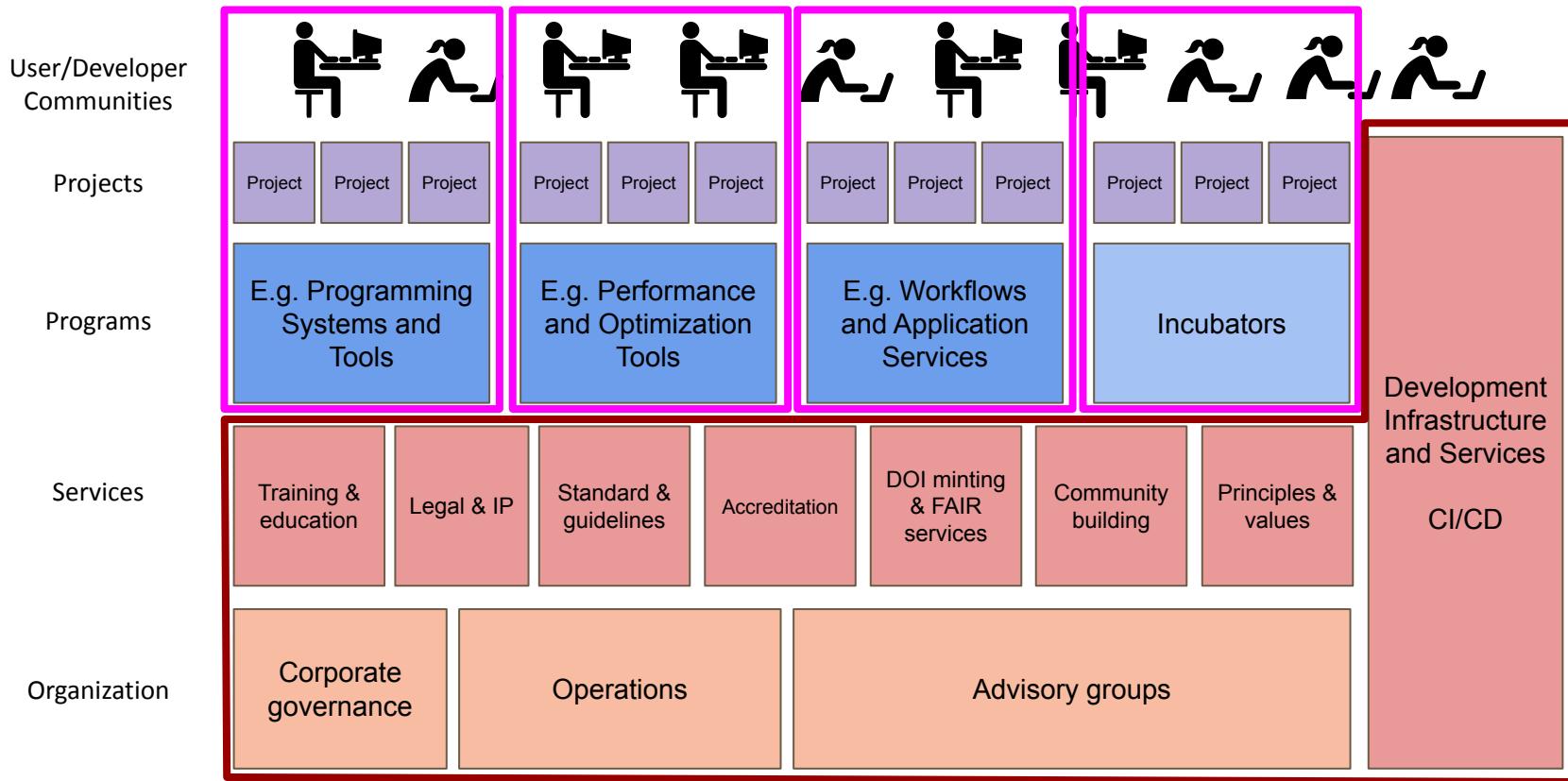
What is the foundation's mission?

Provide an equitable and resilient center of gravity that enables and supports a thriving and sustainable ecosystem of open source scientific software projects.

Plan for Promoting Inclusive and Equitable Research

This presentation outlines the strategies and plans for promoting diversity, equity, and inclusion in the Open Scientific Software Foundation (OSSF), with a focus on leadership, research, training, outreach, and measurable outcomes.

How might the foundation be structured?



Key concepts

User/developer communities are the keystone of the organization

Projects are centered around one or more software artifacts

Programs provide a way for sets of user and developer communities to self organize and determine the best way of operating for their community

Services are available to all projects that are part of the foundation

Advisory boards provide guidance and recommendations to the foundation

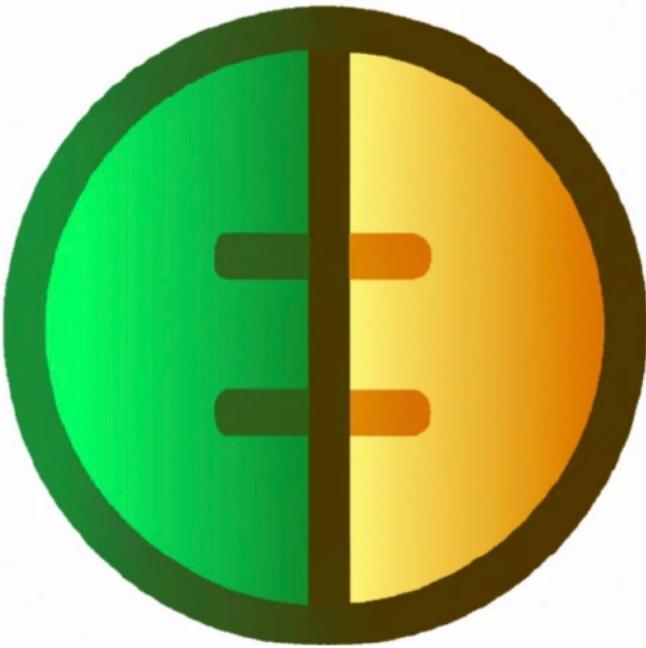
Operations provides responsibility for the day-to-day operation of the foundation, negotiations with sponsors/vendors, and facilitating meetings/events

Corporate governance is ensuring that the foundation meets the needs of the members and stakeholders and works towards long term sustainability goals

What value would we bring to software ecosystems?

- Representative organization that can advocate on behalf of the member projects
- Strong sense of affinity and attachment to other member projects, of “belonging”, of shared purpose
- Powerful position for developing vendor and stakeholder relationships (e.g. AWS, commercial development tools, etc.)
- Common infrastructure services (CI/CD, build, communication, DOIs, FAIR data, etc.)
- Well researched software engineering guidance and practices (standards, guidelines, badging, incentives, etc.)
- Training and education services relating to scientific software development
- Working with the research software engineering community to increase recognition and create educational pathways
- Intellectual property and legal services
- Reduce the costs to DOE by creating a mechanism to bring together resources from multiple funding agencies, organizations, and individuals
- Host meetings and conferences to bring people together to share ideas, particularly across scientific domains
- Provide incentives for improving software practices

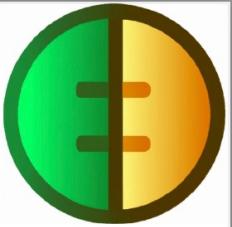
Toward a Post-ECP Software Sustainability Organization (PESO)



LSSw Town Hall Meeting 12
May 18, 2023

Promoting inclusive and equitable research

-
- Michael Heroux (Sandia National Laboratories; PI)
 - James Ahrens (Los Alamos National Laboratory)
 - Todd Gamblin (Lawrence Livermore National Laboratory)
 - Timothy Germann (Los Alamos National Laboratory)
 - Xiaoye Sherry Li (Lawrence Berkeley National Laboratory)
 - Lois Curfman McInnes (Argonne National Laboratory)
 - Kathryn Mohror (Lawrence Livermore National Laboratory)
 - Todd Munson (Argonne National Laboratory)
 - Sameer Shende (University of Oregon)
 - Rajeev Thakur (Argonne National Laboratory)
 - Jeffrey Vetter (Oak Ridge National Laboratory)
 - James Willenbring (Sandia National Laboratories)



PESO Goals Sketch

- Collaboratively steward, facilitate and aggregate activities, processes, resources, relationships, and more
 - Across DOE-sponsored teams, and teams of teams
 - Engaging sponsors, facilities, industry, and community organizations
- Represent the collective interests of the DOE software community
 - What this means depends on the planning process we are in right now
 - Goal is to represent interests that are cross-cutting, not addressed elsewhere
- Provide large-scale infrastructure
 - Software portfolio management at E4S level
 - Spack integration, CI testing, containers, other software ecosystem needs
 - Portfolio lifecycle management

PESO PIER Plan

- Multifaceted approach to advance diversity, equity and inclusion throughout all work in the project, with emphasis on two complementary layers of scope:
 - activities within the project and
 - partnerships with others to plan and lead work toward culture change in our community overall
- In both contexts, we will address:
 - **recruitment and inclusion**, with emphasis on engaging diverse individuals from underrepresented groups as members of our teams and community
 - cultivating **work environments** that promote mutual respect and professionalism, with emphasis on sharing best practices and effecting culture change
 - planning for scholarly and **professional growth of community members**, with particular emphasis on research software engineers (RSEs) and early-career staff

PESO PIER Plan

Collaborate with the ECP Broadening Participation Initiative, other seedling projects, and the broader community to advance diversity, equity and inclusion in the DOE computing sciences workforce, with emphasis on long-term community growth and successes in software sustainment.

- Determine and publish a code of conduct for PESO events and work
- Plan a series of events in spring/summer 2023 to build an understanding of current practices, challenges, gaps, and opportunities to advance DEI in the DOE computing sciences workforce
- **June-July:** Host events and publicly share early information on community experiences, challenges, insights, and highlights of best practices for advancing DEI in the DOE computing sciences workforce, including strategies for mentorship in scientific software projects
- **July-August:** Write a cohesive document that describes challenges, gaps, opportunities, and needs for work to advance DEI in the DOE computing sciences workforce; determine phase-1 goals and metrics to help assess the impact of activities that aim to advance DEI in our community
- **September:** Determine specific plans for multi-year work to address high-priority needs in advancing DEI in the DOE computing sciences workforce, with emphasis on long-term community growth and successes in software sustainment
- **October and beyond:** Execute these plans to address high-priority needs in advancing DEI in the DOE computing sciences workforce; evaluate progress using phase-1 goals and metrics, and refine plans based on enhanced understanding

Community Input on HPC Workforce Issues

- **Goals:**
 - Share information on community experiences, challenges, insights, and highlights of best practices for advancing DEI in the DOE computing sciences workforce, including strategies for mentorship in scientific software projects
 - Build an understanding of current practices, challenges, gaps, and opportunities to advance DEI in the DOE computing sciences workforce
 - Summarize in a written document (co-authored by interested members of the community) – all are welcome
- **May 18: LSSw Town Hall – Community discussion**
 - We invite your input ... sign up, provide suggestions, insights, comments, etc.
 - <https://bit.ly/hpc-workforce-input2023>



Name	Institution	Email	Want notification about upcoming working sessions (June 2023)?	Interest in participating in the HPC Workforce Development and Retention (HPC-WDR) Action Group (longer term, monthly meetups)	Comments: Suggestions for questions/topics to discuss (for the community) / pointers to resources, references, best practices / Discuss challenges, experiences, insights, etc.
Lois Curfman McInnes	ANL	curfman@anl.gov	yes	yes	All input is welcome!
Suzanne Parete-Koon	OLCF	paretekoonst@ornl.gov	yes	yes	Resource for employees that gives career guidance that is not a mentor or HR

- **Working sessions in June-July**
 - June 2: 2-3 pm ET
 - Digest preliminary input, refine questions, share draft-1 structure for document
 - Invite additional input
 - June 22: 3-4 pm ET: Digest community input, refine structure for document, invite additional input
 - July TBD: Writeups, feedback, refinement
 - Iterate until completion (by late July)
 - **Outcome: Document summarizing current practices, challenges, gaps, and opportunities to advance DEI in the DOE computing sciences workforce. The document is completely separate from any software sustainment proposals.**

LSSw Town Hall Discussion

- We invite your input on HPC workforce issues: Sign up, provide suggestions, insights, comments, etc.
- <https://bit.ly/hpc-workforce-input2023>

