The government seeks individual input; attendees/participants may provide individual advice only.

Middleware and Grid Interagency Coordination (MAGIC) Meeting Minutes[1]
September 2, 2020, 12-2 pm ET

Virtual

Participants

Francine Alkisswani (NTIA)	Faith MacDonald (ODNI)
Lisa Arafune (CASC)	Grant Malmberg
Keith Beattie (LBL)	David Martin (ANL)
Wes Bethel (LBL)	Mekisha Marshall (ODNI)
Eric Burger (OSTP)	Edward Moynihan (UI)
Richard Carlson (DOE/SC)	Jun Ni (UIowa)
Dhruva Chakravorty (TAM)	George Ostrouchov (ORNL)
Laura Christopherson (Renci)	Donald Petravic (NCSA)
Ciji Davis (USC/ISI)	Steve Petruzza (Utah)
Martin Doczkat (FCC)	Anne Richeson (CenturyLink)
Amy Friedlander (NSF)	Lavanya Ramakrishnan (LBL)
Sharon Broude Geva (UMich)	Glenn Ricart (US Ignite)
Dan Fay (Microsoft)	Stefan Robila (NSF/CISE/OAC)
Monisha Ghosh (FCC)	Birali Runesha (UChicago)
Nakia Grayson (NIST)	Jennifer Schopf (UI)
Linda Hayden (SCG)	Jill Schroeder (PNNL)
Rob Hughes (NGC)	Suhas Somnath (ORNL)
Ana Hunsinger (Internet2)	Alan Sill (TTU and OGF)
Margaret Johnson (NCSA)	Todd Shechter (UW-Madison)
Daniel S. Katz (NCSA)	Alan Sussman (NSF)
Joyce Lee (NCO)	Wendy Whitcup (USC/ISI)
Miron Livny (UW-Madison)	Jonathan Williams (NSF)
Jason Lopez (Xodiak)	Bevin A. Zauderer (NSF)
Chris Lowe (USDA/ARS)	

<u>Proceedings</u>
This meeting was chaired by Richard Carlson (DOE/SC) and Stefan Robila (NSF).

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[1] Any opinions, findings, conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the Networking and Information Technology Research and Development Program.

<u>**Guest Speakers**</u>

- **Linda Hayden,** Director of Workforce Development, Science Gateways Community. Worked with large NSF and NSAS programs
- **Mekisha Marshall**, Chief Science & Technology Advisor, National Maritime Intelligence-Integration Office, National Intelligence Manager – Maritime, Office of the Director of National Intelligence
- **Dan Katz**, Assistant Director for Scientific Software and Applications at National Center for Supercomputing Applications and Research Associate Professor

<u>**Overview of workforce development**</u>

Dr. Hayden:

- Build partnerships with minority professional organizations, which now have voice in structuring relationship. Making connections with faculty as well as students – important for mentorship programs and Identify talent. Includes joining organization and helping to build their interactions. Key: enabling organization to have a voice. Examples: National Technical Association, etc. Have access to students; know what works due to their experience.
- Assure awareness of value of workforce development to reviewers who are making recommendations to program officers re: funding - workforce development and broader impact outcomes are equally as significant as technology and research outcomes.

Mekisha Marshall

- Need to bring in stakeholders from educational institutions to increase understanding of importance of their (HBCU) programs
- NRL successfully worked with HBCU educators/students; brought in as model for NMIO
- Annual workshop and technical bulletins- (e.g., research that impacts maritime domain); past focuses: technical bulletins requesting articles from academic institutions; and annual workshops facilitating fed/student interactions. Events are for community, not just NMIO. Next year looking at environmental security.

Dan Katz – Case Studies of Research Software Development and Management in Universities.
<u>Focus on software – why</u>?

- Funding, publications (across disciplines and journals),
- Researchers – 90% in US/UK use it; and essential to research

<u>Software as strategic advantage</u>

Direct – competitive advantage to institutions developing software and indirect (software enabled)

To develop better research software. Address problem of people and convincing others that "people" is a difficult problem (culture, management of groups developing software, software issues)

<u>Craftsperson and Scholar</u>

Scholar: archetypal researcher driven to understand to their fullest capability vs. Craftsperson: driven to create and leave behind reifying artifact

Scientific software requires people who are a combination of the best of both roles

<u>What is Research Software Engineer?</u> – understand software engineering practices and can perform in research context vs. researcher developer (focused on research)

<u>Society of Research Software Engineering</u>
- Promote people in RSE movement- international nonprofit
- US RSE Association (informal association) focused on U.S. numbers and issues (networking, jobs, career, events). Most members in academia first, then labs. About 500 members

<u>Career paths in U.S. universities</u>

CaRCC (Campu Research Computing Consortium) – CI workforce Development/Professionalization Committee produced draft Research Computing and Data Professionals Job Elements and Career Guide.

USG:
- support training and fellowships
- 2-month limit in federal funding (e.g., NSF) difficult for full-time staff members as some need more support.
- Peer Review process – role of professionals sometimes focused upon; other times focus on students without regard to whether best suited for work.

Ideas/ programs/ partnerships

Linda Hayden
- 23 NITRD member agencies invest approx. 6.5B annually in R&D programs related to advanced networking and IT capabilities needed by USG and Nation; Workforce development outcomes are equally important as networking and IT
- 3rd generation of mentoring – received Presidential Award for Excellence in Science, Mathematics and Engineering mentoring

<u>Success is in the Numbers (Students). Example:</u>

<u>Cyberinfrastructure for Remote Sensing of Ice Sheets</u> (CReSIS) program
- Each cohort: Women (42-43%) and minorities (66-89%).
- Minority grad student participation increased from 7% to 40%
- Overall CReSIS WD programs (55% Female; 80% minority students (African American, Hispanic and Native American)
- Discovery of new world feature resulted and named Elizabeth City State University Bay in Antarctica

<u>SGCI WD Connects students to Gateway Experts and Technology</u>
- Internships – women (33%); minorities (52%); now at Red Hat, Oracle, etc.
- Hackathons (Supercomputing Conference and PEARC)
- Professional Development Seminars
- Young Professional Awardees – serve as Ambassadors, committee members – reaching out for Workforce development
- Coding institute (summer) and academic year workshops
- Gateway conference – tutorials / training

<u>SGCI Mentoring Model</u> – build community of mentors (81) and work with NCAR (GEO REU network)

<u>Suggestions for NITRD</u>: encourage strong community partnerships

Mekisha Marshall
- Personal investment/ relationship development - speaking engagements (schools, churches), mentorship
- Professional: Students/ internships; Global Maritime Forum (April 2021); NMIO technical bulletin
- Global Maritime program (April 2021)
- Will send information on previous reports and technical bulletins
- Interested in talking with other federal colleagues re: programs
- Grow future workforce to include women and minorities – have actual program

Dan Katz

<u>Research Software Group Models</u>
- Illinois NCSA: Software Directorate: support individual researcher needs and generalize needs across projects; build software frameworks to meet needs of multiple groups
  - Group leads mentor staff; senior developer mentors staff in each project
- NCRC: provide software development support and services to researchers
  - Most agile
  - Line management – mentoring through technical leadership team
- Manchester: Research Software and Data Science – application support, training, short and longer term projects
  - Mentor staff
- High level comparison
- Overcoming varying finite duration funding streams – challenges is growth (how to learn new skills)

<u>Career Paths</u> – tried to look at equivalent experience over formal degrees

<u>Best practices</u> – organizing teams, software, coding practices, etc.

<u>Institutional memory</u> – professional software developers internal to an institution – capture knowledge beyond individual project

<u>Changing scientific culture</u>
- Science is result and how arrived at result. What are tools developed that you can use again. Science is not just story, but also the software; need to focus on both simultaneously
- Software becoming recognized essential part of research, but supporting aspects of such software are not. RSE staff and groups emerging globally to address needs; they and data scientist are key to common research activities. Challenge: scientific community recognizes need and benefits of these positions

Discussion
- Setting up RSE question – see Slide 20 (Dan Katz presentation)- HR changed system to allow positions
- Right metrics for funding agencies to use? Results of prior funding – often not see much related to workforce development; usually overlooked. Could perhaps be strengthened in solicitation

- SG workshops – 33% women participants, but room for improvement
- Effort to differentiate between Asian American and Asians from overseas; while there appears to be adequate representation of Asian Americans, there's ethnic diversity within Asian Americans (e.g., South Asian, East Asian, Pacific Islander) and also socioeconomic status
- NCSA Sustaining software over time in past –by sustaining people who developed it (e.g., disaster management and planning program), so don't lose investment
- Data science – somewhat similar to RSE situation, but not same focus on data sets as outputs. Data Science Alliance – annual meeting in October

FY2022 Annual Planning Meeting: Present framework and key topics to LSN; Flesh out details later

Workforce development –
- Cyber teams (NSF)
- Cyber training (NSF) and Planning Grant (UTA) – year 2 of grant

On-Prem Resources: Pearc Paper & CASC Survey (another source underway) (Alan Sill)

Data Synchronization – emerging challenge. Example:
- Collaboration across large and small infrastructure – computations run on XSEDE machines and local campus machines. Especially if migrate sensor data from is on campus to new machines – XSEDE side (AI focused)

Next meeting: October 7th (12 pm ET). Workforce development, Session 2: Diversity and Inclusion