

CESD – ESS CYBERINFRASTRUCTURE WORKING GROUPS Annual Meeting Highlights

J. David Moulton (LANL)

ESS PI Meeting, Bolger Center, Potomac, MD
May 1, 2018.

Outline

Recap and Highlights from 2017

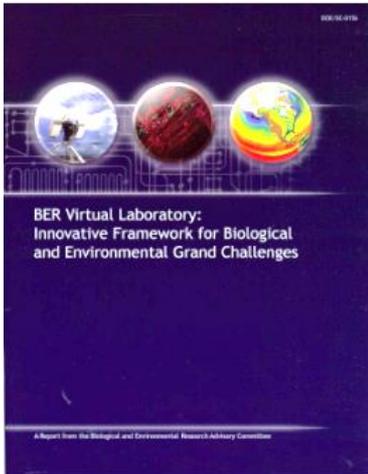
- Motivation, how we formed, our structure ...
- Activities

Annual Meeting (yesterday)

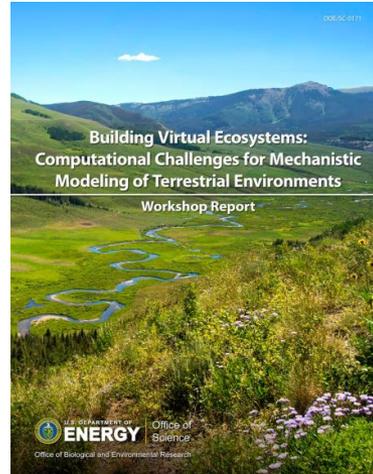
- Design Thinking Exercise?
- Plans for 2018.

Building Community Cyberinfrastructure ...

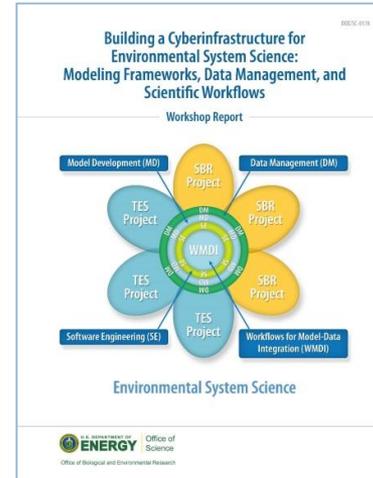
2013



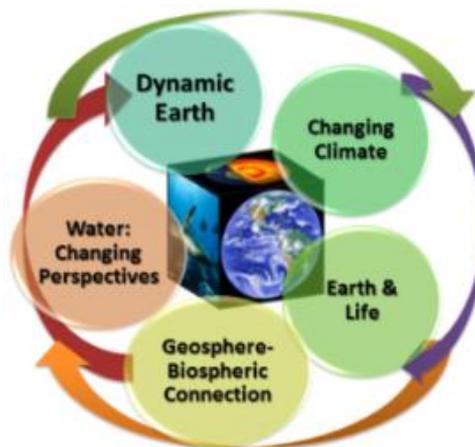
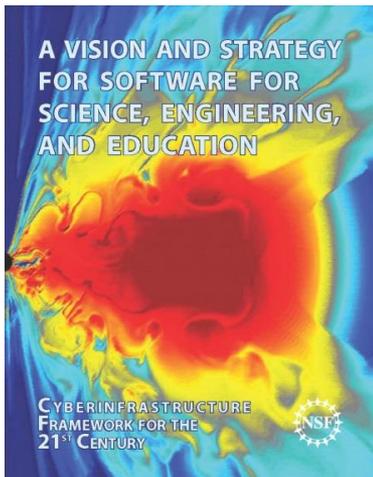
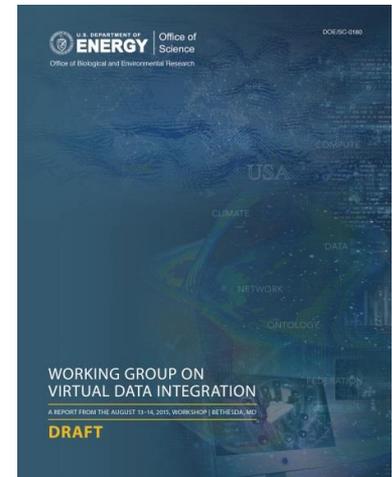
2014



2015



2016



funded by NSF
CRITICAL ZONE OBSERVATORY PROGRAM
studying the zone where rock meets life



UNIVERSITIES ALLIED FOR WATER RESEARCH



ESS Cyberinfrastructure Working Groups Structure

Following recommendations of the workshop report and feedback from 2015 AGU Town Hall the Working Groups Kickoff was a year ago ...

Established an Executive Committee

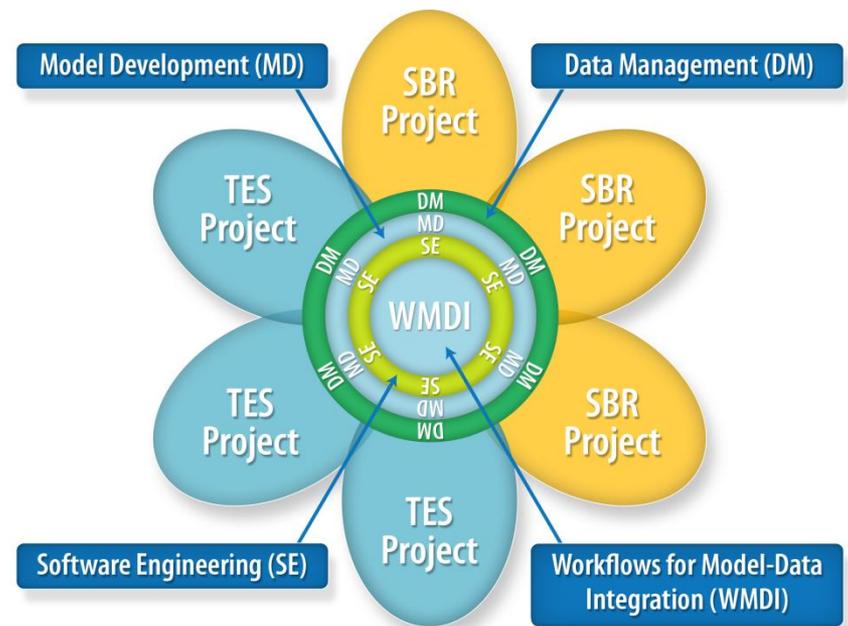
Deb Agarwal, Xingyuan Chen, Paul Hanson,
Forrest Hoffman, Margaret Torn,
David Moulton (Chair), Eric Pierce,
Dean Williams, Roelof Versteeg,
Stan Wullschleger

Established Three Working Groups

- Data Management
- Model-Data Integration
- Software Engineering and Interoperability

Reporting on Working Group Activities

- Informal reporting to S.C. (PMs) and E.C. (PIs)
- Annual reporting at ESS PI Meeting



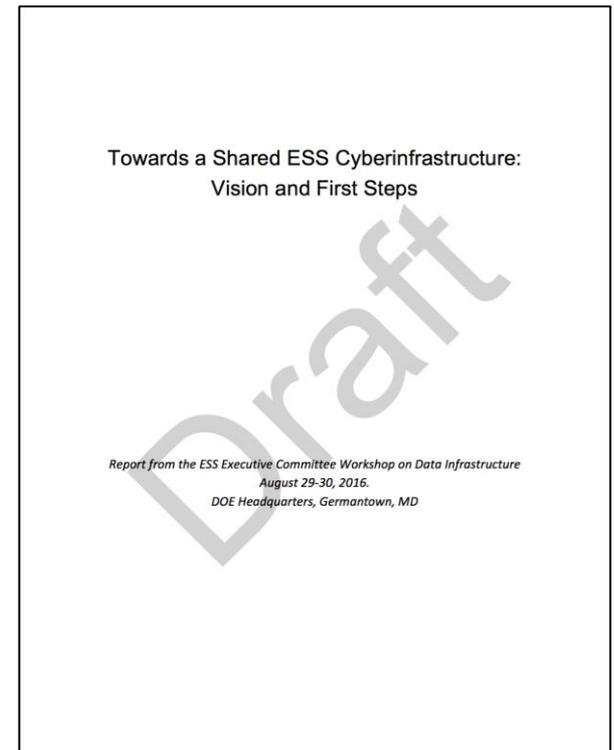
Environmental System Science

ESS Executive Committee Workshop on Data Infrastructure

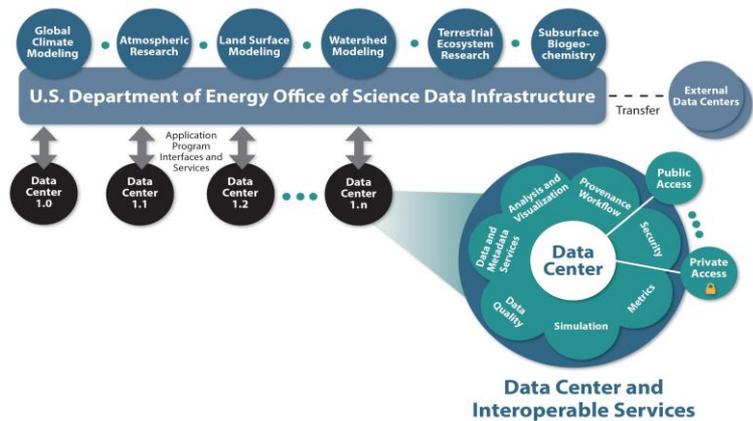
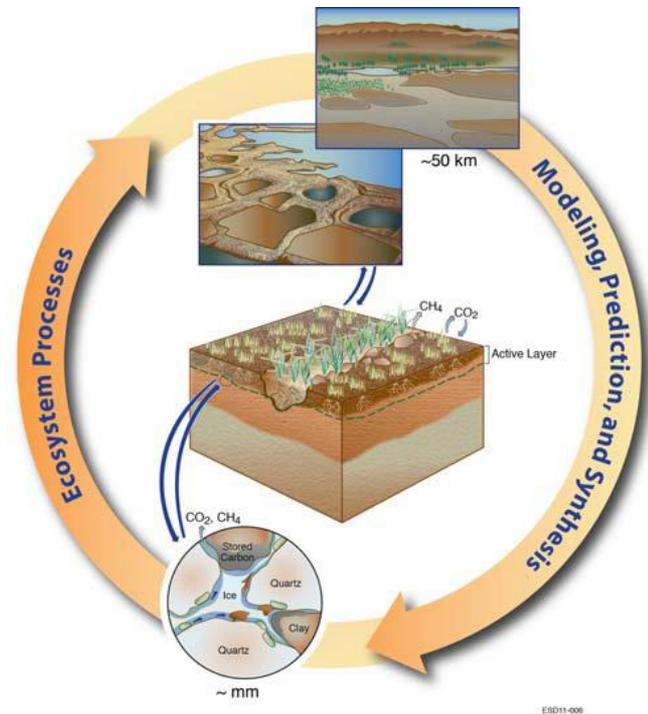
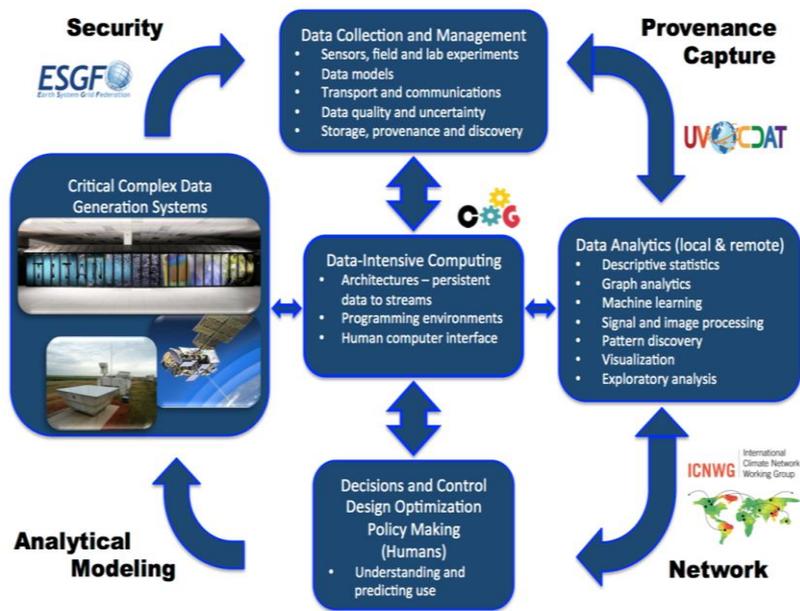
Workshop: August 29-30, 2016; Germantown, MD
Organizers: Jay Hnilo (CESD) and David Moulton (LANL, EC – Chair)
Participants: 10 participants representing Executive Committee, 7 DOE PMs

Motivation:

- *"the innovation most needed is a framework that allows seamless integration of multiscale observations, experiments, theory, and process understanding into predictive models for knowledge discovery"* (BERAC 2013)
- Exponential growth in the amount, variety and complexity of scientific data
- Significant fragmentation across projects and disciplines still remains
- A need for a data center that would be a foundational part of a community cyberinfrastructure



ESS Community Cyberinfrastructure and the Virtual Laboratory



Reconciling *different view points and emphasis into requirements* for a new data center and a phased approach to community-based cyberinfrastructure development.

Highlights from the Working Groups

- **Model Intercomparison and Benchmarks participation**
 - ▣ International Land Model Benchmarking (ILAMB) Workshop and Tools
 - ▣ Subsurface Environmental Simulation Benchmarking Workshop
 - ▣ 2nd Integrated Hydrologic Model Intercomparison Workshop
- **Community Outreach**
 - ▣ Proposed a session for AGU Fall Meeting 2018, “Computational Methods and Tools for Model-Data Integration.”
 - ▣ Breakout Session tonight “Building Community Testbeds for Modeling Watershed Systems” (Laura Condon, Xingyuan Chen)
- **Geospatial Science to Inform Land Surface Models**
 - ▣ Identify tools and resources for geospatial data analytics
 - ▣ Whitepaper (Mishra, Serbin, Wainwright, Kumar, Huang, and Chen)

Highlights from the Working Groups

- **Facilitate communication across projects**
 - MDI is conducting a google survey on workflows and model–data integration tools across the groups.
 - SEI Webinars to seed discussion and collaboration
 - Kickoff last week by Ryan Knox “Design and Developments of the Functionally Assembled Terrestrial Ecosystem Simulator (FATES)”
 - Regular (monthly?) videoconferences
- **Challenge: Finding Time to Meet and Collaborate**
 - Too many projects, time is fragmented/overcommitted
 - Doodle polls are no longer effective, nor are Fire Drills
 - ***Explore new ways to support interdisciplinary collaboration!***

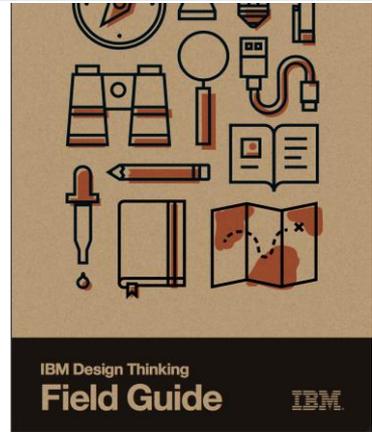
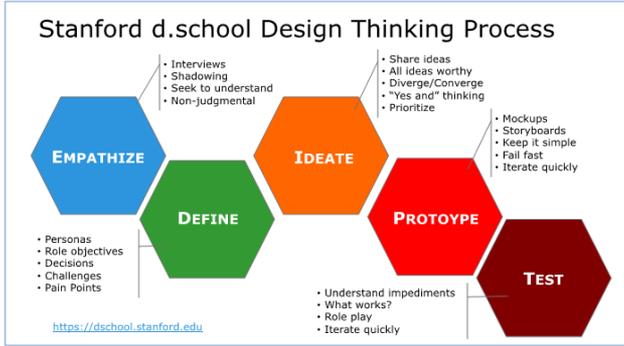
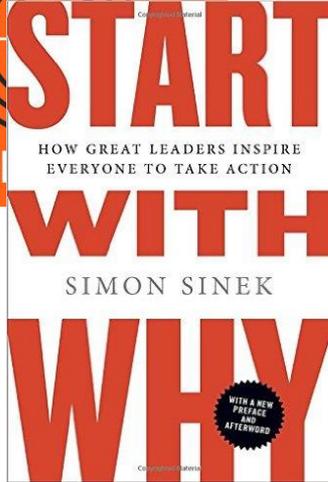
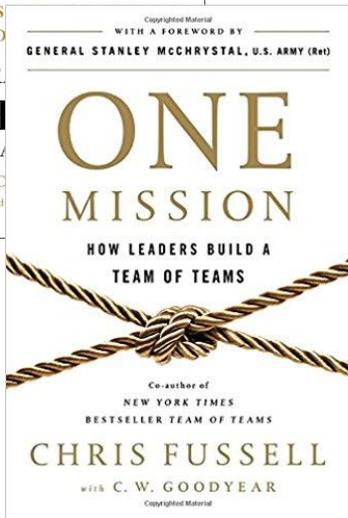
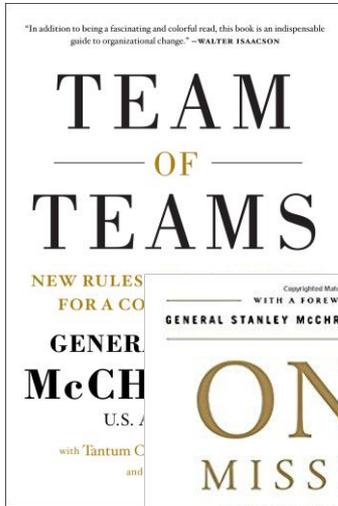
Working Groups Annual Meeting

Annual Meeting to be held on:

Monday preceding the ESS PI Meeting

- 50 participants, 7 BER PMs.
- A quick recap of recent activities
- ESS DIVE (Data Infrastructure for a Virtual Ecosystem)
 - ▣ Overview presentation and high-level design
 - ▣ Demonstration / Discussion
- Design Thinking Exploration Exercise for the ESS Cyberinfrastructure Working Groups.

Brainstroming...



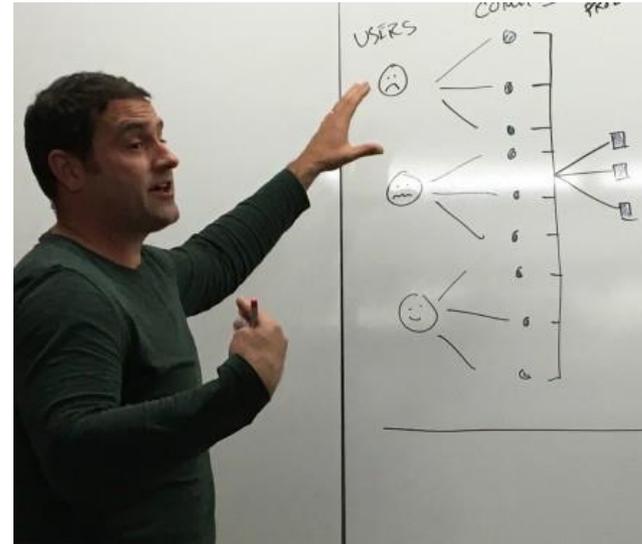
How do we tap into the passion and potential of the community, breakdown stovepipes, and empower interdisciplinary teams.

Team with experts ...



Kate Maher

Associate professor of Earth Science, Stanford
Geochemist, subsurface reactive transport



Matt Rothe

Co-founder of the FEED Collaborative and d.school fellow.
photo: Naomi Starkman

Create a customized 1-day (compressed) training course

Objectives and Logistics:

Use a human-centered and collaborative approach to:

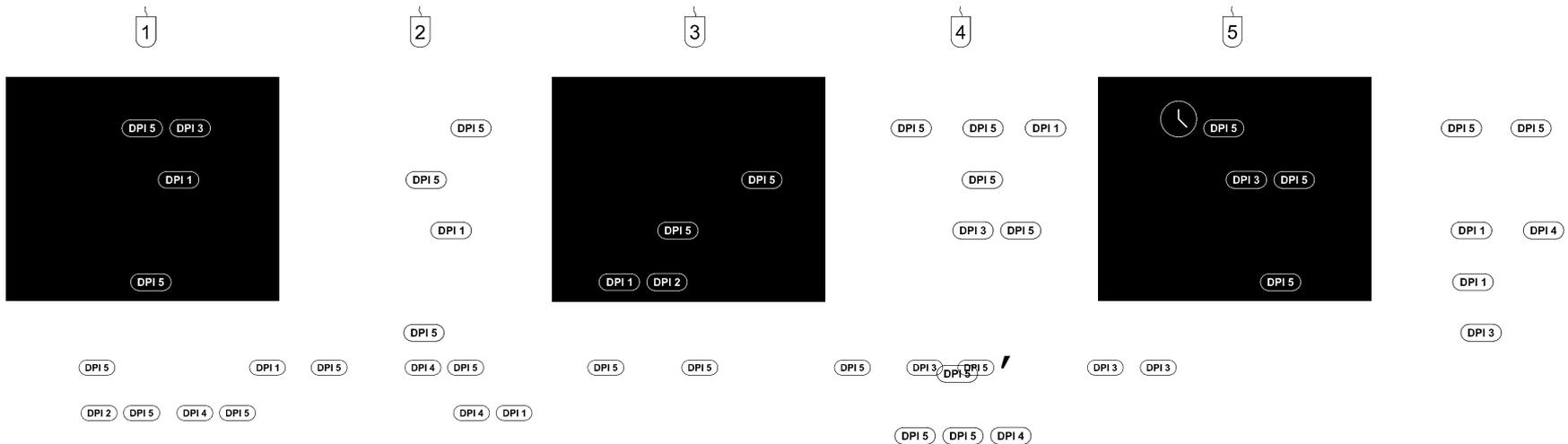
Identify and solve for research needs among relevant scientific communities to advance a predictive understanding of watershed and terrestrial systems.

Have fun along the way.

Approach:

- ▣ Identified 12 stakeholders with diverse backgrounds
- ▣ Created a team for each with diverse membership
- ▣ Jumped into to participate with an open mind

Roadmap ...



We were guided through these steps to develop our skills in communication, *empathy, listening, inference, framing/reframing*, and the collaborative process, to develop a product design for each stakeholder.

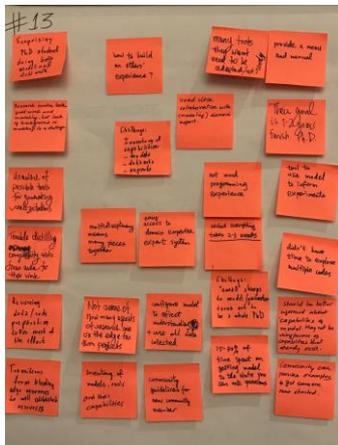
Highlights

Warmup Exercises

- ▣ Yes, but vs. Yes, and
- ▣ Empathy Goggles
- ▣ Listening with purpose (with empathy)



Interviews, exercises, inference, ..., product



Human-centered, collaborative:

Our stakeholder needs a way to ...

Solving this need should make them feel ...



Interesting, suprising, tense?

Products/Deliverables

A one page report from your team

- The *catchy title* of your idea
- The *stakeholder need* you're trying to solve
- The *big insight* that led to this need
- The *defining feature* of your idea
- The team's *shared objective* for collaborating to create the idea
- Aspects of *team leadership* that would enhance collaboration

Sample Product Titles

- Multi-Resolution Data Analysis Toolkit (MRDAT)
- Archive Acclaim (or Die)
- ModExHub
- Guardians of the data galaxy,
- Automated Analytics to Infinity (AAI)

Looking Ahead

- Leverage new human-centered skills to
 - ▣ improve communication within and across the working groups
 - ▣ increase collaboration/activity throughout the year.
- Explore potential of our “new products” to identify/motivate new priorities and activities
- Work closely with ESS-DIVE
- Continue community outreach



Questions?