CESD – ESS CYBERINFRASTRUCTURE WORKING GROUPS
Annual Meeting Highlights

J. David Moulton (LANL)

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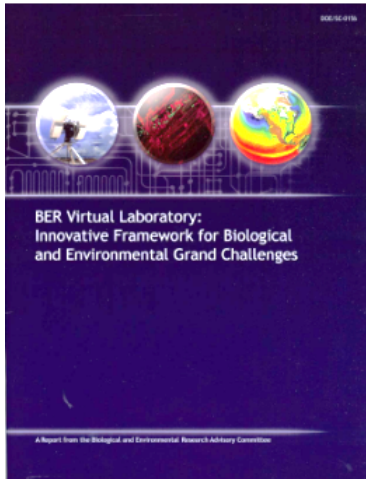May 1, 2018.

Outline

Recap and Highlights from 2017

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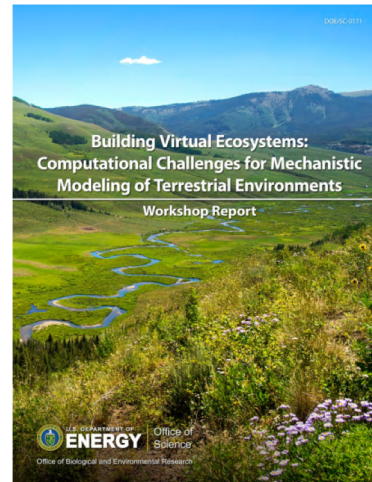- Activities

Annual Meeting (yesterday)

- Design Thinking Exercise?
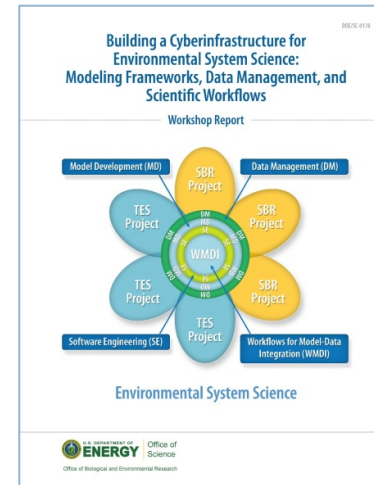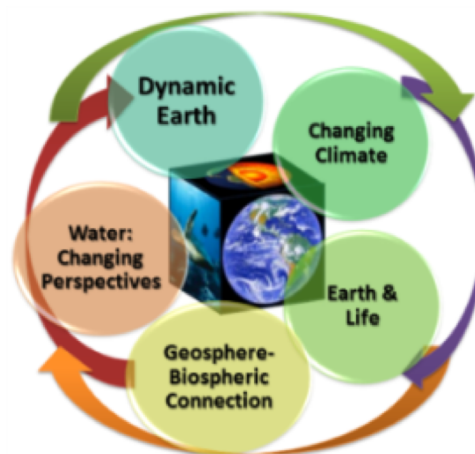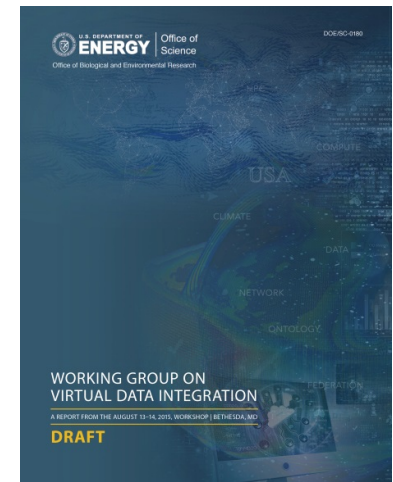- Plans for 2018.

Building Community Cyberinfrastructure …
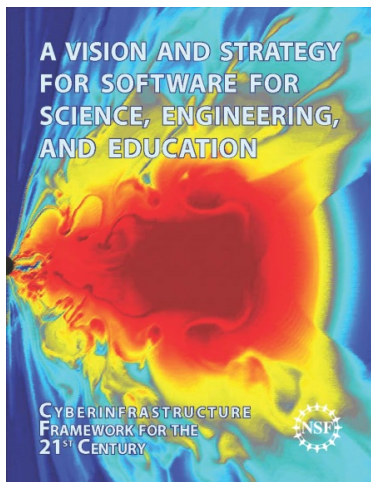
ESS Cyberinfrastructure Working Groups Structure

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
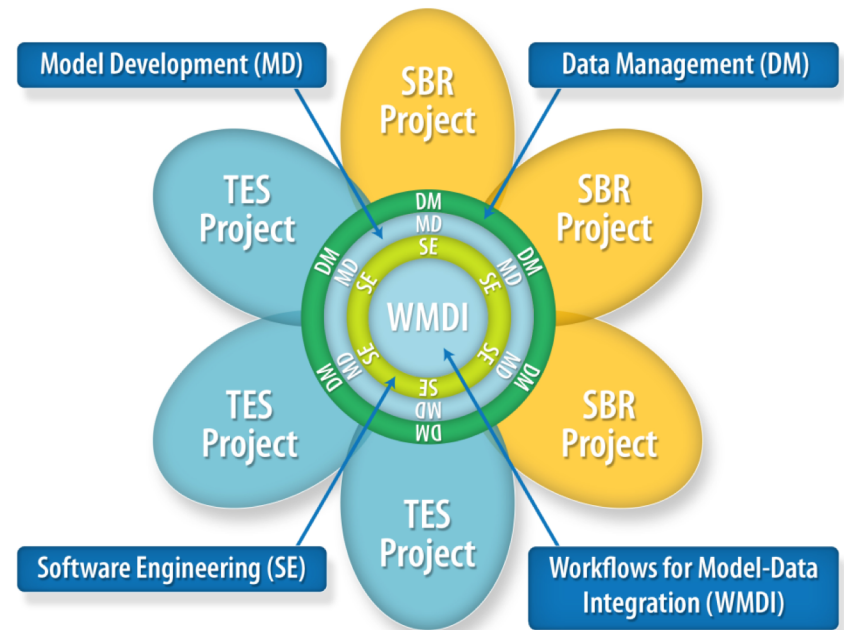
Environmental System Science

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

Towards a Shared ESS Cyberinfrastructure:
Vision and First Steps

Draft

Report from the ESS Executive Committee Workshop on Data Infrastructure
August 29-30, 2016.
DOE Headquarters, Germantown, MD

http://science.energy.gov/~/media/ber/pdf/workshop%20reports/Towards_a_Shared_ESS_Cyberinfrastructure.pdf

ESS Community Cyberinfrastructure and the Virtual Laboratory
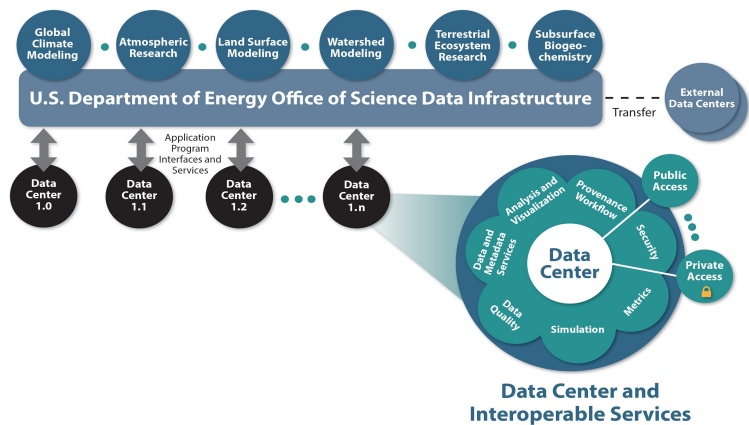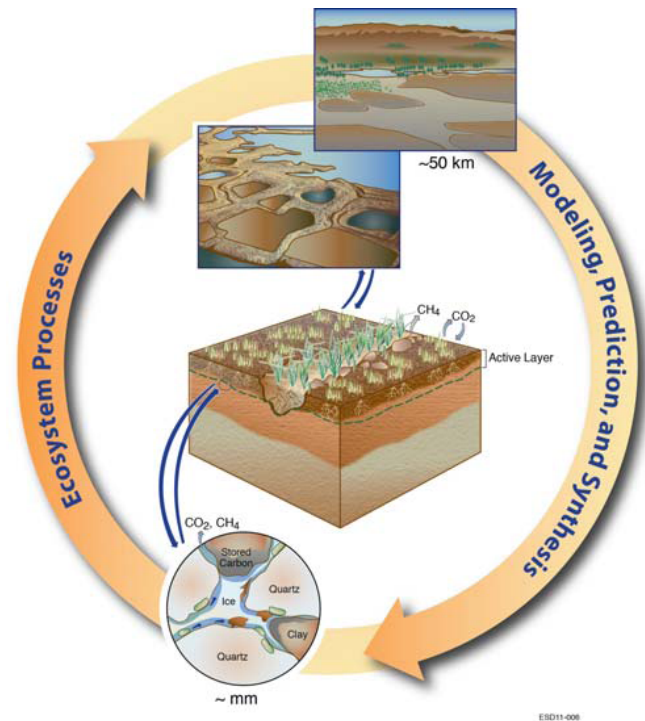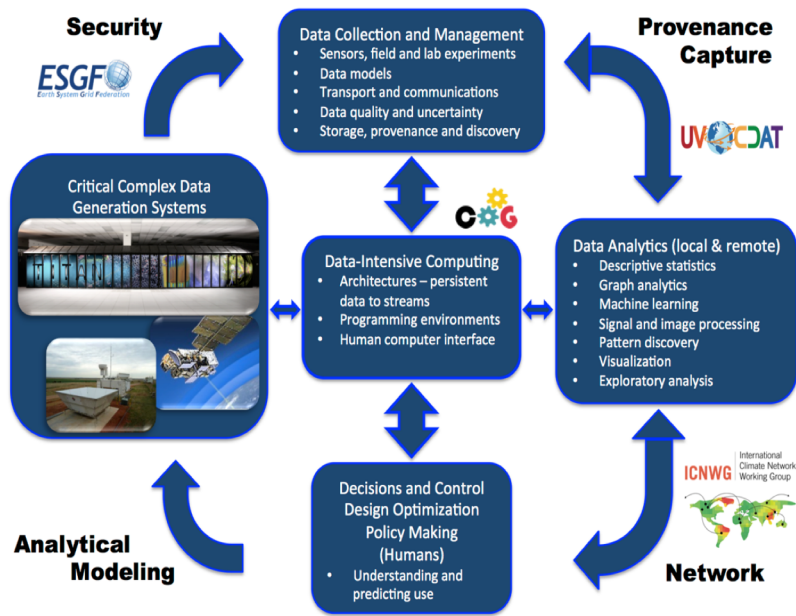
Reconciling *different view points and emphasis into requirements* for a new data center and a phased approach to community-based cyberinfrastructure development.

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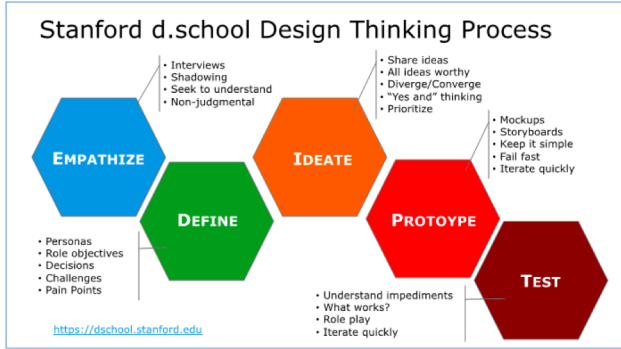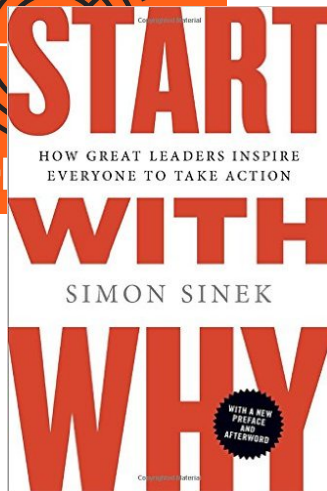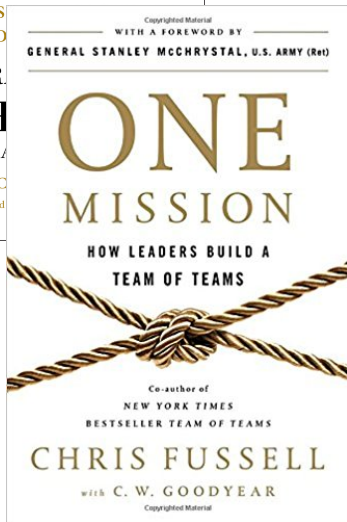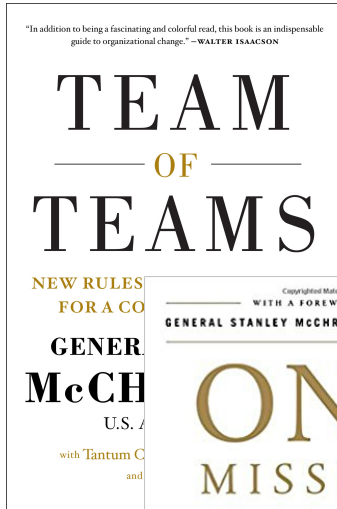
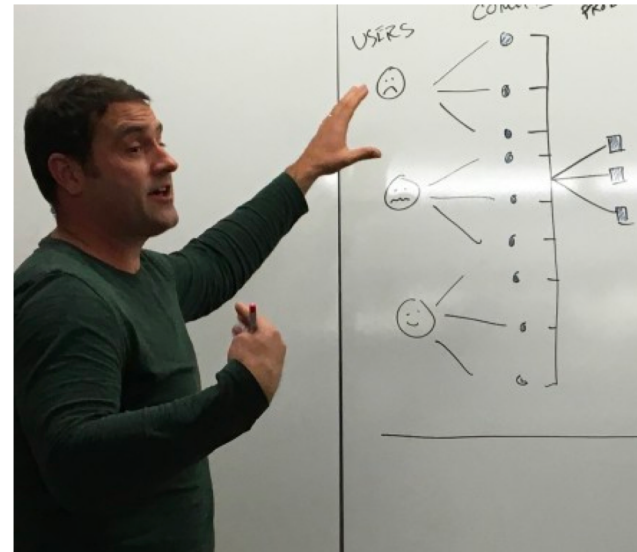**How do we tap into the passion and potential of the community, breakdown stovepipes, and empower interdisciplinary teams.**

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:

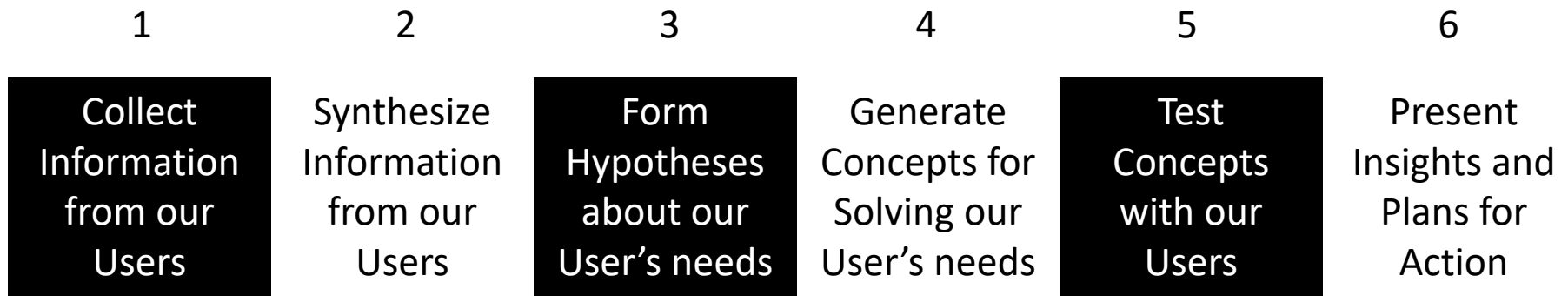Use a human-centered and collaborative approach to:

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 ...

1	2	3	4	5	6
Collect Information from our Users	Synthesize Information from our Users	**Form Hypotheses about our User's needs**	Generate Concepts for Solving our User's needs	**Test Concepts with our Users**	Present Insights and Plans for Action

*Users / Stakeholders = people in the scientific community for whom you will be designing today

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.
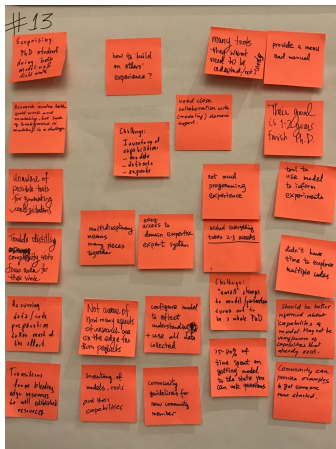
Highlights

Warmup Exercises

- Yes, but vs. Yes, and

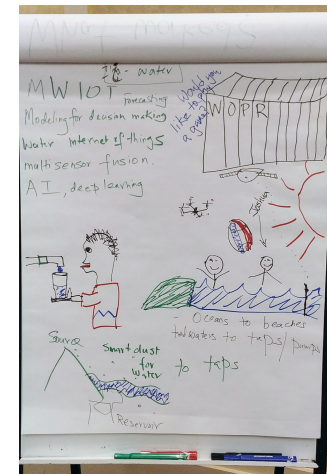- Empathy Goggles

- Listening with purpose (with empathy)

Interviews, exercises, inference, …, product

Interesting, suprising, tense?

Human-centered, collaborative:

Our stakeholder needs a way to …

Solving this need should make them feel …

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?