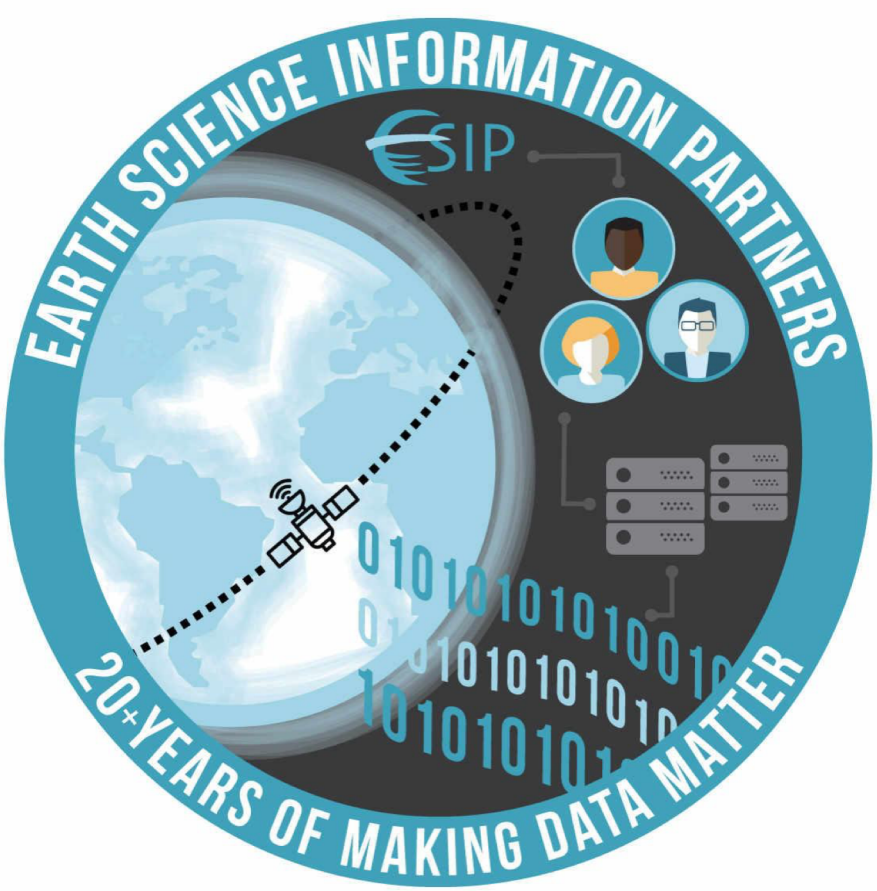
2019 Winter Meeting Highlights



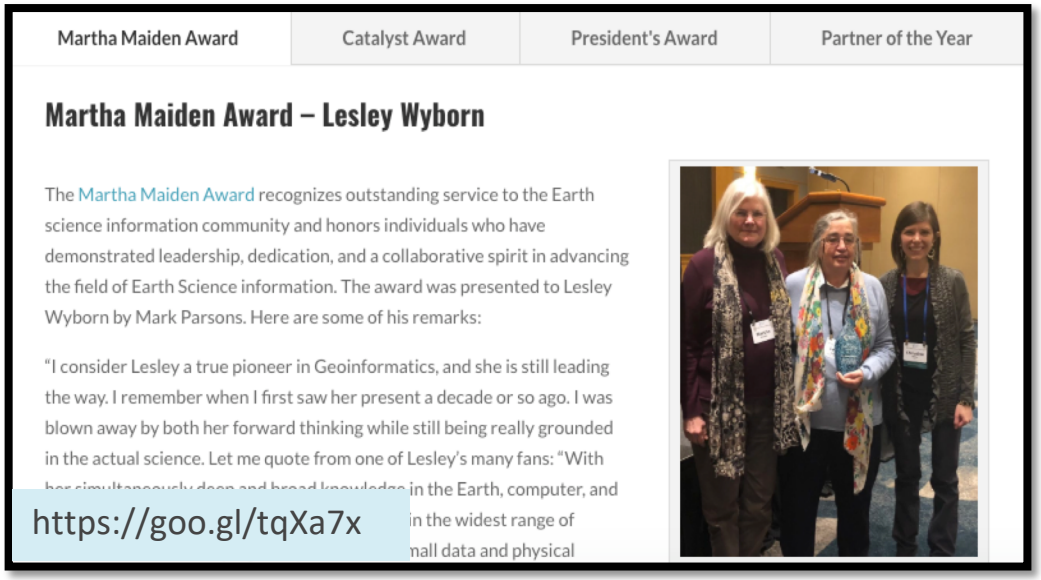
Thursday February 7th, 2019
12:00 PM ET

Agenda

- Welcome & Overview
- Plenary Highlights
- Session Highlights
- Community Fellow Perspectives
- Questions/Other Perspectives
- Close

Theme: Increasing the Use and Value of Earth Science Data and Information

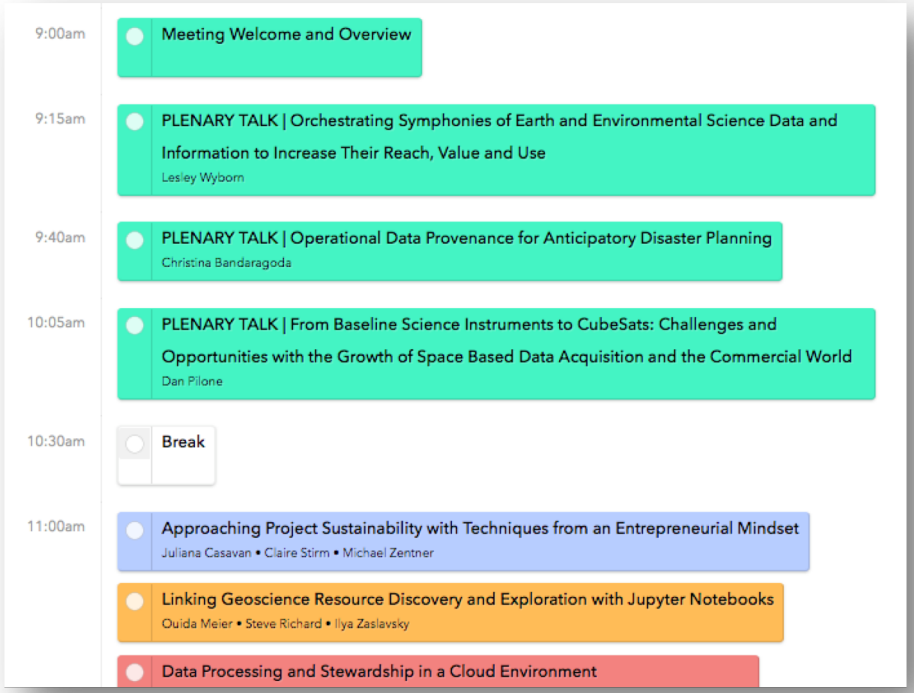
- 188 In-Person Attendees
- 6 Plenary Talks
- 34 Breakout Sessions
- 50 Posters
- 4 Peer Recognition Awards

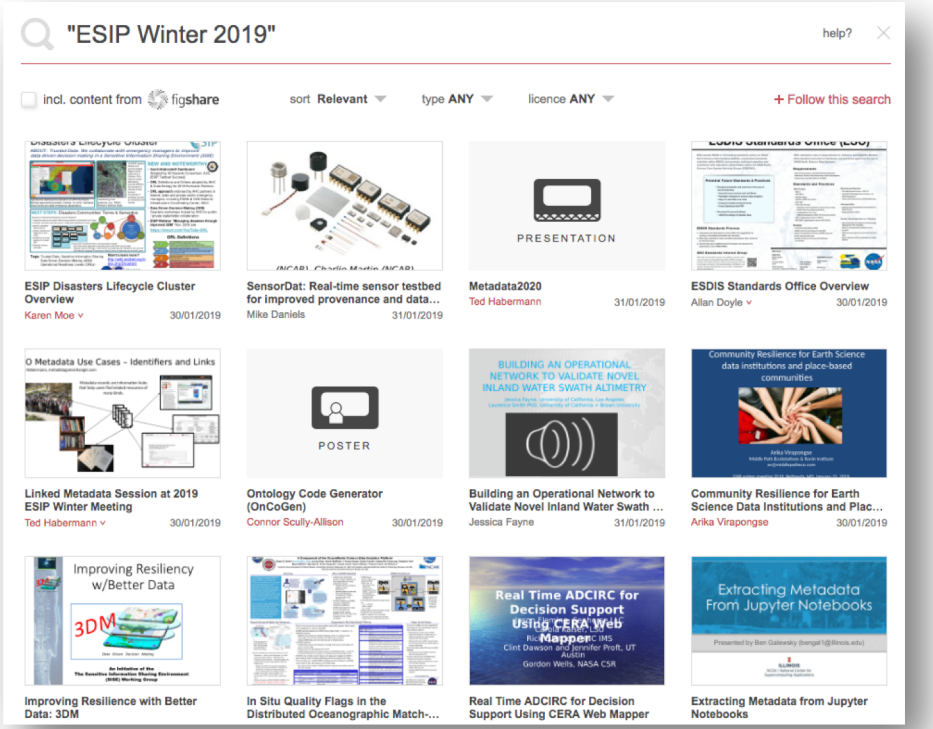


2019 WINTER MEETING

January 15-17, 2019
Bethesda North Marriott, Bethesda, MD

Find & Access Meeting Content





By Session:
https://2019esipwintermeeting.sched.com/

View Presentations:
https://esip.figshare.com/
"ESIP Winter 2019"

Plenary Highlights

Karl Benedict (ESIP President)
Mike Daniels (ESIP Vice-President)

Overview of Tuesday Plenary Presentations

Prepared by Mike Daniels
ESIP Vice President
National Center for Atmospheric Research

Day 1 PLENARY TALK: Orchestrating Symphonies of Earth and Environmental Science Data and Information to Increase Their Reach, Value and Use

Lesley Wyborn

lesley.wyborn@anu.edu.au

Key Takeaways

- Lesley's organization, Australia's NCI, received a large grant to fund a large data store to allow new interdisciplinary research.
- "The Geoscience community is like an orchestra, with each aspect of science bringing different sounds and harmonics, yet following the same musical score (i.e. standards)."
- Four primary sub disciplines in geoscience are: geochemists (strings), geophysicists (woodwinds), earth observationalists (brass) and geologists (percussion)
- Simon Cox developed the O&M Model (ISO19156), which became their musical score and described observations in terms of **procedure**, **results**, **observed property** and **feature of interest**.
- To implement standards, one must balance richness versus reach. AGU's Thriving Earth Exchange is a great exemplar of this balance. Collaborative organizations such as ESIP E2SIP, and the RDA Earth, Space and Environmental Sciences Interest Group are also promoting these ideas.

Day 1 PLENARY TALK: Operational Data Provenance for Anticipatory Disaster Planning

Christina Bandaragoda

cband@uw.edu

Key Takeaways

- NSF RAPID grant to better use earth data in environment of major disasters.
- A chief focus of research centered around the process of assessing water quality after a major disaster like a hurricane.
- Goal: understand ways to obtain comprehensive information to more people faster to find the “steps for operationalizing data provenance from the household to the public scales”.
- Primary cyberinfrastructure used, Hydroshare platform, allowed for a mixture of observational data and model data, all stored in one place.
- Mesh networks and effective social networking were also a key to success, especially when the disaster affected infrastructure.
- Four requirements to making data use more successful: 1) private risk reduction products for individuals, 2) anonymous products used for public decision-making, 3) trusted data quality control processes and communication and 4) trusted organizational management. The group has been sponsored for two ESIP lab projects, including the upcoming “WATERHACKWEEK”, March 25-29, 2019.

Day 1 PLENARY TALK:
From Baseline Science Instruments to CubeSats: Challenges and Opportunities with the Growth of Space Based Data Acquisition and the Commercial World

Dan Pilone

dan@element84.com

Key Takeaways

- CubeSats: small satellites that conform to strict specifications (e.g. size & weight) of a class of satellites known as “nanosatellites.” See cubesat.org.
- CubeSats lower barriers of building and deploying satellite systems so that university departments can more easily enter this area of research and instrumentation.
- Launches of CubeSats have shown marked increases since 2013, with over 500 launches expected in 2019. Increases are primarily driven by commercial interests.
- A whole new set of industries has risen out of the CubeSat revolution including “ride sharing” (spaceflight.com), inexpensive satellite instrumentation (cubesatshop.com), remote command and control (AWS groundstations) and data collection (cubesatdata.com)
- Some implications of this technology are 1) much more agile satellite development, 2) democratization of outer space science discovery, 3) data privacy issues, 4) increased space debris (from 8,000 pieces being tracked to 18,000 pieces) and 5) more data!

Overview of Thursday Plenary Presentations

Prepared by Karl Benedict
ESIP President
Director of Research Data Services, University Libraries, UNM

Overview

- **Tom Arrison** – The National Academies of Sciences, Engineering, and Medicine – *Open Science at an Inflection Point*
- **Mark Parsons**, Chelle Gentemann, and National Academies of Sciences, Engineering, and Medicine Committee – Rensselaer Polytechnic Institute – *Open Source software Policy Options for NASA and Space Sciences*
- **Heather Joseph** – Scholarly Publishing and Academic Resources Coalition (SPARC) – *Exploring the Role of Journals in an "Open" Future*

Overview of Thursday Plenary Presentations

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Director of Research Data Services, University Libraries, UNM

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Heather Joseph – Scholarly Publishing and Academic Resources Coalition (SPARC) – *Exploring the Role of Journals in an "Open" Future* (recording)

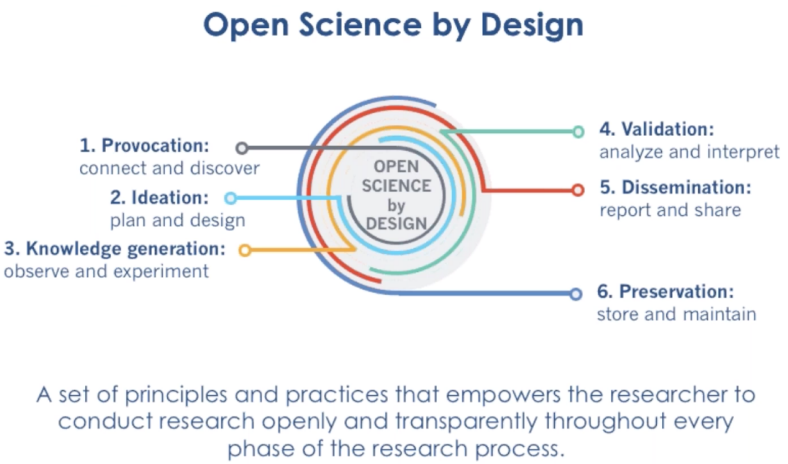
Tom Arrison – *Open Science at an Inflection Point?*

Introduced *Open Science by Design Project* performed by BRDI

Recommendations:

- Building a Supportive Culture
- Training
- Ensuring long-term Preservation and Stewardship
- Facilitating Data Discovery, Reuse, and Reproducibility
- Ongoing Need to Develop New Approaches to Foster Open Science

Posed the question of whether we are at an "Inflection Point" in the adoption of Open Science practices



Mark Parsons – *Open Source software Policy Options for NASA and Space Sciences*

NASA commissioned report from NAS

Recommendations:

- Build a community norm
- Training and education around legal requirements
- Support for infrastructure
- Support community libraries
- Foster credit culture
- Move from incentives to mandates
- Avoid unfunded mandates

In the long run "Foster OSS as a norm"

Heather Joseph – *Exploring the Role of Journals in an "Open" Future*

Scientific Communication is the thing we should focus on not publishing

Open Access is an **enabler** of the key goals of

- Accelerated research
- Enriched education
- Shared learning
- Maximizing the value of literature
- ➔ Uniting humanity in a common intellectual conversation

An open ecosystem that is enabled and controlled by the community of Funders, Libraries, Institutions, and Societies

This is already happening …

"An old tradition and a new technology have converged to make possible an unprecedented public good…"

"This will accelerate research, enrich education, share the learning of the rich with the poor and the poor with the rich, make this literature as useful as it can be, and lay the foundation for uniting humanity in a common intellectual conversation and quest for knowledge."

Budapest Open Access Declaration - 2002

Take Away Points

- ”Open” is a broadly shared value and intent
- It is not easy and will take work
  - Investment of effort and resources
  - Culture Change
  - Organizational Change
  - Policy and Legal Frameworks
  - Requires diverse input
- We have an increasing understanding of the challenge, now we need to dive and start doing the work

We need to take the long view because this is not going to happen quickly

Session Highlights

A series of 2 minute lightning talks from breakout sessions

Approaching Product Sustainability with Techniques from an Entrepreneurial Mindset

SGCI GIVE AWAYS:

- A science gateway is an online locus connecting instruments / data sets with scientists who author tools for analysis with massive audiences that use those results
- The SGCI is a service organization available to all US federal funded projects
- Some of our offerings are not technical, but instead focus on business issues in running a science gateway, one of which is a 5 day intensive workshop event
- ESIP members have realized value in attending

ESIP TAKE AWAYS:

- The SGCI provides a gateway catalog of gateways related to teaching, research, and learning
- SGCI hosts a 5 day Science Gateways Bootcamp which is a 5 day bootcamp to help participants develop the framework for: generating pitches, developing communication skills, bringing an idea to fruition, selling the idea, setting goals, and producing deliverables
- Bootcamp pitches aim to service the needs of a variety of communities (ex. teachers, crop map stakeholders, ESIP, repositories, and data providers) improving data accessibility and usability within these communities

Presented by Mike Zentner
ScienceGateways.org

Science Gateways Community Institute

Data to decisions provenance (d2dprov) for climate resilience

tinyurl.com/d2dprov2025vision

Problem Statement
(e.g. one page human-readable text)

Chesepeake Bay... water quality impediment... impacts oyster fisheries... runoff from chicken agriculture... extreme precipitation patterns expected to exacerbate runoff... we are charged with proposing green and gray infrastructure to reduce nutrient loads in aquatic ecosystems, reduce runoff, and increase aquatic biodiversity

Concept extraction and knowledge mapping service capable of modeling causality along the data-to-decision value chain ("Genome Assembler")

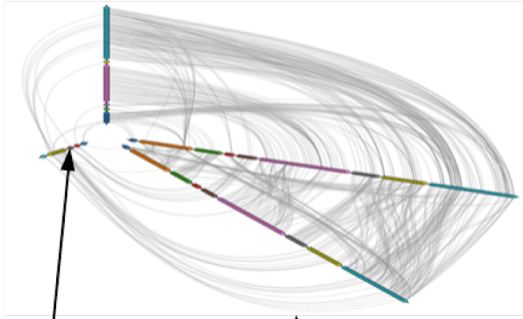
Search against

Knowledge Graph Repository ("Genome Library")

Hits returned

Potential solutions ("hits") are ranked ordered for goodness-of-fit to the problem statement as "Resilience Genomes"

Planners pick Genome(s) for editing



Problem Statement

Three candidate Genomes are displayed. Genome goodness-of-fit may be determined by how each Genome relate to each other and the problem statement

Planners edit genomes (cut, paste, tweak), submit evolved Genomes to repository

Document repositories

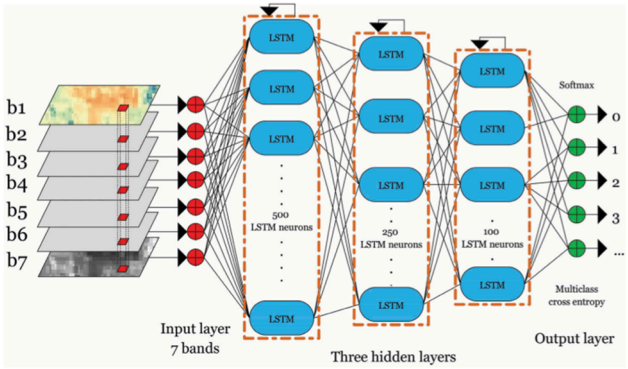
Genome Assembler crawls and indexes documents from the US CRT and Record of Decision (ROD) repositories.

Updates Genome Library

ESIP Lab Project Members: Brian Wee, Tom Narock, Nancy Hoebelheinrich, Arif Albayrak, Bill Teng

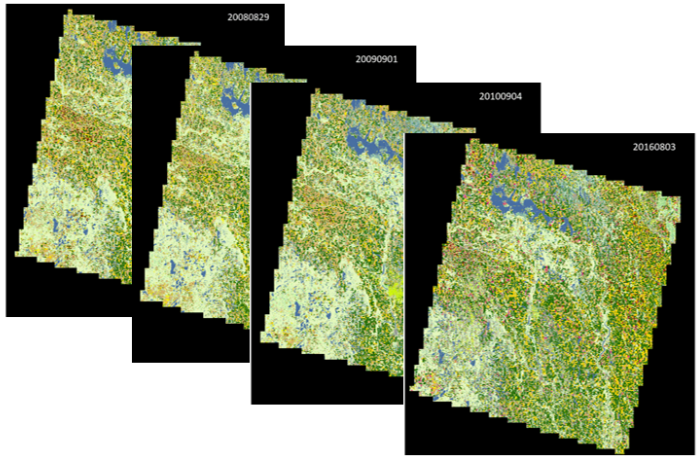
Exercising Deep Learning Technique on Earth Datasets for Agriculture

Ziheng Sun, Liping Di, Annie Burgess



Goal:

- Carry out a discussion on the research areas, technical details, data sources, and performances of deep learning in agriculture.
- Toward a common strategy to connect and prepare Earth datasets for the training/testing of customized deep neural networks to help advance agricultural researches into next level: intelligent agriculture.



Session Takeaways:

- The workflow of deep learning: gather data > choose network type > choose DL library > find powerful hardware > data preprocessing > training > predicting > validation. This workflow can be used in all three aspects of agriculture: monitoring, predicting, and decision making.
- The quality of crop information in the training datasets is the key to a successful model.
- The trained models have restrictions in time and location.
- ESIP machine learning cluster and ESIP Github are great platforms and tools for these efforts happen.

Get Involved:
Check out our ESIPLab
Geoweaver project
Contact: zsun@gmu.edu

(Ag+Climate) Soil Data

Scaling **UP** and **OUT** Knowledge

Location, Spatial, Temporal, Multiple Uses

Why Care??

Production
Mitigation

Adaptation
Resilience

Tradeoffs / Cobenefits: easy & targeted data deposition vs reuse for multiple purposes?

Food

Food and livelihood security

Increasing yields, improving adaptability

Climate

Greenhouse gas emissions

Carbon sequestration

Terrestrial

Land use and land cover change

Biodiversity loss, Soil Health, Erosion

Water

Eutrophication of waterbodies

(sediment and nutrient runoff)

Irrigation / Water-use

Challenge points in Soil Data research lifecycle or infrastructure

technical and social in data: collection, formats, standards, metadata, computational/analytical tools and techniques, vocabularies, repositories…

Initiatives for Soil Data integration

communities of practice, technologies, analytics, databases & information systems

Future Directions

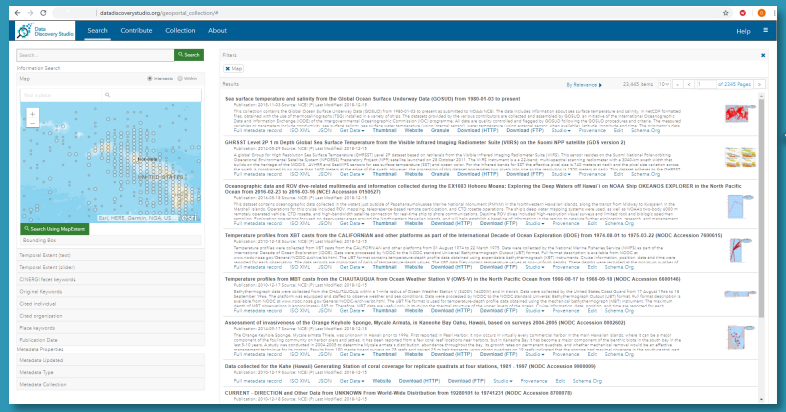
Research Data Alliance: Soil Data WG / IGAD & GOAT Ag Data Hackathon in April, ESIP Summer & beyond!

ESIP Ag & Climate Cluster:
Chris Beltz, Bill Teng, Nancy Hoebelheinrich
Lindsay Barbieri (Bar) lkbar@uvm.edu @barbieriiv

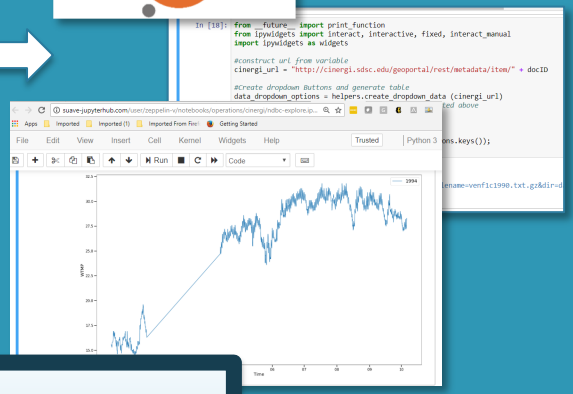
Linking Geoscience Resource Discovery and Exploration using Jupyter Notebooks: *the EarthCube Data Discovery Studio*

Data Discovery Studio

Ilya Zaslavsky, Stephen Richard, Ouida Meier



jupyterhub



Find the Data You Need!

- 1.67 million records from 40+ data repositories and EarthCube contributions
- Search by map, time extent, text
- Automated semantic enhancement and indexing
- Provenance tracing
- Metadata validation and editing
- Ontology-based faceted search
- ISO 19139 and schema.org markup
- Connect to several JupyterHubs for additional analysis
- Contribute resources
- Assemble resource collections

NEW

Data Discovery Science Competition

Category 1: assemble a collection of resources for a research question or community

Category 2: contribute a Jupyter notebook for a process or new resource type

Details at **bit.ly/ddscompete** -due **May 1, 2019**

datadiscoverystudio.org

datadiscoverystudio@gmail.com

Data Processing and Stewardship in a Cloud Environment

- Cloud environments can create lots of complexity in governance, data security, and financial management, but also create an easier environment for managing and using petabyte-scale data archives across the Earth Sciences.
- It's never too early to think about cost and security when developing in the cloud.
- Data stewardship is important to consider when maintaining an archive in the cloud.
- Considering how organizations control access to cloud components is crucial for building a productive data-management workflow with AWS, while protecting from errors and data loss.

Peter Plofchan
Peter.G.Plofchan@raytheon.com

Lauren Frederick
lauren@element84.com

GCMD Keywords Management Process and Lifecycle

Tyler Stevens

Goals/Highlights:

- Conveyed the Global Change Master Directory (GCMD) keyword management and governance process.
- Discussed how the GCMD keywords are reviewed through the NASA's ESDIS Standards Office (ESO).
- Highlighted how users can influence keyword additions and modifications.
- Had a question/answer/discussion session about the keywords.

Session Takeaways:

- GCMD keywords are used by numerous national and international organizations and continue to evolve based on yearly reviews and contributions by the science community.
- There is an interest in normalizing measurement terms in the GCMD KMS for the UMM-Var model.
- There are some gaps in the keywords, especially within biology that needs to be addressed. The GCMD team will be getting input from subject matter experts in that area.

Get Involved:
Check out the GCMD Keyword Page at:
https://earthdata.nasa.gov/about/gcmd/global-change-master-directory-gcmd-keywords
Contact: support@earthdata.nasa.gov for more information.

NASA Metadata Models and Standards Round-Table

Tyler Stevens, Erich Reiter, Joe Rincione

Goals/Highlights:

- Provided updates on the UMM models (Collections, Services, Variables, Granules)
- Facilitated a discussion on UMM models, answered metadata questions from users, and gathered feedback for future improvements to the models based on user needs.

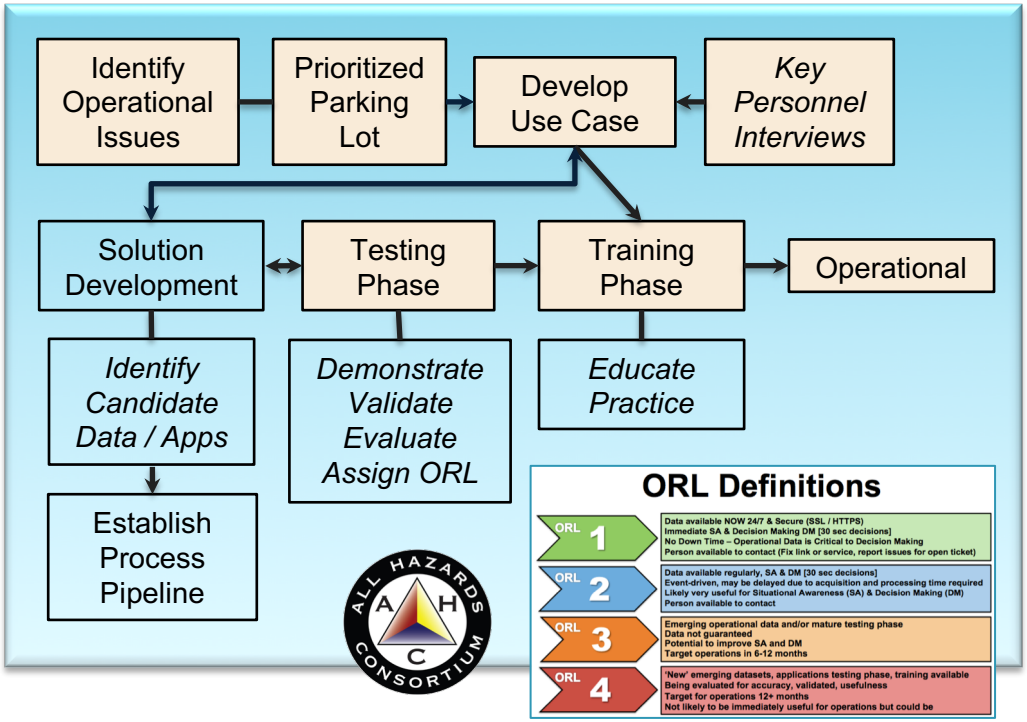
Session Takeaways:

- The UMM models are continuing to evolve based on user needs and mission requirements.
- There should be a regular schedule for UMM releases.
- Communication of the UMM model changes and releases will be made more transparent going forward.
- There is discussion of potentially refactoring UMM-S to separate out tools and services.

Get Involved:
For more information on the UMM models, see https://wiki.earthdata.nasa.gov/display/CMR/CMR+Documents
Contact: support@earthdata.nasa.gov for more information.

Maturing Operational Readiness Levels – ORL Framework for Disasters Applications

- ***Trusted Data*** is defined through **partnerships** with emergency managers to improve data-driven decision making in a Sensitive Information Sharing Environment
- ORL defines 4 levels of **readiness**, i.e. usefulness and trust **per Use Case**
- Goal is to restructure processes into a **repeatable framework**, i.e. capture the underlying concepts about trusted data to support decision makers in specific situations
- Key component is a **communications model** to capture **user terms** in their words



Key Ideas to building trust

- Align with Partners
- Listen to their Issues
- Understand their Use Case
- Offer Solutions
- Test within their Trusted Environment
- Usability is key

Get Involved – **Disasters Lifecycle Cluster**
GoToMeeting Monthly 1st Thursdays @4 ET
http://wiki.esipfed.org/index.php/Disasters
Karen.Moe@NASA.gov Co-Chairs
Dave@StormCenter.com Dave Jones

Marine Data Cluster

Chris Olson

NetCDF-CF Compliance

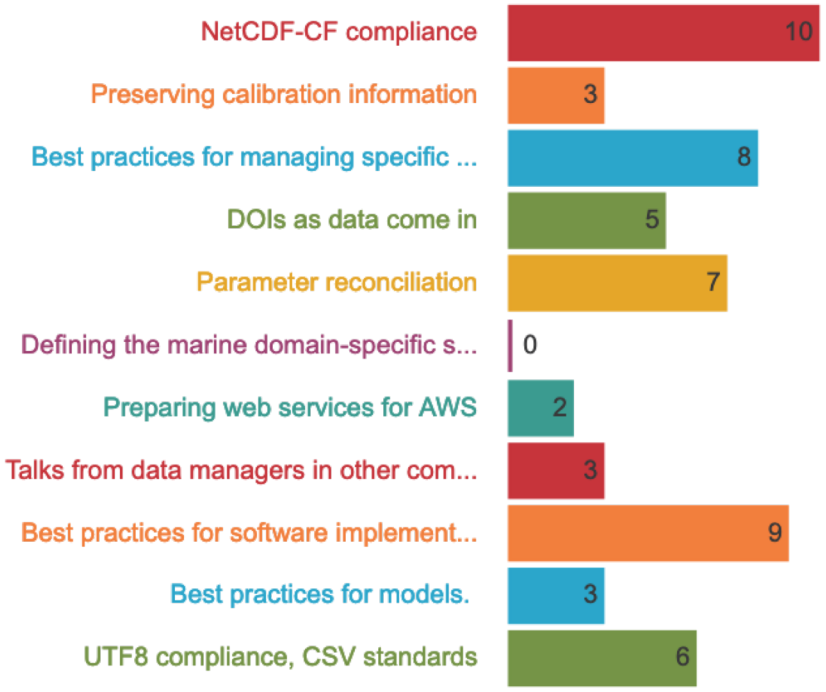
- Compliance checkers
- Rosetta tool for converting CSV to netCDF-CF
- Parameter reconciliation

Best Practices for Software Implementation

- Version control systems
- Preparing web services for AWS
- Data Servers (ERDDAP, THREDDS)
- Linked data, linking versions

Best Practices for Managing Marine Data Types

- 24 Hz CTD data
- Transmissometer and fluorometer
- NCEI netCDF decision tree
- Storing and sustaining best practice resources



Get Involved:
http://wiki.esipfed.org/index.php/MarineData
Join the mailing list:
https://lists.esipfed.org/mailman/listinfo/esip-marinedata
Next Meeting: Feb 14, 2019 at 10:30 PST

Community Resilience for Earth Science data institutions and place-based communities

Arika Virapongse, Middle Path EcoSolutions

Goal of the session

To introduce and scope out our new Community Resilience cluster of ESIP, which aims to:

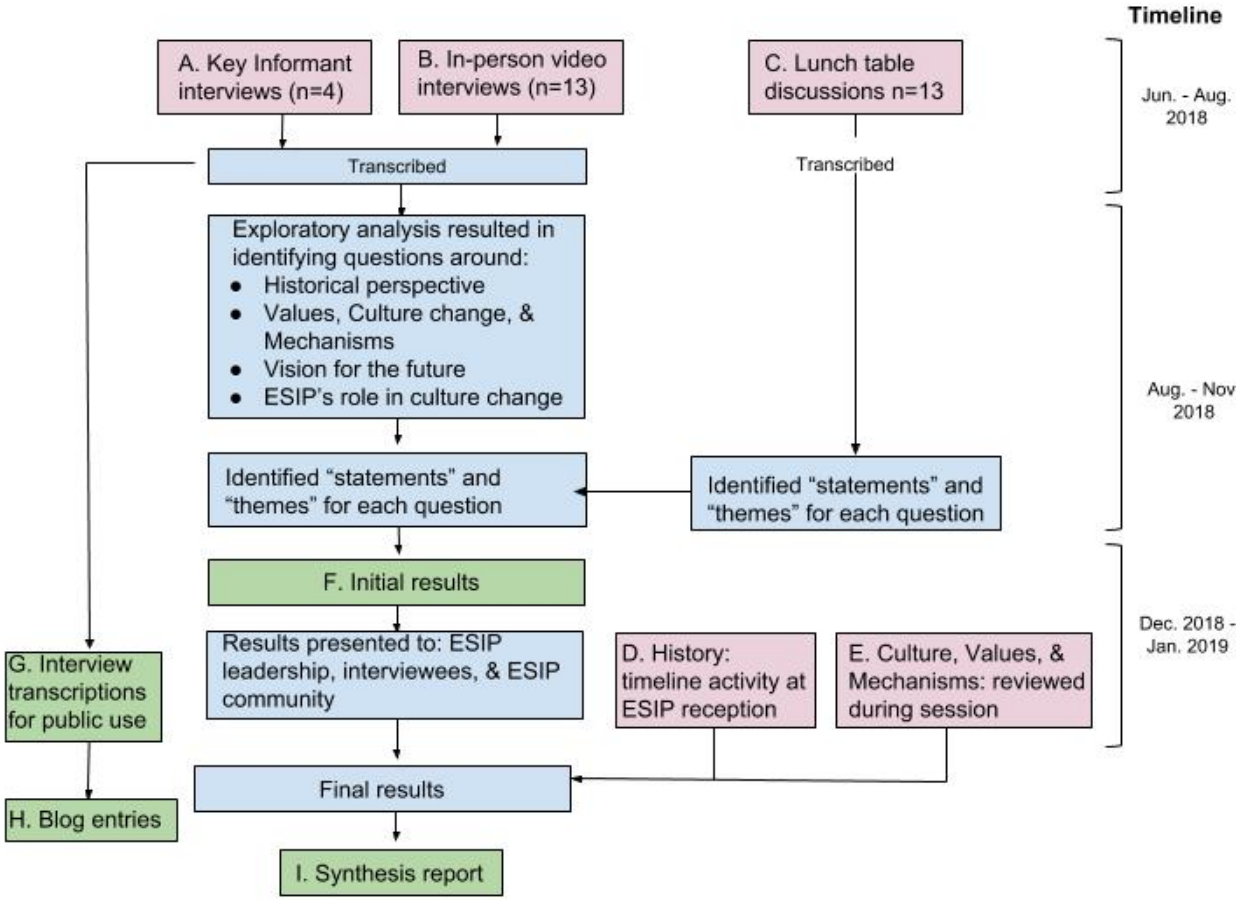
Enhance community resilience through culturally meaningful improvements to data accessibility and informatics tools.

- Jonathan Blythe, BOEM: **An institutional perspective on community resilience and the role of data in federal decision making**.
- Lauren Showalter, The National Academies of Science, Engineering, and Medicine: **Large scale data management and its role in improving community resilience in the Gulf of Mexico**
- Rupu Gupta, New Knowledge: **Balancing data & community needs in collaborative resilience efforts**
- Natasha Udu-gama, Thriving Earth Exchange, AGU: **Data Sharing & Management for Community Resilience: Insights from Community Science**

Get Involved:
Join our Community Resilience Cluster!
Contact:
av@middlepatheco.com

Making Data Matter: Results from the ESIP Community

Arika Virapongse, Middle Path EcoSolutions



D. History timeline

Get Involved:
Check out our upcoming ESIP blog series!
Contact:
av@middlepatheco.com

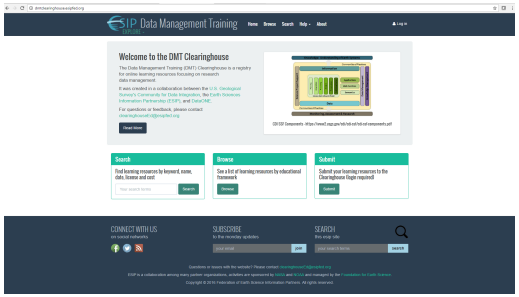
Evolving the Editorial Policies & Practices of the Data Management Training Clearinghouse: A Working Session

Original Session Goals:

- Provide (equivalent to) online training to community volunteers who wish to *submit* and/or *review* descriptions of educational resources to the DMTC using existing:
  - Selection Criteria
  - Tutorial for Submitting Descriptions to the DMTC with suggested workflow
  - Metadata input form
- Gather feedback from participants on their experiences using the Selection Criteria & submission tools
- Seek interested participants / collaborators

Takeaways from discussion of Selection Criteria using surefire & edge cases:

- Keep different learning styles in mind when choosing resources to add to the Clearinghouse
- Encourage evaluation / description / addition of information about accessibility features for those who are visually or otherwise challenged
- Broaden our understanding of "uniqueness" of a resource to include interesting or memorable ways to present information about a concept/skill even if the concept/skill is already amply covered.



http://dmtclearinghouse.esipfed.org

Takeaways from our quest for interest:

- (At least 3) Potential participants interested in our Metadata Enhancement and Assessment Framework Working Groups, and our Editorial team!
- **Always looking for others!**

Contacts for questions, interest, submissions:
Nancy J. Hoebelheinrich (nhoebel@kmotifs.com)
Karl Benedict
(kbene@unm.edu)

Triage in the Data Ward: A collaborative working session for developing a data rescue decision framework

Presenters: Denise Hills, Steve Diggs, Simon Goring, Matt Mayernik, and Reid Boehm

Link to session notes:
https://goo.gl/31au5w

TAKEAWAYS:

- Sharing data rescue STORIES (e.g., the process; what was enabled; financial benefit) will be necessary to get the essential support for data rescue efforts
- Coordination with aligned groups is key to be sure that effort is not duplicated and that efforts are complementary
- Harnessing Code for America style-infrastructure to pair motivated people with relevant skills to the opportunities to participate in data rescue efforts could be a good model to identify data heroes / minions within the data nomination tool
- Recognition (such as a data rescue award, or even in small ways, such as a t-shirt or other shout-out) can go a long way to encourage volunteer / citizen scientist data rescue efforts

Want to know how to delight your repository users? - Usability can help!

Tuesday, January 15 • 2:00pm - 3:30pm

Sophie Hou, NCAR

Goal: Allow attendees to have the opportunity to -

- **Learn** about the **techniques** that can be applied to a data repository
- **See** evaluation **examples and results** from DASH
- **Practice** how to evaluate the usefulness of a data repository by using the newly created DASH Repository as the test case

Takeaways:

- Usability testing helps in creating useful software by involving targeted users.
- There are usability techniques available and compatible for all stages of repository design and implementation lifecycle.
- Developers have to juggle with a lot of issues. Team members can help by communicating usability issues and trade-offs with developers.

Citations – Software, Data and Research Objects

Jessica Hausman

- Software Citation Guidelines endorsed and published at: https://doi.org/10.6084/m9.figshare.7640426
- Citations Guidelines cluster revisiting the data citations
- Research Object Citations session
  - Presentations on what are research objects, FORCE11 software citation implantation group, physical samples/IGSN2, Digital Object Identifier Protocol (DOIP)
  - Good discussions on the research significance of those different types of objects and why it's important to those specific communities
  - Software and Services Citation cluster will be merging with the Citation Guideline cluster to go broader and address research objects

Get Involved:
Join the Citation Guidelines mailing list:
https://lists.esipfed.org/mailman/listinfo/esip-citationguidelines

Council of Data Facilities General Assembly

- Shared infrastructure survey results
  - Most data centers are interested in shared hardware infrastructure and coordinating cybersecurity
  - Will do a workshop to discuss technical requirements for the shared infrastructure and see about collaborating with Jetstream or XSEDE, hardware or cloud
- ESSO report on p418 GUI, need a way to integrate JSON-LD and accept new datasets
- P419/GeoCODES, p418 done right
  - goals: integration of services, extensions of detailed metadata, scale up
- Enabling FAIR data project ends in February, but will remain active through COPDESS
- COPDESS wants guidelines to assess quality of data, metadata, and domain standards
- CTS certification, those who expressed interest should have been contacted
- EarthCube Office proposals due Feb. 28, Core due March 14

https://www.earthcube.org/group/council-data-facilities

Community Fellow Perspectives

COLLABORATION

SOIL DATA

Ellie Davis

Join the Agriculture & Climate Cluster

Wiki:

http://wiki.esipfed.org/index.php/Agriculture_and_Climate

Mailing List:

https://lists.esipfed.org/mailman/listinfo/esip-agclimate

Data discovery in ecological modeling

Zachary Robbins

Background: At the Dynamic Ecosystems and Landscapes lab, we synthesize many data sources into ecological models.

The main points my lab group and I discussed:

- Improving programmatic ways to address data discovery (using an R or Python notebooks).
- The implementation of linked geospatial data as a way to streamline data discovery
- Discovery of metadata and metadata updating metadata using Jupyter notebooks.

  The idea of a smart hand off and working to improve how our lab works implements it with model outputs.

https://www.esipfed.org/collaboration-updates/arranging-the-orchestra-of-data

zjrobbin@NCSU.edu
ZJRinthewoods

Machine Learning for Earth Science

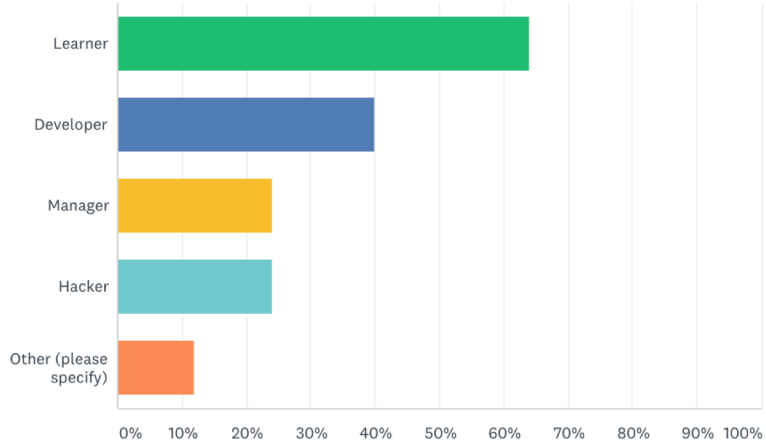
Yuhan Rao

Motivation:

- Inform the community about the cluster; (***We are new!***)
- Gather ESIP community input/idea about machine learning (ML);
- Strategize ML cluster's effort that are valuable to ESIP community;

Regarding machine learning, what roles do you play? (check all

Answered: 25 Skipped: 0



Takeaways:

- Strong community interests at different levels (beginner, user, developer, manager etc.);
- ML application requires domain knowledge and ML knowledge;
- Two potential foci:

1) Overview/general ML training (for Earth and space sciences);
2) ML recommended practices & standards;

Get involved with ML Cluster

Wiki:
http://wiki.esipfed.org/index.php?title=Machine_Learning
Mailing List:
https://lists.esipfed.org/mailman/listinfo/esip-machinelearning
Next meeting 2/15 12PM ET

What role does ESIP play in communicating to the non-scientific data community?

How should ESIP balance technical prowess and accessibility?

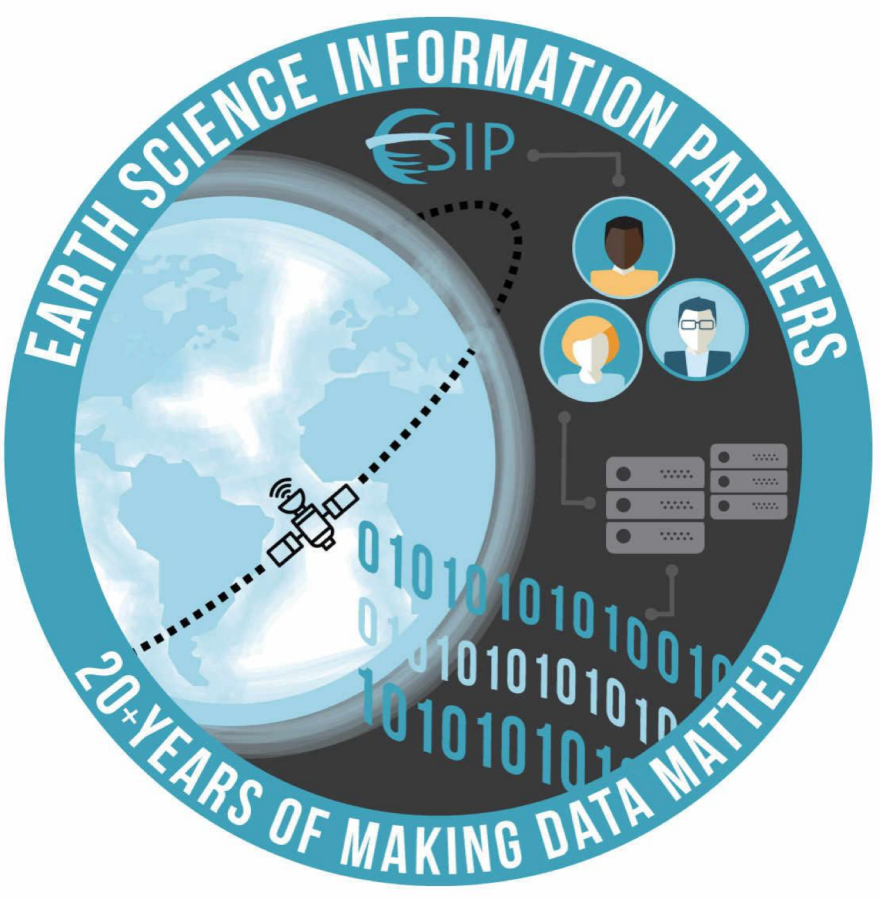
Key takeaways from **20 Years of Making Data Matter**

Get Involved:
Check out the ESIP Lab!
https://www.esipfed.org/esip-lab/programs

Ben Roberts-Pierel

Questions/Other Perspectives?

Call for Sessions:
https://goo.gl/GmFeKk



2019 SUMMER MEETING

July 16-19, 2019

Greater Tacoma Convention Center, Tacoma, WA

Engagement Ops.

DISCOVER

Find people and tools to make your data findable, accessible, interoperable, and reusable.

COLLABORATE

Join-in or create a new collaboration area around your Earth science data challenges.

INNOVATE

Utilize small-grant funding to build or expand Earth data technologies.

NETWORK

Extend your network. Build connections across federal agencies, the private setor, and academia.

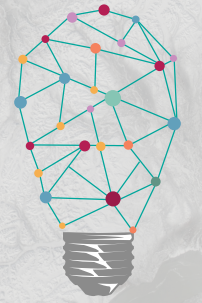
JOIN

Encourage your organization to join ESIP's 110+ member organizations. Unlock membership benefits: start new collaborations, apply for funding, and more.

What else can YOU do?

- Tell others about ESIP
- Volunteer for Leadership
- Join Visioneers
- Stay vocal by sharing your expertise and questions on telecons, Slack, mailing lists, etc.

https://www.esipfed.org/onepager



ESIP LAB

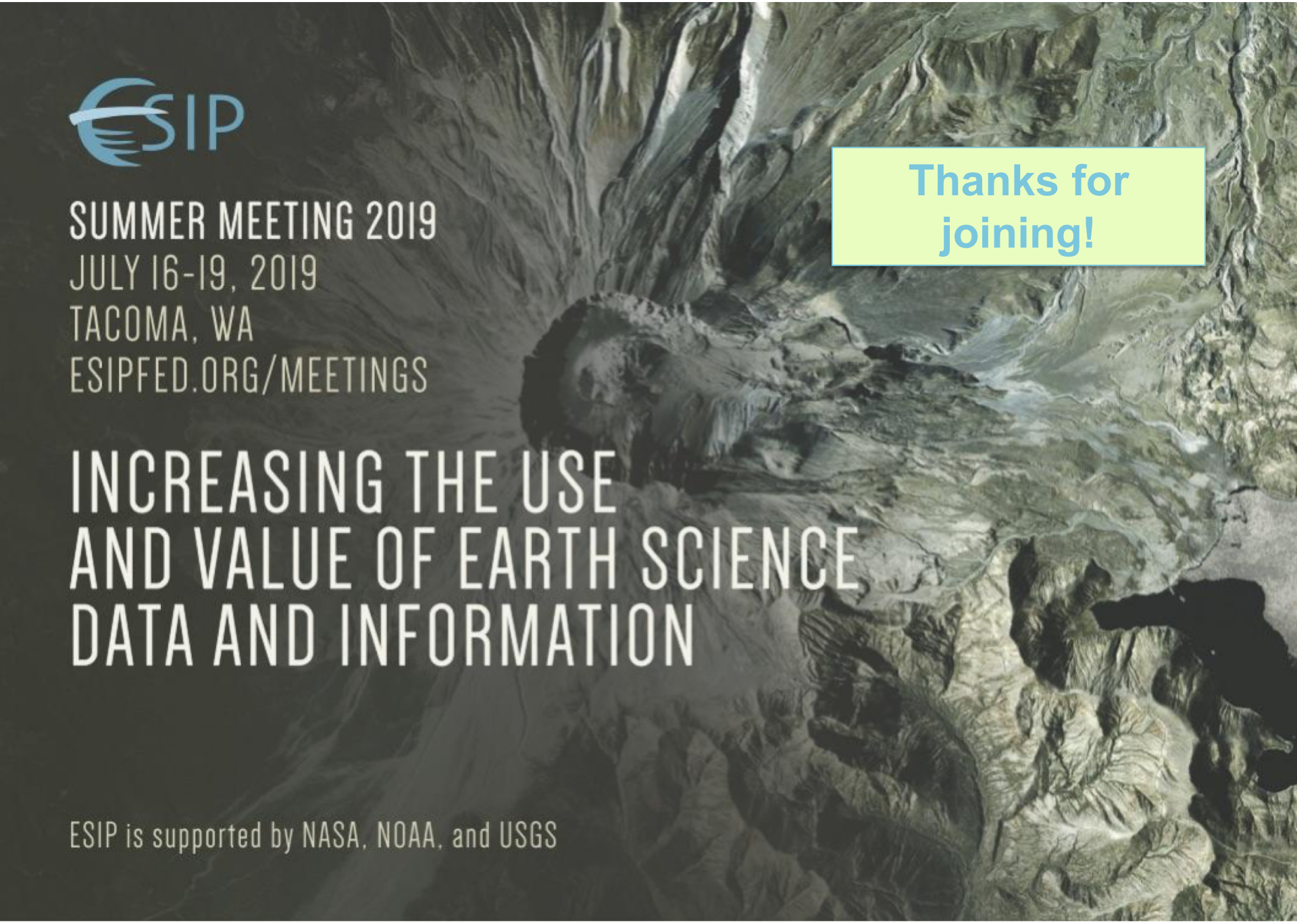
HOW TO GET INVOLVED

Google Summer of Code: Submit an idea or be a mentor!
Visit: github.com/esipfed/gsoc

Spring RFP: Submit a proposal to our next RFP.
Visit: esipfed.org/esip-lab/funding-opportunities

Contribute/Share/Re-Use a previously-funded Lab project.
Visit: github.com/esipfed (tag = esip-lab)

Contribute to ESIP's Community Ontology Repository (COR)
Subscribe/post: lists.esipfed.org/mailman/listinfo/esip-cor



Thanks for joining!