



Meeting Highlights Webinar

ESIP Summer Meeting
August 12th, 2021
Info: esipfed.org/telecons



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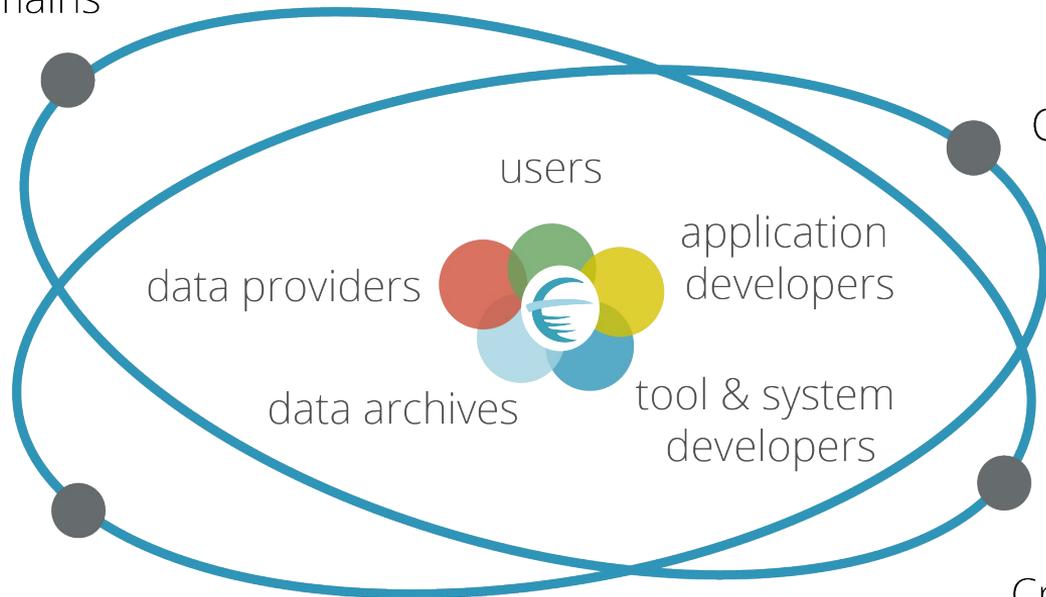
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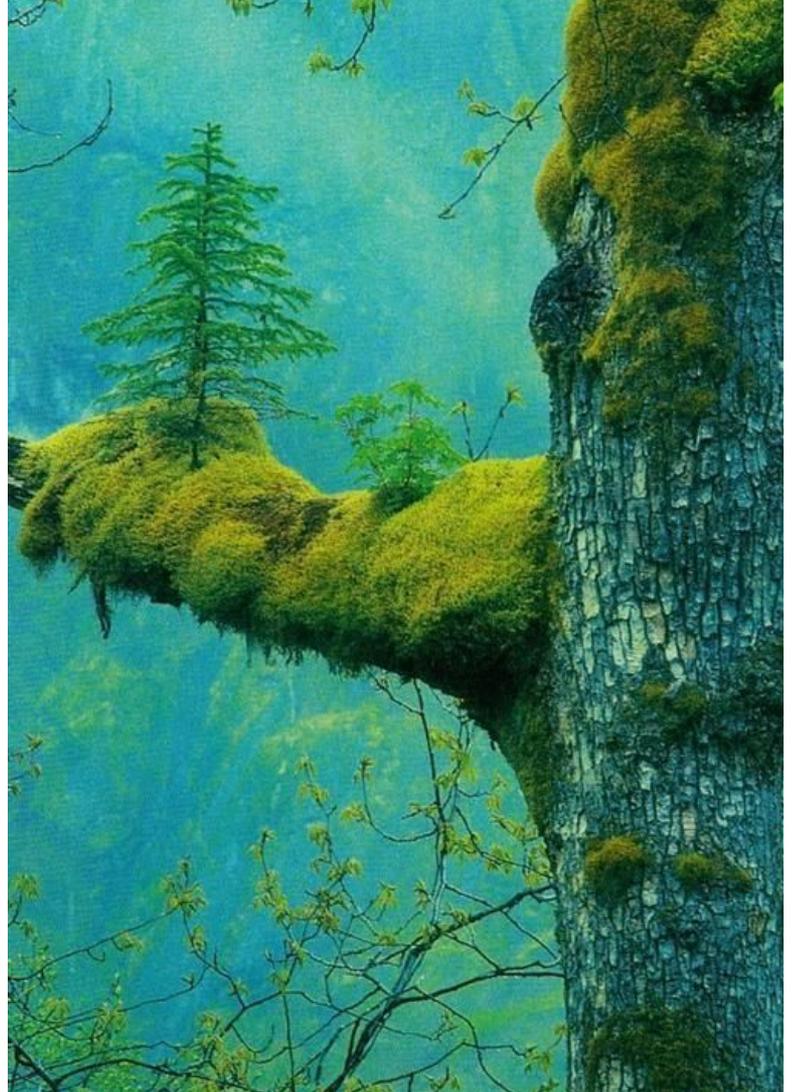
Academia



Cross-
Agency

2021 ESIP THEME

Leading Innovation in Earth
Science Data Frontiers



MEETING TECHNOLOGY



2021ESIPSUMMERMEETING.SCHED.COM

ESIP.FIGSHARE.COM/SUBMIT

BIT.LY/sm21takeaways

Day	Time	Session Name	Takeaway #1	Takeaway #2	Takeaway #3
Tue, Jan. 26	13:30 ET - 15:00 ET	Understanding the ESIP Community Participation Guidelines: What it means for you	Application of the CPG to not only individuals but groups or agencies/organizations should be further explored	Additional training should be made available: training for leadership (staff and volunteers) to help infuse CPG into all ESIP spaces; bystander intervention training/resources; ways to handle bad behavior and encourage appropriate behavior with understanding and compassion with an emphasis on leading practices	The connection of ESIP's core values to the CPG is there but should be emphasized and made more explicit
Tue, Jan. 26	16:00 ET - 17:30 ET	Jupyter Notebooks: Harnessing the full potential	Application of JNBs in education, geoscience & publications.	Given the diverse audience, Adoption of JNBs in your respective	

2021 ESIP SUMMER MEETING Homepage

ESIP meetings bring together the most innovative thinkers and leaders around Earth forming a community dedicated to making these data more discoverable, access researchers, practitioners, policy makers, and the public.

Parent Circle: ESIP



@Esipfed

#ESIPFed



<https://2021esipsummermeeting.qiqochat.com/>

Find & Access Meeting Content



Best Practices & Fundamental Challenges of AI in Earth and Space Sciences

Deriving scientific insights from artificial intelligence methods requires adhering to best practices and moving beyond off-the-shelf approaches" (Imme Ebert-Uphoff et al 2019). Artificial intelligence (AI) has been showing promises to address many challenges associated with Earth sciences, such as remote mapping, prediction, anomaly detection, event classification, and potentially provide high-speed, effortless alternatives for representing vague non-observable processes in Earth system models. However, due to AI's uncertainty and black box nature, there is no consensus on a universal way to correctly use AI. This session calls for best practices of AI utilization and invites the current AI practitioners to present their experiences and workflows on preparing AI-ready data, training AI models, or applying AI in real scenarios, as examples for the community to learn from. The successful use of AI in any domain of Earth and Space Sciences is welcomed for this session.

Ryan McGranaghan

ASTRA LLC

Title: The opportunities and challenges of ML: Trends from the space weather perspective

Slides: <https://doi.org/10.6084/m9.figshare.13728070.v1>

Ziheng Sun

George Mason University

Title: Earth AI: Formulating ESIP ML Community Effort

Slides: <https://doi.org/10.6084/m9.figshare.13721521.v1>

[View Recording](#)

[View Notes](#)

By Session:

<https://2021esipsummermeeting.sched.com/>



Examining climate change and fast fashion.pdf

Dataset posted on 15.07.2021

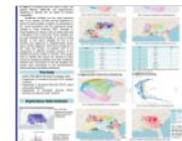
[Patrick Chandler](#) ▾



Cloud-based Data Match-Up Service (CDMS)

Poster posted on 15.07.2021

[Nga Chung](#) ▾



Identifying Vulnerable Healthcare Facilities Due to Effects of...

Poster posted on 15.07.2021

[Thilanka Munasinghe](#) ▾



Helmholtz Metadata Collaboration (HMC) - Integrating Large-...

Poster posted on 15.07.2021

[Emanuel Soeding](#) ▾



Gridded Environmental Data in the Cloud: NCEI Dat...

Poster posted on 15.07.2021

[Mark Capece](#)



Australian Bushfire in 2020: Accessing MERRA-2 Data in G...

Poster posted on 14.07.2021

[Xiaohua Pan](#) ▾



RainBench: Towards Global Precipitation Forecasting from...

Poster posted on 14.07.2021

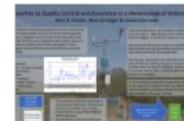
[Christian Schroeder de Witt](#) ▾



Implications of the Data-Centric Nature of Climate Science for ...

Poster posted on 13.07.2021

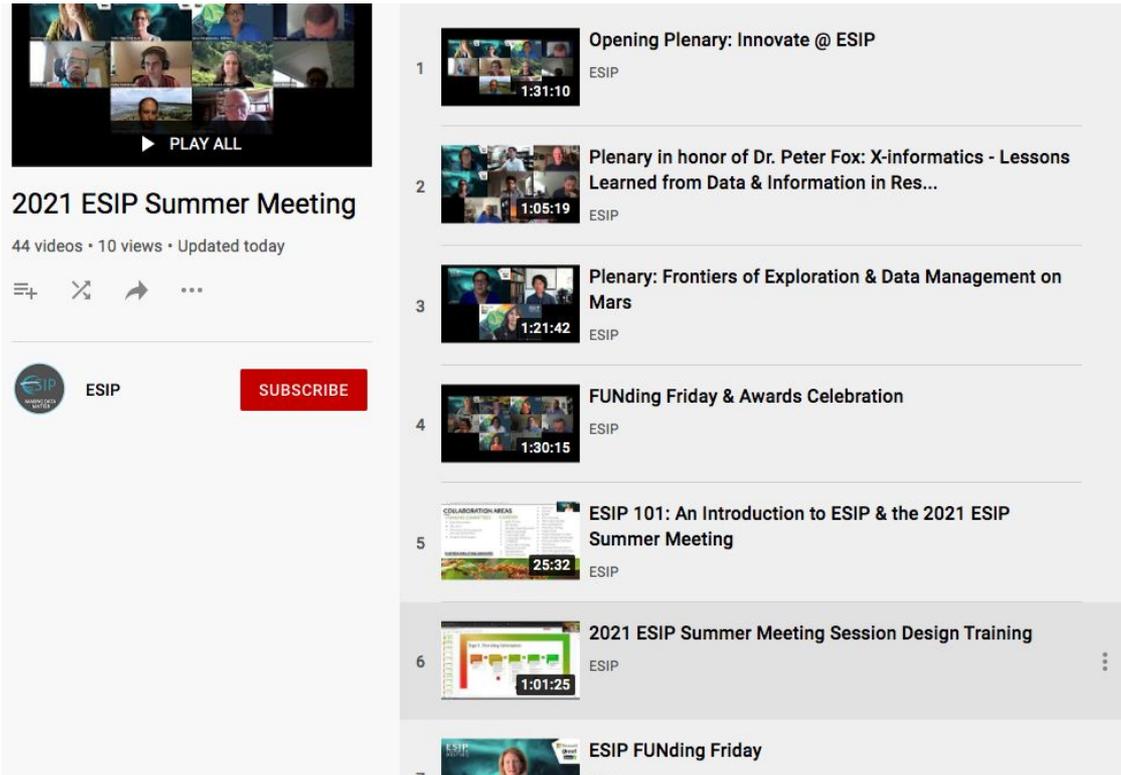
[Seth McGinnis](#)



Browse Presentations:

https://esip.figshare.com/ESIP_Summer_2021

Find & Access Recordings



The image shows a YouTube playlist interface for the 2021 ESIP Summer Meeting. At the top left is a video player with a 'PLAY ALL' button. Below it, the playlist title '2021 ESIP Summer Meeting' is displayed, along with '44 videos • 10 views • Updated today'. The ESIP channel logo and a 'SUBSCRIBE' button are visible. The main area contains a list of seven video thumbnails with their titles and durations:

- 1. Opening Plenary: Innovate @ ESIP (1:31:10)
- 2. Plenary in honor of Dr. Peter Fox: X-informatics - Lessons Learned from Data & Information in Res... (1:05:19)
- 3. Plenary: Frontiers of Exploration & Data Management on Mars (1:21:42)
- 4. FUNding Friday & Awards Celebration (1:30:15)
- 5. ESIP 101: An Introduction to ESIP & the 2021 ESIP Summer Meeting (25:32)
- 6. 2021 ESIP Summer Meeting Session Design Training (1:01:25)
- 7. ESIP FUNding Friday



Browse Recordings on YouTube:

https://www.youtube.com/playlist?list=PL8X9E6I5_i8jWB3hulEaExwyvKvEK_DaD



By the Numbers

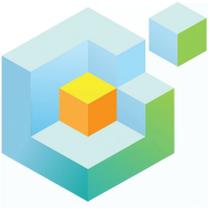
ESIP Summer Meeting



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MEETING BY THE NUMBERS



4
Plenary
Sessions



41
Research
Showcase
Presentations

37
Breakout
Sessions



171
First Time
Attendees



461
Attendees



150+
Organizers &
Speakers



**Our Virtual
Photo!**



Plenary Highlights

ESIP Summer Meeting



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Innovate@ESIP

This session provided an opportunity for NASA, ESIP, and USGS investigators to talk about their work and show how their big ideas can help solve common challenges in the scientific community, increasing the potential for their technology to be infused or reused.

Takeaways:

- **Storytelling is difficult and often not the first tactic used to explain technical projects. However, it is very effective and a project's story can be cultivated with help from peers and mentors.**
- **Projects that have been built through grassroots community effort can have a leg-up related to users and infusion potential.**
- **An amazing amount of work is being done across NASA, USGS, & ESIP. Highlighting this work to potential end-users in and around ESIP moves our community forward.**



Tags:

Innovation, Infusion

Want to learn more?

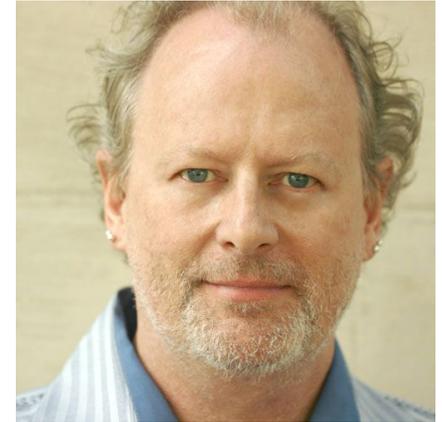
Contact: annieburgess@esipfed.org

X-informatics: Lessons Learned from Data and Information in Research

Honoring Dr. Peter A Fox, sharing lessons learned from his legacy of data in research

Takeaways:

- **Multidisciplinary collaborative research settings produce compelling research**
- **Down to Earth informatics transform and expand the boundaries of scientific inquiry**
- **Systems vs. frameworks: the tension between reliability and flexibility in data infrastructures**



Tags:

Informatics, data science, data-driven research

Want to learn more?

Contact: Ahmed Eleish (eleisa@rpi.edu)



Microsoft



Element 84



Breakout Session Highlights

ESIP Summer Meeting



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ESIP in 2031: A Look Back at a Decade of Innovation



Using the “Future/Present” liberating structure, we went into the future to look back at the decade that started in the middle of a global pandemic.

We found:

- **ESIP increased its impact through innovation and proactive justice, equity, diversity, and inclusion**
- **ESIP’s collaborative and welcoming community opened new partnerships and funding possibilities to directly address global climate change crises**
- **ESIP’s welcoming culture and community spirit modeled open-science collaboration practices that help move science organizations to more effective and more caring research, workplaces, and careers**

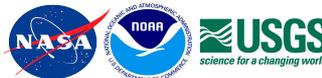


Tags:

Open science, justice equity diversity and inclusion, innovation, meetings, climate

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Want to learn more?

Contact: Bruce Caron or Denise Hills

and 150+ partner organizations

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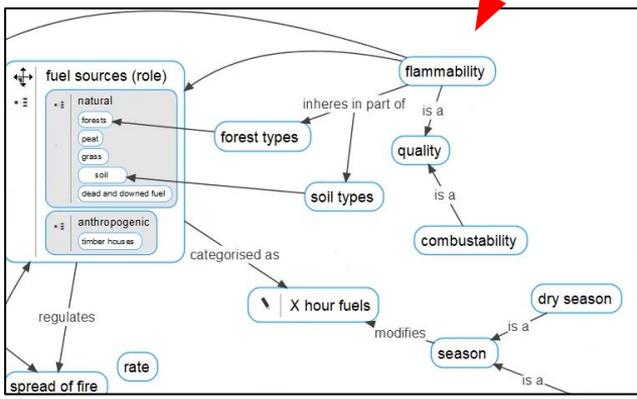
Identifying technology capabilities that meet wildfire science and practitioner requirements - A joint workshop of the Agriculture and Climate and Semantic Harmonization clusters



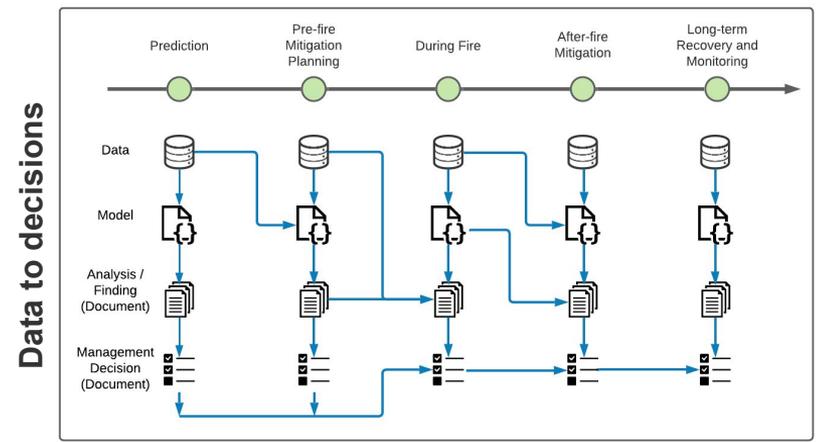
Goal: Assess interoperability requirements to enable sharing of data and information across stakeholders and fire management lifecycle phases

Takeaways:

- Encourage domain experts and knowledge representation experts to work together to **map domain needs to machine-readable representations to enable semantic-aware technologies.**
- Need to **better integrate** fire behavior model, values-at-risk, and sensor data into a **Common Operating Picture.**
- Need to **better estimate burn severity by fusing data** (in-situ, remote, model) to facilitate mitigation of after-burn hazards.



Wildfire management phases



Tags:

Semantics, Wildfire, Disaster Mitigation and Response, Climate Adaptation

Want to learn more?

https://wiki.esipfed.org/Agriculture_and_Climate
<https://wiki.esipfed.org/SemanticHarmonization>



Designing a Public Portal for Participatory Environmental Governance

Participants learned about EDGI's Environmental Enforcement Watch project, attempting to answer realistic user questions such as "is the waterway near my home safe to swim in?"

Takeaways:

- **Public access to data through these new tools (Jupyter Notebooks + reports) is helpful...**
- **...but it's just a start; it's still very frustrating to figure out the environmental conditions of an area of care...**
- **...so it will make a big difference to grow the project, especially by incorporating more datasets!**

Tags:

Environmental enforcement, EDJ, permits, communities, environmental justice



Want to learn more?

Contact: kelsey@envirodatagov.org

Join: EEW meetings Tuesdays, email for info ^

Would This Work for You? Help Us Finalize the Look & Feel of the Innovative Resource Assessment Capability of the Data Management Training Clearinghouse



To apprise the ESIP community of the status of the new Resource Assessment capability to the DMTC's resource description pages and solicit user feedback.

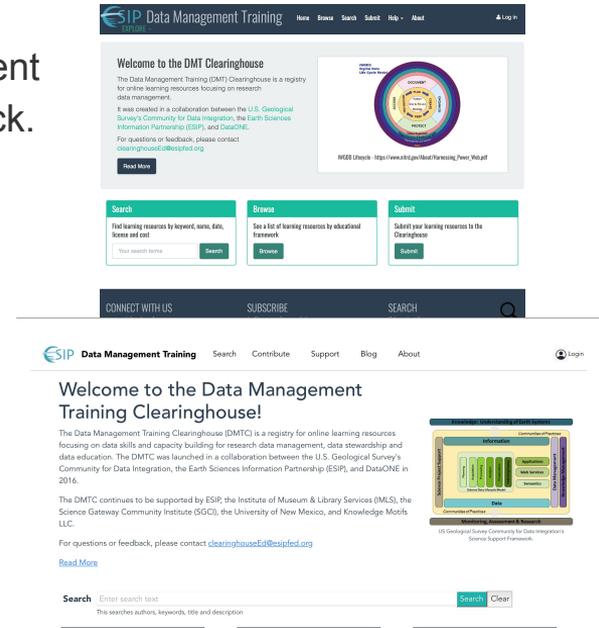
Takeaways:

- **Simplify, simplify, simplify! (survey & survey results)**
- **Be clear in labeling what we are asking users to do**
- **Simple standard survey rolled up into an aggregate rating (i.e. star rating). More information if desired.**

<http://dmtclearinghouse.esipfed.org>

Tags:

Learning resource reviews, User feedback, Training assessment

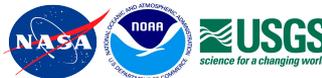


Want to learn more?

Contact:

Karl Benedict - kbene@unm.edu

Nancy Hoebelheinrich - nhoebel@kmotifs.com



ESIP Teacher Workshop Summer 2021: Exploring Earth, Wind, and Fire via Earth Science Data



ESIP members shared resources and led teachers through activities using Earth science data to explore phenomena.

Takeaways:

- [Agenda with links to session resources.](#)
- [YouTube Playlist.](#)
- **Four teachers received FUNding Friday grants!**

Tags:

NOAA CrowdMag app, NASA's Earth System Data Explorer, UNAVCO GPS Velocity Viewer, NOAA CIMSS satellite data, NASA SEDAC Hazards Mapper and HazPop App, En-ROADS Climate Decision Model, JSTAR Mapper, and the Concord Consortium Wildfire Module.



Want to learn more?

Contact:

[Carla McAuliffe@terc.edu](mailto:Carla_McAuliffe@terc.edu)

Join:

[Subscribe to the Education Committee mailing list](#)

**Attend the next Ed Comm meeting,
Thursday, August 19, 2 PM ET**

Foraging for Dataset-Usage Relations

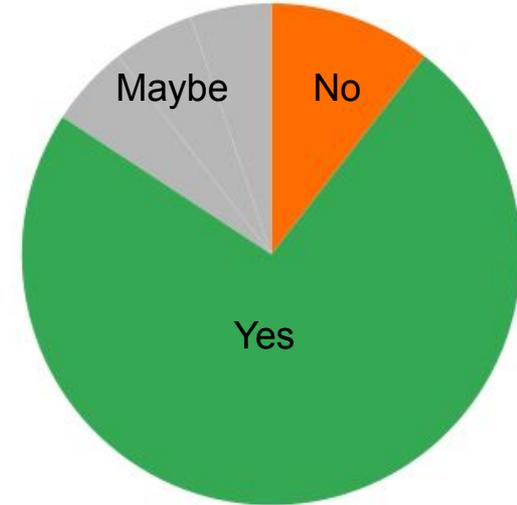


Seek out uses of specific datasets in research articles in order to populate the Usage-Based Discovery database

Takeaways:

- **100 new entries found by participants!** Now included in Usage-based Discovery tool.
- **Most survey respondents recommend continuing to emphasize DOIs to identify datasets**
- **Most respondents reported having at least some fun foraging**

Should we continue to emphasize DOIs for data identification?



Tags:

Search, DOIs, Discovery

Want to help?

Contact: Chris Lynnes, chris.lynnes@nasa.gov or Sara Lafia, slafia@umich.edu

Join: ESIP Discovery Cluster, Aug. 19, 3:00 ET

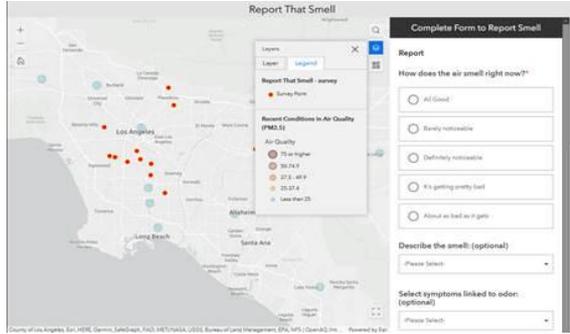
<http://lists.esipfed.org/mailman/listinfo/esip-discovery>



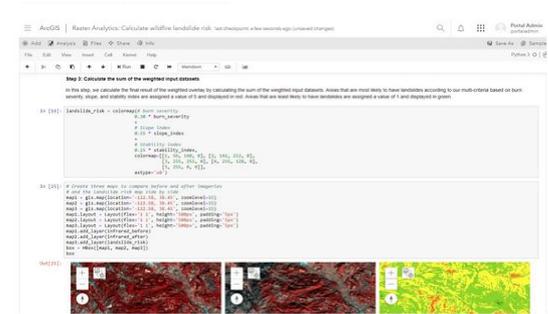
Air Quality Cluster Hackathon



Promoting innovative understanding of shared needs in providing useful Air Quality information to non-traditional users.



Presentations will be during the next ESIP Air Quality Cluster meeting on the 26th of August @ 4pm EDT. Join us!



how a local government can better reach individuals with actionable information regarding the threat of adverse air quality.

how to use citizen science to build a seasonal baseline of localized air quality to help assess and adapt to change

Tags:
air quality, community resilience, health, GIS, citizen science, EPA,

Want to be part of the Air Quality Cluster?
Contact: Mike Little m.m.little@nasa.gov
Beth Huffer beth@lingualogica.net
Join: esip-aqcluster@lists.esipfed.org

AI Data Readiness - Part I



Designing A Community-Driven Road Map for Data Standards and Tools

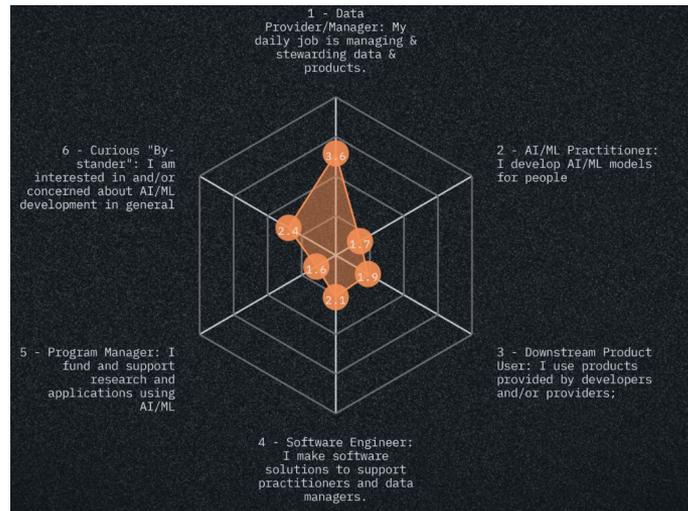
More than 90 community members contributed feedback on a [draft checklist for AI-ready data assessment](#).

Takeaways:

- There are existing & similar efforts have synergy with AI-ready data. We need to identify the gap between these efforts
- How to define & document data quality that is relevant to AI-ready data need more development;
- **Next step** – conversation with relevant groups to refine checklist and guideline development;

Tags:

Artificial Intelligence; Data Readiness



Want to learn more?

Contact: Douglas Rao (douglas.rao@noaa.gov); Tyler Christensen (tyler.christensen@noaa.gov)

Join: [Data Readiness Cluster](#) or [#data-readiness](#)

What Does ML Training Data Interoperability Mean to You?

- *Three different use cases of training data development and reuse;*
- *Community discussion on what makes training data interoperability unique;*

Takeaways:

- To enable AI/ML applications, training data needs to be user-friendly, extensible, and w/ benchmarking codes;
- Interoperability for AI/ML training data is not too different from general data interoperability; ***BUT***, AI/ML model may require different access pattern that can lead to special considerations;
- ***Next step*** – summarize key aspects of training data interoperability with diverse use cases & produce community guidelines;

Tags:

Machine Learning; Data Interoperability

Want to learn more?

Contact: Mark Parsons (map0046@uah.edu)
For NASA ESDS Data Interoperability Working Group

New Frontiers in AI for Earth and Space: Big Data and Parallel Computing

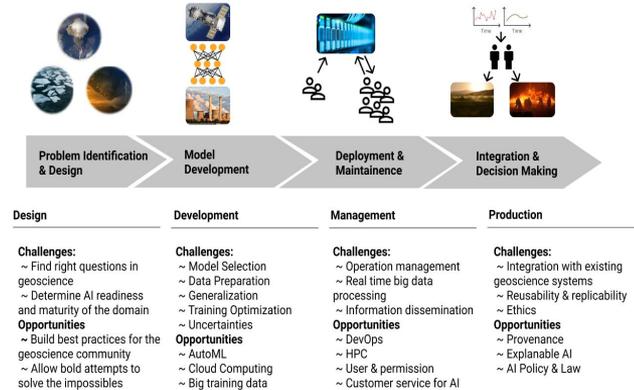
The first session invited speakers with experiences implementing AI at scale to share. The second session conducts a thorough step-by-step tutorial from environment setup (e.g., Dask, STAC, HoloViz, Geoweaver) to train/test AI.

- **#1: Code reproducibility** has 9 levels. Each level of reproducibility has a target user group and different scenario setting. Please make the design as needed.
- **#2: Planetary computer** uses STAC-based APIs for search and discovery, JupyterHub/Dask for computing, to manipulate petabytes of data in blob storage on Azure
- **#3: The AI workflow** generally include identifying scientific question, translating into data science question, accessing and acquiring data, transforming data into AI-ready format, selecting/evaluating/validating models, discovering information by visualization and communication, and educating scientists about the new technique and results.

Tags:
AI; machine learning; big data; parallel computing; dask; holoviz, workflow; geoweaver

Challenges and Opportunities in Earth AI

The complexity of Earth system makes it challenging to realize fully operational AI systems.



Want to learn more?
Jensen Ziheng Sun; zsun@gmu.edu
Join: Machine Learning cluster
https://wiki.esipfed.org/Machine_Learning

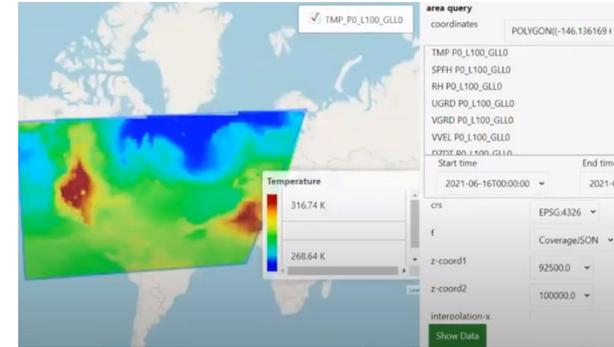
The Saga Continues: Cloud-Optimized Data Formats



Six talks: Tools for generating cloud-optimized data on the cloud (pangeo-forge), cloud-optimized formats for point clouds and rasters (Entwine Point Tiles, MRF), APIs for accessing cloud data (NOAA's EDR API, TileDB), and tools for accessing cloud-optimized data (lp-daac).

Takeaways:

- Some are promoting cloud-optimized data retrieval via **APIs with backend scaling**, others promoting data retrieval via **direct read from object storage with client scaling**.
- Cloud-optimized data access **examples should be shared in notebooks** (and with environments) so they are discoverable and reproducible.
- **The OGC Environmental Data Retrieval (EDR) API is exciting**, and can layer on top of the Pangeo stack (e.g. Dask, Xarray, Geopandas). Best of both worlds?



Want to learn more?

aimee@ds.io
sudhir.shrestha@noaa.gov
rsignell@usgs.gov

#cloud-computing on ESIP Slack

Dynamics Soil Information Systems



Identify current soil data projects and resources.

Takeaways:

- There are some applicable data standards for observations but vocabulary around methods/procedures is hard.
- From a soils perspective, we have procedure manuals but they are not machine readable.
- Integrating farmer-level data sources is hard, and no one is surprised.

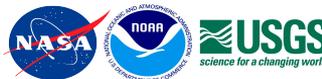


Tags:

Soil, harmonization, data service, interoperability

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Want to learn more?

Contact: Kathe Todd-Brown ktoddbrown@ufl.edu

Join: Soil Informatics and Ontology Cluster

<https://lists.esipfed.org/mailman/listinfo/esip-soil-informatics>

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CARE Principles for ESIP Data Repositories



The current movement toward open data does not fully engage with Indigenous Peoples rights and interests. This session presents current work by our cluster on the CARE principles and how environmental data repositories might engage with them.

Takeaways:

- We are still raising awareness, and many conversations still need to happen. ESIP can facilitate those
- Implementation of CARE will not happen independently, but along with other repository features. A roadmap will be essential
- Guidance for repositories will differ from guidance for researchers
- <https://www.gida-global.org/care>

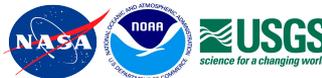


Tags:

Indigenous Peoples, CARE Principles, Collective benefit, Authority, Responsibility, Ethics

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Want to learn more?

Contact: margaret.obrien@ucsb.edu

Join: Third Friday of the month, 4PM Eastern

Mailing list: [ESIP-SustainableDM](#)

and 150+ partner organizations

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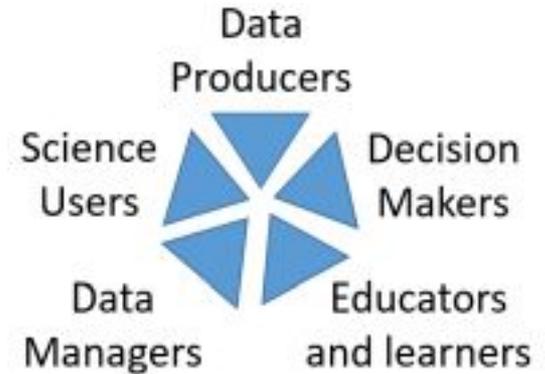
Toward Improving Representation of Data Quality Information



Recognizing the importance of available information about data quality, efforts to improve data quality information are discussed.

Takeaways:

- **Data quality information is needed to support various data uses, including scientific and decision making.**
- **Collaboration is needed among diverse teams of data producers, managers, and different types of users to prepare and represent data quality information.**
- **After developing guidance for representing data quality information, the community will need help to meet the challenges of producing rich data quality information.**



Tags:

**Data quality, Data lifecycle,
Data quality information**



Want to learn more?

Contact: https://wiki.esipfed.org/Information_Quality

Join: <https://lists.esipfed.org/mailman/listinfo/Esip-infoquality>





Community Fellow Highlights

ESIP Summer Meeting



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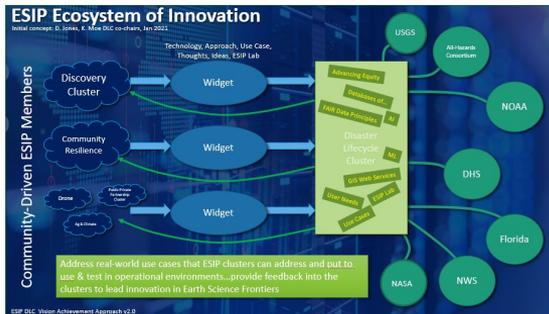
Delivering Trusted Data to Real Users & Decision Makers



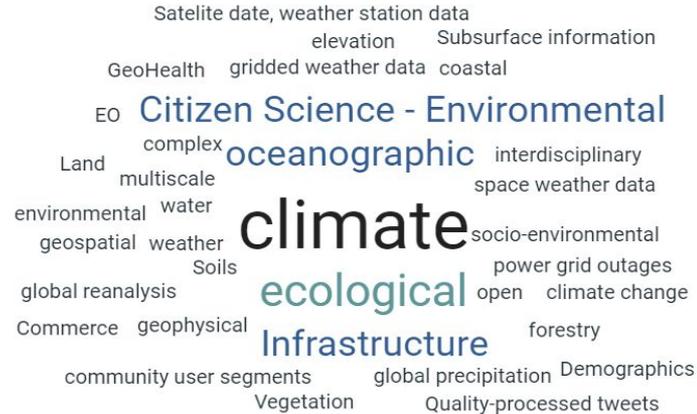
Identified how the ecosystem of innovation works and how ESIP clusters can plug into this process by introducing their products, services and methods into the pathway for real users and decision makers to experience.

Takeaways:

- **Data quality and data trustworthiness is very important for collaboration with end-users**
- **Important for data providers to know what data disasters responders want/need. Also, for responders to be shown what is available/possible.**
- **Application-dependent ORLs are needed**



Enter a word to describe the data you may have or know about



Tags:

ESIP Ecosystem of Innovation, Disaster Lifecycle, ORLs

Want to learn more?

Contact: Karen Moe (karen.moe@earthlink.net)

Dave Jones (dave@stormcenter.com)

Join: <https://lists.esipfed.org/mailman/listinfo/esip-disasters>

1st Thursday of every month @ 4:00 - 5:00 pm



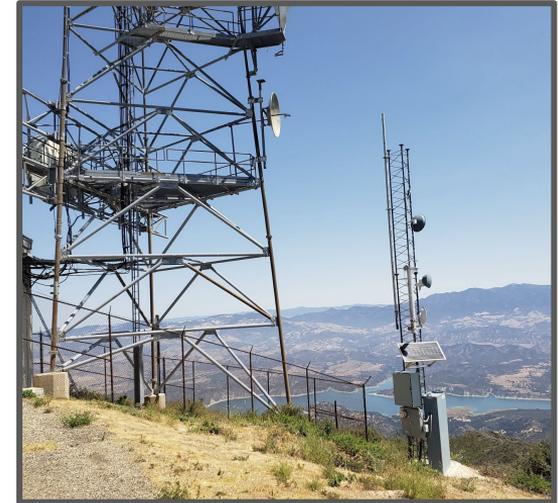
Innovations in EnviroSensing Technology and Practice



Fellow's perspective on a series of presentations on emerging and proven approaches that further the collection, management, and exchange of *in situ* environmental monitoring and observation data.

Takeaways:

- Graduate students often fill the role of the lab's technical expert, with the most hands on experience collecting data and troubleshooting equipment - knowledge retention across "generations" of lab students is important to maintain data integrity.
- More affordable sensor tech tends to require more experience (programming etc.) to set up and use - may present a barrier to entry into the field of physical earth systems data.
- ESIP's semi annual meetings provide incredible exposure for students and new professionals - exposure to new fields and a broader perspective on science and exposure to a great variety of careers in STEM and data science.

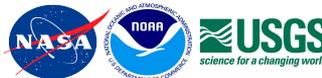


Tags:

Data Stewardship, Metadata, Data Acquisition Systems, Agriculture and Climate, Air Quality, Drones, EnviroSensing, Information Quality

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Want to learn more?

Contact: Kristina Fauss

Join: EnviroSensing Telecon - Sept 7 (1st Tuesday)

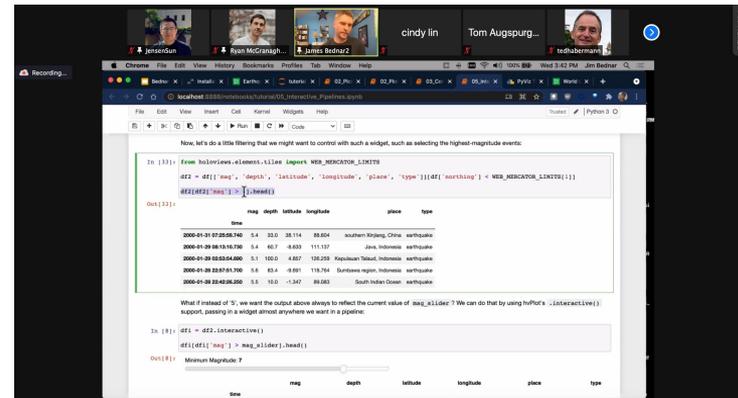
New Frontiers in AI for Earth and Space *and other broader ESIP insights*



(1) Discuss the pros and cons behind scaling up AI for Earth and Space sciences

Takeaways:

- Parallel computing involves **understanding and mitigating the infrastructural and physical constraints** of any institution e.g. their hardware specifications. Is Planetary Computer a way forward?
- AI workflow also include an understanding of the environmental impacts of AI: Google's advanced chatbot Meena consumed [96 metric tons of carbon dioxide equivalent](#), or about the **same as powering more than 17 homes for a year**
- Growing concern on **AI and data ethics** in earth and environmental sciences
 - CARE principles and how to include Indigenous communities (Session: CARE Principles for ESIP Data Repositories)
 - EDGI'S environmental enforcement platform (Session: Designing a Public Portal for Participatory Environmental Governance)



Want to learn more?
Contact: Cindy Lin (ckl58@cornell.edu)
Join: ESIP ML Research Cluster is every third Friday
12-1pm, August 20

Tags:

Big Data; Parallel Computing; AI; data science; AI ethics



ESIP ENGAGEMENT OPPORTUNITIES



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

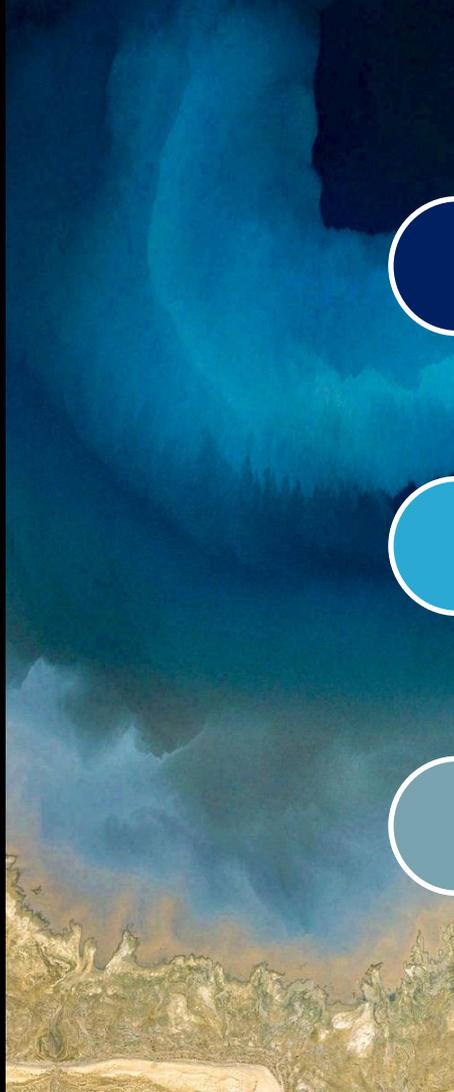
Build connections across federal agencies, the private sector, and academia.



MAKING DATA MATTER
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Thank you for attending!

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