MAKING DATA MATTER
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2020 ESIP Summer Meeting

Highlights Webinar

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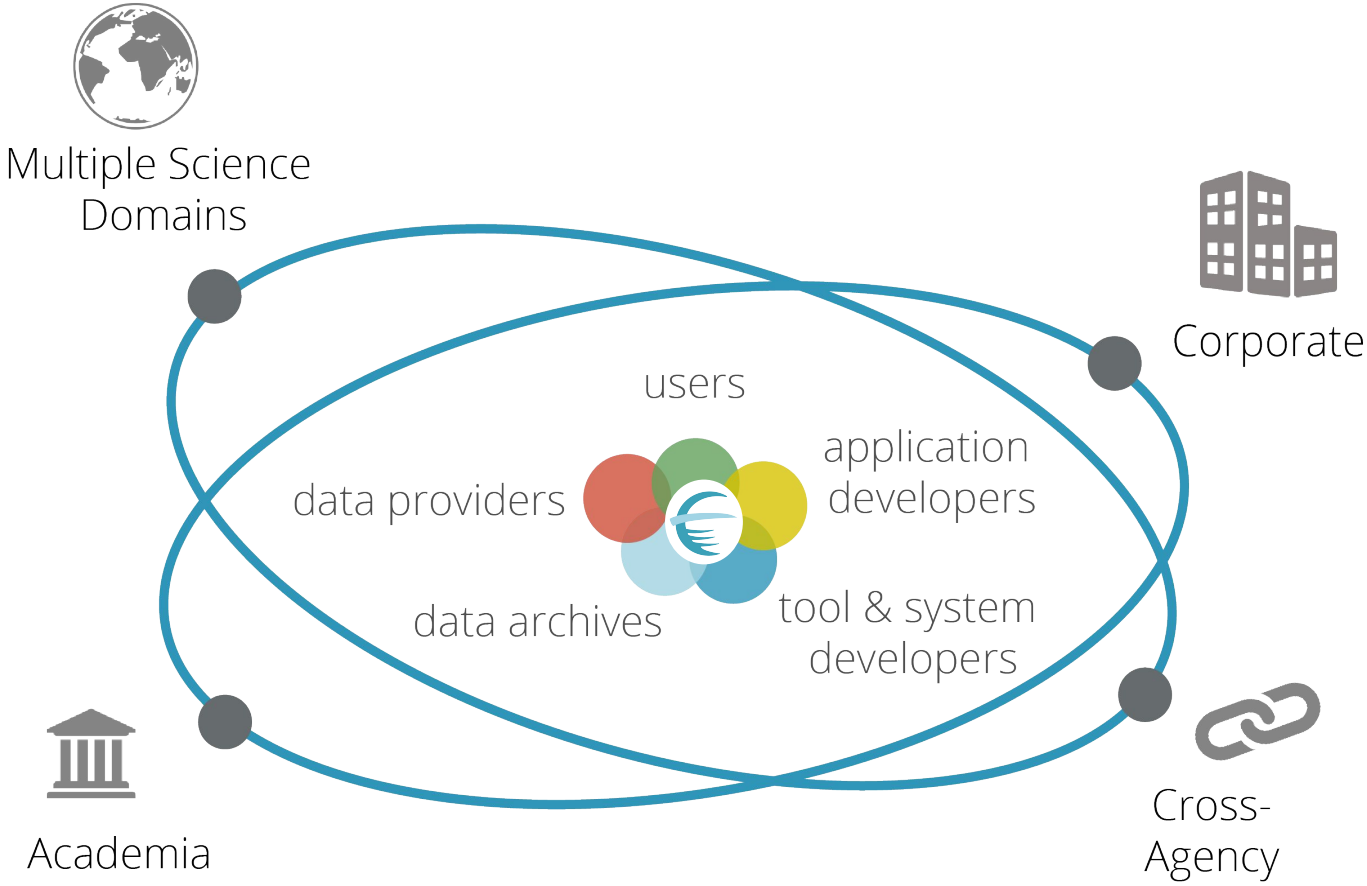
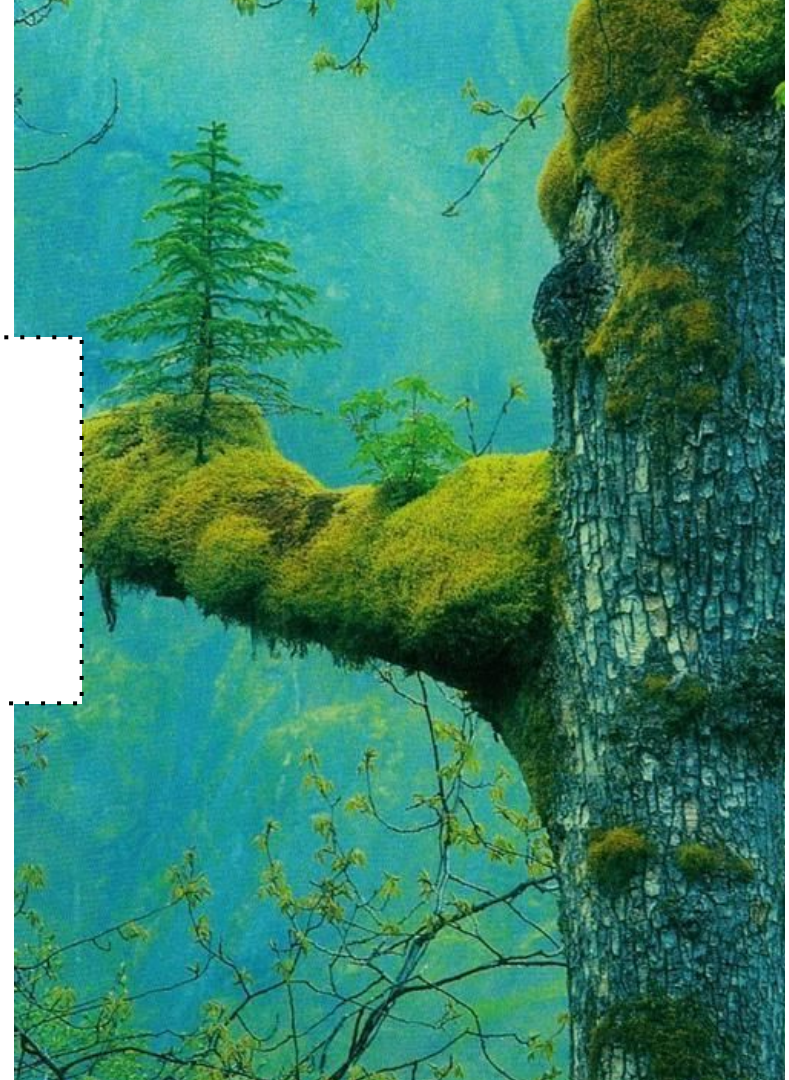


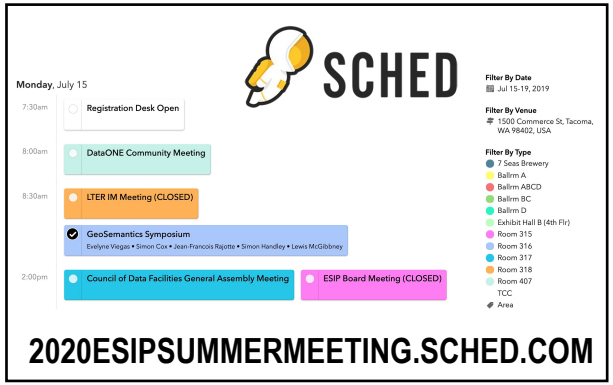
2020 ESIP THEME

Putting Data to Work: Building Public-Private Partnerships to Increase Resilience & Enhance the Socioeconomic Value of Data.

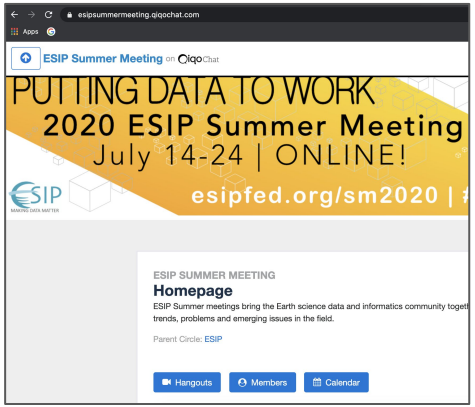


MEETING TECHNOLOGY

zoom



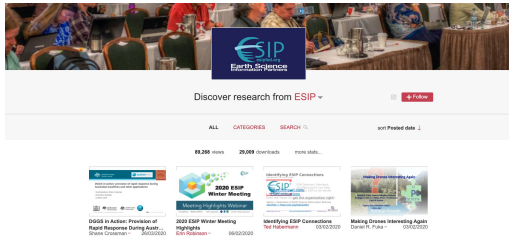
2020ESIPSUMMERMEETING.SCHED.COM



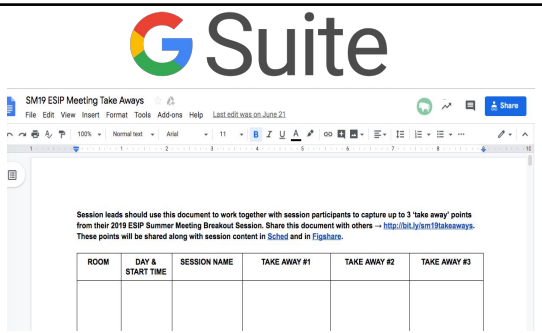
https://esipsummermeeting.qiqochat.com/

2019 ESIP Summer
15,319 Views
4,595 Downloads

figshare



ESIP.FIGSHARE.COM/SUBMIT



BIT.LY/sm20takeaways

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Find & Access Meeting Content

SCHED

Building technical know-how through innovation seed-funding (and community)

ABSTRACT:

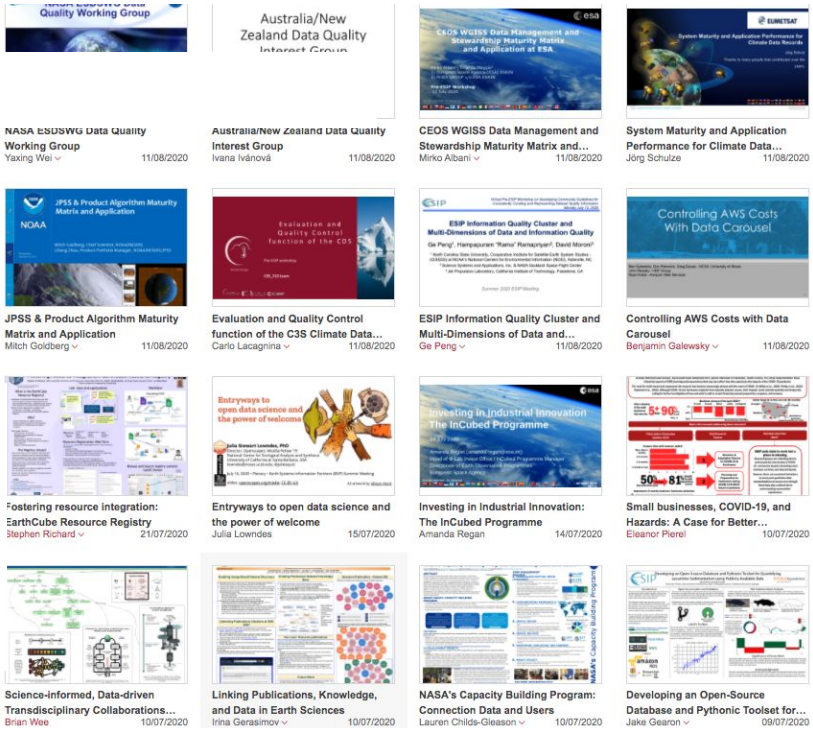
Imagine your fright if during the course of a mature research project you needed to learn a new programming language, learn what a workflow management system is and implement one, and do all of this in a thing called "the cloud". While daunting, it is often the messaging researchers hear, and for good reason. Open, reproducible, and scalable computing is the most-efficient means to a better scientific understanding of our planet. But an all-at-once shift in researchers' computing methodology often falls flat. his session will describe an alternative. Through small projects, prototyping, and community input, programs like the ESIP Lab and the USGS Community for Data Integration provide pathways for researchers to experiment with technology development in a low-stakes environment, while gaining the skills that will enable them to participate in the growing open, scalable Earth science computing revolution. This session will bring together program managers and funded PIs to share lessons learned in building technical capacity within the Earth sciences.

View Recording
View Slides
View Session Notes

Takeaways

- Recognizing that many people are reinventing the wheel is a good place to start. But take the next step to try to improve the process/workflow for others.
- Safe (non-competitive) places (like CDI/ESIP communities) are critical as venues to brainstorm research ideas, i.e. you won't be getting scooped by everyone in the room and can get good feedback
- Sometimes it's worth the investment to learn a new skill...might slow you down in the short term, but has long-term benefits

figshare



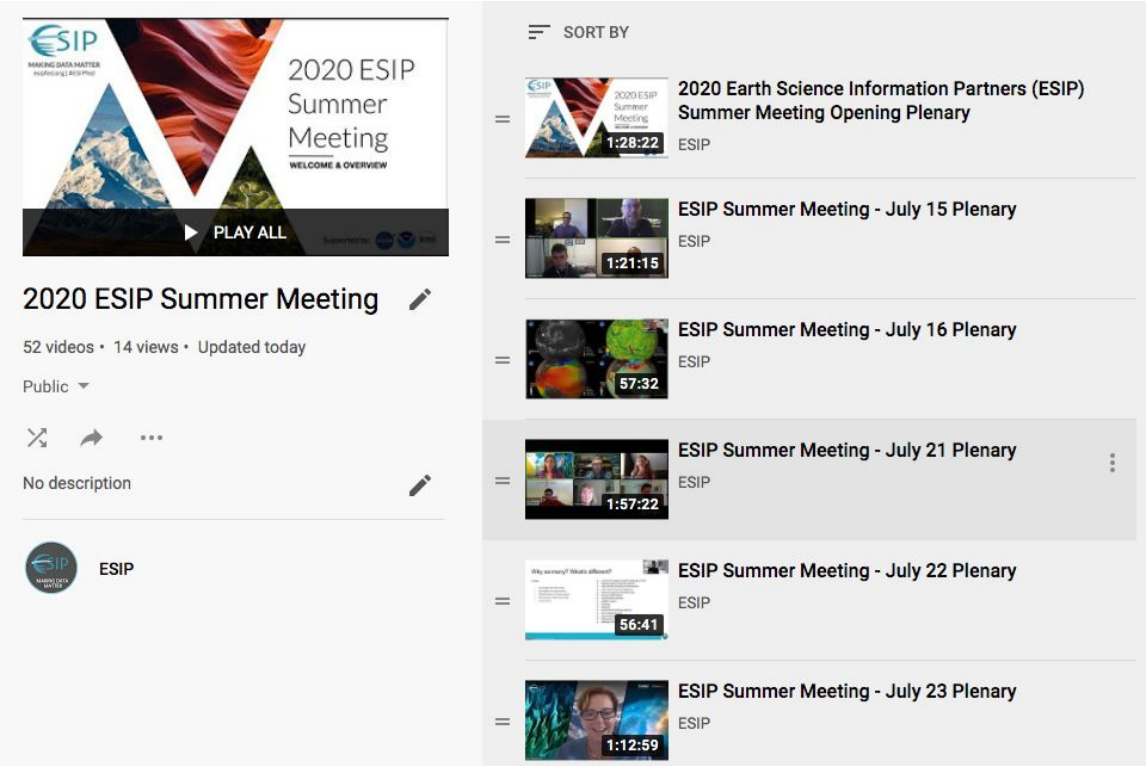
By Session:

https://2020esipsummermeeting.sched.com/

Browse Presentations:

https://esip.figshare.com/ESIP_Summer_2020

Find & Access Recordings



Browse Recordings on YouTube:

https://www.youtube.com/playlist?list=PL8X9E6I5_i8jhv3kplS-Pds24WR9w9iC6

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By the Numbers

Erin Robinson,
Outgoing Executive Director

Supported by:

MEETING BY THE NUMBERS

8
Plenary Sessions

39
Research Showcase

60
+ Sessions

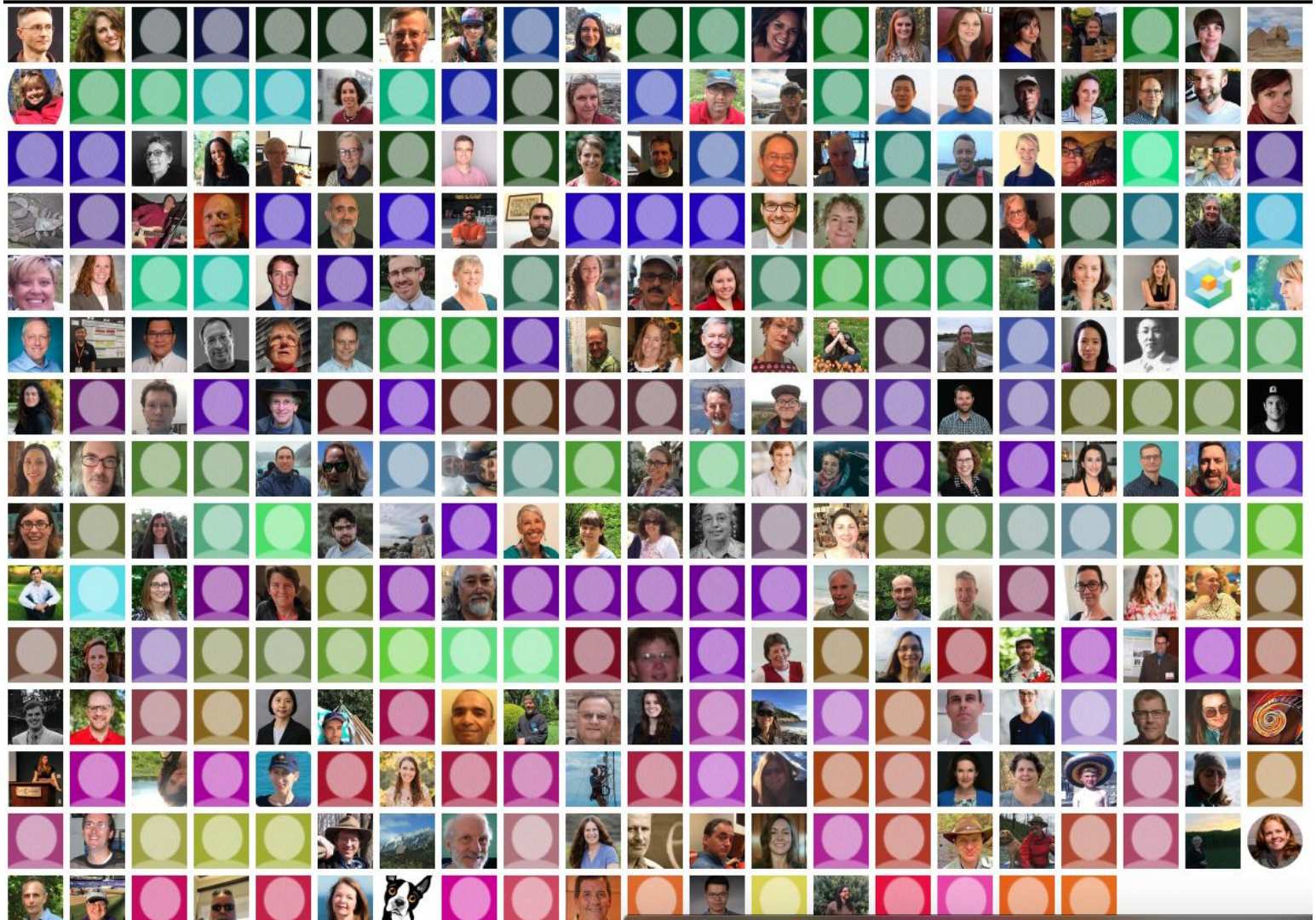
168
+ Speakers

196
First Time Attendees

56
Teachers

20+
International Attendees

512
Attendees!



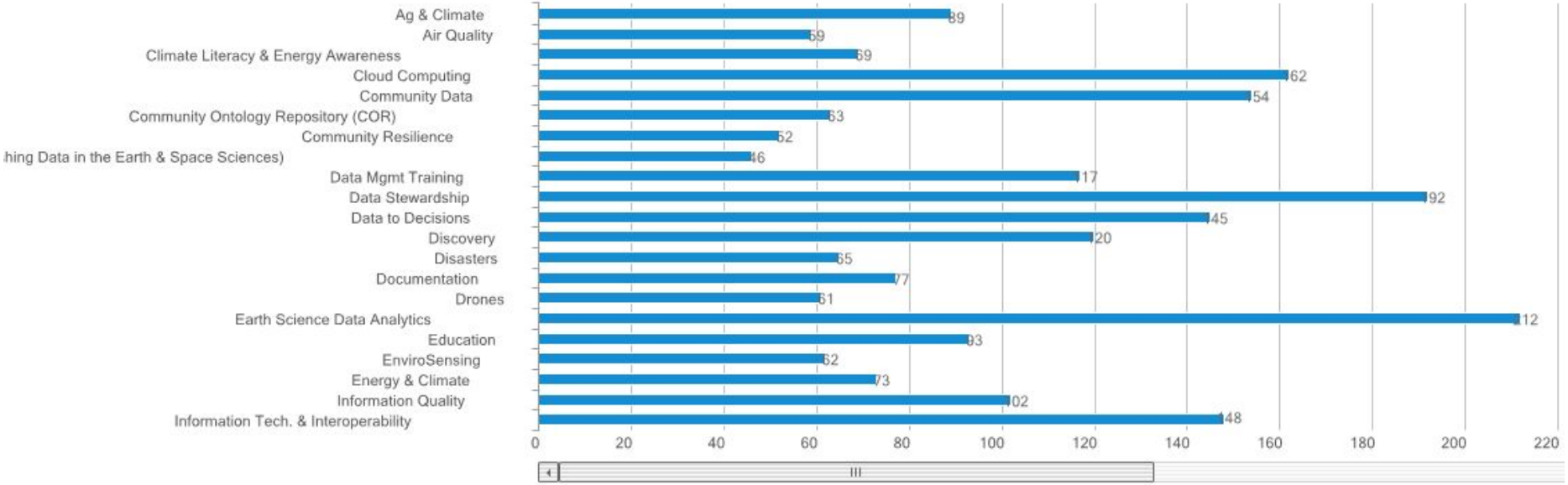
Our first virtual group photo…

GLOBAL ATTENDANCE

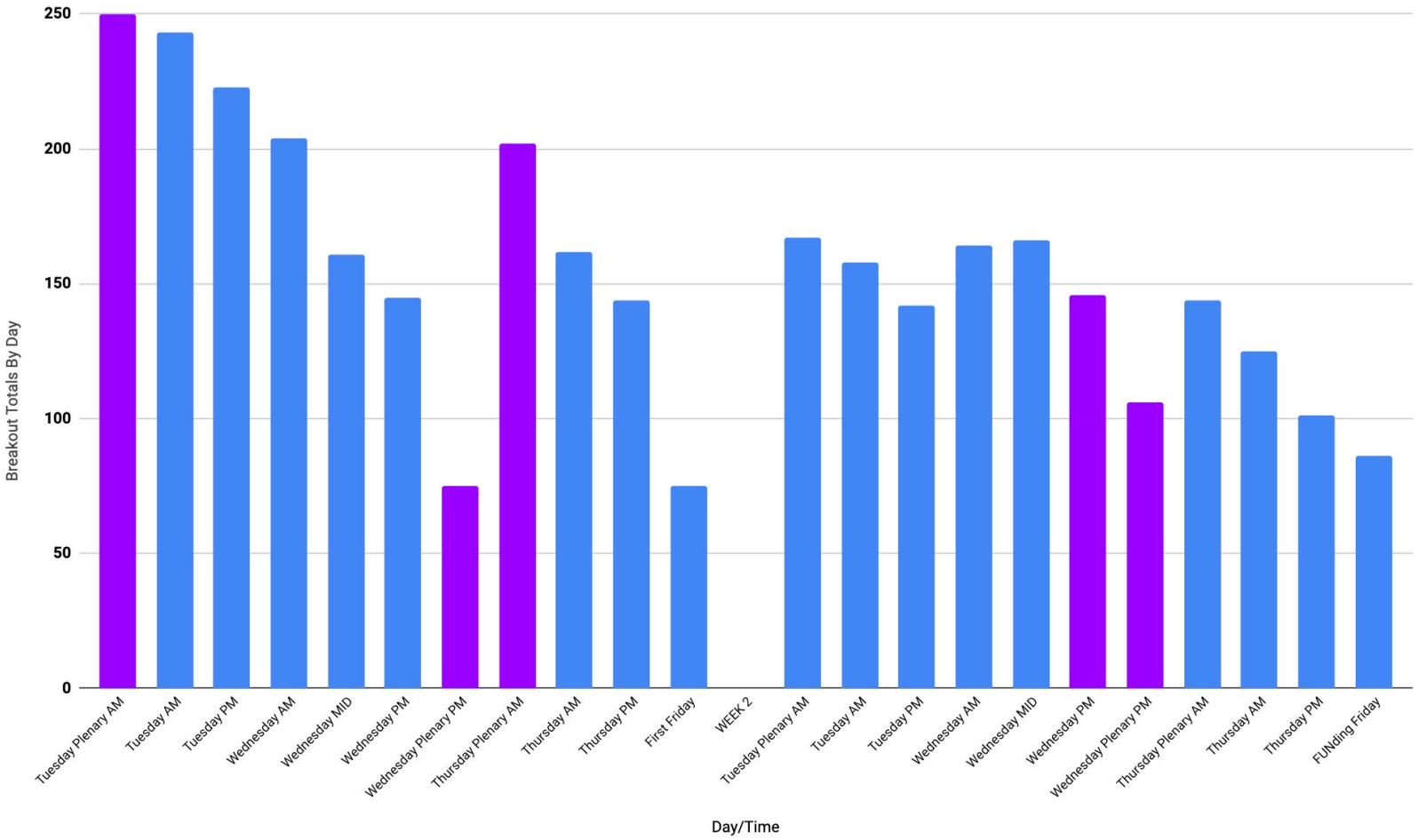
Top 10 Locations By Meeting Participants

1	United States of America	8792
2	Germany	108
3	Canada	108
4	Australia	95
5	United Kingdom	50
6	New Zealand	40
7	South Africa	17
8	Spain	12
9	Netherlands	10
10	Austria	8

Which of the following ESIP areas are of interest?



2020 ESIP Summer Meeting - Breakout Totals By Day



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Welcome Susan Shingledecker

Incoming Executive Director

ESIP

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Plenary Highlights

Supported by:

Plenary Highlights

Week One -

Raskin Scholar - Jacklyn Guz - seeing ESIP's role in showcasing the work of early career professionals.

Danielle Wood - Space Enabled Research Groups - Using data from space to understand earth's systemic sustainability challenge.

Chelle Gentemann - Farallon Institute - empowering efficiency of open science

Julia Stewart Lowndes - OpenScapes - see what is possible

"Advancing justice is enabled by space"

- Danielle Wood

Plenary Highlights

Week Two -

US GEO Town Hall - Martin Yapur, Lawrence Friedl, Timothy Newman

Lesley-Ann Dupigny-Giroux - University of Vermont, VT Climatologist

Dan Morris - Microsoft - highlighting AI for Earth grantees

Strategic Themes Interactive Feedback

How do we get a broad range of sectors using Earth Science data to drive demand?

"Thank you for coming. Who is missing?"

- Lesley Ann Dupigny-Giroux

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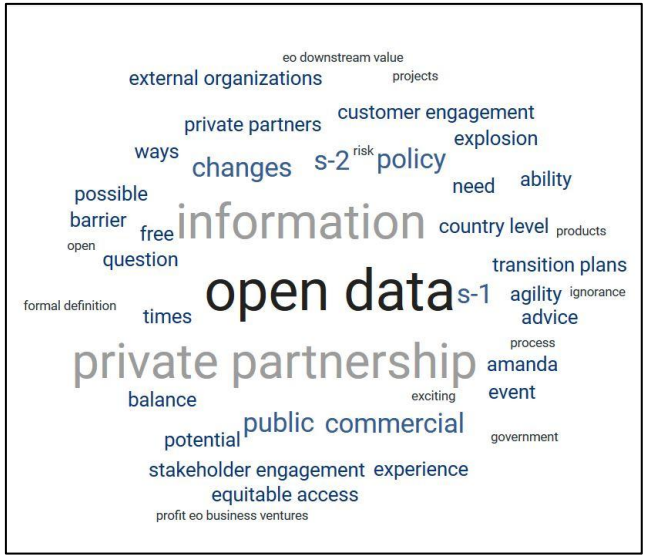
Breakout Session Highlights

Supported by: NASA NOAA USGS

ESIP Public-Private Partnership Cluster

Our session began with a survey of attendees, then four speakers presented their experiences working on Earth observation P3s, representing both public & private partners.



Takeaways:

1. There are numerous past and current Earth observation P3s from which to **build a list of leading practices**
2. **Definitions of P3s vary** depending on context, goals, partners, (etc.) but **similarities exist**
3. **External (public) communication** about partnerships, **partnership procurement**, and maintenance of **open data** were strong topics of interest to attendees

Want to learn more?
Contact: Crista Straub (cstraub@usgs.gov) or Carl Shapiro (cshapiro@usgs.gov)
Join our mailing list
(https://lists.esipfed.org/mailman/listinfo/esip-public-private-partnerships)

Tags:
Public-private partnerships, Earth observation data, best practices, leading practices, value

Open Source Environment-Security Analytics: Combining Capabilities from Government, Industry and Academia

Takeaways:

- Defining the Environment-Security sector is often the first challenge; highly interdisciplinary.
- The open source community aids public private partnerships and navigation of the intelligence community.
- Despite the structural and intellectual complexities, the intelligence community likes open data, and likes data standardization; it makes their job easier.

Tags:
Environment, security, public-private partnerships, open source, data, analytics

Want to learn more or join DANTE?

- Contact: Tom Parris, Joshua Brinks, Bob Chen
- Git: gitlab.com/dante-sttr
- Web: www.dante-project.org

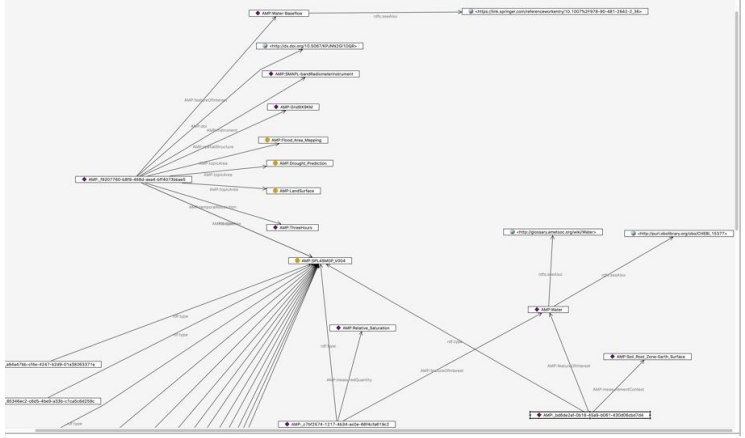
Usage-based Discovery Hackfest

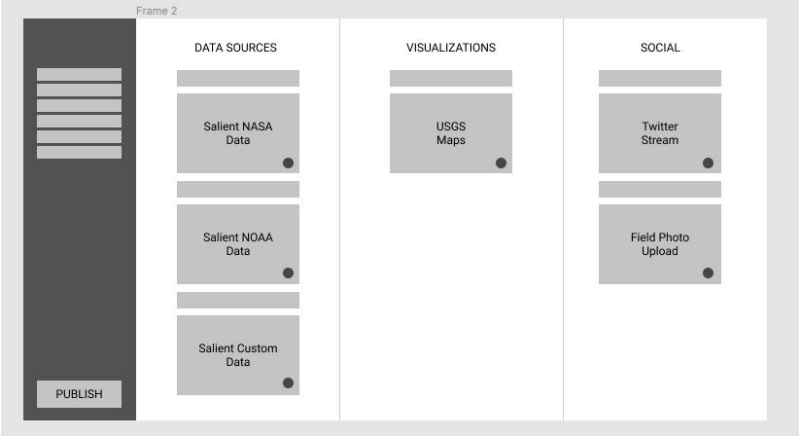
- Usage-based Discovery: finding datasets by how they are used
  - “What datasets does the Dartmouth Flood Observatory use for flood mapping?”
  - Focus of ESIP Discovery cluster for the present
  - Taking a graph database approach
- Hackfest Goal: Proof of Concepts
- 3 Teams
  - Coders
  - User Experience Designers
  - Foragers

C. Lynnes + ESIP Discovery Cluster

Results

- What?
  - Coders: 3 prototypes
  - UX Design: design mockups
  - Foragers: several dataset-use relationships
- So What?
  - **Coders**: this could work...
  - **Designers**: focus on data wranglers that put data+application together for end users
  - **Foragers**: Need better data citation practices in Applications
- Now What?
  - Evolve the code, make it scale
  - Get more dataset-use relationships
  - Other…(TBD)





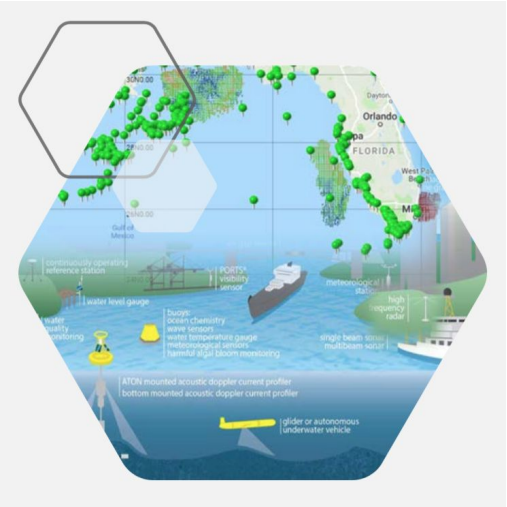
Recent advances in environmental sensing for monitoring and research

Short talks and community discussion

Session Takeaways:

Advancements in low-cost, low-power, and/or open-source hardware and software generate higher quality data and metadata, open up new opportunities, and make *in-situ* environmental monitoring and research more feasible.

The community is very interested in **virtual hands-on workshops** on open-source hardware wiring & programming (e.g., Arduino, LoRa, IoT), SensorML, embedded QA/QC, and data delivery.



X-DOMES (Cross-Domain Observational Metadata for Environmental Sensing). Image credit: Felimon Gayanilo.

Want to learn more? We welcome all.

Wiki: http://wiki.esipfed.org/index.php/EnviroSensing_Cluster
Contacts: Renée Brown rfbrown@unm.edu, Scotty Strachan strachan@unr.edu
Join Us! Monthly telecons are 1st Tuesdays @ 5PM ET | 2PM PT

Keywords:

environmental sensor networks, edge computing, machine learning, metadata, provenance, Internet of Things (IoT), LoRa, SensorML, TensorFlow

Building technical know-how through innovation seed-funding (and community)

Summary of the ESIP Lab and USGS Community for Data Integration seed-funding processes, how to participate, lessons learned.

Integrate a learning objective into your project!

Use the community!

TAKEAWAYS:

- **Innovation seed funding is a way to improve processes and workflows and reduce reinvention of the wheel.**
- **Safe (non-competitive) places (like CDI/ESIP) are critical venues for brainstorming & asking questions while experimenting with new technology implementations.**
- **Time invested in learning a new skill might slow you down in the short term, but has long-term benefits!**

Tags:
Grants, ESIP Lab, CDI, community

Want to learn more?
Contact: Annie Burgess, Leslie Hsu
Join: ESIP Lab | CDI

Community concept mapping for data-to-decisions – Use cases in climate adaptation, disaster planning, and disaster response

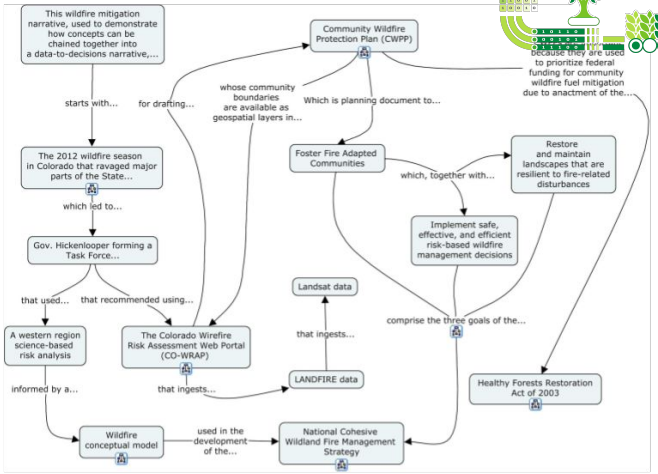
Concept maps as a means to engender common understanding of transdisciplinary socio-environmental challenges, to trace (possibly machine-enabled) from these challenges to relevant data

Takeaways: Concept maps are useful for

- engaging, communicating, and educating
- facilitating transdisciplinary collaborations

Towards ESIP 2021 Winter: Road map aligned with UN SDGs, starting with Food Security & Disasters

Wildfire prevention



2

Want to learn more?

Contact: Bill Teng (william.l.teng@nasa.gov) & Brian Wee (bwee@massiveconnections.com)

Join:

https://bit.ly/33ExnRk

Tags: Climate, data-to-decisions, SDGs, disasters mitigation, soils data harmonization, wildfires, biodiversity, food security

ESIP Community Contributions To The FAIR Convergence Matrix: A Hands-on Workshop Part 1 & 2

Main goal: Help move toward a FAIR data ecosystem by including Earth Science data community implementation profiles

Takeaways:

- People see the value of knowing how others' have implemented FAIR, and want to know more about machine actionable metadata
- GO FAIR tools and services can be very helpful to ESIP in implementing FAIR
- ESIP partners should contribute more to the GO FAIR tools like FAIRsharing.org directory and create more FAIR Implementation Profiles!

Image by Penstones from Pixabay

Want to learn more?

Contact: Nancy Hoebelheinrich, nhoebel@kmotifs.com

Also see:

https://www.go-fair.org/2020/07/08/a-three-point-framework-for-fairification/

Tags:

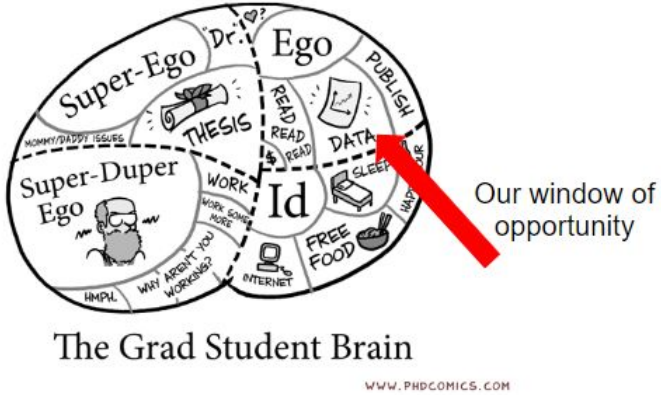
FAIR data principles, machine-actionable metadata, FAIR data ecosystem

What we wished we had learned in Grad School

Create a ‘cheat sheet’ outlining procedures and resources for data management. This resource is aimed specifically at graduate students.

Takeaways:

- **Start early in a grad student’s career**
- **Integrate into existing curricula/requirements**
- **Think about hosting/dissemination and how best to reach people**



Tags:

Data management, grad school, data training

Want to learn more?

Contact: Ben Roberts-Pierel (robertsb@oregonstate.edu)

Connecting Informatics to Science Communities

Informatics are an increasingly important factor to do effective data collection, curation and scientific research. This session looked at this landscape and the future for data users and providers using 9 breakout groups focused on various questions and themes (https://docs.google.com/presentation/d/1y41t9kEhF0KOQYpZ5X1EcAjlplQN_aKSLl4V8FljfmM/edit#slide=id.p)

Takeaways:

- **Leverage Help Desk at conferences including AGU data fairs to engage data users. Match users/problems to experts. Mini presentations at help desk on tools/services to solve a problem. Hackathons.**
- **Start data management/informatics early – career, new mission/campaign, new instrument, new dataset**
- **Build analogies to simplify complex problems – reuse for other disciplines or communities**
- **Promulgate ideas in Marine Data Cluster for now**

Tags:

Information management, interoperability, informatics, user experience, data, applications

Want to learn more?

Contact: Ed Armstrong , Jessica Hausman, Karen Stocks, Carolina Gonzalez, Steve Diggs, Stace Beaulieu

Join: TBD

Credit for Research Artifacts

In research we produce many artifacts including samples, software, data, ontologies that contribute to the body of knowledge. How do we recognize these contributions and the roles involved?

- Defining the artifact to be credited is essential for assigning credit but also difficult. “Model” is especially fraught.
- The Contributor Roles Taxonomy (CRediT) may not apply well for artifacts other than papers. We need to consider other taxonomies . Perhaps ESIP needs to create one.
- The credit use case is harder than the reproducibility use case. People are more difficult than computers.

Images courtesy: https://thenounproject.com

Citation, credit, social systems

Contact: Mark Parsons, parsons.mark@gmail.com

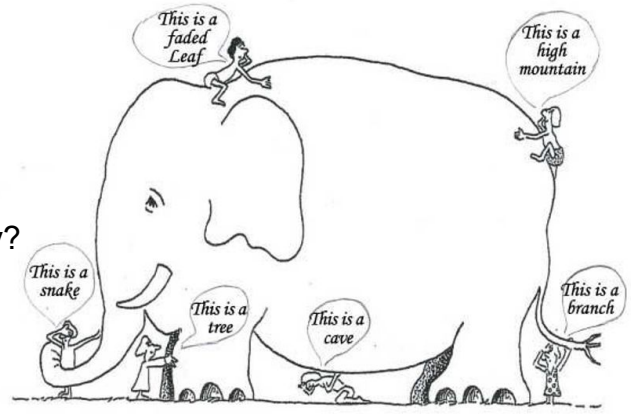
https://wiki.esipfed.org/Research_Object_Citation

Plenary: Proliferation of Vocabularies in Solid Earth, Space and Environmental Sciences: which ones should I use and which ones can I trust?

There was agreement that there is an ‘elephant’ in the room and that it is timely to try to better minimise proliferation of vocabs, ontologies, semantics, etc., whilst still respecting different needs and perspectives where they are necessary...

Takeaways:

- We do need to avoid (often unintended) duplication and reinvention of the wheel not just within ESIP, but external to ESIP. But how, where and who was the debate.
- Within ESIP, which part of the vocabulary ‘elephant’ are the individual clusters/ committees were working on? Is this something for the Semantic Technologies Committee? Can some issues be solved in the ESIP Community Ontology Repository?
- External to ESIP these groups have relevant work:
  a) *Content/concepts*: RDA ESES-IG, Fairsharing.org, Go FAIR, IUGS, IUGG, NERC, ARDC Vocabulary Interest Group.
  b) *Technical issues:* OGC/W3C, ISO, RDA Vocab IG, RDA Terminology IG, Go FAIR, FAIRsFAIR, TDWG, OBO Foundry, CODATA etc, etc, etc



6 blind men describe an elephant (old indian fable)

https://sneliasingapore.wordpress.com/the-onion/mental-models-understanding-our-system/

Tags:

Semantics, vocabularies, ontologies, interoperability, FAIR principles

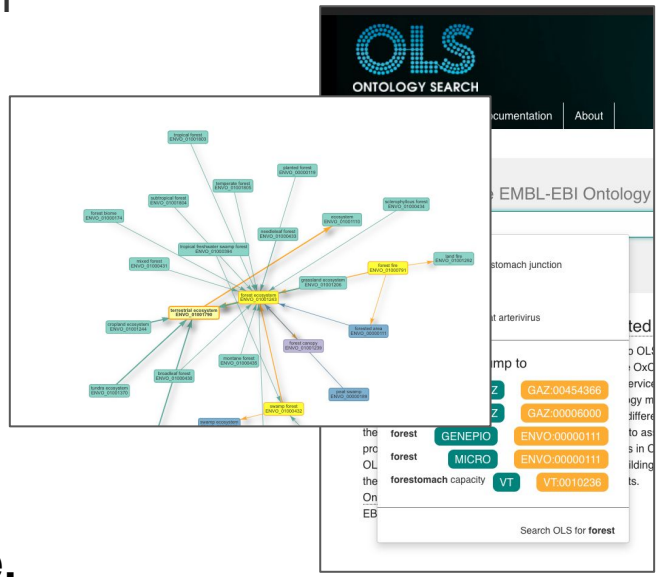
Want to learn more?

Contact: Ruth Duerr

Join: https://lists.esipfed.org/mailman/listinfo/esip-semantictech

Drafting Guidelines for Vocabulary Selection

Consider how to assist repositories and data managers in choosing appropriate vocabularies



Takeaways:

- **Community is currently using many different incompatible vocabularies of varying quality**
- **Users need a coordinated directory or catalog of well-constructed earth and environmental vocabularies, with documentation**
- **Middleware is essential to helping users navigate, understand and use existing vocabularies**

Want to learn more?

Contact: margaret.obrien@ucsb.edu[1]

Join: Semantic Harmonization[2]

[1]User guidelines

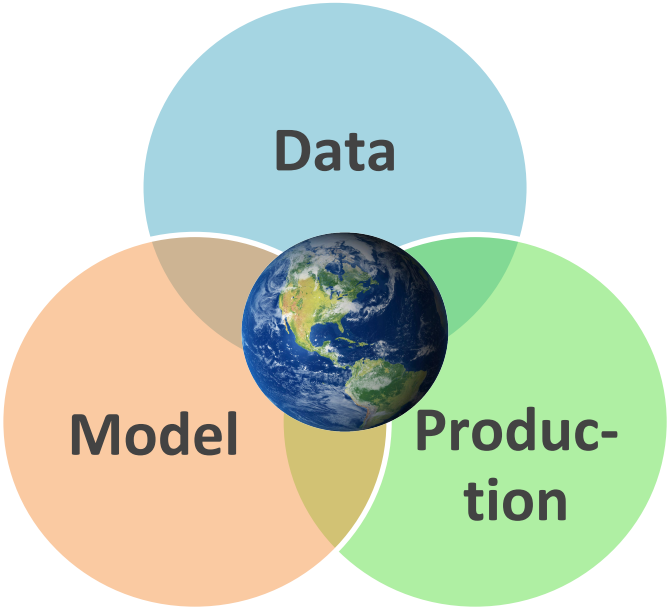
[2]General vocabulary coordination

Tags:

Ontology, vocabulary, OWL, SKOS, RDF

Organizational Strategies, Standards, and Policies for Machine Learning

Engaging with different organizations to discuss how ESIP community can support/promote the adoption of machine learning for all Earth science domains.



Takeaways:

- **There is increasing needs for ML ready data for Earth sciences ;**
- **Maturity level criteria are needed for both data and models;**
- **Lack of (cross-agency) best practices for curating ML ready data to ensure interoperability.**

Tags:
Machine Learning, Strategy, ARD, Best Practices

Want to learn more?
Contact: Yuhan Rao (yuhan.rao@gmail.com)
Join us:
Machine Learning Cluster email list
August telecon (08/21 12pm ET)

Machine Learning Tutorials

Introducing the development of interactive machine learning tutorials for Earth sciences supported by 2019 FUNding Friday.

Takeaways:

- **We need more Earth science oriented tutorials for machine learning;**
- **Plan to expand ESIP machine learning tutorials through co-development with other clusters and users/data providers.**

Want to learn more?
Contact: Yuhan Rao (yuhan.rao@gmail.com)
Join us:
Machine Learning Cluster email list
August telecon (08/21 12pm ET)

Tags:
Machine Learning, Tutorials, Learning & training

Project Planning and Management Workshop

The workshop offered as a combination of project planning and management first principles and hands-on experience with an open source project management tool - ProjectLibre.

Takeaways:

- **A foundation of project management concepts from conceptualization and planning through tracking and completion.**
- **Knowledge on the use of ProjectLibre, a free project management planning tool for project planning, visualization, and analysis**
- **Practice using ProjectLibre for a participant's project of interest**

Tags:

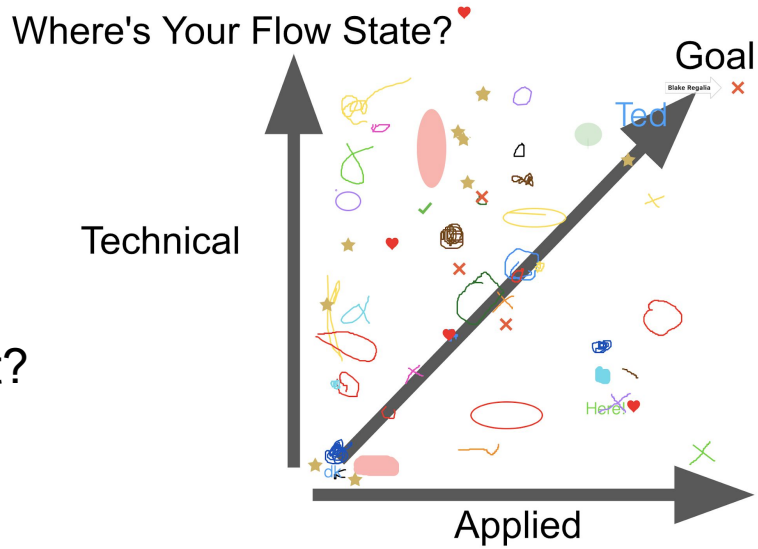
Project Management

Want to learn more?

Contact: Karl Benedict (kbene@unm.edu), Ward Fleri (ward.fleri@gmail.com)

Structured Data on the Web

Putting best practices into practice
Bringing technologists together with practitioners



Takeaways:

- Schema.org allows for a lot of interpretations
- Current best practices are not explicit enough
- Can JSON-Schema be used to be more explicit?
- Focus on driving adoption of shared identifiers.

Tags:
Linked data, schema.org, knowledge management, spatial features

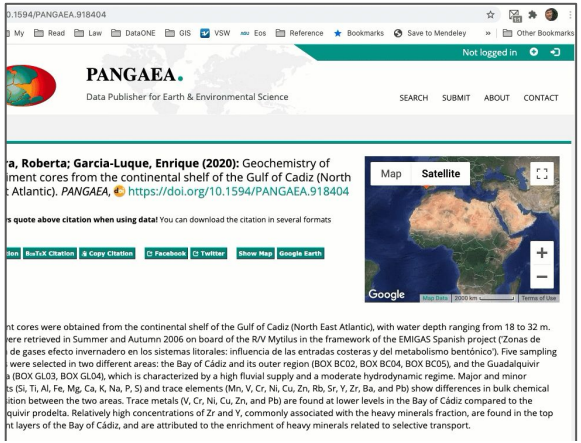
Want to learn more?
Contact: dblodgett@usgs.gov, aebudden@nceas.ucsb.edu ashepherd@whoi.edu, ruth.duerr3@gmail.com, lewis.j.mcgibbney@jpl.nasa.gov
Join: https://github.com/ESIPFed/science-on-schema.org

Science on Schema.org (SOSO)

Discussed needs for schema.org discovery in social sciences, and how to advance guidelines for discovery interoperability. (Gdoc notes)

Takeaways:

- **Terminology matters for onboarding communities**
- **Supporting qualitative data in guidelines**
- **SOSO Dataset Guidelines 1.2 are in progress**
  - **Variable measured (via O&M/SOSA? …)**
  - **Provenance relations (via PROV-O? …)**
  - **Guidelines Validator (via SHACL)**



github.com/datadavev/soso-chrome

https://science-on-schema.org

Tags:

schema.org, Data federation, metadata, discovery, Interoperability

Want to learn more?

Contact: Adam Shepherd

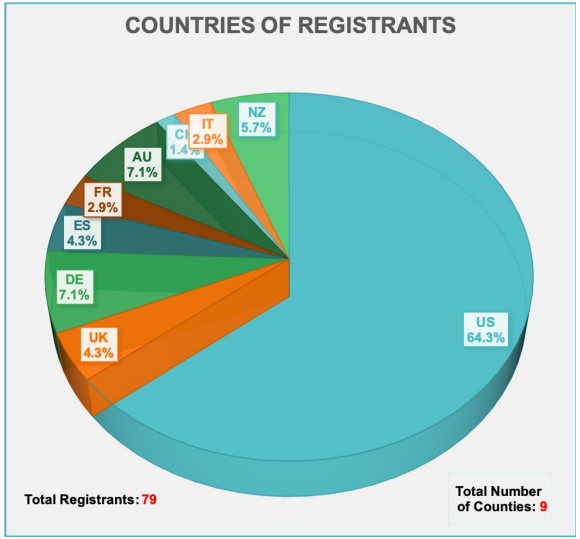
wiki.esipfed.org/Schema.org_Cluster

ESIP IQC/BSC Pre-ESIP Workshop Report Out

- **ESIP IQC co-organized a virtual pre-ESIP workshop on 7/13/2020**
  - Community guidelines for FAIR dataset quality information,
  - Explore the needs, challenges, and existing approaches by various (global) Earth Science organizations.

- **This SM20 session**
  - Pre-ESIP Workshop and its outcomes,
  - Presentations from workshop participants,
  - Open discussion among the ESIP community, workshop participants and organizing committee members.

- **Takeaways**
  - Community guidelines: i) Beneficial; ii) Iterative process with a feedback loop (funders, data producers, data users, and data managers); iii) Actionable; iv) Consideration of long-term sustainability.



Tags:

Data Quality, Information Quality, FAIR

Want to learn more?

Contact: Ge Peng; gpeng@ncsu.edu; other IQC co-chairs: Yaxing Wei, Robert Downs, David Moroni, and Rama Ramapriyan

Join Us: wiki.esipfed.org/Information_Quality

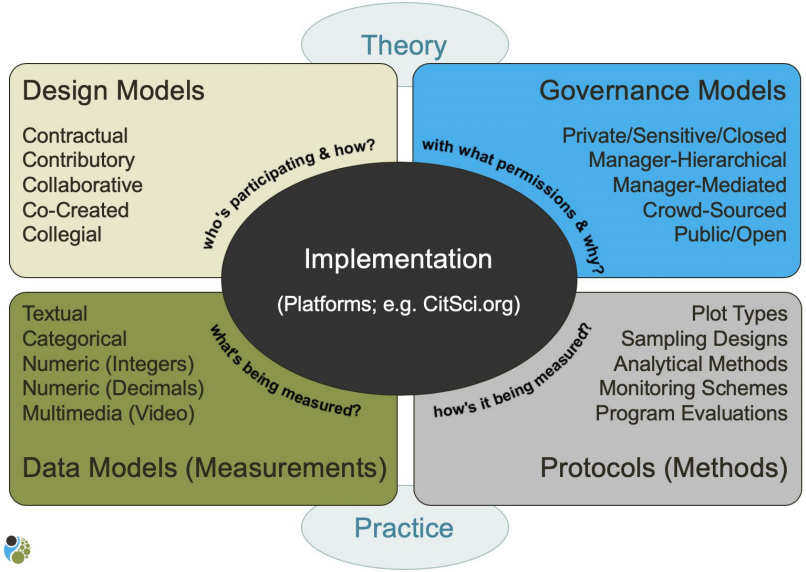
Citizen Science Data and Information Quality

Invited presentations from Citizen Science Association and Earth Challenge 2020 to share experience and the challenges/opportunities you see on improving, documenting, and encouraging use of the quality of citizen science data and services.

ESIP
Information Quality Cluster

Takeaways:

- **Platforms have an important role for helping with CS workflow and increasing confidence in CS data products. Need to improve documentation of quality in all stages of CS projects**
- **A survey of CS stakeholders could identify data quality requirements of different types of users; not just decision makers, but also intermediaries who could improve use of CS data in science that generates useful end products**
- **Rubrics for evaluating quality levels attained by citizen science data products and services would be useful and should be pursued, though there are challenges that need continued discussion.**



Want to learn more?
Contact: Information Quality Cluster
Join: ESIP IQC Mailing List

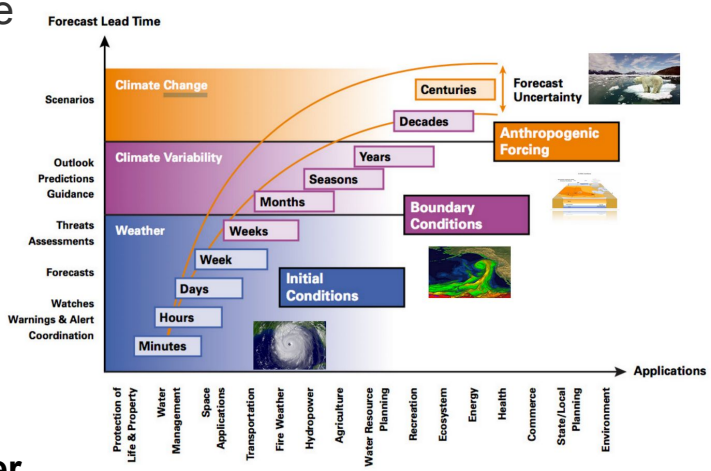
Citizen Science, Data Quality, Information Quality

Exploring New Perspectives and Formulating Best Practices for Data Uncertainty Information - Parts 1 & 2

Part 1: featured 2 new speakers shedding new light on UQ perspectives on data modeling and assimilation; Part 2: 4 mini-breakouts to dive deeper into perspectives, providing foundation for a Part 2 recommendations paper.

Takeaways:

- **Consider new use cases of perspectives not previously explored.**
- **Emerging need to resolve the difference in spatio-temporal scales between in situ, airborne, satellite and modeled/assimilated data.**
- **Discipline independent, open-source tools are needed to support algorithm developers to support UQ workflows and consistent representation in data files; having a common vocabulary in data files addresses users' needs to use UQ/UC information in a manner that fits their purpose.**



Graphic Source: https://www.wmo.int/

Tags: **Uncertainty Quantification, Uncertainty Characterization, Modeling, Assimilation, In SItu, Airborne, Remote Sensing, Information Quality, Data Quality, Data Science, Science Quality, Statistics, Data Fusion**

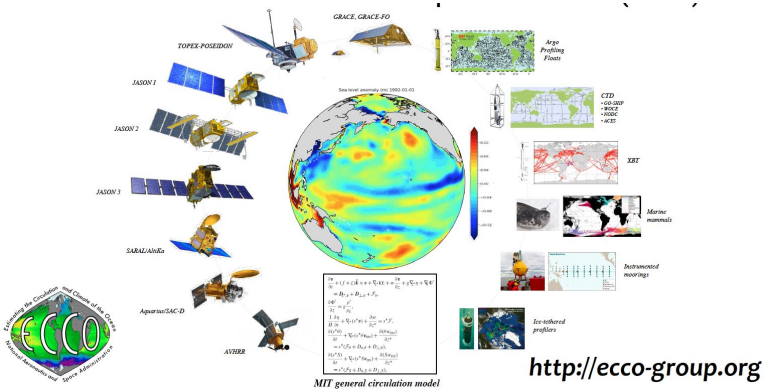
Want to learn more?

Contact: David Moroni (david.f.moroni@jpl.nasa.gov)

Join: IQC Mailing List (http://lists.esipfed.org/mailman/listinfo/Esip-infoquality)

Standardizing The Representation of Uncertainty Information In NetCDF- Status and Next Steps on the NetCDF/CF UQ Proposal

Featured discussion led by Ken Kehoe to on current status of NetCDF/CF UQ proposal and identifying next steps to take in standardizing representation of UQ info in data files; as the graphic illustrates, diversity of data often leads to different representations of UQ.



Takeaways:

- **Polish up the technical terminology.**
- **Need to get some consensus on where we go with regard to using either the standard name modifier vs. the actual standard name; in either approach, the proposal itself contains some optional metadata attributes that would still require the submission of a formal CF proposal.**
- **Need to establish a timeline for community review and submission.**

Tags: **Uncertainty Quantification, Uncertainty Characterization, Modeling, Assimilation, In Sltu, Airborne, Remote Sensing, Information Quality, Data Quality, Data Science, Science Quality, Statistics, netCDF, CF, encoding, interoperability**

Want to learn more?

Contact: **David Moroni (david.f.moroni@jpl.nasa.gov)**
Ken Kehoe (kkehoe@ou.edu)

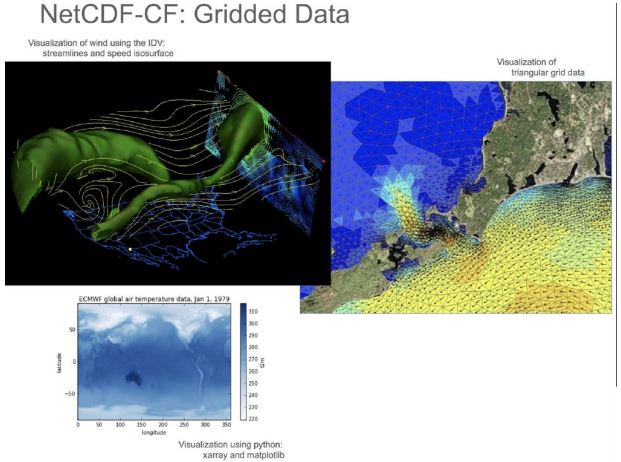
Join: **IQC Mailing List (http://lists.esipfed.org/mailman/listinfo/Esip-infoquality)**

CF Conventions for NetCDF

Short sentence summarizing what happened and/or the goals of the session.

Takeaways:

- **CF is a Community Effort. All are welcome and encouraged to participate.**
- **CF Data Model helps guide CF development -- https://doi.org/10.5194/gmd-10-4619-2017**
- **CF Standard Names:**
  - **Can be related to other vocabularies.**
  - **As LinkedData/ontology, coming soon**



Tags:

CF, Community, Metadata Convention, netCDF

Want to learn more?

Contact: edavis@ucar.edu

Join: This mailing list or next telecon

...and Samples. A proposed ESIP Cluster for the Physical Samples Community

Attendees engaged in energetic discussion on the needs for the physical samples communities. It highlighted a diverse and vast community around samples which needs a space to coordinate.

Takeaways:

- **There is enough community support to propose a physical samples cluster in ESIP.**
- **The draft cluster statement needs to be broadened to encompass the wider range of earth/environmental science sample communities.**
- **We need to coordinate with the broader/global physical samples communities (TDWG, RDA, SPNHC, ICOM).**

Image from: McNutt, M., Lehnert, K., Hanson, B., Nosek, B. A., Ellison, A. M., & King, J. L. (2016). Liberating field science samples and data. *Science*, *351*(6277), 1024-1026.

Tags:

physical samples, repositories, curators, metadata, vocabularies, ontologies

Want to learn more?

Contact: Valerie Stanley or Sarah Ramdeen

Join: *To be announced*

Public-Private Partnerships in the Age of the COVID-19 Global Pandemic (session 1 & 2)

Importance of coordinating data availability, sharing, trust levels and usability between public and private sectors to drive decision making.

Takeaways:

- Trust levels for data are critical for COVID-19 decision making environments
- Public-Private coordination & use case evolution help to improve efficiencies and safety of operations
- Need to bridge the gap between agency data and use of that data throughout the public-private partnership

Next 6 Months (Our Goal): Need to establish a mechanism to provide feedback to agencies and private sector data providers on data usability
(use cases, latency, ease of access)

Tags:
Disasters, trusted data, operational readiness levels, sensitive information sharing, data driven decision making

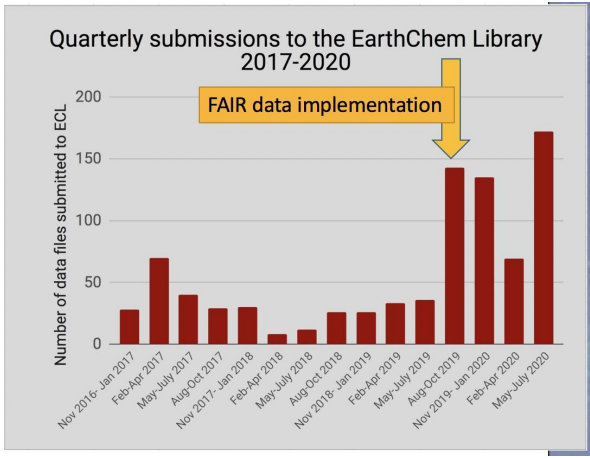
Want to learn more?
Contact: Karen Moe, Dave Jones
Join: esip-disasters@lists.esipfed.org
Meet FIRST Thursday of every month – 4pm ET

Checking in on the Alignment of Data Publishing Workflows Between Repositories, Publishers, Funders, and Researchers

Objective: Evaluate progress and initial experiences of implementing the FAIR Data guidelines at publishers and repositories and design their next conversations

Takeaways:

- Implementation has progressed and is showing impact.
- Repositories struggle to meet inconsistent publishers' requirements.
- Funding for repositories needs to scale to increased demands - HARD!
- Education of researchers is critical: Repositories need to be engaged during the project proposal and Data Management planning phase.
- Use COPDESS to share materials for researchers/authors, editors, repositories, and other stakeholders.
- Encourage funders to participate in the data/repository discussions.



Tags:

COPDESS, Data Stewardship, Repositories

Want to learn more or participate?

Contact: LEHNERT@LDEO.COLUMBIA.EDU or BHANSON@AGU.ORG

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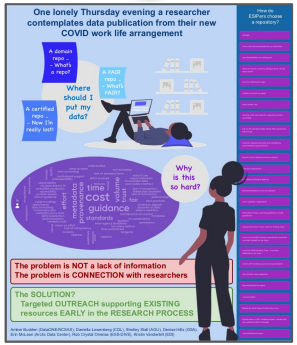
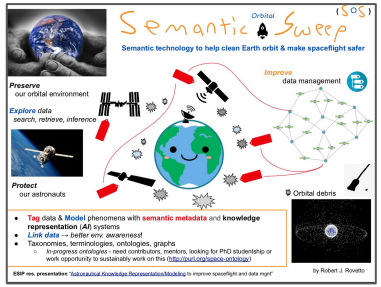
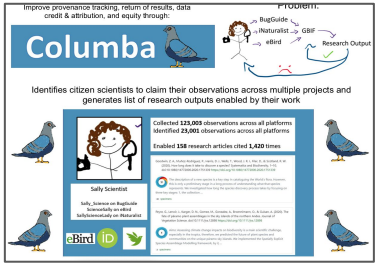
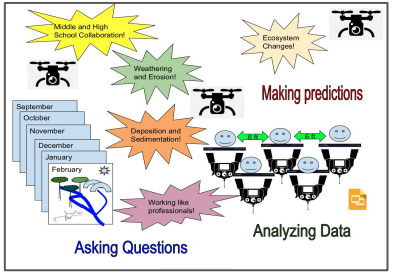
2020 FUNDING FRIDAY

82 attendees
9 submissions
3 member winners
3 student/teacher winners









MAKING DATA MATTER

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Thank you for attending!

Keep up on all things ESIP:
bit.ly/ESIPmondayupdate

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