

Informatics Infrastructure for Data-Driven Materials Research at NIST

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*Shared Metadata and Data Formats for Big-Data Driven Materials Science
Erwin-Schrödinger-Zentrum, Berlin
Monday July 8, 2019*



NIST Disclaimer

Certain commercial equipment, instruments, materials, or software are identified in this talk to foster understanding. Such identification does not imply recommendation or endorsement by NIST, nor does it imply that the materials, equipment, or software identified are necessarily the best available for the purpose.

Acknowledgments

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- Others: Kathy Sharpless, Nicholas Ritchie, Gerhard Goldbeck, Larry Lannom, Giridhar Manepali

Research Data Alliance, Project FREYA

Office of Data and Informatics

Standard Reference Data

- Distribution
- Sales
- Infrastructure
- Usage analysis and impact
- Improve web sites and user interfaces
- Provide APIs

Research Data

- **Improve data management practices**
- Data management planning tools
- **Laboratory automation**
- Electronic Lab Notebooks
- **NIST open data repository**
- **NIST data portal**

Data Science

- Informatics and analytics resource
- Big data
- HPC and Cloud computing

Community

- National Data Services Consortium
- Research Data Alliance
- Other US federal agencies (NIH, DOE, NSF)
- CENDI
- National Metrology Institutes (NMIs)
- BIPM (Paris)
- CODATA, WDS



Robert Hanisch
Director, Office of Data and Informatics

Research Data Management at NIST

Discover



- Standard Reference Data
- Materials Data Repository
- Materials Data Facility
- Persistent identifiers (DOIs, handles)

- Materials Resource Registry (data, code)
- International Metrology Resource Registry
- NIST Enterprise Data Inventory
- data.gov
- NIST Public Data Repository and Search Portal



Access

Interoperate

- Materials Data Curator
- Data type registry
- Schema repository
- Lab info management systems



Discovery

NIST Materials Resource Registry

NIST Home Services > Login Help Contact

Materials Resource Registry

Part of the Materials Genome Initiative

SEARCH FOR RESOURCES **ADD YOUR RESOURCE**

Find Materials Data

This system allows for the registration of materials resources, bridging the gap between existing resources and the end users. The Materials Resource Registry functions as a centrally located service, making the registered information available for research to the materials community.

This is being developed at the National Institute of Standards and Technology and is made available to solicit comments from the Material Science community. Please do not enter any proprietary data into this system.

Home Page

- Services
 - Search for resources
 - Add your resource
- Login
- Help
- Contact

<https://materials.registry.nist.gov/>

stand-
alone data
registry

International Metrology Resource Registry

Bureau
International des
Poids et
Mesures

[Home](#) [Services »](#) [Dashboard](#) [Logout](#) [Help](#) [Contact](#)

<http://imrr.bipm.org/>

IMRR

International Metrology Resource Registry Delta

SEARCH FOR RESOURCES ADD YOUR RESOURCE

Find Resources

This system allows for the registration of resources, bridging the gap between existing resources and the end users. The International Metrology Resource Registry functions as a centrally located service, making the registered information available for research to the global community.

This is being developed at the Bureau International des Poids et Mesures and is made available to solicit comments from the global community. Please do not enter any proprietary data into this system.

Home Page
Services
Search for resources
Add your resource
Dashboard
Logout

stand-alone data registry

PHYSICAL MEASUREMENT LABORATORY

[About PML](#) +[Divisions](#) +[Products/Services](#) +[News/Multimedia](#)[Programs/Projects](#)[Facilities](#) +[Email Newsletter](#)

Atomic Spectra Database



Version 5

[Version History & Citation Information](#) | [Disclaimer](#)

Welcome to the NIST Atomic Spectra Database, NIST Standard Reference Database #78. The spectroscopic data may be selected and displayed according to wavelengths or energy levels by choosing one of the following options:

LINES

Spectral lines and associated energy levels displayed in wavelength order with all selected spectra intermixed or in multiplet order. Transition probabilities for the lines are also displayed where available.

LEVELS

Energy levels of a particular atom or ion displayed in order of energy above the ground state.

**GROUND STATES &
IONIZATION ENERGIES**

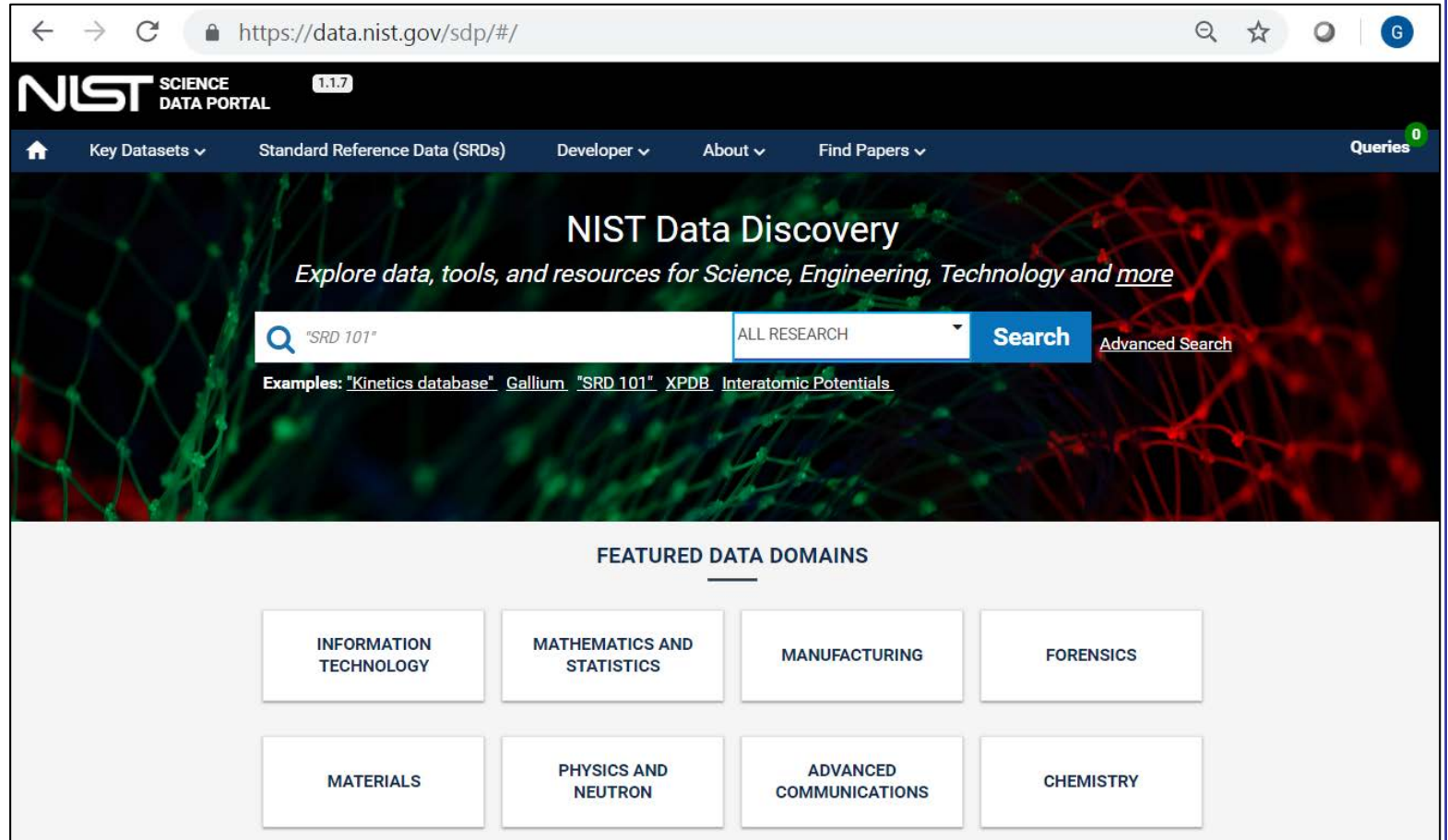
Ground states and ionization energies of atoms and atomic ions.

stand-
alone data
repository

Discover NIST Data at data.nist.gov

Web portal Discovery Tool for NIST public data

- Search All NIST inventory of public datasets
- Access to the NIST Public Data Repository
- Navigation to Data Publications, Custom Repositories

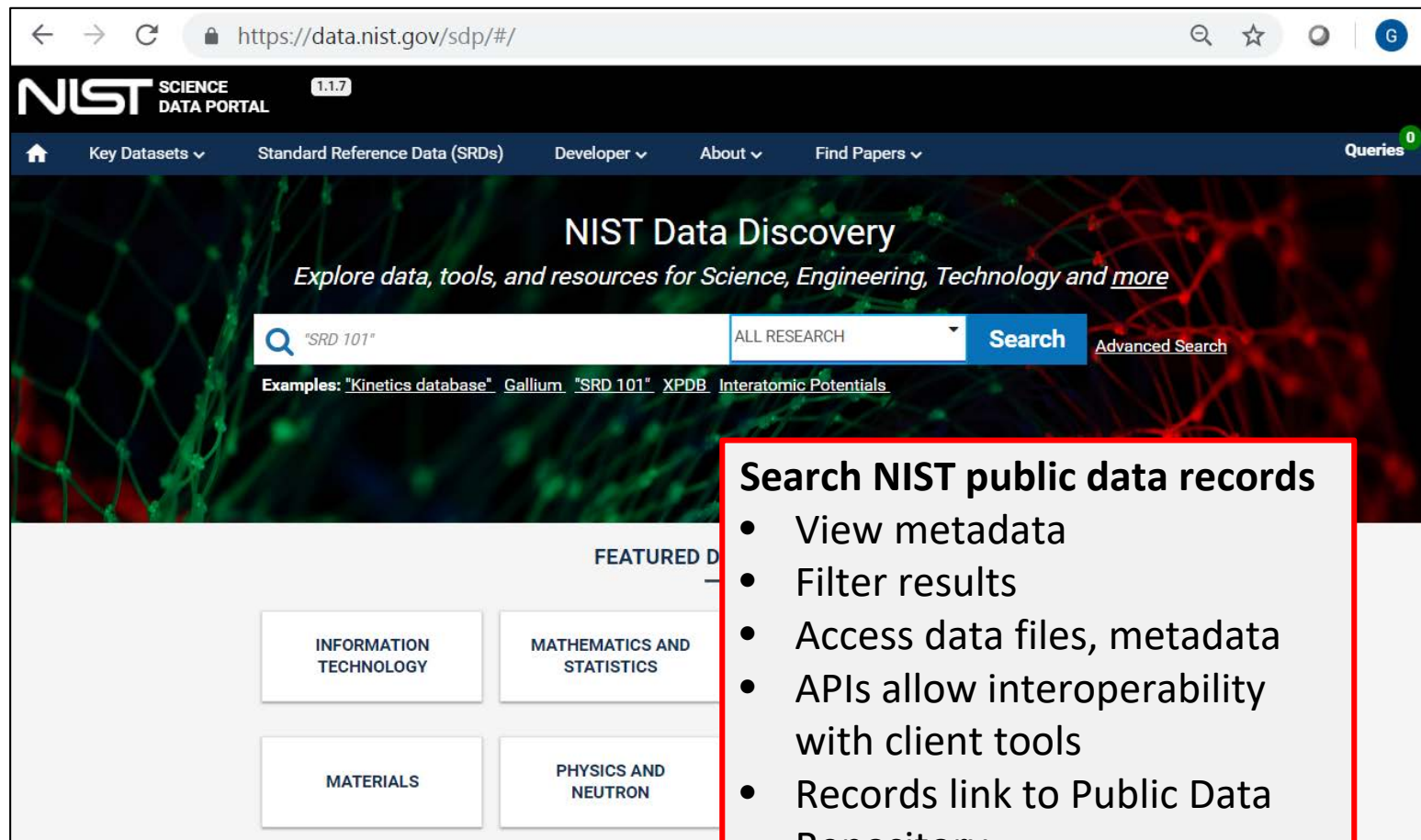


The screenshot displays the NIST Science Data Portal website. The browser address bar shows the URL <https://data.nist.gov/sdp/#/>. The page header includes the NIST logo, "SCIENCE DATA PORTAL", and a version number "1.1.7". A navigation menu contains links for "Key Datasets", "Standard Reference Data (SRDs)", "Developer", "About", and "Find Papers", along with a "Queries" indicator showing 0. The main content area features a search bar with the query "SRD 101" and a dropdown menu set to "ALL RESEARCH". A "Search" button and a link to "Advanced Search" are also present. Below the search bar, examples of search results are listed: "Kinetics database", Gallium, "SRD 101", XPD, and Interatomic Potentials. The "FEATURED DATA DOMAINS" section is displayed below, with buttons for INFORMATION TECHNOLOGY, MATHEMATICS AND STATISTICS, MANUFACTURING, FORENSICS, MATERIALS, PHYSICS AND NEUTRON, ADVANCED COMMUNICATIONS, and CHEMISTRY.

Discover NIST Data at data.nist.gov

Web portal Discovery Tool for NIST public data

- Search All NIST inventory of public datasets
- Access to the NIST Public Data Repository
- Navigation to Data Publications, Custom Repositories



The screenshot shows the NIST Science Data Portal website. The browser address bar displays "https://data.nist.gov/sdp/#/". The page header includes the NIST logo and "SCIENCE DATA PORTAL 1.1.7". A navigation menu contains links for "Key Datasets", "Standard Reference Data (SRDs)", "Developer", "About", and "Find Papers". A search bar is prominently displayed with the text "NIST Data Discovery" and the tagline "Explore data, tools, and resources for Science, Engineering, Technology and more". The search bar contains the query "SRD 101" and a dropdown menu set to "ALL RESEARCH". Below the search bar, there are example search terms: "Kinetics database", Gallium, "SRD 101", XPDB, and Interatomic Potentials. A "Featured Data" section is visible below the search bar, with four categories: "INFORMATION TECHNOLOGY", "MATHEMATICS AND STATISTICS", "MATERIALS", and "PHYSICS AND NEUTRON".

Search NIST public data records

- View metadata
- Filter results
- Access data files, metadata
- APIs allow interoperability with client tools
- Records link to Public Data Repository

Enterprise Data Inventory

- *Enhanced for Discoverability*

Faceted Filters for Research Topic

- *Based on the NIST Taxonomy*

New Data

Publications via MIDAS

- **“Management of Institutional Data Assets”**

The screenshot shows the NIST Science Data Portal interface. At the top, the logo 'NIST SCIENCE DATA PORTAL' is displayed with a version number '1.1.7'. Below the logo is a navigation bar with links for 'Key Datasets', 'Standard Reference Data (SRDs)', 'Developer', 'About', and 'Find Papers'. A search bar is located in the center, with a dropdown menu set to 'ALL RESEARCH' and a 'Search' button. To the right of the search bar is a 'Queries' indicator showing '0'. Below the search bar, there are example search terms: 'Kinetics database', 'Gallium', 'SRD 101', 'XPDB', and 'Interatomic Potentials'. The main content area shows '361 records found' and a pagination control with 'Previous', '1', '2', '3', '4', '5', '...', '37', and 'Next'. A 'Customize Fields' button is also present. On the left side, there are faceted filters for 'Resource Type', 'Research Topics', and 'Record has'. The 'Resource Type' filter includes 'Public Data Resource' (361), 'SRD' (91), and 'Data Publication' (8). The 'Research Topics' filter includes 'Standards' (181), 'Unspecified' (111), 'Physics' (46), 'Information Technology' (24), and 'Materials' (21). The 'Record has' filter includes 'Data File' (106), 'Subcollection' (14), and 'Access Page' (59). The main content area displays three search results, each with a title, a brief description, subject keywords, and a 'Visit Home Page' button. The first result is 'Dataset from Fire Safety Challenges of Tall Wood Buildings - Phase 2: Task 3 - Cross Laminated Timber Compartment Fire Tests'. The second is 'SRM 895 Stainless Steel (SAE 201)'. The third is 'NIST Ionic Liquids Database - (ILThermo) - SRD 147'. The fourth result is partially visible: 'NIST Synthetic Polymer MALDI MS Methods Database - SRD 172'.

ALL RESEARCH

Search

[Advanced Search](#)

Examples: ["Kinetics database"](#) [Gallium](#) ["SRD 101"](#) [XPDB](#) [Interatomic Potentials](#)

Filters » ✕ Clear All

23 records found

« Previous 1 2 3 Next »

Customize Fields

Resource Type

- Data Publication 5
- Public Data Resource 23
- SRD 7

Research Topics

- Standards 14
- Physics 7
- Unspecified 7
- Materials 2
- Chemistry 2

Record has

- Data File 6
- Access Page 3

Authors and Contributors

Hestia Fossil Fuel Carbon Dioxide Emissions for Indianapolis, Indiana

Hestia Project quantifies, simulates and visualizes greenhouse gases such as carbon dioxide emitted in urban regions. Indianapolis data is provided at the county level (200 m grid resolution), and at hourly and yearly time frames. It builds upon work conducted at the ...[Read more](#)

Subject Keywords: *Greenhouse Gas, Carbon Dioxide, CO2, Urban Emissions, Carbon Monitoring, Atmospheric Modeling, Indianapolis, I...[Read more](#)*

[Visit Home Page](#)

Hestia Fossil Fuel Carbon Dioxide Emissions Inventory for Los Angeles Basin

Hestia Project quantifies, simulates and visualizes greenhouse gases such as carbon dioxide emitted in urban regions. Los Angeles basin activity is provided at the 1 km grid spatial resolution, and at temporal resolutions of hourly or annually. Hestia-LA urban CO2 emi...[Read more](#)

Subject Keywords: *Greenhouse Gas, Carbon Dioxide, CO2, Urban Emissions, Carbon Monitoring, Atmospheric Modeling, Los Angeles Bas...[Read more](#)*

[Visit Home Page](#)

Hestia Fossil Fuel Carbon Dioxide Emissions for Baltimore, Maryland

Hestia Project quantifies, simulates and visualizes greenhouse gases such as carbon dioxide emitted in urban regions. Baltimore, Maryland activity is provided at the county level (200 m grid resolution), and at hourly and yearly time frames. It builds upon work conduc...[Read more](#)

Subject Keywords: *Greenhouse Gas, Carbon Dioxide, CO2, Urban Emissions, Carbon Monitoring, Atmospheric Modeling, Baltimore, Mary...[Read more](#)*

[Visit Home Page](#)

Metadata and Vocabulary Standards for NIST Data

This page provides pointers to the various metadata and vocabulary standards used to serve and manage NIST data as part of NIST's open data initiative (Open Access to Research).

Table of Contents

- [NIST Extensible Resource Data Model \(NERDm\)](#)
- [Project Open Data \(POD\)](#)

NIST Extensible Resource Data Model (NERDm)

The NIST Extensible Resource Data Model (NERDm) refers to the [JSON-LD](#)-formatted metadata schema used by the NIST Public Data Repository (PDR) and Science Data Portal internally to describe data resources available from NIST. It is defined using [JSON Schema](#).

Resources

- [A Reader's Guide to NERDm Metadata](#)
- JSON Schema definition files:
 - NERDm Core (latest): [nerdm-schema-0.2.json \(v0.1\)](#)
 - Extension: Publications (latest): [nerdm-schema-0.2.json \(v0.1\)](#)
- JSON-LD context files:
 - [nerdm-schema-context.jsonld](#)

Data Publication

Hestia Fossil Fuel Carbon Dioxide Emissions for Indianapolis, Indiana

Kevin R. Gurney, Risa Patarasuk, Jianming Liang, Yuyu Zhou, Darragh O'Keeffe, Maya Hutchins, Jianhua Huang, Yang Song, Preeti Rao, Tamae M. Wong, James R. Whetstone

Contact: [Tamae Wong](#)

Identifier: [doi:10.18434/T4/1503341](https://doi.org/10.18434/T4/1503341)

Version: 3.2.0... Released: 2018-11-01 Last modified: 2019-04-19

Description

Hestia Project quantifies, simulates and visualizes greenhouse gases such as carbon dioxide emitted in urban regions. Indianapolis data is provided at the county level (200 m grid resolution), and at hourly and yearly time frames. It builds upon work conducted at the national scale by the Vulcan Project. These high spatial and temporal resolution datasets are available from 2010 to 2015.

Subject Keywords: Greenhouse Gas, Carbon Dioxide, CO2, Urban Emissions, Carbon Monitoring, Atmospheric Modeling, Indianapolis, Bottom-up Inventory

Data Access

These data are public.

Files  

Click on the file/row in the table below to view more details.

Name	Media Type	Size
200m.Indy.v3_2.total.annual.local.2010.nc	application/x-netcdf	215.1 kB
200m.Indy.v3_2.total.annual.local.2010.nc.sha256	text/plain	64 Bytes
200m.Indy.v3_2.total.annual.local.2011.nc	application/x-netcdf	215.1 kB

- Go To ..**
- ➔ Description
- ➔ Data Access
- ➔ References
- Record Details**
- ≡ View Metadata
- 📄 Export JSON
- Use**
- » Citation
- 📄 Fair Use Statement
- Find**
- 🔍 Similar Resources



Citation ✕

Copy the recommended text to cite this resource

Gurney, Kevin R., Patarasuk, Risa, Liang, Jianming, Yuyu, Zhou, O'Keeffe, Darragh, Hutchins, Maya, Huang, Jianhua, Song, Yang, Rao, Preeti, Wong, Tamae M., Whetstone, James R. (2018), Hestia Fossil Fuel Carbon Dioxide Emissions for Indianapolis, Indiana, National Institute of Standards and Technology, <https://doi.org/10.18434/T4/1503341> (Accessed 2019-6-19)

[See also NIST Citation Recommendations](#)

Example Search: "JARVIS"

The screenshot shows the NIST JARVIS search interface. At the top, there is a navigation bar with links for Home, Key Datasets, Standard Reference Data (SRDs), Developer, About, and Find Papers. Below this is a search bar containing the query "JARVIS" and a dropdown menu set to "ALL RESEARCH". A blue "Search" button is to the right of the search bar. Below the search bar, there are example search terms: "Kinetics database", Gallium, "SRD 101", XPDB, and Interatomic Potentials.

On the left side, there is a "Filters" panel with a "Clear All" button. The filters are organized into three sections:

- Resource Type:** Public Data Resource (1)
- Research Topics:** Physics (1), Materials (1), Electronics (1), Chemistry (1)
- Record has:** Access Page (1)

The main content area shows "1 records found" and a pagination control with "Previous", "1", and "Next" buttons. The search result is for "JARVIS: Joint Automated Repository for Various Integrated Simulations". The description states: "JARVIS (Joint Automated Repository for Various Integrated Simulations) is a repository designed to support classical force-field, density functional theory, machine learning calculations and experiments. The JARVIS website (JARVIS...Read more)". The subject keywords are: "Density functional theory, classical interatomic potential, force-field, python, JARVIS...Read more". Below the description is a green button labeled "Visit Home Page".

A red arrow points from the "Visit Home Page" button to the text "Links to existing repositories" on the right side of the image.

Public Data Resource

JARVIS: Joint Automated Repository for Various Integrated Simulations

Contact: [Kamal Choudhary](#) .. ⊕
Identifier: [doi:10.18434/M3HQ1W](https://doi.org/10.18434/M3HQ1W)
Last modified: 2017-10-18

Description

JARVIS (Joint Automated Repository for Various Integrated Simulations) is a repository designed to automate materials discovery using classical force-field, density functional theory, machine learning calculations and experiments. The Force-field section of JARVIS (JARVIS-FF) consists of thousands of automated LAMMPS based force-field calculations on DFT geometries. Some of the properties included in JARVIS-FF are energetics, elastic constants, surface energies, defect formations energies and phonon frequencies of materials. The Density functional theory section of JARVIS (JARVIS-DFT) consists of thousands of VASP based calculations for 3D-bulk, single layer (2D), nanowire (1D) and molecular (0D) systems. Most of the calculations are carried out with optB88vDW functional. JARVIS-DFT includes materials data such as: energetics, diffraction pattern, radial distribution function, band-structure, density of states, carrier effective mass, temperature and carrier concentration dependent thermoelectric properties, elastic constants and gamma-point phonons. The Machine-learning section of JARVIS (JARVIS-ML) consists of machine learning prediction tools, trained on JARVIS-DFT data. Some of the ML-predictions focus on energetics, heat of formation, GGA/METAGGA bandgaps, bulk and shear modulus.

Research Topics: Physics: Condensed matter , Materials: Modeling and computational material science , Electronics: Thin-film electronics , Electronics: Optoelectronics , Chemistry: Molecular characterization , Chemistry: Theoretical chemistry and modeling , Chemistry: Chemical thermodynamics and chemical properties , Electronics: Semiconductors , Materials: Materials characterization , Physics: Optical physics

Subject Keywords: Density functional theory, classical interatomic potential, force-field, python, JARVIS, MGI, MDCS, RESTAPI, automation

Data Access

These data are public. For more information, please visit the [home page](#).

Data is available via the following locations:

- [JARVIS for DFT](#)
- [JARVIS for Force-fields](#)

References

This data is referenced in :

- <https://www.nature.com/articles/sdata2016125>
- <https://www.nature.com/articles/s41598-017-05402-0>

- Go To ..
- Description
- Data Access
- References
- Record Details
- View Metadata
- Export JSON
- Use
- Citation
- Fair Use Statement
- Find
- Similar Resources
- Resources

[Visit Home Page](#)

Customized Links to existing repositories

Links to Scholarly Publications auto-generated



Key Datasets ▾

Standard Reference Data (SRDs)

Developer ▲

About ▾

Find Papers ▾

APIs

GitHub (usnistgov)

Explore data, tools, and resources for Science, Engineering, Technology and more

Interatomic Potentials

Examples: "Kinetics database" [G](#)

INFORMATION TECHNOLOGY

https://data.nist.gov/sdp/#/api

swagger

default (/v2/api-docs) ▾

Explore

Resource api

This REST api exposes data listing from NIST NERDm schema.

[NIST Public license](#)

Search API : Search Controller

Show/Hide | List Operations | Expand Operations

GET	/records	Get/Search NERDm records.
GET	/records/fields	Get all fields in the NERDm records.
GET	/records/{ediid}	Get NERDm record of given id.
GET	/resourceApi	Get all Resource apis.
GET	/taxonomy	Get all taxonomy data.

[BASE URL: /rmm , API VERSION: Build-1.0.0-rc]

Access

Data Access





These data are public.

Files  

Click on the file/row in the table below to view more details.

Options for Access include Direct Download

Total No. files: 56

Name	Media Type	Size	Status
200m.Indy.v3_2.total.annual.local.2010.nc	application/x-netcdf	215.1 kB	 
200m.Indy.v3_2.total.annual.local.2010.nc.sha256	text/plain	64 Bytes	 
200m.Indy.v3_2.total.annual.local.2011.nc			
200m.Indy.v3_2.total.annual.local.2011.nc.sha256			
200m.Indy.v3_2.total.annual.local.2012.nc			
200m.Indy.v3_2.total.annual.local.2012.nc.sha256			
200m.Indy.v3_2.total.annual.local.2013.nc			
200m.Indy.v3_2.total.annual.local.2013.nc.sha256			
200m.Indy.v3_2.total.annual.local.2014.nc			
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200m.Indy.v3_2.total.annual.local.2015.nc			
200m.Indy.v3_2.total.annual.local.2015.nc.sha256			
200m.Indy.v3_2.total.annual.UTC.2010.nc			
200m.Indy.v3_2.total.annual.UTC.2010.nc.sha256			
200m.Indy.v3_2.total.annual.UTC.2011.nc			

Go To ..

- Description
- Data Access
- References

Record Details


- View Metadata
- Export JSON

Use


- Citation
- Fair Use Statement

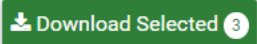

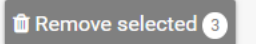
Or via Data Cart






NIST PUBLIC DATA REPOSITORY 1.17 About | Search | Cart 

Download Manager








Zip File Name	Download Status
download56035-1.zip	✓ downloaded 


  

Name	Media Type	Size	Status
<input checked="" type="checkbox"/> Hestia Fossil Fuel Carbon Dioxide Emissions for Indianapolis, Indiana			
<input checked="" type="checkbox"/> 200m.Indy.v3_2.total.annual.local.2010.nc <i>download56035-1.zip</i>	application/x-netcdf	215.1 kB	 downloaded
<input checked="" type="checkbox"/> 200m.Indy.v3_2.total.annual.local.2010.nc.sha256 <i>download56035-1.zip</i>	text/plain	64 Bytes	 downloaded
<input checked="" type="checkbox"/> 200m.Indy.v3_2.total.annual.local.2011.nc <i>download56035-1.zip</i>	application/x-netcdf	215.1 kB	 downloaded

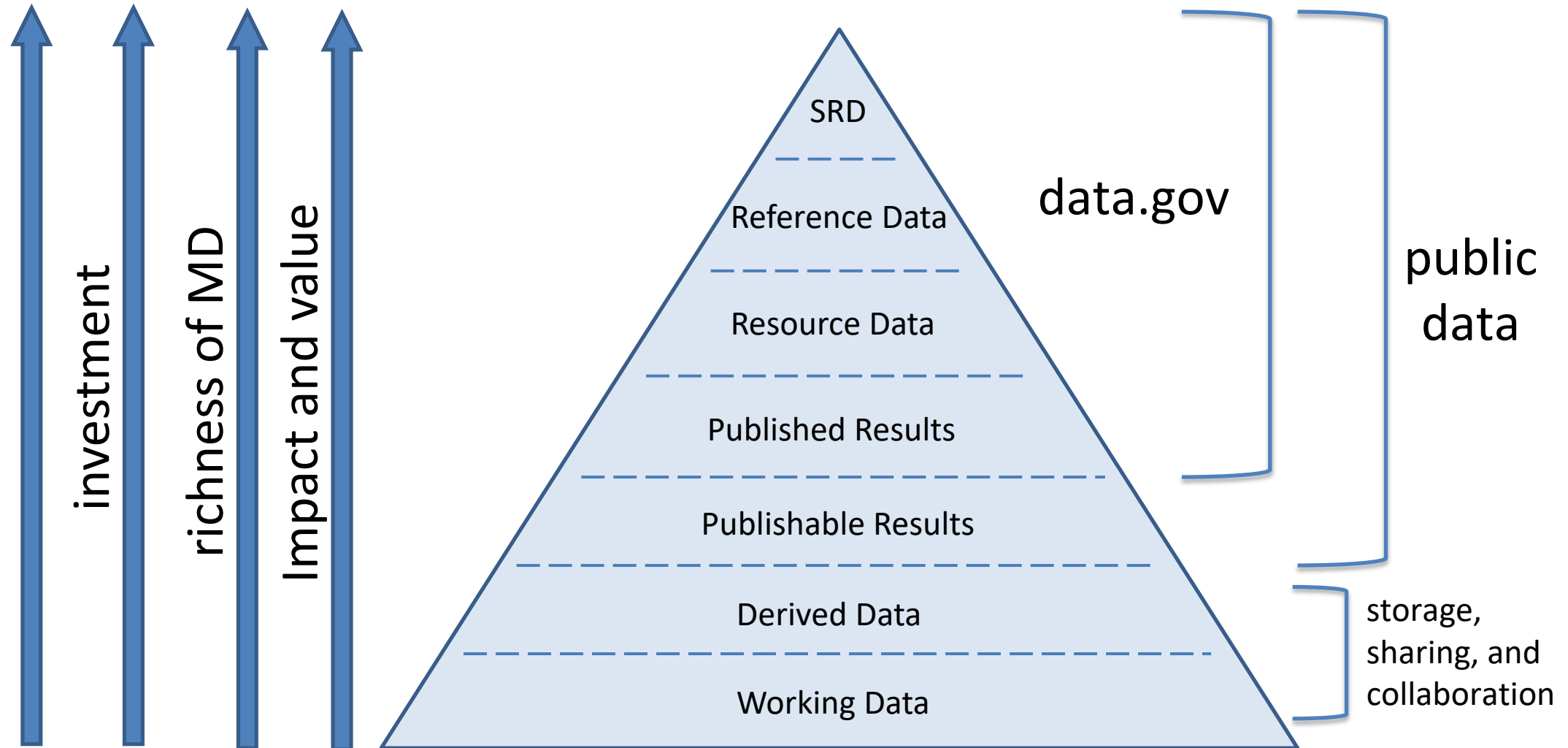
NIST National Institute of Standards and Technology
U.S. Department of Commerce

HEADQUARTERS
100 Bureau Drive

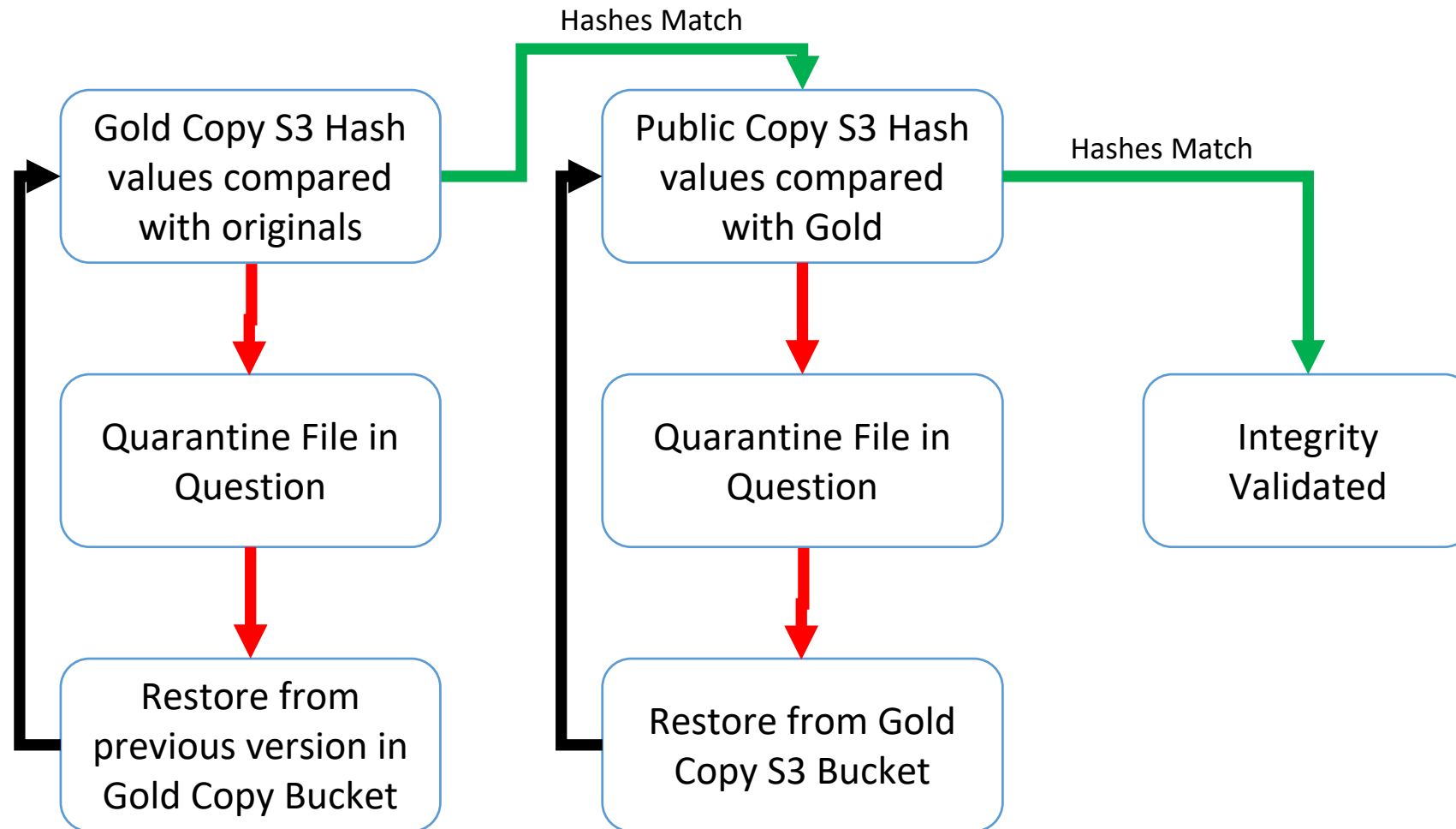
      

download56035-1.zip  Show all

NIST Public Data Access Policy



Data Integrity



- Integrity checked once per day
- Files are quarantined and reverted back to the previous version if an issue is detected

Future Enhancements Planned

- Metrics for the NIST Public Data patterns of use
 - “Data as a First-Class Research Output”
[\(https://makedatacount.org/\)](https://makedatacount.org/)
 - Researchers can see how many Page Views or Downloads their data
- **Enhance machine readability of datasets for AI**
- Public software & analysis tool linked integration
- Large-scale datasets – they already exist as a challenge!
 - Evaluating Globus (community demonstrated with archive systems for public access)
- Search – auto suggest enhance with Data Driven index
 - E.g. natural language processing of the metadata (e.g. rules-based ontology)

Interoperability & Reusability

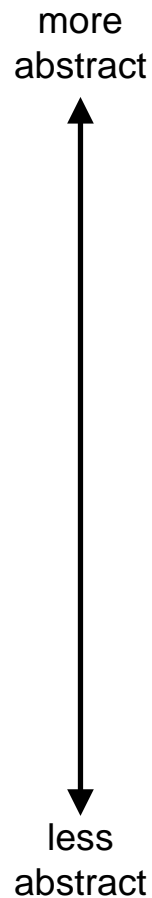
Part of a Larger Interoperability Problem

Long-tail research data is limited by lack of :

- Interoperability
- Provenance
- Automated reasoning

Experimentalists, instrument operators, and modeling/simulation researchers face interoperability challenges at many levels of abstraction

As you all know, fixing these problems is *hard*.



<u>level</u>	<u>meaning</u>	<u>examples</u>
ontology	concepts, relationships	samples, observations
metadata semantics	concepts, taxonomy	spatial scale, affine xforms
metadata syntax	terms, controlled vocabulary	magnification vs. horizontal field width (HFW)
data shapes	dimensions, data types	img focus series vs. SEM-EDS map
on-disk serialization	dataset file formats	Gatan .dm3 TIFF 6.0

Research Data Alliance (RDA) Activities



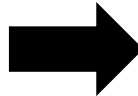
<https://rd-alliance.org>

**RDA/CODATA Materials Data,
Infrastructure & Interoperability IG**

“Materials IG”

Chairs

**James Warren (NIST)
Laura Bartolo (Northwestern)
Takuya Kadohira (NIMS)
Adham Hashibon (Fraunhofer IWM)
Alysia Garmulewicz (Universidad de
Santiago de Chile)**



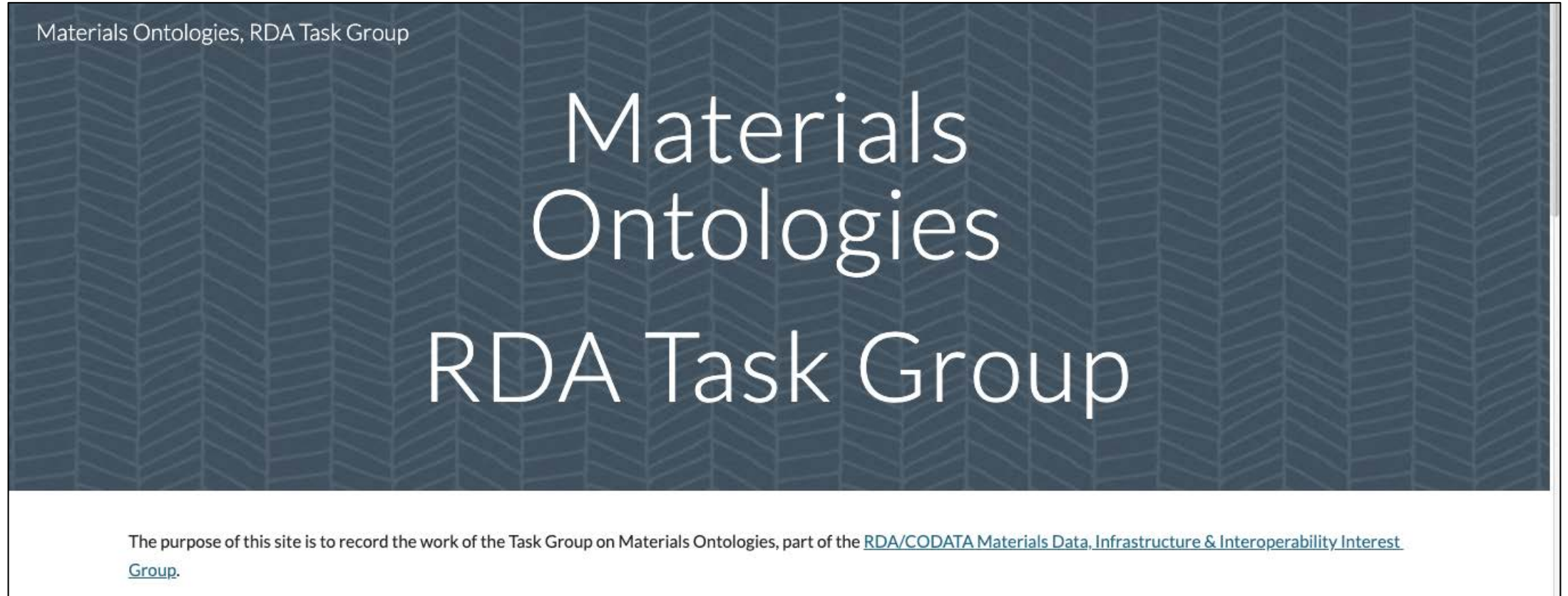
Materials Ontologies Task Group

Chairs

**Gerhard Goldbeck (Goldbeck Consulting)
Clare Paul (Air Force Research Lab)
John Henry Scott (NIST)**

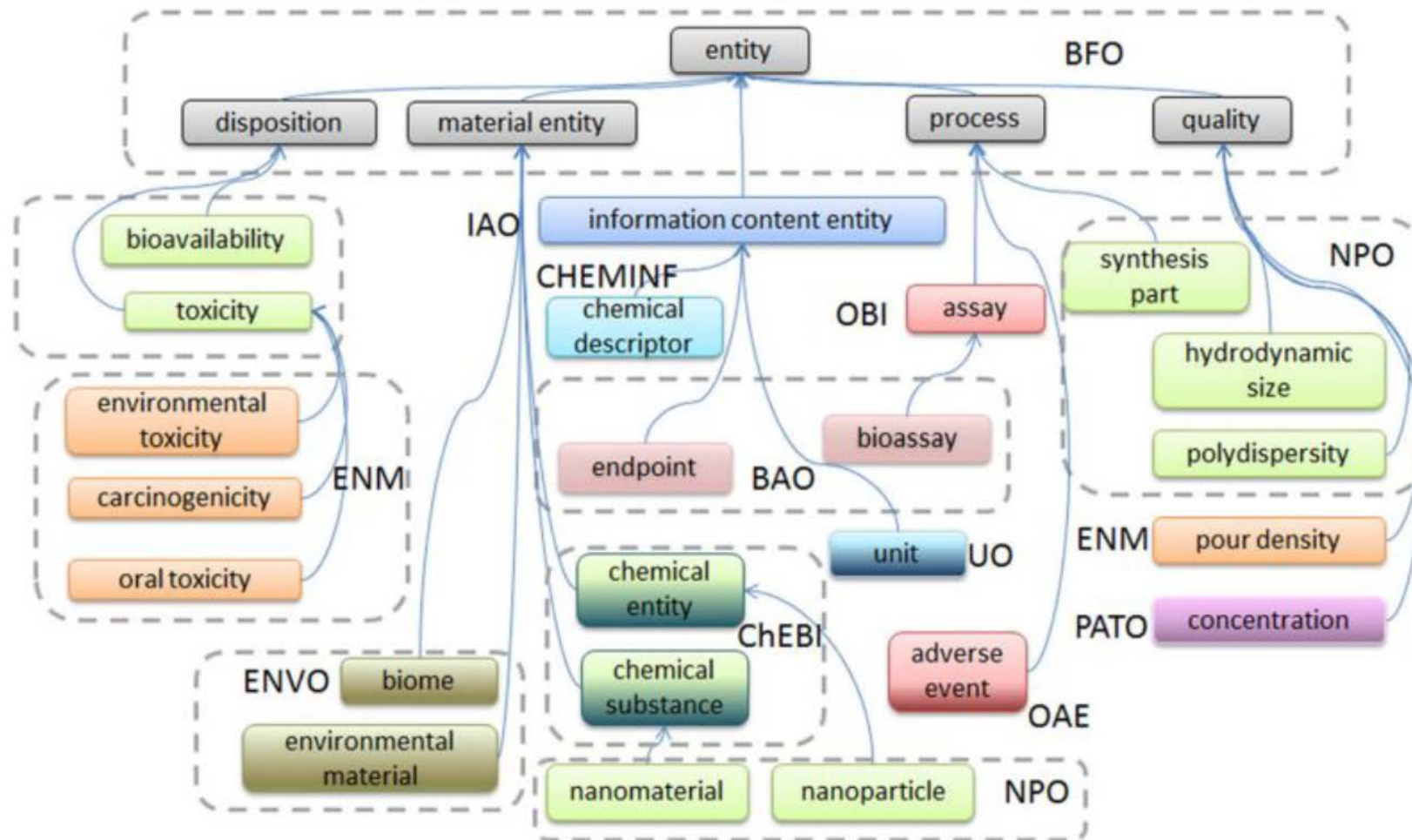
- 1. Initial Call: 13 March 2019**
- 2. Task Group Approved: 04 Apr 2019 @ P13**
- 3. 1st Telecon: 25 May 2019**

RDA Materials Ontologies Task Group



<https://sites.google.com/view/rda-materials-ontologies-tg/home>

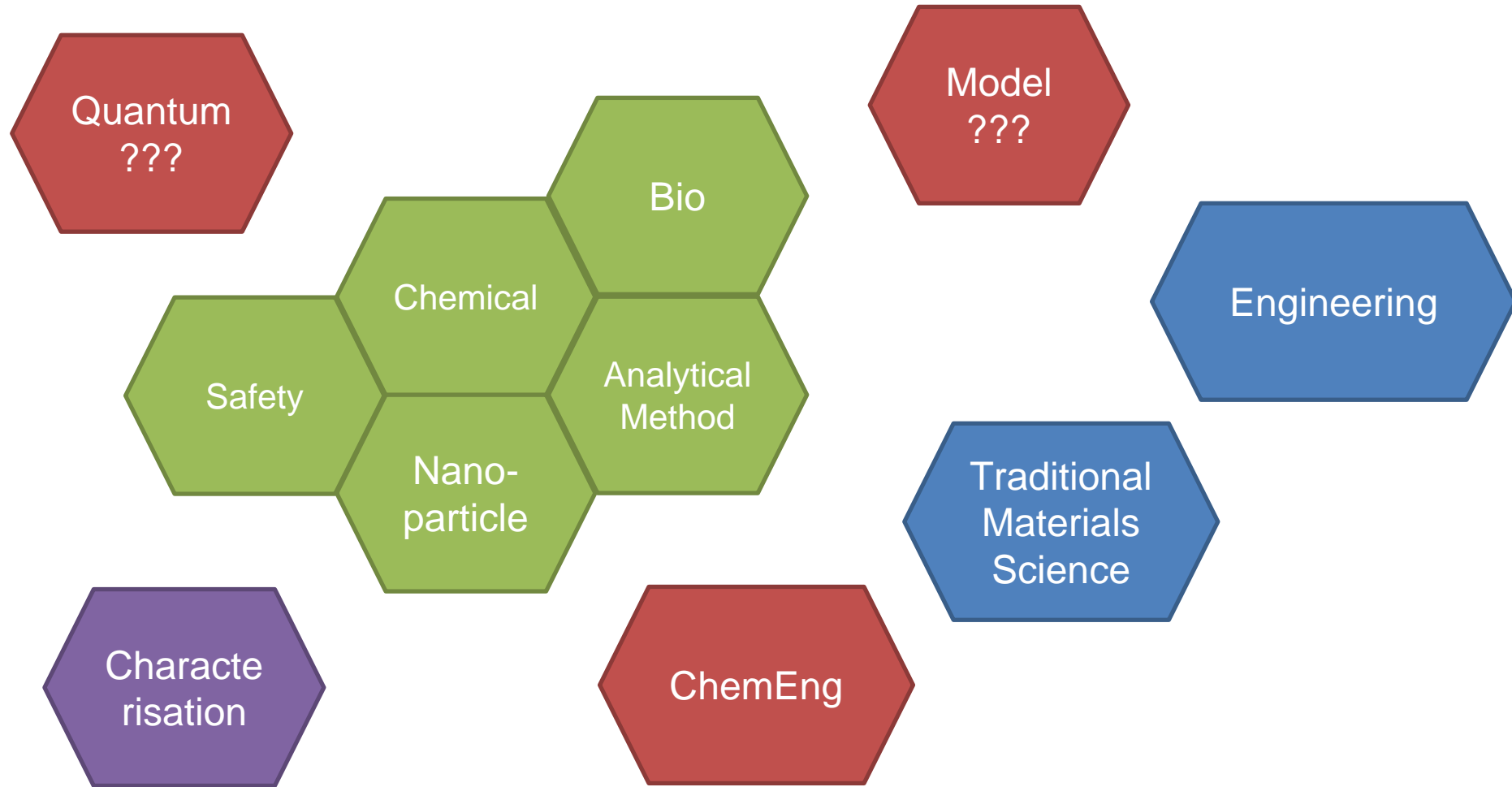
Balkanization of materials ontologies



Courtesy of

Slide courtesy: Gerhard Goldbeck, after Egon Willighagen, Univ Maastricht

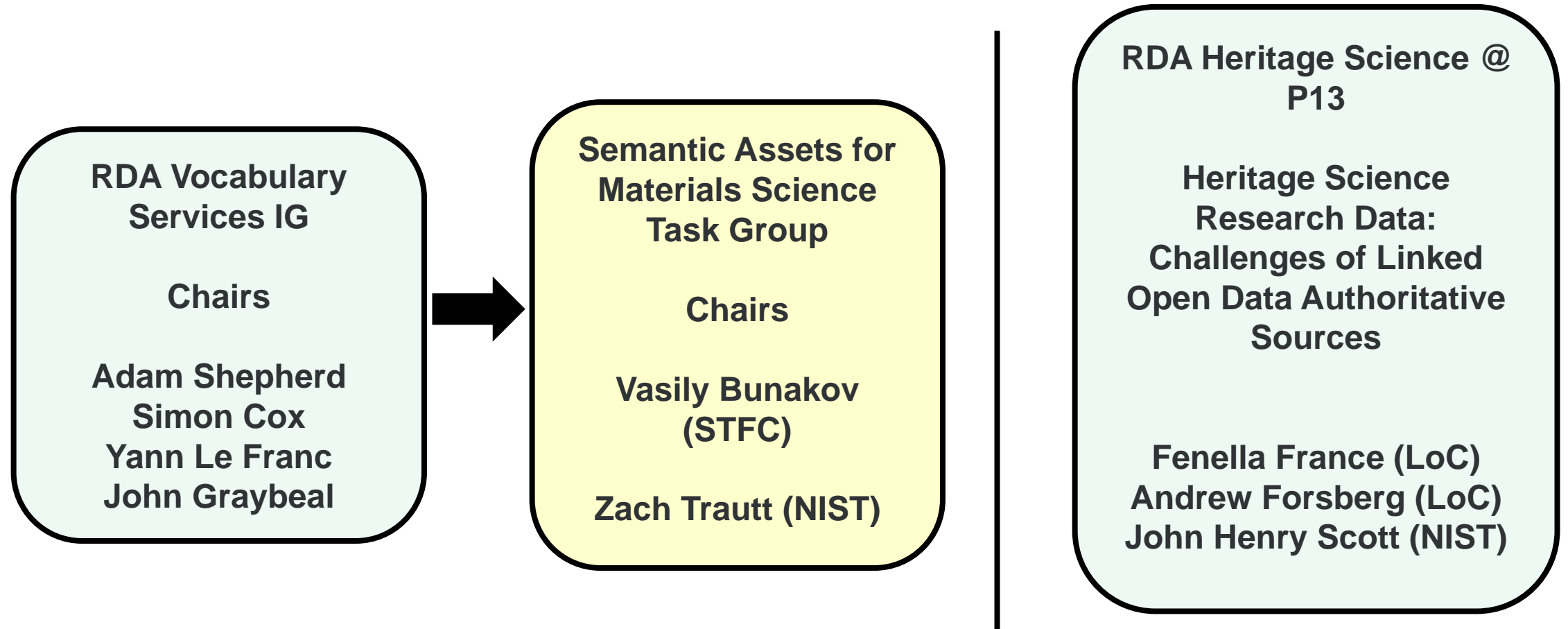
Current Status



Where do we want to get to?



Research Data Alliance (RDA) Activities



Research Data Alliance (RDA) Activities

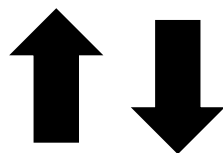


Schema Repository and Registry
Part of the Materials Genome Initiative

<https://schemas.nist.gov>



Zach Trautt



The EMMC Taxonda Registry



THE EUROPEAN MATERIALS MODELLING COUNCIL

Recent NIST Metadata Workshops

CHiMaD

NIST
National Institute of
Standards and Technology
U.S. Department of Commerce

WORKSHOP 5

**2018 NIST/CHiMaD Materials Microscopy Data
Conference**

October 25-26, 2018 (Northwestern University)

Program, videos, all talks online at:

http://chimad.northwestern.edu/news-events/CHiMaD_Data_Database_Efforts.html

Recent NIST Metadata Workshops

CHiMaD

NIST
National Institute of
Standards and Technology
U.S. Department of Commerce

WORKSHOP 6

2019 NIST/CHiMaD Video Conference

Workflow, June Lau, April 9, 1:30-3:00PM ET

To learn more about the conference click [here](#).

Vocabulary/Metadata, John Henry Scott, March 19, 1:30-3:00PM ET

To learn more about the conference click [here](#).

Sample History, Carelyn Campbell, March 5, 1:30-3:00PM ET

All content online at:

http://chimad.northwestern.edu/news-events/CHiMaD_Data_Database_Efforts.html

Recent NIST Metadata Workshops



WORKSHOP 7

2019 NIST/CHiMaD Materials Microscopy Data Conference

May 15-16, 2019 (NIST National Cybersecurity Center of Excellence)

All content online at:

http://chimad.northwestern.edu/news-events/CHiMaD_Data_Database_Efforts.html

Recent NIST Metadata Workshops

Microstructure Repository and Metadata Workshop: May 13-14

Lehigh University, the National Institute for Standards and Technology (NIST), and the National Science Foundation will be sponsoring a workshop from mid-day May 13, 2019 – May 14, 2019 to address key issues involved in materials data curation, assess current best practices, and develop a plan for establishing future protocols for widely accessible data repositories. This workshop will serve to create a new microstructures data repository that will enable researchers to share, access, and analyze images and associated data from multiple platforms. In preparation for this workshop, we held a preliminary meeting last November to discuss potential schema and the curation of metadata as related to electron micrographs and associated data. As a result of this November meeting, we have started construction of the repository as a testbed to evaluate proposed schema.

The logo for the National Institute of Standards and Technology (NIST), consisting of the letters "NIST" in a bold, black, sans-serif font.

Program online at:

<https://www.nist.gov/document/agenda-microstructure-workshop-may-13-14-2019>

Thank You

please contact me if you want these slides,
or if you have questions (or suggestions!)

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