Northwestern Medicine®

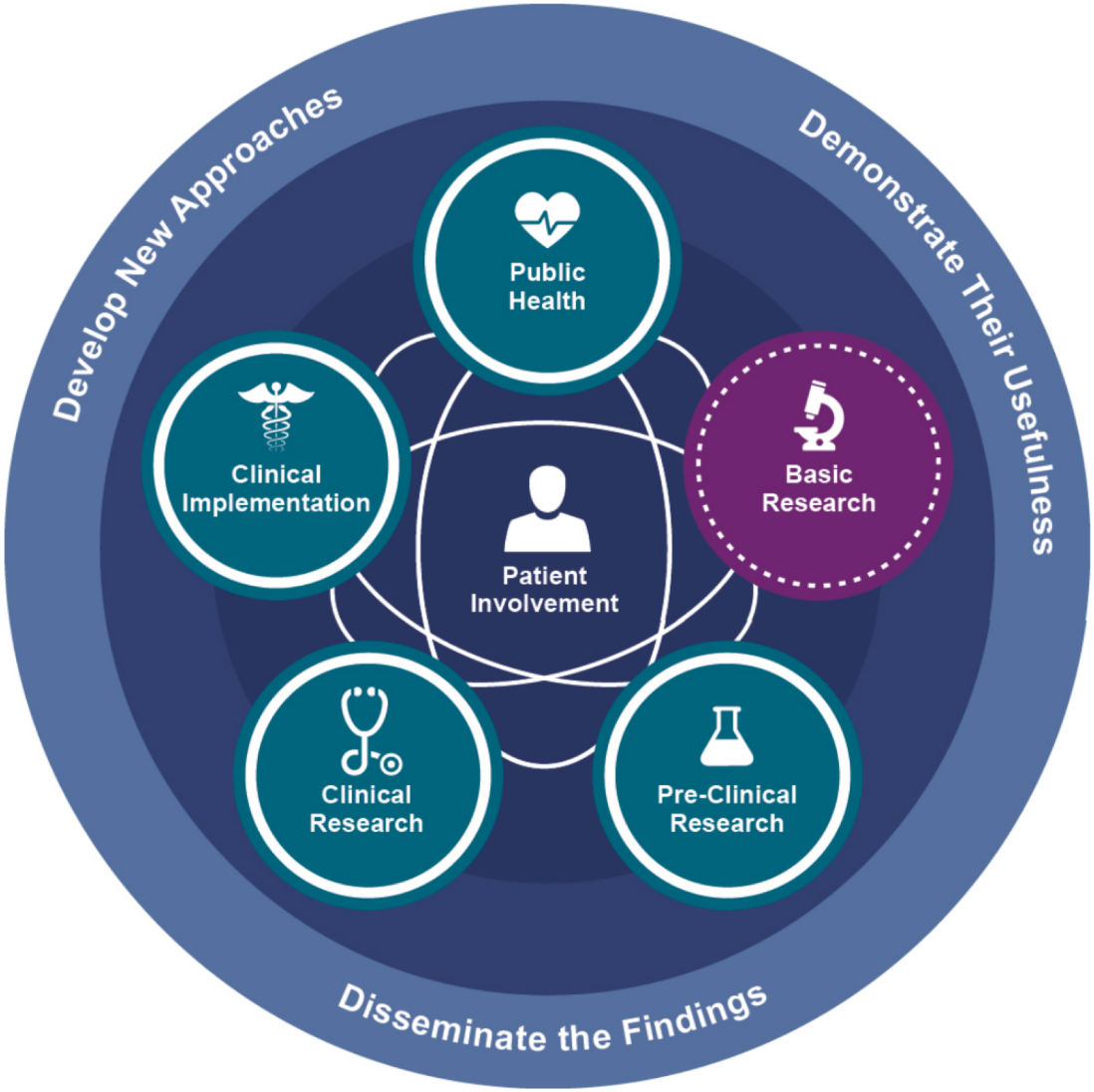
Team Scientists: how do we enable everyone to get credit for their work?

ORCID Person Citation WG

Kristi Holmes, Northwestern
kristi.holmes@northwestern.edu
@kristiholmes
April 17, 2019

Biomedical research evolves: Accelerating discovery & implementation

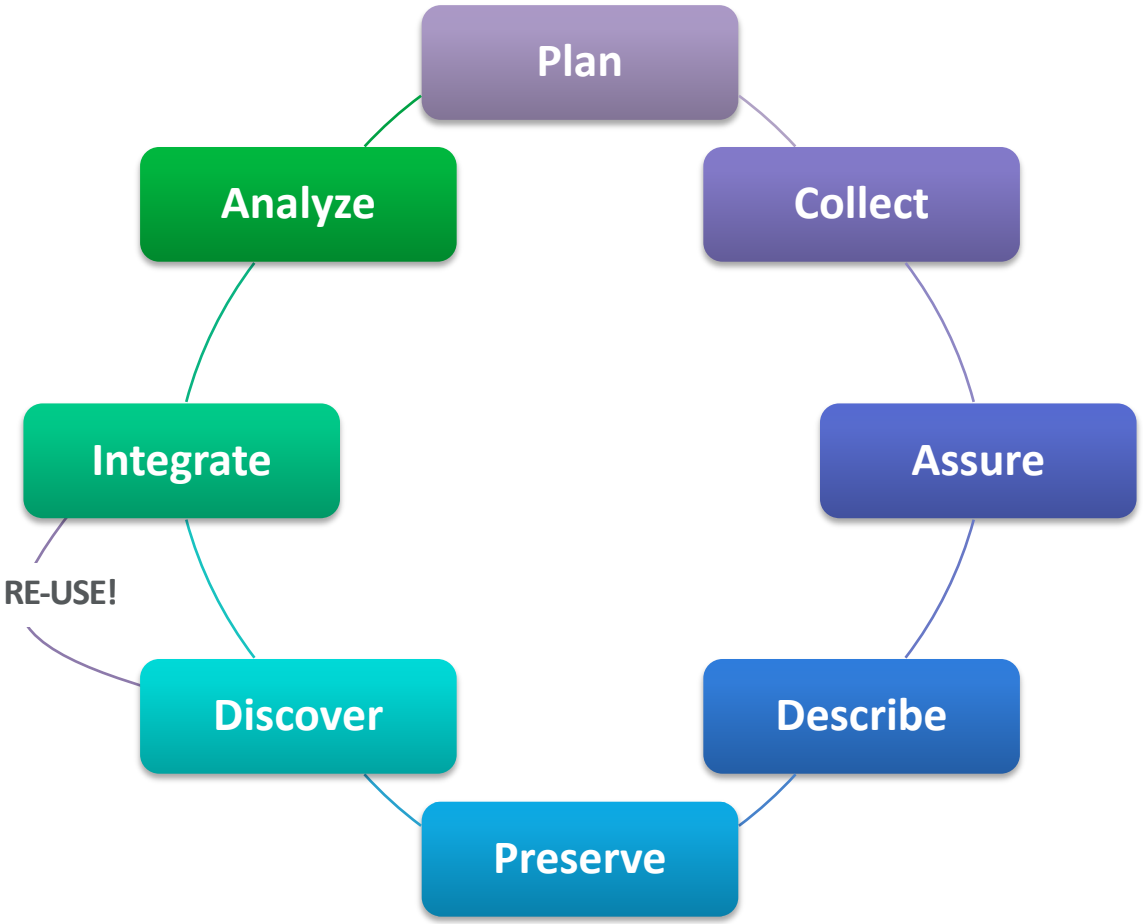
- TEAM SCIENCE
- WORKFORCE DEVELOPMENT
- IDEATION & INNOVATION
- COMMUNICATION
- ASSESSMENT & IMPROVEMENT
- MATURATION OF THE ENVIRONMENT



Northwestern Medicine®

https://ncats.nih.gov/translation/spectrum

Biomedical research evolves and opens



OPEN SCIENCE YIELDS:

- **SPEED:** The research process becomes faster
- **EFFICIENCY:** Data collection can be funded once, and used many times for a variety of purposes
- **ACCESSIBILITY:** Anyone can access and build upon research resources with minimal barriers to access
- **IMPACT & LONGEVITY:** Open publications and data are more discoverable and receive more citations long-term
- **TRANSPARENCY & QUALITY:** The evidence that underpins research can be made open for anyone to scrutinize and replicate findings, leading to a more robust scholarly record

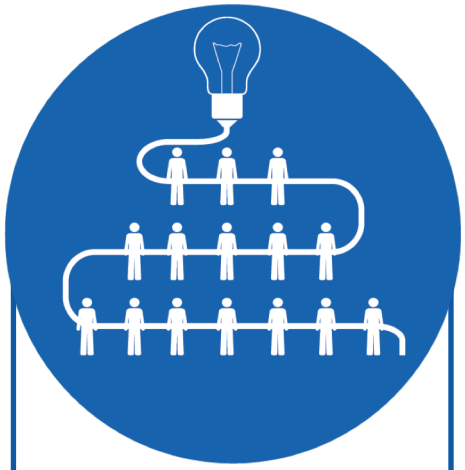
http://www.slideshare.net/martindonnelly/winning-horizon-2020-with-open-science

What is impact?

More than papers and grants – we are driving toward improved health and wellbeing

- IMPROVEMENTS IN HEALTH THROUGH TREATMENT AND PREVENTION
- CONTRIBUTIONS TO SOCIETY THROUGH ECONOMIC GROWTH AND PRODUCTIVITY
- EXPANSION OF THE BIOMEDICAL KNOWLEDGE BASE THROUGH CUTTING-EDGE RESEARCH
- CULTIVATION OF THE BIOMEDICAL WORKFORCE OF TODAY AND TOMORROW

https://www.nih.gov/about-nih/what-we-do/impact-nih-research



For effective translation of knowledge and discoveries into the improved health of our communities, it is essential to incorporate evaluation strategies that enable investigators and teams to measure, monitor, and communicate the impact of their work

Northwestern Medicine®

Biomedical research evolves

Consider the entire research workforce and all that they do

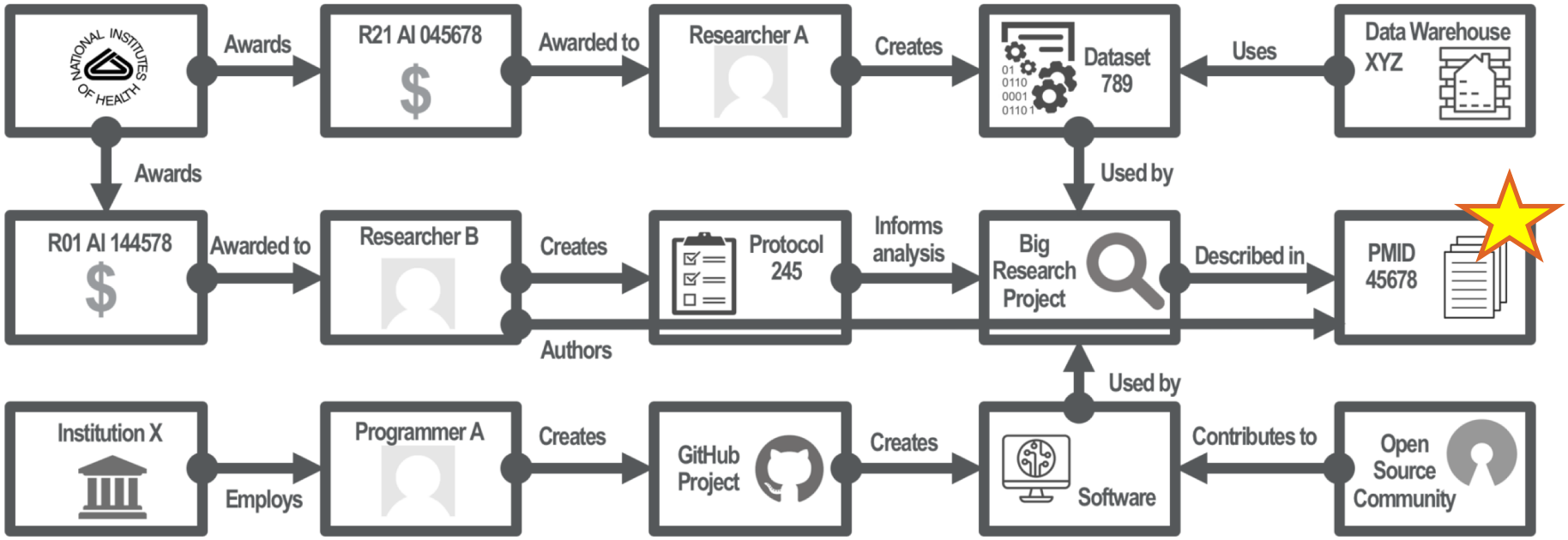
Diverse outputs
Diverse impacts
Diverse roles

Each a critical component of the research process

- New experimental methods, data models, databases, or software tools
- New diagnostic criteria
- New standards of care
- Biological materials or animal models
- Consent documents
- Clinical/practice guidelines
- Quality measure guidelines
- Maps and visualizations
- Measurement instruments
- Continuing education materials
- Quality measure guidelines
- Cost-effective intervention
- Consensus development conferences
- American Medical Association Current Procedural Terminology (CPT) codes
- Change in delivery of healthcare services
- Gray literature

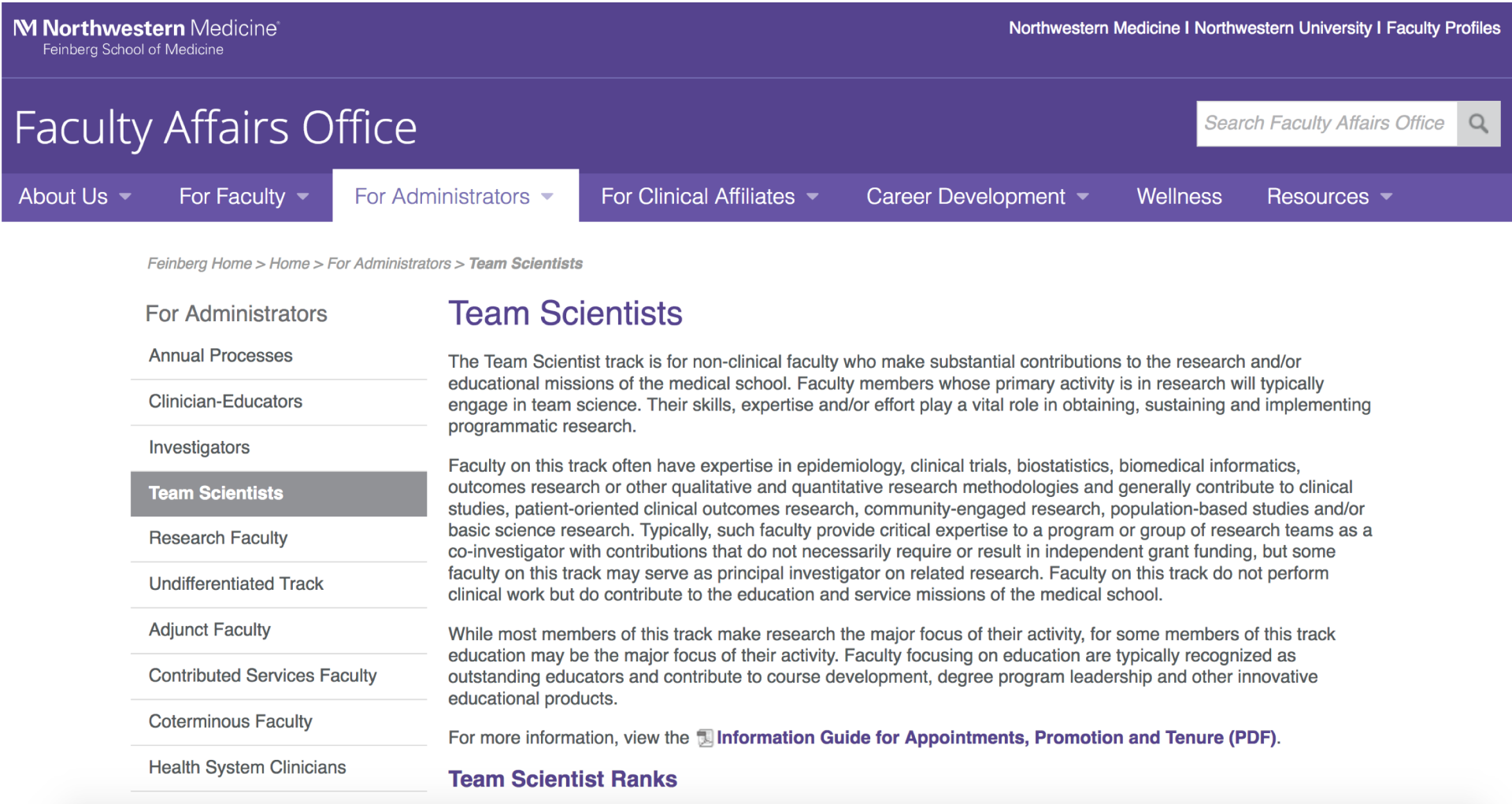
Northwestern Medicine®

https://becker.wustl.edu/impact-assessment
http://nucats.northwestern.edu/



Adapted from original by @figgyjam

Institutional perspectives & new models



Northwestern Medicine
Feinberg School of Medicine

Northwestern Medicine I Northwestern University I Faculty Profiles

Faculty Affairs Office

Search Faculty Affairs Office

About Us | For Faculty | For Administrators | For Clinical Affiliates | Career Development | Wellness | Resources

Feinberg Home > Home > For Administrators > **Team Scientists**

For Administrators

- Annual Processes
- Clinician-Educators
- Investigators
- **Team Scientists**
- Research Faculty
- Undifferentiated Track
- Adjunct Faculty
- Contributed Services Faculty
- Coterminous Faculty
- Health System Clinicians

Team Scientists

The Team Scientist track is for non-clinical faculty who make substantial contributions to the research and/or educational missions of the medical school. Faculty members whose primary activity is in research will typically engage in team science. Their skills, expertise and/or effort play a vital role in obtaining, sustaining and implementing programmatic research.

Faculty on this track often have expertise in epidemiology, clinical trials, biostatistics, biomedical informatics, outcomes research or other qualitative and quantitative research methodologies and generally contribute to clinical studies, patient-oriented clinical outcomes research, community-engaged research, population-based studies and/or basic science research. Typically, such faculty provide critical expertise to a program or group of research teams as a co-investigator with contributions that do not necessarily require or result in independent grant funding, but some faculty on this track may serve as principal investigator on related research. Faculty on this track do not perform clinical work but do contribute to the education and service missions of the medical school.

While most members of this track make research the major focus of their activity, for some members of this track education may be the major focus of their activity. Faculty focusing on education are typically recognized as outstanding educators and contribute to course development, degree program leadership and other innovative educational products.

For more information, view the **Information Guide for Appointments, Promotion and Tenure (PDF)**.

Team Scientist Ranks

Northwestern Medicine

- **Team Scientist Track (variable amounts of effort distributed between research and education depending upon domain of activity)**

This track is for non-clinical faculty who make substantial contributions to the research and/or educational missions of the medical school. Faculty members whose primary activity is in research will typically engage in team science. Their skills, expertise and/or effort play a vital role in obtaining, sustaining and implementing programmatic research. Faculty on this track often have expertise in epidemiology, clinical trials, biostatistics, biomedical informatics, outcomes research or other qualitative and quantitative research methodologies and generally contribute to clinical studies, patient-oriented clinical outcomes research, community-engaged research, population-based studies and/or basic science research. Typically such faculty provide critical expertise to a program or group of research teams as a co-investigator with contributions that do not necessarily require or result in independent grant funding, but some faculty on this track may serve as principal investigator on related research. Faculty on this track do not perform clinical work but do contribute to the education and service missions of the medical school. While most members of this track make research the major focus of their activity, for some members of this track education may be the major focus of their activity. Faculty focusing on education are typically recognized as outstanding educators and contribute to course development, degree program leadership, and other innovative educational products. Faculty rank in this track will be titled Assistant Professor, Associate Professor, or Professor. This is a non-tenure-eligible regular faculty track.

Prepare your packet (clusters of work):
https://www.feinberg.northwestern.edu/fao/for-faculty/promo-tenure/prepare-your-packet.html

Institutional perspectives & new models
Northwestern's Team Scientist Faculty Track

- 2015: a new "Team Scientist" track was established within our regular faculty lines to better value such scientists' contributions.
- Collaborative effort between NUCATS (Lloyd-Jones),Vice Dean for Faculty Affairs at Feinberg (Lowe), and relevant stakeholders.
- Enthusiasm on campus by collaborative scientists, successful promotion pathway
- Collaborative scientists who span content disciplines at NU now have several distinct pathways for promotion with clear metrics through our tenure-eligible, non-tenure-eligible, and research faculty lines.

Team Scientist Faculty Track Survey Results	
	SATISFIED
Overall satisfaction with current position	74%
Opportunity to collaborate with other faculty	90%
Sense of contributing to important research	83%
Contributions are acknowledged via co-authorships	80%
Promotion process is clear and transparent	68%
Fall, 2017 survey response rate: 81% Herzog, Holmes, Lloyd-Jones	

It takes technology + culture.

Game changer: *Perhaps one of the biggest shifts in "culture" was the development, release, and implementation of the CRedIT taxonomy, making it easier to give people credit for 14 specific contributions in a published work.*

CRT

CRediT

CRediT is high-level taxonomy, including 14 roles, that can be used to represent the roles typically played by contributors to scientific scholarly output. The roles describe each contributor's specific contribution to the scholarly output.

https://casrai.org/credit/

OpenVIVO

Implementation of a community-driven concept of credit, based on input from community workshops

1. Provide a VIVO experience for everyone, a demonstration of VIVO, a platform for experimentation, and an ownership experience for the VIVO team
2. Use persistent identifiers for all entities – people (ORCiD), works (DOI and PMID), organizations (GRID), journals (ISSN), concepts (FAST)
3. Automatic, real-time ingest of metadata from identifiers via public APIs
4. Publication of data
5. Consumption and reuse of data
6. Attribution of works by scholars to indicate roles in works

Around the same time we were hosting workshops to aske attendees – what do you want credit for?

Northwestern Medicine®

frontiers in Research Metrics and Analytics

TECHNOLOGY REPORT ARTICLE
Front. Res. Metr. Anal., 01 March 2018 | https://doi.org/10.3389/frma.2017.00012

Check for updates

Download Article Export citation

2,258
TOTAL VIEWS
27

View Article Impact

SHARE ON
0 0 0 0 New

OpenVIVO: Transparency in Scholarship

Violeta Ilik[1]*, Michael Conlon[2], Graham Triggs[3], Marijane White[4], Muhammad Javed[5], Matthew Brush[4], Karen Gutzman[6], Shahim Essaid[4], Paul Friedman[6], Simon Porter[7], Martin Szomszor[7], Melissa Anne Haendel[4], David Eichmann[8] and Kristi L. Holmes[6]

[1]Stony Brook University, Stony Brook, NY, United States
[2]University of Florida, Gainesville, FL, United States

Front. Res. Metr. Anal. **2,** (01 March 2018)
doi:10.3389/frma.2017.00012

Driven by community input

OpenVIVO is a free and open-hosted semantic web platform that anyone can join and that gathers and shares open data about scholarship in the world. OpenVIVO, based on the VIVO open-source platform, provides transparent access to data about the scholarly work of its participants. OpenVIVO demonstrates the use of persistent identifiers, the automatic real-time ingest of scholarly ecosystem metadata, the use of VIVO-ISF and related ontologies, the attribution of work, and the publication and reuse of data—all critical components of presenting, preserving, and tracking scholarship. The system was created by a cross-institutional team over the course of 3 months. The team created and used RDF models for research organizations in the world based on Digital Science GRID data, for academic journals based on data from CrossRef and the US National Library of Medicine, and created a new model for attribution of scholarly work. All models, data, and software are available in open repositories.

Transparency in Scholarship

Scholarship requires knowledge of previous work. The growth of scholarship worldwide and the proliferation of scholarly output types—from papers and monographs to preprints, conference papers, datasets, posters, and presentation slides—have fundamentally changed the scholarly ecosystem from an environment dependent on libraries to one that is dependent on the electronic resources made available by libraries to support discovery and knowledge transfer. This shift clearly drives a need for the representation of scholarly works using standard metadata formats to facilitate indexing and discovery.

For scholars to have knowledge of previous work, the work must be indexed and discoverable *via* electronic systems. Metadata regarding the

PEOPLE ALSO LOOKED AT

Eugene Garfield's Influences upon the Future of Evaluative Informetrics
Henk F. Moed

Openness and Impact of Leading Scientific Countries
Caroline S. Wagner, Travis Whetsell, Jeroen Baas and Koen Jonkers

Active Role of the Necrotic Zone in Desensitization of Hypoxic Macrophages and Regulation of CSC-Fate: A hypothesis
Maryam Mehrabi, Fatemeh Amini and Shima Mehrabi

Predictive Effects of Novelty Measured by Temporal Embeddings on the Growth of Scientific Literature
Jiangen He and Chaomei Chen

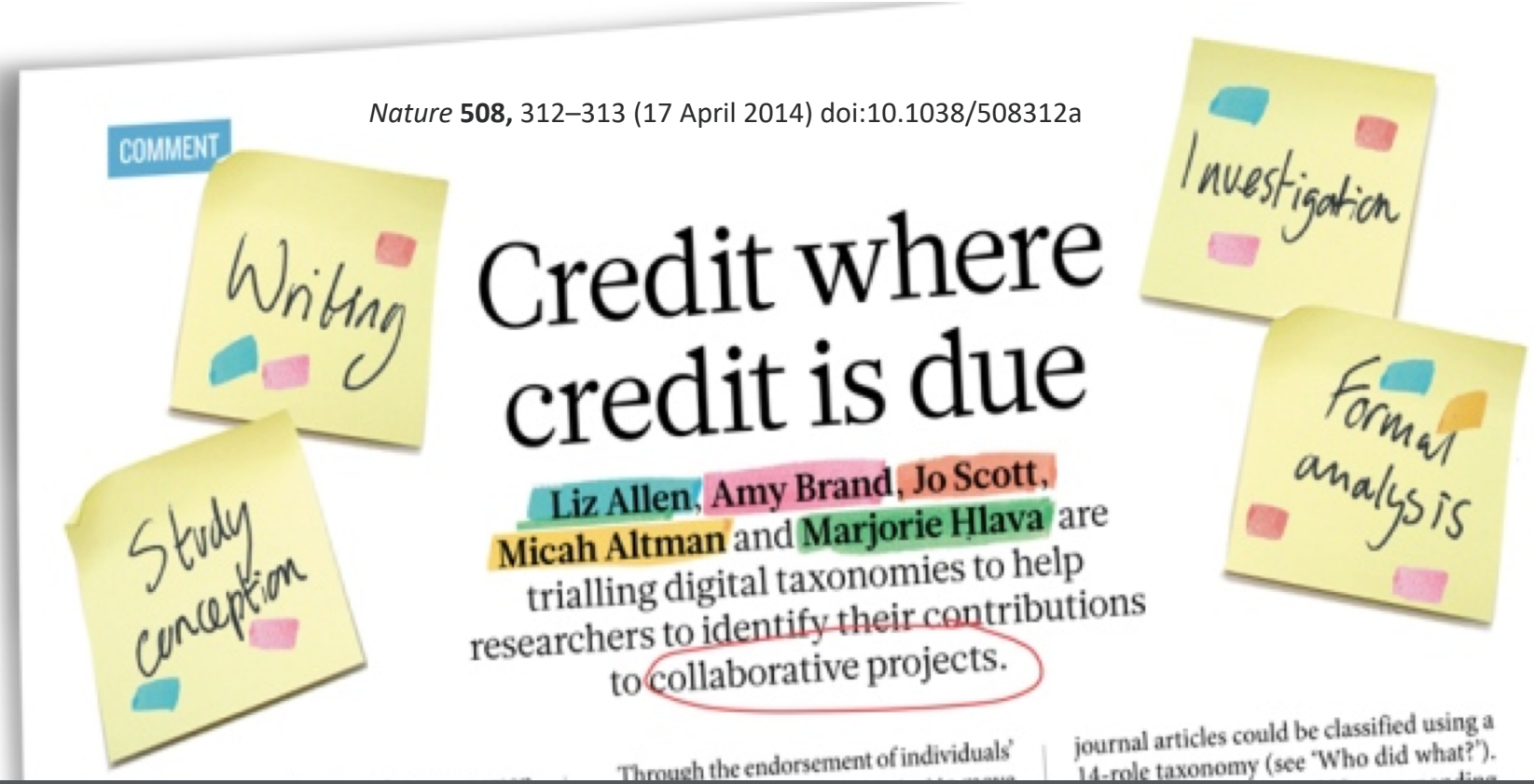
Interdependent Followers Prefer Avoidant Leaders: Followers' Cultural Orientation Moderates Leaders' Avoidance Relationships

OpenVIVO

Implementation of a community-driven concept of credit, based on input from community workshops

1. Provide a VIVO experience for everyone, a demonstration of VIVO, a platform for experimentation, and an ownership experience for the VIVO team
2. Use persistent identifiers for all entities – people (ORCiD), works (DOI and PMID), organizations (GRID), journals (ISSN), concepts (FAST)
3. Automatic, real-time ingest of metadata from identifiers via public APIs
4. Publication of data
5. Consumption and reuse of data
6. Attribution of works by scholars to indicate roles in works

Next stop: map community workshop input on top of a sturdy foundation of CRedIT



Game changer: *Perhaps one of the biggest shifts in "culture" was the development, release, and implementation of the CRedIT taxonomy, making it easier to give people credit for their specific contribution in a published work.*

CRT

CRediT

CRediT ontology in OWL:
https://github.com/data2health/credit-ontology

CRediT is high-level taxonomy, including 14 roles, that can be used to represent the roles typically played by contributors to scientific scholarly output. The roles describe each contributor's specific contribution to the scholarly output.

https://casrai.org/credit/

Contribution Role Ontology

The Contribution Role Ontology (CRO) contains classes representing scholarly contributions. The CRO imports classes from the CRediT ontology[1] (computational version of the CRediT taxonomy[2]), in **bold**.

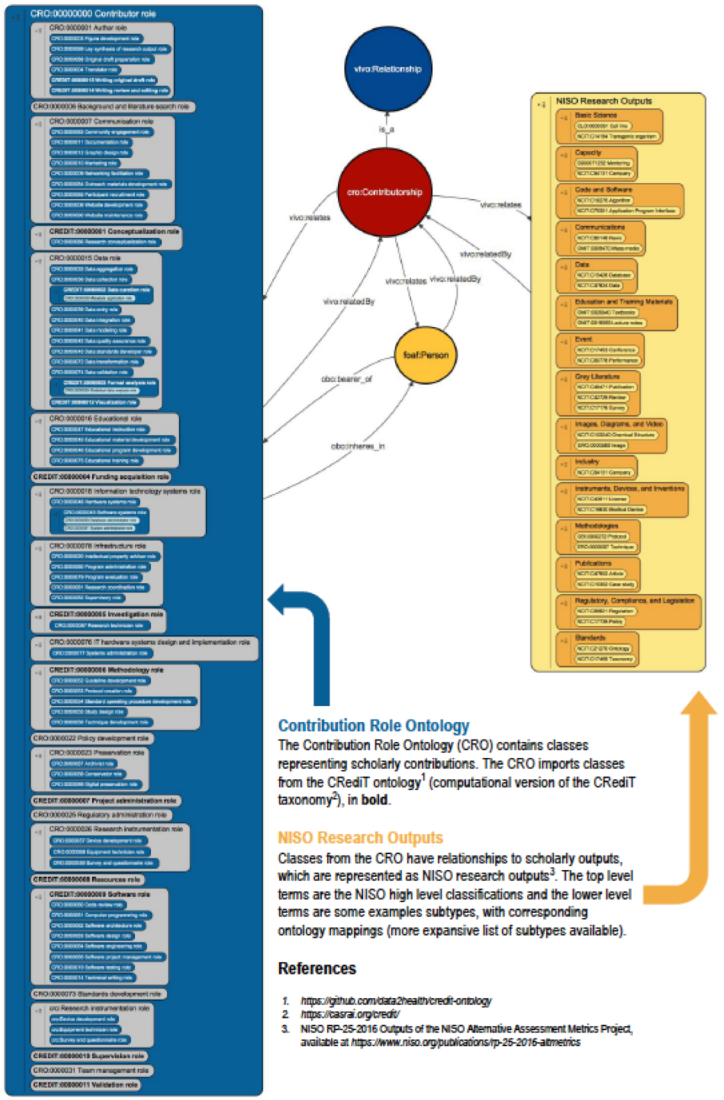
NISO Research Outputs

Classes from the CRO have relationships to scholarly outputs, which are represented as NISO research outputs[3]. The top level terms are the NISO high level classifications and the lower level terms are some examples subtypes, with corresponding ontology mappings (more expansive list of subtypes available).

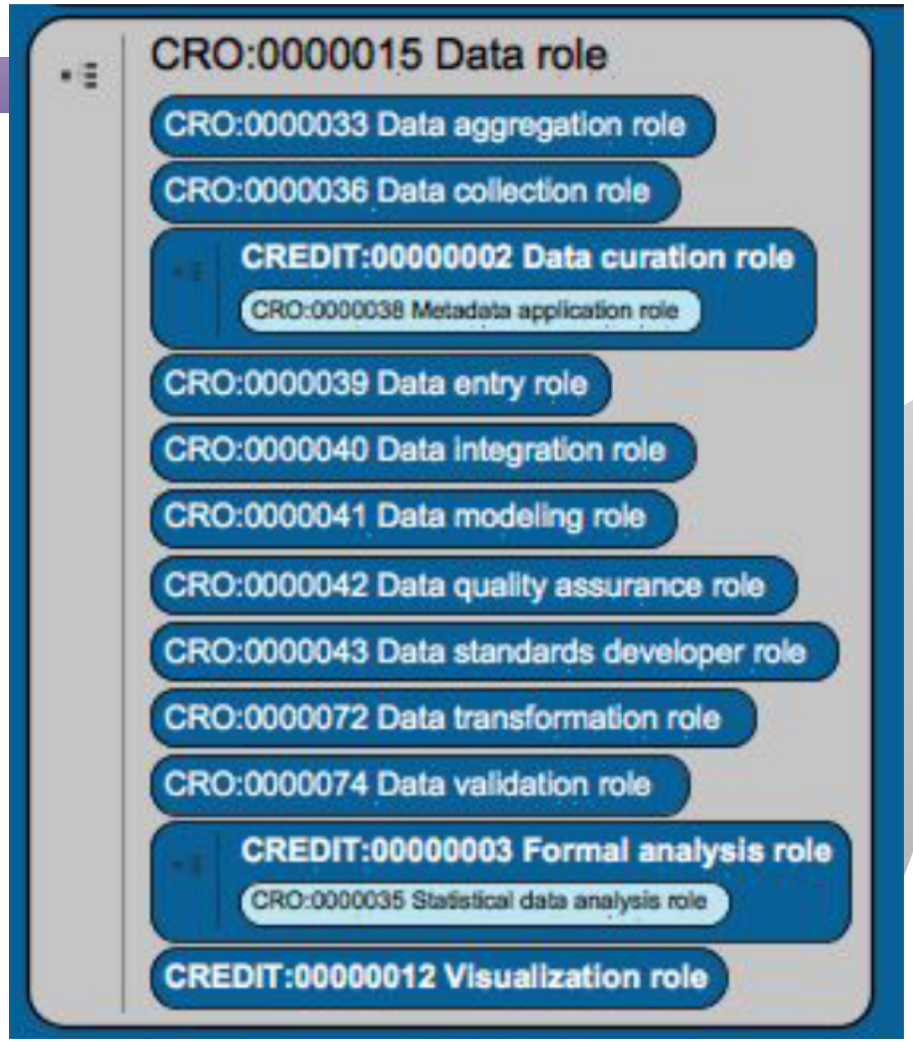
References

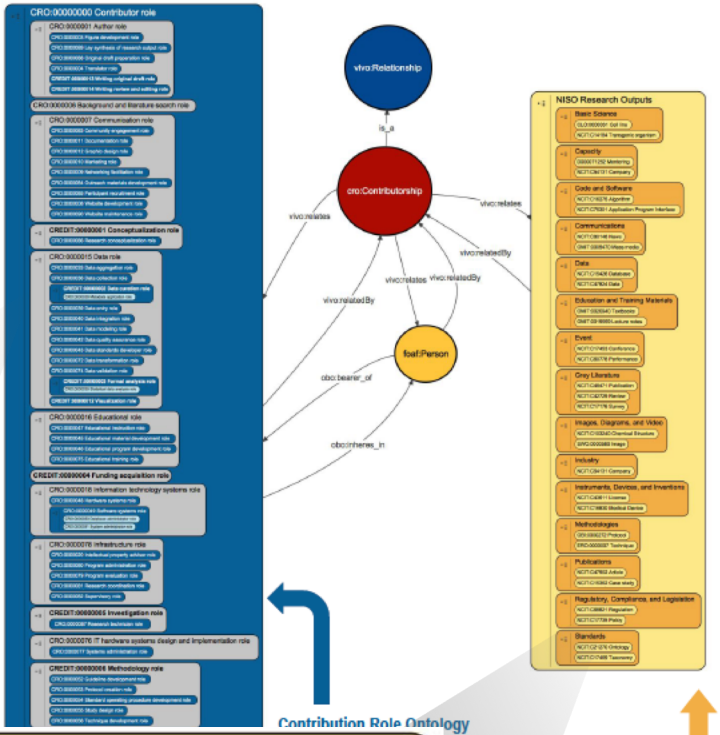
1. *https://github.com/data2health/credit-ontology*
2. *https://casrai.org/credit/*
3. NISO RP-25-2016 Outputs of the NISO Alternative Assessment Metrics Project, available at *https://www.niso.org/publications/rp-25-2016-altmetrics*

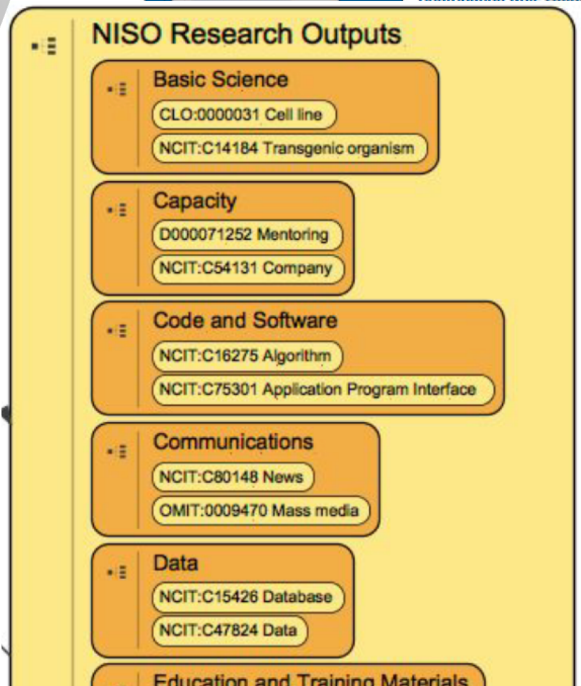
Details at
http://bit.ly/PID19attribution



Northwestern Medicine®



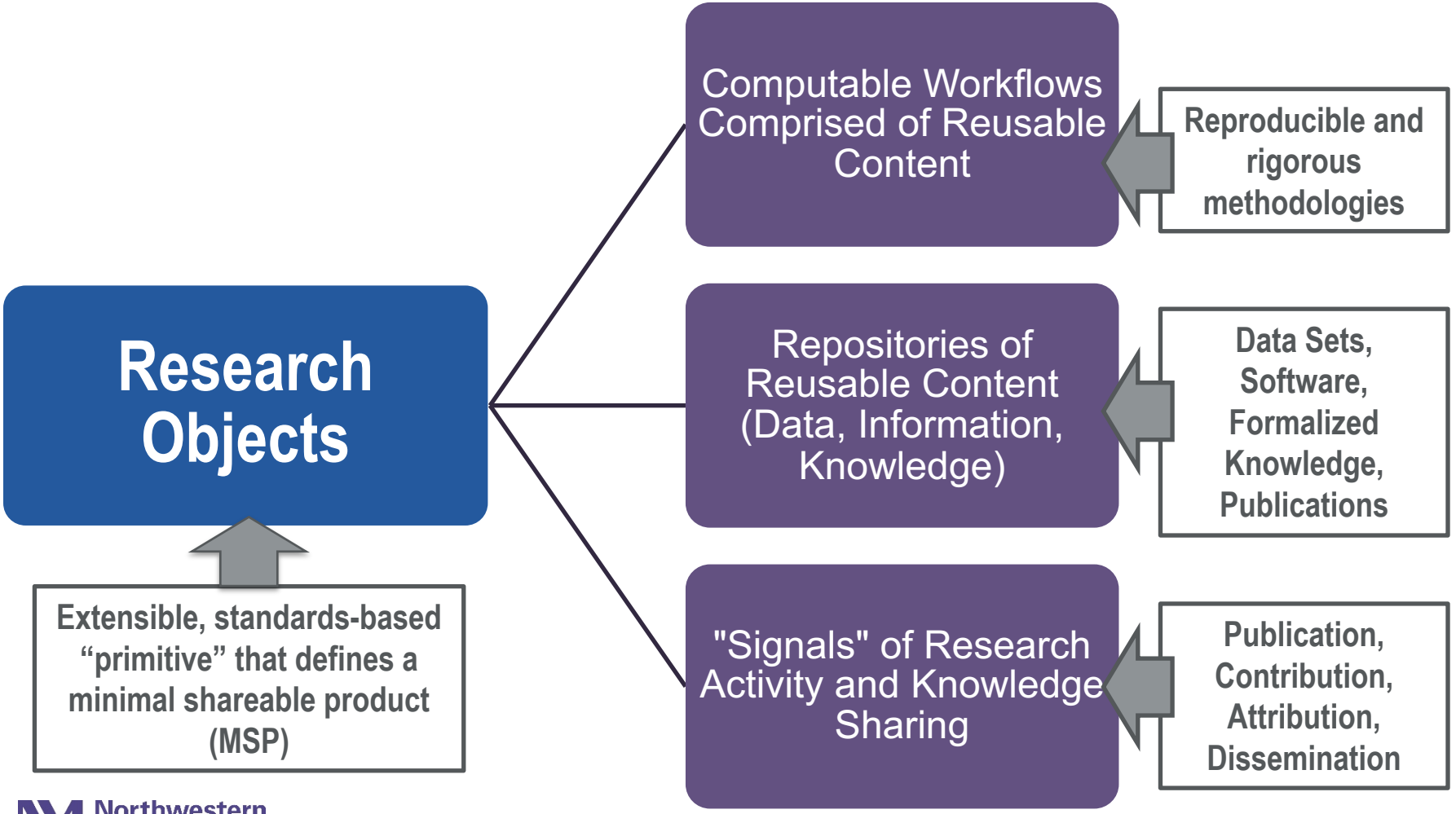




Join us! Submit tickets! ☺
https://github.com/data2health/contributor-role-ontology or
https://github.com/data2health/architecting_attribution

Research Objects: A Common Unit of Sharing Across Use Cases

with @prpayne5



Northwestern Medicine®

Architecting Attribution

https://github.com/data2health/architecting_attribution

(sign-up at the bottom of the page)

Products to be delivered:

- Contribution Role Ontology
- Digital research object taxonomy
- Annotation file format
- Attribution workflow for research information systems and other use cases
- Local guide to support attribution in CTS at the person-level
- Demonstrator for the individual

Milestones with Dates

April: enhanced contribution role ontology
May: finalize strategy for digital object types
May: finalize annotation file format
August: demonstrator for the individual
Fall: Credit, Attribution, and Incentives workshop

What will be delivered by fall:

- CRedIT Ontology, Contribution Role Ontology, digital research object taxonomy, translational research object taxonomy, & annotation file format
- Local guide to support attribution in CTS at the hub level
- Demonstrator for the individual to generate content for CVs, biosketches, etc.

Thank you!

Teams

- Northwestern University Clinical and Translational Sciences Institute
- Office of Faculty Affairs at Feinberg School of Medicine
- CD2H
  NU team: *Karen Gutzman, Sara Gonzales, Lisa O'Keefe*
  OHSU team*: Marijane White, Nicole Vasilevsky, Melissa Haendel*
- OpenVIVO collaborators, Force11 Attribution WG, NISO, Cathy Sarli & Becker Library
- Galter Library, NUCATS, ChicagoCHEC, FIRST DailyLife, Health for All

NIH Support

- U24TR002306 (NCATS)
- UL1TR001422 (NCATS)
- U54CA202995, U54CA202997, U54CA203000 (NCI)
- P30AR072579 (NIAMS)
- G08LM012688 (NLM