



The Informatics of Attribution a story of culture + technology

2018 SSP Seminar

New Directions in Strategy, Technology, and Community

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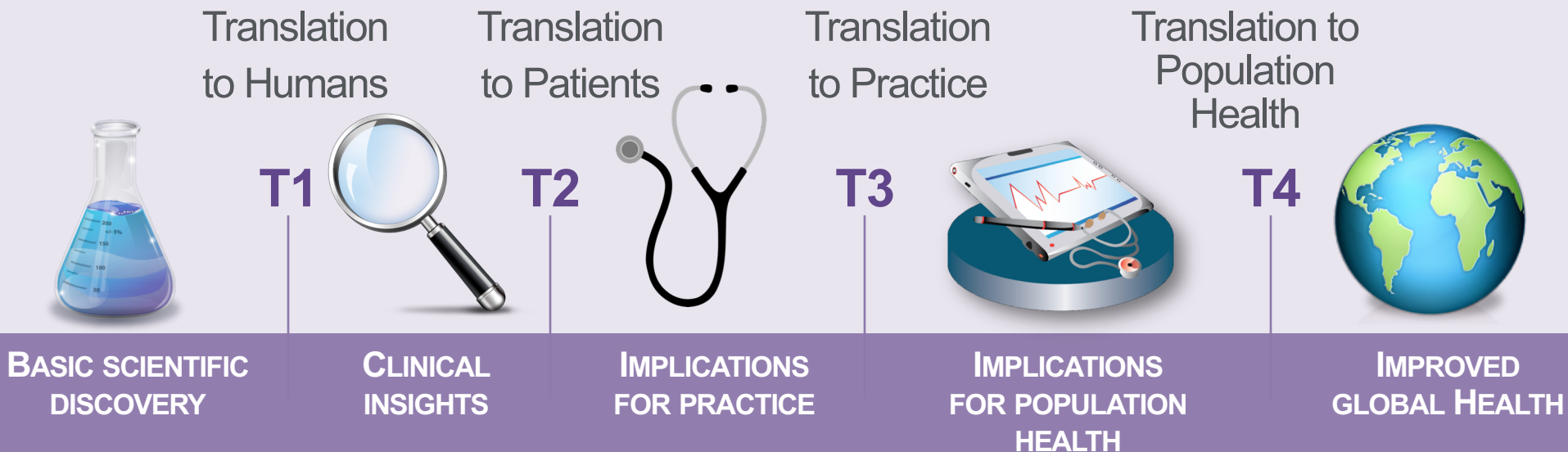
Galter Health Sciences Library & Learning Center

@kristiholmes

Attribution for All

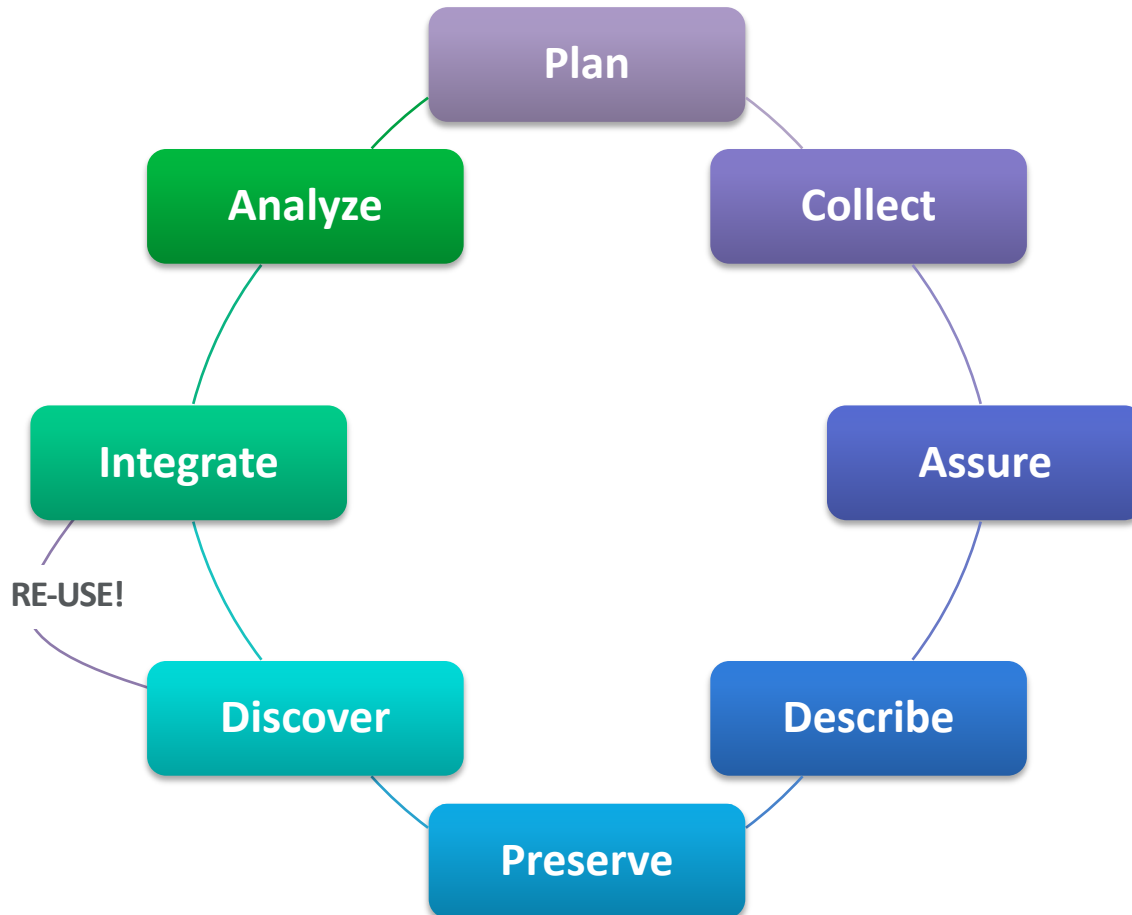
- ✓ Biomedical research evolves
- ✓ Institutional perspectives and new models
- ✓ Publication data and beyond
- ✓ Meaningful assessment and impact
- ✓ Next steps

Biomedical research evolves: Accelerating discovery & implementation (context)



Environment
Team Science
Training
Idea development
Research process
Communication
Assessment & Improvement

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

Biomedical research evolves

An increasing pressure to show impact

A Definition of Research Impact

Research impact is the demonstrable contribution that research makes to the economy, society, culture, national security, public policy or services, health, the environment, or quality of life, beyond contributions to academia.

Research Impact Principles and Framework, Australian Research Council
<http://www.arc.gov.au/general/impact.htm>

Impact of NIH Research:

improvements in health through treatment and prevention, contributions to society through economic growth and productivity, and expansion of the biomedical knowledge base through cutting-edge research and cultivation of the biomedical workforce of today and tomorrow.

Our Health – promoting treatment and prevention

Our Society – driving economic growth and productivity

Our Knowledge – expands the biomedical knowledge base

Impact of NIH Research, National Institutes of Health, US
<http://www.nih.gov/about-nih/what-we-do/impact-nih-research>

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

Institutional perspectives & new models

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*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

➤ **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.

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%	

Preliminary Findings from the Review, Promotion, and Tenure Study

MAY 30, 2018 | IN BLOG, PRELIMINARY FINDINGS, RESEARCH | BY ALICE

<https://www.scholcommmlab.ca>



Directors



Dr. Juan Pablo Alperin

Dr. Juan Pablo Alperin is a co-director of the #scholcommmlab, as well as an assistant professor at the Canadian Institute for Studies in Publishing and an associate director of research of the Public Knowledge Project at Simon Fraser University, Canada.

[Read More](#)



Dr. Stefanie Haustein

Dr. Stefanie Haustein is a co-director of the #scholcommmlab as well as an assistant professor at the School of Information Studies at the University of Ottawa. Her research focuses on social media in scholarly communication, bibliometrics, and altmetrics.

[Read More](#)

COMMENT

Writing

Study
conception

Credit where credit is due

Liz Allen, Amy Brand, Jo Scott, Micah Altman and Marjorie Hlava are trialling digital taxonomies to help researchers to identify their contributions to collaborative projects.

Investigation

Formal
analysis

Research today is rarely a one-person

Through the endorsement of individuals' contributions, researchers can start to move

journal articles could be classified using a 14-role taxonomy (see 'Who did what?'). The survey was sent to 1,200 corresponding

CRT

CReditT

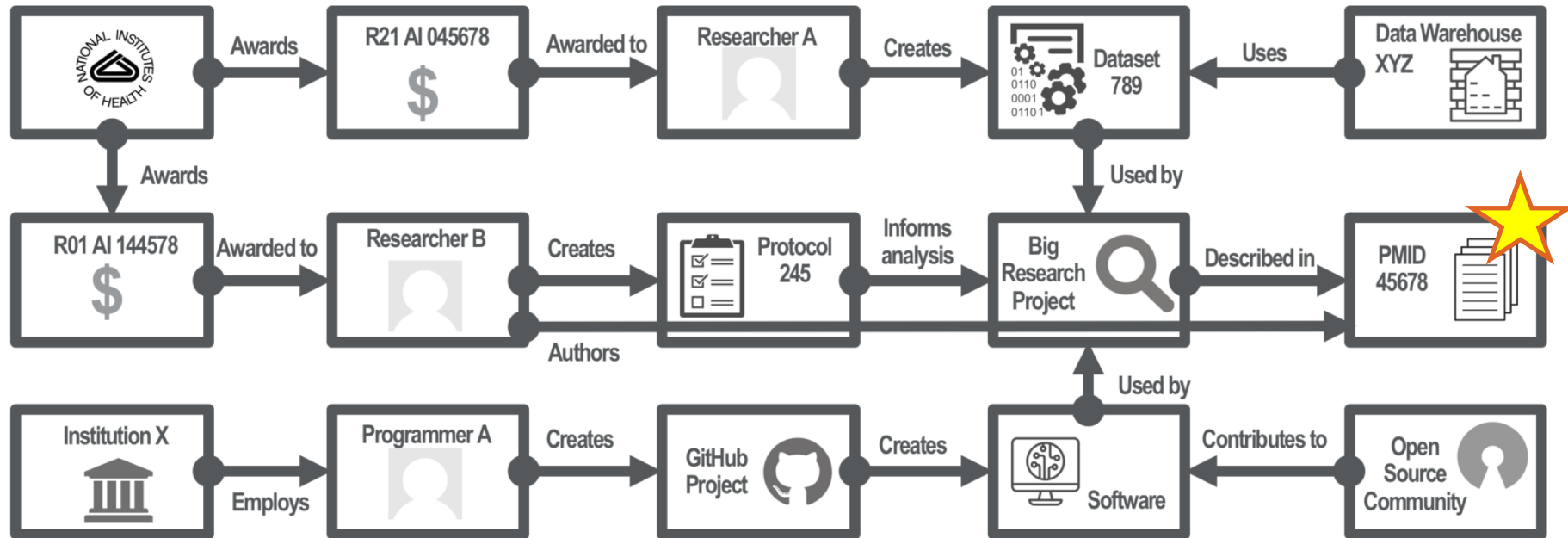
CReditT is high-level taxonomy, including 14 roles, that can be used to represent the roles typically played by contributors to scientific scholarly output. The roles describe each contributor's specific contribution to the scholarly output.

What about publication data?

This is an SSP event, after all

- What's here?
 - Valuable bibliographic metadata (collaborators, journal titles, affiliations, keywords and indexing, etc.)
 - CRedit roles
 - Citations to these works (source dependent)
 - Various metrics
- What's not?
 - Only traditional outputs are accounted for...so several other outputs are missed!
 - Second-degree affiliation – non-affiliated papers, but written by our people (e.g., before they arrived)
 - *Reliable* links to funding – mechanics and cultural aspects
 - Open access status? Compliance status? Etc...
 - companion digital objects, ancillary products
 - Other roles

Better attribution: extending credit beyond the publication



Adapted from Julie McMurry

What work is being done, who is doing it, and what outputs are being created?

1. Understand deeply the requirements for a computable attribution system from a large diversity of stakeholders;
2. Build model(s) to meet these requirements (CRO, ROO);
3. Evaluate the models in real pilot systems with real data.

By using contribution roles & research outputs to develop infrastructure to understand the scholarly ecosystem, we can better understand, leverage, and credit a diverse translational workforce

Our Approach: The Informatics of Attribution

1. Understand deeply the requirements for a computable attribution system from a large diversity of stakeholders;
2. Build model(s) to meet these requirements; and
3. Evaluate the models in real pilot systems with real data.

Development of data models to address these needs demands a rigorous requirements-driven approach

Key modeling challenges for development of integrative community standards

1. Accommodation of diverse and complex data types
2. Support needs of different applications and systems
3. Interoperability with broader data landscape

Key tools necessary to drive change

1. Technology
2. Persistent identifiers
3. Data models
4. Connections – of all kinds!

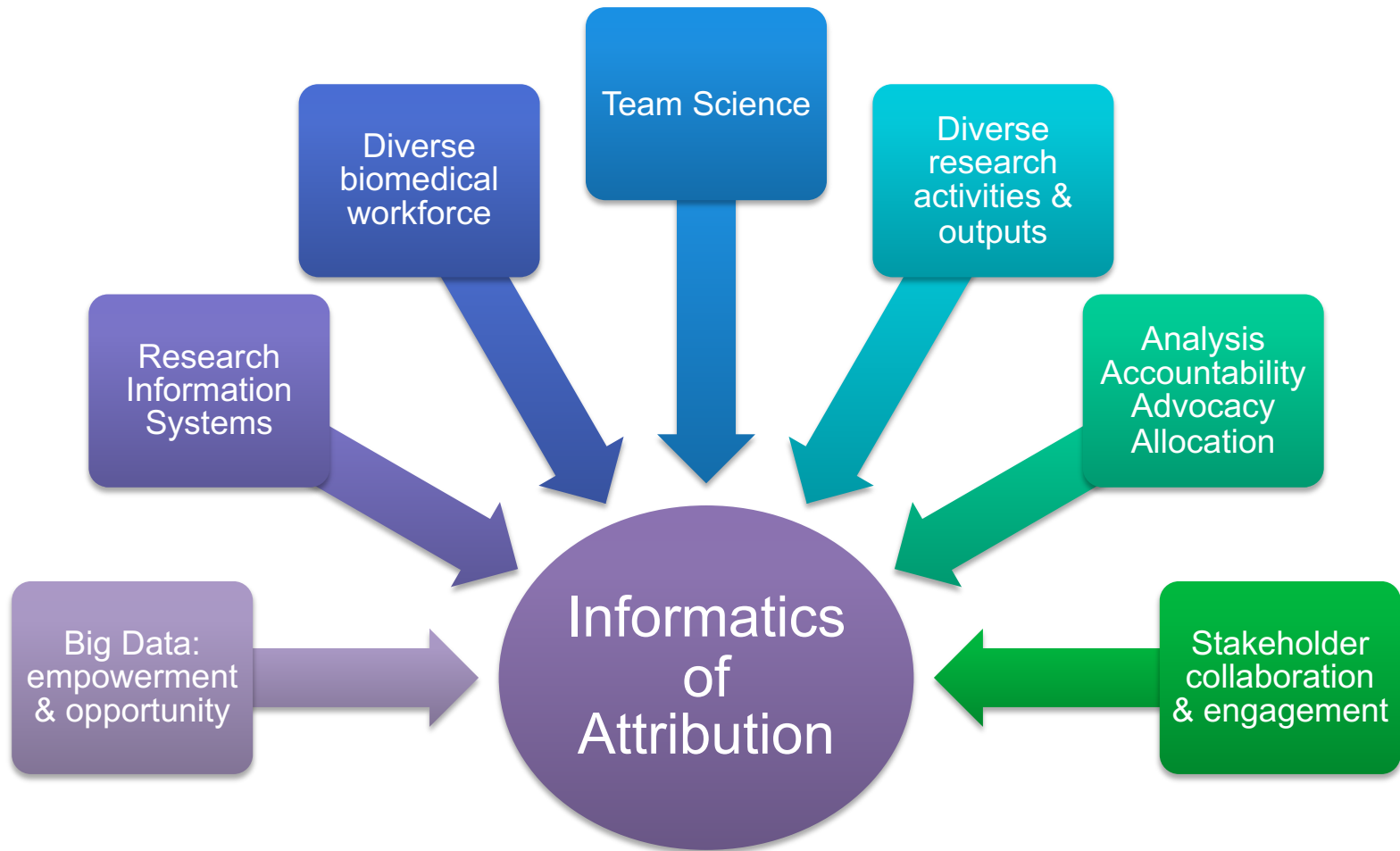


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FOR DATA TO HEALTH

@kristiholmes & @ontowonka

Why now & how do we get there?

Informatics of Attribution



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<http://bit.ly/AttributionSignUp>

How do we get there?

Informatics of Attribution

Requires Culture & technology

- ✓ Data use, reuse, & repurposing + smarter systems
- ✓ Persistent identifiers
- ✓ Cultural interventions & algorithms
- ✓ Better representation of contributor roles (CRedit & CD2H)
- ✓ Recognition of a range of outputs (Becker Model, NISO, CD2H)
- ✓ Ideas & input from all perspectives
- ✓ A COLLABORATIVE APPROACH!

<http://bit.ly/AttributionSignUp>

recommended practice



The screenshot shows the NISO website with a navigation bar including links like Home, What We Do, Join NISO, Explore, Events, NISO I/O, Standards Committees, and Standards & Publications. The main content area is titled 'NISO RP-25-2016 Outputs of the NISO Alternative Assessment Metrics Project'. It includes an abstract about altmetrics, a 'Publication type' section listing 'Recommended Practice' and 'Front Matter', and a 'Publication Date' of September 14, 2016, with ISBN 978-1-937522-71-1.

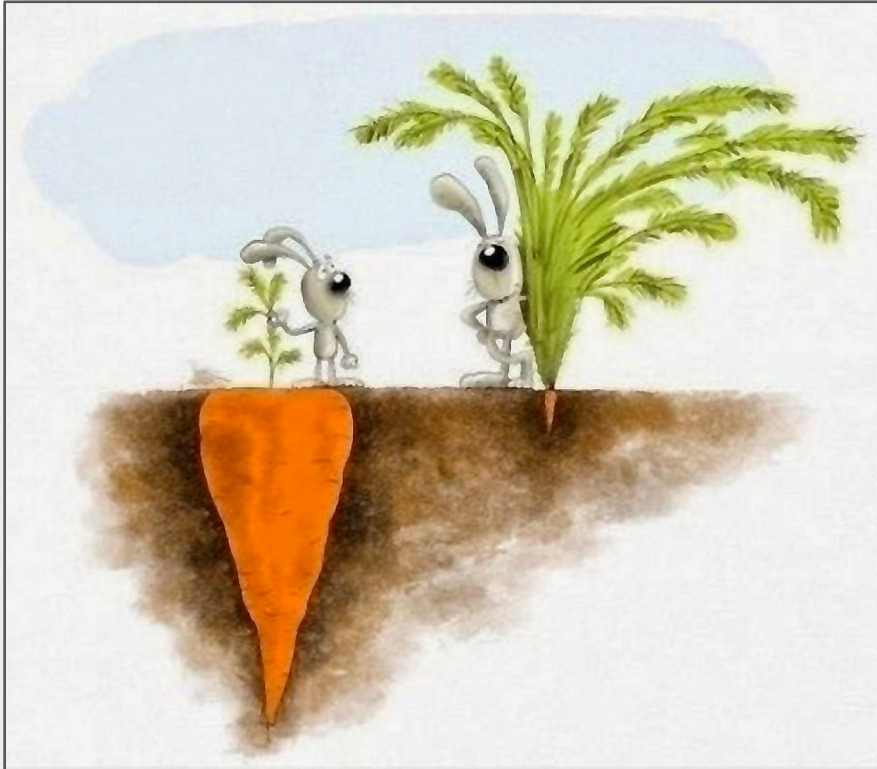
<https://www.niso.org/publications/rp-25-2016-altmetrics>



The screenshot shows the website for 'ASSESSING THE IMPACT OF RESEARCH', a Bernard Becker Medical Library Project. The main heading is 'Becker Medical Library Model for Assessment of Research Impact'. It describes the model as a framework for tracking diffusion of research outputs and activities to locate indicators that demonstrate evidence of biomedical research impact. The site includes sections for 'About this Website' and 'Benefits of Assessment of Research Impact', which lists quantifying and documenting research impact, justifying future requests for funding, quantifying return on research investment, and discovering how research findings are being used. A quote from the CHITS study is also present: 'I had anecdotal evidence of the CHITS study impact, but I wondered if quantitative, independent indicators'.

<https://becker.wustl.edu/impact-assessment/model>

Attribution for All



Desired outcomes: Machine-actionable approaches to...

- Understand our changing scholarly ecosystem
- Do a better job of giving credit where credit is due
- Leverage expertise data to improve translational processes and efficiencies



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- Galter Library
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- Cathy Sarli
- Becker Library

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<http://bit.ly/AttributionSignUp>

Thank you!

Term	Definition (CRediT)
Conceptualization	Ideas; formulation or evolution of overarching research goals and aims.
Methodology	Development or design of methodology; creation of models.
Software	Programming, software development; designing computer programs; implementation of the computer code and supporting algorithms; testing of existing code components.
Validation	Verification, whether as a part of the activity or separate, of the overall replication/reproducibility of results/experiments and other research outputs.
Formal Analysis	Application of statistical, mathematical, computational, or other formal techniques to analyse or synthesize study data.
Investigation	Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection.
Resources	Provision of study materials, reagents, materials, patients, laboratory samples, animals, instrumentation, computing resources, or other analysis tools.
Data Curation	Management activities to annotate (produce metadata), scrub data and maintain research data (including software code, where it is necessary for interpreting the data itself) for initial use and later re-use.
Writing – Original Draft	Preparation, creation and/or presentation of the published work, specifically writing the initial draft (including substantive translation).
Writing – Review & Editing	Preparation, creation and/or presentation of the published work by those from the original research group, specifically critical review, commentary or revision – including pre- or post-publication stages.
Visualization	Preparation, creation and/or presentation of the published work, specifically visualization/data presentation.
Supervision	Oversight and leadership responsibility for the research activity planning and execution, including mentorship external to the core team.
Project Administration	Management and coordination responsibility for the research activity planning and execution.
Funding Acquisition	Acquisition of the financial support for the project leading to this publication.