Measuring Success Through Improved Attribution

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#VIVOcredit
What *IS* “success”?
It’s not always what you see
Some key points to help us unpack this discussion:

- Stakeholders
- Attribution requirements
- Greatest challenges
- Greatest opportunities

- Perspectives from consumers and producers of improved attribution
  - Panelists
  - Attendees
Melissa
Drosophila Muller F Elements Maintain a Distinct Set of Genomic Properties Over 40 Million Years of Evolution

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Many contributions don’t lead to authorship

BD2K key personnel co-authorship

⇒ 20% awardees are not adequately profiled using publications
Some contributions are anonymous


An interview with Austin Smith.
Vicente C.

Abstract
Austin Smith is a stem cell and developmental biologist, who has dedicated his career to the study of pluripotency, stem cell renewal and differentiation. He is currently the Director of the Wellcome Trust MRC Cambridge Stem Cell Institute at the University of Cambridge, UK. We met him there to discuss his research and interests, as well as his role as an editor for Development.

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Data deposition

Anonymous review

Image credit: http://disruptiveviews.com/is-your-data-anonymous-or-just-encrypted/
Credit extends beyond the original contribution

- Stacy creates *mouse1*
- Kristi creates *mouse2*
- Karen uses performs RNAseq analysis on *mouse1* and *mouse2* to generate *dataset3*, which she subsequently curates and analyzes
- Karen writes publication `pmid:12345` about the results of her analysis
- Karen explicitly credits Stacy as an author but not Kristi.
Credit is connected

⇒ Credit to Stacy is asserted, but credit to Kristi can be inferred
What kind of questions can we ask?

- Find all people who made contributions to a given publication
- Find all publications or research entities to which a person has contributed
- Track what types of contributions a person made during their training
- Find all persons at my institution who have contributed to publications as a data curator or software developer
- Find all papers that used software developed by a given person
- Find all research entities that are related to the funding of a particular grant
Melissa Summary

- **Stakeholders:** Authors, reviewers, software engineers, biocurators, patients, companies – ANYONE who contributes ANY scholarly product or service to the scientific landscape.

- **Requirements:** Uniquely identify: people, organizations, their roles, and the type of contribution.

- **Challenges:** Tracking contribution use downstream, anonymous contributions vs. publicly identified contributions. Incentivizing organizations to value this information: P&T, Funding Agencies, Publishers, etc.

- **Opportunities:** Better structure biosketch systems such as SciENcv using VIVO-ISF to support varied contributions. Work with crediting systems such as BlockChain to track anonymous contributions. Update the JATS publishing standard to enable a variety of credit types. Take advantage of organizations with global data sharing impact such as GA4GH.
Karen
Thoughts from the library…

Word cloud created using Tagxedo based on text from:
Metrics and Impact Core

at Galter Health Sciences Library

- Research Impact: demonstrate, assess, visualize

- Services include:
  - developing successful publishing strategies
  - managing or tracking publications
  - maintaining an impactful online identity
  - measuring or assessing research impact
  - communicating research impact to audiences

Metrics and Impact Core webpage
Who We Serve

**Individuals**
- promotion and tenure
- annual review
- tracking research
- new NIH Biosketch

**Research Groups**
**Departments**
**Institutions**
- advancement of science
- advocating for funding
- planning for infrastructure
- highlight expertise of members
- rankings or comparison
Why consider contribution/ attribution?

- **More than publications.** Scholarly output is broader in scope than only peer-reviewed publications

- **Better metadata.** How can we represent contributions to those outputs?

  **Area:** Education
  **Role:** developer of training materials, student, teaching faculty, mentor, teacher, project manager, creator
  **Output:** syllabus, education or teaching packages, teaching faculty, reading list, lecture, curriculum, case studies, business cases (write-ups), problem sets (teaching), training materials for education information sciences, methods for project plan (how you can digitize your special collections), lesson plan, mentorship, training methodologies

  *Brainstorm from FORCE2015 "Contribution and Attribution in the Context of the Scholar" Workshop held, January 11, 2015 in Oxford, England*

- **What is impactful?** Better data allows us to ask better evaluation questions
Connections to the library

- **Tenure and Promotion**

  Northwestern University Tenure and Promotion Guidelines.

  Feinberg recognizes the critical importance of collaboration (“team science”) in research and scholarly activity and that the contributions of middle authors in multi-authored publications are often seminal and of the highest quality. When research and/or scholarship is pursued in a collaborative fashion and results in multi-authored publications, the specific contributions of the candidate must be clear and significant.

  ([http://www.feinberg.northwestern.edu/fao/docs/faculty/Information-Guide-for-APT.pdf](http://www.feinberg.northwestern.edu/fao/docs/faculty/Information-Guide-for-APT.pdf))

- **Funding Applications**

  NIH Training Grant Application.

  Table 6B: Summarize these data in the body of the proposal. For example, what is the average number of papers published by trainees, how many first author, what has been the impact of these publications on their field of science.


- **Evaluating Research**

  NIH CTSA Application.

  Applicants should plan for ways to identify best practices in team science, and to disseminate successful models…This may also include using innovative measures (other than the sole use of publications or grant support) when evaluating researchers. These measures could focus for example on contributions to therapeutics development (such as patents, or the impact of projects advanced).

Continued…

- **New NIH Biosketch**
  
  The new format extends the page limit from four to five pages, and allows researchers to **describe up to five of their most significant contributions to science**, along with the historical background that framed their research. Investigators can outline the central findings of prior work and the influence of those findings on the investigator’s field. Investigators involved in Team Science are provided the opportunity to describe their specific role(s) in the work.


- **Nominating Committee for Award**
  
  All scientists with a background in hypertension research and those who have made a meritorious scientific discovery or discoveries, either alone or with others, may be considered. The Selection Committee will assess the candidates' overall credentials and their impact on the field of hypertension.

(http://my.americanheart.org/professional/Councils/AwardsandLectures/LifetimeAchievement/Excellence-Award-for-Council-on-Hypertension-sponsored-by-Novartis_UCM_322694_Article.jsp)
In summary…

- Stakeholders: faculty, staff, department chairs, institute directors, institute members, institution, and more…

- Requirements: easy to use or implement, robust enough to fit variety of needs

- Challenges: making connections between the various roles and outputs in the scholarly ecosystem

- Opportunities: make systems work for researchers, better evaluation methods
Kristi

centers, programs, institutes
Evaluation & Continuous Improvement at NUCATS

**Data Sources**
- Research Networking Systems (LatticeGrid, NU Scholars, VIVO)
- FSM Profiles
- Survey Data
- Research Navigators
- Galter Digital Repository
- myNUCATS membership database
- Clinical Systems
- nuCORE
- NITRO-Workflow
- NITRO-Study Tracker
- NITRO-Competitions
- Symplectic Elements
- Web of Science, Scopus
- NITRO-Reporter
- Institutional Grants Mgmt.
- Alternative Metrics

**Inputs**
Researcher needs, attributes, resources, and requests

**Instrumented Processes**
Computerized workflows producing process data

**Becker Model**
Outputs → Impacts
- Traditional Metrics
- Non-Traditional Metrics

**Continuous Improvement**
Process Data and Dashboards

**Environment**
Performance Dashboards
Data Reports
Visualizations
Northwestern University Clinical and Translational Sciences (NUCATS) Institute Evaluation and Continuous Improvement Program

Diverse outputs, diverse impacts, diverse roles
Each a critical component of the research process

INVESTIGATORS
STATISTICIANS
STUDENTS
LAB TECHS
TRAINEE\'S
TRIAL COORDINATORS
DATA WRANGLERS
LIBRARIANS
ADMIN\'S
NURSES
COMMUNITY PARTNERS
DEVELOPERS
ANALYSTS
- Measurement instruments
- Consent documents
- Continuing education materials
- Cost-effective intervention
- Consensus development conferences
- Change in delivery of healthcare services
- Gray literature
- New experimental methods, databases, animal models, or software tools
- New diagnostic criteria or standards of care
- Biologics
- Curriculum guidelines
- Clinical/practice guidelines
- Quality measure guidelines

PATHWAYS
ADVANCEMENT OF KNOWLEDGE
CLINICAL IMPLEMENTATION
LEGISLATION AND POLICY ENACTMENT
ECONOMIC BENEFIT
COMMUNITY BENEFIT & CAPACITY BUILDING

https://becker.wustl.edu/impact-assessment
http://nucats.northwestern.edu/
Program and enterprise-level initiatives

- Stakeholders: decision makers at the local-level and beyond, funders, public, local community, remote collaborators
- Requirements: need to be clear, need to translate to real ROI, should help convey ROI to stakeholders, quantitative if possible, should offer real-time feedback, should leverage enterprise data stores
- Challenges: response from faculty, data quality and currency, difficult to do benchmarking, difficult to understand comparisons
- Opportunities: better able to communicate ROI to stakeholders, better understanding of impact, better morale/more effective teams when efforts are properly recognized
Community Forum (30 min)

- We want to hear from you:
  - What do YOU want to see in an integrated framework?
  - What systems need to integrate with a data model?
  - What is the biggest hurdle to accomplishing a common credit framework?
  - What partners need to be at the table?

- Google doc for notes at https://goo.gl/dI6P0H
Thank you!

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Join the Attribution Working Group at: https://www.force11.org/group/attributionwg