

Understanding Attribution:

creating equitable models in the scholarly ecosystem

FORCE 2017 Research Communication and e-Scholarship Conference | Berlin, Germany

Date: Wednesday, October 25, 2017

Time: 3:00 – 4:30 pm (15:00-16:30)

Location: Room 4

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On social media use hashtags: #FORCE2017, #attribution

Who we are...



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Learning Objectives

- Gain an understanding of attribution and contribution in the scholarly ecosystem
- Discuss and analyze current attribution and contribution models and efforts
- Brainstorm and consider the components of a system to capture attribution and contribution
- Engage in activities that broaden understanding of the application of ontologies
- Review the work of the Force11 Attribution Working Group and discuss future efforts

Agenda

- 15:00 - 15:20 **Review the importance of proper attribution**
Proper credit for scholarly work creates a better record and inventory of expertise and experience and sets the stage for productive and trusted collaborations.
- 15:20 - 15:50 **Discuss the current attribution environment**
Topics to be covered include: groups in the contribution/attribution environment, their work, creating an equitable environment in the scholarly ecosystem, limitations on capturing attribution
- 15:50 - 16:20 **Explore attribution and credit in action**
Each group will have time to review scholarly objects and consider a basic data model for attribution.
- 16:20 - 16:30 **Wrap up**

The importance of proper attribution

Proper credit for scholarly work creates a better record and inventory of expertise and experience and sets the stage for productive and trusted collaborations.

Attribution: an imperfect model

*Reviewers on hiring committees and grant funding applications usually **don't have the time to read each publication and assess author contributions**, and hence rely, to different degrees, **on the position of your name on the author list** for each publication.*



Cham, Jorge. The Author List. PhD Comics. Retrieved from: <http://phdcomics.com/comics/archive.php?comid=562>

Mehta, Devang. Science first, scientists later. Medium. Retrieved from: <https://medium.com/@devang/science-first-scientists-later-6419cbc4ac9b>

Strain under current attribution model

“The practice of explicitly giving authors **equal credit is increasingly common** in original research publications. Scientific journals should consider providing guidance for authors regarding this practice.”

Akhbue E, Lautenbach E. “Equal” Contributions and Credit: An Emerging Trend in the Characterization of Authorship. *Annals of epidemiology*. 2010;20(11):868-871. doi:10.1016/j.annepidem.2010.08.004. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2953548/>

Davidson, M. Equal Contribution for Authors in PubMed. NLM Technical Bulletin. 2017;September-October (418) Retrieved from: https://www.nlm.nih.gov/pubs/techbull/so17/so17_contrib_equal_author_pub_med.html

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Equal Contribution for Authors in PubMed

Davidson M. Equal Contribution for Authors in PubMed. NLM Tech Bull. 2017 Sep-Oct;(418):e5.

2017 September 14 [posted]

Journal publishers who submit citation data to PubMed may now indicate equal contribution among authors. You can view equal contribution among authors in PubMed in two ways:

1. Abstract display format: in the author section (see Figure 1).

Format: Abstract

Acta Neurologol. 2012 Apr;123(4):485-498. doi: 10.1007/s00401-012-0959-7. Epub 2012 Feb 23.

Subgroup-specific alternative splicing in medulloblastoma.

Dubuc AM*1,2,3, Morrissy AS*1,6, Kloosterhof NK*4,5, Northcott PA*2,3, Yu EP*, Shih D*1,2,3, Peacock J*2,3, Grajkowska W*, van Meter T*, Eberhart CG*, Pfister S*, Marra MA*1, Weiss WA*2, Scherer SW*1,14, Rutka JT*1,3, French PJ*, Taylor MD*1,2,3.

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- 9 Department of Pathology, Johns Hopkins University, Baltimore, Maryland, USA.
- 10 German Cancer Research Centre, University of Heidelberg, Heidelberg, Germany.
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- 12 Helen Diller Family Comprehensive Cancer Centre, University of California, San Francisco, California, United States of America.
- 13 The Centre for Applied Genomics, The Hospital for Sick Children, Toronto, Ontario, Canada.
- 14 Department of Molecular Genetics, University of Toronto, Toronto, Ontario, Canada.

Contributed equally

Figure 1: Equally contributing authors in author section of PubMed abstract display.

Attribution gone awry (1)

Contribution to Science:

“...this study introduces Nrf2 as a novel therapeutic target for [Fragile X Syndrome (FXS)] and shows that restoration of this novel target appears as promising therapeutic approach for FXS.”

Retracted Over Dispute on Author Order:

The retraction has been agreed as all authors cannot agree on a revised author order, and at least one author continues to dispute the original order. In this case, the original article is being retracted on the grounds that the journal does not have permission to publish.

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Genes, Brain and Behavior
Official publication of the International Behavioural and Neural Genetics Society
Genes, Brain and Behavior (2017)
doi: 10.1111/gbb.12373

Nrf2: a novel therapeutic target in fragile X syndrome is modulated by NNZ2566

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Fragile X-associated disorders are a family of genetic conditions resulting from the partial or complete loss of fragile X mental retardation protein (FMRP). Among these disorders, fragile X syndrome (FXS) is the most common cause of inherited intellectual disability and autism. Progress in basic neuroscience has led to identification of molecular targets for treatment in FXS; however, there is a gap in translation to targeted therapies in humans. This study introduces a novel therapeutic target for FXS, nuclear factor (erythroid-derived 2)-like 2 (Nrf2), a transcription factor known to induce expression of over 100 cytoprotective genes. We also show that NNZ2566, a drug that has successfully completed a phase 2 clinical trial in FXS, is effective in modulating this target in FXS, partially reversing the FXS phenotype. NNZ2566 has a therapeutic role as Nrf2 activator.

NQO1 (NAD(P)H dehydrogenase quinone 1), GST- α 1 (glutathione S-transferase α -1) and EH (epoxide hydrolase) and has a knockdown effect on E-cadherin. In summary, the Nrf2/ARE (antioxidant response element) pathway appears to be a novel promising therapeutic target for FXS and NNZ2566 appears to be acting as an activator of the Nrf2/ARE pathway and suggests a potential benefit across multiple symptoms that could be associated with the pathobiological processes underlying FXS.

Keywords: Autism spectrum disorder, behavior, E-cadherin, Fmr1 knockout mouse, fragile X syndrome, GST-1, NNZ2566, NQO1, Nrf2/ARE pathway, oxidative stress

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Fragile X syndrome (FXS), the most commonly inherited form of mental retardation and the most common genetic cause of autism, is caused by the loss of the fragile X mental retardation protein (FMRP) encoded by the fragile X mental retardation 1 (Fmr1) gene (Verkerk et al. 1991). The FMRP regulates neuronal RNA metabolism, and its absence or mutations in the gene leads to FXS (Hagerman 1997). Fundamental research on the Fmr1 knockout (KO) mouse (The Dutch-Belgian Fragile X Consortium et al. 1994) has provided promising insights into the cellular and molecular underpinnings of the disease, suggesting several targets for pharmacological therapies. For instance, treatments aimed at reversing a protein synthesis phenotype, through inhibition of metabotropic glutamate receptors and downstream signaling kinases such as Mitogen-activated protein kinase 1 (MAPK1) (ERK1/2), have been shown to ameliorate mutant phenotypes (Dölen et al. 2007; Michalon et al. 2012). Similarly, treatments built on the observation that the density and morphology of dendritic spines are abnormal in humans with FXS and Fmr1 KO mice have also been shown to ameliorate mutant phenotypes (Dolan et al. 2013; Hayashi et al. 2007). Despite much research in these areas, there is a gap in translation to targeted therapies in humans, and an effective treatment has not yet been developed (Berry-Kravis et al. 2013). Further investigation into identifying additional therapeutic avenues for the treatment of FXS is needed.

Increased oxidative stress is a phenotypic component of FXS (Bechara et al. 2009; Davidovic et al. 2011; de Diego-Otero et al. 2009; El Bekay et al. 2007). Oxidative stress results from an imbalance between the formation and neutralization of pro-oxidants and leads to the dysregulation

Deacon, R. M. J., Hurley, M. J., Rebolledo, C. M., Snape, M., Altimiras, F. J., Fariás, L., Pino, M., Biekofsky, R., Glass, L. and Cogram, P. (2017), Nrf2: a novel therapeutic target in fragile X syndrome is modulated by NNZ2566. *Genes, Brain and Behavior*. doi:10.1111/gbb.12373. Retrieved from:

<http://onlinelibrary.wiley.com/doi/10.1111/gbb.12373/abstract?campaign=woleto>

Attribution gone awry (2)

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- Technicians complain their contribution ignored

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Nature 385, 810 - 813 (27 February 1997); doi:10.1038/385810a0

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Viable offspring derived from fetal and adult mammalian cells

I. WILMUT, A. E. SCHNIEKE*, J. MCWHIR, A. J. KIND* & K. H. S. CAMPBELL

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Fertilization of mammalian eggs is followed by successive cell divisions and progressive differentiation, first into the early embryo and subsequently into all of the cell types that make up the adult animal. Transfer of a single nucleus at a specific stage of development, to an enucleated unfertilized egg, provided an opportunity to investigate whether cellular differentiation to that stage involved irreversible genetic modification. The first offspring to develop from a differentiated cell were born after nuclear transfer from an embryo-derived cell line that had been induced to become quiescent¹. Using the same procedure, we now report the birth of live lambs from three new cell populations established from adult mammary gland, fetus and embryo. The fact that a lamb was derived from an adult cell confirms that differentiation of that cell did not involve the irreversible modification of genetic material required for development to term. The birth of lambs from differentiated fetal and adult cells also reinforces previous speculation^{1,2} that by inducing donor cells to become quiescent it will be possible to obtain normal development from a wide variety of differentiated cells.

1. Campbell, K. H. S., McWhir, J., Ritchie, W. A. & Wilmut, I. Sheep cloned by nuclear transfer from a cultured cell line. *Nature* **380**, 64–66 (1996). | [Article](#) | [PubMed](#) | [ISI](#) | [ChemPort](#)
2. Solter, D. Lambing by nuclear transfer. *Nature* **380**, 24–25 (1996). | [Article](#) | [PubMed](#) | [ISI](#) | [ChemPort](#)
3. Gurdon, J. B., Laskey, R. A. & Reeves, O. R. The developmental capacity of nuclei transplanted from keratinized skin cells of adult frogs. *J. Embryol. Exp. Morph.* **34**, 93–112 (1975). | [PubMed](#) | [ISI](#) | [ChemPort](#)
4. Quinlivan, T. D., Martin, C. A., Taylor, W. B. & Cairney, I. M. Pre- and perinatal mortality in those ewes that conceived to one service. *J. Reprod. Fert.* **11**, 379–390 (1966). | [ChemPort](#)
5. Walker, S. K., Heard, T. M. & Seamark, R. F. *In vitro* culture of sheep embryos without co-culture: successes and perspectives. *Therio* **37**, 111–126 (1992).
6. Nash, M. L., Hungerford, L. L., Nash, T. G. & Zinn, G. M. Risk factors for perinatal and postnatal mortality in lambs. *Vet. Rec.* **120**, 61–65 (1986). | [PubMed](#) | [ISI](#) | [ChemPort](#)

I. WILMUT, A. E. SCHNIEKE*, J. MCWHIR, A. J. KIND & K. H. S. CAMPBELL, Viable offspring derived from fetal and adult mammalian cells, *Nature*. doi:10.1038/385810a0. Retrieved from: <https://www.nature.com/nature/journal/v385/n6619/abs/385810a0.html>

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Photo courtesy of The Roslin Institute, The University of Edinburgh

Attribution gone awry (2)



But the debate does not end there. One member of the Dolly team, a technician called Bill Ritchie, along with Karen Mycock, another technician, was responsible for the intricate and arduous egg and cell manipulation needed to create each clone. At the end of each day, the few successfully cloned embryos were collected and transplanted into ewes. "There were two people doing nuclear transfer that day and it could have been either who created the embryo that made Dolly," said one scientist close to the project.

Mr Ritchie argues that his and Ms Mycock's names should have appeared on the list of authors of the 1997 research paper. Instead, the technicians both appear in the small print of acknowledgements at the end of the report's list of references.

<http://bit.ly/2yGAarD>

- "It's one of those scenarios. You have a hierarchy of employment and you need the job. They dictate the rest."
- Many scientists say technicians are merely doing what they are told, while the credit - the all-important name on the paper - goes to those whose intellectual thought made the research a success.
- "You get some papers where the authors haven't done a scrap of work themselves, it's all down to the technicians acknowledged at the back"
- "It all comes down to how far down the list you want to go"

Narrowly defined models cause problems

TABLE 1.

GROWING PERVERSE INCENTIVES IN ACADEMIA

<i>Incentive</i>	<i>Intended effect</i>	<i>Actual effect</i>
"Researchers rewarded for increased number of publications."	"Improve research productivity," provide a means of evaluating performance.	"Avalanche of" substandard, "incremental papers"; poor methods and increase in false discovery rates leading to a "natural selection of bad science" (Saldino and McElreath, 2016); reduced quality of peer review
"Researchers rewarded for increased number of citations."	Reward quality work that influences others.	Extended reference lists to inflate citations; reviewers request citation of their work through peer review
"Researchers rewarded for increased grant funding."	"Ensure that research programs are funded, promote growth, generate overhead."	Increased time writing proposals and less time gathering and thinking about data. Overselling positive results and downplay of negative results.
Increase PhD student productivity	Higher school ranking and more prestige of program.	Lower standards and create oversupply of PhDs. Postdocs often required for entry-level academic positions, and PhDs hired for work MS students used to do.
Reduced teaching load for research-active faculty	Necessary to pursue additional competitive grants.	Increased demand for untenured, adjunct faculty to teach classes.
"Teachers rewarded for increased student evaluation scores."	"Improved accountability; ensure customer satisfaction."	Reduced course work, grade inflation.
"Teachers rewarded for increased student test scores."	"Improve teacher effectiveness."	"Teaching to the tests; emphasis on short-term learning."
"Departments rewarded for increasing U.S. News ranking."	"Stronger departments."	Extensive efforts to reverse engineer, game, and cheat rankings.
"Departments rewarded for increasing numbers of BS, MS, and PhD degrees granted."	"Promote efficiency; stop students from being trapped in degree programs; impress the state legislature."	"Class sizes increase; entrance requirements" decrease; reduce graduation requirements.
"Departments rewarded for increasing student credit/contact hours (SCH)."	"The university's teaching mission is fulfilled."	"SCH-maximization games are played": duplication of classes, competition for service courses.

Modified from Regehr (pers. comm., 2015) with permission.

"...incentives for academic scientists have **become increasingly perverse** in terms of competition for research funding, development of quantitative metrics to measure performance, and a changing business model for higher education itself."

Edwards MA, Roy S. Academic Research in the 21st Century: Maintaining Scientific Integrity in a Climate of Perverse Incentives and Hypercompetition. *Environmental Engineering Science*. 2017;34(1):51-61. doi:10.1089/ees.2016.0223. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5206685/>

Representing diverse contributions

Non-traditional role:

As **primary technician**, I performed human brain autopsies, whole brain hemisphere sectioning, cholinergic and immunohistochemical staining, stereological analysis and publication preparation. During the years I worked in the lab, **almost 200 papers** were published, **40** of which I supplied technical expertise.

Non-traditional outputs:

My published work in this area is modest, however I have delivered over **30 invited lectures** and served as a consultant for dozens of libraries helping them establish clinical and translational research support services. I also **teach the only formal course** dedicated to these topics at a school of information science. I have also **developed an assessment model** to help uncover meaningful outputs and indicators of impact

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Benefits to the Community

- better discovery and **selection of team members** for team-based science
- creates a **directory of experts** that can be used for a variety of needs (treating patients, speaking at a conference or to the media, etc.)
- impartial selection and **nomination for awards** and committees
- more **equitable decisions** related to promotion and/or tenure

Benefits to the Individual

- increase recognition and **validation of current skills** and expertise
- motivation to build upon skills or **gain new skills**
- ease of **building your professional brand** (i.e. describing or explaining expertise or skills to community)
- ease of finding and **engaging your network** of colleagues and experts

Solutions from the community: Project CRediT

“The Contributor Roles Taxonomy project (Project CRediT) emerged to address recognition that the concept of ‘authorship’ in producing scientific scholarly output is outdated and no longer fit for purpose.”

Contributor Roles

A high-level classification of the diverse roles performed in the work leading to a published research output in the sciences. Its purpose to provide transparency in contributions to scholarly published work, to enable improved systems of attribution, credit, and accountability.

Extended Description

The classification includes, but is not limited to, traditional authorship roles. That is, these roles are not intended to define what constitutes authorship. Rather, the roles are intended to apply to all those who contribute to research that results in scholarly published works, and it is recommended that all tagged contributors be listed, whether they are formally listed as authors or named in acknowledgements.

An individual contributor may be assigned multiple roles, and a given role may be assigned to multiple contributors. When there are multiple people serving in the same role, a degree of contribution may optionally be specified as ‘lead’, ‘equal’, or ‘supporting’. It is recommended that

Meta

Version

ID 9dbb95f4-55ed-4e43-9301-a9f0e3e17afe

Original source



CRediT. Casrai. Retrieved from: <http://docs.casrai.org/CRediT>

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Force11 Attribution Working Group

“This working group was formed out of the FORCE2015 "Contribution and Attribution in the Context of the Scholar" Workshop held Sunday, January 11, 2015 in Oxford.

The goal of this working group was to work on attribution implementation for any research products (including publications, datasets, data standards, research resources, etc.).”



The screenshot shows the FORCE11 website interface. At the top, the FORCE11 logo is displayed with the tagline "The Future of Research Communications and e-Scholarship". A navigation menu includes links for ABOUT, COMMUNITY, GROUPS, RESOURCES, NEWS + BLOGS, EVENTS, PUBLICATIONS, MEDIA, and DONATE. The current page is titled "FORCE11 > Groups > Attribution Working Group". The main content area is titled "ATTRIBUTION WORKING GROUP" and includes a "DESCRIPTION" section. The description states that the group was formed out of the FORCE2015 "Contribution and Attribution in the Context of the Scholar" Workshop and aims to work on attribution implementation for various research products. It also notes that the group recognizes the distinction between authorship and contributorship and is open to a diverse range of community members. A "GROUP MENU" on the left lists links for Group Home, Members, Workshops/Events, Links + Files, Google Forum, and Calendar. A "FORCE2017 MENU" on the left lists links for Home and Sponsorship Opportunities. The "CHAIRS" section lists Melissa Haendel, Karen E Gutzman, Stacy Konkiel, and Kristi Holmes.

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Attribution Working Group. FORCE11. Retrieved from:
<https://www.force11.org/group/attributionwg>

The current attribution environment

Topics to be covered include: groups in the contribution/attribution environment, their work, creating an equitable environment in the scholarly ecosystem, limitations on capturing attribution

Activity: the current attribution environment

1. Split the room into small groups of 2-4 people.
 2. Each small group will be assigned one of the attribution projects listed below.
 3. The small group will have 10 minutes to discuss the questions provided on the next slide.
 4. The small group will report back to the larger group when done.
-
- Authorship or Contributor, according to the International Committee of Medical Journal Editors (ICMJE) (<http://www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html>)
 - Mozilla Badges (<https://openbadges.org/>)
 - LinkedIn Endorsements (<https://www.linkedin.com/help/linkedin/answer/31888/skill-endorsements-overview?lang=en>)
 - Discogs Credit List: <https://www.discogs.com/help/creditslist>
 - SCoRO, the Scholarly Contributions and Roles Ontology (<http://www.sparontologies.net/ontologies/scoro/source.html>)
 - NISO Alternative Metrics Working Group B “NISO Persistent Identifiers and Alternative Outputs Working Group” (<http://www.niso.org/publications/rp/rp-25-2016>)
 - Force 11 Attribution Working group (<https://www.force11.org/group/attributionwg>)
 - Project Credit (<http://docs.casrai.org/CRedit>)

Small group discussion questions

1. How is this group related to the contribution/attribution environment?
2. What work has this group done (currently or in the past) to contribute to the attribution environment?
3. How does the group's work contribute to an equitable environment in the scholarly ecosystem?
4. Do you feel the group's work poses any limitations on capturing attribution?
5. Conversely, does the group's work expand your understanding of capturing attribution?
6. Does the group describe the benefits of capturing attribution, and if so, how do they describe them?
7. Can you find any examples of their work being used in practice?

Explore attribution and credit in action

Each group will have time to review scholarly objects and consider a basic data model for attribution.

Activity: Explore attribution and credit in action

Description:

Split the room into groups of 2-4 people. Each group is given 20 minutes to explore a project and answer some provided questions.

Small group activity

Select a project:

Internet Movie Database, Full cast and crew of Star Wars IV: http://www.imdb.com/title/tt0076759/fullcredits?ref_=ttco_sa_1

Mark Bevan's lab. Resources. <http://labs.feinberg.northwestern.edu/bevan/resources/index.html>

Michael Jackson. Thriller. <https://www.allmusic.com/album/thriller-mw0000056882/credits>

Answer the following questions:

1. Make a list (or review an already existing list) of the roles involved with the project.
2. Make a list of all the objects or outputs involved with the project.
3. Discuss in your small group
 - a. Are there any issues related to granularity with description of roles, objects, or outputs?
 - b. In what situations should these roles be acknowledged?
 - c. What aspects of attribution are missing (or not missing) from the object(s) or output(s)?

Large group discussion questions

As a large group, answer the following questions:

1. Please share the roles they found in their scholarly objects.
2. How can we organize these roles into a hierarchy?
3. Are there any relationships between roles, or between roles and objects?
4. Please identify people who performed the roles, or consider people who were not mentioned that must have performed the roles.
5. In what ways would this kind of classification assist researchers?
6. Who else might it benefit and why?

Wrap up: model to capture attribution

Large group discussion: capturing attribution

Questions:

1. In your area of work, what things are given credit, or aren't given credit? What is your experience?
2. What are the things you think are important (to you/community) or should be present in how the ontology is created?
3. Are there small steps you can take, or that can be taken to move things forward?

Thank you!