What's the Point of Authors?

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Combined Measurement of the Higgs Boson Mass in pp Collisions at $\sqrt{s} = 7$ and 8 TeV with the ATLAS and CMS Experiments

G. Aad *et al.**

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(Received 25 March 2015; published 14 May 2015)

A measurement of the Higgs boson mass is presented based on the combined data samples of the ATLAS and CMS experiments at the CERN LHC in the $H \to \gamma\gamma$ and $H \to ZZ \to 4\ell$ decay channels. The results are obtained from a simultaneous fit to the reconstructed invariant mass peaks in the two channels and for the two experiments. The measured masses from the individual channels and the two experiments are found to be consistent among themselves. The combined measured mass of the Higgs boson is

$$m_H = 125.09 \pm 0.21\ (\text{stat}) \pm 0.11\ (\text{syst})\ \text{GeV}.$$

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The study of the mechanism of electroweak symmetry breaking is one of the principal goals of the CERN LHC program. In the standard model (SM), this symmetry breaking is achieved through the introduction of a complex doublet scalar field, leading to the prediction of the Higgs boson H [1–6], whose mass m_H is, however, not predicted by the theory. In 2012, the ATLAS and CMS Collaborations at the LHC announced the discovery of a particle with Higgs-boson-like properties and a mass of about 125 GeV [7–9]. The discovery was based primarily on mass peaks observed in the $\gamma\gamma$ and $ZZ \to \ell^+\ell^-\ell^+\ell^-$ (denoted $H \to ZZ \to 4\ell$ for simplicity) decay channels, where one or both of the Z bosons can be off shell and where ℓ and ℓ' denote an electron or muon. With m_H

This Letter describes a combination of the Run 1 data from the two experiments, leading to improved precision for m_H. Besides its intrinsic importance as a fundamental parameter, improved knowledge of m_H yields more precise predictions for the other Higgs boson properties. Furthermore, the combined mass measurement provides a first step towards combinations of other quantities, such as the couplings. In the SM, m_H is related to the values of the masses of the W boson and top quark through loop-induced effects. Taking into account other measured SM quantities, the comparison of the measurements of the Higgs boson, W boson, and top quark masses can be used to directly test the consistency of the SM [17] and thus to search for evidence of physics beyond the SM.

What’s in a byline?

Costello; Gilbey; Haw; Marcer; Sitarskij; Ziugzda

Gilbey; Ziugzda; Haw; Costello; Marcer; Sitarskij.

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Some problems with authorship

i) Confusion about what the norms are for assigning positions on the byline;

ii) Flouting of disciplinary norms, often enabled by unclarity;

iii) Prevalence of *Ghost authors,* especially in medical sciences (Wislar et al 2011);

iv) Irresolvable disagreements about the byline, especially ininterdisciplinary research;

v) Problems with *reading* the byline.

Whose problem is it?

- Researchers negotiating their bylines and getting recognition for their work;
- Journals dealing with abuses of authorship;
- Disciplines managing their research cultures;
- Significance of authorship for the collective progress of science.

Proposals

1) Allow collective authors (Wray, de Ridder)
2) Abandon authorship (Kukla, Hueber, Winsberg)
3) Regiment authorship (ICJME guidelines, CRediT)
4) Randomise the byline (Ray ® Robson 2018)
5) Supplement authorship (contribution statements)
6) Allow pseudonymous authorship (the Journal of Controversial Ideas, Minerva 2014)

Plan

- Central question: What's the point of authorship?
  - What function(s) does authorship play in the collective endeavor of scientific inquiry?
  - Throughout I'll use 'science' as an English stand-in for 'wissenschaft'.
- Authorship plays five functions: i) allocating credit, ii) constructing a speaker, iii) enabling credibility judgements, iv) supporting accountability, v) creating an intellectual marketplace.
- No one status can simultaneously play all of these functions (four problem cases).
- The CSWG proposal: journals should replace authors with *contributors, spokespeople, writers,* and *guarantors.*

1. The Functions of Authorship

1. Allocating Credit

- Discovery as an intellectual achievement
- Authorship as a recognition of contribution to a collective achievement
- What goes wrong when people are left off?
  - Invisible technicians (Shapin).
  - The Matthew effect (Merton) and the Matilda effect (Rossiter).
  - Epistemic injustice (Fricker 2007), epistemic oppression (Dotson 2014), and epistemic appropriation (Davies 2018)
- Issues
  - What is the achievement of the paper? (citation vs the byline).
  - What kind of achievement is due credit? (intellectual vs practical)
  - Multiple authorship and ‘significant contributions’.

Credit: Assigning someone the status of author on a paper is a way to attribute to them full or partial credit for the intellectual achievement(s) of the paper

2. Constructing a Speaker

- Publishing is an institutionally authorized form of assertion
- Assertion generates obligations:
  - Sincerity
  - Consistency and coherence
  - Defend or retract norm
  - Knowledge norm
- Publishing generates obligations:
  - Publication and belief, norms of writing, corresponding authors.
- Who do these obligations apply to?
  - All, distributed, one, collective.

Speaker: a function of assigning a set of people as the peoples of a paper is to create an *epistemically* responsible speaker.

3. Credibility Judgements

- When should we trust results?
  - Journal, university, method (open science badges), lab reputation, community checking (if that were false, I would have heard about it by now), skepticism.
- At least part of the story is that individual authors put up their credibility for results.
- Whose credibility matters?
  - Lead author, average credibility, highest credibility, lowest credibility, journal's credibility, Lab credibility.

arXiv.org

Academia.edu
share research

Credibility: a function of assigning a set of people as the authors of a paper is to enable readers to make judgements about how credible the results of the paper are.

4. Supporting Accountability

- Community pressure provides reasons that work to push up epistemic standards
- Intellectual reactive attitudes (Tollefsen 2017)
- Who should be accountable?
  - All, one, distributed, collective.
- Problems with anonymity (joint work with Haixin Dang).
  - The Journal of Controversial Ideas: it's academic freedom without responsibility, and that's recklessness (in *the Conversation*)

Accountability: a function of assigning a set of people as the authors of a paper is to create a target for praise if the paper is epistemically good, and censure if the paper is epistemically bad.

5. Creating an intellectual marketplace

- Science aims to produce knowledge.
  - Knowledge is a *public good*, so systems that allow people to freely pursue it are subject to the *public goods problem.*
  - Authorship is a *private good* associated with recognition for discovery.
  - Authorship creates an incentive systems which deals with the public goods problem (Zollman 2018),and creates an efficient division of labour across projects (Kitcher 1990, Strevens 2001).
- There are a lot of open questions about how credit for co-authorship functions in different disciplines.

Market: a function of assigning a set of people as the authors of a paper is to create a system of private goods which are apt for market mechanisms.

The Functions of Authorship

1. **Credit**: Assigning someone the status of author on a paper is a way to attribute to them full or partial credit for the intellectual achievement(s) of the paper.
2. **Speaker:** a function of assigning a set of people as the peoples of a paper is to create an *epistemically* responsible speaker.
3. **Credibility:** a function of assigning a set of people as the authors of a paper is to enable readers to make judgements about how credible the results of the paper are.
4. **Accountability:** a function of assigning a set of people as the authors of a paper is to create a target for praise if the paper is epistemically good, and censure if the paper is epistemically bad.
5. **Market:** a function of assigning a set of people as the authors of a paper is to create a system of private goods which are apt for market mechanisms.

2. Four Problem Cases

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1) Disbelieving Contributors;
2) Credibility Manipulation;
3) Invisible Technicians;
4) Radically Collaborative Research.

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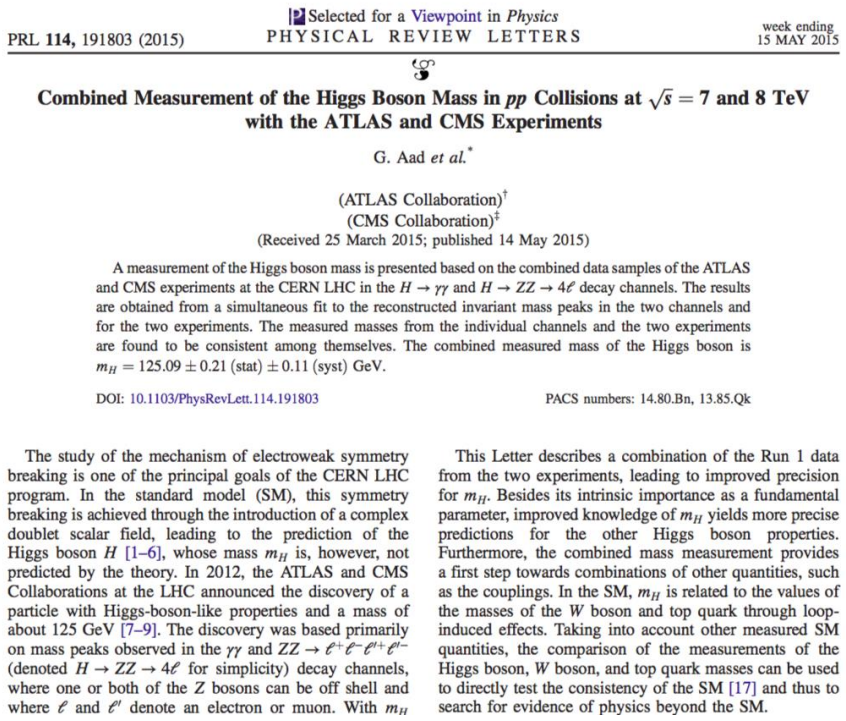

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Diagnosis

1) Disbelieving Contributors;	Credit/Speaker
2) Credibility Manipulation;	Credit/Credibility
3) Invisible Technicians;	Credit/Speaker, Credibility
4) Radically Collaborative Research.	Credit/Speaker, Accountability

3. The CSWG proposal

Options

1) Pick a set of coherent functions for authorship and design authorship guidelines around them.
2) Accept the inconsistency of the concept of authorship, but leave it up to disciplines and individual researchers to handle.
3) Try to design a new practice which preserves all of the functions of authorship, whilst addressing their inconsistency.

The death of the (scientific) author

A Slow Death

- St Bonaventure (13th C) on the "fourfold way of making a book"
  - Scribes, compilers, commentators, authors.
- Barthes, Foucault, and the Hermeneutic death of the author.
- Rennie, Yank and Emmanuel (1997) 'When Authorship Fails'
  - Replace the status of author with *contributors* and *guarantors*

The CWSG Proposal

- *Contributor:* someone who is (partially) creditworthy for the discovery.
- *Writer:* someone who contributes to the writing of the project and takes responsibility for the sincerity, coherence and consistency, and the knowledge norms
- *Spokesperson:* someone who takes responsibility for the defend or retract norm.
- *Guarantor*: someone who provides their credibility, is held accountable, and expresses sincerity.

Benefits of the CSWG proposal

- The proposal neatly clears up the four problem cases: people can be listed as contributors, without being listed as writers, spokespeople, or guarantors (and vice versa).
- The proposal is extremely flexible: it's able to represent a large number of different research cultures (compare the humanities with lab science, High-energy physics, and crowdsourced research).
- The proposal can be used straightforwardly to reorganise the byline, but it can also be useful in clarifying authorship disputes with standard guidelines.
- The proposal doesn't give a recipe for determining who ought to play which role, but it does allow collaborators to ask coherent questions.

Comparison with the ICJME guidelines

Four necessary and sufficient conditions for someone to be an author

1. Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work;
2. Drafting the work or revising it critically for important intellectual content;
3. Final approval of the version to be published;
4. Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Comparison with the CRediT (contributor roles taxonomy) proposal

- Conceptualization
- Data curation,
- Formal analysis,
- Funding acquisition,
- Investigation,
- Methodology,
- Project administration,
- Resources,
- Software,
- Supervision,
- Validation,
- Visualization,
- Writing (original draft),
- Writing (editing and reviewing).

Thanks!

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Contributors (alphabetical): Line Edslev Andersen; Rosemary Bailey; Udit Bhatia; Joanna Burch-Brown Liam Kofi Bright; Jim Brooke; Peter Cameron; Catrin Campbell-Moore; Joe Cornelli; Stephen Crowley; Haixin Dang, Rachel Fraser; Isobel Falconer; Adam Ferner; Monica Gamez; Mikkel Gerken; Joshua Habgood-Coote; Katherine Hawley; Matthias Heyman; Klemens Kappel; Ethan Landes; Hélène Landemore, Benedikt Loewe; Ursula Martin; Dan Lunt, Chris Meyns; Louise Millard; Dann Mitchell; Samir Okasha; Andrew Peet; Richard Pettigrew; Jeroen de Ridder; Robert Ross; Pierre Saint-Germier; Anya Skatova; Mona Simion; Fenner Tanswell; Daniel Whiting; Alan Wilson; K. Brad Wray; Dilara Yeşilova.

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