



## CRITICAL PERSPECTIVES

### Equity in Author Order: A Feminist Laboratory's Approach

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## Abstract

Author order is crucial; it is the currency of academia. Within STEM disciplines, women and junior researchers--those who are the primary constituents of our lab-- consistently receive less credit for equal work. Our [Civic Laboratory for Environmental Action Research \(CLEAR\)](#) is a feminist marine science laboratory at Memorial University of Newfoundland, Canada. Recognizing that the stakes are high for CLEAR members, we have developed an approach to author order that emphasizes process and equity rather than system and equality. Our process is premised on: 1) deciding author order by consensus; 2) valuing care work and other forms of labour that are usually left out of scientific value systems; and 3) taking intersectional social standing into account. Although CLEAR's approach differs from others', we take author order seriously as a compromised but dominant structure within science we must contend with. That is, rather than attempt to circumvent author order, we stay with the trouble. This article outlines this process.

## Introduction

Author order is crucial; it is the currency of academia. Within STEM disciplines, women and junior researchers—those who are the primary constituents of our lab—consistently receive less credit for equal work (Rosser, 2004). Our [Civic Laboratory for Environmental Action Research \(CLEAR\)](#) is a feminist marine science laboratory at Memorial University of Newfoundland, Canada. Recognizing that the stakes of recognition are high for CLEAR members, we have developed an approach to author order that emphasizes process and equity rather than system and equality. Unlike most other labs, we do not attempt to objectively determine the value of contributions, nor do we reward only labor recognized as 'intellectual'. Although CLEAR's approach differs from others', we take author order seriously as a compromised but dominant scientific structure with which we must contend. That is, rather than attempt to circumvent author order, we stay with the trouble.

## Existing Methods for Determining Author Order

Author order norms for the biological and animal sciences, where we

publish most, understand the first author (what we call the Hot Young Thang), as the most important author in terms of findings, writing, and study design. The last author (The White/Wise Old Man), is the anchor of the paper, and provides the lab, training, and grants. These two positions receive the most credit for the research. Other authors rank between them from most important contributor to least. How is this order best determined?

The problem with existing approaches to author order is their reliance on metrics and systems that aim to accurately reward contributions to a paper. The Vancouver Protocol (International Committee of Medical Journal Editors, 1978) standardizes biomedical journal submissions and includes standards for what one must contribute to be considered an author: conception and design, or analysis and interpretation of data; drafting the article or revising for intellectual content; and/or final approval of the version to be published. However, it does not offer a standard for how to choose author order other than it “should be a joint decision of the coauthors” (1978: 4). In contrast, psychologist Stephen Kosslyn’s system measures contribution up to a maximum of 1,000 points, where anyone with less than 100 points is acknowledged in a footnote (Kosslyn, 2002). This system aims to quantify unlike tasks—ideas versus bench work, writing versus note-taking (also see Venkatraman, 2016).

Recognizing that the system is flawed, some research groups have used unconventional methods to draw attention to the problematic nature of the process. For example, author order has been decided by competitions that involve skill, such as games of: Scramble (Belyea & Lancaster, 2002); tennis (Griffiths & Anderson, 1978); or a brownie bake-off (Young & Young, 1992). Others participate in games of chance, such as: rock, paper, scissors (Kupfer et al., 2004) and coin-toss (Miller & Ballard, 1992). In situations where a paper requires additional authors, cats have been credited as co-authors (McGaw & Twitchit, 2012, Hetherington & Willard, 1975). These techniques are merely parodies of the current protocols to discern author order, recognizing that the system

is already compromised.

Others have sought to more explicitly circumvent the hierarchical system, such as J.K. Gibson-Graham, two co-authors who hyphenate their name so they receive equal credit on all publications (e.g. Gibson-Graham, 1996), even after half of the team, Julie Graham, died in 2010. Some co-authors publish under their research group name rather than individual names (e.g. Superstorm Research Lab, 2013). Food geographer Ian Cook uses ‘Cook et al.’ to acknowledge the collective work in any research-writing endeavor (e.g. Cook et al., 2008). Yet these practices do not accrue value to members that help them to acquire sought-after positions; we have collectively decided to privilege individuals’ names, even as we problematize hyper-individualism in science in other ways.

Rather than a metric system that remains stable across articles and contexts, CLEAR uses a situated and context dependent process that assumes decisions about author order will be different for every paper.

## Equity

CLEAR’s work is informed by the feminist value of *equity*, whether we are ordering supplies or building scientific instruments (see Liboiron, 2016). Equity is different than equality. Equality involves treating everyone exactly the same, and as a result has no impact on the uneven positions from which different people start. Equity, in contrast, is sensitive to the different positions of participants and so is potentially transformative of power relations. Existing author order protocols favor equality. Our own protocols foreground equity and are shaped by a shared commitment to consensus, care work, and acknowledgement of social location. We consider each of these in turn below.

## Consensus

Consensus allows a group to reach an acceptable and supportable resolution to an issue, even if that acceptance and support is uneven (see Treloar, 2013 on the importance of differentiating between uneven consensus and unanimous agreement). We follow the consensus based decision-making process, as described by Hartnett (2011), that involves identifying key concerns through open discussion, creating proposals that address them, then amending the proposal until everyone agrees to move forward. This can take a few minutes or a few weeks.

The aim of consensus is to redistribute power and advocacy. Tenured faculty do not have more say than undergraduate students, though we acknowledge that faculty still have greater power of persuasion and that unconscious biases are always at work. We support one another during the conversation by stepping up to advocate for another person's work or ideas if they are quiet, modest, or absent, and stepping back if we have spoken more than others. We aim to ask questions as much as we make statements. The result is that these conversations tend to be fun, interesting, and supportive.

## Care Work is Valued Work

Care is a form of political and ethical practice that “holds things together” (de la Bellacasa, 2011, p.90; Martin et al., 2015). We also acknowledge that care work can disproportionately affect certain groups more than others depending on gender, ethnicity, class, sexuality, and perceived abilities. With this in mind, the lab aims to distribute and acknowledge care work in its various forms. Different forms of care we consider when discussing author order have included: training new members on protocols; maintaining equipment; cleaning up; contributing to logistical tasks including note taking, scheduling, sending email reminders and booking rooms; caring for members' physical and mental health by listening, sending sick people home, providing “time outs,” and telling

jokes; and thanking each other.

### **Social Location**

CLEAR has eighteen members. Dr. Max Liboiron directs (non-tenured, woman). Dr. Charles Mather facilitates (tenured, man). We have one male PhD student, four female master's students, and eleven undergraduates, ten of whom are women. We have one male staff member. We are one Indigenous woman, and a whole lot of white people. We have a bunch of queers, but we've never actually counted. Our members have had negative experiences in other labs: we have been mistaken for assistants rather than Primary Investigators (PIs); have had names moved down lists of author order without discussion; are constantly spoken over and interrupted by senior and male colleagues; have experienced data and grant theft by advisors; have been told we are expected to work long hours without any credit since we do not make intellectual contributions to projects; are expected to prioritize our work over all other personal and professional goals and obligations; and have been represented in media interviews as "girly" and silly instead of intelligent. This is why we believe that simply bringing more women and people of color into science—equality—while maintaining the status quo only perpetuates the violence experienced. It is also why we seek to give our lab members authorship credit.

For decades, feminist STS scholars have articulated how power circulates through science, differentially impacting people depending on their social location (Haraway, 1988; Harding, 2001). Social location—the groups people belong to because of their place or position in history and society, including race, gender, age, sexual orientation, and educational status—influences not just how people encounter science (determining their wages, likelihood of receiving tenure, awards, etc.) but also how science is produced (influencing the values embedded within their research, the questions they choose to ask, methods they use and more) (Talbear, 2015; Whyte, in press). For these reasons, we consider social

location when awarding author order.

Some of the aspects of social position we've considered include:

- Whether the author is an academic; the value of order to a non-academic will be different than an academic. It is important to consider non-academics as full collaborators and value them as such via authorship and involvement in the consensus process.
- Affiliation; which affiliations do we want to highlight, and why? We may want to promote new, unsung, non-profit, or underfunded organizations and universities.
- Who needs the cultural capital most? Is anyone going on the job market, going up for tenure, or applying for graduate school?
- For whom is authorship a unique opportunity? Publishing opportunities for faculty and graduate students can be numerous, while for others (such as undergraduate students) publishing may be a unique opportunity to be recognized.
- Hierarchical status; often undergraduate and technician work is not valued as much as graduate or faculty work, even where the same labor is performed.
- Payment status; are some members being paid wages or stipends for the work, while others are not? Are they paid the same amounts or the same way?
- Number of publications authors already have; the publication may mean more to someone who has fewer.
- Direction of member's research; if a paper fits particularly well with a member's research trajectory, it may provide more value than if they are working on a different topic.
- The past struggles of some members; some people have already encountered acute setbacks in their careers due to social location.
- Markers of difference: consider gender, race, Indigeneity, age, disability, and other markers of difference and privilege. How can we address severe underrepresentation of certain demographics in STEM right here, right now?



### A Snapshot of the Process



Image 1: Lab members during conversation about author equity, 2016. Photograph by CLEAR photographer-in-residence Bojan Fürst.

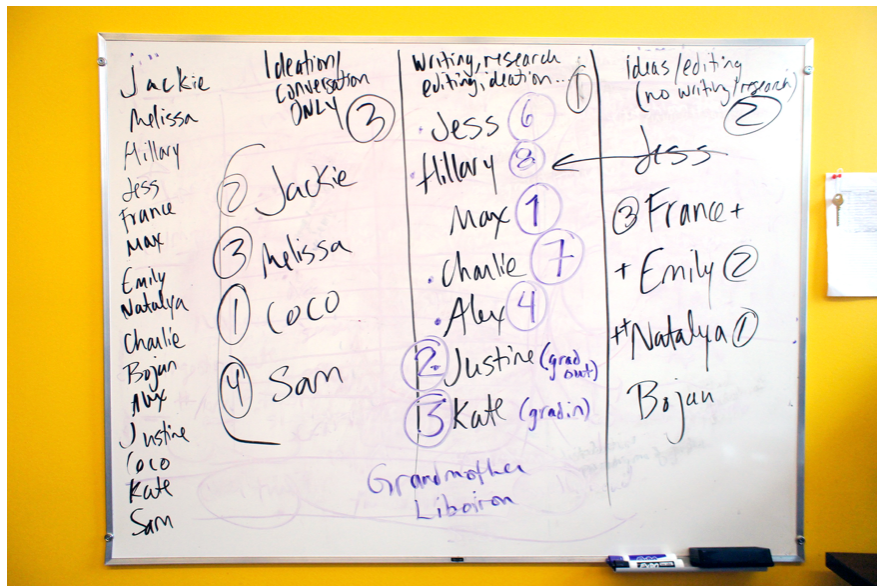


Image 2: White board with traces of our process. Photo CLEAR, [Creative Commons Attribution-ShareAlike 4.0 International License](#).

These are guidelines for practices, not rules. So, what does this look like, in practice?

A trained facilitator facilitates each meeting. When making a decision, we use our fingers to indicate agreement or the need for more conversation. Fingers wiggled upwards means yes; sideways means more discussion is needed; and downwards means no. We call them twinkle fingers.

Facilitation starts by writing the names of every participant on a whiteboard. We add names of absentees or people who contributed to the project who might not have been involved in writing. Then, we “chunk” people based on the amount or type of labor contributed. For the paper you are reading now, these chunks included involvement in: 1) discussions; 2) editing and discussions; and 3) writing, editing, and discussions. People can move between chunks after they are added (Image 2).

The longest part of our process is ordering authors within these chunks. We choose the first and last author in a section by discussing types and values of labor and by reviewing the lists of care work and social standing explained above. People step up to ask for consideration, step back if they feel they are already considered, and recommend others based on the care and labor they’ve seen them perform. This last practice is important for absent members. When two people seem completely even, there is a strong temptation to resort to alphabetical order, but that is not staying with the trouble. We go down the list of care work and social location and think of other aspects of social location and care not already on the list. This often leads to discussions of what counts as social location, privilege, and care, and thus refines our commitment to intersectional feminism.

The process of determining author order in CLEAR is performative: it enacts and strengthens the values we hold dear. Recognizing past care work leads to thanking each other. Talking about what should be included in social standing hones our ideas of equity, and allows us to

stand in solidarity with one another. Crucially, each iteration of determining author order is different in that we are always faced with a new set of issues to consider. Our approach to authorship order is not, and can never be, systematized. The establishment of systems closes discussion. Instead, we use a situated process that recognizes diversity and difference while at the same time rewarding the varied contributions to knowledge production, and most importantly, we become a more reflexive, stronger feminist lab every time we have these discussions.

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## Bios

**Jessica Melvin** is a member of the Civic Laboratory for Environmental Action Research (CLEAR) where her research focuses on marine microplastics in fish as well as how to tackle the problem through collaboration with the public (citizen science). She is a recent graduate of the Coastal and Marine Management master's program at the University Centre of the Westfjords in Iceland and holds a Bachelor of Science in Marine Biology from Memorial University of Newfoundland.

**Emily Wells** is a member of Civic Laboratory for Environmental Action Research (CLEAR) and an undergraduate in biology and French at Memorial University of Newfoundland. In addition to citizen science and marine plastic research with CLEAR, she has a diverse background in genetics, ecology, and behavioral psychology. She has been awarded multiple research scholarships, including an NSERC Undergraduate Research Award. Wells is an outreach demonstrator with NatureNL and Let Talk Science!, and her involvement in the local scientific community has been recognized by multiple awards.

**Hillary Bradshaw** is an Environmental Science Masters student working in the Civic Laboratory for Environmental Action Research (CLEAR) at Memorial University of Newfoundland. Her thesis monitors the bottom of the ocean in the far north for macro and micro plastics through video and

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**Jacquelyn Saturno** is a member of the Civic Laboratory of Environmental Action Research (CLEAR). She is PI for a microplastic ingestion study of Atlantic salmon in Newfoundland. From her education at University of Guelph and Niagara College and experience working for non-profits, academic institutions and environmental consulting, she has extensive knowledge in restoration ecology and conservation biology in terrestrial and aquatic systems.

**Justine Ammendolia** is a member of CLEAR. She has recently completed her M.Sc. in Marine Biology at Memorial University conducting a study on the effects of hydrostatic pressure on the biological roles of echinoderms. She is also a grantee of the National Geographic Young Explorers Grant for her research on Arctic seabirds in Greenland during her undergraduate degree at University of Guelph.

**Dr. Charles Mather** works in the Geography Department, Memorial University of Newfoundland. His current work focuses on the historical and contemporary politics of Atlantic salmon conservation in Eastern Canada in the context of debates on the Anthropocene.

**Alex Zahara** is an interdisciplinary researcher and PhD Candidate in the Department of Geography at Memorial University of Newfoundland, and member of Civic Laboratory for Environmental Action Research (CLEAR). His doctoral research examines the history and effects of wildfire management in Northern Canadian communities, focusing on discourses of smoke as a form of industrial contamination. His research interests include the role of pollution in settler colonialism; queer and feminist science methods; ethics of care in risk management; citizen science and direct action research.

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**Sam Westcott** is a writer and guitarist from Topsail, Newfoundland. He was a member of CLEAR for eighth months in 2016/17, while studying English and Creative Writing in St. John's at Memorial University of Newfoundland, producing podcasts and writing poetry for the lab. His poetry and short fiction have been published by the Paper Mill Press, and in 2016 his band Ataraxia released their first EP.

**Katharine Winsor** is a graduate student in Sociology at Memorial University of Newfoundland and member of Civic Laboratory for Environmental Action Research (CLEAR). Her research focuses on young offenders, social supports, and the role of disability in juvenile justice decision making and has presented on these topics. Winsor's work with CLEAR centres on citizen science, curriculum development of DIY technologies, and feminist approaches to research.

**Dr. Max Liboiron** directs the Civic Laboratory for Environmental Action Research (CLEAR), a feminist marine science and technology laboratory. Liboiron's research bridges the physical and social sciences in its investigation of how marine plastics are represented in science and how these methods of representation relate to action. Liboiron is managing editor of *Discard Studies*, a member of the Endocrine Disruptors Action Group (EDAction), and a co-organizer for the Gathering for Open Science Hardware (GOSH).

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