Engineering roles and identities in the scientific community: toward participatory justice

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Objective

• To examine the structure of the big science community
• The effects of the rise of particle accelerator and particle detector
• Division of epistemic labor

• To clarify the roles of community members
• Classification and identities of members
• Ethical issues and ways to resolve them
Structure of the big science community

• Big science (Hoddeson, Kolb, Westfall, 2007): long duration, large collaborations, large funding, large sizes, no epistemic criteria for ending experiments. Experimental chains (strings).

• Theorists, experimentalists, instrumentalists (Galison 1987).

• Rise of accelerator in 1930s-1940s.

• Theorists are spatially separated from other groups.

• Separation of experimentalists from instrumentalists.

• Instrumentalists are often recruited from trained experimentalists (or even theorists).

• Typecasting experimentalists according to the type of instrument they learned to work with.
Why is a scientist more prestigious than engineer?

• (Martin 2017): prestige of social and epistemic groups in science is asymmetric
• (Roy 2012), anthropological studies at CERN. Theorists ”who think” are at the top of the prestige hierarchy, those “who use their hands” are on the bottom
• I argue this distinction goes back to Aristotle, distinction between ἐπιστήμη (episteme) as knowledge, understanding, or cognition and τέχνη (techne) as craft or practical art
• (Boon 2011) “dichotomy of intellectual status”
• My argument: roles should be distinguished from people. Dichotomy of activities must not entail dichotomy of intellectual status
Roles and epistemic justice

• Dissimilarities between subcommunities: perceived property relationships and rights claimed to the experimental data and results.

• Epistemic injustice in the community: it attracted attention of scholars only very recently (Grasswick, 2017; Perović, 2017; Pla-Julián & Jose-Luis, 2018).

• (Fricker 2007): testimonial and hermeneutical injustice

• (Anderson 2012): the credibility of social groups can be discounted or favored not only on a transactional basis but also per their belonging to a group

• Redesigning social institutions is unavoidable when alleviating structural epistemic injustice
Injustice in an engineering context

• (Hookway 2010) “participating is not just a matter of exchanging information: it involves asking questions, floating ideas, considering alternative possibilities, and so on”

• “[E]pistemic injustice that is directed at someone’s functioning as a participant in discussion, deliberation, and inquiry does not simply cause the victim to lose epistemic confidence more generally. Rather it questions the possession of capacities that are necessary for participation in these kinds of epistemic activities.”

• I argue that excluding engineers (and alike), who possess basic skills of a scientist, from epistemically significant discourses and practices of big science represents epistemic injustice.

• (Anderson 2012): collaborative learning and research can help overcome the bias of more privileged individuals and groups over less privileged ones.

• This will help both transcend the perception of boundary objects (accelerators, detectors, and data) as delimiters between epistemic and nonepistemic communities
The community structure in high-energy physics has been examined. I noticed a shift in the identity of experimentalists and explain this shift through the convergence of the constructive nature of experimentalists’ work with the engineer.

The exclusion of engineers and other nonscientist specializations in megascience from most epistemically valuable discourses and practices is in the framework of the concept of participatory epistemic injustice.

I suggest avenues to overcome participatory injustice in big science:

• Joint projects for engineering and nonengineering community members in which they cast themselves in epistemically equivalent roles

• Increasing horizontal mobility between communities
Thank you for your attention!