

The Nature of Science

jointly organised by
 the Physics Education Division (DD),
 the History of Physics Division (GP),
 the Gravitation and Relativity Division (GR), and
 the Theoretical and Mathematical Physics Division (MP)

Christian Forstner
 Ernst-Haeckel-Haus - Wissenschaftsgeschichte
 Friedrich Schiller University Jena
 christian.forstner@uni-jena.de

For some decades, the term “Nature of Science” has given a headline to discussions in the history and philosophy of science about the ways in which science is developed by people within certain personal, historical, social and theoretical frameworks. Likewise, science education has considered what understanding of the nature of science learners hold and how such an understanding is developed and might be guided and supported.

In this symposium we take up new and challenging perspectives on and developments in science and society to enhance the discussion. The perspectives presented in the contribution to the symposium relate to three different aspects:

Lucy Avraamidou will share empirical results about the role of women and their representation in science. Developments in theoretical physics as well as their growing discrepancies to ongoing structural practices will be discussed by Daniel Harlow. As a completion, the change in medial communication and its effect on the discussion of scientific results and knowledge with a special emphasis on the role of social media will be presented by Dietmar Hoettecke.

Overview of Invited Talks and Sessions

(Lecture hall Audimax)

Invited Talks

SYNS 1.1	Tue	14:00–14:30	Audimax	The Role of Nature of Science Education for Science Media Literacy — ●DIETMAR HÖTTECKE
SYNS 1.2	Tue	14:30–15:00	Audimax	What kinds of identities are deemed in/our of place in physics? — ●LUCY AVRAAMIDOU
SYNS 1.3	Tue	15:00–15:30	Audimax	Some thoughts on the status of theoretical physics — ●DANIEL HARLOW

Sessions

SYNS 1.1–1.3	Tue	14:00–15:40	Audimax	The Nature of Science
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SYNS 1: The Nature of Science

Chair: Susanne Heinicke

Time: Tuesday 14:00–15:40

Location: Audimax

Invited Talk SYNS 1.1 Tue 14:00 Audimax
The Role of Nature of Science Education for Science Media Literacy — ●DIETMAR HÖTTECKE — Faculty of Education, University of Hamburg

Science is inevitably mediated to the public sphere and both professional journalism and social media networks play important roles. For well-informed decision-making, it is essential for citizens to know how scientists communicate with each other, as well as with the public. Until recently, the conventional mass media (e.g. newspapers) typically functioned as gatekeepers, helping to assess the reliability and trustworthiness of scientific claims. In today's culture, media and their gatekeeping roles are rapidly vanishing. In social media information flows along existing networks, sometimes heedless of scientific expertise and quality of information. As a result, we need an expanded conception of nature of science (NOS): First, students need to learn about the epistemics of communicative practices, within science and in society, science as a system of distributed knowledge and expertise, characterized by division of labor as well as a social system of checks and balances, trust and credibility. Second, students have to learn about the epistemic structure of science communication and the role of "gatekeepers". Here, the role of social media and its correlated phenomena have to be considered like aggregated news, filter bubbles, echo chambers, spirals of silence, fake news, and purposeful disinformation. Third, the "consumer" of science has to learn about him- and herself, including the role of confirmation bias, motivated reasoning, and the social context of trust. These three perspectives finally lead to a the idea of Science Media Literacy as an expansion of more traditionally NOS perspective.

Invited Talk SYNS 1.2 Tue 14:30 Audimax
What kinds of identities are deemed in/our of place in

physics? — ●LUCY AVRAAMIDOU — University of Groningen, Groningen, Netherlands

By adopting an intersectional approach, I will present the findings of an empirical study that aimed to examine the ways in which physics identity intersects with other identities (i.e., racial identity, gender identity, Islamic religious identity, social-class identity, single-motherhood, and ethnic identity) and influences women's recognition. To do that I draw upon a life history, multiple case-study of three women in physics: a native to Western Europe, late-career white woman; two immigrant women to Western Europe, one is an undergraduate student of color, and the other, an early-career Muslim woman. With evidence gathered from this empirical study I will argue that a conceptualization of physics identity that does not value people for who they are in their entirety, made up of multiple and intersectional identities, but only values how people produce or consume scientific knowledge is exclusionary and only serves to create suffering. For an exploration of women's participation in physics, any attempt to examine gender in isolation instead of in intersection with other multiple identities is an ill-equipped way of examining the complexities and dynamics of contemporary identity politics embedded in recognition.

Invited Talk SYNS 1.3 Tue 15:00 Audimax
Some thoughts on the status of theoretical physics — ●DANIEL HARLOW — MIT Department of Physics, Cambridge, MA

Abstract: Theoretical physics has changed substantially from what it was in the post-war period, but these changes are often not reflected in funding and hiring structures. I will present a contemporary assessment of what the goals of and methods of theoretical physics are, and how it relates to society more broadly.

General Discussion