

## Section 4

### Group Knowledge and Mathematical Collaboration

**Organizer:** Fenner Tanswell (University of Oxford)

**Participants:** Lorenzo Lane (University of Oxford), Josh Habgood-Coote (University of St Andrews & University of Stirling)

#### **Abstract:**

Mathematics is a deeply social discipline. The stereotype of the “lone genius” is one which does not fit the breadth and depth of mathematical work, which also features everything from one-on-one collaborations to massive collective efforts. In this symposium we will look at the epistemology and practices of mathematical collaboration from three perspectives: social epistemology, mathematical practice and ethnographic research.

#### **Titles and Abstracts of the talks**

1.

Fenner Tanswell: Proving Activities and Collaborative Mathematics

In this talk I will emphasise the activity of proving in securing mathematical knowledge. I will be drawing on observations of the language used in mathematical proofs to argue that the proofs themselves are a mix of propositions and imperatives, very much in the style of a recipe or set of instructions for other mathematicians to carry out the same proving activity. The suggestion is that this will provide a natural picture of informal proofs and their epistemic significance, fitting in with modern approaches in epistemology. In the final section I will contrast this instructional role with the testimonial role of proofs, arguing that the line between the two becomes blurred as proofs get larger and more massively collaborative.

2.

Lorenzo Lane: Coordinating Visions: Documenting collaborative knowledge production at mathematics institutes

The following is based upon 6 months of ethnographic research at 4 leading mathematics institutes in Europe. I study the processes by which mathematicians develop common perspectives, problems and reference frames. I demonstrate how the creation of these shared cognitive resources is supported by the physical, social, and linguistic environments individuals inhabit. Sharing physical, communicative and social spaces, I argue, facilitates the production of shared conceptual spaces, which leads to goals, visions, and solutions to problems being more easily coordinated.

3.

Josh Habgood-Coote: Mathematical Knowledge and the Division of Epistemic Labour

In this paper, I explore some aspects of the social epistemology of mathematics, focusing on the importance of the division of epistemic labour to knowledge via proof. In the first part of the paper, I sketch an account of group inquiry, which is able to model the division of epistemic labour, and in the second part of the paper, I apply this model to mathematics arguing: i) that the division of epistemic labour (both diachronic and interpersonal) is

important to knowledge via proof, and ii) that in cases that involve divided inquiry in the process of proving some theorem — such as the proof of the classification of finite simple groups — a group of mathematicians can know a proof, although mathematician fully understands, or knows that proof.