<p align="center">Programme</p>

<p align="center">Virtue Epistemology of Mathematical Practices</p>

<u>Friday, July 13th</u>

09:30-09:45   Opening Remarks
09:45-10:45   Andrew Aberdein - Florida Institute of Technology, United States

Virtues, arguments, and mathematical practice

This paper defends a virtue argumentation theory of mathematical practice. It does so on two grounds. Firstly, there are significant but neglected areas of both argumentation theory and the study of mathematical practice where a shared virtue approach is potentially salutary. For example, conventional approaches in each discipline pay little attention to the contribution the respective practice makes to human flourishing. Secondly, mathematical practice is potentially a valuable testbed for the ambitious varieties of virtue argumentation theory. Virtue accounts have already been proposed for aspects of mathematical practice corresponding to argument appraisal, such as the social acceptance of proofs. The success of such accounts would suggest that virtue approaches can be of comparable utility within argumentation in general.

10:45-11:45   Alessandra Tanesini - Cardiff University, UK

Arrogance, Anger and Assertion

Arrogance has widespread negative consequences for epistemic practices. Arrogant people tend to intimidate and humiliate other agents, and to ignore or dismiss their views. They have a propensity to mansplain. They are also angry. In this paper I explain why anger is a common manifestation of arrogance in order to understand the effects of arrogance on assertion. I argue that superbia (which is the kind of arrogance that is my concern here) is a vice of superiority characterised by an overwhelming desire to diminish other people in order to excel and by a tendency to arrogate special entitlements for oneself, including the privilege of not having to justify one's claims.

11:45-12:00   Coffee Break

12:00-13:00   Laura Kotevska - University of Sydney, Australia

Arnauld on Mathematical Virtue

Why were mathematicians and philosophers in the seventeenth century re-examining and publishing new editions of Euclid's Elements? Why, long after the appearance of Zambertti's translation of Euclid in 1505 - the first published translation from Greek sources - did mathematicians and philosophers continue in the project of rewriting Euclid? Who in the Renaissance and early modern era was engaged in the continued examination of Euclid and to what end? Translation disputes and arguments about the worthiness of the Greek sources account for some of these interventions. What were the other, less widely acknowledged, motivations for engaging in the task of rewriting Euclid?

This paper argues that the cultivation of mathematical virtues accounts for some of the reasons why mathematicians, philosophers and theologians sought to rewrite the Elements of Euclid in the early modern era. To this end, I explore questions of early modern virtue epistemology as they emerge in editions of the Elements, focussing particularly on the attitudes expressed in Antoine Arnauld's Nouveaux éléments de géométrie. According to Arnauld, an acquaintance with the Elements could train a love of truth, the occlusion of the senses, attentiveness, demonstrative certainty and the habit of being governed by reason. Not simply an artefact of pursuing mathematical knowledge, these virtues explained why one should become acquainted with the Elements of Euclid. The paper concludes by offering an account of how Arnauld's attitudes to the propaedeutic value of mathematics shaped the version of the Elements he published in 1667. Lastly, the paper shows how this mathematical work grounded the epistemological commitments of his better-known work the Logique, ou l'art de penser.

13:00-14:00   Lunch
14:00-15:00   Line Edslev Andersen - Centre for Science Studies, Aarhus University, Denmark; the talk will be on joint work with Henrik Kragh Sørensen (University of Copenhagen) and Hanne Andersen (University of Copenhagen).

The Role of Trust in Mathematics

We present empirical data on mathematicians' attitudes towards relying on others and aim to explain them. Some mathematicians try to completely avoid, and believe they should avoid, relying on the results of others without checking their proofs. A mathematician who pursues autonomy in this sense presumably does so in part because she finds it to be

valuable for herself, but we argue that she likely also does so for the sake of the mathematical community.

15:00-16:00   Maurice Chiodo - Cambridge University, UK

Mathematicians acting amorally - how they harm society, and why they don't notice

It is crucial for mathematicians to understand that their work, output, insight and labour can be used not only for good, but also for bad. Mathematics is an extremely sharp double-edged blade. When directed towards the betterment of society, it can effect rapid positive change. However, when placed in the hands of those who wish to carry out acts that inflict harm on society, intentionally or otherwise, it can inflict incredible harm with astonishing efficiency.

With the rapid advancement of technology, mathematicians have been thrust into the engine room of human endeavour. Their discipline, once heralded as "pure", studied for its "beauty", and seen as "detached from the physical world", now shoulders a great social responsibility. Mathematicians need to appreciate this new burden that they carry. Otherwise, by continuing in the paradoxical belief that mathematics is useful but never harmful, they will sleepwalk into becoming agents of harm.

I'm a postdoctoral researcher in mathematician at Cambridge. For the past two years I have been trying to teach mathematics students about ethical behaviour. Their responses to this have ranged between comical and chilling. I'll talk about some of the ethical issues mathematicians face, my experiences teaching them about this, and how a large proportion of mathematicians have practically no awareness or regard for the impact of their work. To understand this properly, one must first understand some of the culture and social structure that exists in the mathematical community; how we relate to each other, how we teach upcoming students, and how we speak about and view mathematics.

This work has been done as part of the newly-formed Cambridge University Ethics in Mathematics Project (http://www.ethics.maths.cam.ac.uk/), with support from the Cambridge University Ethics in Mathematics Society (https://cueims.soc.srcf.net/).

16:00-16:30   Coffee Break

16:30-17:30   Frank Scheppe - Vrije Universiteit Brussel, Belgium

Meaningfulness / meaninglessness and epistemic authenticity / fakeness in Wittgenstein's philosophy of mathematical practice

Among several ways in which Wittgenstein's philosophy of mathematics presages present-day philosophy of mathematical practice, there is his use of an ethical and aesthetical vocabulary in his highly controversial critical remarks on, for instance, Cantor's work on infinity and Gödel's incompleteness proofs. In this contribution, I show (1) how this critical strand in Wittgenstein's work systematically revolves around the ethical-aesthetical opposition between 'authenticity' vs. 'fakeness', (2) how these concepts in turn fit in with a radically practice-based account of meaning in general and the meaningfulness of mathematical practices in particular, and (3) how this concept of epistemic authenticity is akin to the emergent virtue-epistemological approach to mathematical practices in that it (3a) has the potential to shed new light on various issues in philosophy of mathematics by linking them to broader philosophical concerns, but (3b) also highlights the inherent tension between the relative autonomy of local practices vs. their embedding in encompassing cultural systems.

17:30-17:45   Coffee Break
17:45-18:45   Fenner Tanswell - University of St Andrews, UK

Proof, Rigour and Mathematical Virtues

In this talk I will be investigating the application of virtue epistemology to mathematical knowledge from proofs. I shall argue the case that this provides us with the tools to account for informal proofs and the nature of rigour as they are found in mathematical practice, overcoming obstacles that rule out the opposing formalist-reductionist approach. I will discuss a case study of the ongoing difficulties with verifying the correctness of Mochizuki's proof of the abc conjecture, and suggest that mathematical virtues and vices are playing a central role in the controversy.

From 20:00   Informal Dinner

Saturday, July 14th

09:30-11:30   Reading of: Reuben Hersh, "Examples of Virtue", followed by a round table discussion

11:30-11:45   Coffee Break

11:45-12:45   Colin Rittberg (VUB), Fenner Tanswell (St Andrews), Jean Paul Van Bendegem (VUB)

Epistemic Injustice in Mathematics

We investigate how epistemic injustice can manifest in mathematical practices. We do this as both a social epistemological and virtue-theoretic investigation of mathematical practices. We delineate the concept both positively – we show that a certain type of folk theorem can be a source of epistemic injustice in mathematics – and negatively by exploring cases where the obstacles to participation in a mathematical practice do not amount to epistemic injustice. Having explored what epistemic injustice in mathematics can amount to, we use the concept to highlight a potential danger of intellectual enculturation.