Second Congress of Greek Mathematicians – SCGM, Athens, July 4–8, 2022

Session on the History of Mathematics – Friday 8.VII.2022
Organizer: Jean Christianidis (Department of History and Philosophy of Science, NKUA)
Room 105, New Building of the School of Applied Mathematical and Physical Sciences, NTUA

**Program**

09:00–09:30 Francesca Papanika
**Title:** From 'theory' to 'precision': numerical calculations in the early post-Christian centuries
**Abstract:** The arithmetical problems contained in the extant mathematical papyri of the first and second centuries AD were conceived as examples of lower-level mathematics in earlier historiography. The same historiographical approach was also adopted for the case of the surviving treatises of the period that contain numerical algorithmic procedures. In this light, for example, van der Waerden describes Heron's *Metrica* as "a very childish little book". Unlike Hellenistic mathematical treatises, which are attributed to specific authors (for example, Euclid's *Elements*), and contain axiomatic-and-deductive solutions, the papyri texts are anonymous, and the solution of problems is carried out by algorithmic numerical procedures. According to more recent historiographical approaches, these texts represent alternative mathematical practices. Høyrup, for example, describes them as 'sub-scientific', alternative 'traditions' developed to provide solutions to everyday problems of measurement and transactions. My thesis is that the arithmetic operations contained in the papyri texts are a means of searching for precision and that this is highlighted by the systematic use of fractional numbers. I will present relevant examples from the papyri, which I will compare with numerical examples from the *Metrica*. In a broader context, this practice marks a stage in the transition of mathematical treatises from theoretical to technical textbooks.

09:30–10:00 Vasilios Siochos
**Title:** Identifying the parts of a proposition in Euclid's *Elements* using machine learning algorithms
**Abstract:** Proclus proposed a schema for analyzing a mathematical proposition into six parts: enunciation, setting out, specification, construction, proof and conclusion. Some of them can be identified in the Ancient Greek Mathematical texts by specific formulaic expressions. Though, neither all parts are always identifiable by such expressions, nor they appear in a particular sequence within the propositions. This paper focuses on the development of a tool for the researchers of History of Mathematics, supporting them to semantically annotate Ancient Greek Mathematical texts according to the categories of the Proclus' schema. In particular, machine learning algorithms are utilized to identify the parts of a proposition. The suggested methodology is applied in the seven first books of Euclid's *Elements* and the results are encouraging.

10:00–10:30 Athanasia Megremi
**Title:** Byzantine mathematics as the constant sideliner: where do the Mathematics of the Eastern Empire stand in the history of the Medieval Mathematical world
**Abstract:** A narrative indicative of the role of Byzantine science in general has been quite resilient from the time of its conceptualization (in the 19th century) until today: how the Eastern Empire stood in the crossroad of scientific--more precisely of mathematical, as is our interest here, development facilitating its transmission but otherwise passively watching Mathematics happen all around Europe. Our understanding of what Mathematics and mathematical learning was the standard at the Eastern Empire is crucial in our understanding of what medieval mathematics actually looked like in their time. In the following presentation we will follow the content of Arithmetics, its teaching and learning procedures and the learning and cognitive values connected to it.

10:30–11:00 Michalis Sialaros
**Title:** Antagonism as Essential Part of Ancient Greek Milieu: The case of Mathematics

**Abstract:** The term ‘Greek miracle’ is often employed to denote a shift in thinking from mythical to rational explanation that apparently took place in the early Greek world around the sixth century BCE. For mathematics, the term signifies the passing from the numerical algorithmic procedures found in pre-Hellenic cultures to the axiomatic and deductive proofs that appear in Greek mathematical texts after the fifth century BCE. The historiographical idea of a ‘Greek miracle’ has received extended and, occasionally, justified criticism over the past few decades. Be that as it may, the fact remains that no axiomatic and deductive proofs have been found in pre-Hellenic mathematical texts. This fact compels us to consider a growing number of recent studies that suggest that the origins of the distinctive characteristics of Greek mathematics must be understood within the broader context of Greek culture, especially regarding textual form, language, and logical structure. By picking up the threads of these discussions, this paper shows how the axiomatic and deductive structure offered grounds for remarkably new types of debates among ancient Greek thinkers. This remark constitutes an additional argument in favour of the view that axiomatic and deductive mathematics was a cultural product of Greek adversarial culture—and, precisely for this reason, it was substantially shaped by its norms, forms, and standards.

All talks will be in Greek.