

PhD fellowship on Paleolithic numerical notations

Centre National de la Recherche Scientifique, University of Bordeaux

The *Unité Mixte de Recherche* 5199 of the CNRS offers a funded three years PhD fellowship for the European Research Council Synergy project QUANTA "Evolution of Cognitive Tools for Quantification". The fellowship will ideally start the 1st October, 2021

Background

Numbers are ubiquitous in our modern globalized world and play a fundamental role in its functioning. Quantification—that is, the ability to represent, think about, and symbolically express quantity-related facts—is a universal phenomenon manifested to some degree in all cultures and languages. While *quantifiers* are learned as part of natural language, even without writing practices or scholastic immersion, the acquisition of *numerals* requires some form of cultural training (often via apprenticeship or formal schooling). Mastering a numeral system paves the way for numeracy, that is, the uniquely human ability to assess, remember, and convey discrete quantities in an exact manner. This raises a tantalizing question on emergence: If for our ability to count numeral systems are an essential cognitive tool, how then could such a tool ever be invented in the first place? In other words: When, where, how, and why did humans make the transition from natural quantifiers to exact symbolic quantification with numerals? Reconstructing the evolution of cognitive tools for quantification as a product of cultural practices and their cognitive implications is the prime goal of the ERC funded Synergy Project QUANTA. Highly interdisciplinary, this project will involve senior researchers, post-docs and PhD students from four research institutions (University of Bordeaux, University of Bergen, University of California San Diego, and the Max Planck Institute for Evolutionary Anthropology, Leipzig). The PhD student in Bordeaux will contribute to this overarching endeavor by conducting research on the earliest known systems of quantification, dated to the Upper and possibly Middle Palaeolithic. The research will involve the taphonomic and technological analysis of Palaeolithic and ethnographic objects in bone, ivory, antler and stone, the creation of experimental protocols to guide the interpretation of archaeological finds, the morphometric study of series of archaeological and experimental marks according to the principles of Weber-Fechner's law, the application of multivariate statistical analyses from data derived from geometric morphometry, and the microscopic analysis of archaeological and experimental objects using optical, confocal and scanning electron microscopes. The results will be analyzed in the light of theoretical models and scenarios on the evolution of means for quantification and conceptual grids developed by cognitive scientists to characterize the performance of cognitive tools for quantification.

The Applicant

The successful candidate will have a MA or a MSc in Prehistory, Archaeology, Paleoanthropology or Cognitive sciences. He/she will ideally have an expertise in the European and African Paleolithic record, bone taphonomy, the technological analysis of archaeological bone objects and a strong interest in the evolution of human cognition. Competences in macrophotography, confocal microscopy, scanning electron microscopy, geometric morphometry and multivariate statistical analyses would be a plus. The candidate will be motivated to travel in Europe and Africa, will be prepared to spend internships at the other host institutions involved in QUANTA, and will be fluent in written and spoken English and preferably also in French.

Conditions

The Doctoral student will work in Bordeaux under the supervision of Francesco d'Errico (UMR 5199 PACEA, University of Bordeaux) and Andrea Bender (University of Bergen). This fellowship requires a commitment of 35 hours per week. Women and minorities are encouraged to apply.

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Post-Doctoral Position on the Origin of Cognitive Tools for Quantification Centre National de la Recherche Scientifique, Bordeaux University

The *Unité Mixte de Recherche* 5199 of the CNRS offers a funded three years Post-Doctoral Position for the European Research Council Synergy project QUANTA "Evolution of Cognitive Tools for Quantification". The fellowship will ideally start the 1st October, 2021

Background

Numbers are ubiquitous in our modern globalized world and play a fundamental role in its functioning. Quantification—that is, the ability to represent, think about, and symbolically express quantity-related facts—is a universal phenomenon manifested to some degree in all cultures and languages. While *quantifiers* are learned as part of natural language, even without writing practices or scholastic immersion, the acquisition of *numerals* requires some form of cultural training (often via apprenticeship or formal schooling). Mastering a numeral system paves the way for numeracy, that is, the uniquely human ability to assess, remember, and convey discrete quantities in an exact manner. This raises a tantalizing question on emergence: If for our ability to count numeral systems is an essential cognitive tool, how then could such a tool ever be invented in the first place? In other words: When, where, how, and why did humans make the transition from natural quantifiers to exact symbolic quantification with numerals? Reconstructing the evolution of cognitive tools for quantification as a product of cultural practices and their cognitive implications is the prime goal of the ERC funded Synergy Project QUANTA. Highly interdisciplinary, this project will involve senior researchers, post-docs and PhD students from four research institutions (University of Bordeaux, University of Bergen, University of California San Diego, and the Max Planck Institute for Evolutionary Anthropology, Leipzig).

The Post-Doctoral researcher in Bordeaux will contribute to this overarching endeavor by developing analytical methodologies and improving theoretical frameworks to identify and characterize the earliest devices to store numerical information. The research will also involve the application of these innovative frames of inference to Palaeolithic objects and evaluation of results in synergy with other avenues of research conducted, in parallel, by other members of the project.

The Applicant

The successful candidate will have a PhD in Prehistory, Archaeology, Paleoanthropology or Cognitive sciences. He/she will ideally combine an expertise in the European and African Paleolithic record, the technological analysis of archaeological bone objects and a strong interest in cultural and cognitive evolution, interdisciplinary research, cross-cultural studies. Competences in macrophotography, confocal microscopy, scanning electron microscopy, geometric morphometry and multivariate statistical analyses will be prioritized. The candidate will have the ability to independently conduct scientific research (literature mining, analysis, creation of databases, syntheses and reporting), leading to international publications. Skills to work in an international and multidisciplinary research environment are essential credential to apply. Broad scientific interest beyond the applicant's own field is expected. The candidate will be motivated to travel in Europe and Africa, will be prepared to spend internships at the other host institutions involved in QUANTA, and will be fluent in written and spoken English, and preferably also in French.

Conditions

The position is for a fixed-term period of 3 years and is associated with the project "Evolution of Cognitive Tools for Quantification (QUANTA)", funded by the European Research Council with a Synergy Grant to Andrea Bender (UiB), Francesco d'Errico (CNRS Bordeaux), Russell Gray (MPI for Evolutionary Anthropology, Leipzig), and Rafael Núñez (UCSD). The Post-Doctoral Fellow will work in Bordeaux

under the supervision of Francesco d'Errico (UMR 5199 PACEA, University of Bordeaux) and in collaboration with the other members of the team based in Bordeaux and in the other host institutions. This fellowship requires a commitment of 35 hours per week. Women and minorities are encouraged to apply. Salary will depend on previous experience.

Enquiries

Francesco d'Errico, Université Bordeaux, avenue des Facultés, F-33405 Talence, France. Tel. 0540002628.
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References

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