



Berlin
Mathematical
School

BMS Friday Colloquium

Friday 10 December 2010 at 14:15

Tea before the lecture begins at 13:00

BMS Loft, Urania, An der Urania 17, 10787 Berlin

Rafael Núñez (UCSD)

What then is Mathematics? A view from Cognitive Science

Mathematics is a unique body of knowledge. The very entities that constitute what mathematics is are mental abstractions that cannot be perceived directly through the senses. So, what kind of thing is mathematics? In academia, this question is usually studied in formal logic, philosophy, and the history of mathematics. This talk will address this question with a naturalistic approach that takes into account the biological and socio-cultural constraints under which the human mind unfolds.

Rafael Núñez will show (1) how what we call mathematics is far from being genetically determined; (2) that its emergence is made possible by use of everyday sense-making cognitive mechanisms for imagination; (3) that mathematical truth and objectivity come out of the collective use of these mechanisms; and (4) that it can have domains that are internally consistent but mutually inconsistent. He will show that these properties are not unique to mathematics but that they exist in everyday abstract conceptual systems as well.

These points will be illustrated with empirical observations in various areas. He'll defend the idea that everyday conceptual systems possess biologically constrained and socially mediated forms of "truth" and "objectivity". These properties serve as grounding for developing more complex and refined forms of abstraction, which find the most sublime form in mathematics.

Professor Rafael Núñez is the director of the Embodied Cognition Lab at the Department of Cognitive Science, University of California, San Diego. He grew up in Chile, obtained his doctoral degree in Switzerland and completed his post-doctoral work in Stanford and Berkeley. He investigates cognition from the perspective of the embodied mind. His multidisciplinary approach uses methods such as psycholinguistic experiments, gesture studies, brain imaging, and field research with isolated indigenous groups. His book *Where Mathematics Comes From: How the Embodied Mind Brings Mathematics into Being* (with George Lakoff) presents a new theoretical framework for understanding the human nature of mathematics and its foundations.