



学术报告

From Molecules to Models: Integrating Experimental Taphonomy and AI to

Resurrect Ancient Life

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报告人简介:

Dr. Arindam Roy takes a deeply interdisciplinary approach to palaeobiology, developing novel technologies and analytical frameworks to extract biologically meaningful information from the fossil record. His research bridges experimental taphonomy, biogeochemistry and artificial intelligence, with a particular focus on the preservation of soft tissues and pigments, and on deep learning-based automated segmentation of fossil CT data.

报告摘要:

Recovering the biology and life history of ancient vertebrates requires rigorous, scalable methods. Exceptionally preserved fossils retain biological signals ranging from pigments encoding colouration and behaviour, to three-dimensional anatomy recording form, function, ontogeny and phylogeny, but extracting these data at different preservational scales demands experimental and technological innovation. This talk explores two research programmes demonstrating how experimental taphonomy, geochemistry, and artificial intelligence are transforming palaeobiological reconstruction. The first uses controlled diagenetic experiments to establish frameworks for reconstructing vertebrate colouration, illuminating ancient ecology and behaviour. The second develops automated deep learning pipelines for CT segmentation of Jurassic vertebrate fossils from the Isle of Skye, Scotland, accelerating access to anatomical data critical for resolving the deep-time origins of modern vertebrate groups. Together, these approaches reveal the biology and life histories of ancient organisms with unprecedented resolution and precision.

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