

# Department of Geography ---- Public Seminar Series

***“Animals at work: The modification of substrates and landscapes by biogenic activity in deep time”***

Speakers:

Professors Luis A. Buatois and M. Gabriela Mángano

(Department of Geological Sciences, University of Saskatchewan, Saskatoon, Canada)

Date: 27<sup>th</sup> April, 2017 (Thursday)

Time: 2:30 – 4:00 pm

Venue:

Room AAB1217, Resource Centre, Department of Geography,

Academic and Administration Building (AAB), Baptist University Road Campus

Hong Kong Baptist University

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Substrates and landscapes are strongly affected by biogenic activity. Ichnology, the multidisciplinary science that studies organisms-substrate interactions, has experienced an explosive development during the last decades. Animals interact with their substrates in three fundamental ways: bioturbation (organism activity involving both particle and solute transport within burrows, into the surrounding sediment and across the sediment-water interface, typically resulting in disturbance of the primary sedimentary fabric), bioerosion (biogenic activity involving mechanical or biochemical penetration of a rigid substrate, such as hardgrounds, clasts, bones or rocks) and biodeposition (production or concentration of sediment by the activities of an organism). The impact of organism activity may be profound, resulting in landscape shaping in both continental and marine settings. In doing so, some benthic organisms modify, maintain, and create habitats, exerting profound changes in the ecosystems. Modification of the physical environment by the action of these ecosystem engineers directly or indirectly modulate the availability of resources to other species. Tracking the effects of animal activity through time is essential to understand the role of geobiological processes in macroevolution. The appearance of novel ways of interaction with the substrate during the Cambrian Explosion represents an evolutionary breakthrough of the highest level. In particular, a major shift in benthic ecologic structure consisted in a marked increase in sediment mixing due to bioturbation, the establishment of a suspension-feeder infauna, increased complexity of the trophic web, and coupling of benthos and plankton during the early Cambrian. The Great Ordovician Biodiversification Event was associated to evolutionary innovations in bioerosion, among other aspects. Finally, the Mesozoic Marine Revolution was conducive to further increases in depth of bioturbation, a marked increase in the utilization of the infaunal ecospace and profound modification of marine landscapes. Ichnology is emerging as a multidisciplinary science which is able to yield insights into the deep history of the biosphere.

Luis Buatois obtained his degree in Geology at the University of Buenos Aires and got his PhD at the same institution. In 1994, he received a degree in Philosophy, with a focus on Philosophy of Sciences (University of Tucuman). From 1994-1998 he was a postdoctoral fellow with the Kansas Geological Survey. He returned to Argentina in 1998 becoming a Researcher at the Argentinean Research Council. In 2004, he joined the University of Saskatchewan, where he is a Professor. He specializes in paleoenvironmental, stratigraphic, and evolutionary aspects of ichnology. He has been Vice-President of the International Palaeontological Association and President of the International Ichnological Association. He has carried out field and subsurface work worldwide, including Canada, United States, Costa Rica, Trinidad and Tobago, Venezuela, Colombia, Ecuador, Bolivia, Brazil, Argentina, Chile, Antarctica, Spain, Romania, Ukraine, China, South Africa, and Namibia. Luis has published six books. He has edited three journal special issues, and is the author of approximately 200 scientific papers.

Gabriela Mángano received her degree in Geology at the University of Buenos Aires and got her PhD at the same institution. After finishing a degree in Philosophy, specializing in Philosophy of Sciences, she went to the Kansas Geological Survey as a postdoctoral fellow. She returned to Argentina to take a position as Researcher at the Argentinean Research Council. Since 2004, she is a Professor at the University of Saskatchewan. Gabriela's interests are in ichnology and its significance in evolutionary paleoecology and ancient sedimentary environments. She has done extensive research worldwide, including Argentina, Brazil, Canada, United States, Spain, Switzerland, Romania, Jordan and China. During the last years, she has been interested on ichnofaunas from Burgess Shale-type deposits, having been involved in the discovery of a remarkable fossil site in the Canadian Rockies, Marble Canyon. She is the author of four books, has edited three special publications and is the author of approximately 170 scientific papers. She is co-editor of *Palaios* and a member of the Editorial Board of many paleontological journals, such *Journal of Paleontology*, *Paleontologia Electronica*, *Ameghiniana* and *Revista Brasileira de Paleontologia*. She is member of the Scientific Board of the UNESCO International Geoscience Program (IGCP), member of the SEPM Board and Treasurer of the International Ichnological Association.