

# Chapter 24

## Science Communication with Dinosaurs

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### ABSTRACT

*Dinosaurs successfully conjure images of lost worlds and forgotten lives. Our understanding of these iconic, extinct animals now comes from many disciplines, not just the science of palaeontology. In recent years palaeontology has benefited from the application of new and existing techniques from physics, biology, chemistry, engineering, but especially computational science. The application of computers in palaeontology is highlighted in this chapter as a key area of development in studying fossils. The advances in high performance computing (HPC) have greatly aided and abetted multiple disciplines and technologies that are now feeding paleontological research, especially when dealing with large and complex data sets. We also give examples of how such multidisciplinary research can be used to communicate not only specific discoveries in palaeontology, but also the methods and ideas, from inter-related disciplines to wider audiences. Dinosaurs represent a useful vehicle that can help enable wider public engagement, communicating complex science in digestible chunks.*

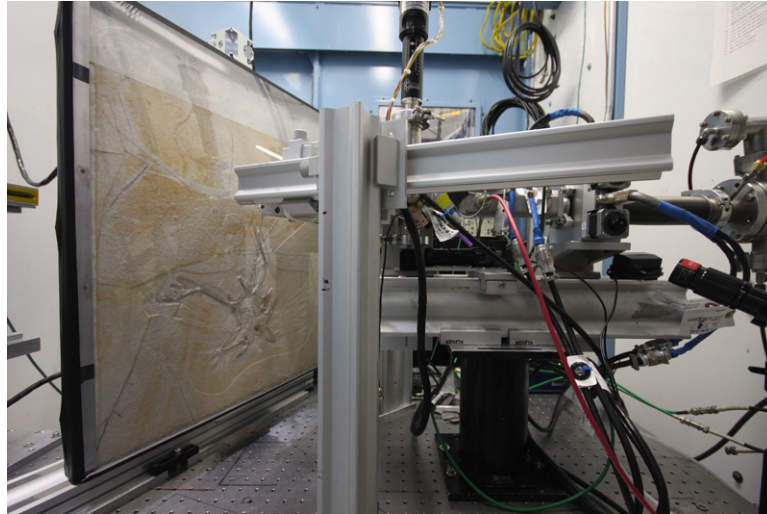
### INTRODUCTION

Dinosaurs are often hailed as a scientific communication breakthrough, but is this really the case? Does the ‘and finally’ news story, usually based upon a recent publication, give credit to the years of painstaking work from discovery to final

interpretation? The same can be said for many areas of science, where the object of the science becomes the story but not the science itself. This, in part, is the fault of both media and the scientists, given we must be more aware of how our science is translated into digestible chunks that can be understood by non-specialist audiences. Dinosaurs, however, are in a unique position. These animals have the potential to unlock many new areas of

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Figure 1. The fossil of *Archaeopteryx* being scanned at the Stanford synchrotron, using the recently developed technique of synchrotron rapid scan X-ray fluorescence (SRS-XRF)



research to the public, given they provide a unique vehicle to deliver often complex science. Whether it be particle physicists blasting fossils with high energy X-rays at a synchrotron (Bergmann et al, 2010) (Figure 1) or computational biologists making dinosaurs run in virtual environments (Sellers & Manning, 2007), it is clear these extinct giants have a role to play in engaging the public with more than just old fossil bones.

In the past ten years the science of palaeontology has been reinventing itself, looking to new disciplines to help solve very old questions. Now that palaeontology is such a diverse, interdisciplinary research area, it has successfully facilitated in the communication of multiple fields of science. Interdisciplinary work with engineers, physiologists, geneticists, computational scientists and many other disciplines provides avenues that might excite interest in what might be considered discrete or obscure areas of research. Indeed, computational palaeontology is a splendid example of how the digitisation of specimens and subsequent computational analyses are both eye-catching and easy to distribute through modern media. This chapter aims to present a number of

case studies detailing the different ways to communicate research undertaken on dinosaurs that helps facilitate the wider understanding of science to a public audience, focussing, where possible, on the application of computational science. The use of museum displays, science festivals, television, and schools' outreach programmes will be but a few examples discussed, to illustrate the application of past life to presenting 21<sup>st</sup> Century science.

## DUSTY DINOSAUR BONES

The public perception of palaeontology, and particularly the study of dinosaurs, begins with excavations, usually in the desert with field teams digging up fossil bones. Whilst this image has been glamorised and perpetuated by television and film, there is some core of truth here. However, even the collection of specimens is beginning to change, as a function of the development and application of new technology. The use of laser scanning technology at dig sites (Manning, 2008) is now yielding important spatial data in the relationship

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