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About

(/university/colleges/les/research-gallery/richard-butler.aspx) Richard is a vertebrate palaeontologist whose research focuses on the systematics, evolution and biogeography of late Palaeozoic to Mesozoic reptiles. He is particularly interested in the origin and dramatic evolutionary radiation of dinosaurs and closely related fossil groups in the aftermath of the Permo-Triassic mass extinction, the largest extinction event in the history of life on Earth. Another major research focus addresses the patterns and drivers of vertebrate diversity and body size over extended geological timescales.

Qualifications

2007 – PhD, University of Cambridge
2002 – BSc Geology, University of Bristol

Biography

2011–2013. Junior Research Group Leader (DFG Emmy Noether Programme), GeoBio-Center, Ludwig-Maximilians-Universität München, Munich, Germany.
2009–2011. Alexander von Humboldt Foundation Research Fellowship, Bayerische Staatssammlung für Paläontologie und Geologie, Munich, Germany.
2008–2009. NERC Researcher Co-Investigator, Department of Palaeontology, Natural History Museum.
2006–2008. NERC Research Assistant, Department of Palaeontology, Natural History Museum, London.

Awards

2011. Palaeontological Association Hodson Award (annual award to a palaeontologist under the age of 35 who has made a notable early contribution to the science)
2005. Society of Vertebrate Paleontology Predoctoral Fellowship (annual award intended to promote a professional career in vertebrate palaeontology)

Teaching

Richard contributes to teaching in the Geology, Geology and Geography, and Palaeobiology and Palaeoenvironments programmes. Current contributions include field teaching as well as supervision of third and fourth year research projects.

Postgraduate supervision

Martin Ezcurra (http://www.birmingham.ac.uk/schools/gees/people/dr-students/ezcurra-martin.aspx) – Systematics and evolutionary history of proterosuchian archosauriforms
Roland Sookias (http://www.birmingham.ac.uk/schools/gees/people/dr-students/sookias-roland.aspx) – Euparkeriidae and the early evolutionary radiation of archosauriforms

Richard has supervised or co-supervised Master's theses in Birmingham, Munich, Cambridge, London and Bristol, with several students going on to PhDs and publishing their Master's results in journals including *Proceedings of the Royal Society B* and *Biology Letters*. Potential doctoral researchers interested in projects relating to Mesozoic vertebrate evolution and/or deep time diversity patterns should contact him via email.

Research

Research interests

- Systematics, taxonomy, and anatomy of archosaurs, particularly dinosaurs, and closely related groups
- Terrestrial recovery from the Permo-Triassic mass extinction event
- Phanerozoic and Mesozoic diversification patterns among vertebrates, and fossil record quality
- Late Palaeozoic–Mesozoic vertebrate biogeography
- Body size evolution and its drivers in deep time
- Early evolution of the avian respiratory system, and lung ventilation among fossil archosaurs

Archosauromorph Research Group website (http://www.archosauromorpha.com)

Key research grants

2014-2018. Marie Curie Career Integration Grant: "The early Mesozoic rise of archosaurs: New insights into an exemplar evolutionary radiation" (Principal Investigator)
2011-2014. German Research Foundation (DFG) Emmy Noether Programme: **"Dawn of the dinosaurs: Archosauromorph evolution in the terrestrial Triassic"**

(http://www.birmingham.ac.uk/research/activity/geosystems/projects/dawn-dinosaurs.aspx) (Principal Investigator)
2010-2011. German Research Foundation (DFG) Research Grant: “Terrestrial vertebrates from near the Triassic-Jurassic boundary in Portugal: Excavation, geological context, and faunal change” (Principal Investigator)
2008-2009. NERC Small Grant: “Origin of the avian respiratory system: A CT-study of postcranial pneumaticity in basal archosaurs” (Researcher Co-Investigator)

Richard has also received additional small grant funding (each < £5000) from the Royal Society, Synthesys, Lamont-Doherty Earth Observatory, Jurassic Foundation, Palaeontological Association, Systematics Association, and the Percy Sladen Memorial Fund, among others.

Other activities

2014–. Ordinary Member of Council, the Palaeontological Association
2013–. Executive Committee, the Paleobiology Database
2013–. Editorial Board, *Journal of Vertebrate Paleontology*
2013–. Editorial Board, *Acta Palaeontologica Polonica*
2012–. Program Committee, Society of Vertebrate Paleontology
2012–2014. Editorial Board, *PLOS ONE*
2010–2013. Associate Editor, *Paläontologische Zeitschrift*

Publications

In press

76. Barrett PM, **Butler RJ**, Mundil R, Scheyer TM, Irmis RB. & Sánchez-Villagra MR. In press. A palaeoequatorial ornithischian and new constraints on early dinosaur diversification. *Proceedings of the Royal Society B*.

75. Upchurch P, Andres B, **Butler RJ**, Barrett PM. In press. An analysis of pterosaurian biogeography: implications for the evolutionary history and fossil record quality of the first flying vertebrates. *Historical Biology*.

74. Brusatte SL, **Butler RJ**, Barrett PM, Carrano MT, Evans DC, Lloyd GT, Mannion PD, Norell MA, Peppe DJ, Upchurch P, Williamson TE. In press. The extinction of the dinosaurs. *Biological Reviews*.

73. Brusatte SL, **Butler RJ**, Mateus O, Steyer JS. In press. A new species of *Metoposaurus* from the Late Triassic of Portugal and comments on the systematics and biogeography of metoposaurid temnospondyls. *Journal of Vertebrate Paleontology*.

72. Sookias RB, Sennikov AG, Gower DJ, **Butler RJ**. In press. The monophyly of Euparkeriidae (Reptilia: Archosauriformes) and the origins of crown Archosauria: a revision of *Dorosuchus neoetus* from the Middle Triassic of Russia. *Palaeontology*.

71. Niedźwiedzki G, Brusatte SL, Sulej T, **Butler RJ**. In press. Basal dinosauriform and theropod dinosaurs from the middle-late Norian (Late Triassic) of Poland: implications for Triassic dinosaur evolution and distribution. *Palaeontology*.

70. Mateus O, **Butler RJ**, Brusatte SL, Steyer JS, Whiteside JH. In press. The first phytosaur (Diapsida, Archosauriformes) from the Late Triassic of the Iberian Peninsula. *Journal of Vertebrate Paleontology*.

2014

69. **Butler RJ**, Sullivan C, Ezcurra MD, Liu J, Lecuona A, Sookias RB. 2014. New clade of enigmatic early archosaurs yields insights into early pseudosuchian phylogeny and the biogeography of the archosaur radiation. *BMC Evolutionary Biology* **14**:128.

68. Benson RBJ, Frigot RA, Goswami A, Andres B, **Butler RJ.** 2014. Competition and constraint drove Cope's rule in the evolution of giant flying reptiles. *Nature Communications* **5**:3567.

67. Ezcurra MD, Scheyer T, **Butler RJ.** 2014. The origin and early evolution of Sauria: reassessing the Permian saurian fossil record and the timing of the crocodile-lizard divergence. *PLOS ONE* **9**:e89165.

66. **Butler RJ,** Rauhut OWM, Stocker MR, Bronowicz R. 2014. Redescription of the phytosaurs *Paleorhinus* ("*Francosuchus*") *angustifrons* and *Ebrachosuchus neukami* from Germany, with implications for Late Triassic biochronology. *Zoological Journal of the Linnean Society* **170**: 155–208.

2013

65. Nesbitt SJ, **Butler RJ**, Gower DJ. 2013. A new archosauriform (Reptilia: Diapsida) from the Manda beds (Middle Triassic) of southwestern Tanzania. *PLOS ONE* **8**: e72753.

64. Niedźwiedzki G, Brusatte SL, **Butler RJ.** 2013. *Prorotodactylus* and *Rotodactylus* tracks: an ichnological record of dinosauromorphs from the Early–Middle Triassic of Poland. In: *Anatomy, Phylogeny and Palaeobiology of Early Archosaurs and their Kin*, Nesbitt SJ, Desojo JB, Irmis RB (eds). Geological Society, London, Special Publications **379**: 319-351.

63. Stocker MR, **Butler RJ**. Phytosauria. 2013. In: *Anatomy, Phylogeny and Palaeobiology of Early Archosaurs and their Kin*, Nesbitt SJ, Desojo JB, Irmis RB (eds). Geological Society, London, Special Publications **379**: 91-117.

62. Sookias RB, **Butler RJ**. Euparkeriidae. 2013. In: *Anatomy, Phylogeny and Palaeobiology of Early Archosaurs and their Kin*, Nesbitt SJ, Desojo JB, Irmis RB (eds). Geological Society, London, Special Publications **379**: 35-48.

61. Ezcurra MD, **Butler RJ**, Gower DJ. 2013. Proterosuchia: the origin and early history of Archosauriformes. In: *Anatomy, Phylogeny and Palaeobiology of Early Archosaurs and their Kin*, Nesbitt SJ, Desojo JB, Irmis RB (eds). Geological Society, London, Special Publications **379**: 9-33.

60. **Butler RJ.** 2013. “*Francosuchus*” *trauthi* is not *Paleorhinus*: implications for Late Triassic vertebrate biostratigraphy. *Journal of Vertebrate Paleontology* **33**: 858–864.

59. Toljagić O, **Butler RJ**. 2013. The Triassic/Jurassic mass extinction as trigger for the Mesozoic radiation of crocodylomorphs. *Biology Letters* **9**: 20130095.

58. Benson RBJ, Mannion PD, **Butler RJ**, Upchurch P, Goswami A, Evans SE. 2013. Cretaceous tetrapod fossil record sampling and faunal turnover: implications for biogeography and the rise of modern clades. *Palaeogeography, Palaeoclimatology, Palaeoecology* **372**: 88–107.

57. **Butler RJ**, Benson RBJ, Barrett PM. 2013. Pterosaur diversity: untangling the influences of sampling biases, Lagerstätten, and genuine biodiversity signals. *Palaeogeography, Palaeoclimatology, Palaeoecology* **372**: 78–87.

56. Nesbitt SJ, **Butler RJ**. 2013. Redescription of the archosaur *Parringtonia gracilis* from the Middle Triassic Manda Beds of Tanzania, and the antiquity of Erpetosuchidae. *Geological Magazine* **150**: 225–238.

55. **Butler RJ**, Yates AM, Rauhut OWM, Foth C. A pathological tail in a basal sauropodomorph dinosaur from South Africa: evidence of traumatic amputation? *Journal of Vertebrate Paleontology* **33**: 224–228.

54. Brusatte SL, **Butler RJ**, Niedźwiedzki G, Sulej T, Bronowicz R, Satkunas J. 2013. First record of Mesozoic terrestrial vertebrates from Lithuania: phytosaurs (Diapsida: Archosauriformes) of probable Late Triassic age, with a review of phytosaur biogeography. *Geological Magazine* **150**: 110–121.

2012

53. Han F-L, Barrett PM, **Butler RJ**, Xu X. 2012. Postcranial anatomy of *Jeholosaurus shangyuanensis* (Dinosauria, Ornithischia) from the Lower Cretaceous Yixian Formation of China. *Journal of Vertebrate Paleontology* **32**: 1370–1395.

52. Ősi A, Prondvai E, **Butler RJ**, Weishampel DB. 2012. Phylogeny, histology and inferred body size evolution in a new rhabdodontid dinosaur from the Late Cretaceous of Hungary. *PLOS ONE* **7(9):** e44318.

51. Mannion PD, Benson RBJ, Upchurch P, **Butler RJ**, Carrano MT, Barrett PM. 2012. A temperate palaeodiversity peak in Mesozoic dinosaurs and evidence for Late Cretaceous geographical partitioning. *Global Ecology and Biogeography* **21**: 898–908.

50. Sookias RB, Benson RBJ, **Butler RJ**. 2012. Biology, not environment, drives major temporal patterns in terrestrial tetrapod body size. *Biology Letters* **8**: 674–677.

49. Brusatte SL, **Butler RJ**, Prieto-Marquez A, Norell MA. 2012. Dinosaur morphological diversity and the end-Cretaceous extinction. *Nature Communications* **3**: article 804.

48. Foth C, Brusatte SL, **Butler RJ**. 2012. Do different disparity proxies converge on a common signal? Insights from the cranial morphometrics and evolutionary history of Pterosauria (Diapsida: Archosauria). *Journal of Evolutionary Biology* **25**: 904–915.

47. Sookias RB, **Butler RJ**, Benson RBJ. 2012. Rise of dinosaurs reveals major body size transitions are driven by passive processes of trait evolution. *Proceedings of the Royal Society B* **279**: 2180–2187.

46. **Butler RJ**, Porro LB, Galton PM, Chiappe LM. 2012. Anatomy and cranial functional morphology of the small-bodied dinosaur *Fruitadens haagarorum* (Ornithischia: Heterodontosauridae) from the Upper Jurassic of the USA. *PLOS ONE* **7**: e31556.

45. **Butler RJ**, Barrett PM, Gower DJ. 2012. Reassessment of the evidence for postcranial skeletal pneumaticity in Triassic archosaurs, and the early evolution of the avian respiratory system. *PLOS ONE* **7**: e34094.

44. **Butler RJ**, Brusatte SL, Andres B, Benson RBJ. 2012. How do rock record biases affect studies of disparity in deep time? A case study of the Pterosauria (Reptilia: Archosauria). *Evolution* **66**: 147–162.

43. Benson RBJ, **Butler RJ**, Carrano MT, O'Connor PM. 2012. Air-filled postcranial bones in theropod dinosaurs: physiological implications and the 'reptile'-bird transition. *Biological Reviews* **87**: 168–193.

2011

42. **Butler RJ**, Brusatte SL, Reich M, Nesbitt SJ, Schoch RR, Hornung JJ. 2011. The sail-backed reptile *Ctenosauriscus* from the latest Early Triassic of Germany and the timing and biogeography of the early archosaur radiation. *PLOS ONE* **6**: e25693 (28 pages).

41. Barrett PM, **Butler RJ**, Twitchett RJ, Hutt S. 2011. New material of *Valdosaurus canaliculatus* (Ornithischia: Ornithopoda) from the Lower Cretaceous of southern England. *Special Papers in Palaeontology* **86**: 131–163.

40. Upchurch P, Mannion PD, Benson RBJ, **Butler RJ**, Carrano MT. 2011. Geological and anthropogenic controls on the sampling of the terrestrial fossil record: a case study from the Dinosauria. In: *Comparing the Geological and Fossil Records: Implications for Biodiversity Studies*, McGowan AJ, Smith AB (eds). Geological Society, London, Special Publication **358**: 209–240.

39. Benson RBJ, **Butler RJ**. 2011. Uncovering the diversification history of marine tetrapods: ecology influences the effect of geological sampling biases. In: *Comparing the Geological and Fossil Records: Implications for Biodiversity Studies*, McGowan AJ, Smith AB (eds). Geological Society, London, Special Publication **358**: 191–207.

38. Norman DB, Crompton AW, **Butler RJ**, Porro LB, Charig AC. 2011. The Lower Jurassic ornithischian dinosaur *Heterodontosaurus tucki* Crompton and Charig, 1962: cranial anatomy, functional morphology, taxonomy and relationships. *Zoological Journal of the Linnean Society* **163**: 182–276.

37. **Butler RJ**, Jin L, Chen J, Godefroit P. 2011. The postcranial osteology and phylogenetic position of the small ornithischian dinosaur *Changchunsaurus parvus* from the Quantou Formation (Cretaceous: Aptian-Cenomanian) of Jilin Province, northeastern China. *Palaeontology* **54**: 667–683.

36. **Butler RJ**, Benson RBJ, Carrano MT, Mannion PD, Upchurch P. 2011. Sea-level, dinosaur diversity, and sampling biases: investigating the 'common cause' hypothesis in the terrestrial realm. *Proceedings of the Royal Society B* **278**: 1165–1170.

35. Brusatte SL, Niedźwiedzki G, **Butler RJ**.2011. Footprints pull origin and diversification of dinosaur stem-lineage deep into Early Triassic. *Proceedings of the Royal Society B* **278**: 1107–1113.

34. Porro LB, **Butler RJ**, Barrett PM, Moore-Fay S, Abel RL. 2011. New heterodontosaurid specimens from the Lower Jurassic of southern Africa and the early ornithischian dinosaur radiation. *Earth and Environmental Science Transactions of the Royal Society of Edinburgh* **101**: 351–366.

33. Barrett PM, **Butler RJ**, Nesbitt SJ. 2011. The roles of herbivory and omnivory in early dinosaur evolution. *Earth and Environmental Science Transactions of the Royal Society of Edinburgh* **101**: 383–396.

2010

32. Wang X, Pan R, **Butler RJ**, Barrett PM. 2010. The postcranial skeleton of the iguanodontian ornithopod *Jinzhousaurus yangi* from the Lower Cretaceous Yixian Formation of western Liaoning, China. *Earth and Environmental Science Transactions of the Royal Society of Edinburgh* **101**: 135–159.

31. **Butler RJ**. 2010. The anatomy of the basal ornithischian dinosaur *Eocursor parvus* from the lower Elliot Formation (Late Triassic) of South Africa. *Zoological Journal of the Linnean Society* **160**: 648–684.

30. Brusatte SL, Nesbitt SJ, Irmis RB, **Butler RJ**, Benton MJ, Norell MA. 2010. The origin and early radiation of dinosaurs. *Earth-Science Reviews* **101**: 68–100.

29. Ősi A, **Butler RJ,** Weishampel DB. 2010. A Late Cretaceous ceratopsian dinosaur from Europe with Asian affinities. *Nature* **465**: 466–468.

28. **Butler RJ,** Barrett PM, Kenrick P, Penn MG. 2010. Testing coevolutionary hypotheses over geological timescales: interactions between Cretaceous dinosaurs and plants. *Biological Journal of the Linnean Society* **100**: 1–15.

27. Benson RBJ, **Butler RJ**, Lindgren J, Smith AS. 2010. Mesozoic marine tetrapod diversity: mass extinctions and temporal heterogeneity in geological megabiases affecting vertebrates. *Proceedings of the Royal Society B* **277**: 829–834.

26. Jin L, Chen J, Zan S, **Butler RJ**, Godefroit P. 2010. Cranial anatomy of the small ornithischian dinosaur *Changchunsaurus parvus* from the Quantou Formation (Cretaceous: Aptian–Cenomanian) of Jilin Province, northeastern China. *Journal of Vertebrate Paleontology* **30**: 196–214.

25. **Butler RJ**, Galton PM, Porro LB, Chiappe LM, Henderson DM, Erickson GM. 2010. Lower limits of ornithischian dinosaur body size inferred from a diminutive new Upper Jurassic heterodontosaurid from North America. *Proceedings of the Royal Society B* **277**: 375–381.

2009

24. **Butler RJ**, Barrett PM, Abel RL, Gower DJ. 2009. A possible ctenosauriscid archosaur from the Middle Triassic Manda Beds of Tanzania. *Journal of Vertebrate Paleontology* **29**: 1022–1031.

23. **Butler RJ**, Barrett PM, Gower DJ. 2009. Postcranial skeletal pneumaticity and air-sacs in the earliest pterosaurs. *Biology Letters* **5**: 557–560.

22. Brusatte SL, **Butler RJ**, Sulej T, Niedźwiedzki G. 2009. The taxonomy and anatomy of rauisuchian archosaurs from the Late Triassic of Germany and Poland. *Acta Palaeontologica Polonica* **54**: 221–230.

21. **Butler RJ**, Barrett PM, Nowbath S, Upchurch P. 2009. Estimating the effects of the rock record on pterosaur diversity patterns: implications for hypotheses of bird/pterosaur competitive replacement. *Paleobiology* **35**: 432–446.

20. Barrett PM, **Butler RJ**, Wang X-L, Xu X. 2009. Cranial anatomy of the iguanodontoid ornithopod *Jinzhousaurus yangi* from the Lower Cretaceous Yixian Formation of China. *Acta Palaeontologica Polonica* **54**: 35–48.

19. **Butler RJ**, Sullivan RM. 2009. The phylogenetic position of the ornithischian dinosaur *Stenopelix valdensis* from the Lower Cretaceous of Germany: implications for the early fossil record of Pachycephalosauria. *Acta Palaeontologica Polonica* **54**: 21–34.

18. **Butler RJ**, Barrett PM, Kenrick P, Penn MG. 2009. Diversity patterns amongst dinosaurs and plants during the Cretaceous: implications for hypotheses of dinosaur/angiosperm co-evolution. *Journal of Evolutionary Biology* **22**: 446–459.

17. **Butler RJ**,Barrett PM, Kenrick P, Penn MG. 2009. Testing co-evolutionary hypotheses over geological timescales: interactions between Mesozoic non-avian dinosaurs and cycads. *Biological Reviews* **84**: 73–89.

16. **Butler RJ,** Zhao Q. 2009. The small-bodied ornithischian dinosaurs *Micropachycephalosaurus hongtuyanensis* and *Wannanosaurus yansiensis* from the Late Cretaceous of China. *Cretaceous Research***30**: 63–77.

2008

15. Barrett PM, **Butler RJ**, Edwards NP, Milner AR. 2008. Pterosaur distribution in time and space: an atlas. *Zitteliana B* **28**: 61–107.

14. **Butler RJ**, Upchurch P, Norman DB. 2008. The phylogeny of the ornithischian dinosaurs. *Journal of Systematic Palaeontology* **6**: 1–40.

13. **Butler RJ**, Porro LB, Norman DB. 2008. A juvenile skull of the primitive ornithischian *Heterodontosaurus tucki* from the 'Stormberg' of South Africa. *Journal of Vertebrate Paleontology* **28:** 702–711.

12. **Butler RJ**, Goswami A. 2008. Body size evolution in Mesozoic birds: little evidence for Cope's rule. *Journal of Evolutionary Biology* **26**: 1673–1682.

11. **Butler RJ**, Barrett PM. 2008. Palaeoenvironmental controls on the distribution of Cretaceous herbivorous dinosaurs. *Naturwissenschaften* **95**: 1027–1032.

10. **Butler RJ**, Galton PM. 2008. The 'dermal armour' of the Wealden dinosaur *Hypsilophodon*: a reappraisal. *Cretaceous Research***29**: 636–642.

9. Chen J, **Butler RJ**, Jin L. 2008. New material of large-bodied ornithischian dinosaurs, including an iguanodontian ornithopod, from the Quantou Formation (middle Cretaceous: Aptian–Cenomanian) of Jilin Province, northeastern China. *Neues Jahrbuch für Geologie und Paläontologie, Abhandlungen* **248**: 309–314.

8. Barrett PM, **Butler RJ**, Novas FE, Moore-Fay S, Moody JM, Clark JM, Sanchez-Villagra MR. 2008. Dinosaur remains from the La Quinta Formation (Lower or Middle Jurassic) of the Venezuelan Andes. *Paläontologische Zeitschrift* **82**: 163–177.

2005–2007

7. **Butler RJ**, Smith RMH, Norman DB. 2007. A primitive ornithischian dinosaur from the Late Triassic of South Africa, and the early evolution and diversification of Ornithischia. *Proceedings of the Royal Society B* **274**: 2041–2046.

6. Norman DB, **Butler RJ**, Maidment SCH. 2007. Reconsidering the status and affinities of the ornithischian dinosaur *Tatisaurus oehleri* Simmons, 1965. *Zoological Journal of the Linnean Society* **150**: 865–874.

5. **Butler RJ**, Upchurch P. 2007. The problem of highly incomplete taxa and the phylogenetic relationships of the theropod dinosaur *Juravenator starki*. *Journal of Vertebrate Paleontology***27**: 253–256.

4. Corfe IJ, **Butler RJ**. 2006. Comment on 'A Well-Preserved *Archaeopteryx* Specimen with Theropod Features'. *Science* **313**:1238. (doi:10.1126/science.1130800)

3. **Butler RJ**, Porro LB, Heckert AB. 2006. A supposed heterodontosaurid tooth from the Rhaetian of Switzerland and a reassessment of the European Late Triassic record of Ornithischia (Dinosauria). *Neues Jahrbuch für Geologie und Paläontologie, Monatshefte* **10**: 613–633.

2. Barrett PM, **Butler RJ**, Knoll F. 2005. Small-bodied ornithischian dinosaurs from the Middle Jurassic of Sichuan, China. *Journal of Vertebrate Paleontology* **25**: 823–834.

1. **Butler RJ.** 2005. The 'fabrosaurid' ornithischian dinosaurs of the Upper Elliot Formation (Lower Jurassic) of South Africa and Lesotho. *Zoological Journal of the Linnean Society* **145**: 175–218.

Expertise

Dinosaurs, vertebrate palaeontology, fossils