

# MATTHEW FORREST

Date of birth: 22/11/1983  
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## RESEARCH EMPLOYMENT

- 2011-present: Post-doctoral researcher at Biodiversity and Climate Research Centre (BiK-F), Frankfurt am Main, in the field of terrestrial biosphere modelling and scientific programming. Research topics include:
  - Development of process-based fire modelling with LPJ-GUESS-SPITFIRE.
  - Modelling vegetation-fire-herbivore interactions.
  - Coupling LPJ-GUESS vegetation model to the EMAC atmospheric and circulation model.
  - Modelling future impacts of climate and land use change on the terrestrial biosphere.
  - Studying climate-vegetation interactions across a range of past time scales.
  - Development of software tools for analysing vegetation model output (R package DGVMTools).
- 2005-2010: PhD candidate with the University of Glasgow in the field of experimental particle physics. Most research performed at DESY, Hamburg (2006-2009) and included:
  - Experimental particle physics including analysis of large datasets, development of computer simulations and detector and hardware tasks.

## ADVANCED EDUCATION

- 2005-2010 Ph.D. Experimental Particle Physics, University of Glasgow, UK
- 2001-2005 M.Sci. Physics and Mathematics, 2:1, University of Glasgow, UK

## COMPUTING SKILLS

- Languages: C++, FORTRAN, L<sup>A</sup>T<sub>E</sub>X, R, Python, Bash
- Operating Systems: GNU/Linux and MS Windows
- Libraries and applications: LPJ-GUESS, R spatial packages, CDO, NCO, MS Office/OpenOffice

## PEER- REVIEWED PUBLICATIONS

- Quantitative assessment of fire and vegetation properties in simulations with fire-enabled vegetation models from the Fire Model Intercomparison Project, Hantson S., ..., **Forrest M.**, ... *et al.*  
*Geoscientific Model Development* 13(7):3299-3318 (2020)
- Global vegetation patterns of the past 140,000 years, Allen J. R. M., **Forrest M.**, ... *et al.*  
*Journal of Biogeography* 47(10):2073-2090 (2020)
- Vegetation biomass change in China in the 20th century: An assessment based on a combination of multi-model simulations and field observations, Song X., ..., **Forrest M.**, ... *et al.*  
*Environmental Research Letters* 15(9) 09402 (2020)
- Global ecosystems and fire: Multi-model assessment of fire-induced tree-cover and carbon storage reduction, Lasslop G., ..., **Forrest M.**, ... *et al.*  
*Global Change Biology* 26(9):5027-5041 (2020)
- Including vegetation dynamics in an atmospheric chemistry-enabled general circulation model: linking LPJ-GUESS (v4.0) with the EMAC modelling system (v2.53),

- Forrest M.**, Tost H., Lelieveld J. and Hickler T.  
*Geoscientific Model Development* 13(3):1265-1309 (2020)
- Fire hazard modulation by long-term dynamics in land cover and dominant forest type in Eastern and Central Europe,  
Feurdean A., ..., **Forrest M.**, ... *et al.*  
*Biogeosciences* 17:1213-1230 (2020)
  - Pronounced and unavoidable impacts of low-end global warming on northern high-latitude land ecosystems,  
Ito A., ..., **Forrest M.**, ... *et al.*  
*Environmental Research Letters* 15(4) 044006 (2020)
  - Historical (1700-2012) global multi-model estimates of the fire emissions from the Fire Modeling Intercomparison Project (FireMIP),  
Li F., ..., **Forrest M.**, ... *et al.*  
*Atmospheric Physics and Chemistry* 19(19):12545-12567 (2020)
  - Response of simulated burned area to historical changes in environmental and anthropogenic factors: a comparison of seven fire models,  
Teckentrup L., ..., **Forrest M.**, ... *et al.*  
*Biogeosciences* 16:3883-3910 (2019)
  - Emergent relationships with respect to burned area in global satellite observations and fire-enabled vegetation models,  
Forkel M., **Forrest M.**, ... *et al.*  
*Biogeosciences* 16(1):57-79 (2019)
  - Effect of changing vegetation and precipitation on denudation Part 1: Predicted vegetation composition and cover over the last 21 thousand years along the Coastal Cordillera of Chile,  
Werner C., **Forrest M.**, ... *et al.*  
*Earth Surface Dynamics* 6(4):829-858 (2018)
  - Historic global biomass burning emissions for CMIP6 (BB4CMIP) based on merging satellite observations with proxies and fire models (1750-2015),  
van Marle M., ..., **Forrest M.**, ... *et al.*  
*Geoscientific Model Development* 10(09):3329-3357 (2017)
  - A human-driven decline in global burned area,  
Andela N., ..., **Forrest M.**, ... *et al.*  
*Science* 356(6345):1356 (2017)
  - The Fire Modeling Intercomparison Project (FireMIP), phase 1: Experimental and analytical protocols with detailed model descriptions,  
Rabin S., ..., **Forrest M.**, ... *et al.*  
*Geoscientific Model Development* 10(03):1175-1197 (2017)
  - The status and challenge of global fire modelling,  
Hantson S., ..., **Forrest M.**, ... *et al.*  
*Biogeosciences* 13(11):3359-3375 (2016)
  - The stable hydrogen isotopic composition of sedimentary plant waxes as quantitative proxy for rainfall in the West African Sahel,  
Niedermeyer E., **Forrest M.**, ... *et al.*  
*Geochimica et Cosmochimica Acta* 184 (2016): 55-70
  - Low CO<sub>2</sub> required to maintain seasonal and open vegetation during the Late Miocene,  
**Forrest M.**, Eronen J.T, Utescher T., Knorr G., Stepanek C., Lohmann G. & Hickler T.  
*Climate of the Past* 11(12):1701-1732 (2015)
  - Potential impact of large ungulate grazers on African vegetation, carbon storage and fire regimes,  
Pachzelt, A. **Forrest M.**, Rammig A., Higgins S. & Hickler T.  
*Global Ecology and Biogeography* 24(9):991-1002 (2015)

- Measurement of isolated photon production in deep inelastic *ep* scattering, ZEUS Collaboration (**M. Forrest** lead analyst and author)  
*Physics Letters B 687 (2010) 16-25*

## SELECTED TALKS

- Using remote sensing data to improve coupled fire-vegetation models, *GINKGO Workshop, 28-29 October 2020, Online*
- Enhancing the Modular Earth System Model (MESSy) with biosphereprocesses from LPJ-GUESS, *EGU General Assembly 2014, 27 April-2 May 2014, Vienna, Austria*
- Project 3: Modelling past, present and future distribution of biomes and species in th Yunann biodiversity hotspot, *Yunnan Biodiversity Hotspot Symposium, Dresden, 3 April 2016*
- Combining process-based modelling with the fossil record: Results from the late Miocene, *The Yunnan Biodiversity Hotspots - Its history and future threats, 6 August 2015, Kunming, Chia*
- Climate Change Impacts on Turkish Vegetation, *EGU General Assembly 2014, held 27 April-2 May 2014, Vienna, Austria*
- Prompt-photon production in DIS, *DIS 2009, 29 April 2009, Madrid*
- Prompt photons at HERA, *HERA/LHC Workshop 13 May, 2007, DESY, Hamburg*

## SELECTED POSTERS

- Enhancing the Modular Earth System Model (MESSy) with biosphereprocesses from LPJ-GUESS, *EGU General Assembly 2018, 8-13 April 2018, Vienna, Austria*

## TRAINING SCHOOLS

- Paleon Summer School: Assimilating Long-Term Data into Ecosystem Models *12-18 August, 2012, University of Notre Dame Environmental Research Center, Land O'Lakes, WI.*
- European Earth System and Climate Modelling School - E2SCMS *1-12 June 2012, Kos, Greece*
- 1st TERRABITES Training School on Land Biosphere Modeling *8-10 February, 2012, Frascati, Italy*
- COST FP0603 Spring School 2011 "Modeling Forest Ecosystems" *9-13 May 2011, Kaprun, Austria*