

Daniel James Bower (Dan J. Bower)

CONTACT INFORMATION	Caltech Geophysics Division, MC 252-21 Pasadena, CA 91125	office: (626) 395-6971 e-mail: dan@caltech.edu
SUMMARY OF QUALIFICATIONS	Highly motivated and communicable scientist/researcher with a focus on multiphysics modeling and 4-D data synthesis and analysis, historically in the solid-Earth sciences. My PhD specialized in the dynamic regime and mineral physics of the Earth's interior through the advancement and application of numerical models and parallel computing methods. This research included international collaboration, community-based software development, and presentations to Caltech donors, academic peers, and the general public. My undergraduate experience provided a rigorous background in geophysical field methods and analysis techniques devised for petroleum exploration and interrogation of the shallow subsurface. At the British Petroleum Institute (Univ. of Cambridge) I explored challenges in engineering physics and applied turbulent plume theory and small-scale laboratory experiments to understand natural ventilation flows. Research from this laboratory resulted in the development and commercialization of a low energy ventilation system by a spin out company. As a student ambassador to both fellow graduate students and Caltech I have championed several causes through dialogue and debate with a variety of audiences and worked as a team leader to enable other students to advance common goals of the graduate community.	
EMPLOYMENT AUTHORIZATION	British citizen (US permanent resident)	
RESEARCH INTERESTS	Geodynamics; geophysical fluid dynamics; solid-Earth processes; geophysical fieldwork, data acquisition and processing; seismology; numerical modeling; parallel computing; natural ventilation and energy efficient building design.	
EDUCATION	California Institute of Technology , Pasadena, CA, USA	
	<i>Doctor of Philosophy, Geophysics</i>	expected 2012
	<i>Master of Science, Geophysics</i>	2008
	University of Cambridge (BP Institute) , Cambridge, UK	
	<i>Master of Philosophy, Fluid flow in industry and the environment</i>	2005
	University of Durham , Durham, UK	
	<i>Bachelor of Science with honours, Geophysics</i>	2004
PUBLICATIONS	Bower, D.J. and M. Gurnis (2012), High bulk modulus structures in the lower mantle from dynamic Earth models with paleogeography, in preparation.	
	Sun, D., D.V. Helmberger, J.M. Jackson, R.W. Clayton and D.J. Bower (2011), Rolling hills of primordial material on the core-mantle boundary, <i>Nature Geosci.</i> , submitted.	
	Bower, D.J., M. Gurnis, J.K. Wicks, and J.M. Jackson (2011), A geodynamic and mineral physics model of a solid-state ultralow-velocity zone, <i>Earth Planet. Sci. Lett.</i> , 303, 193–202, doi:10.1016/j.epsl.2010.12.035.	
	Gurnis, M., M. Turner, S. Zahirovic, L. DiCaprio, S. Spasojević, R.D. Müller, J. Boyden, M. Seton, V.C. Manea, and D.J. Bower (2011), Plate tectonic reconstructions with continuously closing plates, <i>Comput. Geosci.</i> , in press.	
	Bower, D.J., M. Gurnis, J.M. Jackson, and W. Sturhahn (2009), Enhanced convection and fast plumes in the lower mantle induced by the spin transition in ferropericlase, <i>Geophys. Res. Lett.</i> , 36, L10306, doi:10.1029/2009GL037706.	
	Sun, D., D. Helmberger, S. Ni, and D. Bower (2009), Direct measures of lateral velocity variation in the deep Earth, <i>J. Geophys. Res.</i> , 114, B05303, doi:10.1029/2008JB005873.	
	Bower, D.J., C.P. Caulfield, S. Fitzgerald, and A.W. Woods (2008), Transient ventilation dynamics following a change in strength of a point source of heat, <i>J. Fluid Mech.</i> , 614, 15–37, doi:10.1017/S0022112008003479.	

SELECTED
ABSTRACTS

Bower, D.J., and M. Gurnis (2008), Transient slabs and plumes in the lower mantle in compressible models with the post-perovskite phase transition, *EOS Trans. AGU*, 89(53), Fall Meet. Suppl., Abstract DI41A-1741.

Bower, D.J., M. Gurnis, J.M. Jackson, D. Sun, and D.V. Helmberger (2008), Compressible geodynamic modeling of slab-remnants beneath Central America and the African LLVS, *International workshop: Transport properties of the lower mantle*, Yunishigawa, Japan.

Bower, D.J., E. Tan, D. Sun, M. Gurnis, and D.V. Helmberger (2008), Dynamics of large-scale lower mantle seismic structure elucidated through computational models, plate evolution, and mineral physics, *33rd International Geological Congress*, Oslo, Norway.

Sun, D., D.J. Bower, and D.V. Helmberger (2007), Detection of diffraction patterns at the edge of the African Superplume, *EOS Trans. AGU*, 88(52), Fall Meet. Suppl., Abstract S11B-0559.

HONOURS AND
AWARDS

Engineering and Physical Sciences Research Council scholarship 2004
Chevron Prize for the best undergraduate geophysics dissertation at the Univ. of Durham 2004

LEADERSHIP
POSITIONS

Vice-Chair of the Graduate Student Council (Caltech) 2008–2009 and 2010–2011
Co-organizer of the Dix Seismo Lab seminar series (Caltech) 2008–2009
Graduate Student Council, Board of Directors (Caltech) 2007–2011
President of Caltech Salsa Club 2007–2009
External Events Secretary, Churchill College (Cambridge) 2004–2005

PROFESSIONAL
EXPERIENCE

California Institute of Technology, Pasadena, CA, USA

Teaching Assistant

- Applied geophysics seminar and field course
- Geodynamics
- Mineral physics of Earth's interior

Institute Service

- Presentations to donors with formal and informal interaction
- Graduate student advisory member to faculty and trustee committees
- Co-organizer of student recruitment and orientation events
- Assisted with laboratory tours at alumni day

PROFESSIONAL
MEMBERSHIPS

American Geophysical Union (AGU)

PROGRAMMING

Proficient with Python, L^AT_EX 2_ε, Matlab, Generic Mapping Tools (GMT)
Familiar with C, Fortran, HTML, Visualization Toolkit (VTK), XML

SCIENTIFIC
SOFTWARE

GPlates, Paraview, Seismic Analysis Code (SAC)

REFEREES

Dr Michael Gurnis

Director, Seismological Laboratory
John E. and Hazel S. Smits Professor of Geophysics
California Institute of Technology
Pasadena, CA 91125, USA
phone: *available on request*
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Dr Jennifer M. Jackson

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California Institute of Technology
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Dr Donald V. Helmberger

Smits Family Professor of Geophysics
and Planetary Science
California Institute of Technology
Pasadena, CA 91125, USA
phone: *available on request*
e-mail: *available on request*

Dr Colm Caulfield

Senior Lecturer, BPI and DAMTP
Fellow of Churchill College
BP Institute, Bullard Laboratories
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