Veronica J. Bray

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Education

PhD in Planetary Science - 2004 to 2008, Imperial College London, UK.
"Impact Crater Formation on the Icy Satellites" (Supervisors: G. S. Collins and J. V. Morgan)
MSci Planetary Science, Valedictorian & 1st Class - 2000 to 2004, University College London, UK.
MSci: "Meander geometry of venusian canali" (Supervisors: A. P. Jones, K. T. Pickering)
BSc: "Origin and morphological evolution of palimpsests" (Supervisor: J. E. Guest)

Research Experience

Associate Staff Scientist (Dec 2011 – Present)
Lunar and Planetary Laboratory/University of Arizona, Tucson, AZ.
Research Associate (Sept 2008 – Dec 2011)
Advisors: Alfred McEwen and H. Jay Melosh, University of Arizona, Tucson, AZ.
Visiting Scientist (Jan 2009 - Jan 2010)
Collaborating with Paul Schenk, Lunar and Planetary Institute, Houston, TX.
Visiting International Scholar (Feb - Dec 2006)
Advisor: Elizabeth Turtle, Lunar and Planetary Laboratory, Tucson, AZ.
Chicxulub Seismic Experiment Team Member
December 2005 to January 2006, Yucatan, Mexico.

Teaching and Supervisory Experience

Adjunct Lecturer, Fall 2011 and 2012, University of Arizona, Tucson, AZ.
- Teaching PTYS-214 Astrobiology to an 80 person undergraduate class
- Composed full curriculum, homework/labs and exams.

Co-supervisor of graduate students, December 2008 - Present, University of Arizona.
- Designed research projects, directed research and manuscript writing.
- Co-Supervisor of LPL graduate students Catherine Elder (with Jay Melosh) and Corwin Atwood-Stone (with Alfred McEwen).

Tutoring for GSCE & A-level math and science, Oct 2007 – Sept 2008, Imperial Tutors, UK.
- Taught students in small groups/individually with lesson and homework plans based on the National Curriculum. Intensive exam-time classes and advice on exam/revision techniques.

Demonstrator for Undergraduate Courses, Autumn Term 2007, Imperial College London, UK.
- Physics for Geoscientists (~50 students), Computing Skills for Geologists (~20 students).
- Available to Undergraduate students during classes and in practical sessions for discussion and explanation of course material.

Fieldtrip Demonstrator for Undergraduate Mapping, Sept 2005, Imperial College London, UK.
- One of 7 personnel responsible for ensuring the safety of 65 undergraduate students.
- Responsible for unsupervised teaching 8 students about the geological processes occurring in the area of the Urra Basin, Spain, and how to create detailed field notes/maps
- Conducted one-on-one tutorials each day to ensure continuing assessment of their work.
- Responsible for evaluating and marking the final term projects for more than 10 students; the grades assigned counted towards their undergraduate degree.

Publications

Bray, V. J. (2013) Multiple entries (central peak crater, peak-ring crater, central pit crater, crater wall, crater rim, canali, impact structure) In: Hargitai H, Kereszturi A (eds): Encyclopedia of planetary landforms and other surface features. Springer. ISBN 978-1-4614-3133-6 (in review).

Bray, V. J, . G. S. Collins, J. V. Morgan and H. J. Melosh. Hydrocode simulation of Ganymede and Europa cratering trends. Submitted to Icarus.

Helfenstein, P., Thomas, P. C., Veverka, J., Burns, J. A., Roatsch, T., Giese, B., Wagner, R., Denk, T., Neukum, G., Turtle, E. P., **Bray, V. J.,** Perry, J., Rathbun, J. and C. C. Porco. Tectonism and Terrain Evolution on Enceladus. *Icarus.* In Review.

Neish, C. D., R.L. Kirk, R.D. Lorenz, **V.J. Bray**, P. Schenk, B. Stiles, E. Turtle, K. Mitchell, A. Hayes, Cassini RADAR Team (2013). Topography of craters on Titan. Icarus 233(1):82-90.

Bray, V. J., C. Atwood-Stone, and A. S. McEwen (2012), Investigating the transition from central peak to peak-ring basins using central feature volume measurements from the Global Lunar DTM 100m, *Geophys. Res. Lett.* 39:L21201.

Elder, C. M., **V. J. Bray,** H. J. Melosh (2012). The theoretical plausibility of central pit formation via melt drainage. Icarus 221:831–843.

Tornabene, L. L., G. R. Osinski, A. S. McEwen, J. M. Boyce, **V. J. Bray**, C. M. Caudill, J. A. Grant, S. Mattson, and P. J. Mouginis-Mark (2012). Widespread crater-related pitted materials on Mars: Further evidence for the role of target volatiles during the impact process. *Icarus*, **220**:348-368.

Bray, V. J., P. M. Schenk, H. J. Melosh, J. V. Morgan, G. S. Collins. Ganymede crater dimensions – implications for peak and pit formation and development. (2012) Icarus 217:115-129.

Bray, V. J., L. L. Tornabene, L. Keszthelyi, A. S. McEwen, B. R. Hawke, T. Giguere, S. Kattenhorn, W. Garry, B. Rizk, C. Caudill, L. R. Gaddis, C. van der Bogert (2010). New insight into lunar impact melt mobility from the LRO Camera. *Geophys. Res. Lett.* doi:10.1029/2010GL044666.

Collins, G. C., M. Bland, **V. J. Bray** and 24 others (2010). Ganymede science questions and future exploration. White paper submitted as part of the 2010 planetary decadal survey.

Banks, M. E., Bryne, S., Galla, K. G. , Murray, B. C., McEwen, A. S., **Bray, V. J.,** Fishbaugh, K. E., Dundas, C. M., Herkenhoff, K. E., Murray, B. C., and the HiRISE Team (2010), Crater Population and Resurfacing of the Martian North Polar Layered Deposits, *Journal of Geophysical Research.*115. doi:10.1029/2009JE003523

Reufer, A., N. Thomas, W. Benz, S. Byrne**, V. Bray,** C. Dundas and M. Searls (2010). Models of high velocity impacts into dust-covered ice: Application to Martian northern lowlands. *Planetary and Space Science*, 58 (10):1160-1168.

Dundas , C. M., L. P. Keszthelyi, **V. J. Bray,** and A. S. McEwen (2010), Role of material properties in the cratering record of young platy‐ridged lava on Mars, *Geophys. Res. Lett.*, *37*, L12203, doi:10.1029/2010GL042869.

Bray, V. J., (2009). Impact Crater Formation on the Icy Galilean Satellites. Ph. D. Thesis, Imperial College London, United Kingdom.

Bray, V. J., G. S. Collins, J. V. Morgan and P. M. Schenk (2008). The Effect of Target Properties on Crater Morphology: Comparison of Central Peak Craters on the Moon and Ganymede, *Meteoritics and Planetary Science,* 43 (12): 1979-1992.

Waltham, D., K. T. Pickering, and **V. J. Bray** (2007), Particulate gravity currents on Venus, *J. Geophys. Res*., 113, E02012, doi:10.1029/2007JE002913.

Bray V. J., D. B. J. Bussey, R. C. Ghail, A. P. Jones, K. T. Pickering (2007), Meander geometry of Venusian canali: Constraints on flow regime and formation time, *J. Geophys. Res.,* 112, E04S05, doi:10.1029/2006JE002785.

Mission Involvement

- HiRISE Associate Science Team Member
- LROC Associate Science Team Member and Targeting Action Team Member
- Submitted science exploration targets for both LROC and HiRISE between 2008 – 2012

Professional Activities

- Staff Scientist Representative to Faculty, Lunar and Planetary Lab (June 2012 – Present)
- Lunar and Planetary Science Conference Program Committee Member (2011 and 2012)
- NASA grant proposal review panel member (2009 and 2012).
- External reviewer for NASA grant proposals (2009, 2010, 2011)
- Panelist and invited speaker at the LRO Science Targeting Meeting (June 2009)
- Reviewer for MAPS (2009), Icarus (2008, 2011, 2012) and Journal of Geophysical Research (2011)
- Reviewer for the books "Science of Solar System Ices" (Edited by J. Castillo and others), "Impact Cratering: Processes and Products" (G. Osinski and E. Pierrazzo Eds).

Honors and Awards

- NASA Group Achievement Award to the HiRISE Team, 2011
- NASA Group Achievement Award to the LRO Team, 2010
- Janet Watson Departmental Scholarship, 2004 – 2007
- European Space Agency (ESA) student scholarship, 2006
- Dean's Award (*Valedictorian*) 2004 in Planetary Science, University College London
- Planetary Science Prize for Academic Excellence, University College London, 2001

Education and Public Outreach

- PSI contractor to produce meteorite and impact melt kits for K12 teacher training (ongoing, 2012)
- Invited public speaker at the catastrophe/extinctions themed TusCon 39 (November, 2012), Tucson Amateur Astronomy Association (October, 2012), the University of Arizona's MSL focused Summer Science Saturday (July 2012), the Society for Women Engineers (UofA undergraduate group) (April, 2012), Sun Vista Retirement Community Astronomy Club (August 2009).
- Replying scientist for the "Ask Astro" section of Astronomy Magazine (October Edition, 2012)
- Interviewed for the Tucson Weekly and Arizona Daily Star (May and July 2012)
- Impact demonstrations with Maria Schuchardt at Yuri's night at the Pima Air and Space Museum.
- Caption writer and image preparation for a HiRISE picture 'coffee table' book (Summer, 2011)
- Featured Scientist in the UK's 'Astronomy Now' Magazine (August 2010)
- Featured Scientist in the UK's 'Starlight' Magazine for children and young persons (February 2009)
- Interviewed for Astronomy Now's featured article on Impact Cratering (February 2009)
- Invited seminar-series speaker, Imperial College (August 2007, February 2005), the Southampton Oceanography Centre (November 2005) and University College London (January 2005).
- Invited speaker at the Technical Presentation Skills Course hosted by the Graduate School of Engineering and Physical Sciences at Imperial College (Autumn 2005 and 2006).