Ivy S. Curren

University of California Los Angeles
595 Charles Young Drive East, Slichter Hall 3839
Los Angeles, CA 90095-1567
Phone: 315.725.9116 • Fax: 310.825.2779 • E-mail: iscurren@epss.ucla.edu
Website: http://ivyscurren.wordpress.com/

Education

Ph.D. Geology *in progress*
University of California Los Angeles, CA
Adviser: An Yin (UCLA)
Committee Members: David Jewitt (UCLA), David Paige (UCLA), Vijay Gupta (UCLA), Robert Pappalardo (JPL)
Dissertation Title: Physical Analog Modeling as a Tool for Investigating Planetary Tectonics: Insights into the Kinematic, Dynamic and Thermal Processes of Shear Deformation on Terrestrial and Icy Bodies in the Solar System

B.S. Geology 2006
University of Miami, FL
Adviser: Harold Wanless

Professional Experience

Manager/Director's Assistant, UCLA Institute for Planets & Exoplanets (iPLEX) 2011 – present

- Established and launched iPLEX, a multi -disciplinary, -departmental and -institutional entity on the UCLA campus
- Organized and aided in the development of a Memorandum of Understanding between JPL and UCLA allowing collaborative planetary science, including periodic research workshops
- Developed, maintain and create content for the iPLEX website (planets.ucla.edu), including an up-to-date calendar of all planetary seminars and activities occurring in the Los Angeles area
- Self-publish the iPLEX annual catalog containing full-length written-from-interview articles showcasing planetary research at UCLA
- Organized and conducted multiple large-scale (20-100 attendees) planetary-related internationally-recognized conferences and workshops, including an interactive virtual "without walls" conference in collaboration with the NASA Ames Astrobiology program (The Present-Day Habitability of Mars Conference)
- Organizer of iPLEX Lunch (weekly seminar series at UCLA)
- Wrote and awarded several grant proposals for both the institute as a whole and individual initiatives within the institute
- Improved existing and developed new planetary science Education and Public Outreach program, with tasks including organizing record numbers of on-campus and off-campus school/group visits, presentations to teacher networks (e.g., LASTN), development and coordination of large (5000+ attendees) outreach events such as UCLA's "Exploring Your Universe", creation of online application and database of all outreach events and a volunteer hub providing student volunteers with materials and resources for outreach activities, and developing teaching resources such as instructional and educational demonstrations and "How-To" guides
- Manage all administrative and accounting operations for the institute
- Organized new center (iPLEX Learning Laboratory) for education and outreach development, learning and storage; includes an online system of filmed demonstrations with both instructional and educational components, known as the Physical Demonstrations Data Library (PDDL)
- Developed a new UCLA undergraduate student course with one paid Teaching Assistant position, which focuses on outreach activities and communicating science to the public

Field Geophysicist, NAEVA Geophysics Inc., Charlottesville, VA 2008 – 2009

- Acted as Site Geologist/Team Leader overseeing environmental and munitions remediation geophysical field investigations for multiple clients in site locations within and outside of the United States.
- Managed crew, activity and production completion, and quality control of several geophysical instruments including multi-sensor EM61-MK2 electromagnetic coils equipped with GPS and/or local data positioning equipment, seismic refractors, gradiometers and magnetometers.
- Conducted multiple experimental surveys using prototype electromagnetic instruments in a collaborative effort with the Department of Defense to advance detection and identification methods of unexploded ordnance.

Field Geophysicist, NAEVA Geophysics Inc., Congers, NY 2006 – 2008

- Performed subsurface detection surveys in both urban and rural locations using cable locating equipment and ground penetrating radar.
- Produced proposal quotes for clients prior to fieldwork and professional geophysical reports after fieldwork was completed.
- Managed all environmental aspects of a construction site in a former oil refinery in lower Manhattan, NY; utilized photoionization detection and air quality equipment to monitor for airborne volatile organic compounds and directed waterproofing activities for the new building.

Research Experience

UCLA Tectonics Laboratory Manager, University of California Los Angeles 2013 – present

- Plan operations and experiments in the UCLA Tectonics Laboratory, which consists of a precision-cut multi-walled gear-driven tectonic experimental "sandbox" apparatus
- Troubleshoot and operate apparatus hardware (including gears, thermal couples, and materials) and software (including LinCode system operation coding, automated camera software, and thermal couple software)
- Design experiments that simulate tectonic processes on Earth and other planetary bodies
- Develop and improve the quality of laboratory with additional equipment and software, and create modifications useful for both teaching and research
- Developed an improved version of the UC Davis-designed Augmented Reality Sandbox (ARS), which has both educational and research applications
- Manage seven undergraduate student laboratory assistants

Research Assistant, University of California Los Angeles 2010 – 2012

- Assisted in UCLA Professor Peter Bird's research activities involving his neotectonic model, NeoKinema, in relation to plate boundaries and seismic hazard maps
- Designed and built an analog model for performing strike-slip fault experiments

Sedimentology Laboratory Assistant, University of Miami 2003 – 2005

- Assisted in quantifying sand size distribution and characteristic type grains (i.e., quartz vs. foraminifera) for an anti-beach renourishment study and campaign in Broward County, South Florida.
- Operated sedimentology equipment such as large mechanically operated sifters and scanning electron microscopes.

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Teaching Experience

Teaching Assistant Consultant, University of California Los Angeles 2012 – present

- Improved upon existing and developed new curriculum to teach incoming University of California Los Angeles, Department of Earth, Planetary, and Space Sciences graduate students how to be effective teaching assistants.
- Worked directly with and administered pedagogy-based lessons to new graduate students in order to develop good teaching practices.
- Acted as new-graduate-student mentor, answering questions and providing support to those students in need.

Teaching Assistant, University of California Los Angeles

- Earthquakes (EPSS 8) Sept.–Dec. 2009
- Solar System and Planets (EPSS 9) Jan.–March 2010, 2011
- Oceanography (EPSS 15) April – June 2011
- Teaching in Earth, Planetary, and Space Sciences (EPSS 495) Sept.–Dec. 2012, 2013, 2014

Field Experience

Field work along San Andreas, Carrizo Plain section	March 2015
UCLA Origin of Plate Tectonics Course, SW United States	February 2015
UCLA Advanced Mapping Course, Eureka and Death Valley, California	March 2012
UCLA Sedimentary Basins Course, Ridge Basin, California	May 2010
UCLA Geologic Mapping Course, Point Dume, CA	September 2009
Feld mapping in Montgomery Botanical Center, Florida	August 2003 – June 2006
Field mapping on Big Island, Hawaii	March 2006
University of Miami Summer Field, Newfoundland and Labrador, Canada	June 2005 – July 2005
Field mapping in Aguadilla and Boqueron, Puerto Rico	March 2005
Field mapping in the Uinta Mountains, Colorado	November 2004

Awards and Honors

Teaching Assistant Consultant, University of California Los Angeles, CA	Sept. – Dec. 2014
UCLA Department of Earth, Planetary, and Space Sciences Service Award	September 2014
Awarded full proposal amount for Office of Instructional Development Instructional Improvement Grant to create the Physical Demonstrations Digital Library, University of California Los Angeles, CA	June 2014
Awarded full proposal amount for Office of Instructional Development Instructional Improvement Grant to improve the Central Asian Tectonics Laboratory, University of California Los Angeles, CA	June 2014
Teaching Assistant Consultant, University of California Los Angeles, CA	Sept. – Dec. 2013
Teaching Assistant Consultant, University of California Los Angeles, CA	Sept. – Dec. 2012
Excellence in Teaching, University of California, Los Angeles, CA	September 2010

Distinguished Geophysicist, NAEVA Geophysics, Charlottesville, VA — December 2008

Dean's List, University of Miami, FL — 2003 – 2006

Professional Societies

American Geophysical Union — 2010 – present

Southern California Earthquake Society — 2009 – present

Geological Society of America — 2005 – present

Professional Service

Served as Executive Secretary on the inaugural proposal review panel for NASA's Planetary Data Archiving, Restoration, and Tools Program, Dallas, TX, February 1-6, 2015

Member/Student Director of the Outreach Committee within the Department of Earth, Planetary and Space Sciences, University of California, Los Angeles, CA, 2014 – present

Co-Chair of "Exploring Your Universe" development and organizational committee, University of California Los Angeles, CA, 2011 – present

Presented "Exploring Your Universe" Activities and Funding request to UCLA Dean of Physical Sciences and Development Officers; secured >$27k funding for event, University of California Los Angeles, August 7, 2014

Presented UCLA Science Outreach program activities to the UCLA Meteorite Gallery Advisory Committee, University of California Los Angeles, June 5, 2014

Presented UCLA Science Outreach program activities to the Los Angeles Science Teachers' Network at The Willows Community School, Culver City, CA, May 16, 2014

Served as Executive Secretary on a Proposal Review Panel for NASA's Planetary Geology and Geophysics Program, Baltimore, MD, September 15 – 20, 2013

Member of graduate student focus group for communication and image development for the College of Letters and Sciences, University of California, Los Angeles, CA, August 12, 2013

Member of image development team, Department of Earth, Planetary and Space Sciences, University of California, Los Angeles, CA, 2013

Educational outreach participant at "TwentyWonder: A Carnival for the Mind", Los Angeles, CA, July 13, 2013

UCLA-JPL outreach event UCLA graduate student representative, Jet Propulsion Laboratory, Pasadena, CA, April 24, 2013

Organizer and Participant - JPL@UCLA Planetary Research Collaboration Day, University of California, Los Angeles, CA, June 11, 2012

Volunteer Teaching Assistant for UCLA class, "Earth without the Moon", field trip – Cabrillo Aquarium and State Beach, San Pedro, CA, March 5, 2011

Fall Quarter student assistant for UCLA Department of Earth and Space Sciences Colloquium series, September – December 2011

Volunteer surveyor for the Inner Cabrillo Beach Marine Life Survey, San Pedro, CA, June 6, 2011

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Research Interests

- Interpretation of planetary surfaces using multiple types of data, models and research techniques
- Fault mechanics and kinematics, rheology, lithospheric strength profiles, lithosphere-crust interaction, dynamic processes of tectonic deformation with respect to tectonic styles and evolution of terrestrial planets and icy satellites
- Kinematic evolution and mechanics of transform and strike-slip fault systems on terrestrial and icy solar system bodies
- Application of scaled analog modeling and numerical simulations to planetary tectonics
- Role of volatiles in tectonics and geomorphology on terrestrial and icy solar system objects
- Lunar volcanic processes, including viscosity of lunar lavas and their movement in relation to topographic depressions and craters
- Martian tectonics and underlying implications for planetary evolution and astrobiology
- Combining theoretical, experimental and observations to develop cohesive framework for the range of dynamic processes operating (or previously operating) in the solar system
- The interaction and resulting surface expressions of cratering on planetary surfaces with active volcanic and tectonic processes, with emphasis on understanding (divergent?) cratering rates in the inner and outer solar system
- Developing laboratory experiments that "ground truth" remote sensing measurements for potential or active space missions

Refereed Publications

Curren, I.S., and Bird, P. (2014). Formation and suppression of strike-slip fault systems, *Pure and Applied Geophysics Special Volume: Properties and Processes of Crustal Fault Zones*, (ed. Ben-Zion, Y.), 1-20, doi: 10.1007/s00024-014-0826-7.

Non-refereed Publications

Curren, I.S., and DeRose, K. (2013), UCLA Planets: 2013 – 2014 Edition, *Institute for Planets and Exoplanets*, Los Angeles, CA, 35p.

Abstracts/Posters and Presentations

Curren, I.S., Paige, D.A., and Esturas, L. (2016). An impact model for the origin of rocky surfaces and melt deposits at the antipode of Tycho crater. Abstract #2756 (oral presentation), *Lunar and Planetary Science Conference XLVII*, The Woodlands, Texas, 21-25 March.

Curren, I.S., Paige, D.A., Esturas, L., and Russell, P. (2016). An impact model for the origin of deposits at the antipode of Tycho crater. *Lunar Reconnaissance Orbiter Diviner Team Meeting*, Maui Economic Development Center, Kihei, HI, 23 February

Curren, I.S., Paige, D.A., Jögi, P., and Esturas, L. (2015). An impact melt origin for Tycho antipode deposits. Abstract #P53B-2111, 2015 Fall Meeting, AGU, San Fransisco, Calif., 14-18 Dec.

Curren, I.S., Vican, L., Sitarski, B., and Jewitt, D.C. (2015). Exploring Your Universe at UCLA: Steps to developing and sustaining a large STEM event. Abstract #ED43A-0872, 2015 Fall Meeting, AGU, San Fransisco, Calif., 14-18 Dec.

Curren, I.S. (2015). Recent observations of Pluto and its Moons from New Horizons. *UCLA iPLEX Lunch*, University of California Los Angeles, CA, 25 September.

Curren, I.S. (2015). Honey, I shrunk the geology: Using scaled laboratory models to investigate planetary tectonics. *Joint JPL-UCLA Planetary Science Workshop*, University of California Los Angeles, CA, 27 May.

Curren, I.S., and Yin, A. (2015). The versatility of tectonic analog modeling: From moons to classrooms and everything in between. *2015 Analog Modeling of Tectonics Workshop*, University of Massachusetts Amerherst, Amherst, MA, 13-15 March.

Curren, I.S., and Jewitt, D.J. (2015). Embedding effective science communication practices into undergraduate education. Abstract #2952, 2015 Lunar and Planetary Science Conference, The Woodlands, TX 16-20 March.

Curren, I.S., and Yin, A. (2015). Likely suspects for water-vapor plume eruptions on icy satellites. Abstract #2924, 2015 Lunar and Planetary Science Conference, The Woodlands, TX 16-20 March.

Curren, I.S., Yin, A., and Pappalardo, R.T. (2014). Fault formation and evolution on icy satellites as a result of bidirectional cyclical shear: Insights from physical analog experiments, Abstract #P43B-3992, 2014 Fall Meeting, AGU, San Fransisco, Calif. 15-19 Dec.

Curren, I.S., and Jewitt, D.J. (2014) UCLA's Institute for Planets and Exoplanets: Structuring an Education and Public Outreach Program from the Ground Up, Abstract #ED11B-3418, 2014 Fall Meeting, AGU, San Fransisco, Calif. 15-19 Dec.

Curren, I.S., (2014). Ridge, fracture, and chaos terrains on Europa: Insights from Analogue Experiments. *UCLA Planetary Science Seminar*, University of California, Los Angeles, CA, 23 October.

Jögi, P., Curren, I.S., and Paige, D.A. (2014). A ballistic/lava flow model for the Tycho antipodal deposits, *presentation*, 2014 LPSC Meeting, The Woodlands, Texas, 17-21 March.

Curren, I.S., and Bird, P. (2013). Suppression of strike-slip faults by crustal heterogeneities, Abstract #T23E-2637, 2013 Fall Meeting, AGU, San Fransisco, Calif., 9-13 Dec.

Curren, I.S., and Glesener, P., A (2013). A physical analog model of strike-slip faulting for model-based inquiry in the classroom, Abstract #ED53A-0623, 2013 Fall Meeting, AGU, San Fransisco, Calif., 9-13 Dec.

Curren, I.S., and Bird, P. (2013). Suppression of strike-slip faults by crustal heterogeneities, 2013 Annual SCEC Meeting, Palm Springs, CA, 8-11 Sept.

Glesener, G.B., Jewitt, D.J., and Curren, I.S. (2012), The Education and Public Outreach Plan for UCLA's Institute for Planets and Exoplanets, Abstract #ED51B-0890, 2012 Fall Meeting, AGU, San Fransisco, Calif., 3-7 Dec.

Submitted/In Prep for Publication

Curren, I.S., and Yin, A. A new mechanism for cycloid formation, *in prep*.

Curren, I.S., Yin, A., and Pappalardo, R.T. New insight into the role of diurnal tidal forces in ridge formation on small bodies, *in prep*.

Curren, I.S., Yin, A., Pappalardo, R.T. Kinematic evolution of shear features resulting from cyclic tidal deformation on small bodies, *in prep*.

Curren, I.S., and Yin, A. A physical model for understanding the origins of v-shaped conjugate faults on Earth, Mars, and Venus, *in prep*.

Curren, I.S., and Yin, A. Experimental observations of heat flow along developing fault systems, *in prep*.

Curren, I.S., Paige, D.A., and Russell, P. A model for rocky surfaces and melt deposits at the antipode of Tycho crater, *in prep*.