

## Christopher Crosby

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### EDUCATION

ARIZONA STATE UNIVERSITY, Tempe, AZ:

Ph.D. candidate, School of Earth and Space Exploration (Geological Sciences), Fall 2006 - present  
*Dissertation advisor:* Dr. J Ramon Arrowsmith.

Geographical Information Science (GIS) Graduate Certificate, Expected, Spring 2008

M.S. Geological Sciences, August 2006

*Thesis Title:* A geoinformatics approach to LiDAR data distribution and processing with applications to geomorphology.

*Thesis advisor:* Dr. J Ramon Arrowsmith.

WHITMAN COLLEGE, Walla Walla, WA:

B.A., Geology with Honors in Major Study, May 2000

*Honors Thesis:* Reassessment of the 1906 earthquake and paleoseismology of the San Andreas fault, Doda Ranch, Northern California

*Thesis advisors:* Dr. Carol Prentice (USGS) and Dr. Kevin Pogue (Whitman College)

### HONORS

#### GRADUATE:

The Troy L. Pewe Vision Fellowship in Quaternary Studies, Arizona State University, 2006-2007

Geological Society of America (GSA) Graduate Student Research Award: April, 2005

Arizona State University Graduate and Professional Student Association Travel Grant: December, 2004

International Lithosphere Program (ILP) young scientist travel grant: Ten years of paleoseismology in the ILP, Kaikoura, NZ: December. 2001

#### UNDERGRADUATE:

Indiana University Geologic Field Camp "Top Student Award": summer 2000

Albert Ripley Leeds Prize in Geology, Whitman College: spring 2000

Honors in Major Study, Whitman College: spring 2000

Undergraduate Honors and Academic Distinction: Whitman College: 1998-1999, 1999-2000

Sally Ann Abshire Grant for research with a professor, Whitman College: 1998-1999

### RESEARCH AND INTERNSHIP EXPERIENCE

GRADUATE RESEARCH ASSISTANT, Department of Geological Sciences

*Arizona State University, Tempe, AZ*

*fall 2003-present*

- Coordinating a team of geologists and computer scientists to build an internet-based LiDAR distribution and processing tool that utilizes Open Source GIS, web services and spatial databases.
- Conducted three field seasons of fault and geomorphic mapping in the Northern Tien Shan Mountains of Kyrgyzstan to document and describe a series of large (>M 7.8) historic thrust earthquakes.
- Exploring the application of high-resolution LiDAR topographic data to constrain differential uplift rates and distributed deformation in coastal Northern California adjacent to the San Andreas fault.

- Developed and implemented Geographic Information Systems for geologic data related to the San Andreas Fault near Parkfield, CA and the Northern Tien Shan region of Kyrgyzstan.

**INTERN/RESEARCH ASSISTANT, Western Earthquake Hazards Team**

*U.S. Geological Survey, Menlo Park, California*

*fall 2000-summer 2003*

- Participated in paleoseismic research projects on the northern San Andreas and Maacama faults in California, the South American-Caribbean plate boundary in Trinidad, the North American-Caribbean plate boundary in Puerto Rico, and the Hurricane fault in northern Arizona.
- Utilized LiDAR data, aerial photography and field observations for geomorphic mapping of marine terraces along the northern California coast. Mapping was used to study variations in coastal uplift rates and to constrain a late Pleistocene slip rate of the northern San Andreas fault. Compiled terrace mapping and imagery data into a GIS for analysis and visualization.
- Led project to gather GPS ground control points for validation of a northern San Andreas fault LiDAR dataset. Worked with representatives from USGS, NASA and the LiDAR contractor to assure that the dataset met the required technical specifications.
- Shipboard scientific party member for 5-week oceanographic cruise to investigate off-shore paleoseismic record of the northern San Andreas fault.
- Member of USGS committee tasked with evaluating field-based computer hardware and GIS software for post-earthquake response efforts.

**INTERN, High-Resolution Seismic Imaging Group, Western Earthquake Hazards Team**

*U.S. Geological Survey, Menlo Park, California*

*summer 2000*

- Participated in research project to investigate the Chesapeake Bay, VA impact crater.
- Gained experience in all aspects of high-resolution seismic imaging, including: line selection, surveying and preparation, instrument set-up, data acquisition, and data processing.

**STUDENT RESEARCHER**

*Keck Geology Consortium*

*summer 1999*

- Conducted a paleoseismic study of a segment of the northern San Andreas fault. Utilized: paleoseismic trench exposures, total station topographic surveys, and historical data to relocate past rupture of the San Andreas fault at Fort Ross, California.
- Research developed into topic of undergraduate honors thesis.

**INTERN**

*Hager Geoscience, Inc., Waltham, Massachusetts*

*summer 1998, 1999*

- Responsible for the management of a relational database of structural and lithologic geologic data gathered during the Metro West Water Supply Tunnel (MWWST) construction project.
- Assisted with subsurface geologic mapping tasks as part of the MWWST project.
- Served as field assistant on numerous geophysical surveys: ground penetrating radar, electromagnetics/resistivity, and high-resolution seismic reflection/refraction.
- Participated in seismic monitoring of tunnel boring machines and construction site blasting.

**CONTRACTING EXPERIENCE**

*C.J. Crosby and Associates, Tempe, AZ*

*2006-2007*

- Provided Geographic Information System (GIS) and figure production support for paleoseismic research performed by the Western Earthquake Hazards Team at the U.S. Geological Survey, Menlo Park, CA

- Produced GIS database to guide acquisition of GeoEarthScope LiDAR topographic data along faults within the Northern San Andreas fault system.

## TEACHING EXPERIENCE

Arizona State University, Tempe, AZ

Teaching Assistant – “Computers in Geology”, Fall 2005

Whitman College, Walla Walla, WA

Teaching Assistant – “Introduction to Geology Laboratory”, Spring, 2000

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## PUBLICATIONS

Jaeger-Frank, E., **Crosby, C.J.**, Memon, A., Nandigam, V., Arrowsmith, J R., Conner, J., Altintas, I., and Baru, C., A Three Tier Architecture for LiDAR Interpolation and Analysis, *Lecture Notes in Computer Science*, Volume 3993, Apr 2006, p. 920-927, DOI: 10.1007/11758532\_123.

Korjenkov, A. M., Arrowsmith, J R., **Crosby, C.**, Mamyrov, E., Orlova, L. A., Povolotskaya, I. E., Tabaldiev, K., Direct seismogenic destruction of the Kamenka medieval fortress, northern Issyk-Kul region, Tien Shan, *Journal of Seismology*, Special Issue on Archeoseismology, DOI 10.1007/s10950-006-9029-8.

Toké, N.A., J R. Arrowsmith, J.J. Young, **C.J. Crosby**, 2005, Paleoseismic implications for fault behavior along the Parkfield segment of the San Andreas Fault (SAF), *In Press BSSA Special Issue on the 2004 Parkfield Earthquake*.

**Crosby, C. J.**, 2004, Digital database of faulting accompanying the 1966 Parkfield, California, earthquake: U.S. Geological Survey Open-File Report 2004-1437.

**Crosby, C.J.**, and Carson, R.J., 1999, The Geology of Steamboat Rock, Grand Coulee, WA: *Washington Geology*, vol. 27, no. 2/3/4, p. 3-8.

## THESES

**Crosby, C.J.**, A Geoinformatics Approach to LiDAR Data Distribution and Processing with Applications to Geomorphology: Tempe, Arizona, Arizona State University, M.S. Thesis.

**Crosby, C.J.**, Reassessment of the 1906 earthquake and paleoseismology of the San Andreas fault, Doda Ranch, Northern California: Walla Walla, Washington, Whitman College, Undergraduate Honors Thesis.

## ABSTRACTS

**Crosby, C.J.**, Frank, E., Arrowsmith, J R., Nandigam, V., Kim, H.S., Conner, J., Memon, A., Baru, C., Alex, N., Enabling Access to High-Resolution LiDAR Topography Through Cyberinfrastructure-Based Data Distribution and Processing, Presented at *Cyberinfrastructure for the Geosciences Workshop*, Moscow, Russia, June 25-26, 2007 [INVITED]

**Crosby, C.J.**, Frank, E., Arrowsmith, J R., Nandigam, V., Kim, H.S., Conner, J., Memon, A., Baru, C., Alex, N., The GEON LiDAR Workflow as a Distribution Pathway for Community LiDAR

Topography Datasets, *Geoinformatics 2007*, San Diego, CA, May 17-18, 2007.

**Crosby, C.J.**, Arrowsmith, J R., Frank, E., Nandigam, V., Kim, H.S., Conner, J., Memon, A., Baru, C., Enabling Access to High-Resolution LiDAR Topography through Cyberinfrastructure-Based Data Distribution and Processing, The Annual Meeting of the American Association of Geographers, Abstract of 103rd Annual Meeting, San Francisco, CA, 2007.

**Crosby, C.J.**, Arrowsmith, J R., Frank, E., Nandigam, V., Kim, H.S., Conner, J., Memon, A., Alex, N., Baru, C., The GEON LiDAR Workflow as a Distribution Pathway for Forthcoming GeoEarthScope LiDAR Datasets, 2007 Earthscope Annual Meeting, Monterey, CA.

Arrowsmith, J R. and **Crosby, C.J.**, GeoEarthscope and related topographic LiDAR datasets in the classroom: lessons about geomorphology, digital elevation models, and cyberinfrastructure, 2007 Earthscope Annual Meeting, Monterey, CA.

**Crosby, C.J.**, Arrowsmith, J R., Frank, E., Nandigam, V., Kim, H.S., Conner, J., Memon, A., Baru, C., Enhanced Access to High-Resolution LiDAR Topography through Cyberinfrastructure- Based Data Distribution and Processing, *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract IN41C-04, 2006.

Kim, H., Arrowsmith, J R., **Crosby, C.J.**, Jaeger-Frank, E., Nandigam, V., Memon, A., Conner, J., Badden, S.B., Baru, C., An Efficient Implementation of a Local Binning Algorithm for Digital Elevation Model Generation of LiDAR/ALSM Dataset, *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract G53C-0921, 2006.

Arrowsmith, J R., Campbell, B., **Crosby, C.**, Raleigh, D., Tectonic geomorphology and earthquake geology of the 1857 reach of the San Andreas Fault: a new look from Airborne Laser Swath Mapping, *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract G53C-0916, 2006.

**Crosby, C.J.**, Arrowsmith, J.R., Baru, C., Meertens, C., 2006, A National Framework For Community LIDAR Datasets, Geological Society of America *Abstracts with Programs*, Vol. 38, No. 7, p. 550

**Crosby, C.J.**, Arrowsmith, J R., Conner, J., Frank, E., Memon, A., Nandigam, V., Wurman, G., Baru, C., A geoinformatics-based approach to the distribution and processing of integrated LiDAR and imagery data to enhance 3D earth systems research, Presented at the Geological Society of America Penrose Conference: "Unlocking 3D Earth Systems — Harnessing New Digital Technologies to Revolutionize Multi-Scale Geologic Models", Durham, UK, September, 2006.

**Crosby, C.J.**, Arrowsmith, J R., Frank, E., Nandigam, V., Kim, H.S., Conner, J., Memon, A., Baru, C., An Internet-based Tool for Accessing and Processing the Southern San Andreas (B4) LiDAR / ALSM Dataset, Southern California Earthquake Center Annual Meeting, Proceedings and Abstracts, v. 16, Palm Springs, CA, September, 2006.

**Crosby, C.J.**, Conner, J., Frank, E., Arrowsmith, J R., Memon, A., Nandigam, V., Wurman, G., Baru, C., Community Services for Serving LiDAR Data, Presented at the *International Workshop of Cyberinfrastructure for Geosciences (IWCG2006)*, Beijing, China, July 21-23, 2006. [INVITED]

- Crosby, C.J.**, Conner, J., Frank, E., Arrowsmith, J R., Memon, A., Nandigam, V., Wurman, G., Baru, C., The GEON LiDAR Workflow: An Internet-Based Tool for the Distribution and Processing of LiDAR Point Cloud Data, *Geoinformatics 2006*, Reston, VA May 11, 2006.
- Crosby, C.J.** and Arrowsmith, J R., Utilization of LiDAR / ALSM Point Cloud Data for Earthquake Geology and Tectonic Geomorphic Mapping, Analysis, and Visualization, Presented at the 100th Anniversary Earthquake Conference, San Francisco, CA April 18-21, 2006.
- Arrowsmith, J R. and **Crosby, C.J.**, New Looks at Active Faults: Tectonic Geomorphology using Airborne Laser Swath Mapping (ALSM), Presented at the 100th Anniversary Earthquake Conference, San Francisco, CA April 18-21, 2006.
- Crosby, C.J.**, Conner, J., Frank, E., Arrowsmith, J R., Memon, A., Nandigam, V., Wurman, G., Baru, C., The GEON LiDAR Workflow: An Internet-Based Tool for the Distribution and Processing of LiDAR Point Cloud Data, *2006 UNAVCO Science Workshop*, Denver, CO.
- Crosby, C.J.**, Conner, J., Frank, E., Arrowsmith, J R., Memon, A., Nandigam, V., Wurman, G., Baru, C., A Geoinformatics Approach to LiDAR / ALSM Data Distribution, Interpolation, and Analysis, *Eos Trans. AGU*, 86(52), Fall Meet. Suppl., Abstract H31E-1349, 2005.
- Arrowsmith, J R., **Crosby, C.J.**, Korjenkov, A.M., Mamyrov, E., Povolotskaya, I.E., Surface rupture of the 1911 Kebin (Chon-Kemin) earthquake, Northern Tien Shan, Kyrgyzstan, *Eos Trans. AGU*, 86(52), Fall Meet. Suppl., Abstract T51F-05, 2005. [presenting author]
- Crosby, C.J.**, Conner, J., Frank, E., Arrowsmith, J R., Memon, A., Nandigam, V., Wurman, G., Baru, C., A Geoinformatics Approach to LiDAR / ALSM Data Distribution, Interpolation and Analysis, Southern California Earthquake Center Annual Meeting, Proceedings and Abstracts, v. 15, Palm Springs, CA, September, 2005.
- Crosby, C.J.**, Arrowsmith, J R., Conner, J., Wurman, G., LiDAR Data Distribution, Interpolation and Analysis on the GEON Grid – Beyond Proof of Concept, GEON Annual Meeting, San Diego, CA, 2005.
- Crosby, C. J.**, Arrowsmith, J R., Oldow, J. S., Prentice, C. S., Exploiting LiDAR for Regional Morphologic Correlation and Dating of Wave-cut and Fault-Controlled Landforms, *Eos Trans. AGU*, 85 (47), Fall Meet Suppl., Abstract G13B-0810, 2004.
- Crosby, C.J.**, Arrowsmith, J.R., LiDAR Data Distribution, Interpolation and Analysis on the GEON Grid – A Conceptual Framework, *Geological Society of America Annual meeting*, Paper No. 60-6, 2004.
- Arrowsmith, J R., **Crosby, C. J.**, Korjenkov, A. M., Mamyrov, E., Povolotskaya, I. E., Surface rupture along the Chon Aksu and Aksu (eastern) segments of the 1911 Kebin (Chon-Kemin) earthquake, Tien Shan, Kyrgyzstan, *Eos Trans. AGU*, 85 (47), Fall Meet. Suppl., Abstract T14C-02, 2004.
- Toké, N. A., Arrowsmith, J R., **Crosby, C. J.**, Young, J. J., Paleoseismology and Tectonic Geomorphology: Results From the Parkfield, CA Segment of the San Andreas Fault, *Eos Trans. AGU*, 85 (47), Fall Meet. Suppl., Abstract T13A-1336, 2004.

- Crosby, C.J.**, Arrowsmith, J.A., Computational challenges of LiDAR data processing and analysis – A GEON solution, Southern California Earthquake Center Annual Meeting, Proceedings and Abstracts, v. 14, Palm Springs, CA, September, 2004.
- Toké, N. A., Arrowsmith, J R., **Crosby, C. J.**, Young, J. J., Preliminary paleoseismology results from the Parkfield, CA Segment of the San Andreas Fault, Southern California Earthquake Center Annual Meeting, Proceedings and Abstracts, v. 14, Palm Springs, CA, September, 2004
- Prentice, C.S., **Crosby, C.J.**, Harding, D.J., Haugerud, R.A., Merritts, D.J., Gardner, T., Koehler, R.D., and Baldwin, J.N., 2003, Northern California LIDAR Data: A Tool for Mapping the San Andreas Fault and Pleistocene Marine Terraces in Heavily Vegetated Terrain, *Eos Trans. AGU*, 84 (46), Fall Meet. Suppl., Abstract G12A-06, 2003.
- Crosby, C.J.**, Prentice, C.S., Weber, J., Ragona, D., Paleoseismic evidence for Holocene Faulting, Central Range Fault, South American-Caribbean Plate Boundary, *Seismological Society of America Annual Meeting*, 2003.
- Stenner, H.D., **Crosby, C.J.**, Dawson, T.E., Amoroso, L., Pearthree, P.A., Lund, W.R., Evidence for variable slip from the last three surface-rupturing earthquakes along the Central Hurricane Fault, Arizona, *Seismological Society of America Annual Meeting*, 2003.
- Fenton, C.H., Prentice, C.S., Benton, J., **Crosby, C.J.**, Sickler, R.R., Stephens, T.A., 2002, Paleoseismic evidence for prehistoric earthquakes on the northern Maacama fault, Willits, CA, *Eos Trans. AGU*, 83 (47), Fall Meet. Suppl., Abstract S11B-1143, 2002.
- Prentice, C.S., Mann, P., Weber, J., Peña, L.R., and **Crosby, C.**, 2002, Paleoseismology in the Caribbean: A review of studies in Hispaniola, Puerto Rico and Trinidad: EOS, Transactions of the American Geophysical Union, v. 83.
- Crosby, C.J.**, Prentice, C.S., Weber, J., and Hengesh, J.V., 2001, Paleoseismic and geomorphic evidence for Quaternary fault slip on the Central Range and Los Bajos faults, South American-Caribbean plate boundary, Trinidad: Ten Years of Paleoseismology in the ILP: Progress and Prospects, 17-21 December, 2001, Kaikoura, New Zealand, Programme and Abstracts. Institute of Geological and Nuclear Sciences Information Series 50, p. 50-51.
- Prentice, C.S., Langridge, R., Baldwin, J.N., Dawson, T., Merritts, D.J., and **Crosby, C.J.**, 2001, Paleoseismic and Quaternary tectonic studies of the San Andreas Fault between Shelter Cove and Fort Ross, Northern California, USA: Ten Years of Paleoseismology in the ILP: Progress and Prospects, 17-21 December, 2001, Kaikoura, New Zealand, Programme and Abstracts. *Institute of Geological and Nuclear Sciences Information Series 50*, p. 52-53.
- Prentice, C.S., Weber, J., and **Crosby, C.J.**, 2001, Paleoseismic and Geomorphic Evidence for Quaternary Fault Slip on the Central Range Fault, South American-Caribbean Plate Boundary, Trinidad [abs]: EOS, Transactions of the American Geophysical Union, v. 82, p. F928.
- Crosby, C.J.**, 2000, Reassessment of the 1906 earthquake and paleoseismology of the San Andreas

fault, Doda Ranch, northern California: Thirteenth Keck Research Symposium in Geology, Proceedings, Whitman College, Walla Walla, WA, p. 136-139.

### **PROFESSIONAL ACTIVITIES**

Co-Organizer: "Processing and analysis of GeoEarthScope and other community LiDAR topography datasets", Geological Society of America Short Course, October 2007.

Invited Instructor: Cyberinfrastructure Summer Institute for Geoscientists at San Diego Supercomputer Center, August 13-17, 2007. Presented: "The GEON LiDAR Workflow: Cyberinfrastructure-Based Data Distribution and Processing".

Co-Organizer: "LiDAR Data: Management, Processing, and Access" Special Interest Group, 2006 UNAVCO Science Workshop, Denver, Colorado. March 14, 2006.

Participant: Cyberinfrastructure Summer Institute for Geoscientists at San Diego Supercomputer Center. August 16-20, 2004.

### **PROPOSALS**

Co-author of "GeoEarthScope LIDAR Project - LiDAR point cloud data processing and delivery workflow" PIs: J Ramon Arrowsmith and Chaitan Baru. Submitted as subcontract to GeoEarthScope from UNAVCO. Successfully funded for 2007-2009.

Primary author of "Application of LiDAR data to constraining a late Pleistocene slip rate and vertical deformation of the Northern San Andreas Fault, Fort Ross to Mendocino, California: Collaborative research between Arizona State University and the U.S. Geological Survey." PI: J Ramon Arrowsmith. Submitted to the National Earthquake Hazard Reduction Program (NEHRP). Successfully funded for FY06.

Primary author of "Application of ALSM Data to Regional Morphologic Landform Correlation and Constraining San Andreas Fault-Driven Vertical Coastal Deformation, Bodega Bay, California." Submitted to the National Center for Airborne Laser Mapping Seed Money Proposal call in 2005 but not funded.