

## CURRICULUM VITAE OF NATHANIEL A. LIFTON

### Education

- 1997 Ph.D., Geosciences, University of Arizona  
Dissertation Title: A new extraction technique and production rate estimate for *in situ* cosmogenic  $^{14}\text{C}$  in quartz  
Advisor: William B. Bull
- 1985 B.A., Geological Sciences, University of California at Santa Barbara (with highest honors)

### Honors and Awards

- 1989 Chevron USA Graduate Student Fellowship (1989)
- 1985 Charles W. Woodhouse Award for Outstanding Undergraduate Geology Student, University of California, Santa Barbara (1985)
- 1983 Edwin V. Van Amringe Award for Outstanding Geology Student, Pasadena City College, Pasadena, CA (1983)

### Professional Experience

- 2002–Present Associate Research Scientist, Department of Geosciences, University of Arizona, and Arizona Accelerator Mass Spectrometry Facility
- 1997–2002 Research Associate, Department of Geosciences, University of Arizona, and NSF-Arizona Accelerator Mass Spectrometry Facility
- 1990–1997 Research Assistant, Department of Geosciences, University of Arizona
- 1985–1990 Geologist, Dames & Moore, Santa Barbara, CA, Irvine, CA, and Tucson, AZ
- 1984–1985 Laboratory Assistant, Department of Geological Sciences, University of California, Santa Barbara: Cathy Busby, Supervisor
- 1984 Surveying Field Assistant, Department of Geological Sciences, University of California, Santa Barbara: Arthur Sylvester, Supervisor

### Research Interests

*Geochronology, Geochemistry* – Develop methods for using *in situ* cosmogenic nuclides (CNs) to derive surface exposure ages and erosion rates for process-oriented geomorphic studies. Use *in situ* cosmogenic  $^{14}\text{C}$  (*in situ*  $^{14}\text{C}$ ) to calibrate variations of *in situ* CN production rates with altitude and latitude. Investigate the effects of millennial-scale geomagnetic variability on CN production rates in time and space. Apply *in situ*  $^{14}\text{C}$  in concert with long-lived CNs such as  $^{10}\text{Be}$ ,  $^{26}\text{Al}$ , and  $^{36}\text{Cl}$  to investigate complex exposure scenarios, particularly involving glacial advance and retreat. Refine techniques for extracting *in situ*  $^{14}\text{C}$  from terrestrial materials.

**Publications**

- Schaefer, J.M. and Lifton, N., 2006. Cosmogenic Nuclide Dating/Methods, in Elias, S.A., *ed.*, Encyclopedia of Quaternary Science, Elsevier, Amsterdam, pp. 412-419.
- Miller, G.H., Briner, J.P., Lifton, N.A., and Finkel, R.C., 2006. Limited ice-sheet erosion and complex exposure histories derived from in situ cosmogenic  $^{10}\text{Be}$ ,  $^{26}\text{Al}$ , and  $^{14}\text{C}$  on Baffin Island, Arctic Canada. *Quaternary Geochronology* **1**: 74-85.
- Lifton, N.A., Bieber, J.W., Clem, J.M., Duldig, M.L., Evenson, P., Humble, J.E., and Pyle, R., 2005. Addressing solar modulation and long-term uncertainties in scaling in situ cosmogenic nuclide production rates: *Earth and Planetary Science Letters* **239**(1-2): 140-161.
- Matmon, A., Shaked, Y., Porat, N., Enzel, Y., Finkel, R., Lifton, N., Boarretto, E., and Agnon, A., 2005. Landscape development in a hyperarid sandstone environment along the margins of the Dead Sea fault: Implications from dated rock falls: *Earth and Planetary Science Letters*, **240**: 803-817.
- Pigati, J. S., and Lifton, N. A., 2004, Geomagnetic effects on time-integrated cosmogenic nuclide production with emphasis on in-situ  $^{14}\text{C}$  and  $^{10}\text{Be}$ : *Earth and Planetary Science Letters* **226**: 193-205.
- Jull, A.J.T., Burr, G.S., McHargue, L.R., Lange, T.E., Lifton, N.A., Beck, J.W., Donahue, D.J., and Lal, D., 2004, New frontiers in dating of geological, paleoclimatic and anthropological applications using accelerator mass spectrometric measurements of  $^{14}\text{C}$  and  $^{10}\text{Be}$  in diverse samples: *Global and Planetary Change* **41**: 309-323.
- Jull, A.J.T., Pigati, J., Lifton, N.A., McHargue, L.R., Burr, G.S., Lal, D., and Waters, M.R., 2002. The potential for using in-situ cosmogenic  $^{14}\text{C}$  and  $^{10}\text{Be}$  for dating of artifacts and archaeological materials. 9<sup>th</sup> International Conference on Accelerator Mass Spectrometry, Nagoya, Japan, Sept 2002, p. 42
- Lifton, N.A., Jull, A.J.T., and Quade, J., 2001. A new extraction technique and production rate estimate for in situ  $^{14}\text{C}$  in quartz. *Geochimica et Cosmochimica Acta* **65**(12): 1953-1969.
- Desilets, D., Zreda, M., and Lifton, N.A., 2001. Comment on "Scaling factors for production rates of in situ produced cosmogenic nuclides: A critical reevaluation" by Tibor J. Dunai. *Earth and Planetary Science Letters* **188**: 283-287.
- Lifton, N.A., Jull, A.J.T., and Quade, J., 1996. Progress in extracting *in situ*-produced cosmogenic  $^{14}\text{C}$  from quartz: Implications for integrated late Quaternary production rates. *Radiocarbon*, **38**: 77-78.
- Jull, A.J.T., McHargue, L.R., Lifton, N.A., Phillips, W.M. and Quade, J., 1996. Production of  $^{14}\text{C}$  and  $^{10}\text{Be}$  in the atmosphere and on the Earth's surface. *Radiocarbon*, **38**: 160-161.
- Jull, A.J.T., Lifton, N., Phillips, W.M. and Quade, J., 1994. Studies of the production rate of cosmic-ray produced  $^{14}\text{C}$  in rock surfaces. *Nuclear Instruments and Methods in Physics Research B*, **92**: 308-310.
- Lifton, N.A. and Chase, C.G., 1992. Tectonic, climatic and lithologic influences on landscape fractal dimension and hypsometry: Implications for landscape evolution in the San Gabriel

Mountains, California, in, R.S. Snow and L. Mayer (Editors), *Fractals in Geomorphology. Geomorphology*, **5**: 77-114.

**Abstracts:**

- Lifton, N., 2005, Toward using millennial-scale geomagnetic field models to constrain in situ cosmogenic nuclide production rate variations (*invited*), *Eos. Trans. AGU*, 86(52), Fall Meet. Suppl., Abstract GP24A-05.
- Lifton, N., 2005, Can models of millennial-scale geomagnetic field variations be improved for in situ cosmogenic nuclide applications? (*invited*), 10th Scientific Assembly of the International Association of Geomagnetism and Aeronomy, Toulouse, France, July 18-29, Abstract IAGA2005-A-01167.
- Lifton, N., Pigati, J., Jull, A.J.T., Quade, J., 2005, Extracting in situ cosmogenic  $^{14}\text{C}$  from olivine: Significance for the CRONUS-Earth Project, *Eos. Trans. AGU*, 86(52), Fall Meet. Suppl., Abstract U23B-06.
- Zreda, M., and Lifton, N., 2005, *In-situ*  $^{14}\text{C}$  and  $^{36}\text{Cl}$ : A tool for analyzing complex exposure and burial histories of glacial landscapes, *Geol. Soc. Am. Abstracts with Programs*, Vol. 37, No. 7, p. 399, Abstract 178-6.
- Pigati, J.S., Lifton, N.A., Jull, A.J.T., and Quade, J., 2005, Experimental developments in low level  $^{14}\text{C}$  research: *Geol. Soc. Am. Abstracts with Programs*, Vol. 37, No. 7, p. 478, Abstract 216-2.
- Miller, G.H., Briner, J.P., Kaplan, M.R., Lifton, N.A., Davis, P.T., Coulthard, R., Landvik, J., Clarke, B., and Atkinson, R., 2005, Resolving the role of cold-based ice along the NE Laurentide margin: New insights from a decade of cosmogenic exposure dating: *Geol. Soc. Am. Abstracts with Programs*, Vol. 37, No. 7, p. 398, Abstract 178-1
- Lifton, N.A., Bieber, J.W., Clem, J.M., Dulig, M.L., Evenson, P., Humble, J.E., and Pyle, R., 2005, Solar modulation and scaling in situ cosmogenic nuclide production rates: *Geochimica et Cosmochimica Acta*, v. 69, no. 10, p. A166.
- Pigati, J.S., Lifton, N.A., and Desilets, D., 2005, Integrating geomagnetic records and cosmogenic nuclide production: *Geochimica Et Cosmochimica Acta*, v. 69, no. 10, p. A167.
- Schaefer, J.M., Denton, G.H., Lowell, T., Anderson, B., Rinterknecht, V., Ivy-Ochs, S., Kubik, P.W., Schluechter, C., Chinn, T., Barrell, D., Lifton, N., Jull, T., 2004, The glacial record of New Zealand's Southern Alps (*poster*), *EOS Transactions of the American Geophysical Union*, 85(47), Fall Meeting Supplement, Abstract PP33B-0921.
- Lifton, N.A., Pigati, J., Jull, A.J.T., Quade, J., Bierman, P., Stone, J. and Kober, F., 2003. Testing cosmogenic nuclide production rate scaling models using in situ cosmogenic  $^{14}\text{C}$  from surfaces at secular equilibrium. *Geochimica et Cosmochimica Acta* 67(S1): Abstracts of the 13<sup>th</sup> Annual V.M. Goldschmidt Conference, Kurashiki, Japan, A253.
- Lifton, N.A., Schaefer, J., Jull, A.J.T., Denton, G., and Schluechter, C., 2003, In situ cosmogenic  $^{14}\text{C}$  and  $^{10}\text{Be}$  dating of Holocene glacial advances in New Zealand (*abstr*), Abstracts of the 18th International Radiocarbon Conference, Wellington, New Zealand, p. 95.

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- Zreda, M., and Lifton, N., 2000. Revealing complex exposure histories of Arctic landforms using in-situ  $^{14}\text{C}$  and  $^{36}\text{Cl}$ . *Eos, Transactions, American Geophysical Union*. **81**: F24.
- Lifton, N. A., 2000. A robust model for scaling in situ cosmogenic nuclide production rates. *Geological Society of America Annual Meeting, Abstracts with Programs*. **32**: A400.
- Lifton, N. A., Jull, A. J. T., and Quade, J., 2000. A new extraction technique and production rate estimate for *in situ* cosmogenic  $^{14}\text{C}$  in quartz. *Abstracts of the 17<sup>th</sup> International Radiocarbon Conference*, Jerusalem.
- Lifton, N.A., Phillips, W., Jull, A.J.T. and Quade, J., 1993. Integrated late Quaternary production rates for *in situ*-produced cosmogenic  $^{14}\text{C}$  from Lake Bonneville shoreline features, using new extraction techniques. *EOS, Transactions of the American Geophysical Union*, **74**: 649.
- Lifton, N.A. and Jull, A.J.T., 1992. Depth distribution of *in situ*-produced cosmogenic  $^{14}\text{C}$  in sediments from the Walnut Gulch Experimental Watershed, southern Arizona. *Geological Society of America Abstracts with Program*, **24**: 121.

### **Collaborators**

Other than colleagues at the University of Arizona: John Bieber (*U. Delaware*), Paul Bierman (*U. Vermont*), Brian Borchers (*New Mexico Tech*), Jason Briner (*SUNY Buffalo*), Marc Caffee (*Purdue U.*), John Clem (*U. Delaware*), Marc Duldig (*Australian Antarctic Division*), Paul Evenson (*U. Delaware*), Daniel Farber (*U. California, Santa Cruz*), Robert Finkel (*Lawrence Livermore National Laboratory*), John Humble (*U. Tasmania*), Susan Ivy-Ochs (*ETH Zurich*), Florian Kober (*ETH Zurich*), Mark Kurz (*Woods Hole Oceanographic Institute*), Devendra Lal (*Scripps Institute of Oceanography*), Ari Matmon (*Hebrew University*), Gifford Miller (*U. Colorado*), Kunihiko Nishiizumi (*U. California Berkeley*), Lewis Owen (*U. Cincinnati*), Fred Phillips (*New Mexico Tech*), Roger Pyle (*U. Delaware*), Joerg Schaefer (*Lamont-Doherty Earth Observatory*), Janet Sisterson (*Massachusetts General Hospital*), John Stone (*U. Washington*), Terry Swanson (*U. Washington*)

### **Graduate Advisors:**

William B. Bull, Jay Quade, A.J. Timothy Jull, Clement G. Chase, Marek Zreda