

Daniel J. Morgan

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Professional Profile

As a geomorphologist, I seek to understand how landscapes change through time and how environmental changes are reflected across a landscape. To address these questions, I utilize a variety of geochronologic techniques, including exposure dating with cosmogenic nuclides (such as ^{10}Be , ^{26}Al , and ^{21}Ne) and lichenometry, which allow me to study questions about landscape evolution, the timing of geologic events, and the rates at which geomorphic processes occur. My work involves a balance of field-based studies in alpine areas and Antarctica, laboratory analysis, and numerical modeling. Additionally, I study the sustainable use of natural resources, quantifying environmental impacts using life cycle assessments, and the role of science in environmental decision making.

Education

2009, Ph.D., Geological Sciences, *University of Washington*, Seattle, WA

- * Dissertation: *Stability of unconsolidated deposits in the McMurdo Dry Valleys, Antarctica*
- * Environmental Management Graduate Certificate, 2008
- * Chevron scholarship, May 2009
- * Howard Coombs Fellowship for Excellence in Teaching, Department of Earth and Space Sciences, University of Washington, 2008
- * Richard E. Fuller Fellowship for Research, Department of Earth and Space Sciences, University of Washington, 2006
- * Graduate Student Research Award, Department of Earth and Space Sciences, University of Washington, 2005

2002, B.A. *Pomona College*, Claremont, CA

- * Double-major in Geology and Mathematics
 - * Mason L. Hill Award, Department of Geology, Pomona College, 2002
 - * Don Zenger Award, Department of Geology, Pomona College, 2002
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Appointments

2009 – Present: Senior Lecturer, Department of Earth and Environmental Sciences, Vanderbilt University

2012 – Present: Director of Undergraduate Studies, EES Department, Vanderbilt University

Spring 2007: Instructor, Program on the Environment, University of Washington

2003 – 2009: Teaching and Research Assistant, Department of Earth and Space Sciences, University of Washington

Peer Reviewed Publications (* denotes student author)

Published

- O'Neal, M. A., N. Legg, B. Hanson, **D. J. Morgan**, and A. Rothgeb* (2013). Lichenometric dating of rock surfaces in the northern Cascade Range, USA. *Geografiska Annaler*, Volume 95, Issue 3, pages 241-248, September 2013, DOI: 10.1111/geoa.12012.
- Putkonen, J., **D. J. Morgan**, and G. Balco (2012). Regolith transport quantified by braking block, McMurdo Dry Valleys, Antarctica. *Geomorphology*, 155–156: 80–87, ISSN 0169-555X, doi:10.1016/j.geomorph.2011.12.010.
- Morgan, D. J.**, J. Putkonen, G. Balco, and J. Stone (2011). Degradation of glacial deposits quantified with cosmogenic nuclides, Quartermain Mountains, Antarctica, *Earth Surface Processes and Landforms*, 36: 217-228, doi:10.1002/esp.2039.
- Morgan, D.**, J. Putkonen, G. Balco, and J. Stone (2010). Quantifying regolith erosion rates with cosmogenic nuclides ^{10}Be and ^{26}Al in the McMurdo Dry Valleys, Antarctica, *Journal of Geophysical Research*, 115, F03037, 17 PP., doi:201010.1029/2009JF001443.
- Putkonen, J. Balco, G.B., and **D. J. Morgan** (2008). Slow regolith degradation without creep determined by cosmogenic nuclide measurements in Arena Valley, Antarctica. *Quaternary Research*, 69, 242–249, doi:10.1016/j.yqres.2007.12.004.
- Putkonen, J., M. Rosales*, N. Turpen*, **D. Morgan**, G. Balco, and M. Donaldson* (2007). *Regolith transport in the Dry Valleys of Antarctica*, in Antarctica: A Keystone in a Changing World – Online Proceedings of the 10th ISAES, edited by A. K. Cooper and C. R. Raymond et al., USGS Open-File Report 2007-1047, Short Research Paper 103.

In Preparation

- Morgan, D. J.**, and J. Putkonen, (In preparation for submission spring 2014). Moraine degradation rates quantified with cosmogenic ^{10}Be . For submission to *Journal of Geophysical Research*.
- Morgan, D. J.**, S. Wernke, R. McCracken*, and M. O'Neal (In preparation for submission summer 2014). Developing a lichen growth rate curve from archaeological sites, Colca Valley, Peru. For submission to *Arctic, Antarctic, and Alpine Research*.
- Balco, G., **Morgan, D.**, and J. Putkonen (In preparation for submission fall 2014) Calculating erosion rates over multiple time scales with cosmogenic nuclides ^{26}Al , ^{10}Be , and ^{21}Ne . For submission to *Geology*.

Reports

- Morgan, D. J.**, Born, B., Cook, R., Radenovic, H., and S. Renzi, (2007). *Seattle Food System Enhancement Project: Greenhouse Gas Emissions Study*. University of Washington, Program on the Environment Certificate in Environmental Management Keystone Project, 2006-2007. City of Seattle, Department of Neighborhoods.
- Cook, R., **Morgan, D. J.**, Radenovic, H., Renzi, S., and B. Born, (2007). *Seattle Food System Enhancement Project*. University of Washington, Program on the Environment Certificate in Environmental Management Keystone Project, 2006-2007. City of Seattle, Department of Neighborhoods.

Abstracts (* denotes student author and + denotes student presenter)

Morgan, D. J., G. Balco, J. Putkonen, T. Bibby*, C. Giusti*, A. Ball*, C. Hedberg*, M. Diamond*, and K. Ringger* (2013). Cosmogenic Ne-21 exposure ages of glacial boulders constrained by local bedrock erosion rates in Ong Valley, Antarctica. *American Geophysical Union, Fall Meeting 2013*. Abstract #EP41A-0795.

Putkonen, J., C. Giusi*, E. Hoefft*, **D. Morgan**, and G. Balco (2013). Intriguing glacial flow patterns, Moraine Canyon, Antarctica. Paper No. 104-2, *2013 GSA Annual Meeting in Denver, CO (27 – 30 October 2013)*.

Putkonen, J., **D. J. Morgan**, and G. Balco (2012). Landscape degradation and regolith transport in McMurdo Dry Valleys of Antarctica. *American Geophysical Union, Fall Meeting 2012*, Abstract #EP53E-1081.

Morgan, D. J. and J. Putkonen (2012). Moraine degradation rates quantified with cosmogenic Be-10 from soil profiles in Bloody Canyon, CA. Abstract ID# 212503, *2012 GSA Annual Meeting in Charlotte, NC (4–7 November 2012)*.

van Stolk, C.* +, **D. J. Morgan**, and S. Wernke (2012) Paleoclimate applications to an archaeological site in southern Peru. Abstract ID# 212022, *2012 GSA Annual Meeting in Charlotte, NC (4–7 November 2012)*.

Putkonen, J., R. Madoff, and **D. Morgan** (2012). Do moraines degrade, what evidence do we have? Abstract ID# 211222, *2012 GSA Annual Meeting in Charlotte, NC (4–7 November 2012)*.

van Stolk, C.* +, **D. J. Morgan**, and S. Wernke (2012) Paleoclimate applications to an archaeological site in southern Peru. *Archaeological Sciences of the Americas Symposium (5 – 6 October 2012)*.

Putkonen, J., T. Bibby*, **D. Morgan**, G. Balco, C. Giusti, and R. Matheney (2012). Geomorphology and regolith erosion rates from ice-free valleys in the Southern Transantarctic Mountains. *XXXII Scientific Committee on Antarctic Research (SCAR) and Open Science Conference, July 2012*.

Grady, C.* +, and **D. J. Morgan** (2011). Modeling moraine degradation in the Sierra Nevada Mountains, California with a 1-D linear diffusion equation. *American Geophysical Union, Fall Meeting 2011*, Abstract #EP23C-0765.

McCracken, R.G.* +, **Morgan, D. J.**, and S.A. Wernke (2011). Use of archaeological sites in development of lichen growth curve, Colca Valley, Peruvian Andes. Paper No. 102-16, *2011 GSA Annual Meeting in Minneapolis, MN (9-12 October 2011)*.

Bibby, T.* +, Putkonen, J., and **D. J. Morgan** (2011). What could possibly happen in a million years? Landscape evolution in the southern Transantarctic Mountains. Paper No. 102-7, *2011 GSA Annual Meeting in Minneapolis, MN (9-12 October 2011)*.

Morgan, D. J., J. Putkonen, and G. Balco (2011). Determining rates of geomorphic processes over multiple timescales with cosmogenic nuclides Al-26, Be-10, and Ne-21 in Wright Valley, Antarctica. *11th International Symposium on Antarctic Earth Sciences*, University of Edinburgh, Scotland.

Morgan, D. J., Putkonen, J., Balco, G., and J. Stone (2009). Sublimation of ground ice and erosion of glacial deposits quantified with cosmogenic nuclides, McMurdo Dry Valleys, Antarctica. *American Geophysical Union, Fall Meeting 2009, Eos Trans. AGU, 90(52)*, Fall Meet. Suppl., Abstract #C52A-08.

- Putkonen, J., Jahraus, T., **Morgan, D.**, and G. Balco (2009). Direct quantification of current sediment transport on surfaces in varying climates, WA and ND, USA and Dry Valleys, Antarctica. *Geological Society of America, Abstracts with Programs*, Vol. 41, No. 7, p. 336.
- Balco, G., D. H. Rood, **D. Morgan**, and W. Behr (2009). Forward models of geomorphic processes used to interpret complex cosmogenic-nuclide data sets. *Geochimica et Cosmochimica Acta Supplement Proceedings of the Goldschmidt Conference*.
- Morgan, D. J.**, Putkonen, J., Balco, G., and J. Stone (2008). Colluvium erosion rates in the McMurdo Dry Valleys, Antarctic. *American Geophysical Union, Fall Meeting 2008, Eos Trans. AGU, 89(53)*, Fall Meet. Suppl., Abstract #C34B-05.
- Balco, G., Shuster, D.L., **Morgan, D.**, and J. Putkonen (2008). Combined measurements of cosmogenic Be-10, Al-26, and Ne-21 in quartz used to discern temporal changes in rates of Antarctic landscape evolution. *American Geophysical Union, Fall Meeting 2012, Eos Trans. AGU, 89(53)*, Fall Meet. Suppl., Abstract #V51H-01.
- Balco, G., Putkonen, J., **Morgan, D.**, Schaefer, J., and Winckler, G., (2008). Bedrock erosion rates in the Antarctic Dry Valleys. *Geochimica et Cosmochimica Acta, Proceedings of the Goldschmidt Conference*.
- Born, B., and **Morgan, D. J.** (2007). Urban Sustainability, Climate Change, and The Food System: Measuring Urban Food System Impacts on Greenhouse Gases. Association of Collegiate Schools of Planning, *ACSP 2007 Annual Conference*, October 18-21 in Milwaukee, Wisconsin.
- Putkonen, J., Balco, G., and **Morgan, D.** (2006). Unexpectedly rapid sediment erosion in Arena Valley, Antarctica. *Geological Society of America Abstracts with Programs*, Vol. 38, No. 7, p. 440.
- Morgan, D. J.** and Putkonen, J. (2006). Geomorphic indicators of sediment transport in the McMurdo Dry Valleys, Antarctica. *Scientific Committee on Antarctic Research (SCAR) Second Open Science Conference*, July 2006.
- Morgan, D. J.** and Putkonen, J. (2005). Sediment transport in the McMurdo Dry Valleys, Antarctica. *Geological Society of America Abstracts with Programs*, Vol. 37, No. 7, p. 304.
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Current, Pending, and Recent Support

Pending: "Collaborative Research: Clarifying the ingredients and significance of nonlocal versus local sediment transport on steepland hillslopes." Source of Support: NSF, Total Award Amount: \$182,245 (VU award), Total Award Period Covered: 8/1/2014 – 7/31/2017. Grant submitted January 16, 2014 with Co-PIs David Furbish (VU) and Josh Roering (U. of Oregon).

Pending: Member of Advisory Board and Recruitment Committee for "Team STEM: Designing STEM-supportive Learning (-to-Teach) Environments." Source of Support: NSF DRK-12, Total Award Amount: No award to DM. Grant submitted December 6, 2013 with PI Barbara Stengel (VU).

Pending: "Collaborative Research: Long Term Sublimation and Preservation of Two Separate, Buried Glacier Ice masses, Ong Valley, Southern Transantarctic Mountains." Source of Support: NSF, Total Award Amount: \$111,848 (VU award), Total Award Period Covered: 9/1/2015 – 8/31/2017. Grant resubmission in April 2014 encouraged by program manager. Co-PIs Jaakko Putkonen (UND) and Greg Balco (BGC).

Recent: Research Personnel for NSF #0838968, "Collaborative Research: Systematic Analysis of Landscape Evolution and Surface Ages in Transantarctic Mountains." No award to DM. Co-PIs Jaakko Putkonen (UND) and Greg Balco (BGC).

Projects, Collaborators, and Field Work

Antarctica: 2004-06, 2010-current, with Jaakko Putkonen (University of North Dakota) and Greg Balco (Berkeley Geochronology Center). Geomorphology, glacial history and landscape stability of Antarctic Dry Valleys.

Peru: 2010-current, with Steve Wernke (Vanderbilt University) and Michael O'Neal (University of Delaware). Glacial and environmental history of Mawchu Llacta archeological site.

Sierra Nevada, CA: 2006 - current, with Jaakko Putkonen (University of North Dakota), David Furbish (VU) and Josh Roering (UO). Quantifying sediment erosion rates on glacial moraines. The role of non-local transport in moraine evolution.

Students Supervised

Undergraduate students at Vanderbilt University

Honors Senior Thesis students

Kyle Broach, 2011-12: Bioturbation rates under sea ice, Explorer's Cove, Antarctica
Catherine Grady, 2011-12: Degradation of glacial moraines in the Sierra Nevada, CA

Summer Undergraduate Research Projects

Courtney van Stolk summer 2012: Lichenometry and cores, 4-weeks of field work in Peru
Catherine Grady, summer 2011: Hillslope modeling and 3-weeks of field work in Mono Lake, CA
Rebecca McCracken, summer 2010: Lichenometry and 3-weeks of field work in Peru

Independent and Directed Study

Carson Hedberg, fall 2013 – current: Cosmogenic nuclide analysis
Ashley Ball, spring 2013: Cosmogenic nuclide analysis
Kyle Ringger, spring 2013: Cosmogenic nuclide analysis
Michael Diamond, spring 2012: Cosmogenic nuclide analysis
Ziquan Fan, spring 2012: Life cycle assessment of smartphones
Michael Diamond, fall 2011: Glacial advance and retreat from satellite images
Rebecca McCracken, spring 2011: Lichenometry from archeological sites in Peru
Mitchell Stocky, spring 2011: Cosmogenic nuclide analysis

Graduate students

Manuel Martinez (Vanderbilt University, MS 2015 expected) – Committee member
Tyler Doane (Vanderbilt University, MS 2014 expected) – Committee member
Siobhan Fathel (Vanderbilt University, MS 2013) – Committee member
Lauren Williams (Vanderbilt University, MS 2013) – Committee member
Allison Rothgeb (University of Delaware, MS 2012) – Reader

Courses Taught

Vanderbilt University

EES 101 Dynamic Earth: Introduction to Geological Sciences, spring 2010, fall 2010, fall 2011, spring 2013, fall 2013.
EES 111 Dynamic Earth Lab, fall 2009 – spring 2012
EES 113 Oceanography Lab, fall 2009 – current
EES 210 Field Methods, May 2013 – “Maymester” course in New Zealand
EES 240 Structural Geology, each spring semester 2009 – current
Vanderbilt Visions, fall 2010 – current: mentor for first-year undergraduate students
ENVS 099 Antarctic Exploration, the Nature of Virtue, and the Search for Heroism in Modern Life, spring 2014 – seminar for first-year students

University of Washington

Instructor, Program on the Environment

ENVIR 100 Environmental Studies 100: Interdisciplinary Foundations, spring 2007
Co-taught with economics professor Yoram Bauman

Teaching Assistant, Department of Earth and Space Sciences

ESS 101 Introduction to Geological Sciences, 2003-04 (3 quarters), winter 2008
ESS 209 Geomorphological Expedition to Nepal (3-week field course in Nepal), September 2007
ESS 210 Physical Geology, spring 2005
ESS 211 Physical Processes of the Earth, fall 2006
ESS 304 Volcanoes and Glaciers of the Pacific Northwest, summer 2004
ESS 400 Field Geology (6-week field course in SW Montana), summer 2007 and 2008
ESS 426 Fluvial Geomorphology, spring 2008

Service

Vanderbilt

Director of Undergraduate Studies, Department of Earth and Environmental Sciences (2012 – current): duties include advising all undergraduate majors and minors, course scheduling, curriculum revision, and development of guidelines for senior honors thesis projects, teaching assistants, and research assistants.
Faculty sponsor for *Geoscene* (2009 – current): undergraduate club for the Earth and Environmental Sciences department.
Vanderbilt Visions, fall 2010 – current: Faculty mentor for first-year undergraduate students.
Faculty interviewer for Vanderbilt Visions, spring 2011, 2012, 2013
Vanderbilt Visions review committee, 2012-2013: member of review committee assigned by the Dean of the Commons to review Vanderbilt Visions and VUcept programming.
Academic Night faculty volunteer, fall 2013: FAQs for first-year students
Member of the Cumberland Project, Vanderbilt University’s project to develop a curriculum on environmental studies and sustainability, 2011 – current.
MOSAIC Multicultural Recruitment weekend, spring 2010 – current: Faculty lecturer and discussion leader for multicultural recruitment weekend.
Faculty sponsor for Mayfield Living and Learning Community, 2012-13.

University of Washington

Graduate Student Representative, Department of Earth and Space Sciences, 2008-09.

Graduate Student Representative, Advisory Board for the Program on the Environment, 2007-09.

This board supervised the undergraduate major in environmental studies and graduate certificate programs.

Graduate Student Representative, Steering Committee for the Environmental Management Certificate Program, Program on the Environment, 2006-09.

Community

Peer-reviewer for: *Geology*, *Global Planetary Change*, *Earth and Planetary Science Letters*.

Grant-reviewer for the National Science Foundation.

Workshops and Professional Development

"Transantarctic Mountains Science Meeting," September 23-24, 2013, University of Minnesota. This meeting brings together the broader scientific community to build multidisciplinary collaborations in the Transantarctic Mountains.

"Teaching Oceanography," June 18-20, 2013, City College of San Francisco. This workshop is part of the On the Cutting Edge professional development program for current and future geoscience faculty.

"Engineering, Sustainability, and the Geosciences," Colorado School of Mines, March 6-8, 2013. This workshop is part of the InTeGrate project for interdisciplinary teaching of geoscience for a sustainable future.

"Early Career Geoscience Faculty: Teaching, Research, and Managing Your Career," June 12-17, 2011, College of William and Mary, Williamsburg, VA. This workshop is part of the On the Cutting Edge professional development program for current and future geoscience faculty.

"Preparing for an Academic Career in the Geosciences: Workshop for Graduate Students and Post-Doctoral Fellows," July 31-August 3, 2008, National Weather Center, University of Oklahoma. This workshop is part of the On the Cutting Edge professional development program for current and future geoscience faculty.

Invited Talks, Guest Lectures and Outreach Presentations

"Contrary landscapes: Age and activity of landforms in Antarctic Dry Valleys." University of Pennsylvania, Department of Earth and Environmental Science, department seminar January 31, 2014.

"Principles of Hydraulic Fracturing." Vanderbilt University, SPEAR club, October 7, 2013.

"Research and Life in Antarctica." Vanderbilt multicultural recruitment weekend (MOSAIC) March 2010, 2011, 2012, 2013.

"Geology of Tennessee." Vanderbilt University, Wilskills Outdoor Club, October 24, 2012.

"Geomorphology of Antarctica." University of North Dakota, Department of Geology and Geological Engineering, department seminar, June 22, 2011

"Why are rivers fun to paddle?" Vanderbilt University, Wilskills Outdoor Club, February 2010

"How will Antarctica react to future climate change?" Vanderbilt University, Students Promoting Environmental Awareness and Recycling (SPEAR), November 2009

"Reconstruction of Former Glaciers." University of Washington, ESS 431: Principles of Glaciology, fall 2007, fall 2008

"Petroleum Geology." University of Washington, ENVIR 100: Interdisciplinary Foundations, fall 2007, winter 2008, fall 2008, winter 2009

“Introduction to Life Cycle Assessment.” University of Washington, URBDP 520: Quantitative Methods in Urban Design and Planning, fall 2007

“Petroleum Geology of the Arctic National Wildlife Refuge.” University of Washington, Program on the Environment, ENVIR 450: Choices and Change in the Arctic National Wildlife Refuge, summer 2005, summer 2006

“Geology of Auckland, New Zealand.” University of Washington, Program on the Environment and UW Tacoma Urban Studies, ENVIR 400: Comparative Perspectives on Cities & the Environment: Seattle, WA, Auckland, New Zealand, and Sydney, Australia, January 2006

“Antarctica: Life and Research at the Bottom of the Earth.” Dina Pigott’s 2nd grade class, Epiphany School, Seattle, WA, February 2006

“Field Work and Camp Life in Antarctica.” Yakama Tribal School, Toppenish, WA, May 2005

Professional Affiliations

American Geophysical Union

Geological Society of America

National Association of Geoscience Teachers