

Stephen Thomas Lancaster

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EDUCATION

Massachusetts Institute of Technology	Ph.D., Hydrology (Dept. Civil & Environmental Eng.)	1998
Harvard University	B.A., Physics major	1990

THESIS

A Nonlinear River Meandering Model and its Incorporation in a Landscape Evolution Model
Rafael L. Bras and Kelin X Whipple, co-supervisors (abstract and thesis at http://www.geo.oregonstate.edu/~lancasts/thesis_abstract.pdf and [.../thesis.pdf](http://www.geo.oregonstate.edu/~lancasts/thesis.pdf))

PROFESSIONAL EXPERIENCE

Associate Professor, Dept. of Geosciences, Oregon State University	2007-present
Assistant Professor, Dept. of Geosciences, Oregon State University	2001-2007
Research Associate, Dept. of Geosciences, Oregon State University	1998-2001
Research Assistant, Dept. of Civil and Environmental Engineering, MIT	1993-1998
Volunteer for Science, U.S. Geological Survey and Volunteer in the Parks, Buffalo National River	1992
Laboratory Aid, High Energy Physics Laboratory, Harvard University	1990-1991
Teaching Fellow, Physics Department, Harvard University	1990

COURSES

GEO 202 Earth Systems Science	2005–2007
Introductory course in Geosciences “core”. Revised lecture and laboratory materials in 2005. Adopted new book, lecture notes, and tests and developed some new labs in 2007. Teach in odd years.	
GEO 306 Minerals, Energy, Water, and the Environment	2002
Course meeting Science and Technology requirement in the Baccalaureate Core Curriculum.	
GEO 309 Environmental Justice	2004–
Developed and taught new course meeting Difference, Power, and Discrimination (DPD) requirement in the Baccalaureate Core Curriculum (first such course in Geosciences). Development funded by OSU DPD Course Development Grant. Teach every year.	
GEO 322 Surface Processes	2002–
Redesigned course, including lecture and laboratory materials. Laboratory manual rewritten in 2005 with additional TA funded in part by OSU L.L. Stewart Faculty Development Award. Teach every year.	

- GEO 432/532 Applied Geomorphology** 2003–
Course essentially designed from scratch in 2003 and completely revised to focus on river restoration and related issues in 2005. Focuses on collection and utilization of field data in written reports. Teach every year.
- GEO 582 Geomorphology of Forests and Streams** 2006–
Redesigned course in 2006. Teach in even years.
- GEO 699 Topics in Geomorphology** 2003
Seminar course focused on modeling in geomorphology. Taught once as overload.

GRANTS

- USGS-IWW Small Grants Program, \$24,297** 2008-2009
“The Influence of Sediment Deposition on the Emergence Success of Juvenile Salmonids,” S. Lancaster (PI) and C. May (co-PI).
- National Science Foundation, Geomorphology and Land-use Dynamics, \$18,000** 2007-2008
“Small Grant for Exploratory Research: Mapping the November 2006 Periglacial Debris Flows on Mount Hood and Mount Rainier,” A. Nolin (PI), and S. Lancaster (co-PI).
- National Science Foundation, Geomorphology and Land-use Dynamics, \$107,538** 2007-2010
“Collaborative Research: The Role of Debris Flows in Shaping Mountainous Terrain,” S. Lancaster (with G. Tucker, U. Colorado at Boulder).
- National Park Service, \$36,200** 2007-2008
“Modeling a Channel Migration Corridor for the 59-mile Segment of the Missouri National Recreation River,” S. Lancaster (PI), R. Jacobson (co-PI), T. Cole, and R. Inglis.
- Watershed Research Cooperative, Oregon State University, \$23,000** 2007-2008
“Sediment sources and sinks observed through LiDAR in Trask River Watershed Study Area,” S. Lancaster.
- National Science Foundation, Ocean Tech. & Interdisciplinary Coord., \$19,981** 2007-2008
“Evaluation of Optical Fiber Distributed Temperature Sensors (DTS) as a Tool to Constrain Heat and Mass Transport Between Sediments and the Overlying Water Column,” A. Trehu (PI), R. Haggerty, S. Lancaster, and J. Selker (co-PIs).
- National Council for Air and Stream Improvement, Inc., \$15,000** 2006-2007
“Application of the CHILD model to determine the probability of wood and sediment delivery to a critical reach,” S. Lancaster.
- Australian Research Council, AU \$1,484,016** (my share = AU \$19,000) 2006-2010
“TERRESIM: A simulation system for understanding and managing interactions between runoff, vegetation, soils and climate in a changing environment,” G. Willgoose (fellowship recipient), P. Binning, S. Lancaster, M. Kirkby, and P. Bishop (partner investigators).
- National Science Foundation, Geomorphology and Land-use Dynamics, \$289,260** 2006-2009
“Sediment Storage at the Transition Between Debris-Flow and Fluvial Processes,” S. Lancaster.
- National Science Foundation, Hydrologic Sciences, \$80,000** 2006-2009
“Heat Budget in the Hyporheic Zone of a Large, Gravel-Bed River,” S. Lancaster (PI) and R. Haggerty (co-PI).
- USDI Bureau of Land Management, \$20,474** 2005-2006
“Forest Management Effects on Peak Storm Flows and Consequent Effects on Stream Channel Morphology,” S. Lancaster.

- Oregon Department of Environmental Quality, \$61,000** 2005
 “Investigation of the Temperature Impact of Hyporheic Flow,” S. Lancaster (PI) and R. Haggerty (co-PI).
- OSU L.L. Stewart Faculty Development Award, \$2200** 2005
 “Active Learning Component for Laboratories in a Medium-Enrollment, Required Course for Geosciences Majors,” S. Lancaster.
- USDA Forest Service-OSU cooperative agreement, \$499,415** 2004-2009
 “Geomorphic response to changing water and sediment regimes,” S. Lancaster and G. Grant (USFS).
- OSU Technology Resource Fee grant, \$10,565** 2004
 “Enhanced Classroom for the Department of Geosciences,” S. Lancaster.
- OSU Undergraduate Research Innovation Scholarship Creativity, \$1000** 2003
 “Mapping valley deposit surface ages with dendrochronology,” Z. Gray (S. Lancaster, advisor).
- OSU Difference, Power, and Discrimination Curriculum Development Grant, \$3,000** 2003
 “Developing a course on environmental justice in the Department of Geosciences,” S. Lancaster.
- Northwest Academic Computing Consortium, \$10,000** 2003-2004
 “Simulating landscape evolution in the classroom with the Channel-Hillslope Integrated Landscape Development (CHILD) model,” S. Lancaster.
- Portland General Electric, \$134,000** 2002-2005
 “Impacts of removing Marmot Dam,” S. Lancaster.

RECENT COLLABORATORS

Linda Ashkenas (OSU), Rafael Bras (MIT), John Bolte (OSU), Nathan Casebeer (OSU), Quintijn Clevis (Shell), Sky Coyote (freelance), Roger Denlinger (USGS CVO), Arnaud Desitter (Oxford), Kevin Farthing (OSU), Nicole Gasparini (Tulane), Gordon Grant (USDA PNW), Stan Gregory (OSU), Roy Haggerty (OSU), Robert Jacobson (USGS CERC), Anne Jefferson (UNC-Charlotte), Gary Lock (Oxford), Christine May (JMU), Anne Nolin (OSU), John Selker (OSU), Anne Trehu (OSU), Gregory Tucker (CU-Boulder), Emily Underwood (OSU), Rose Wallick (OSU), Garry Willgoose (U. Newcastle).

STUDENTS

John Zunka, M.S., Geology	2008-present
J. Rose Wallick, Ph.D., Geology	2007-present
W. Terry Frueh, Ph.D., Water Resources Engineering	2007-present
Graysen Squeochs, M.S., Water Resources Science (with R. Haggerty)	2006-present
Nicole Czarnomski, Ph.D., Water Resources Engineering	2005-present
Emily Underwood, M.S., Geology	2005-2007
Kevin Farthing, M.S., Environmental Engineering	2005-2006
Colin MacLaren, M.S., Geography	2004-present
Anne Jefferson, Ph.D., Geology (with G. Grant, USFS)	2002-2006
Nathan Casebeer, M.S., Geology	2002-2004
J. Rose Wallick, M.S., Geology and Bioengineering	2001-2004

RECENT INVITED PRESENTATIONS AND WORKSHOPS

Meeting on thermal pollution credit trading sponsored by the Willamette Partnership, OSU, June, 2006.

Dept. Seminar, Dept. Geological Sciences, Central Washington University, Ellensburg, Washington, February, 2005.

Special seminar, College of Engineering, University of Idaho–Boise, Boise, Idaho, May, 2004.

Earth Surface Processes Research Institute, University of Arizona and U.S. Geological Survey, Science Plan Development Meeting on Quantitative Geomorphology, Tucson, Arizona, June 26-27, 2003.

North American Forest Ecology Workshop, Oregon State University, Corvallis, Oregon, June 19, 2003.

Workshop to Discuss the National Center for Airborne Laser Mapping (NCALM), sponsored by the National Science Foundation, University of Florida, Gainesville, Florida, April 24-26, 2003.

PROFESSIONAL ORGANIZATIONS

American Geophysical Union	1993-present
Society for the Advancement of Chicanos and Native Americans in Science	2003-2004
American Indian Science and Engineering Society	1993-1994

SYNERGISTIC ACTIVITIES

Temperature Total Maximum Daily Load, Willamette River, Oregon 2005-present
Made several presentations to and met with Oregon Dept. Environmental Quality, municipal clean water agencies, and other stakeholders regarding formulation of new rules for stream temperature regulation of the Willamette River, Oregon, and development of a scheme for trading pollution and restoration credits.

Developer, Channel-Hillslope Integrated Landscape Development (CHILD) Model 1996-present
One of the original group of four scientists (others, R.L. Bras, N.M. Gasparini, G.E. Tucker) that designed and programmed this modeling “toolbox” for landscape evolution at MIT and, subsequently, elsewhere. Designed and implemented algorithms for meandering over geologic time, movement of points with dynamic remeshing, debris-flow runout, and incorporation of vegetation, among others. Recently directed the development of a graphical user interface that will allow classroom use of the CHILD model.

Coastal Landscape Analysis and Modeling Study (CLAMS) 1998-present
Participate as a “PI” in this project uniting foresters, ecologists, economists, sociologists, and geomorphologists and funded by the Oregon Department of Forestry and the U.S. Forest Service’s Northwest Forest Plan. Adapted CHILD model to problems of forest-geomorphology interactions influencing aquatic habitat. Make presentations to and attend meetings with participants from federal and state agencies, local watershed councils, forest industry, and non-governmental organizations.

Difference, Power and Discrimination (DPD) Program, OSU 2001-present
Attended two workshop series for pedagogical development and incorporation of curricular materials for teaching issues of difference, power, and discrimination in the classroom. Awarded a DPD Curriculum Development Grant for the development of a “DPD” course on environmental justice in the Department of Geosciences. Developed course, GEO 309 Environmental Justice, which meets the DPD requirement in OSU’s Baccalaureate Core Curriculum.

Faculty Advisor, American Indian Science and Engineering Society, OSU Chapter 2002-present
Attend weekly meetings. Supervise and assist activities including retreats, pow-wows, and regional and

national meetings.

AWARDS AND HONORS

GE Fund Junior Faculty Coupon (\$15,000 start-up funds upon faculty appointment)	1998
American Geophysical Union Outstanding Student Paper Award, Hydrology section	1996
National Science Foundation Minority Graduate Research Honorable Mention	1993
MIT Minority Graduate Fellowship	1992-93
Parsons Fellowship, MIT	1992-93
Graduated <i>Cum Laude</i> in General Studies, Harvard University	1990
Harvard College Scholarship for academic achievement of high distinction	1988-89
National Merit Scholarship	1985-86

PUBLICATIONS (PEER-REVIEWED)

Jefferson, A., G.E. Grant, and S.T. Lancaster, 2009. Drainage development on permeable basaltic landscapes inferred from a chronosequence of overlapping shield volcanoes. *Journal of Geophysical Research – Earth Surface*, submitted manuscript.

S.T. Lancaster, E.F. Underwood, and W.T. Frueh, 2009. Sediment reservoirs at mountain stream confluences: Dynamics and effects of tributaries dominated by debris flow and fluvial processes. *Geological Society of America Bulletin*, submitted and revised manuscript.

Lancaster, S.T., 2008. Evolution of sediment accommodation space in steady-state bedrock-incising valleys subject to episodic aggradation. *Journal of Geophysical Research*, 113, F04002, doi:10.1029/2007JF000938. (http://www.geo.oregonstate.edu/~lancasts/Lancaster_2007JF000938_JGR_2008.pdf)

Lancaster, S.T., and N.E. Casebeer, 2007. Sediment storage and evacuation in headwater valleys at the transition between debris-flow and fluvial processes. *Geology*, 35(11), 1027-1030, doi:10.1130/G239365A.1. (http://www.geo.oregonstate.edu/~lancasts/Lancaster_Geology_2007.pdf, http://www.geo.oregonstate.edu/~lancasts/Lancaster_Geology_2007_Supplementary_Material.pdf)

Wallick, J.R., G.E. Grant, S.T. Lancaster, J.P. Bolte, and R.P. Denlinger, 2007. Patterns and controls on historical change in a large river, Willamette River, Oregon, USA, in *Large Rivers: Geomorphology and Management*, edited by A. Gupta, John Wiley & Sons, Ltd., Hoboken. (http://www.geo.oregonstate.edu/~lancasts/Wallick_etal_Willamette_Large_Rivers.pdf)

Clevis, Q., G. Tucker, G. Lock, S. Lancaster, N. Gasparini, A. Desitter, and R. Bras, 2006. Geoarchaeological simulation of meandering river deposits and settlement distributions: A three-dimensional approach. *Geoarchaeology: An International Journal*, 21(8), 843-874, doi:10.1002/gea.20142. (http://www.geo.oregonstate.edu/~lancasts/Clevis_EtAl_Geoarch_21_2006.pdf)

Lancaster, S.T., and G.E. Grant, 2006. Debris dams and the relief of headwater streams, *Geomorphology*, 82, 84-97, doi:10.1016/j.geomorph.2005.08.020. (special issue: The Hydrology and Geomorphology of Bedrock Rivers, edited by P.A. Carling) (http://www.geo.oregonstate.edu/~lancasts/Lancaster_Grant_debris_dams_Geomorphology_82_2006.pdf) INVITED.

Wallick, J.R., S.T. Lancaster, and J.P. Bolte, 2006. Determination of bank erodibility for natural and anthropogenic bank materials using a model of lateral migration and observed erosion along the Willamette River, Oregon, USA, *River Research and Applications*, 22(6), 631-649, doi:10.1002/

rra.925. (http://www.geo.oregonstate.edu/~lancasts/Wallick_EtAl_Bank_Erodibility_RRA_22_2006.pdf)

Clevis, Q., G.E. Tucker, S.T. Lancaster, A. Desitter, N. Gasparini, and G. Lock, 2006. A simple algorithm for the mapping of TIN data onto a static grid; applied to the stratigraphic simulation of river meandering deposits, *Computers and Geosciences*, 32(6), 749-766, doi:10.1016/j.cageo.2005.05.012. (http://www.geo.oregonstate.edu/~lancasts/Clevis_EtAl_CompGeosci_32_2006.pdf)

Lancaster, S.T., S.K. Hayes, and G.E. Grant, 2003. Effects of wood on debris flow runout in small mountain watersheds, *Water Resources Research*, 39(6), 1168, doi:10.1029/2001WR001227. (http://www.geo.oregonstate.edu/~lancasts/2001WR001227_lancaster_effwooddf.pdf)

Lancaster, S.T., and G.E. Grant, 2003. You want me to predict what? in *Prediction in Geomorphology*, edited by P.R. Wilcock and R.M. Iverson, pp. 41-50 (DOI: 10.1029/135GM04), American Geophysical Union, Washington. (http://www.geo.oregonstate.edu/~lancasts/CH4_Layout.pdf)

Lancaster, S.T., and R.L. Bras, 2002. A simple model of river meandering and its comparison to natural channels, *Hydrological Processes*, 16(1), 1-26. (http://www.geo.oregonstate.edu/~lancasts/LancasterBras2002_fmtd.pdf)

Tucker, G.E., S.T. Lancaster, N.M. Gasparini, and R.L. Bras, 2001b. The channel-hillslope integrated landscape development (CHILD) model, *Landscape Erosion and Evolution Modeling*, ed. by R.S. Harmon and W.W. Doe, III, pp. 349-388, Kluwer Academic/Plenum Publishers, New York. (<http://www.colorado.edu/geolsci/gtucker/preprints/child01nofigs.doc> and <http://www.colorado.edu/geolsci/gtucker/preprints/child01caps+figs.pdf>)

Tucker, G.E., S.T. Lancaster, N.M. Gasparini, R.L. Bras, and S.M. Rybarczyk, 2001a. An object-oriented framework for hydrologic and geomorphic modeling using triangulated irregular networks, *Computers and Geosciences*, 27(8), 959-973. (http://www.geo.oregonstate.edu/~lancasts/Tucker_EtAl_CompGeosci_27_2001.pdf)

Lancaster, S.T., S.K. Hayes, and G.E. Grant, 2001. Modeling sediment and wood storage and dynamics in small mountainous watersheds, *Geomorphic Processes and Riverine Habitat*, ed. by J.M. Dorava, D.R. Montgomery, B.B. Palcsak, and F.A. Fitzpatrick, pp. 85-102, American Geophysical Union, Washington. (http://www.geo.oregonstate.edu/~lancasts/SedWoodDynStor_fin.pdf)

REPORTS (NOT PEER-REVIEWED)

Lancaster, S., R. Haggerty, S. Gregory, K.T. Farthing, and S. Biorn-Hansen, 2005. *Investigation of the Temperature Impact of Hyporheic Flow: Using Groundwater and Heat Flow Modeling and GIS Analyses to Evaluate Temperature Mitigation Strategies on the Willamette River, Oregon*, Final Report to Oregon Dept. Environmental Quality, Oregon State University, Corvallis, 104 pp. (http://www.geo.oregonstate.edu/~lancasts/Lancaster_et_al_Hyporheic_Report_for_DEQ_Final.pdf)

Tucker, G.E., N.M. Gasparini, R.L. Bras, and S.T. Lancaster, 1999. *A 3D Computer Simulation Model of Drainage Basin and Floodplain Evolution: Theory and Applications*, Technical Report for U.S. Army Construction Engineering Research Laboratories. (<http://platte.mit.edu/~child/Lit/report99.html>)

Tucker, G., N. Gasparini, S. Lancaster, and R. Bras, 1997. *An Integrated Hillslope and Channel Evolution Model as an Investigative and Prediction Tool*. Year 2 annual report, DACA88-95-R-0020. Department of Civil and Environmental Engineering, Massachusetts Institute of Technology, Cambridge, Mass., irregular pagination.

SELECTED ABSTRACTS

- Lancaster, S.T., 2008. Evolution of Sediment Accommodation Space in Steady-State Bedrock-Incising Valleys Subject to Episodic Aggradation, *Eos Trans. AGU*, 89(53), Fall Meet. Suppl., Abstract H43F-1078.
- Frueh, W.T., S. Coyote, and S.T. Lancaster, 2008. Valley-Bottom Sediment Storage Volumes Determined From LiDAR-Derived Digital Elevation Models and Channel Substrate Mapping, *Eos Trans. AGU*, 89(53), Fall Meet. Suppl., Abstract H53C-1066.
- Copeland, E.A., P. Kennard, A.W. Nolin, S.T. Lancaster, and G.E. Grant, 2008. Initiation of recent debris flows on Mount Rainier, Washington: A climate warming signal? *Eos Trans. AGU*, 89(53), Fall Meet. Suppl., Abstract H51F-0887.
- Squeochs, G., S.T. Lancaster, R. Haggerty, A.M. Trehu, and J. Selker, 2008. Distributed Temperature Sensing (DTS) using optical fiber probes to constrain heat and fluid transport in the subsurface, *Eos Trans. AGU*, 89(23), Jt. Assem. Suppl., Abstract NS24A-05.
- Underwood, E.F., and S.T. Lancaster, 2007. Sediment transfer and storage in headwater basins of the Oregon Coast Range: Transit times from radiocarbon-dated deposits, *Eos Trans. AGU*, 88, Fall Meet. Suppl., Abstract H43H-03.
- Lancaster, S.T., and N.E. Casebeer, 2006. Debris-flow deposition, valley storage, and fluvial evacuation in headwater valleys, *Eos Trans. AGU*, 87, Fall Meet. Suppl., Abstract NG43D-1174.
- Lancaster, S.T., and G.E. Grant, 2005. Coalescing debris-fill complexes in headwater valleys of the Oregon Coast Range, *Eos Trans. AGU*, 86(47), Fall Meet. Suppl., Abstract H51H-01.
- Lancaster, S.T., and G.E. Grant, 2004. Debris dams, sediment impoundment, and the relief of headwater streams, *Eos Trans. AGU*, 85(47), Fall Meet. Suppl., Abstract H41G-02.
- Tucker, G.E., Q. Clevis, G. Lock, S. Lancaster, and A. Desitter, Modeling the stratigraphy and preservation potential of meandering stream deposits, *Eos. Trans. AGU*, 84(46), Fall Meet. Suppl., Abstract H42C-1093, 2003.
- Lancaster, S.T., S.K. Hayes, and G.E. Grant, 2001. Modeling sediment and wood storage and dynamics in small mountainous watersheds, *EOS, Trans. AGU*, 82(47), suppl., p. F498.
- Lancaster, S.T., S.K. Hayes, and G.E. Grant, 2000. Sediment and wood storage and dynamics in small mountainous watersheds, *EOS, Trans. AGU*, 82(20), suppl., p. S189. (INVITED)
- Lancaster, S.T., G.E. Tucker, N.M. Gasparini, R.L. Bras, and K.X Whipple, 1998. River meandering in the landscape: A study with the channel-hillslope integrated landscape development model, *EOS, Trans. AGU*, 79(45), suppl., p. F385.
- Lancaster, S.T., R.L. Bras, and K.X Whipple, 1996. Simulation of river meandering over long distances and times: A physically based model, *EOS, Trans. AGU*, 77(17), suppl., p. S124.

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