

# GREGORY E. TUCKER

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## EDUCATION

Ph.D., Geosciences, Pennsylvania State University, 1996

A.B., Anthropology, Brown University (cum laude), 1988

## ACADEMIC APPOINTMENTS

2017 – present Executive Director, Community Surface Dynamics Modeling System (CSDMS), Boulder, USA  
2013 – present Professor, CIRES and Department of Geological Sciences, University of Colorado, Boulder, USA  
2007 – 2013 Associate Professor, CIRES and Department of Geological Sciences, University of Colorado, Boulder, USA  
2010 Visiting Scientist, Institut des Sciences de la Terre, Grenoble, France  
2004 – 2007 Assistant Professor, CIRES and Department of Geological Sciences, University of Colorado, Boulder, USA  
2000 – 2003 University Lecturer in Geocomputation, School of Geography and the Environment, Oxford University, UK  
2000 – 2003 Tutorial Fellow in Geography, Brasenose College, Oxford, UK  
1997 – 2000 Research Associate, Department of Civil and Environmental Engineering, MIT, USA  
1996 Postdoctoral Associate, Department of Civil and Environmental Engineering, MIT, USA

## HONORS AND AWARDS

Ralph Alger Bagnold Medal, European Geosciences Union, 2012

Boulder Faculty Assembly Teaching Excellence Award, University of Colorado, 2013

Fellow, American Geophysical Union (elected 2017)

## MEMBERSHIPS

American Geophysical Union

Geological Society of America

Sigma Xi

Phi Beta Kappa

Community Surface Dynamics Modeling System

## PUBLICATIONS

### *Refereed Journal Articles, Book Chapters, and Proceedings*

(Denotes graduate student author; \*post-doctoral author; †undergraduate author)

- Carriere\*, A., Le Bouteiller, C., **Tucker, G.E.**, Klotz, S., and Naaim, M. (in press) Impact of vegetation on erosion: Insights from the calibration and test of a landscape evolution model in alpine badland catchments. *Earth Surface Processes and Landforms*.
- Duvall, A.R., Harbert\*, S.A., Upton, P., **Tucker, G.E.**, Flowers, R.M., and Collett, C. (in press) River patterns reveal landscape evolution at the edge of subduction, Marlborough Fault System, New Zealand. *Earth Surface Dynamics*.
- Rossi†, M., Anderson, R.S., Anderson, S.P., and **Tucker, G.E.** (in press) Orographic controls on sub-daily rainfall statistics and flood frequency in the Colorado Front Range, USA. *Geophysical Research Letters*, doi: 10.1029/2019GL085086.
115. Bandaragoda, C. R., Castronova, A., Istanbuluoglu, E., Strauch, R., Nudurupati, S.S., Phuong, J., Adams, J.M., Gasparini, N.M., Barnhart, K., Hutton, E.W.H., Hobley, D.E.J., Lyons, N.J., **Tucker, G.E.**, Tarboton, D.G., Idaszak, R., and Wang S. (2019) Enabling collaborative numerical modeling in earth sciences using knowledge infrastructure, *Environmental Modelling and Software*, 120, 104424, <https://doi.org/10.1016/j.envsoft.2019.03.020>.
114. Barnhart\*, K. R., Glade\*, R. C., Shobe\*, C.M., and **Tucker, G.E.** (2019) Terrainbento 1.0: a Python package for multi-model analysis in long-term drainage basin evolution, *Geosci. Model Dev.*, 12, 1267-1297, <https://doi.org/10.5194/gmd-12-1267-2019>.
113. Barnhart\*, K. R., Hutton, E., and **Tucker, G.E.** (2019) umami: a Python package for Earth surface dynamics objective function construction, *Journal of Open Source Software*, 4(42), 1776, <https://doi.org/10.21105/joss.01776>.
112. Barnhart\*, K.R., Rengers, F.K., Ghent†, J.N., C.M., **Tucker, G.E.**, Coe, J.A., Kean, J.W., Smith, J.B., Staley, D.M., Kleiber, W., and Wiens, A.M. (2019) Topographic change detection at Chalk Cliffs, Colorado, USA, using airborne lidar and UAS-based Structure-from-Motion photogrammetry, *7th International Conference on Debris-Flow Hazards Mitigation*, <http://dx.doi.org/10.25676/11124/173233>.
111. Collette\*, C.M., Duvall, A.R., Flowers, R.M., **Tucker, G.E.**, and Upton, P. (2019) The timing and style of oblique deformation within New Zealand’s Kaikōura Ranges and Marlborough Fault System based on low-temperature thermochronology. *Tectonics*, v. 38, no. 4, p. 1250-1272, <https://doi.org/10.1029/2018TC005268>.
110. Glade\*, R. C., Shobe\*, C. M., Anderson, R. S., & **Tucker, G. E.** (2019). Canyon shape and erosion dynamics governed by channel-hillslope feedbacks. *Geology*, 47(7), 650-654.
109. Gray\*, H.J., Jain, M., Sawakuchi, A.O., Mahan, S.A., and **Tucker, G.E.** (2019) Luminescence as a sediment tracer and provenance tool. *Reviews of Geophysics*, <https://doi.org/10.1029/2019RG000646>.
108. Kochanski, K., Anderson, R.S., and **Tucker, G.E.** (2019) The evolution of snow bedforms in the Colorado Front Range and the processes that shape them. *The Cryosphere*, v. 13, p. 1267–1281, <https://doi.org/10.5194/tc-13-1267-2019>.
107. Reitman\*, N.G., Mueller, K.J., **Tucker, G.E.**, Gold, R.D., Briggs, R.D., and Barnhart\*, K.R. (2019) Landscape Evolution Models Demonstrate that Offset Channels are Incomplete Records of Strike-Slip Fault Displacement. *Journal of Geophysical Research*, 124, <https://doi.org/10.1029/2019JB018596>.
106. Barnhart\*, K.R., Hutton, E., Gasparini, N.M., and **Tucker, G.E.** (2018) Lithology: A Landlab submodule for spatially variable rock properties. *Journal of Open Source Software*, 3(30), 979, <https://doi.org/10.21105/joss.00979>.
105. Gray\*, H.J., **Tucker, G.E.**, and Mahan, S. (2018) Application of a luminescence-based sediment transport model. *Geophysical Research Letters*, v. 45(12), p. 6071-6080, <https://doi.org/10.1029/2018GL078210>.

104. Harbert, S.A., Duvall, A.R., and **Tucker, G.E.** (2018) The Role of Near-Fault Relief Elements in Creating and Maintaining a Strike-Slip Landscape. *Geophysical Research Letters*, 10.1029/2018GL080045
103. Kochanski, K.A.P., Anderson, R.S., and **Tucker, G.E.** (2018) Statistical classification of self-organized snow surfaces. *Geophysical Research Letters*, v. 45, p. 6532-6541, <https://doi.org/10.1029/2018GL077616>.
102. Langston, A.L., & **Tucker, G. E.** (2018) Developing and exploring a theory for the lateral erosion of bedrock channels for use in landscape evolution models. *Earth Surface Dynamics*, v. 6, p. 1-27, <https://doi.org/10.5194/esurf-6-1-2018>.
101. Pelletier, J.D., Barron-Gafford, G.A., Gutierrez-Jurado, H., Hinckley, E.S., Istanbuloglu, E., McGuire, L.A., Niu G.-Y. Poulos, M.J., Rasmussen, C., Richardson, P., Swetnam, T.L., and **Tucker, G.E.** (2018) Which way do you lean? Using slope aspect variations to understand Critical Zone processes and feedbacks. *Earth Surface Processes and Landforms*, v. 43(5), p. 1133-1154, <https://doi.org/10.1002/esp.4306>.
100. Rengers, F.K., McGuire, L.A., Ebel, B.A., & **Tucker, G.E.** (2018) The evolution of a colluvial hollow to a fluvial channel with periodic steps following two transformational disturbances: A wildfire and a historic flood. *Geomorphology*, v. 309, p. 121-130, <https://doi.org/10.1016/j.geomorph.2018.01.003>.
99. Shobe, C.M., **Tucker, G. E.**, and Rossi, M.W. (2018) Variable-threshold behavior in rivers arising from hillslope-derived blocks. *Journal of Geophysical Research*, <https://doi.org/10.1029/2017JF004575>.
98. Strauch, R.E., Istanbuloglu, E., Nudurupati, S.S., Bandaragoda, C., Gasparini, N.M., & **Tucker, G.E.** (2018) A hydro-climatological approach to predicting regional landslide probability using Landlab. *Earth Surface Dynamics*, v. 6, p. 49-75, <https://doi.org/10.5194/esurf-6-49-2018>.
97. **Tucker, G. E.**, McCoy, S.W., and Hobley, D.E.J. (2018) A lattice grain model of hillslope evolution. *Earth Surface Dynamics*, v. 6, p. 563-582, <https://doi.org/10.5194/esurf-6-563-2018>.
96. Adams, J. M., Gasparini, N. M., Hobley, D. E., **Tucker, G. E.**, Hutton, E. W., Nudurupati, S. S., and Istanbuloglu, E. (2017) The Landlab OverlandFlow component: a Python library for computing shallow-water flow across watersheds. *Geoscientific Model Development*, v. 10, p. 1645–1663, <https://doi.org/10.5194/gmd-10-1645-2017>.
95. Glade, R.C., Anderson, R.S., **Tucker, G.E.** (2017) Block-controlled hillslope form and persistence of topography in rocky landscapes. *Geology*, v. 45(4), p. 311–314, <https://doi.org/10.1130/G38665.1>.
94. Gray, H.J., **Tucker, G.E.**, Mahan, S., McGuire, C., and Rhodes, E.J. (2017) On extracting sediment transport information from measurements of luminescence in river sediment. *Journal of Geophysical Research*, v. 122, no. 3, p. 654-677, <https://doi.org/10.1002/2016JF003858>.
93. Gray, H.J., Shobe, C.M., Hobley, D.E.J., **Tucker, G.E.**, Duvall, A.R., Harbert, S.A., and Owen, L.A. (2017) Off-fault deformation rate along the southern San Andreas fault at Mecca Hills, southern California, inferred from landscape modeling of curved drainages. *Geology*, v. 46(1), p. 59-62, <https://doi.org/10.1130/G39820.1>.
92. Hobley, D. E., Adams, J. M., Nudurupati, S. S., Hutton, E. W., Gasparini, N. M., Istanbuloglu, E., & **Tucker, G. E.** (2017) Creative computing with Landlab: an open-source toolkit for building, coupling, and exploring two-dimensional numerical models of Earth-surface dynamics. *Earth Surface Dynamics*. <https://doi.org/10.5194/esurf-5-21-2017>.
91. Shobe, C.M., **Tucker, G.E.**, and Barnhart, K.R. (2017) The SPACE 1.0 model: A Landlab component for 2-D calculation of sediment transport, bedrock erosion, and landscape evolution. *Geoscientific Model Development*, v. 10, p. 4577-4604, <https://doi.org/10.5194/gmd-2017-175>.
90. Ebel, B.A., Rengers, F.K., **Tucker, G. E.** (2016) Observed and simulated hydrologic response for a first-order catchment during extreme rainfall three years after wildfire disturbance. *Water Resources Research*, v. 52, <https://doi.org/10.1002/2016WR019110>.
89. Rengers, F.K., Lunacek, M., and **Tucker, G.E.** (2016) Application of an Evolutionary Algorithm for Parameter Optimization in a Gully Erosion Model. *Environmental Modelling and Software*, v. 80, p. 297-305, <https://doi.org/10.1016/j.envsoft.2016.02.033>.

88. Rengers, F.K., **Tucker, G.E.**, and Mahan, S. (2016) Episodic bedrock erosion by gully-head migration, Colorado High Plains, USA. *Earth Surface Processes and Landforms*, <https://doi.org/10.1002/esp.3929>.
87. Rengers, F.K., **Tucker, G.E.**, Moody, J.A., and Ebel, B. (2016) Illuminating wildfire erosion and deposition patterns with repeat terrestrial lidar. *Journal of Geophysical Research*, v. 121, no. 3, p. 588-608.
86. Roy, S.G., Koons, P.O., Osti, B., Upton, P., and **Tucker, G.E.** (2016) Multi-scale characterization of topographic anisotropy. *Computers and Geosciences*, v. 90, part B, p. 102-116, <https://doi.org/10.1016/j.cageo.2015.09.023>.
85. Roy, S.G., Koons, P.O., Upton, P., and **Tucker, G.E.** (2016) Dynamic links among rock damage, erosion, and strain during orogenesis. *Geology*, <https://doi.org/10.1130/G37753.1>.
84. Shobe, C.M., **Tucker, G.E.**, and Anderson, R.S. (2016) Hillslope-derived blocks retard river incision. *Geophysical Research Letters*, v. 43, <https://doi.org/10.1002/2016GL069262>
83. **Tucker, G.E.**, Hobbey, D.E.J., Hutton, E., Gasparini, N.M., Istanbuluoglu, E., Adams, J.M., and Nudurupati, S.S. (2016) CellLab-CTS 2015: Continuous-time stochastic cellular automaton modeling using Landlab. *Geoscientific Model Development*, v. 9, p. 823-839, <https://doi.org/10.5194/gmd-9-823-2016>.
82. Duvall, A., and **Tucker, G.E.** (2015) Dynamic Ridges and Valleys in a Strike-Slip Environment. *Journal of Geophysical Research*, v. 120, no. 10, p. 2016-2026, <https://doi.org/10.1002/2015JF003618>.
81. Ebel, B., Rengers, F.K., and **Tucker, G.E.** (2015) Aspect-Dependent Soil Saturation and Insight Into Debris-Flow Initiation During Extreme Rainfall in the Colorado Front Range. *Geology*, v. 43, no. 8, p. 659-662.
80. Harris, N., and **Tucker, G.E.** (2015) Soils, slopes, and source rocks: application of a soil chemistry model to nutrient delivery to rift lakes. *Sedimentary Geology*, v. 323, p. 31-42.
79. Langston, A.L., **Tucker, G.E.**, and Anderson, R.S. (2015) Interpreting climate-modulated processes of terrace development along the Colorado Front Range using a landscape evolution model. *Journal of Geophysical Research*, v. 120, p. 2121–2138, <https://doi.org/10.1002/2014JF003403>.
78. Langston, A.L., **Tucker, G.E.**, Anderson, R.S., and Anderson, S.P. (2015) Evidence for climatic and hillslope-aspect controls on vadose zone hydrology and implications for saprolite weathering. *Earth Surface Processes and Landforms*, v. 40, no. 9, p. 1254–1269, <https://doi.org/10.1002/esp.3718>.
77. Rengers, F.K., **Tucker, G.E.** (2015) The evolution of gully headcut morphology: a case study using terrestrial laser scanning and hydrological monitoring. *Earth Surface Processes and Landforms*, v. 40, no. 10, <https://doi.org/10.1002/esp.3721>.
76. Roy, S.G., Koons, P.O., Upton, P., and **Tucker, G.E.** (2015) The influence of crustal strength fields on the patterns and rates of fluvial incision. *Journal of Geophysical Research*, v. 120, p. 275-299, <https://doi.org/10.1002/2014JF003281>.
75. **Tucker, G.E.** (2015) Landscape evolution. In: Schubert, G., ed., *Treatise in Geophysics*, 2<sup>nd</sup> ed., 38 pp.
74. Adams, J.M., Nudurupati, S.S., Gasparini, N.M., Hobbey, D.E.J., Hutton, E., **Tucker, G.E.**, and Istanbuluoglu, E. (2014) Landlab: Sustainable Software Development in Practice. Proceedings of 2nd Workshop on Sustainable Software for Science: Practice and Experiences. <https://doi.org/10.6084/m9.figshare.1097629.v6>
73. Griffin, E.R., Perignon, M.C., Friedman, J.M., and **Tucker, G.E.** (2014) Effects of woody vegetation on overbank sand transport during a large flood, Rio Puerco, New Mexico. *Geomorphology*, v. 207, p. 30-50, <https://doi.org/10.1016/j.geomorph.2013.10.05>.
72. Rengers, F.K., and **Tucker, G.E.** (2014) Analysis and modeling of gully headcut dynamics, North American High Plains. *Journal of Geophysical Research*, v. 119, p. 983-1003, <https://doi.org/10.1002/2013JF002962>.
71. Anderson, R.S., Anderson, S.P., and **Tucker, G.E.** (2013) Rock damage and regolith transport by frost: an example of climate modulation of geomorphology of the critical zone. *Earth Surface Processes and Landforms*, v. 38, p. 299-316, <https://doi.org/10.1002/esp.3330>.

70. Bradley, D.N., and **Tucker, G.E.** (2013) Storage time, age, and erosion hazard of laterally accreted sediment on the floodplain of a simulated meandering river. *Journal of Geophysical Research*, v. 118, p. 1308-1319, 10.1002/jgrf.20083.
69. Godard, V., **Tucker, G.E.**, Fisher, G.B., Burbank, D.W., and Bookhagen, B. (2013) Frequency-dependent landscape response to climatic forcing. *Geophysical Research Letters*, v. 40, p. 859-863, <https://doi.org/10.1002/grl.50253>.
68. Kean, J.W., McCoy, S.W., **Tucker, G.E.**, Staley, D.M., and Coe, J.A. (2013) Runoff-generated debris flows: Observations and modeling of surge initiation, magnitude, and frequency. *Journal of Geophysical Research*, v. 118, p. 2190-2207, <https://doi.org/10.002/jgrf.20148>.
67. McCoy, S.W., **Tucker, G.E.**, Kean, J.W., and Coe, J.A. (2013) Field measurement of basal forces generated by erosive debris flows. *Journal of Geophysical Research*, v. 118, p. 589-602, <https://doi.org/10.1002/jgrf.20041>.
66. Perignon, M.C., **Tucker, G.E.**, Griffin, E.R., and Friedman, J. (2013) Effects of riparian vegetation on topographic change during a large flood event, Rio Puerco, New Mexico, USA. *Journal of Geophysical Research*, v. 118, p. 1193-1209, <https://doi.org/10.002/jgrf.20073>.
65. **Tucker, G.E.**, and van der Beek, P. (2013) A model for post-orogenic development of a mountain range and its foreland. *Basin Research*, v. 12, p. 1-19, <https://doi.org/10.1111/j.1365-2117.2012.00559.x>.
64. Wilcox, T., Mueller, K., Upton, P., Powell, L.K., Chen Y.-G., Huang S.-T., Yanites, B.J., and **Tucker, G.** (2013) Structural inheritance and erosional controls on thrust kinematics in western Taiwan. *Geosphere*, v. 9(4), p. 1091-1101.
63. Anderson, S.P., Anderson, R.S., and **Tucker, G.E.** (2012) Landscape-scale linkages in critical-zone evolution. *Comptes Rendus Geosciences*, v. 344, p. 586-596, <https://doi.org/10.1016/j.crte.2012.10.008>.
62. Bradley, D.N., and **Tucker, G.E.** (2012) Measuring gravel transport and dispersion in a mountain river using passive radio tracers. *Earth Surface Processes and Landforms*, v. 37, p. 1034-1045, <https://doi.org/10.1002/esp.3223>.
61. McCoy, S.W., Kean, J.W., Coe, J.A., **Tucker, G.E.**, Staley, D.M., and Wasklewicz, T.A. (2012) Sediment entrainment by debris flows: In situ measurements from the headwaters of a steep catchment. *Journal of Geophysical Research*, v. 117, F03016, <https://doi.org/10.1029/2011JF002278>.
60. Attal, M., Cowie, P.A., Whittaker, A.C., Hopley, D., **Tucker, G.E.**, and Roberts, G.P. (2011) Testing fluvial erosion models using the transient response of bedrock rivers to tectonic forcing in the Apennines, Italy, *Journal of Geophysical Research*, v. 116, F02005, <https://doi.org/10.1029/2010JF001875>.
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58. McCoy, S.W., Coe, J.A., Kean, J.W., **Tucker, G.E.**, Staley, D.M., and Wasklewicz, T.A. (2011) Observations of debris flows at Chalk Cliffs, Colorado, U.S.A.: part 1, in situ measurements of flow dynamics, tracer particle movement and video imagery from the summer of 2009, In Genevois, R., Hamilton, D.L., and Prestininzi, A, eds., Proceedings of the 5th International Conference on Debris Flow Hazards Mitigation, Mechanics, Prediction and Assessment, Padua, Italy, June 14-17, 2011, *Italian Journal of Engineering Geology and Environment* and Casa Editrice Universita La Sapienza, Rome, Italy. <https://doi.org/10.4408/IJEGE.2011-03.B-078>.
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55. Wilcox, T., Mueller, K., Upton, P., Chen, Y.-G., Huang, S.T., Yanites, B., and **Tucker, G.** (2011) Linking Taiwan's Subcritical Hsueshan Range Topography and Foreland Basin Architecture, *Tectonics*, v. 30, TC4011, <https://doi.org/10.1029/2010TC002825>.
54. Yanites, B.J., **Tucker, G.E.**, Hsu H.-L., Chen C.-C., Chen Y.-G., Mueller, K.J. (2011) The influence of sediment cover variability on long-term river incision rates: an example from the Peikang River, central Taiwan, *Journal of Geophysical Research*, v. 116, F03016, <https://doi.org/10.1029/2010JF001933>.
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47. Yanites, B.J., and **Tucker, G.E.** (2010) Controls and limits on bedrock channel geometry: *Journal of Geophysical Research*, v. 115, F04019, <https://doi.org/10.1029/2009JF001601>.
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38. Whittaker, A.C., Attal<sup>+</sup>, M., Cowie, P.A., **Tucker, G.E.**, and Roberts, G.P. (2008) Decoding temporal and spatial patterns of fault uplift using transient river long profiles: *Geomorphology*, v. 100, no. 3-4, p. 506-526, <https://doi.org/10.1016/j.geomorph.2008.01.018>.
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- Tucker, G.E.**, Doty, S.G., Barnhart, K.R., Hill, M.C., Rossi, M.W., Shobe, C.M., Glade, R.C., and Wolff, M. (2018) Modeling Long-Term Erosion at the West Valley Demonstration Project and Western New York Nuclear Services Center. Technical report prepared for United States Department of Energy and New York State Energy Research and Development Authority, 512 pp.
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- Tucker, G.E.** (2004) Models in geomorphology, in *Encyclopedia of Geomorphology*, edited by A. Goudie, Routledge.
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- Duke, W.L., Pazzaglia, F.J., Gibbs, M.T., Hayes, K.R., and **Tucker, G.E.** (1992) Rhythmically Spaced Reactivation Surfaces in Cross-bedded Sand Bodies of the Pensauken Formation Indicate a Shallow Subtidal Setting, in F. J. Pazzaglia and T. W. Gardner, eds., *Tectonic Geomorphology and Late Cenozoic Geology of the Lower Susquehanna River Basin*: Geological Society of America Field Trip Guidebook, Penn State University, University Park, PA, p. A1-A4.

## RECENT CONFERENCE PRESENTATIONS (2019)

- Adams, J.M., Overeem, I., Hutton, E., Kettner, A.K. and Tucker, G.E. (2019, June) Exploring Surface Processes Using the Community Surface Dynamics Modeling System Modeling Tools. Joint Federal Interagency Sedimentation and Hydrology Conference (SEDHYD), Reno, NV.
- Bandaragoda, C., Castronova, A.M., Istanbuluoglu, E., Strauch, R.L., Nudurupati, S.S., Phoung, J., Adams, J.M., Gasparini, N.M., Barnhart, K.B., Hutton, E., Hobley, D.E., Lyons, N.J., Tucker, G.E., Tarboton, D.G., Idaszak, R. and Wang, S.W. (2019, December) Enabling collaborative numerical modeling in hydrology using knowledge infrastructure. Paper presented at American Geophysical Union fall meeting, San Francisco, CA.
- Barnhart, K.R., Tucker, G.E., Doty, S., Shobe, C.M., Glade, R.C., Rossi, M.W., and Hill, M.C. (2019, August) Projections of erosion for a temperate watershed on a 10,000 year timescale. Paper presented at Goldschmidt conference, Barcelona, Spain.
- Barnhart, K.R., Tucker, G.E., Coe, J.A., Kean, J.W., Smith, J.B., and Staley, D.M. (2019, December) Topographic change detection at Chalk Cliffs, CO using Airborne LiDAR and UAS-based Structure from Motion photogrammetry. Invited presentation at 7th International Conference on Debris-Flow Hazards Mitigation, Golden, CO.
- Barnhart, K.R., Tucker, G.E., Doty, S., Shobe, C.M., Glade, R.C., Rossi, M.W., and Hill, M.C. (2019, December) The importance and challenge of thresholds in calibrating landscape evolution models. Paper presented at American Geophysical Union fall meeting, San Francisco, CA.
- Barnhart, K.R., Tucker, G.E., Doty, S., Shobe, C.M., Glade, R.C., Rossi, M.W., and Hill, M.C. (2019, December) Uncertainty in the prediction of erosion on geologic time scales. Paper presented at American Geophysical Union fall meeting, San Francisco, CA.

- Carriere, A., Le Bouteiller, C., Tucker, G.E. and Naaim, M (2019, April) Vegetation-modulated erosion in badland catchments. Paper presented at European Geophysical Union general assembly, Vienna Austria
- Duvall, A.R., Harbert, S., Upton, P., Tucker, G.E., Flowers, R.M. and Collett, C. (2019, December) Faulting, uplift and river capture dictate drainage patterns in New Zealand's Marlborough Fault System. Paper presented at American Geophysical Union fall meeting, San Francisco, CA.
- Gasparini, N.M., Adams, J.M. Bandaragoda, C., Barnhart, K.R., Hobley, D.E., Hutton, E., Istanbuluoglu, E., Lyons, N.J., Mouchene, M., Nudurupati, S.S., Strauch, R.L. and Tucker, G.E. (2019, December) Tools for learning about earth surface processes and how to model them. Paper presented at American Geophysical Union fall meeting, San Francisco, CA.
- Gemperline, J., Tucker, G.E., Rossi, M.W. and Hynek, B.M. (2019, December) Initial landscape evolution model results for Martian valley networks show potential differences between distributed rainfall and a melting ice sheet. Paper presented at American Geophysical Union fall meeting, San Francisco, CA.
- Glade, R., Shobe, C.M., Anderson, R.S. and Tucker, G.E. (2019, December) How do channel-hillslope feedbacks modulate river canyon evolution? Paper presented at American Geophysical Union fall meeting, San Francisco, CA.
- Hutton, E., Tucker, G.E., Piper, M., Kettner, A.K. and Overeem, I. (2019, December) The Basic Model Interface 2.0: A standard interface for geoscientific numerical models and data. Paper presented at American Geophysical Union fall meeting, San Francisco, CA.
- Kettner, A.K., Overeem, I., Tucker, G.E., Hutton, E., Piper, M. and Hsu, L. (2019, December) Developing and implementing standards and best practices for developers of numerical models. Paper presented at American Geophysical Union fall meeting, San Francisco, CA.
- Kuebler, S., King, G.C.P., Bailey, G. and Tucker, G.E. (2019, December) Reconstructing human-landscape interactions in tectonically active regions. Paper presented at American Geophysical Union fall meeting, San Francisco, CA.
- Litwin, D., Harman, C.J., Tucker, G.E. and Barnhart, K.R. (2019, December) A numerical exploration of coevolution between runoff pathways, climate and landscape morphology. Paper presented at American Geophysical Union fall meeting, San Francisco, CA.
- Reitman, N.G., Mueller, K.J., Tucker, G.E., Gold, R.D., Briggs, R.W. and Barnhart, K.R. (2019, December) Offset channels are incomplete records of strike-slip fault displacement. Paper presented at American Geophysical Union fall meeting, San Francisco, CA.
- Rossi, M.W., Anderson, R.S., Anderson, S.P. and Tucker, G.E. (2019, December) Interactions among hydrologic and geomorphic thresholds in fluvial landscape evolution. Paper presented at American Geophysical Union fall meeting, San Francisco, CA.
- Roy, S.G., Koons, P.O., Tucker, G.E. and Upton, P. (2019, December) Advancing geomechanical analyses with deep learning to predict landslide susceptibility from spatially explicit strength and stress states. Paper presented at American Geophysical Union fall meeting, San Francisco, CA.
- Shobe, C.M., Bennett, G.L., Tucker, G.E., Roback, K., Miller, S.R. and Roering, J.J. (2019, December) Disassembling California: Boulders as a lithologic control on river and landscape evolution at the Mendocino Triple Junction. Paper presented at American Geophysical Union fall meeting, San Francisco, CA.
- Steckler, M.S., Hutton, E., Ologan, D., Tucker, G.E., Grall, C. and Gurcay, S. (2019, December) Developing Sequence Stratigraphic Modeling in Landlab to improve understanding of the tectonics in the Gulf of Kusadasi, Turkey. Gasparini, N.M., Adams, J.M. Bandaragoda, C., Barnhart, K.R., Hobley, D.E., Hutton, E., Istanbuluoglu, E., Lyons, N.J., Mouchene, M., Nudurupati, S.S., Strauch, R.L. and Tucker, G.E. (2019, December) Tools for learning about earth surface processes and how to model them. Paper presented at American Geophysical Union fall meeting, San Francisco, CA.
- Tucker, G.E. (2019, March) Testing landscape evolution models with topographic data. Invited lecture presented at workshop on Data Analytics for Climate and Earth, Lake Arrowhead, CA.

- Tucker, G.E. (2019, October) Community, Computing, and Education: an overview of CSDMS. Recorded lecture provided for 2019 CoMSES Virtual Meeting.
- Tucker, G.E., Barnhart, K.R., Doty, S.G., Glade, R.C., Hill, M.C., Rossi, M.W. and Shobe, C.M. (2019, November) Testing long-term channel network incision models using a natural experiment in postglacial landscape evolution. Paper presented at River, Coastal and Estuarine Morphodynamics Symposium (RCSEM), Auckland, New Zealand.
- Tucker, G.E., Hobley, D.E.J., and McCoy, S.W. (2019, December) Exploring the morphologic diversity of normal-fault facets. Paper presented at American Geophysical Union fall meeting, San Francisco, CA.

## RESEARCH GRANTS

### ***Current Support***

- Community Facility Support: The Community Surface Dynamics Modeling System (CSDMS)*. U.S. National Science Foundation EAR Division, PI: G. Tucker, with co-investigators E. Hutton, A. Kettner, and I. Overeem, 2018-21, \$3,616,768.
- Topographic response to the transition from snowmelt- to rainfall- triggered extremes*. U.S. National Science Foundation EAR Division, PI: M. Rossi, with co-investigators R. Anderson and G. Tucker, 2018-21, \$404,990.
- Collaborative Research: SI2-SSI: Landlab: a flexible, open-source modeling framework for earth-surface dynamics*. U.S. National Science Foundation ACI Division, PI: G. Tucker (in collaboration with Tulane University and University of Washington), 2015-2020, \$789,778 to CU Boulder.

### ***Past Support***

- Computational Infrastructure for the Community Surface Dynamics Modeling System*. U.S. National Science Foundation EAR Division, PI: G. Tucker (as of autumn 2017), 2012-2019, \$5,690,110.
- Boulder Creek CZO II: Evolution, Form, Function, and Future of the Critical Zone*. U.S. National Science Foundation EAR Division, PI: S. Anderson with co-investigators R. Anderson, N. Molotch, H. Rajaram, and G. Tucker, 2013-2018 (extended to 2019), \$4,500,000 (~20%).
- PREEVENTS Track 1: A transdisciplinary approach to next-gen natural hazard modeling: Improving accuracy and usability of earth surface process models for pre-event risk assessment*. U.S. National Science Foundation EAR Division, PI: A. Kettner, with co-investigators I. Overeem and G. Tucker, 2017-2018, \$49,839.
- Traveling at the Speed of Light: Using Luminescence to Quantify Sediment Transport*. American Chemical Society Petroleum Research Fund, PI: G. Tucker, 2016-2018, \$110,000.
- Collaborative Research: Normal-Fault Facets as Recorders of Erosion and Tectonics*. U.S. National Science Foundation EAR Geomorphology and Land-use Dynamics Program, PI: G. Tucker, 2013-2015 (extended to 2018), \$214,212 (100%).
- Collaborative Research: Tracing the Geomorphic Signature of Strike-Slip Faulting in Marlborough Hill Country, South Island, New Zealand*. U.S. National Science Foundation EAR Division, PI: R. Flowers with co-investigator G. Tucker (in collaboration with University of Washington), 2013-2017, ~\$114,000 (50%).
- Impacts of Vegetation and Climate Change on Dryland Rivers: Lessons from the Rio Puerco, New Mexico*. U.S. National Science Foundation EAR Division, PI: G. Tucker, 2013-2016 (extended to 2017), \$299,994 (100%).
- Collaborative Research: Rivers, Faults, and Growing Mountains: Dynamic Feedback between Crustal Deformation, Rock Strength, and Erosion*. U.S. National Science Foundation EAR Division, PI: G. Tucker (in collaboration with University of Maine), 2013-2015 (extended to 2016), \$19,436 (100%).

*Collaborative Research: SI2-SSE: Component-Based Software Architecture for Computational Landscape Modeling.* U.S. National Science Foundation OCI Program, PI: G. Tucker (in collaboration with Tulane University and University of Washington), 2012-2015, \$224,124 (100%).

*From Peaks to Prairie: Two Natural Experiments in Decadal Landscape Evolution.* U.S. National Science Foundation EAR Geomorphology and Land-use Dynamics Program, PI: G. Tucker, 2010-2013 (extended to 2014), \$299,720 (100%).

*Computer Animation of River Meandering.* Arts and Sciences Support for Education Through Technology (ASSETT) development grant, 2012-2013, \$4,200.

*Shaking hills and twisted rivers: Tracing the fingerprints of earthquakes past and present in New Zealand's Marlborough Hill Country.* National Geographic Society, PI: A. Duvall with co-investigator G. Tucker, 2012-2013, \$22,465 (~30%).

*EarthCube Domain End-User Workshop: Engaging the Critical Zone community to bridge long tail science with big data.* U.S. National Science Foundation, PI: A. Aufdenkampe with co-investigators C. Duffy and G. Tucker, 2012-2013, \$99,922 (funding to University of Delaware for workshop support).

*Boulder Creek CZO Renewal: Weathered Profile Development in a Rocky Environment and Its Influence on Watershed Hydrology and Biogeochemistry.* U.S. National Science Foundation EAR Division, PI: S. Anderson with co-investigators R. Anderson, N. Molotch, H. Rajaram, and G. Tucker, 2012-2013, \$1,000,000 (~20%).

*CZO: Boulder Creek Critical Zone Observatory – Weathered Profile Development in a Rocky Environment and Its Influence on Watershed Hydrology and Biogeochemistry.* U.S. National Science Foundation EAR Division, PI: S. Anderson with co-investigators R. Anderson, N. Fierer, A. Sheehan, and G. Tucker, 2007-2012, \$4,249,997 (~20%).

*RAPID: Collecting Field Data in Support of LiDAR Acquisition during Maximum Snow Conditions and Maximum Leaf Out in the Boulder Creek Critical Zone Observatory.* U.S. National Science Foundation, PI: S. Anderson with co-investigators N. Molotch and G. Tucker, 4/15/10-4/14/11, \$33,150.

*CMG Research: Modeling River Basin Dynamics; Parallel Computing and Advanced Numerical Methods.* U.S. National Science Foundation Collaborations in Mathematical Geoscience Program, PI: S. Peckham (Instaar) with co-investigators T. Manteuffel (CU Applied Math), S. McCormick (CU Applied Math), and G. Tucker, September, 2006 to August 2010, \$900,000 (21%).

*Collaborative Research: The Role of Debris Flows in Shaping Mountainous Terrain.* U.S. National Science Foundation EAR Geomorphology and Land-use Dynamics Program, PI: G. Tucker with external collaborator S. Lancaster (Oregon State) and CU collaborator A. Lester, 9/1/07-8/31/10, \$147,583 (100%).

*SGER: Imaging a Natural Experiment in Drainage Divide Migration.* U.S. National Science Foundation EAR Small Grants for Exploratory Research Program, PI: G. Tucker, September 2006 to August 2007, \$4,948 plus high-resolution, research-grade laser altimetry data obtained for a study site east of Denver.

*Collaborative Research: Erosional Forcing of Late Quaternary Compressive Strain, West Central Taiwan.* U.S. National Science Foundation EAR Tectonics Program, PI: K. Mueller (CU Geological Sciences) with co-investigator G. Tucker and external collaborator P. Upton (Univ. Maine), August 2005 to July 2009 – \$268,700 (37%).

*Analysis and Modeling of Complex Geomorphic Systems: Technique Development, Data Collection, and Application to Rangeland Terrain.* U.S. Army Research Office, PI: G. Tucker, August 2004 to July 2008, \$299,106.

*Modelling the Stratigraphy, Geoarchaeology, and Aggregate Resources of English Valley Systems.* English Heritage, PI: G. Tucker with co-investigator G. Lock (Univ. Oxford), January 2003 to March 2004, £73,000 (75%).

*Modeling the Dynamics of Gully and Arroyo Development: Fort Carson and Pinon Canyon Maneuver Site, Colorado.* U.S. Army Research Office, PI: G. Tucker, June 2001 to May 2004, \$200,000.

## INVITED COLLOQUIA

US Geological Survey, Rocky Mountain Science Seminar, May 2019  
Colorado State University, Department of Geosciences, February 2017  
University of Wyoming, Department of Geology and Geophysics, February 2016  
University of Washington, Department of Earth and Space Sciences, October 2014  
University of Pennsylvania, Department of Earth and Environmental Sciences, April 2014  
Duke University, Department of Civil and Environmental Engineering, October 2013  
University of Wyoming, Department of Geology and Geophysics, October 2012  
University of Colorado, Department of Geological Sciences, September 2012  
European Geophysical Union, Ralph Alger Bagnold Lecture, April 2012  
University of Colorado, Hydrosciences Seminar, April 2012  
GNS Science, Lower Hutt, New Zealand, February 2012  
University of Kansas, Department of Geography, November 2011  
University of Colorado, Department of Geological Sciences, August 2011  
Institute for Arctic and Alpine Research, February 2011  
ETH Zürich, Switzerland, December 2010  
Centre de Recherches Pétrographiques et Géo-chimiques, Nancy, France, December 2010  
Université Joseph Fourier, ISTERRE, Grenoble, France, November 2010  
Cemagref, Grenoble, France, November 2010  
University of New Mexico, Department of Earth and Planetary Sciences, October 2009  
University of Colorado, Water Sciences Seminar, September 2009  
University of Wyoming, Department of Geology and Geophysics, December 2007  
University of Colorado, Department of Applied Mathematics, November 2007  
Geological Society of London, Bicentennial Conference, September 2007  
University of Calgary, Department of Biological Sciences, April 2007  
University of Minnesota, St. Anthony Falls Hydraulics Laboratory, March 2006  
Colorado State University, Department of Geological Sciences, April 2005  
University of Colorado, Department of Civil, Environmental and Architectural Engineering, March 2005  
University of Colorado, Department of Geography, February 2005  
University of Cincinnati, Department of Geology, October 2004  
University of Colorado, INSTAAR, April 2004  
University of Cambridge, Department of Earth Sciences, November 2003  
Vrije Universiteit Amsterdam, Department of Geography, March 2003  
ETH Zürich, Institute of Hydromechanics and Water Resources, February 2003  
University of Zürich, Department of Geography, February 2003  
University of Leeds, School of Geography, February 2003  
University of Bristol, School of Geographical Sciences, November 2002  
University of Cambridge, Institute for Theoretical Geophysics, October 2002  
University of Oxford, Institute of Archaeology, March 2002  
University of Sheffield, Department of Geography, March 2002  
Géosciences Rennes, France, December 2001  
University of St. Andrews, School of Geography and Geosciences, October 2001  
Yale University, Department of Geology and Geophysics, April 2001  
Imperial College London, Department of Earth Sciences, February 2001  
University of Edinburgh, Department of Geography, February 2001  
University of Glasgow, Department of Geography and Topographic Science, February 2001  
Kings College London, Department of Geography, November 2000  
University of Southampton, Department of Geography, November 2000  
University of Oxford, Department of Earth Sciences, October 2000  
University of Oxford, Oxford Centre for Industrial and Applied Mathematics, July 2000  
Massachusetts Institute of Technology, Earth Resources Laboratory, October 1999  
Cornell University, Department of Geological Sciences, January 1997

## TEACHING ACTIVITIES

### *Courses Taught*

*The Fluid Earth* (Upper-level undergraduate course, CU, 2008–present)  
*Geomorphology Seminar* (Graduate reading seminar, CU, 2005–present)  
*Introduction to Numerical Modeling in Earth and Environmental Sciences* (a.k.a. “Modeling Landscapes”) (Graduate/undergraduate course, CU, 2005–present)  
*Computational Tools* (graduate course, CU, 2018)  
*Geomorphology* (Upper-level undergraduate course, CU, 2016)  
*Sediment Transport Mechanics* (Graduate course, CU, 2006–2015)  
*Introduction to Physical Geology* (Introductory undergraduate lecture course, CU, 2004–2015)  
*Advanced Geomorphology* (Graduate course, CU, 2007)  
*Seminar in Landscape Evolution* (Combined graduate-undergraduate seminar, CU, 2004)  
*Environmental Modelling* (Interdisciplinary M.Sc. course, Oxford, 2000–2003)  
Undergraduate tutorial teaching in various topics in first-year *Physical Geography* (Oxford, 2000–2003)  
*Fluvial and Tectonic Geomorphology* (M.Sc. course, Oxford, 2002)  
*River Basin Dynamics* (Upper-level undergraduate course, Oxford, 2001)  
*GIS in Terrain Analysis* (Undergraduate and M.Sc. short course, Oxford, 2000–2001)  
*Introduction to Hydrology* (Upper-level undergraduate course, MIT, 1998)  
*Process-Response Models of River Basin Evolution* (Short course, Perugia, Italy, June 1998)

### *Postdoctoral Scholars, Graduate Students, and Undergraduate Students Supervised*

Current: 4 postdoctoral, 2 Ph.D., 2 undergraduate  
Graduated/completed: 8 postdoctoral, 8 Ph.D., 3 D.Phil., 3 M.Sc., 7 undergraduate

## PROFESSIONAL SERVICE

### *Software Products*

Landlab: project leader and co-developer. First release in December 2013. Under active development (<http://landlab.github.io>).  
CHILD: co-developer. First publication in 2000. Under maintenance and occasional development (<http://csdms.colorado.edu/wiki/Model:CHILD>).  
GOLEM: developer. First publication in 1994. (no longer under active development)

### *National / International Service*

Community Surface Dynamics Modeling System (CSDMS): Executive Director, October 2017–present; Deputy Director 2016–2017; Chair of Terrestrial Working Group and Member of Executive Committee, 2007–2016  
Panel Reviewer for US Department of Energy proposal review, Feb. 2019  
Member of Executive Committee, Boulder Creek Critical Zone Observatory, 2007–2019  
Member, European Geophysical Union Ralph Alger Bagnold Medal Committee, 2012–2016  
Member of Editorial Board, *Earth Surface Processes and Landforms*, 2004–2013  
Associate Editor, *Journal of Geophysical Research – Earth Surface*, 2007–2009  
Lecturer, National Center for Earth-Surface Dynamics Summer Institute, 2012  
Co-convener, American Geophysical Union special session on *Modeling the Terrestrial Landscape*, AGU Fall meeting, December, 2016  
Co-convener, American Geophysical Union special session on *Debris Flows: From Hazard Mitigation to Landscape Evolution*, AGU Fall meeting, December, 2011  
Co-convener, American Geophysical Union special session on *Computational Modeling of Landscapes and Seascapes*, AGU Fall meeting, December, 2009  
Co-convener, American Geophysical Union special session on *Geomorphic Impacts of Global Change*, AGU Fall meeting, December, 2006  
Co-convener, American Geophysical Union special session on *Impacts of Hydrology on Landscape Evolution*,

AGU Fall meeting, December, 2005  
 Co-convenor, American Geophysical Union special session on *Testing Models of Drainage Basin Geomorphology*, AGU Fall meeting, December, 1999  
 Co-convenor, American Geophysical Union special session on *Hillslope and Fluvial Processes*, AGU Spring meeting, June, 1999  
 Co-convenor, American Geophysical Union special session on *Geomorphic Responses to Environmental Change*, AGU Spring meeting, June, 1998  
 Co-convenor, American Association of Petroleum Geologists special session on *Surface Processes and Neotectonics*, AAPG-SEPM annual meeting, May, 1998  
 Peer reviewer for national and international journals and book publishers, including (2010-present): *Basin Research; Computers and Geosciences; Earth Surface Processes and Landforms; Geografia Fisica e Dinamica Quaternaria; Geology; Geomorphology; Geophysical Research Letters; Hydrology and Earth System Science; Journal of Geophysical Research; Lithosphere; Nature Geoscience; Quaternary Research; Reviews in Engineering Geology; Water Resources Research*.  
 Peer reviewer for funding agencies, including (2010-present): *U.S. National Science Foundation; ACS Petroleum Research Fund*.

### ***University Service (2018 – present)***

#### *Cooperative Institute for Research in Environmental Sciences (CIRES)*

2018-present Member, Executive Committee  
 2018-present Member, Graduate Fellowship Review Committee  
 -present Faculty Affiliate, Earth Lab

#### *Department of Geological Sciences*

2019 Chair, Reappointment Committee for an assistant professor in Geological Sciences  
 2019 Member, Promotion Committee for an associate professor in Geological Sciences  
 2018-19 Member, Executive Committee  
 2018-19 Member, Computational Curriculum Development Committee  
 2018 Chair, New Department Chair Search Committee  
 2018 Chair, Promotion Committee for an associate professor in Geological Sciences

#### *University of Colorado*

2019 Member, DAICR Benefits Working Group  
 2018-19 Chair, Computational Earth-Surface Dynamics Search Committee, INSTAAR/CSDMS