

# SCOTT DALE PECKHAM

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## Professional Preparation

Oregon State University	Corvallis, OR	Physics	B.S. 1987
Oregon State University	Corvallis, OR	Engineering Physics	B.S. 1987
Oregon State University	Corvallis, OR	Mathematics – Probability	M.S. 1989
University of Colorado	Boulder, CO	Geophysics – Hydrology	PhD. 1995
U.S. Geological Survey	Boulder, CO	NRC Postdoc– Hydrology	1995-1998

## Professional Societies

American Geophysical Union (AGU)  
American Association for the Advancement of Science (AAAS)  
International Association for Mathematical Geosciences (IAMG)  
International Environmental Modelling & Software Society (iEMSs)  
International Society for Geomorphometry (ISG)

## Appointments

**Research Scientist III and Fellow** at INSTAAR, Univ. of Colorado at Boulder. Research interests include: cyberinfrastructure for modeling (PI on several NSF EarthCube projects), hydrologic modeling, fluvial landscape evolution, seafloor and stratigraphic evolution, nonlinear PDEs, differential geometry, scaling theory, sediment plumes, coastal dynamics, efficient computer algorithms, source-to-sink sediment transport. Co-taught course in Oceanography, Spring 2003 to 2006. 1998-Present. Fellow since August 2006. 1998 to Present.

**Chief Software Architect** for CSDMS, Univ. of Colorado at Boulder. CSDMS (Community Surface Dynamics Modeling System) is a large, NSF-funded project that began in 2007 and serves the earth surface modeling community. Designed and implemented much of the CSDMS architecture, including the Basic Model Interface (BMI) and the CSDMS Standard Names. April 2007 to September 2013.

**National Research Council (NRC) Research Associate**, USGS Water Resources Division, Boulder. Research on the flow dynamics, sediment transport, and geometry of large river basins, working with Dr. J. Dungan Smith. Developed a steady-state fluvial landscape model and a new mathematical method for solving this and similar types of nonlinear partial differential equations. 1995 to 1998.

**NASA Global Change Graduate Student Fellow**, Center for the Study of Earth from Space (CSES), CU Boulder. (1990-1993).

**Graduate Research Assistant**, Center for the Study of Earth from Space (CSES), CU. Research to explain scaling laws for river networks. Developed expertise in remote sensing, image processing, nonlinear dynamics, complexity theory, fractals/multifractals, cascades, chaos theory and dynamical systems. 1989-1995.

**Graduate Research / Teaching Assistant**, Mathematics Department, OSU. Developed models for the analysis and description of random networks with Edward C. Waymire. Extensive coursework in probability theory and stochastic processes. Taught courses in college algebra with good reviews. 1987-1989.

## Teaching

Guest instructor in graduate-level course on component-based, hydrologic modeling at the University of Trento, Italy. The course title was: "International Summer School on Hydrological Modeling with OMS (Object Modeling System) Components", July 18-21, 2016. Lead instructor: Olaf David.

Guest instructor in graduate-level course, GEOS 697, "Interdisciplinary modeling: Water-related issues and changing climate", Boise State University, sponsored by NSF/EPSCoR, June 7, 2015. Lead instructor: Laurel Saito.

Guest instructor in graduate-level course, RGSC 618, "Interdisciplinary modeling: Water-related issues and changing climate", New Mexico State University, sponsored by NSF/EPSCoR, June 7, 2012. Lead instructor: Laurel Saito.

Co-taught graduate-level course, GEOL/GEOG 5700, "Surface Process Modeling: Applying the CSDMS Modeling Tool", University of Colorado at Boulder, Fall 2010. Instructors: J. Syvitski, I. Overeem and S.D. Peckham. 2 credits.

Guest instructor in graduate-level course, NRES 730, "Interdisciplinary modeling: Water-related issues and changing climate", University of Nevada at Reno, sponsored by NSF/EPSCoR, July 28, 2010. Lead instructor: Laurel Saito.

Co-taught course GEOL 4060/5060, Oceanography, University of Colorado at Boulder, Spring 2003, Spring 2004, Spring 2005, Spring 2006. Instructors: J. Syvitski, and S.D. Peckham. 4 credits.

## Service on Scientific and Advisory Committees

**Chair:** NSF CUAHSI (Consortium of Universities for the Advancement of Hydrologic Science, Inc.) Standing Committee for Informatics, overseeing the CUAHSI Water Data Center (2014 to 2018).

**Elected, At-Large Member:** NSF EarthCube Leadership Council (mid 2016 to 2018).

**Member:** TACC (Texas Advanced Computing Center) Data Advisory Board (mid-2017 to 2019)

**Member:** Organizing Committee for the International Society for Geomorphometry Annual Meeting 2018, Boulder, CO. (<http://2018.geomorphometry.org>)

**Member:** Scientific Committee for the iEMSs 2018 Annual Meeting, Fort Collins, CO.

**Chair:** Organizing Committee for the 2016 NSF EarthCube Annual Meeting (2015 to 2016).

**Chair:** Organizing Committee for the EarthCube 2015 Tech Hands Meeting, Scripps Institution of Oceanography, UC San Diego, La Jolla, CA (Apr. 8-10, 2015).

**Co-Chair:** Cyber-informatics and Numerics Working Group, Executive Committee of CSDMS (Community Surface Dynamics Modeling System) (2013 to 2018)

**Chair:** Cyber-informatics and Numerics Working Group, Executive Committee of CSDMS (Community Surface Dynamics Modeling System) (2019 to Present)

**Member:** NSF CUAHSI (Consortium of Universities for the Advancement of Hydrologic Science, Inc.) Standing Committee for Informatics (2009 to Present).

**Member:** International Scientific Committee for HIC 2016 (12<sup>th</sup> International Conference on Hydroinformatics), Incheon, South Korea. (Present to Aug. 2016)

**Member:** International Scientific Committee for HIC 2014 (11<sup>th</sup> International Conference on Hydroinformatics), CCNY, New York, NY (Aug. 2014)

**Member:** Scientific Committee of the International Society for Geomorphometry, geomorphometry.org (2010 to Present)

**Member:** University of Colorado's Conflict of Interest Advisory Committee that led to new policies including the hire of a Compliance Director (2005 to 2007).

**Member:** Snake River Watershed Task Force, a stakeholder organization that examined strategies for mitigating the detrimental effects of acid mine drainage in the Snake River watershed of Summit County, Colorado (1999 to 2003).

## Peer-reviewed Publications

Peckham, S.D., and M. Stoica (2022) Core principles of the Scientific Variables Ontology. Proceedings of the 9th International Conference on Water Resources and Environmental Research (ICWRER 2022), p. 58-63, Eds. Ni-Bin Chang and Liping Fang. Special session: Next generation hydroinformatics applications in water resources research and education. (Invited)

[https://www.researchgate.net/publication/368471658\\_Core\\_Principles\\_of\\_the\\_Scientific\\_Variables\\_Ontology](https://www.researchgate.net/publication/368471658_Core_Principles_of_the_Scientific_Variables_Ontology)

G. Tucker, E.W.H Hutton, M.D. Piper, B. Campforts, T. Gan, K.R. Barnhardt, A. Kettner, I. Overeem, S.D. Peckham, L. McCready, and J.P.M Syvitski (2022) Numerical modeling of Earth's dynamic surface: A community approach, Geosci. Model. Dev., 15(4), 1413-1439, <https://doi.org/10.5194/gmd-15-1413-2022>.

Peckham, S.D., D.S. Stamps, H. Wang, and A. Sheehan (2023) Simplified access to geoscience datasets with the BALTO Jupyter notebook graphical user interface, Computers & Geosciences (in progress)

Peckham, S.D. (2023) Manning's equation and power-law approximations to the logarithmic law of the wall, (in preparation).

Stoica, M. and S.D. Peckham (2023) Foundations of the Scientific Variables Ontology: An ontological blueprint for constructing machine-readable quantitative and qualitative variable names, Semantic Web Journal (in preparation).

Gil, Y., D. Garijo, D. Khider, C.A. Knoblock, V. Ratnakar, M. Osorio, H. Vargas, M. Pham, J. Pujara, B. Shbita, B. Vu, Y. Chiang, D. Feldman, Y. Lin, H. Song, V. Kumar, A. Khandelwal, M. Steinbach, K. Tayal, S. Xu, S.A. Pierce, L. Pearson, D. Hardesty-Lewis, E. Deelman, R. Ferreira da Silva, R. Mayani, A.R. Kemanian, Y. Shi, L. Leonard, S. Peckham, M. Stoica, K. Cobourn, Z. Zhang, C. Duffy, L. She (2021) Artificial intelligence for modeling complex systems: Taming the complexity of expert models to improve decision making, ACM Transactions on Interactive Intelligent Systems, 11(2), pp 1-49, <https://doi.org/10.1145/3453172>.

- G. Tucker, E.W.H Hutton, M.D. Piper, B. Campforts, T. Gan, K.R. Barnhardt, A. Kettner, I. Overeem, S.D. Peckham, L. McCready, and J.P.M Syvitski (2021) Numerical modeling of Earth's dynamic surface: A community approach, EarthArXiv, <https://doi.org/10.31223/X51615>.
- Stoica, M. and S.D. Peckham (2019). The Scientific Variables Ontology: A Blueprint for Custom Manual and Automated Creation and Alignment of Machine-Interpretable Qualitative and Quantitative Variable Concepts. Proceedings of the Modeling the World's Systems Conference, May 13-15 2019, Washington, DC. <http://mint-project.info/assets/publications/stoica-peckham-cwm19.pdf>. (<https://www.momacs.pitt.edu/conference/conference-2019/>).
- Garijo, D., D. Khider, V. Ratnakar, Y. Gil, E. Deelman, R Ferreira da Silva, C.A. Knoblock, Y. Chiang, M. Pham, J. Pujara, B. Vu, D. Feldman, R. Mayani, K. Cobourn, C.J. Duffy, A. Kemanian, L. Shu, V. Kumar, A. Khandelwal, K. Tayal, S.D. Peckham, M. Stoica, A. Dabrowski, D. Hardesty-Lewis, S.A. Pierce (2019) An intelligent interface for integrating climate, hydrology, agriculture, and socioeconomic models, pp. 111-112, Proc. of the 24th International Conference on Intelligent User Interfaces: Companion, Marina del Rey, CA, USA, March 16-20, 2019. ACM 2019, <https://doi.org/10.1145/3308557.3308711>.
- Badham, J., S. Elsayah, J. Guillaume, S. Hamilton, R. Hunt, T. Jakeman, S. Pierce, V. Snow, M. Babbar-Sebens, B. Fu, P. Gober, M. Hill, T. Iwanaga, D. Loucks, W. Merritt, S. Peckham, A. Richmond, F. Zare, D. Ames and G. Bammer (2019) Effective modeling for Integrated Water Resource Management: A guide to contextual practices by phases and steps and future opportunities, *Environmental Modelling and Software*, 116, 40-56, <https://doi.org/10.1016/j.envsoft.2019.02.013>.
- Peckham, S.D. (2018) Using the open-source TopoFlow Python package for extracting D8 grids from DEMs and for fluvial landscape evolution modeling, *Proceedings of Geomorphometry 2018*, Boulder, CO, pp. O-11-1 to O-11-4, <https://peerj.com/collections/57-geomorphometry2018/>, [http://2018.geomorphometry.org/Peckham\\_2018\\_geomorphometry.pdf](http://2018.geomorphometry.org/Peckham_2018_geomorphometry.pdf)
- Peckham, S.D., E.C. Waymire and P. De Leenheer (2018) Critical thresholds for eventual extinction in randomly disturbed population growth models, *Journal of Mathematical Biology*, pp. 1-31, <https://doi.org/10.1007/s00285-018-1217-y>.
- Garijo, D., D. Khider, Y. Gil, L.A.M.C. Carvalho, B.T. Essawy, S. Pierce, D.H. Lewis, V. Ratnakar, S.D. Peckham, C. Duffy, J.L. Goodall (2018) A semantic model catalog to support comparison and reuse, 9<sup>th</sup> International Conference on Environmental Modelling and Software, Ft. Collins, CO.
- Peckham, S.D. (2017) Looking for patterns: An approach for tackling tough problems, Integration and Implementation Insights weblog, WordPress.com, <https://i2insights.org/2017/05/23/explaining-patterns/>.
- Peckham, S.D., M. Stoica, E.E. Jafarov, A. Endalamaw and W.R. Bolton (2017) Reproducible, component-based modeling with TopoFlow, a spatial hydrologic modeling toolkit, *Earth and Space Science*, 4(6), 377-394, special issue: *Geoscience Papers of the Future*, American Geophysical Union, <http://dx.doi.org/10.1002/2016EA000237>.
- Jiang, P., M. Elag, P. Kumar, S.D. Peckham, L. Marini, R. Liu (2017) A service-oriented architecture for coupling web service models using the Basic Model Interface (BMI), *Environmental Modelling & Software*, 92, 107-118, <http://dx.doi.org/10.1016/j.envsoft.2017.01.021>. (EMELI-Web, available at: <http://ecgs.ncsa.illinois.edu/emeli-web/>).
- Elag, M.M., P. Kumar, L. Marini, S.D. Peckham and R. Liu (2017) Semantic interoperability of long-tail geoscience resources over the Web, Chapter 9, pp. 175-200, In: *Large-Scale Machine Learning in the Earth Sciences*, Eds. A.N. Srivastava, R. Nemani and K. Steinhaeuser, Chapman and Hall, CRC Press, 208 pp, ISBN-13: 978-1498703871.
- David, C.H., Y. Gil, C. Duffy, S.D. Peckham and S.K. Venayagamoorthy (2016) An introduction to the special issue on geoscience papers of the future, *Earth and Space Science*, 3, 1-4, special issue: *Geoscience Papers of the Future*, American Geophysical Union, <http://dx.doi.org/10.1002/2016EA000201>.
- Peckham, S.D., A. Kelbert, M. Hill and E. Hutton (2016) Towards uncertainty quantification and parameter estimation for Earth system models in a component-based modeling framework, special

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- Peckham, S.D. (2015) Longitudinal elevation profiles of rivers: Curve fitting with functions predicted by theory. In: Jasiewicz, J., Zwolinski, Zb., Mitasova, H., Hengl, T. (Eds.), *Geomorphometry for Geosciences*, pp. 137-140, Bogucki Wydawnictwo Naukowe, Adam Mickiewicz University in Poznań, Institute of Geoecology and Geoinformation, Poznań, Poland. ISBN: 978-83-7986-059-3, June 15, <http://geomorphometry.org/Peckham2015>.
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- North, E.W., E.E. Adams, A.E. Thessen, Z. Schlag, R. He, S.A. Socolofsky, S.M. Masutani and S.D. Peckham (2015) The influence of droplet size and biodegradation on the transport of subsurface oil droplets during the Deepwater Horizon spill: A model sensitivity study, *Environmental Research Letters*, 10, 024016, <http://dx.doi.org/10.1088/1748-9326/10/2/024016>.
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- Peckham, S.D. (2014) The CSDMS Standard Names: Cross-domain naming conventions for describing process models, data sets and their associated variables, Proceedings of the 7<sup>th</sup> Intl. Congress on Env. Modelling and Software, International Environmental Modelling and Software Society (iEMSs), San Diego, CA. (Eds. D.P. Ames, N.W.T. Quinn, A.E. Rizzoli), Paper 12. <http://scholarsarchive.byu.edu/iemssconference/2014/Stream-A/12/>.
- Peckham, S.D. (2014) EMELI 1.0: An experimental smart modeling framework for automatic coupling of self-describing models, *Proceedings of HIC 2014*, 11<sup>th</sup> International Conf. on Hydroinformatics, New York, NY. CUNY Academic Works, [http://academicworks.cuny.edu/cc\\_conf\\_hic/464/](http://academicworks.cuny.edu/cc_conf_hic/464/).
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- Peckham, S.D. (2013) Mathematical surfaces for which specific and total contributing area can be computed: Testing contributing area algorithms, *Proceedings of Geomorphometry 2013*, Nanjing, China, pp. O-11-1 to O-11-4, <http://geomorphometry.org/Peckham2013>, October 7.
- Peckham, S.D., E.W.H. Hutton and B. Norris (2013) A component-based approach to integrated modeling in the geosciences: The Design of CSDMS, *Computers & Geosciences*, special issue: Modeling for Environmental Change, 53, 3-12, <http://dx.doi.org/10.1016/j.cageo.2012.04.002>.
- Peckham, S.D. and J.L. Goodall (2013) Driving plug-and-play models with data from web-services: A demonstration of interoperability between CSDMS and CUAHSI-HIS, *Computers & Geosciences*, special issue: Modeling for Environmental Change, 53, 154-161, <http://dx.doi.org/10.1016/j.cageo.2012.04.019>.

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- Cobourn, K.M., H. Lintz, S. Peckham and L. Saito (2013) A framework to understand and guide research and management in rangelands with ecological thresholds, *Rangeland Ecology and Management* (submitted)
- Syvitski, J.P.M., S.D. Peckham, O. David, J.L. Goodall, C. Deluca, G. Theurich (2012) Chapter 28: Cyberinfrastructure and community environmental modeling, 399-410, In: *Handbook of Environmental Fluid Dynamics, Volume 2: Systems, Pollution, Modeling and Measurements*, Editor: H.J.S. Fernando, CRC Press, Taylor & Francis Group, LLC.
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- Malik, T., D.G. Tarboton, J.L. Goodall, E. Choi, A. Bhatt, S.D. Peckham, I. Foster, D.H.T. That, B. Essawy, Z. Yuan, P.K. Dash, G. Fils, T. Gan, O.I. Fadugba, A. Saxena and T.A. Valentic (2017) GeoTrust Hub: A platform for sharing and reproducing geoscience applications, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract: IN43A-0068.
- M. Kejrival, S.A. Pierce, P.I.Q. Houser, S.D. Peckham, Z. Stanko, D.H. Lewis, Y. Gil, D.D. Pennington, C. Knoblock and D. Garijo (2017) Semi-automatic data integration using Karma, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract: IN13A-0053.
- Bandaragoda, C., J. Phuon, S. Mooney, K. Stephens, E. Istanbuluoglu, K. Pieper, W. Rhoads, M. Edwards, A. Pruden, J. Bales, E. Clark, L. Brazil, M. Leon, W.G. McDowell, J.S. Horsburgh, D.G. Tarboton, A.S. Jones, E. Hutton, G.E. Tucker, L. McCready, S.D. Peckham, W.C. Lenhardt, and R. Idaszak (2017) Building infrastructure to prevent disasters like Hurricane Maria, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract: NH23E-2077.
- Koskela, R., M. Ramamurthy, J. Pearlman, K. Lehnert, T. Ahern, J. Fredericks, S. Goring, S. Peckham, L. Powers, F. Kamalabdi, K. Rubin and L. Yarmey (2017) EarthCube: A community-driven cyberinfrastructure for the geosciences, *Geophysical Research Abstracts*, Vol. 19, EGU2017-5884-1, EGU General Assembly 2017.
- Peckham, S.D., A. Kelbert, S. Rudan and M. Stoica (2016) A new browser-based, ontology-driven tool for generating standardized, deep descriptions of geoscience models, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract: H41B-1339.
- Davis, E., K. Kehoe, S.M. Collis, N. Guy and S.D. Peckham (2016) CF Standard Names: Supporting increased use of netCDF-CF across the geoscience community, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract IN23A-1759.
- Jiang, P., M. Elag, P. Kumar, R. Liu, Y. Hu, L. Marini, S.D. Peckham and L. Hsu (2016) An application of the Geo-Semantic micro-services in seamless data-model integration, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract IN11E-03.
- Jafarov, E.E., S.D. Peckham, M. Stoica, W.R. Bolton, A.M. Endalamaw (2016), Application of the TopoFlow model to two sub-basins of the Caribou - Poker Creek Research Watershed, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract GC43E-1206.
- Peckham, S.D. (2016) Towards standard variable names for environmental chemistry: Semantic mediation and extensions to the CSDMS Standard Names, *International Environmental Modelling and Software Society (iEMSs) 8th International Congress on Environmental Modelling and Software*,

Toulouse, France, Paper A-1, Sabine Sauvage, José-Miguel Sánchez-Pérez, Andrea Rizzoli (Eds.)  
<http://www.iemss.org/society/index.php/iemss-2016-proceedings>. (July 10-14),  
<https://scholarsarchive.byu.edu/iemssconference/2016/Stream-A/1/>, ISBN: 978-8890357459

Goodall, J.L. and S.D. Peckham (2016) Interoperability between the Basic Modeling Interface (BMI) and the Open Modeling Interface (OpenMI): A step toward building the Earth System Bridge for modeling framework interoperability" (July 12, 2016). *8th International Congress on Environmental Modelling and Software, Toulouse, France*. Paper A-28.

<http://scholarsarchive.byu.edu/iemssconference/2016/Stream-A/28>

Peckham, S.D. (2016) Advances in geoscience modeling: Smart modeling frameworks, self-describing models and the role of standardized metadata, *Geophysical Research Abstracts*, Vol. 18, EGU2016-9508, EGU General Assembly 2016.

Peckham, S.D. (2015) Toward a geoscientific semantic web based on how geoscientists talk across disciplines, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract PA53A-2230.

Malik, T., I. Foster, J.L. Goodall, S.D. Peckham, J.B.H. Baker and M. Gurnis (2015) Personalized, shareable geoscience dataspace for simplifying data management and improving reproducibility, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract IN21E-01 (Invited).

Jiang, P., M. Elag, P. Kumar, S.D. Peckham, R. Liu, L. Marini and L. Hsu (2015) A smart modeling framework for integrating BMI-enabled models as web services, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract IN31C-1775.

Peckham, S.D., C. DeLuca, D. Gochis, J. Arrigo, R. Dunlap, A. Kelbert and E. Choi (2014) EarthCube – Earth System Bridge (ESB): Spanning scientific communities with interoperable modeling frameworks, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract IN31D-3754.

Kelbert, A. and S.D. Peckham (2014) Metadata for numerical models of deep Earth and Earth surface processes, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract IN31D-3721.

Choi, E., A. Kelbert and S.D. Peckham (2014) Linking tectonics and surface processes through SNAC-CHILD coupling: Preliminary results towards interoperable modeling frameworks, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract T33B-4683.

Peckham, S.D. (2013) Smart frameworks and self-describing models: Model metadata for automated coupling of hydrologic process components (**Invited**), *Eos Trans. AGU*, Fall Meet. Suppl., Abstract IN33C-01.

Bolton, W.R., R. Busey, L.D. Hinzman and S.D. Peckham (2013) Simulation of water and land-surface feedbacks in a polygonal tundra environment, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract C53A-0541.

Olsen, C., H.E. Lintz and S.D. Peckham (2013) Testing a theoretical model that predicts thresholds in populations forced by imposing random, episodic disturbances, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract B23E-0603.

Peckham, S.D. (2012) Modeling frameworks, workflows and community modeling: Where are we now and where do we go from here? (Invited), *Eos Trans. AGU*, Fall Meet. Suppl., Abstract IN54B-05.

Peckham, S.D. (2012) Plug-and-play hydrologic modeling: Is that really possible? (Invited), *Eos Trans. AGU*, Fall Meet. Suppl., Abstract IN11B-1462.

Gochis, D.J., S.D. Peckham, J.S. Arrigo, J.S. Famiglietti, J.T. Reager, J. Edman (2012) Progress and opportunities in Earth System model coupling with emphasis on hydrological model components (Invited), *Eos Trans. AGU*, Fall Meet. Suppl., Abstract H31N-01.

Hinzman, L.D., W.R. Bolton, J.M. Cable, B. Nijssen, D. Lettenmaier, S.D. Peckham and D. Morton (2012) Quantifying interdependence among processes and characterizing dynamic controls across spatial scales by linking climate, hydrology and ecosystem models, *Eos Trans. AGU*, Fall Meet.

- Suppl., Abstract B53E-0710 (or B41C-0311 ?)
- Overeem, I., E. Hutton, A. Kettner, S.D. Peckham and J.P. Syvitski (2012) The Community Surface Dynamics Modeling System: Experiences on building a collaborative modeling platform (Invited), *Eos Trans. AGU*, Fall Meet. Suppl., Abstract IN54A-06.
- Syvitski, J.P., E. Hutton, S.D. Peckham, I. Overeem and A. Kettner (2012) CSDMS 2.0: Computational infrastructure for community surface dynamics modeling, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract IN51D-1707.
- Peckham, S.D. (2011) A population growth model forced by random, episodic disturbances, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract B33E-0506.
- Cobourn, K.M. and S.D. Peckham (2011) When does ecological sustainability ensure economic sustainability? An integrated analysis of thresholds in semi-arid western rangelands, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract B31K-05.
- Peckham, S.D. (2010) Component-based hydrologic and landscape evolution models: Interoperability, standards and new algorithms, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract H53H-07.
- North, E.W., Z. Schlag, E.E. Adams, R. He, K.H. Hyun, C.R. Sherwood, R.P. Signell and S.D. Peckham (2010) Simulating the three-dimensional dispersal of aging oil with a Lagrangian approach, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract OS42A-07.
- Peckham, S.D. and Hutton, E.H. (2009) Componentizing, standardizing and visualizing: How CSDMS is building a new system for integrated modeling from open-source tools and standards, *Eos Trans. AGU*, 90(52), Fall Meet. Suppl., Abstract IN11A-1045.
- Peckham, S.D. Hutton, E.W.H. and Syvitski, J.P.M. (2009) The CSDMS project and submission standards for model source code. Abstracts of the IAMG 2009 Meeting, August 23-29, 2009 Stanford, CA
- Peckham, S.D. (2008) Towards a system for high-performance, multi-language, component-based modeling, *Eos Trans. AGU*, 89(53), Fall Meet. Suppl., Abstract IN33A-1158.
- Bachman, S. and Peckham, S.D. (2008) Comparison of numerical approaches to a steady-state landscape equation, *Eos Trans. AGU*, 89(53), Fall Meet. Suppl., Abstract H51D-0862.
- Peckham, S.D. and Syvitski, J.P.M. (2007) Evaluation of model coupling frameworks for use by the Community Surface Dynamics Modeling System (CSDMS), *Eos Trans. AGU*, 88(52), Fall Meet. Suppl., Abstract H53C-1407.
- Peckham, S.D. (2006) Modeling longshore transport and coastal erosion due to storms at Barrow, Alaska, *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract H311-01.
- Peckham, S.D. (2005) A new method for computing flow paths and contributing areas over both convergent and divergent topography, *Eos Trans. AGU*, 86(52), Fall Meet. Suppl., Abstract H43D-0526.
- Morehead, M.D., S.D. Peckham and J. Muskatirovic (2005) Lessons learned from predicting the poorly gauged Sweetwater Creek basin, in Central Idaho, *Eos Trans. AGU*, 86(52), Fall Meet. Suppl., Abstract H51B-0355. (Note: This used TopoFlow.)
- Peckham, S.D., E. Hutton and J.P.M. Syvitski (2004) New results on the form and stability of continental shelf profiles, 32nd Intl. Geological Congress, Abs. Vol., pt 2, abs. 307-12, p. 1377. (Florence, Italy)
- Peckham, S.D. (2004) The TopoFlow hydrologic model: A new community project, *Eos Trans. AGU*, 85(17), p. 255, Jt. Assem. Suppl., Abstract H52B-05. (Invited talk, AGU Joint Assembly Meeting, Montreal, Canada)
- Peckham, S.D. (2003) Estimating geomorphically effective rainrates from elevation data, *Eos Trans. AGU*, 84(46), p. 263, Fall Meet. Suppl., Abstract H41A-07.
- Bolton, W.R., L.D. Hinzman, S.D. Peckham, D.L. Kane and K. Yoshikawa (2003) Characterizing the influence of permafrost on hydrological processes through a spatially distributed model, *Eos Trans. AGU*, 84(46), p. 181, Fall Meet. Suppl., Abstract H22B-0929.
- Peckham, S.D., M. Nolan and L. Hinzman (2002) A new distributed hydrologic model based on ARHYTHM and RiverTools, *Eos Trans. AGU*, 83(47), Fall Meet. Suppl., Abstract H71E-08.

- Peckham, S.D. and M.F. Hutchinson (2001) Fluvial landscape reconstruction and process-based gridding algorithms, *Eos Trans. AGU*, 82(47), p. 429, Fall Meet. Suppl., Abstract H32A-0292.
- Morehead, M.D., M.S. Seyfried, S.D. Peckham and J.P.M. Syvitski (2001) Comparison of suspended sediment and discharge regimes among North American watersheds, *Eos Trans. AGU*, 82(47), p. 447, Fall Meet. Suppl., Abstract H41A-0262, Invited.
- Peckham, S.D. (2001) Mathematical modeling of landforms, *Transactions, Japanese Geomorphological Union*, v. 22(4), p. C-186. (Fifth International Conference on Geomorphology, Tokyo, Japan)
- Peckham, S.D. and J.P.M. Syvitski (2001) A 3D numerical model for fluvial landforms: Bifurcating channels and realistic longitudinal profiles from first principles, 7th International Conference on Fluvial Sedimentology, Univ. of Nebraska, Lincoln, NE.
- Peckham, S.D., E. Hutton and J.P.M. Syvitski (2000) Building seafloor stratigraphy via sediment deposition from plumes and other sources: A comparison of numerical and new analytic results, *Eos Trans. AGU*, 81(48), p. 632, Fall Meet. Suppl., Abstract OS61A-16.
- Peckham, S.D. (1999) Quantitative predictions from conservation equations, *Eos Trans. AGU*, Abstract H52F-03. (AGU Fall Meeting, San Francisco, CA)
- Peckham, S.D. (1998) Analytic solutions to nonlinear PDEs in geophysics, *Eos Trans. AGU*, v. 79(45), p. F2, Abstract U71B-04 (AGU Fall Meeting, San Francisco, CA)
- Peckham, S.D. and J.D. Smith (1997) Hydraulic geometry, a broken symmetry, and Hack's law, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract H41B-09.
- Peckham, S.D. (1996) The topographic coordinate transformation: A new analytic solution method for nonlinear landform PDEs, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract H32A-06.
- Peckham, S.D., V.K. Gupta and J.D. Smith (1996) A dynamic self-similarity hypothesis and predictions of downstream hydraulic geometry and longitudinal river profiles, *Eos Trans. AGU*, p. 77, Spring Meet. Suppl., Abstract H32C-05. (AGU Spring Meeting, Baltimore, MD)
- Bahr, D.B., M.F. Meier and S.D. Peckham (1995) The physical basis for glacier volume-area scaling and implications for mass balance profiles, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract H21E-01, Invited.
- Veitzer, S.A., V.K. Gupta and S.D. Peckham (1995) Isomorphism between self-similar tree topologies and multinomial cascades via their width functions, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract H41A-02.
- Peckham, S.D. (1995) Self-similarity in Shreve's random model, *Eos Trans. AGU*, Fall Meet. Suppl., Abstract H52E-08.

### **Chaired Sessions at Professional Meetings**

- David, O. and S.D. Peckham (2020) Session C8: Model-coupling frameworks: Advances in design, application solutions, and future opportunities for environmental modeling, 10<sup>th</sup> Annual Meeting of the International Environmental Modelling and Software Society (iEMSs), virtual, Sept. 2020.
- Hsu, T.-J., X. Liu, E.H. Meiburg, S.D. Peckham (2016) EP028: Moving down the chain: Studying Earth surface processes using computational fluid dynamics approaches across scales, American Geophysical Union, Fall Meeting, San Francisco, CA.
- Duffy, C., Y. Gil, C. Mattmann and S.D. Peckham (2015) U51A: Innovative community software schemes for the geosciences: Models, scripts, GIS data systems, workflows, collaboration tools, and more... American Geophysical Union, Fall Meeting, San Francisco, CA (Dec. 18)
- Peckham, S.D. and D.G. Tarboton (2014) S4-01: Special Session: Metadata for discovering and integration of data and models, 11<sup>th</sup> International Conference and Hydroinformatics (HIC 2014), City College New York (CCNY), NYC (Aug. 17)
- Peckham, S.D. (2014) S4-02: Special Session: User interfaces, environments and visualization in support of modeling, 11<sup>th</sup> International Conference and Hydroinformatics (HIC 2014), City College New York (CCNY), NYC (Aug. 17)



Goodall, J., J.S. Arrigo and S.D. Peckham (2013) H11E. Innovation in hydrology through the design, development, and use of community technologies and resources, posters

### **Additional Presentations and Unpublished Abstracts**

June 2022. Peckham, S.D. Tricks for including graphical user interfaces and visualization in Jupyter notebooks, EarthCube 2022 Annual Meeting: Building Beyond, June 14-16, Scripps Seaside Forum, La Jolla, CA. (oral)

May 2021. Peckham, S.D. (**Invited**). The Scientific Variables Ontology: A standard representation for variable names to support interoperability, USGS Community for Data Integration (CDI) Workshop (virtual), Designing Data-Intensive Science, Session: Semantic Web 101.

May 2021. Peckham, S.D. Component-based hydrologic modeling: Getting started with the TopoFlow 3.6 Python package (TopoFlow Clinic), CSDMS 2021 Annual Meeting: Changing landscapes and seascapes: Modeling for discovery, decision-making and communication, Boulder, CO.

Mar. 2021. Peckham, S.D. The TopoFlow data preparation workflow, EarthCube Scientific Workflow Training Session (virtual), EarthCube ASSET project, Mar. 16.

Oct. 2020. Peckham, S.D. Integration of the TopoFlow geospatial hydrologic model into the World Modelers architecture, DARPA World Modelers 2020 All Hands Meeting (virtual), Oct. 14.

Sep. 2020. Peckham, S.D. (**Invited**) TopoFlow and MINT (Model INTEgration through Knowledge-Rich Data), WaterHackWeek (virtual), Floating Tutorial, Sept. 3, <https://waterhack.sched.com/>, <https://www.hydroshare.org/resource/c59689b403b3484182b016fbc0267ac/>, Sept. 3.

Aug. 2020. Peckham, S.D. (**Invited**) The adapter-mediator pattern and cross-domain interoperability of data sets and models, KDD2020 Virtual Conference, 26<sup>th</sup> ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), Association for Computing Machinery, Session: Bridging methods and applications in data science (panel discussion), Org. Achi Dosanjh and Sang-Yun Oh, Aug. 27.

Jul. 2020. Peckham, S.D., M. Stoica, D. S. Stamps, J. Gallagher, N. Potter and D. Fulker (**Invited**) An Interactive GUI for BALTO in a Jupyter notebook, Jupyter meets the Earth virtual meeting, July 27, Organizers: Fernando Perez and Lindsey Heagy, July 27.

Jun. 2020. Peckham, S.D., M. Stoica, D. S. Stamps, J. Gallagher, N. Potter and D. Fulker (**Invited**) An Interactive GUI for BALTO in a Jupyter notebook, Abstract 158, 2020 EarthCube Annual (Virtual) Meeting, June 18, [earthcube.org/EC2020](http://earthcube.org/EC2020).

June 2019. Stamps, D.S., J. Gallagher, S. D. Peckham, A. Sheehan, N. Potter, M. Stoica, E. Njinju, D. Fulker, K. Neumiller, Z. M. Easton, R. R. White, D. R. Fuka. Brokered Alignment of Long-Tailed Observations (BALTO) Applications in Geoscience, EarthCube Annual Meeting 2019, Denver, CO, June 12-14.

June 2019. Done, J., C. Bruyere, M. Daniels, Y. Gil and S. Peckham, Mapping EarthCube Tools to Science Workflows: Progress from the ASSET Project, EarthCube Annual Meeting 2019, Denver, CO, June 12-14.

June 2019. Pierce, S.A., J. Powell, A. Karpatne, D. Garijo, J. Martin, D.H. Lewis, P. Marchetto, S.B. Cleveland, M. Daniels, I.N. Athanasiadis, P. Keys, I. Demir, D.R. Fuka, S.D. Peckham, M.C. Hill, I. Ebert-Uphoff, D.D. Pennington, G.A. Jacobs, Y. Gil, Intelligent systems and geosciences, EarthCube Annual Meeting 2019, Denver, CO (June 12-14).

June 2019. J. Powell, A. Karpatne, D. Garijo, J. Martin, D.H. Lewis, P. Marchetto, S.B. Cleveland, M. Daniels, I.N. Athanasiadis, P. Keys, I. Demir, S.D. Peckham, M.C. Hill, I. Ebert-Uphoff, D.D.

- Pennington, G.A. Jacobs, Y. Gil, S. Pierce, Creating sustainable knowledge centric communities with artificial intelligence applications to Earth science problems, EarthCube Annual Meeting 2019, Denver, CO (June 12-14).
- Apr. 2019. Peckham, S.D. (**Invited**) The Ontology for Scientific Variables and how it supports cross-domain interoperability for data sets and models, University of Idaho, Moscow. (April 18).
- Apr. 2019. Peckham, S.D. What is the difference between a variable, index and indicator? World Modelers MINT Project Team Meeting, Marina del Rey, CA (April 10).
- March 2019. Peckham, S.D. (**Invited**) Model reusability & interoperability: The key challenges and how to solve them, CUAHSI INFEWS Modeling Workshop (March 20-22), RENCI, Chapel Hill, NC (talk given remotely).
- Feb. 2019. Peckham, S.D. (**Invited**) Model explainability: How do we describe model capabilities without getting too technical?, DARPA World Modelers / Causal Exploration PI Meeting, Redondo Beach, CA (Feb. 25 – Mar. 1)
- Feb. 2019. Peckham, S.D. (**Invited**) Principle-based, semi-automatic ontology generation to support cross-domain interoperability of data sets and models, AAAS Meeting, Feb. 15, Washington, DC.
- Aug. 2018. Peckham, S.D. Using the open-source TopoFlow Python package for extracting D8-based grids from DEMs and fluvial landscape evolution modeling, Geomorphometry 2018: The 5th International Conference on Geomorphometry, August 13-17, Boulder, CO.
- June 2018. Peckham, S.D. and M. Stoica. Principle-based, semi-automatic ontology generation to support cross-domain interoperability of data sets and models, iEMSs 2018: 9th International Conference on Environmental Modelling and Software: "Modelling for sustainable food-energy-water systems", June 24-28, CSU, Fort Collins, CO.
- June 2018. Malik, T., J. Goodall, D. Tarboton, S. Peckham, E. Choi, and A. Bhatt (2018) GeoTrust: A integrated workbench for publishing, sharing, and reproducing geoscience applications, EarthCube All Hands 2018 Meeting, Washington, D.C. (poster).
- June 2018. Stamps, D.S., J. Gallagher, S. Peckham, A. Sheehan, N. Potter, M. Stoica, S. Malloy, E. Njinju, Z.M. Easton and D.R. Fuka (2018) Towards brokered alignment of long-tailed observations (BALTO), EarthCube All Hands 2018 Meeting, Washington, D.C. (poster).
- Apr. 2018, Peckham, S.D. (**Invited**) Results for a class of rooted, binary, random trees with fixed height, Random trees: Structure, self-similarity and dynamics, April 23-27, CIMAT (Centro de Investigacion en Matematicas), Guanajuato, Mexico.
- Feb. 2018. Peckham, S.D. (**Invited**) Representing data and models for reuse so they can be read by machines and humans, Session: Finding water management solutions with artificial intelligence, AAAS 2018 Annual Meeting, Feb. 15-19, Austin, TX.
- Jan., 2018. Peckham, S.D. (2018) The Geoscience Standard Names Ontology, DARPA World Modelers Program Kickoff Meeting, Jan. 29-31, Biosphere 2, Oracle, AZ.
- Jan., 2018. Peckham, S.D. (2018) Demonstration of EMELI 1.0: An experimental smart modeling framework for automatic coupling of self-describing models, DARPA World Modelers Program Kickoff Meeting, Jan. 29-31, Biosphere 2, Oracle, AZ.
- Jan., 2018. Peckham, S.D. (2018) World Modelers, MINT Project: Design criteria and architecture concepts, DARPA World Modelers Program Kickoff Meeting, Jan. 29-31, Biosphere 2, Oracle, AZ.
- Jan., 2018. Peckham, S.D. and M. Stoica (2018) Principle-based, semi-automatic ontology generation for model and data variables, DARPA World Modelers Program Kickoff Meeting, Jan. 29-31, Biosphere 2, Oracle, AZ.
- Jan., 2018. Peckham, S.D. and M. Stoica (2018) Principle-based, semi-automatic ontology generation for model and data variables, DARPA World Modelers Program, MINT Team Kickoff Meeting, ISI, Univ. of Southern California, Marina del Rey, CA.
- July, 2017. Peckham, S.D. The Geoscience Standard Names Ontology, EarthCube IS-GEO Research Coordination Network Meeting, Austin, TX.

- Apr. 2017. Peckham, S.D. Mathematical modeling of steady-state fluvial landforms, APPM Seminar, Univ. of Colorado, Boulder.
- Jan. 2017. Peckham, S.D. (**Invited**) The Geoscience Standard Names Ontology, GeoSemantics Symposium (before 2017 Winter ESIP Meeting), Bethesda, MD. (Jan. 10)
- Oct. 2016. Peckham, S.D. (**Invited**) Integrated environmental modeling, Describing effective core practices for developing and using models to support integrated water resource management, SESYNC Pursuit Meeting #2, A. Jakeman and S. Pierce (organizers), SESYNC, Annapolis, MD (Oct. 24-27).
- Oct. 2016. Peckham, S.D. (**Invited**) Flow resistance and longitudinal elevation profiles of rivers: Two stories about developing mathematical models to understand observations, Dawdy Lecture in Hydrologic Science, San Francisco State University, San Francisco, CA. (Oct. 11-12)
- Sept. 2016. Peckham, S.D. (**Invited**) Futuristic geoscience modeling: Smart modeling frameworks, self-describing models and the role of standardized metadata, Geological Society of America (GSA) Annual Meeting, Denver, CO (Sept. 25-28).
- July 2016. Peckham, S.D. Lecture: Plug-and-play modeling: Smart modeling frameworks, self-describing models and the role of standardized metadata, International Summer School on Hydrological Modeling with OMS (Object Modeling System) Components, University of Trento, Trento, Italy. (July 18-21) <http://webmagazine.unitn.it/evento/dicam/9539/oms-2016>.
- July 2016. Peckham, S.D. Contributions to the EarthCube architecture by the Earth System Bridge building block project (lightning talk), EarthCube 2016 All Hands Meeting, Denver, CO.
- July 2016. Peckham, S.D. Toward a geoscientific semantic web based on how geoscientists talk across disciplines (poster), EarthCube 2016 All Hands Meeting, Denver, CO.
- May 2016. Peckham, S.D. (**Invited**) Lessons learned from working on several big cyber-infrastructure projects, NSF Workshop on Innovative Cyber-infrastructure for Integrated Food, Energy and Water (FEW) Research, Scottsdale, AZ (May 22-23) [http://cybergis.illinois.edu/events/few\\_ci/home](http://cybergis.illinois.edu/events/few_ci/home).
- May 2016. Peckham, S.D. and A. Pope. The Geoscience Paper of the Future -- OntoSoft Training Clinic, <http://dx.doi.org/10.6084/m9.figshare.1586773>, CSDMS Annual Meeting -- Capturing Climate Change, Boulder, CO (May 17-19).
- May 2016. Peckham, S.D. The CSDMS Standard Names, NSF EarthCube Building Block: Earth System Bridge -- Environmental Chemistry Names/Ontology Workshop, Boulder, CO (May 11-13).
- May 2016. Peckham, S.D. Geoscience Standard Names Ontology, NSF EarthCube Building Block: Earth System Bridge -- Environmental Chemistry Names/Ontology Workshop, Boulder, CO (May 11-13).
- April 2016. Peckham, S.D. (**Invited**) Advances in geoscience modeling: Smart modeling frameworks, self-describing models and the role of standardized metadata, European Geoscience Union (EGU) General Assembly 2016, Vienna, Austria (April 17-22). (Video of presentation available at: <http://client.cntv.at/egu2016/us3>)
- March 2016. Peckham, S.D. (**Invited**) Integrated environmental modeling, Describing effective core practices for developing and using models to support integrated water resource management, SESYNC Pursuit Meeting #1, A. Jakeman and S. Pierce (organizers), SESYNC, Annapolis, MD (Mar. 8-11).
- Feb. 2016. Peckham, S.D. The CSDMS Standard Names: Progress toward delivery as added value RDF and crosswalks to other vocabularies, EarthCube GeoSemantics Team Meeting, UIUC, Urbana, IL (Feb. 22).
- August 2015. Peckham, S.D. and E. Hutton. Response to model integration with Python wrapper and CSDMS, PRESTO - Development of a Prototype of an Integrated Modeling System for Socio-Economic and Environmental Analysis to Promote Sustainability at the Regional Level, SESYNC, Annapolis, MD. (Aug. 3-5)

- July 2015. Peckham, S.D. The EMELI modeling framework, TopoFlow and Basic Model Interface (BMI), EarthCube GeoSemantics Team Meeting, NCSA, Urbana, IL (July 21-24).
- July 2015. Peckham, S.D. (**Invited**) Earth System Bridge: Spanning Scientific Communities with Interoperable Modeling Frameworks, CUAHSI 3<sup>rd</sup> Hydroinformatics Meeting Meeting – Model and Data Interoperability: From Theory to Practice, University of Alabama, Tuscaloosa, AL (July 14-18).
- July 2015. Peckham, S.D. (4-hour Workshop) The CSDMS Standard Names: Cross-domain naming conventions for describing process models, data sets and their associated variables, CUAHSI 3<sup>rd</sup> Hydroinformatics Meeting – Model and Data Interoperability: From Theory to Practice, University of Alabama, Tuscaloosa, AL (July 14-18).
- June 2015. Peckham, S.D. (**Invited**) EarthCube - Earth System Bridge: Spanning scientific communities with interoperable modeling frameworks, EarthCube Architecture Workshop, Scripps Institution of Oceanography, UC San Diego, La Jolla, CA (June 19-20).
- June 2015. Peckham, S.D. (**Invited**) Plug-and-play modeling: An overview of CSDMS and the Earth System Bridge project (guest lecture), Graduate-level course, GEOS 697 - Interdisciplinary Modeling: Water-related Issues and Changing Climate, Boise State University, Boise, ID (June 6-9).
- May 2015. Peckham, S.D. EarthCube - Earth System Bridge: Spanning scientific communities with interoperable modeling frameworks (poster), EarthCube All Hands Meeting, Arlington, VA (May 27-29).
- May 2015. Elag, M.M., P. Kumar, L. Marini, S.D. Peckham, L. Hsu, R. Lui and P. Jiang (2015) Geo-Semantic framework for integrating long-tail data and model resources for advancing Earth system science (poster), EarthCube All Hands Meeting, Arlington, VA (May 27-29)
- May 2015. Peckham, S.D. (**Invited**) Integrated plug-and-play modeling: An overview of CSDMS and the Earth System Bridge project, Integrated Modeling for Adaptive Management of Estuarine Systems Workshop, UC Davis, Davis, CA (May 21-22).
- May 2015. Peckham, S.D. An overview of the Earth System Bridge project (and some background about CSDMS), EarthCube Earth System Bridge Workshop: Numerical Model Metadata for Solid Earth Sciences, Portland State University, Portland, OR (Apr. 30 to May 2)
- Apr. 2015. Peckham, S.D. An overview of the Earth System Bridge project (and some background about CSDMS), 3<sup>rd</sup> Workshop on Coupling Technologies for Earth System Models, Manchester, UK (Apr. 20-22).
- Apr. 2015. Peckham, S.D. A Semi-technical overview of the Earth System Bridge project, EarthCube Tech Hands Meeting, Scripps Institution of Oceanography, UC San Diego, La Jolla, CA (Apr. 8-10). Peckham was the lead organizer.
- Mar. 2015. Peckham, S.D. Component-based, plug-and-play modeling: An overview of CSDMS, the Community Surface Dynamics Modeling System, EarthCube GeoSoft Early Career Advisory Committee Meeting, Information Sciences Institute (ISI), University of Southern California, Marina del Rey, CA (Mar. 11-13)
- Feb. 2015. Peckham, S.D. (**Invited**) Sharing variables between models in a plug-and-play community modeling system like CSDMS: The semantic mediation problem and the CSDMS Standard Names, RDA (Research Data Alliance) Metadata Semantics Summit Workshop, IUPUI Campus, Indianapolis, IN (Feb. 23-25)
- Feb. 2015. Peckham, S.D. Update on the CSDMS Standard Names and Model Coupling Metadata, EarthCube GeoSoft Kickoff Meeting, Marina del Rey, CA (Feb. 3-4)
- Jan. 2015. Peckham, S.D. (**Invited**) An overview of CSDMS, the Community Surface Dynamics Modeling System and the Earth System Bridge project, SESYNC Model Integration Workshop: Development of a Prototype of an Integrated Modeling System for Socio-Economic and Environmental Analysis to Promote Sustainability at the Regional Level, NCSG (Natl. Center for Smart Growth Research and Education) and SESYNC (National Socio-Environmental Synthesis Center), Annapolis, MD (Jan. 21-23).

- Dec. 2014. Peckham, S.D., C. DeLuca, D. Gochis, J. Arrigo, R. Dunlap, A. Kelbert and E. Choi, EarthCube – Earth System Bridge (ESB): Spanning scientific communities with interoperable modeling frameworks, AGU Fall Meeting, Abstract IN31D-3754.
- Nov. 2014. Peckham, S.D. (**Invited**) GeoSoft: Software stewardship for the geosciences, EarthCube Sediment Experimentalists Network (SEN) European Workshop: “Experimentalists going Dutch: Exploring the life-cycle of sedimentary experiments”, University of Utrecht, The Netherlands, (Nov. 4-7), (GeoSoft co-PIs Y. Gil, C. Duffy, C. Mattmann and E. Robinson)
- Oct. 2014. Peckham, S.D. The CSDMS Standard Names and Basic Model Interface (BMI), EarthCube Geosemantics Kickoff Meeting, National Center for Supercomputing Applications (NCSA), Urbana, IL (Oct. 20 - 21)
- Sep. 2014. Peckham, S.D. (**Invited**) The CSDMS Standard Names: Cross-domain naming conventions for describing process models, data sets and their associated variables, The Meaning of Names: Naming Diversity in the 21<sup>st</sup> Century, Boulder, CO (Sep. 30 – Oct. 1)
- Aug. 2014. Peckham, S.D. EMELI 1.0: An experimental smart modeling framework for automatic coupling of self-describing models, 11<sup>th</sup> International Conference on Hydroinformatics, City College New York (CCNY), NYC (Aug. 17-21)
- July 2014. Peckham, S.D. (**Invited**) Workshop: Challenging and Catalyzing Innovation toward Better Evidence and Tools to support Disaster Resilience in Developing Countries, Understanding Risk Forum ([understandrisk.org](http://understandrisk.org)), London, UK (July 4)
- July 2014. Peckham, S.D. (**Invited**) The Community Surface Dynamics Modeling System (CSDMS) and the Basic Model Interface (BMI), based on Commonalities, Workshop: “Plug and Play” – What will it take to connect the modeling tools?, Understanding Risk Forum ([understandrisk.org](http://understandrisk.org)), London, UK (July 3)
- June 2014. Peckham, S.D., C. DeLuca, D. Gochis, J. Arrigo, R. Dunlap, A. Kelbert, E. Choi (Poster) EarthCube – Earth System Bridge (ESB): Spanning scientific communities with interoperable modeling frameworks, EarthCube All Hands Meeting, Washington, DC, (June 24-26).
- June 2014. Peckham, S.D. (**Invited**) The CSDMS Standard Names: Cross-domain naming conventions for describing process models, data sets and their associated variables, 7<sup>th</sup> International Congress on Environmental Modeling and Software, iEMSS, San Diego, CO (June 16)
- May 2014. Peckham, S.D. An Introduction to CSDMS, the Community Surface Dynamics Modeling System, CSDMS Training Workshop for graduate students, WC-WAVE Summer Graduate Interdisciplinary Training and Tri-State Meeting (NSF EPSCoR), University of New Mexico, Albuquerque, NM (May 28)
- May 2014. Peckham, S.D. Clinic: Introduction to the Basic Model Interface (BMI) and the CSDMS Standard Names, CSDMS Annual Meeting, Boulder, CO (May 20-22)
- April 2014. Peckham, S.D. The CSDMS Standard Names, CUAHSI Ontology Project Meeting, City College New York (CCNY), NYC (April 8-9)
- Feb. 2014. Peckham, S.D. Earth System Bridge: An NSF-funded EarthCube Building Block, EarthCube Portfolio Workshop, National Ecological Observatory Network Inc. Headquarters (NEON), Boulder, CO (Feb. 12-14)
- Dec. 2013. Peckham, S.D., (**Invited**) Smart frameworks and self-describing models: Model metadata for automated coupling of hydrologic process components, AGU Fall Meeting 2013, Abstract IN33C-01. (Dec. 11)
- Nov. 2013. Peckham, S.D., (**Invited**) The EarthCube Earth System Bridge Project: Plug-and-play hydrologic models that work in multiple modeling frameworks, 2013 Ven Te Chow Hydrosystems Laboratory Fall Seminar Series, Dept. of Civil and Environmental Engineering, Univ. of Illinois, Urbana-Champaign. (Nov. 19)
- Nov. 2013. Peckham, S.D., An introduction to CSDMS, the Community Surface Dynamics Modeling System, Earth System Modeling Workshop, hosted by NSF EarthCube EAGER grant: Earth System Modeling Coupling Concept Award, UCAR, Boulder, CO. (Nov. 11)

- Nov. 2013. Peckham, S.D., An introduction to CSDMS, the Community Surface Dynamics Modeling System, webinar for Tri-State EPSCoR Project on Integrated Modeling. (Nov. 7)
- Aug. 2013. Peckham, S.D., **(Invited)** Random tree graphs with a job to do: From lightning to river networks, Mathematical Congress of the Americas Meeting, Guanajuato, Mexico. (Aug. 6)
- April 2013. Peckham, S.D. and E.C. Waymire **(Invited)** A critical threshold for eventual extinction in a randomly disturbed population dynamics model, NSF-funded workshop: Connectivity, Non-linearity and Regime Transitions in Future EarthScapes (STRESS series), Lake Tahoe, NV. (April 26)
- April 2013. Peckham, S.D., Modeling frameworks, workflows and community modeling: Where are we now and where do we go from here?, NSF EarthCube Modeling Workshop for the Geosciences (hosted by CUAHSI, CSDMS and CIG), Boulder, CO. (April 23)
- March 2013. Peckham, S.D., Introduction to the Basic Model Interface and CSDMS Standard Names (clinic), CSDMS Annual Meeting 2013, UCAR, Boulder, CO. (March 25)
- March 2013. Peckham, S.D., Introduction to the CSDMS Standard Names (webinar), CUAHSI monthly telecon. (March 6)
- Feb. 2013. Peckham, S.D., **(Invited)** An overview of the Community Surface Dynamics Modeling System (CSDMS), Second Workshop on Coupling Technologies for Earth System Models (CW2013), National Center for Atmospheric Research, Boulder, CO. (Feb. 20)
- Feb. 2013. Peckham, S.D., Modeling frameworks, workflows and community modeling: Where are we now and where do we go from here?, NSF EarthCube Summary Workshop on Earth System Model Coupling, Univ. of California, Irvine. (Feb. 11)
- December 2012. What's in a name? How the CSDMS Standard Names support sharing variables between models (Invited), Frontiers in Computational Physics: Modeling the Earth System, Boulder, CO (Dec. 20)
- September 2012. An introduction to CSDMS, the Community Surface Dynamics Modeling System, Meeting to evaluate model frameworks for IWRSS (Integrated Water Resources Science and Services), NOAA-NWS-OHD (Office of Hydrologic Development), Silver Spring, MD. (Sept. 13)
- August 2012. A population growth model forced by random, episodic disturbances and a critical threshold, Workshop on Mathematical Problems in the Environmental Sciences (MPES), Oregon State University, Corvallis, Oregon (Aug. 1)
- June 2012. A brief introduction to CSDMS, the Community Surface Dynamics Modeling System, guest lecture, Interdisciplinary Modeling: Water-Related Issues and Changing Climate (RGSC 618), New Mexico State University, Las Cruces, NM (June 9).
- November 2011. Advances in component-based modeling: Insights from the CSDMS project, Model Fusion Conference 2011, The Geological Society, London (Nov. 29).
- November 2011. The Community Surface Dynamics Modeling System (CSDMS -- Plug-and-play model interoperability for the earth sciences, Hydrologic Sciences and Water Resources Engineering Seminar Series, University of Colorado, Boulder (Nov. 9)
- November 2011. Participated in NSF EarthCube Charrette, Washington, D.C.
- October 2011. TopoFlow Hydrologic Model Hands-on Training, CSDMS Annual Meeting: Impact of time and process scales, Boulder, CO (Oct. 28).
- October 2011. Introducing BMI: Basic Model Interface, CSDMS Annual Meeting: Impact of time and process scales, Boulder, CO (Oct. 30).
- July 2011. Component-based ocean modeling with the Community Surface Dynamics Modeling System (CSDMS), Chesapeake Bay Program (CBP) Modeling Quarterly Review Meeting, Annapolis, MD (July 12)
- June 2011, Component-based ocean modeling with the Community Surface Dynamics Modeling System (CSDMS), Chesapeake Community Modeling Program (CCMP) Hydrodynamic Modeling Workshop, Smithsonian Environmental Research Center (SERC), Edgewater, MD (June 10)

March 2011, Wishlist for a modeling framework and the design of CSDMS, Community Hydrologic Modeling Platform (CHyMP) 3rd Workshop, Irvine, CA.

October 2010, New tools and information for code contributors, Developer Clinic, CSDMS Conference: Modeling for Environmental Change, San Antonio, TX (Oct. 15)

October 2010, Poster: North, E.W., Z. Schlag, E.E. Adams, R. He, K.H. Hyun, C.R. Sherwood, R.P. Signell and S.D. Peckham (2010) Simulating the three-dimensional dispersal of aging oil with a Lagrangian approach, CSDMS Conference: Modeling for Environmental Change, San Antonio, TX (Oct. 15)

October 2010, Poster: Peckham, S.D. and J.L. Goodall (2010) Driving plug-and-play models with data from web services - A demonstration of interoperability between CSDMS and CUAHSI-HIS, CSDMS Conference: Modeling for Environmental Change, San Antonio, TX (Oct. 15)

September 2010, Towards landscape evolution models that run much faster, Landscapes into Rock, William Smith Meeting, Geological Society of London, London, UK. (Sept. 21-23)

September 2010, The Community Surface Dynamics Modeling System (CSDMS), 3rd Annual National CZO Meeting, Boulder, CO (Sept. 13)

July 2010, A cartoon overview of component-based modeling concepts and CSDMS, University of Nevada, Reno, In course: Interdisciplinary modeling: Water-related issues and changing climate, NRES 730, sponsored by NSF/EPSCoR (July 28)

July 2010, A brief introduction to CSDMS, the Community Surface Dynamics Modeling System, University of Nevada, Reno, Guest lecture in course: Interdisciplinary modeling: Water-related issues and changing climate, NRES 730, sponsored by NSF/EPSCoR (July 28)

July 2010, A brief introduction to CSDMS, the Community Surface Dynamics Modeling System, CUAHSI HIS Workshop, CUAHSI Biennial Meeting, Boulder, CO (July 19-22)

May 2010, A brief introduction to CSDMS, the Community Surface Dynamics Modeling System, EPSCoR Innovative Working Group meeting: "Identifying the most relevant spatial and temporal scales of climate change with respect to surface hydrologic processes, Valles Caldera National Preserve, New Mexico (May 25)

March 2010, Remote sensing-based flood mapping and flood hazard assessment in Haiti, Rebuilding for Resilience: How Science and Engineering Can Inform Haiti's Reconstruction (March 22-23), University of Miami, FL. (with G.R. Brakenridge)

November 2009, Review of progress on the CSDMS project, CSDMS Chesapeake Focus Research Group Annual Meeting, Virginia Institute of Marine Science (VIMS), Gloucester Point, VA.

September 2009, A relationship between plan and profile curvature in a fluvial landscape model, presentation, Morphometry, Glaciers and Landscapes: A Workshop in Honour of Dr. Ian S. Evans, Durham University, UK.

July 2009, Analytic, steady-state solutions for fluvial landscape evolution models, presentation, Geomorphology 2009, 7th International Conference on Geomorphology (ANZIAG): Ancient Landscapes - Modern Perspectives, Melbourne, Australia.

July 2009, A brief overview of CSDMS, the Community Surface Dynamics Modeling System, presentation, University of Newcastle, Newcastle, Australia.

June 2009 (Syvitski, J.P.M., E.W.H. Hutton, I. Overeem, A. Kettner, and S. Peckham), An Overview of Source to Sink Numerical Modeling Approaches & Applications, AAPG Denver.

April 2009, Technical overview of the Community Surface Dynamics Modeling System, Chesapeake Focus Research Group Meeting, Annapolis, MD.

April 2009, A brief overview of CSDMS, the Community Surface Dynamics Modeling System, presentation, NCED Cyberseminar Series, Minneapolis, MN.

March 2009, A brief overview of CSDMS, the Community Surface Dynamics Modeling System, presentation, Tropical Hydrology Symposium, Smithsonian Tropical Research Institute (SRTI), Panama City, Panama.

March 2009, A very brief discussion of the "Mass Flux Method", presentation, Tropical Hydrology Symposium, Smithsonian Tropical Research Institute (SRTI), Panama City, Panama.

December 2008, Sediment transport in a changing Arctic: River plumes, longshore transport and coastal erosion, Arctic Change 2008 Meeting, Quebec City, Canada. (Invited talk)

October 2008, The technology behind the Community Surface Dynamics Modeling System (CSDMS), CSDMS Education and Knowledge Transfer (EKT) Working Group Meeting, Boulder, CO.

September 2008, The TopoFlow hydrologic model: A community project, Third IAG/AIG SEDIBUD Workshop: Sediment Budgets in Cold Environments, Mountain Research Station, University of Colorado, Boulder.

July 2008, An introduction to CSDMS technical concepts and protocols, CSDMS Executive Committee Meeting, University of Colorado, Boulder, CO.

July 2008, (Goodall, J. and S.D. Peckham) Component-based architectures for building community models, CUAHSI Biennial Colloquium on Hydrologic Science and Engineering, Boulder, CO. (poster and session chair)

July 2008, Evaluation of model coupling frameworks for use by the Community Surface Dynamics Modeling System (CSDMS), Computational Methods in Water Resources, XVII International Conference, San Francisco, CA.

May 2008, Evaluation of model coupling frameworks for use by the Community Surface Dynamics Modeling System (CSDMS), International Ground Water Modeling Center, Golden, CO (poster).

April 2008, Community Surface Dynamics Modeling System overview and working group charge, NSF/EU Workshop on CUAHSI and OpenMI, Wallingford, UK.

March 2008, Community hydrologic modeling: Advantages of using the Common Component Architecture (CCA), Scoping Workshop on a Community Hydrologic Modeling Platform (CHyMP), National Academy of Sciences, Washington, DC.

March 2008, A brief overview of model coupling frameworks, CSDMS Marine and Coastal Working Group Meeting, Orlando, FL.

February 2008, Advantages of using the Common Component Architecture (CCA) for the CSDMS project, CSDMS Cyberinformatics and Numerics Working Group Meeting, University of Colorado, Boulder, CO.

January 2008, Update on CSDMS Adoption of CCA, CCA Winter Meeting, Boulder, CO.

December 2007, A brief overview of model coupling frameworks, CSDMS Terrestrial Working Group Meeting, UC Berkeley, CA.

October 2007, A brief introduction to the CSDMS initiative, CUAHSI Fall Regional Meeting, Boise, ID.

July 2007, Introduction to the Community Surface Dynamics Modeling System, CCA Summer Meeting, Silver Spring, MD.

May 2006, Geomorphometry with RiverTools, Geomorphometry: The Textbook Workshop, Universidad de Extremadura, Placencia, Spain. Sponsored by European Commission, Joint Research Centre.

July 2006, New Features in TopoFlow 1.5, TopoFlow Users Workshop, Saskatoon, Saskatchewan, Canada. Sponsored by National Water Research Institute at NHRC.

March 2004, The TopoFlow hydrologic model: A new community project, AGU Hydrology Days, Fort Collins, CO.

March 2004, Modeling longshore transport and coastal erosion due to storms at Barrow, Alaska, 34th Annual International Arctic Workshop, Univ. of Colorado, Boulder, CO.

October 2003, Using a spatially distributed model to characterize the influence of permafrost on hydrological processes, SEARCH Open Science Meeting (SEARCH = Study of Environmental Arctic Change), October 27, 2003, Seattle, WA. Student Poster (Bolton, W.R., L.D. Hinzman, S.D. Peckham, D.L. Kane and K. Yoshikawa)



August 2003, A numerical model for longshore sediment transport: Preliminary results, Exxon-Mobile Meeting, Univ. of Colorado, Boulder.

May 2003, Developing a Community Surface Dynamics Modeling System (CSDMS), NSF Tsunami Workshop, Honolulu, HI. (with J.P.M. Syvitski, C. Paola, D. Furbish, P. Wiberg and G. Tucker).

February 2003, Geoclutter project progress report, Geoclutter Project Meeting, Univ. of Colorado, Boulder.

January 2003, TopoFlow: A new distributed hydrologic model based on ARHYTHM and RiverTools, TopoFlow Model Workshop, Univ. of Alaska, Fairbanks.

August 2002, Simulating sediment transport near Barrow, Alaska, ANSCIA Project Meeting, Barrow, Alaska. (poster with E. Cassano and H. Cooper)

February 2002, RiverTools: From concept to commercial success, Community Sediment Model Workshop, Boulder, CO.

February 2002, Climate impacts at Barrow, Alaska: Quantifying coastal erosion and flooding, ARCSS All Hands Meeting, Seattle, WA. (poster with W.F. Manley, J.P.M. Syvitski, and M. Dyurgerov)

January 2002, Sediment flux to the coastal zone: Deposition from surficial plumes, Mine Burial Workshop, Scripps Oceanographic Inst., La Jolla, CA. (poster with J.P.M. Syvitski)

January 2002, Sediment flux to the coastal zone: Predictions for the Navy, Mine Burial Workshop, Scripps Oceanographic Institute. (poster with J.P.M. Syvitski and R.D. Hilberman)

January 2002, Progress report on conversion of the ARHYTHM hydrologic model to IDL and development of a graphical user interface, TopoFlow Project Workshop, Univ. of Alaska, Fairbanks.

November 2001, A source to sink sediment transport model for Molokai, USGS Coral Reef Project Workshop, Molokai, HI. (with H. Cooper)

November 2001, Modeling coastal erosion near Barrow, Alaska, Arctic Coastal Dynamics 2nd Workshop, Potsdam, Germany. (with W. Manley, M. Dyurgerov, and J.P.M. Syvitski)

September 2001, Fluvial landscape modeling, INSTAAR Noon Seminar, Univ. of Colorado, Boulder, CO.

August 2001, Fluvial landscape modeling and reconstruction, Geoclutter Project Meeting, Univ. of Colorado, Boulder, CO.

August 2001, A 3D numerical model for fluvial landforms: Bifurcating channels and realistic longitudinal profiles from first principles, 7th International Conference on Fluvial Sedimentology, Univ. of Nebraska, Lincoln. (with J.P.M. Syvitski)

February 2001, Using RiverTools for DEM and Watershed Analysis, UCSB, Santa Barbara, CA. (Invited talk.)

January 2000, Surface hydrology of the Snake River Watershed, Snake River Watershed Task Force Meeting, Keystone, Colorado.

December 1999, Quantitative predictions from conservation equations, AGU Fall Meeting, San Francisco, CA.

November 1999, Mathematical modeling of landforms, UCSB, Santa Barbara, CA (by invitation from Prof. Terry Smith)

April 1998, Flow routing in large river basins, Annual meeting of the European Geophysical Society, Nice, France.

March 1998, Self-similarity and the fluid dynamics of large river networks, Univ. of Illinois, Urbana, IL. (by invitation from Prof. Praveen Kumar)

July 1997, Dynamics of river networks: Towards flow routing at the basin scale, USGS, Menlo Park, CA.

June 1997, Self-similar trees and the fluid dynamics of river networks, Workshop on Networks and Random Structures on Trees, Sandbjerg, Denmark.

February 1997, Topographic coordinates: An analytic solution method for nonlinear landform PDEs, Oregon State Univ., Corvallis, OR.

February 1997, Geometry and surface flow dynamics in large river basins, USGS, Lakewood, CO.

January 1997, Two invited talks: Analytic solutions of nonlinear second-order PDEs by geometry, and Demonstration of the RiverTools program, Meeting on Geometry in Present Day Science, Aarhus, Denmark.

December 1996, The topographic coordinate transformation: A new analytic solution method for nonlinear landform PDEs, Annual Gilbert Club Meeting, Berkeley, CA.

July 1996, New results for self-similar trees, 1996 Annual Meeting of the Society for Industrial and Applied Mathematics, Kansas City, MO.

June 1996, Dynamic self-similarity and predictions of downstream hydraulic geometry, Fourth Annual Workshop on Scale Problems in Hydrology, Krumbach, Austria.

March 1996, Invited participant at Workshop on Stochastic and Statistical Methods in Hydrology, Guanajuato, Mexico.

December 1995, River networks and self-similar trees, Annual Meeting of the Gilbert Club, Berkeley, CA.

### **Additional Meetings and Workshops**

July 2014. CUAHSI 2014 Biennial Meeting: Water Across the Critical Zone: From Local to Global Hydrology, National Conservation Training Center, Shepherdstown, WV. (served on the CUAHSI Informatics Standing Committee) (July 28-30)

July 2013. CUAHSI Conference on Hydroinformatics and Modeling, Utah State University, Logan, UT. (served on the CUAHSI Informatics Standing Committee, July 17th) (July 17-19)

April 2013. NSF EarthCube Modeling Workshop for the Geosciences, University of Colorado, Boulder, CO. Co-organizer. (Apr. 22-23).

February 2013. NSF EarthCube Summary Workshop on Earth System Model Coupling, University of California, Irvine, CA. Co-organizer. (Feb. 11-12)

January 2013. NSF EarthCube Digital Crust Workshop (GEO Domain Workshop: Envisioning a digital crust for simulating continental scale subsurface fluid flow in earth system models), USGS Powell Center, Fort Collins, CO (Jan 29-30).

January 2013. NSF EarthCube Workshop: Engaging the Critical Zone community to bridge long tail science with big data, University of Delaware, Newark, DE. (Jan. 21-23)

October 2012. NSF EarthCube PI Workshop #2, CIRES, University of Colorado, Boulder, CO (Oct. 4-5).

September 2012-Present. National Unified Operational Prediction Capability (NUOPC) - Monthly Telecon, (<http://earthsystemcog.org/projects/nuopc/>)

July 2012. NSF EarthCube PI Workshop #1, NSIDC, University of Colorado, Boulder, CO (July 10).

May 2012. NSF EarthCube: ESM Concept Award Workshop, Developing coupling strategies for Earth System Models: Challenges, opportunities and increasing community participation, National Center for Atmospheric Research (NCAR), Boulder, CO. Co-organizer, (May 22)

April 2012. IWRSS (Integrated Water Resources Science and Services) First Scoping Workshop for the "National Water Model", Chapel Hill, NC. Invited participant. (Apr. 9-11)

April 2012-2013. NSF EarthCube Layered Architecture Concept Award - Weekly Telcon.

June 2012. NSF EarthCube Charrette #2, Washington, D.C. (Jun. 12-14)

November 2011. NSF EarthCube Charrette #1, Washington, D.C. (Nov. 1-4)

February 2011. NSF EPSCoR Innovative Working Group Meeting: Identifying complementary indicators of ecological thresholds in a changing climate, McCall Outdoor Science School (MOSS), Ponderosa State Park, McCall, ID. Co-organizer. (Feb. 5-7)

### **Computer Models and Software**

*Stochastic Conflict Model v. 0.8*: A stochastic, geospatial model that simulates the emergence, spreading (both local and nonlocal), and resolution of conflict. The default setup is for the Greater Horn of

Africa region. Written in Python and distributed as a Python package. Also provides a graphical user interface (GUI) that runs in a Jupyter notebook, and utilities for visualizing output and creating movies. [https://github.com/peckhams/stochastic\\_conflict\\_model](https://github.com/peckhams/stochastic_conflict_model).

**BALTO GUI v. 0.5:** A graphical user interface (GUI) that runs in a Jupyter notebook (within a browser) and uses ipywidgets, ipyleaflet, pydap and binder. Prototype for browsing, subsetting and downloading data from OpenDAP servers. Written in Python. [https://github.com/peckhams/balto\\_gui](https://github.com/peckhams/balto_gui).

**TopoFlow 3.6 Package:** A new version of TopoFlow that runs in Python 3.7, with the addition of many new utilities for input data preparation, including pedotransfer functions and transformations using GDAL. Added standardized metadata to netCDF output files. Now over 94,000 lines of Python code. <https://github.com/peckhams/topoflow36>.

**SVO Tools:** This open-source, Python package for natural language processing (NLP) uses rules and linguistic data from Wiktionary to automatically classify short phrases into one or more of the 10 classes in the Scientific Variables Ontology, [https://github.com/peckhams/svo\\_tools](https://github.com/peckhams/svo_tools)

**Disturbed Logistic Growth Model:** This open-source, Python model computes and plots the single-species population size for a randomly disturbed population growth model. See: Peckham, Waymire and De Leenheer (2018), [https://github.com/peckhams/disturbed\\_logistic](https://github.com/peckhams/disturbed_logistic)

**EMELI (Experimental Modeling Environment for Linking and Interoperability; Python):** A light-weight, Python-based modeling framework for coupling model components that have the CSDMS Basic Model Interface (BMI).

**TopoFlow 3.5 Package (Python):** TopoFlow is a spatially-distributed hydrologic model that contains numerous, stand-alone submodels including: Channels\_Diffusive\_Wave, Channels\_Dynamic\_Wave, Channels\_Kinematic\_Wave, Data\_HIS, Diversions\_Fraction\_Method, Evaporation\_Energy\_Balance, Evaporation\_Priestley\_Taylor, Evaporation\_Read\_File, Infiltration\_Green\_Ampt, Infiltration\_Richards\_1D, Infiltration\_Smith\_Parlange, Meteorology, Saturated\_Zone\_Darcy\_Layers, Snowmelt\_Degree\_Day, Snowmelt\_Energy\_Balance, TopoFlow\_Driver

**D8\_Global:** A toolkit written as a class in Python/NumPy for D8-based hydrologic processing of digital elevation models (DEMs). It can (1) fill depressions in DEMs, (2) compute D8 flow direction code grids, (3) compute D8 contributing area grids in addition to other D8-related products.

**DEM\_Smoother:** An innovative tool written in Python/NumPy that can create a DEM (digital elevation model) with smoothly decreasing elevation profiles from a DEM with poor vertical and horizontal resolution. This is an important pre-processing step that is required for accurate spatial hydrologic modeling.

**Erode\_D8\_Global:** A fluvial landscape evolution model written in Python/Numpy and developed in support of an NSF-CMG grant on which Peckham was PI. It uses a traditional "global" timestepping algorithm, a new stability condition and dynamics-based depression filling. It also has a CSDMS model component interface which allows it to be used as a plug-and-play modeling component within the CSDMS modeling framework. It was featured in a graduate-level modeling course co-taught by Peckham, GEOL 5700. Compare to Erode\_D8\_Local.

**Erode\_D8\_Local:** A fluvial landscape evolution model written in Python/Numpy and developed in support of an NSF-CMG grant on which Peckham was PI. It uses an innovative "local" timestepping

algorithm that is much more efficient (i.e. faster) than the one used by Erode\_D8\_Global. It also employs a new stability condition and dynamics-based depression filling. It also has a CSDMS model component interface which allows it to be used as a plug-and-play modeling component within the CSDMS modeling framework.

**Additional Models:** *Python:* ALAS, I2PY, Py\_Utils. *IDL:* Longshore, Plumes, Shoreline, Strata, TopModel-IDL, TopoFlow-IDL. *C:* TopModel-C

## **Synergistic Activities**

Lead-PI for the NSF EarthCube Building Block project called ASSET and co-PI on the NSF EarthCube Building Block project called BALTO (starting Fall 2017).

Lead-PI for the NSF EarthCube Building Block project called Earth System Bridge and co-PI on three other EarthCube Building Block projects called GeoSoft, GeoSemantics and GeoDataspace. Previously co-PI on two NSF EarthCube EAGER projects.

Frequent interaction with the earth science modeling community, including developers of other integrated modeling and data service projects such as CCA (Common Component Architecture), OpenMI (Open Modeling Interface), ESMF (Earth System Modeling Framework), OMS (Object Modeling System), CUAHSI (now serving on its Standing Committee for Informatics).

Founder of a small software development company called Rivix, LLC in 1998 and developer of its flagship product, RiverTools ([www.rivertools.com](http://www.rivertools.com)). RiverTools is a software toolkit for the analysis of digital terrain and river networks. It was specifically designed to extract, display, and analyze many different kinds of hydrologic data from very large elevation grids. Its speed, accuracy, platform-independence, extensibility and intuitive, point-and-click interface are unmatched by similar applications, and it contributes to hydrology education and research at many institutions around the world.

Author of numerous open-source models including: (1) a spatial hydrologic model called TopoFlow, (2) a fluvial landscape evolution model called Erode, (3) a coastline evolution model called Shoreline, (4) a sediment plume model called Plume and several others. Most of these can now be downloaded from the CSDMS wiki at: <http://csdms.colorado.edu/wiki>.

## **Recent Collaborators**

Jennifer Arrigo (CUAHSI), Joseph Baker (VA.Tech), Robert Bolton (UAF), Kyle Chard (UChicago), Eunseo Choi (UMemphis), Cecelia DeLuca (UCB/NOAA), Chris Duffy (PennState), Rocky Dunlap (UCB/NOAA), Mostafa Elag (UIUC), Jay Famiglietti (UCI), Ian Foster (UChicago), Daniel Garijo (USC), Yolanda Gil (USC), David Gochis (UCAR), Jon Goodall (U.VA), Mike Gurnis (CalTech), Larry Hinzman (UAF), Rick Hooper (CUAHSI), Leslie Hsu (LDEO), Eric Hutton (UCB), Anna Kelbert (OSU), Praveen Kumar (UIUC), Tanu Malik (UChicago), Luigi Marini (NCSA), Thomas Manteuffel (UCB), Chris Mattmann (USC), Steve McCormick (UCB), Boyana Norris (OSU), Erin Robinson (FES), James Syvitski (UCB), Greg Tucker (UCB).

## **Graduate Advisors and Postdoctoral Sponsors**

J. Dungan Smith (NRC postdoctoral advisor), Vijay K. Gupta (doctoral thesis advisor) , and Edward C. Waymire (masters thesis advisor)

## **Service on Graduate Student Committees**

1999. Member of PhD Dissertation Committee for Mark Morehead (Geophysics)  
2000. Member of MS Thesis Committee for Alejandro Machado (Geology)  
2003. Member of PhD Qualifying Exam Committee for Eric Hutton (Geophysics)  
2007. Member of MS Thesis Committee for Scott Bachman (Mathematics)  
2020. Member of PhD Dissertation Committee for Chao Wang (Hydrology, NMT)

## **Service as Thesis Advisor**

Scott Bachman (Univ. of Colorado, Boulder)

## **Supervision**

Maria Stoica, Scientific Programmer & Professional Research Associate  
Eric Hutton, Professional Research Associate  
Jisamma Kallumadikal, Software Engineer  
Chad Stoffel, System and Network Administrator for INSTAAR  
Scott Bachman, Graduate Research Assistant  
Harold Cooper, undergraduate student employee

## **Grants Received as PI or Co-PI**

Collaborative Research: Frameworks: OpenEarthScape – Transformative Cyberinfrastructure for Modeling and Simulation in the Earth-Surface Science Communities, National Science Foundation, CSSI Program, 6/1/21 to 5/31/26, 2 months/year (Lead PI: G. Tucker, total award: **\$2,471,353.**)

MINT: Model INTEgration Through Knowledge-Rich Data and Process Composition, DARPA World Modelers Program, Army Research Office, 9/1/17 to 8/31/21, 6 months/year (Project Lead PI: Y. Gil, Co-Is: S. Peckham, K. Cobourn, E. Deelman, C. Duffy, R.F. da Silva, A. Memanian, C. Knoblock, V. Kumar), Lead PI: Peckham of CU Subaward for **\$1,364,810.**

Collaborative Research: EarthCube Integration: Accelerating Scientific WorkflowS using EarthCube Technologies (ASSET), National Science Foundation, 9/1/17 to 8/31/19, 3 months/year (Lead PI: S. Peckham, Co-Is: C. Bruyere, M. Daniels, Y. Gil, D. Garijo), CU Award for **\$165,000**, grant# 1740719.

Collaborative Research: EarthCube Integration: Brokered Alignment of Long-Tail Observations (BALTO), National Science Foundation, 9/1/17 to 8/31/19, 3 months/year (Lead PI: D.S. Stamps, Co-Is: S. Peckham, A. Sheehan, J. Gallagher, D. Fulker, Z. Easton, D. Fuka), Lead PI: Peckham of CU Subaward for **\$501,233**, grant# 1740696.

EarthCube Building Blocks: GeoTrust: Improving Sharing and Reproducibility of Geoscience Applications, National Science Foundation, 9/1/16 to 8/31/18, 2.1 months/year (Lead PI: Tanu Malik, co-PIs: S. Peckham, I. Foster, J. Goodall, D. Tarboton, A. Bhatt, E. Choi) CU Subaward for **\$99,837**, grant# 1639547.

EarthCube Building Blocks: Earth System Bridge: Spanning Scientific Communities with Interoperable Modeling Frameworks, National Science Foundation (EAR), **\$1,700,000**, 10/1/13 to 9/30/15 (NCE to

8/31/17), 3 months/year. (Lead PI: S. Peckham, co-PIs: C. DeLuca, D. Gochis, J. Arrigo and G. Egbert.), grant# 1343811.

EarthCube Building Blocks: Collaborative Proposal: GeoSoft 2: Collaborative Open-Source Software Sharing for Geosciences, National Science Foundation, \$1.7M, 9/1/14 to 8/31/16 (NCE to 8/31/17), 3 months/year (Lead PI: Y. Gil, co-PIs: S. Peckham, C. Duffy, C. Mattmann, E. Robinson.) CU Subaward for **\$330,000**, grant# 1440332.

EarthCube Building Blocks: Collaborative Proposal: A GeoSemantic Framework for Integrating Long-Tail Data and Models, National Science Foundation, \$1.7 M, 9/1/14 to 8/31/16 (NCE to 8/31/17), 3 months/year (Lead PI: P. Kumar, co-PIs: S. Peckham, M. Elag, L. Marini) CU Subaward for **\$262,299**, grant# 1440333.

EarthCube Building Blocks: GeoDataspace: Simplifying Data Management for Geoscience Models, National Science Foundation, \$300K, 9/1/14 to 8/31/15, 1 month/year (Lead PI: Tanu Malik, co-PIs: S. Peckham, J. Goodall, M. Gurnis, I. Foster, K. Chard, J. Baker) CU Subaward for \$24,627.

Training for CSDMS Modeling Protocols, University of Idaho, \$10K, 5/27/14 to 6/15/15.

EarthCube Building Blocks: Software Stewardship for the Geosciences, National Science Foundation, \$65,000, 10/1/13 to 9/30/14, 3 months/year. (Part of a collaborative \$300K award with Lead PI: Y. Gil, co-PIs: S. Peckham, C.J. Duffy, C. Mattmann and E.M. Robinson), grant# 1343800.

Modeling the hydrology-driven evolution of Arctic landscapes, subaward from University of Alaska at Fairbanks (UAF), \$40,000, 01/01/13 to 06/30/13, 2.2 months/year.

EAGER: Collaborative Research: Developing a community computational infrastructure for Earth System Model research and applications, National Science Foundation, \$60,000, 04/01/12 to 03/31/13, 3 months/year. (Part of a collaborative \$200K award with lead PI David Gochis, NCAR.), grant# 1239718.

EAGER: Collaborative Research: Interoperability Testbed - Assessing a layered architecture for integration of existing capabilities, National Science Foundation, \$18,000, 04/01/12 to 03/31/13, 1 month/year. (Part of a collaborative \$200K award with lead PI Reagan Moore.), grant# 1239697.

A light-weight framework for model coupling adapted for hydrological and landscape evolution models, subaward from University of Alaska at Fairbanks (UAF), \$17,000, 04/01/12 to 09/30/12, 0.9 month/year. (Subaward from DOE-funded NGEE project awarded to UAF.)

A Super-regional testbed to improve models of environmental processes on the U.S. Atlantic and Gulf of Mexico coasts, SURA (Southeastern Universities Research Association, Inc.)/NOAA, subaward from Virginia Inst. of Marine Science (VIMS) to University of Colorado at Boulder, **\$96,414**, 06/01/10 to 05/31/11, 1 month/year.

Collaborative Research: Deepwater Horizon: Simulating the three-dimensional dispersal of aging oil with a Lagrangian approach, NSF RAPID, subaward to University of Colorado at Boulder from proposal with PI Elizabeth North, \$4,099, 07/15/10 to 06/30/11.

CMG Research - Modeling river basin dynamics: Parallel computing and advanced numerical methods, NSF/CMG, EAR 0621199, **\$900,000**, 9/15/06 – 8/31/10, 3 months/year for 4 years. (co-PIs: Tom Manteuffel, Steve McCormick and Greg Tucker)

Toward improved process-based pan-arctic prediction of land surface moisture and energy fluxes, Univ. of Alaska at Fairbanks, subcontract, \$15,000, 7/1/04 – 2/28/05, 1.5 months.

Modeling sediment transport to Molokai's coral reef, USGS subcontract, \$46,830, 8/28/03 – 6/30/04, 4 months.

Detection and attribution of changes in the hydrologic regimes of the Mackenzie, the Kuparuk and the Lena river basins, NSF/CHAMP subcontract from UAF, \$30,000, 11/1/02 – 12/31/04, 1.2 months/year for 2 years.

WERC hydrologic model: conversion and testing, GW Scientific (Univ. of Alaska at Fairbanks), subcontract, \$12,000, 8/1/02 – 7/31/03, 1.1 months.

Conversion of ARHYTHM hydrologic model from Fortran to IDL, Univ. of Alaska at Fairbanks, subcontract, \$15,000, 6/1/02 – 5/31/03, 1.2 months.

A source to sink sediment transport model for the Hawaiian island of Molokai, USGS subcontract, \$15,000, 1/1/02 – 12/31/03, 1.2 months.

Conversion of ARHYTHM hydrologic model from Fortran to IDL, Univ. of Alaska at Fairbanks, subcontract, \$30,000, 1/1/01-12/31/04, 1.2 months/year for 2 years.

Conversion of ARHYTHM hydrologic model from Fortran to IDL, Univ. of Alaska at Fairbanks, subcontract, \$20,000, 7/1/01-10/31/02, 1.6 months.

Predicting the distribution and properties of buried submarine topography on continental shelves, ONR, \$264,000, 1/1/02 – 9/30/04, 3 months/year for 2 years, with J.P.M. Syvitski

Predicting the distribution and properties of buried submarine topography on continental shelves, ONR, \$409,586, 6/15/00 – 12/31/02, 3 months/year for 3 years, with J.P.M. Syvitski

National Research Council Research Associate, \$150,000 + overhead, 1995-1998, 3 years.

NASA Global Change Student Fellow, \$50,000 + overhead, 1990-1993, 3 years.

### **Other Funding Received**

NSF Cooperative Agreement, Facility Support: Computational infrastructure for the Community Surface Dynamics Modeling System (CSDMS), NSF/EAR 1226297, \$4.5M, 10/15/12 to 09/30/17, PI: James Syvitski, 6 months/year for 5 years as Chief Software Architect.

NSF Cooperative Agreement, Facility Support: Organizational infrastructure for the Community Surface Dynamics Modeling System (CSDMS), NSF EAR/OCE 0621695, \$4.5M (total), 4/15/07 – 4/14/12, PI: James Syvitski, 9 months/year for 5 years as Chief Software Architect.

An Integrated Assessment of the Impacts of Climate Variability on the Alaskan North Slope Coastal Region, INSTAAR subaward to model coastal sediment transport and erosion, NSF Office of Polar Programs, Arctic System Science Program, \$405,712 (subcontract) \$2,583,362 (total), 5/1/01 – 4/30/06, 2 months/year for 5 years.

Using remotely-sensed images to estimate suspended sediment concentrations in the littoral zone, subcontract from Raytheon Systems Company, \$100,000, 8/1/98 – 7/31/99, 12 months.