ON THE SURFACE

CSDMS Quarterly Newsletter
May 2019

Job Opportunity at CSDMS!

The CSDMS Integration Facility is seeking a research software engineer (RSE) or hybrid RSE/Postdoc with at least 1 year of software development experience in one or more object-oriented programming languages, with an emphasis on Python. The position is flexible to allow up to 50% time for research-related activities for a postdoc.

The RSE will work on multiple earth surface process and geomorphology projects with the purpose of contributing to our community's efforts in developing new modeling capabilities and to apply existing models that may involve carrying out simulations on high-performance computing and cloud platforms. The RSE will work as part of a small team that is developing new code, modifying/maintaining existing code, and testing a plug-and-play framework that couples process-based numerical models, written by scientist-modelers for creation of simulation capabilities for new theories and concepts.

For additional information and to apply please click here.

Community Models and Tools

Over 300 models and tools are now available in the CSDMS repository. Want your open source model or tool to reach a wider audience? Consider contributing your model to the CSDMS Model Repository.

The following models & tools have been recently submitted:

MODELS

BlockLab Lead developers: Charles Shobe and Rachel Glade, University of Colorado, Boulder. BlockLab computes landscape evolution in the presence of large blocks of rock on hillslopes and in channels.

CVFEM Rift2D Lead developers: Yipeng Zhang and Mark Person, New Mexico Institute of Mining and Technology. Multi-physics numerical model that simulates rock deformation, fluid flow, solute transport and heat transfer in response to ice sheet loading of multiple cycles.

DeltaRCM Vegetation Lead developer: Rebecca Lauzon. Delta-building model DeltaRCM expanded to include vegetation.

ESCAPE Lead developer: Tristan Salles, University of Sydney. Parallel global-scale landscape evolution model.

GRLP Lead developer: Andy Wickert, University of Minnesota. Evolves gravel-bed river long profiles.

GrainHill Lead developer: Greg Tucker, University of Colorado, Boulder. Cellular automaton model of hillslope evolution.

Terrainbento Lead developer: Katy Barnhart, University of Colorado, Boulder. A Python package for multi-model analysis in long-term drainage basin evolution.

TOOLS

GSFLOW-GRASS Lead developers: Andy Wickert and Gene-Hua Ng, University of Minnesota. Quickly generates input files for and runs GSFLOW, and visualizes the output.

CSDMS Help Desk Launched

Community members can now access the newly launched CSDMS Help Desk for user support and troubleshooting. The Help Desk is a single point of contact where you can submit questions regarding CSDMS products and services. The Help Desk provides tracking and an audit trail for your questions. Plus, the responses are archived, searchable and available for the entire community, so the questions you ask may help another CSDMS member in the future. Community members are encouraged to answer questions as well. **DON'T BE SHY!!** In this way, a centralized knowledge system is created and will function as a community resource in resolving pressing software, HPCC, and modeling issues.

[Access CSDMS Help Desk]

PyMT Updates and CSDMS Call for PyMT Projects

PyMT is an Open Source Python package, developed by the CSDMS, that simplifies the process of learning, operating, and coupling models - freeing researchers to focus on exploring ideas, testing hypotheses, and comparing models with data. Since the launch last February, new components/models continue to be added to the PyMT-enabled list each month. An introductory tutorial on PyMT, provided by lead RSE, Eric Hutton is available on the CSDMS web site. Remember! CSDMS offers Software Engineering support if you have a model you would like brought into PyMT. Our RSEs are excited to work with you to make your model easily accessible to a wider audience

Final CSDMS Spring Webinar

Please join us for the final offering in the Spring 2019 CSDMS Webinar Series. **Registration is required** and links are provided below.

GeoClaw Software and Tsunami Modeling
Tuesday, May 7, 2019, 2:00PM ET
Randy LeVeque, Department of Applied Mathematics, University of Washington
GeoClaw is an open-source software package for solving two-dimensional depth-averaged equations over general topography using high-resolution finite volume methods and adaptive mesh refinement. Wetting-and-drying algorithms allow modeling inundation or overland flows. The primary applications where GeoClaw has been used are tsunami modeling and storm surge, although it has also been applied to dam break problems and other overland floods. This tutorial will give an introduction to setting up a tsunami modeling problem in GeoClaw, including:

- Overview of capabilities,
- Installing the software,
- Using Python tools provided in GeoClaw to acquire and work with topography DEMs and other datasets,
- Setting run-time parameters, including specifying adaptive refinement regions,
- The VisClaw plotting software to visualize results using Python tools or display on Google Earth.

Pre-registration required here.

Previous CSDMS-sponsored webinars are archived here and available for viewing anytime. If you have suggestions for future Webinars, please contact csdms@colorado.edu

Community Member Spotlight

Jaia Syvitski - CSDMS founding Executive Director, Jaia Syvitski, will receive the 2019 Lifetime Achievement Award this May. Jaia's seminal research in the global movement of sediments over land and sea, sinking deltas, anthropogenic forcing and efforts toward the establishment the Anthropocene Epoch have influenced a new generation of scientists and policy makers. Jaia has been a tireless advocate for open source science, software, data and model coupling/software reuse.

Lettie Roach - The 2019 Syvitski Student Modeler Award Winner is Lettie Roach! Lettie, affiliated with the National Institute of Water & Atmospheric Research, NIWA, New Zealand, is awarded for her work published in JGR – Oceans. She describes a developed coupled global ocean-sea model that uses emergent sea ice flow size/thickness distribution to predict trends in sea ice extent. Model coupling made it possible to better estimate sea-ice concentration and therefore the polar climate system.

NSF Geoinformatics Program Refresh

A new solicitation has been posted for the NSF Geoinformatics (GI) program from the Division of Earth Sciences (EAR). The target date for submission of proposals is August 15, 2019.

The announcement of the program and link to the solicitation may be found here.

A webinar will be held on Tuesday, May 14 at 2 pm EDT, with a brief overview of the program and the opportunity to ask questions. Please email swhitmey@nsf.gov by 5 pm on Friday, May 10 to enroll in the webinar.

EAR-supported geoinformatics opportunities will fit into three tracks: Catalytic track, Facility track, and Sustainability track. These tracks broadly support the lifecycle of geoinformatics resource development, from pilots (Catalytic) to broad implementation (Facility) to sunsetting and long-term sustainability (Sustainability).

FREEWAT, GIS, MODFLOW and UCODE Short Course

FREEWAT
Free and Open Source Software Tools for Water Resource Management
EU HORIZON 2020 Project

FREEWAT is a MODFLOW/UCODE Plugin for QGIS. The next FREEWAT short course "Modeling Groundwater Flow with the GIS-based MODFLOW GUI FREEWAT and Calibration and Uncertainty quantification using UCODE" will be held on Saturday, June 1st, and Sunday, June 2nd, within the framework of the MODLFOW and More 2019 International Congress, in Golden, Colorado.

To register course, follow the link: https://igwmc.mines.edu/short-courses-and-more/

Publications of Interest - Summer Reading List!

Adebola, T. and K. de Mutsert. 2019. **Spatial simulation of redistribution of fishing effort in Nigerian coastal waters using Ecospace**. *Ecosphere 10(3): 1-16*. https://doi.org/10.1002/ecs2.2623

Adebola, T. and K. de Mutsert. 2019. **Comparative network analyses for Nigerian coastal waters using two Ecopath models developed for the years 1985 and 2000**. *Fisheries Research 213: 33-41*.https://doi.org/10.1016/j.fishres.2018.12.028.

Alexander P, Rabin S, Anthoni P, et al. **Adaptation of global land use and management intensity to changes in climate and atmospheric carbon dioxide**. *Glob Change Biol. 2018;00:1–19*. https://doi.org/10.1111/gcb.14110

Bandaragoda, C.J., Castronova, A., Istanbulluoglu, E., et.al. 2019. **Enabling collaborative numerical modeling in Earth sciences using Knowledge Infrastructure**. *Environmental Modelling & Software Development.*https://doi.org/10.1016/j.envsoft.2019.03.020

Brown, C., Alexander, P., Arneth, A., Holman, I. and Rounsevell, M. 2019. **Achievement of Paris climate goals unlikely due to time lags in the land system**. *Nature Climate Change. https://doi.org/10.1038/s41558-019-0400-5*

Brown, C., Alexander, P. & Rounsevell, M. 2018. **Empirical evidence for the diffusion of knowledge in land use change.** *Journal of Land Use Science.* DOI: 10.1080/1747423X.2018.1515995

Chadwick, A.J., Lamb, M.P., Moodie, A.J., Parker, G. and Nittrouer, J.A. 2019. **Origin of a Preferential Avulsion Node on Lowland River Deltas**. *Geophysical Research Letters.* **https://doi.org/10.1029/2019GL082491**

Chagaris, D., Sagarese, S., Farmer, N., Mahmoudi, B., De Mutsert, K., et. al. 2019. **Management challenges are opportunities for fisheries ecosystem models in the Gulf of Mexico.** *Marine Policy.* https://doi.org/10.1016/j.marpol.2018.11.033.

Chen S, Liu Z, Chen B, Zhu F, Fath BD, Liang S, Su M, Yang J. 2019. **Dynamic Carbon Emission Linkages Across Boundaries. Earth's Future.** DOI: 10.1029/2018EF000811

Ciarletta, D., Shawler, J., Tenebrusco, C., Hein, C. & Lorenzo-Trueba, J. 2019. **Reconstructing Coastal Sediment Budgets from Beach- and Foredune- Ridge Morphology: A Coupled Field and Modeling Approach**. *J Geophysical Research: Earth Surface.* https://doi.org/10.1029/2018JF004908

Collett, 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 Kaikoura Ranges and Marlborough Fault System Based on Low-temperature Thermochronology**. *Tectonics.* **https://doi.org/10.1029/2018TC005268**

Dahood, A., Watters, G.M., and K. de Mutsert. 2019. **Using sea-ice to calibrate a dynamic trophic model for the Western Antarctic Peninsula**. *PLoS ONE 14(4): e0214814.* https://doi.org/10.1371/journal.pone.0214814.

Fath BD, Asmus H, Asmus R, et. al. 2019. **Ecological network analysis metrics: The need for an entire ecosystem approach in management and policy**. *Ocean and Coastal Management* 174, 1-14. DOI: 10.1016/j.ocecoaman.2019.03.007

Fiscus DA, Fath BD. 2018. ***Foundations for Sustainability: A Coherent Framework of Life–Environment Relations***. *Academic Press. London.*

Fuchs, R., Alexander, P., Brown, C., Cossar, F., Henry, R. and Rounsevell, M. 2019. **US-China trade war imperils Amazon rainforest**. *Nature, V567, 451-454.*

Hood, R.R., G. Shenk, R. Dixon, W. Ball, J. Bash, C. Cerco, P. Claggett, L. Harris, T.F. Ihde, L. Linker, C. Sherwood, and L. Wainger. 2019. **Chesapeake Bay Program Modeling in 2025 and Beyond: A Proactive Visioning Workshop**. *STAC Publication Number 19-002, Edgewater, MD. 62 pages.* www.chesapeake.org/stac.

Jordan, R.; Gray, S.; Zellner, M.; et. al.; 2018. **"Twelve questions for the participatory modeling community."** *Earth's Future 6:1046–1057*. https://doi.org/10.1029/ 2018EF000841.

Li Z, Wang Z, Liu X, Fath BD, Liu X, Xu Y, Hutjes R, Kroeze C. 2019. **Causal relationship in the interaction between land cover change and underlying surface climate in the grassland ecosystems in China**. *Science of the Total Environment* 647, 1080-1087. DOI: 10.1016/j.scitotenv.2018.07.401

Lim, Y., Levy, J., Goudge, T. & Kim, W. 2019. **Ice cover as a control on the morphodynamics and stratigraphy of Arctic deltas.** *Geology (2019) 47 (5): 399-402.* https://doi.org/10.1130/G45146.1

Maussion, F., Butenko, A., Champollion, N, et.al. 2019. **The Open Global Glacier Model (OGGM) v1.1**. *Geosci. Model Dev.*https://doi.org/10.5194/gmd-2019-10

McGuire, L. and Youberg, A. 2019. **Impacts of successive wildfire on soil hydraulic properties: Implications for debris flow hazards and system resilience**. *Earth Surface Processes and Landforms.* **https://doi.org/10.1002/esp.4632**

Murphy, B., Czuba and Belmont, P. 2019. **Post-wildfire sediment cascades: a modelling framework linking debris flow generation and network-scale sediment routing.** *Earth Surface Processes and Landforms.* **https://doi.org/10.1002/esp.4635**

Nienhuis, J. and Lorenzo-Trueba, J. 2019. **Simulating barrier island response to sea-level rise with the barrier island and inlet environment (BRIE) model v1.0**. *Geosci. Model Dev.* https://doi.org/10.5194/gmd-2019-10

Richardson, P., Perron, T. & Schurr, N. 2019. **Influences of climate and life on hill slope sediment transport**. *Geology (2019) 47(5):423-426*. https://doi.org/10.1130/G45305.1

Sterling, E.; Zellner, M.; Jenni, K.E.; et. al. 2019. **"Try, try again: Lessons learned from success and failure in participatory modeling."** *Elementa: Science of the Anthropocene 7(1), p.9.* DOI: https://doi.org/10.1525/elementa.347.

Voinov, A.; Jenni, K.; Gray, S.; et. al. forthcoming. **"Tools and methods in participatory modeling: selecting the right tool for the job."** *Environmental Modelling and Software 109(2018):232-255*. https://doi.org/10.1016/j.envsoft.2018.08.028.

Wang S, Fath B, Chen B. 2019. **Energy–water nexus under energy mix scenarios using input–output and ecological network analyses**. *Applied Energy* 233-234, 827-839.

CSDMS would like to thank community members who submitted their publications. Reach your community! To submit publications or resources of interest for a future CSDMS *"On the Surface",* please contact csdms@colorado.edu

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