CSDMS Newsletter - November 2023

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ON THE SURFACE

CSDMS Newsletter
November 2023

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Landlab Version 2.7 Released!

The new version of Landlab brings several new enhancements and bug fixes. Some

highlights include:

Solve advection problems in Landlab: The new AdvectionSolver TVD component provides a general numerical solution for advection problems, using a second-order Total Variation Diminishing (TVD) numerical scheme. To support advection solvers, grid objects now offer an attribute that returns the orientation of links, and new mapping functions make it possible to implement upwind solutions. Learn more with the tutorial notebook and reference documentation.

- **More options and how-to information for output and plotting**: Landlab now offers output in Legacy VTK (Visualization ToolKit) format. This general file format supports unstructured grids,, and can be read into visualization applications like ParaView. Also, included are new tutorials on importing Landlab NetCDF output into ParaView, and importing Landlab .obj output into the popular open-source 3D modeling package Blender.

- **Run Landlab tutorials on the CSDMS JupyterHubs**: You can now access the complete collection of Landlab tutorial notebooks directly on the CSDMS "lab" and "Jupyter" Hubs.

For more on Landlab v2.7, check out the online **Release Notes here.**

New To CSDMS Code Repository

Over 450 models, tools and components are now available in the CSDMS code and metadata repository for numerical models and scientific software tools. CSDMS encourages all community members to make their software (and data) "FAIR": Findable, Accessible, Interoperable and Reusable. **Want to broaden the impacts of your open-source model or tool?** Consider contributing your model to the CSDMS Model Repository. The following models have recently been submitted and are available for community use:

ATS (The Advanced Terrestrial Simulator) - ATS (formerly known as the Arctic Terrestrial Simulator) is a code for solving ecosystem-based, integrated, distributed hydrology. Model developer: Ethan Coon, Oak Ridge National Laboratory.

BarrierBMFT - Barrier-Bay-Marsh-Forest Transect Coupled Model Framework. Model developer: Ian Reeves, Woods Hole Oceanographic Institute.

Coastal Landscape Transect Model (CoLT) - Geomorphic and carbon evolution of a bay-marsh-forest coastal transect. Model developer: Kendall Valentine, University of Washington.

DFMFON - Spatially-explicit mangrove-mudflat dynamic model. Model developer: Sebrian Beselly, IHE Delft and Universitas Brawijaya.

MODFLOW 6 - An object-oriented program and framework developed to provide a platform for supporting multiple models and multiple types of models within the same simulation. Model developer: Joe Hughes, USGS.

Oceananigans.jl - Fast and friendly ocean-flavored Julia software for simulating incompressible fluid dynamics in Cartesian and spherical shell domains on CPUs and GPUs. Model developer: Ali Ramadhan, MIT.

SFINCS - A reduced-physics solver to compute compound flooding in coastal systems due to fluvial, pluvial, tidal, wind and wave-driven processes. Model developer: Tim Leijnse, Deltares.

Sun Fan-delta Model - Fan-delta and alluvial fan landscape evolution model. Model developer: Ajay Limaye, University of Virginia and Andrew Moodie, Texas A&M University.

CSDMS/Open Earthscape
2024 Visiting Scholars Program

Application window opens December 1st, 2023 (deadline February 16th, 2024). The Summer Visiting Scholar Program is open to graduate students interested in spending up to 6 weeks at the CSDMS Integration Facility at the University of Colorado, Boulder. Selected students will be working on their own research and will benefit from mentoring with the CSDMS Research Software Engineers and faculty/staff. Our cohorts in 2022 and 2023 were resounding successes and we hope

to make the 2024 program even more beneficial for your research progress. We anticipate 2-3 students will be selected for the 2024 program. In addition to proximity to the CSDMS Software Engineers and other team members, the Integration Facility can provide the following support:

Student

Domestic travel and lodging support for up to 45 days in Boulder.

Stipend support is available for US Citizens only and is based on CU GRA rates @100% for summer semester (about $5,300 per month). International students and students in the US on F-1 and J-1 visas are welcome to apply and travel/lodging support will be provided, but stipend support cannot be provided due to visa restrictions.

Advisor

Travel and lodging support for a 7-day trip to Boulder (including per diem and ground transportation) to work collaboratively with CSDMS and the student.

Priority will be given to students that have computational projects that:

- Are "shovel ready".
- Will result in a product, such as a publication, a conference presentation, a new model component, an educational tutorial, etc.

To apply, please send an email to csdms@colorado.edu by February 16, 2024 with your name, brief description of your future goals, description of the specific project that could benefit from CSDMS Integration Facility support and any resulting products proposed. Additionally, we'll need approval from your advisor to participate in the program (this can be in the form of an attached letter or email).

We're excited to work with you and we look forward to chatting about how the CSDMS Integration Facility can most usefully contribute to your research next summer!


Save the Date!
Registration Opens in January

CSDMS 2024: Coastlines, critical zones, and cascading hazards: modeling dynamic interfaces from deep time to human time

Montclair State University, NJ

May 14-16, 2024

Important Deadlines:

- **Student Modeler Competition** submission deadline is January 19th, 2024. Submission requirements and additional details can be found here.
- **Call for Clinic presentations!** Each year a variety of clinics are available for registered meeting attendees. If you would like to provide a clinic, additional details and the submission form can be found here. Deadline to submit is December 1st, 2023. Submitters will be notified of acceptance decisions by January 5th, 2024.

- A limited number of **Travel Scholarships** will be available and the deadline to apply is February 9th, 2024. Application information will be available in mid-January.
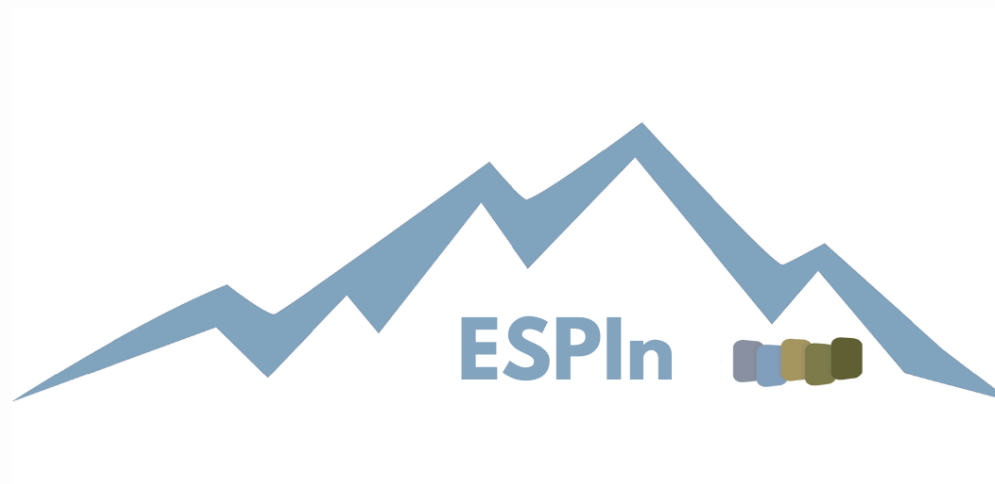
2024 Earth Surface Processes Institute
July 29th to August 6th in Boulder, CO

The Earth Surface Processes Institute (ESPIn) is a six-day in-person summer school for 25 students. ESPIn offers hands-on training in numerical modeling, collaborative coding, and open-source software development, with an emphasis on best practices such as version control, unit testing, continuous integration, and open metadata/modeling standards. ESPIn introduces students to cyberinfrastructure such as the CSDMS Workbench via tutorials delivered on the OpenEarthscape JupyterHub. Students will be provided an opportunity to present their ESPIn team projects in a webinar that will be open for CSDMS community participation. Travel and subsistence support will be provided for all students. Application details for the 2024 ESPIn will be announced in early 2024!

Iterative Integration of Deep Learning in Hybrid Earth Surface System Modelling

A new Nature Review publication from community members Min Chen and Zhen Qian, Key Laboratory of Virtual Geographic Environment (Ministry of Education of PRC), Nanjing Normal University, advocates for the integration of neural networks into Earth-surface modeling throughout the modeling lifecycle (rather than just at the initial stage) to increase accuracy, scalability and customization potential.   Dr. Chen is a Co-Chair of the CSDMS Initiative, Exploring Interoperability of Open Modeling Platforms.

CSDMS Roadshow Opportunity!

CSDMS Roadshow #3 is scheduled for January 24-25th, 2024 at North Carolina State University in Raleigh, NC, hosted by Prof. Helena Mitasova in the Department of Marine, Earth and Atmospheric Sciences and the Center for Geospatial Analytics.

More information on Roadshows can be found at https://csdms.colorado.edu/wiki/Roadshows.

Roadshows #1 and #2 were a lot of fun and we're looking forward to #3. Would you be interested in hosted Roadshow #4? If so, please contact us at csdms@colorado.edu.

CSDMS Community Teaching and Research Resources

Open Earthscape Jupyter Hub - https://csdms.colorado.edu/wiki/JupyterHub
CSDMS EKT Labs - https://csdms.colorado.edu/wiki/Labs_portal

Office Hours (via Zoom) with a CSDMS Research Software Engineer - 9AM on
Wednesdays. To register - https://csdms.colorado.edu/wiki/OfficeHours
CSDMS Help Desk - https://csdms.github.io/help-desk/

Join us on X and Bluesky!

Be the first to know about all the new resources!! For new products, job postings,
events, breaking science, training opportunities and more, please follow us
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