CSDMS Newsletter - June 2020

ON THE SURFACE

CSDMS Quarterly Newsletter
June 2020

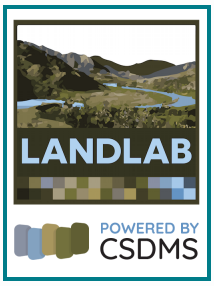
CSDMS Launching Summer Science Series!

You are cordially invited to join your fellow community members for the inaugural **CSDMS Summer Science Series** featuring brief presentations from community members on a range of breaking science topics. This **virtual series will run over 3 sessions on June 30th, July 14th and July 28th** (each session will be about an hour in length). Many of the presenters are students and early-career scientists - so please support the next generation of earth surface modelers by attending the event! To promote further discussions and informal networking, each session will remain open for 1-hour after the presentations are completed. We hope you are able to join us! Registration is required for these no-cost events.

First Up! Session 1, June 30th, 10AM to 12PM Mountain Daylight Time
Brandon Jones, NSF: *"Increasing Participation of Underrepresented Groups in the Geosciences"*
Jaap Nienhuis, Utrecht University: *"Global Morphodynamic Response of Deltas to Sea-Level Rise in the 21st Century"*
Kevin Xu, Louisiana State University: *"Shelf Sediment Transport during Hurricanes Katrina and Rita"*
Zhi Li, University of Illinois: *"pyRiverBed - A Python Framework to Generate Synthetic Riverbed Topography for Constant-width Meandering Rivers"*

Chris Jenkins, University of Colorado, Boulder: *"Man-made Objects Including Bombs Move Around at the Seafloor during Extreme Storms: Modeling Results"*
Julia Moriarty, University of Colorado, Boulder: *"Variability in March-Estuarine Sediment Exchanges in Back-Barrier Systems: Barnegat Bay, New Jersey"*

New Release - Landlab v2.0



Landlab 2.0 is here! This new version has more components and tools, a cleaner component interface, and a refactored gridding engine. Read all about it in this new Esurf paper by Katy Barnhart and colleagues.

New Models and Tools in CSDMS Repository

Over 350 models and tools 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 and tools have been submitted since January 2020 and are available for community use:

Models

CAESAR Lisflood, developer Tom Coulthard: *morphodynamic / landscape evolution model that simulates erosion and deposition in river catchments and reaches over time scales from hours to 1000's of years.*
ChannelProfiler, developer Katy Barnhart: *extracts & plots channel networks from landlab grid.*
ChiFinder, developer Dan Hobley: *calculate Chi Indices.*
DepthDependentTaylorDiffuser, developer Rachel Glade: *implements a depth-dependent Taylor series diffusion rule, combining concepts of Ganti et al. (2012) & Johnstone & Hilley (2014).*
DetachmentLtdErosion, developer Jordan Adams: *simulate detachment limited sediment transport.*
Flexure, developer Eric Hutton: *deform the lithosphere with 1D or 2D flexure.*
GroundwaterDupuitPercolator, developer David Litwin: *solves Boussinesq equation for flow in unconfined aquifer over impermeable aquifer base & calculates groundwater return flow to surface.*
KWAVE, developer Luke McGuire: *model representing infiltration, interception, and runoff using the kinematic wave approximation.*
Landslides, developer Ronda Strauch: *Landlab component that simulates landslide probability of failure as well as mean relative wetness and probability of saturation.*
LinearDiffuser, developer Greg Tucker: *Landlab component that models soil creep as a*

linear diffusion process.
LumSoilMixer, developer Harrison Gray: *to simulate the non-dimensionalized luminescence in a mixing soil.*
NormalFault, developer Katy Barnhart: *implements relative rock motion due to a normal fault.*
OverlandFlowBates, developer Jordan Adams: *simulates overland flow using the 2-D numerical model of shallow-water flow over topography using the Bates et al. (2010) algorithm for storage-cell inundation modeling.*
PerronNLDiffuse, developer Dan Hobley: *nonlinear diffusion, following Perron (2011).*

Tools
DeltaClassification, developer Mariela Perignon: *geometry classification of delta islands.*
DepressionFinderAndRouter, developer
FireGenerator, developer Dan Hobley: *find depressions on a topographic surface.*
FlowAccumulator, developer Katy Barnhart: *component to accumulate flow and calculate drainage area.*
FlowDirectorD8, developer Katy Barnhart: *single-path (steepest direction) flow direction with diagonals on rasters.*
FlowDirectorDinf, developer Katy Barnhart: *flow direction on a raster grid by the D infinity method.*
FlowDirectorMFD, developer Katy Barnhart: *multiple-path flow direction with or without out diagonals.*
FlowDirectorSteepest, developer Katy Barnhart: *single-path (steepest direction) flow direction without diagonals.*
FractureGridGenerator, developer Greg Tucker: *create a 2D grid with randomly generated fractures.*
HackCalculator, developer Katy Barnhart: *calculate Hack parameters.*
Icepack, developer Daniel Shapero: *a Python package for simulating the flow of glaciers and ice sheets, as well as for solving glaciological data assimilation problems.*
LakeMapperBarnes, developer Dan Hobley: *temporarily fills depressions and reroutes flow across them.*
Lithology, developer Katy Barnhart: *create a Lithology object with different properties.*
LossyFlowAccumulator, developer Dan Hobley: *calculate drainage area and accumulate flow, while permitting dynamic loss or gain of flow downstream.*

Critical Zone Research Coordination Network

Cybersymposium, June 23-24, 2020

The Chairs of the CSDMS Terrestrial Working Group are delighted to invite you to participate in ***"Bringing the Science Home!"*** A Cybersymposium for Earth Surface Scientists on June 23-24, 2020. This cybersymposium was funded by NSF as part of a Critical Zone Research Coordination Network, and is part of a larger effort to increase the diversity, inclusion and access of researchers in "critical zone" science—earth surface sciences including hydrology, geology, atmospheric science, ecology, etc.—to bring in new ideas and answers to important interdisciplinary questions. Our goals are to introduce

early-career scientists (undergrads, grads, postdocs, and early career faculty) to critical zone science and provide tools to succeed in research. You can find more information on our efforts here: https://sites.google.com/view/czrcn.

New CSDMS Initiative - River Network Modeling

Co-chairs Allison Pfeiffer, Western Washington University and Katy Barnhart, USGS have launched a new CSDMS River Network Modeling Initiative aimed at developing and applying modeling tools for river channel evolution, including sediment supply and transfer. Initiative products include the Landlab NetworkModelGrid and the NetworkSedimentTransporter component. Ongoing work seeks to expand modeling tools, example applications, and trainings. Thank you Allison and Katy!!

New CSDMS Steering Committee Members

Please join us in thanking **Pat Wiberg**, Professor, University of Virginia, Department of Environmental Sciences for her ongoing commitment to the CSDMS mission. Pat has been a tireless advocate for CSDMS and has served the community since it's inception; first as Chair of the Marine Working Group from and then as Chair of the Steering Committee. Pat's primary research interest is in sediment erosion, transport, and deposition in river, coastal, and wetland environments.

We're delighted to announce that **Michael Barton**, Professor, Arizona State University, School of Human Evolution and Social Change and Director of the Center for Social Dynamics and Complexity has agreed to serve on the CSDMS Steering Committee. He also directs the CoMSES Network and CoMSES CoRe, an international research network and NSF Big Data Spoke facility that promotes open science, knowledge sharing, reproducibility and best practices in emerging cybertools in the socio-ecological sciences. Michael also leads the Open Modeling Foundation initiative.

Education advocate, **Kadidia Thiero** leads the Significant Opportunities in Atmospheric Research and Science (SOARS) Program and affiliated efforts aimed at increasing diversity in the atmospheric sciences. Kadidia's wealth of experience in supporting students from traditionally under-represented groups in the geosciences will be especially beneficial to the CSDMS community as we focus on increasing our diversity, equity and inclusion efforts.

Paola Passalacqua, Associate Professor, University of Texas, Austin, Department of Civil, Architectural and Environmental Engineering, has graciously agreed to serve as Steering Committee Member. Paola's research interests lie at the intersection of water resources engineering, hydrologic sciences and geomorphology. Her research merges the analysis of remote sensing data, numerical modeling, statistical analysis and field work.

Keynote and Clinic Presentations now Available!

Thank you CSDMS Community Members for making the first virtual CSDMS Annual Meeting a success! Over 400 registrants participated in the 2-day event that included keynote

presentations and clinics. All talks and materials are archived for viewing anytime on the CSDMS web site.

CSDMS is an NSF sponsored program