Computing@PNNL
SEMINAR

Understanding Riparian Landscapes Across Continents or Millennia

Richard Barnes

DOE Computational Science Graduate Fellow
Ph.D. Student, Energy & Resources Group
University of California, Berkeley

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Given a limited budget, where in Minnesota are the best locations for wetland remediation? How can stored nuclear waste be kept safe from erosion? What controls the speed at which rivers meander?

To answer ecohydrological and geomorphological questions at unprecedented spatial and temporal scales, we need to (a) parse terabyte-scale datasets (DEMs); (b) perform millions of model realizations to pinpoint the parameters that govern landscape evolution; and (c) do so with statistical rigor, which requires thousands of additional realizations. A core set of graph operations underpin many geomorphic models. These include determination of terrain attributes, such as slope and curvature, flow routing, depression flooding and breaching, flat resolution, and flow accumulation.

In his talk, Richard Barnes will discuss new, best-in-class algorithms that perform these operations. He will show how they can be used in high-performance code via an open-source C++ library, *RichDEM*, which is accessible to general practitioners via Python. Finally, he will share a few case studies of these algorithms in action.

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Host:
Nathan Baker
ACMD Division Director
Nathan.Baker@pnnl.gov