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Harrison Tasoff

Charting the course of rivers

From the smallest creek to the mightiest waterways, rivers have shaped the natural world and the course of human civilization. But a river's only consistent attribute is change, and it's precisely this dynamism that geographer Vamsi Ganti studies. His surface processes research group at UC Santa Barbara explores the fluvial mechanics that shape landscapes on Earth and other planets. In a recent installment of UCSB's video series, "Research in 60 Seconds," Ganti discusses how he investigates these processes and why understanding them is of more than academic interest.

An associate professor in the Department of Geography, Ganti uses remote sensing and a bespoke flume lab to understand river geomorphology. His group has studied ancient river deposits to learn how river dynamics have evolved over Earth's long history. This provides insights into what governs river behavior and which features get preserved in the geologic record.

He also takes advantage of satellite imagery and remote sensing data to investigate the activity of waterways at large scales. From a bird's eye view, Ganti can observe how factors like sediment load, topography, flow and sea level influence the courses of rivers and the formation of deltas. Many of humanity's largest cities lie along waterways, so understanding their behavior is a matter of security.

The researchers in the surface processes group follow up on the insights they've gathered from the field and the sky with their custom water flume. This giant

machine mimics the characteristics of a natural river channel. By carefully controlling different variables, the team can work out how features combine to produce the behavior they've observed in their large-scale studies.

Ganti's work is providing a better account of how rivers flow and how developments like climate change, rising sea level and aggregate mining will shape our waterways in the future.

Media Contact
Harrison Tasoff
Science Writer
(805) 893-7220
harrisontasoff@ucsb.edu

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