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Embracing the “I” in biogeomorphology - on the role of individuals in self-organised coastal landscapes

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Biogeomorphic landscapes emerge through feedback interactions between geophysical processes and biota. Plants can stabilize the soil with their extensive root systems or modulate flows of wind and water with their aboveground canopy, promoting local sediment deposition. Different plant species have evolved different suites of traits that affect their landscape-modifying ability. Here, I will present our recent work on the interactions between individual-scale organization patterns and sediment capture for dune building grasses. Using a combination of field surveys, experiments, and simple numerical models, we demonstrate that different species exhibit different clonal expansion strategies, which determine their sediment capture efficiency. Additionally, even within the same species individuals can express different organizational patterns depending on sediment dynamics. Understanding how individual plants engineer their environment depending on prevailing geophysical conditions, and how these individual-scale interactions affect both plant and landscape dynamics, is crucial for unravelling the dynamics of complex biogeomorphic landscapes.