

## **New Challenges in the Modeling of Landscape Evolution**

Gary Parker

St. Anthony Falls Laboratory

University of Minnesota

[parke002@umn.edu](mailto:parke002@umn.edu)

**Abstract.** In the late 1980's Wilgoose, Rodriguez-Iturbe and Bras delineated the first numerical model capable of evolving complex landscape morphology on its own. This model has led to the establishment of landscape morphodynamics as a field in its own right. Having said this, several challenges need to be overcome if landscape morphodynamics is to continue to produce breakthroughs. These challenges include the following. 1. Even a landscape that has reached steady state still can be expected to display autogenic fluctuations in space and time. That is, these fluctuations are generated and maintained by the system itself, and do not require imposed external fluctuations. At present, no model is capable of capturing this feature. 2. The models of sediment transport used to date are very simple, and do not specifically account for the mechanics of bedrock incision. 3. Bedrock incision is not specifically tied to hillslope process. 4. Most models do not yet include a model for sediment conservation in the regolith. 5. Channel and hillslope process need to be formally tied so that they feed on each other. 6. The transition to the net depositional environment needs to be included. Ideas for overcoming these challenges are presented in the talk.