

Jeffrey S. Kwang (He/Him/His)

CONTACT INFORMATION

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EDUCATION

University of Illinois Urbana-Champaign, Urbana, Illinois USA
Ph.D., Civil Engineering, 2019
Dissertation Title: *Overcoming Unrealistic Behavior of Landscape Evolution Models Attributed to the Stream Power Incision Model: Scale Invariance and Ultra-sensitivity to Initial Conditions*

University of Illinois Urbana-Champaign, Urbana, Illinois USA
M.S., Civil Engineering, 2016
Thesis Title: *Effects of Differential Rainfall on the Dynamics of Landscape Evolution*

Johns Hopkins University, Baltimore, Maryland USA
B.S., Environmental Engineering, 2013

PROFESSIONAL APPOINTMENTS

University of Massachusetts Amherst, Amherst, Massachusetts USA
Postdoctoral Associate, Department of Geosciences, (August 2019 to present)

- Develop numerical model to simulate soil organic carbon redistribution
- Forecast future soil loss in the United States Cornbelt

University of Minnesota, Minneapolis, Minnesota USA
Undergraduate Researcher, Saint Anthony Falls Laboratory, (Summer 2012)

- Flume studies on the role of large woody debris in riverine sediment transport

AWARDS AND FELLOWSHIPS

- **National Science Foundation Earth Sciences Postdoctoral Fellow**, (2022-2024)
- **National Science Foundation Graduate Research Fellow**, (2015 - 2019)
- **Ben Yen Fellow**, University of Illinois Urbana-Champaign, (2013 - 2014)
- **Lucien Brush Award for Excellence in Environmental Engineering**, Johns Hopkins University, (2013)

PAPERS

- Yan, Q., Wainwright, H., Dafflon, B., Uhlemann, S., Steefel, C. I., Falco, N., **Kwang, J. S.**, & Hubbard, S. S. A hybrid data-model approach to map soil thickness in mountain hillslopes. *Earth Surface Dynamics* 9, 1347-1361 (2021).
- Kwang, J. S.**, Langston, A. L. & Parker, G. The role of lateral erosion in the evolution of non-dendritic drainage networks to dendricity and the persistence of dynamic networks. *Proceedings of the National Academy of Sciences of the United States of America* 118, e2015770118 (2021).
- Zhang, L., Li, T., Wang, G., **Kwang, J. S.**, Nittrover, J. A., Fu, X. & Parker, G. How canyons evolve by incision into bedrock: Rainbow Canyon, Death Valley National Park, United States. *Proceedings of the National Academy of Sciences of the United States of America* 117, 14730-14737 (2020).
- Kwang, J. S.** & Parker, G. Extreme Memory of Initial Conditions in Numerical Landscape Evolution Models. *Geophysical Research Letters* 46, 6563-6573 (2019).
- Zhang, L., Stark, S., Schumer, R., **Kwang, J. S.**, Li, T., Fu, X., Wang, G. & Parker, G. The Advective-Diffusive Morphodynamics of Mixed Bedrock-Alluvial Rivers Subjected to Spatiotemporally Varying Sediment Supply. *Journal of Geophysical Research: Earth Surface* 123, 1731-1755 (2018).
- Kwang, J. S.** & Parker, G. Landscape evolution models using the stream power incision model show unrealistic behavior when m/n equals 0.5. *Earth Surface Dynamics* 5, 807-820 (2017).

PAPERS IN REVISION

- Kwang, J. S.**, Thaler, E. A., Quirk, B. J., Quarrier, C. L. & Larsen, I. J. A landscape evolution modeling approach for predicting three-dimensional soil organic carbon redistribution in agricultural landscapes. *Journal of Geophysical Research: Biogeosciences*.
- Thaler, E. A.*, **Kwang, J. S.***, Quirk, B. J., Quarrier, C. L. & Larsen, I. J. Rates of historical anthropogenic soil erosion in the Midwestern United States. *Earth's Future*. *Equal Author Contributions

PAPERS IN PREPARATION

- Kwang, J. S.**, Thaler, E. A. & Larsen, I. J. Forecasting soil loss across the US Corn Belt.

THESES

- Kwang, J. S.** Overcoming Unrealistic Behavior of Landscape Evolution Models Attributed to the Stream Power Incision Model: Scale Invariance and Ultra-sensitivity to Initial Conditions. Ph.D. Dissertation, University of Illinois at Urbana-Champaign, Urbana, Illinois USA (2019).
- Kwang, J. S.** Effects of Differential Rainfall on the Dynamics of Landscape Evolution. M.S. Thesis, University of Illinois at Urbana-Champaign, Urbana, Illinois USA (2016).

CONFERENCE PROCEEDINGS

- Gasparini, N. M., Roth, D. L., Madoff, R., Mukherjee U., Callahan, R. P., Mahon, R., Sklar, L. S., Gagliardi, J., Lehnigk, K., Luna, L., Merritts, D., **Kwang, J. S.**, Del Vecchio, J., Sun, X., Koppes, M. N., McDowell, C., Straub, K. M. & Hassenruck-Gudipati, H. J. Lessons learned from the AGU EPSP URGE pod on how to structure an equitable, inclusive, and safe committee space. American Geophysical Union Fall Meeting (2021). *Poster Presentation*
- Kwang, J. S.**, Thaler, E. A. & Larsen, I. J. Forecasting soil loss across the US Corn Belt. American Geophysical Union Fall Meeting (2021). *Poster Presentation*
- Quarrier, C. L., Larsen, I. J., Quirk, B. J., Thaler, E. A. & **Kwang, J. K.** Quantifying Natural Soil Erosion Rates in Agricultural Landscapes of the Midwestern U.S. to Promote Sustainable Soil Management. American Geophysical Union Fall Meeting (2021). *Poster Presentation*
- Kwang, J. S.**, Thaler, E. A. & Larsen, I. J. Predicting anthropogenic soil organic carbon redistribution in the Midwestern United States. American Geophysical Union Fall Meeting (2020). *Poster Presentation*
- Quirk B. J., David S. R., Thaler, E. A., **Kwang, J. S.** & Larsen, I. J. Using cosmogenic ^{10}Be in detrital quartz to quantify erosion rates in the Des Moines Lobe region of Iowa. American Geophysical Union Fall Meeting (2020). *Poster Presentation*
- Thaler, E. A., **Kwang, J. S.** & Larsen, I. J. Quantifying the magnitude of historical anthropogenic soil loss in the Midwestern United States. American Geophysical Union Fall Meeting (2020). *Poster Presentation*
- Kwang, J. S.**, Langston, A. L. & Parker, G. Steady state behavior and initial condition signal shredding in landscape evolution models incorporating lateral incision. American Geophysical Union Fall Meeting (2019). *Oral Presentation*
- Kwang, J. S.** & Parker, G. Ultra-sensitivity of numerical landscape evolution models to their initial conditions. American Geophysical Union Fall Meeting (2018). *Poster Presentation*
- Kwang, J. S.** & Parker, G. Do Landscapes have good memories? Community Surface Dynamics Modeling System, Coupling of Tectonic and Surface Processes Workshop (2018).
- Kwang, J. S.** & Parker, G. Interactions between landslides and landscape evolution using a sediment flux-dependent bedrock incision model incorporating bed macro-roughness. American Geophysical Union Fall Meeting (2017). *Oral Presentation*
- Kwang, J. S.** & Parker, G. Landscape evolution using a sediment flux-dependent bedrock incision model incorporating bedrock macro-roughness. American Geophysical Union Fall Meeting (2016). *Poster Presentation*
- Kwang, J. S.** & Parker, G. Scale Invariance in Landscape Evolution Models. American Geophysical Union Fall Meeting (2014). *Poster Presentation*
- Kwang, J. S.** Effects of spacing between engineered log jams on flow, scour, and depositional patterns, Geological Society of America (2012). *Poster Presentation*

PRESENTATIONS

- Kwang, J. S.** Modeling landscape evolution from small to big spatiotemporal scales: bedrock mountains and agricultural fields. Professional Seminar. University of Massachusetts Amherst, Amherst, Massachusetts USA (2021).
- Kwang, J. S.** Ultra-sensitivity of Numerical Landscape Evolution Models to their Initial Conditions. Ven Te Chow Hydrosystems Seminar. University of Illinois at Urbana-Champaign, Urbana, Illinois USA (2018).

Kwang, J. S. Dynamic River Networks in Landscape Evolution Models. Ven Te Chow Hydrosystems Seminar. University of Illinois at Urbana-Champaign, Urbana, Illinois USA (2016).

TECHNICAL SKILLS AND TRAINING

Numerical Modeling Development

River Morphodynamics, Landscape Evolution, Soil Dynamics, Sediment Transport

Software and Coding

Python, MATLAB, R, ArcGIS, LaTeX, HEC-RAS, Microsoft Office, FORTRAN, Linux, HTML, JavaScript, ffmpeg

Laboratory

Sediment transport flume experiments, spectroscopy, sediment grain size analysis

Field Geology

Soil coring, field surveying, RTK-GPS, stream-cross sections and profiles, sediment sampling

Bystander Intervention Training

SERVICE

- **Pod Member**, Unlearning Racism in Geoscience (**URGE**), American Geophysical Union, Earth and Planetary Surface Processes, (2021)
- Workshop Presenter, **Eureka!** at the University of Massachusetts Amherst, (2020 - 2021)
- Big Brother, **Big Brothers Big Sisters of America of Central Illinois**, (2014 - 2019)
- Exhibitor, **Engineering Open House** at University of Illinois Urbana-Champaign, (2014 - 2019)

MEMBERSHIPS

- American Geophysical Union
- Tau Beta Pi
- Geological Society of America
- Community Surface Dynamics Modeling System

MANUSCRIPT REVIEWER

Earth Surface Dynamics, Geology, Geophysical Research Letters, Geoscientific Model Development, Journal of Geophysical Research: Earth Surface, Water Resources Research

REFERENCES

Dr. Gary Parker

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email: parkerg@illinois.edu
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Dr. Marcelo Garcia

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