

# Andrew J. Moodie

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## Research Interests

I am broadly interested in addressing the time and space scales across which various processes interact to produce the observed complexity of the Earth's surface. Through numerical modeling, field survey, theory, and experiments, I attempt to quantitatively describe the evolution of diverse landscapes over modern and geologic timescales. I am particularly interested in fluvial morphodynamics, including channel and drainage divide evolution, as well as alluvial fan and deltaic avulsion. My research is motivated by the need for a long-term framework for landscape evolution, so to enable the sustainable management of highly anthropic landscapes.

## Education

Doctor of Philosophy, Earth Science from RICE UNIVERSITY Spring 2019

- 4.00 cumulative GPA (4.33 scale)
- Numerical modeling of delta growth through lobe development and avulsion
- Field measurement of the development of density stratification in the Yellow River, China

Bachelor of Science, with High Honors in Geology, LEHIGH UNIVERSITY May 2014

- Minor in Economics
- Senior Honors Thesis: Exhumation, dynamic topography, and drainage divides of active and ancient orogenic settings: the Gibraltar Arc and Appalachians

## Grants and Fellowships

National Science Foundation Graduate Research Fellowship (NSF GRFP) 2016–2019

## Work Experience

Graduate Advisor	RICE UNIVERSITY, HART SafeClear; Houston, TX	2015–2016
Senior Intern and Field Tech.	PEAK ENVIRONMENTAL; Woodbridge, NJ	2013
Intern and Field Tech.	PEAK ENVIRONMENTAL; Woodbridge, NJ	2012

## Teaching Experience

ESCI 334	Geological Techniques (field trip only), RICE UNIVERSITY	2017
ESCI 334	Geological Techniques, RICE UNIVERSITY	2016
ESCI 334	Geological Techniques (field trip only), RICE UNIVERSITY	2015
EES 2	Intro to Environmental Science, LEHIGH UNIVERSITY	2014
EES 11	Environmental Geology, LEHIGH UNIVERSITY	2012–2014

## Awards

Chair's Award (Departmental Service)	RICE UNIVERSITY	2017
Alison Henning Teaching Award in Earth Science	RICE UNIVERSITY	2016
Vic Johnson Field Camp Scholarship	LEHIGH UNIVERSITY	2013

## Department and Community Involvement

GIESS, Founder and Chair	RICE UNIVERSITY	2017
Undergraduate Research Symposium, Judge	RICE UNIVERSITY	2016
GeoUnion, Treasurer	RICE UNIVERSITY	2015

## Short Courses

Integrated Basin Analysis	EXXONMOBIL, NORTHEASTERN GSA, in Lancaster, PA	2014
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## Field Work

NSF Coastal SEES	Yellow River, China; data collection survey, three weeks	2017
ESCI 635	Piceance Basin, CO; "PETM in the strat. record", three days	2017
NSF Coastal SEES	Yellow River, China; data collection survey, six weeks	2016
ESCI 546	County Clare, Ireland; "Namurian deltaic cyclothem", nine days	2016
ESCI 635	White Sands, NM; "Initiation of aeolian dune fields", five days	2015
NSF Coastal SEES	Yellow River, China; data collection survey, six weeks	2015

## Practical and Analytical Expertise

Geology:	Sediment transport, autogenic channel processes, quantitative stratigraphy, dynamic topography, basin evolution
Technologies:	Matlab, QGIS/ArcGIS, Generic Mapping Tools, OnShape (CAD), R, Python, bash, L <sup>A</sup> T <sub>E</sub> X, Unix, MS Suite, image and vector design, Git

## Professional Associations

DEEPS Journal Club, RICE UNIVERSITY  
NSF Graduate Research Fellowship Program Fellows  
American Geophysical Union, Earth and Planetary Surface Processes  
Geological Society of America  
American Association of Petroleum Geologists  
GeoUnion, RICE UNIVERSITY  
Rice AAPG chapter, RICE UNIVERSITY  
Society of Environmental Scientists, LEHIGH UNIVERSITY

## Refereed Publications

- [3] *Moodie, Andrew J.*, Jeffrey A. Nittrouer, Hongbo Ma, Brandee N Carlson, and Gary Parker. “A quasi-2d delta-growth model accounting for multiple avulsion events, validated by robust data from the Yellow River delta, China.” In: *Journal of Geophysical Research – Earth Surface* (in preparation).
- [2] Hongbo Ma, Jeffrey A. Nittrouer, Kensuke Naito, Xudong Fu, Yuanfeng Zhang, *Moodie, Andrew J.*, Yuanjian Wang, Baosheng Wu, and Gary Parker. “The exceptional sediment load of fine-grain dispersal systems: Example of the Yellow River, China.” In: *Science Advances* 3 (2017), p. 7. DOI: [10.1126/sciadv.1603114](https://doi.org/10.1126/sciadv.1603114).
- [1] *Moodie, Andrew J.*, Frank J. Pazzaglia, and Claudio Berti. “Exogenic forcing and autogenic processes on continental divide location and mobility.” In: *Basin Research* (2017). DOI: [10.1111/bre.12256](https://doi.org/10.1111/bre.12256).

## Other Publications

- [2] *Moodie, Andrew J.* “Evaluating the long-term sustainability of deltas.” In: *Outcroppings – Rice Earth Science Newsletter* 1 (2016), pp. 30–33. [\[link\]](#).
- [1] *Moodie, Andrew J.* “Dynamic topography and drainage divides in active and ancient orogenic settings, the Gibraltar Arc and Appalachians.” Undergraduate Honors Thesis. Bethlehem, PA: Lehigh University, 2014.

## Scientific Presentations with Abstracts

- [15] Chenge An, Gary Parker, Hongbo Ma, Kensuke Naito, *Moodie, Andrew J.*, and Xudong Fu. “Morphodynamic Modeling of the Lower Yellow River, China: Flux (Equilibrium) Form or Entrainment (Nonequilibrium) Form of Sediment Mass Conservation?” In: American Geophysical Union Fall Meeting. Poster. 2017. [\[link\]](#).
- [14] Eric A. Barefoot, Jeffrey A. Nittrouer, Brady Z. Foreman, *Moodie, Andrew J.*, and Gerald R. Dickens. “Towards a mechanistic understanding of the linkages between PETM climate modulation and stratigraphy, as discerned from the Piceance Basin, CO, USA.” In: American Geophysical Union Fall Meeting. Poster. 2017. [\[link\]](#).
- [13] Brandee N. Carlson, Jeffrey A. Nittrouer, *Moodie, Andrew J.*, and Hongbo Ma. “Tie channels on deltas: A case study from the Huanghe (Yellow River) delta, China.” In: American Geophysical Union Fall Meeting. Poster. 2017. [\[link\]](#).
- [12] Gail C. Kineke, Brandee N. Carlson, Austin J. Chadwick, Liang Chen, Benjamin Hobbs, Lisa Kumpf, Michael P. Lamb, Hongbo Ma, *Moodie, Andrew J.*, Michelle Mullane, Kensuke Naito, Jeffrey A. Nittrouer, and Gary Parker. “Morphodynamics and Sediment Transport on the Huanghe (Yellow River) Delta: Work in Progress.” In: American Geophysical Union Fall Meeting. Oral. 2017. [\[link\]](#).
- [11] Hongbo Ma, Jeffrey A. Nittrouer, Baosheng Wu, Yuanfeng Zhang, David C. Mohrig, Michael P. Lamb, Yuanjian Wang, Xudong Fu, *Moodie, Andrew J.*, Kensuke Naito, and Gary Parker. “Phase transition behavior of sediment transport at the sandmud interface, across scales from flumes to the large rivers.” In: American Geophysical Union Fall Meeting. Oral. 2017. [\[link\]](#).
- [10] *Moodie, Andrew J.*, Jeffrey A. Nittrouer, Hongbo Ma, Michael P. Lamb, Brandee N. Carlson, Gail C. Kineke, and Gary Parker. “Measuring Density Stratification and Understanding its Impact on Sediment Transport in Fine-grained Rivers, Based on Observations from the Lower Yellow River, China.” In: American Geophysical Union Fall Meeting. Oral. 2017. [\[link\]](#).
- [9] *Moodie, Andrew J.*, Frank J. Pazzaglia, and Claudio Berti. “Exogenic forcing and autogenic processes on continental divide location and mobility.” In: Geological Society of America Abstracts with Programs. Vol. 49-6. Oral. 2017. [\[link\]](#).

- [8] Brandee N Carlson, Jeffrey A. Nittrouer, Gail C. Kineke, *Moodie, Andrew J.*, Hongbo Ma, and Lisa Kumpf. “The coastline evolution of an abandoned deltaic lobe and the fate of its relict distributary channel: a case study from the Huanghe (Yellow River) delta, China.” In: American Geophysical Union Fall Meeting. Poster. 2016. [\[link\]](#).
- [7] Hongbo Ma, Jeffrey A. Nittrouer, Kensuke Naito, *Moodie, Andrew J.*, and Gary Parker. “The exceptional sediment load of a fine-grain meandering river and relation to bedform geometry: an appealing example from the lower Yellow River, China.” In: Geological Society of America Abstracts with Programs. Vol. 48-7. Oral. 2016. [\[link\]](#).
- [6] *Moodie, Andrew J.*, Jeffrey A. Nittrouer, Hongbo Ma, Brandee N Carlson, and Gary Parker. “A quasi-2d delta-growth model accounting for multiple avulsion events, validated by robust data from the Yellow River delta, China.” In: American Geophysical Union Fall Meeting. Poster. 2016. [\[link\]](#).
- [5] Brandee N. Carlson, Jeffrey A. Nittrouer, Hongbo Ma, and *Moodie, Andrew J.* “Channel infilling processes on the Huanghe (Yellow River) deltaic coastal plain, China.” In: Geological Society of America Abstracts with Programs. Vol. 47-7. Oral. 2015. [\[link\]](#).
- [4] Hongbo Ma, Jeffrey A. Nittrouer, *Moodie, Andrew J.*, Brandee N. Carlson, and Gary Parker. “Role of river bends for the formation and evolution of channel bedforms: Combined field studies and numerical modeling from the tidally influenced zones of the Yellow River, China and Mississippi River, USA.” In: American Geophysical Union Fall Meeting. Poster. 2015. [\[link\]](#).
- [3] *Moodie, Andrew J.*, Hongbo Ma, Jeffrey A. Nittrouer, Brandee Carlson, and Gail C. Kineke. “Spatiotemporal channel-bed evolution patterns observed for the Huanghe (Yellow River), China: Implications for evaluating system response and complexity to external perturbations.” In: Geological Society of America Abstracts with Programs. Vol. 47-7. Poster. 2015. [\[link\]](#).
- [2] Claudio Berti, David J. Anastasio, Frank J. Pazzaglia, Gilles Y. Brocard, *Moodie, Andrew J.*, Josep M. Pares, Paseo S. d. A. Cenieh, and Juan I. Soto. “Drainage network reorganization and divide migration in response to active tectonics in the Betic Range, Spain.” In: Geological Society of America Abstracts with Programs. Vol. 46-6. Oral. 2014. [\[link\]](#).
- [1] *Moodie, Andrew J.* and Frank J. Pazzaglia. “Exhumation, dynamic topography, and drainage divides in active and ancient orogenic settings: the Gibraltar Arc and Appalachians.” In: Geological Society of America Abstracts with Programs. Vol. 46-2. Oral. 2014. [\[link\]](#).

## Other Scientific Presentations

Oral	Fu research group, Tsinghua University	2017
Poster	International Workshop of the Yellow River Delta	2017
Oral	Mohrig research group, UT Austin	2017
Poster	AAPG Rice Industry Geoscience Series	2016
Oral	ExxonMobil and Rice University deltas symposium	2016
Poster	Industry-Rice Earth Science Symposium	2016
Poster	International Workshop of the Yellow River Delta	2015
Poster	Industry-Rice Earth Science Symposium	2015
Poster	Lehigh College of Arts and Sciences Symposium	2014
Oral	Lehigh EES Undergraduate Research Symposium	2014

Last updated: October 5, 2017