

Andrew J. Moodie

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Department of Earth, Environmental,
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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 expected 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

Work Experience

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

Refereed Publications

- [6] Austin J. Chadwick, Michael P. Lamb, *Andrew J. Moodie*, Gary Parker, and Jeffrey A. Nittrouer. “Origin of a preferential avulsion node on lowland river deltas.” In: *Geophysical Research Letters* (submitted).
- [5] Hongbo Ma, Jeffrey A. Nittrouer, Baosheng Wu, Yuanfeng Zhang, David Mohrig, Michael P. Lamb, Yuanjian Wang, Xudong Fu, *Andrew J. Moodie*, Kensuke Naito, Guangqian Wang, Chunhong Hu, and Gary Parker. “Fine-grained sediment transport: universal relation with phase transition.” In: *Science* (in review).
- [4] *Andrew J. Moodie*, Jeffrey A. Nittrouer, Hongbo Ma, Brandee N. Carlson, Austin J. Chadwick, Michael P. Lamb, and Gary Parker. “Modeling deltaic lobe-building and channel avulsions for the Yellow River delta, China.” In: *Journal of Geophysical Research – Earth Surface* (in preparation).

- [3] Chengge An, *Andrew J. Moodie*, Hongbo Ma, Xudong Fu, Yuanfeng Zhang, Kensuke Naito, and Gary Parker. “Morphodynamic model of lower Yellow River: flux or entrainment form for sediment mass conservation?” In: *Earth Surface Dynamics* 6.4 (2018), pp. 989–1010. DOI: 10.5194/esurf-6-989-2018.
- [2] Hongbo Ma, Jeffrey A. Nittrouer, Kensuke Naito, Xudong Fu, Yuanfeng Zhang, *Andrew J. Moodie*, 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.
- [1] *Andrew J. Moodie*, 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.

Grants and Fellowships

Geol. Society of America, Research Grant	\$ 1,400	2018
National Science Foundation, Graduate Fellowship		2016–2019

Teaching Experience

Geological Techniques (field trip)	RICE UNIVERSITY	2018
Geological Techniques (field trip)	RICE UNIVERSITY	2017
Geological Techniques	RICE UNIVERSITY	2016
Geological Techniques (field trip)	RICE UNIVERSITY	2015
Intro to Environmental Science	LEHIGH UNIVERSITY	2014
Environmental Geology	LEHIGH UNIVERSITY	2012–2014

Awards

First Place in Poster Session	HOUSTON GEOL. SOCIETY	2018
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

Summer Undergrad Lunch Seminar Series speaker	RICE UNIVERSITY	2018
Journal Club, Organizer	RICE UNIVERSITY	2018
GIESS Symposium, Founder and Chair [link]	RICE UNIVERSITY	2017–
Undergraduate Research Symposium, Judge	RICE UNIVERSITY	2016
GeoUnion, Treasurer	RICE UNIVERSITY	2015

Short Courses

Summer Institute for Earth-Surface Dynamics	NCED2	2018
Integrated Basin Analysis	EXXONMOBIL	2014

Field Experience

High concentration flow in the YR	Yellow River, China; two weeks	2018
Density currents in Xiaolangdi Reservoir	Henan Province, China; two weeks	2018
Infilling of abandoned channels	Yellow River, China; three weeks	2017
PETM in the stratigraphic record	Piceance Basin, CO; three days	2017
Density stratification in the YR	Yellow River, China; six weeks	2016
Namurian deltaic cyclothems	County Clare, Ireland; nine days	2016
Initiation of aeolian dune fields	White Sands, NM; five days	2015
General river survey	Yellow River, China; six weeks	2015

Practical and Analytical Expertise

Geology:	Sediment transport, autogenic channel processes, reduced-complexity modeling, quantitative stratigraphy, dynamic topography, basin evolution
Technologies:	Matlab, Python, QGIS/ArcGIS, Generic Mapping Tools, Git, L ^A T _E X, Tensorflow/ML, OnShape (CAD), R, bash, Unix, MS Suite, image and vector design

Professional Associations

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

Non-refereed Publications

- [2] *Andrew J. Moodie*. “Evaluating the long-term sustainability of deltas.” In: *Outcroppings – Rice Earth Science Newsletter* 1 (2016), pp. 30–33. [link].
- [1] *Andrew J. Moodie*. “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

- [21] Eric A. Barefoot, Jeffrey A. Nittrouer, Brady Foreman, Elizabeth A. Hajek, and *Andrew J. Moodie*. “Paleohydraulic estimates from alluvial strata during the PETM: an example from the Piceance Basin, Colorado.” In: American Geophysical Union Fall Meeting. Poster. 2018. [link].
- [20] Brandee Carlson, Jeffrey A. Nittrouer, *Andrew J. Moodie*, Michelle Mullane, Lisa Kumpf, and Gail C. Kineke. “Seasonal sediment delivery to an abandoned deltaic distributary channel.” In: American Geophysical Union Fall Meeting. Oral. 2018. [link].
- [19] Hongbo Ma, Jeffrey A. Nittrouer, Brandon J. McElroy, Yuanjian Wang, *Andrew J. Moodie*, Xingyu Chen, Xudong Fu, Baosheng Wu, and Gary Parker. “Turbidity currents in Xiaolangdi reservoir, Yellow River, China: dynamics and geomorphic expression.” In: American Geophysical Union Fall Meeting. Oral. 2018. [link].
- [18] Hongbo Ma, Jeffrey A. Nittrouer, Yuanfeng Zhang, Xudong Fu, Yuanjian Wang, *Andrew J. Moodie*, Yanjun Wang, Baosheng Wu, and Gary Parker. “Change in downstream bedform type, bed material sediment transport regime and flood potential in response to sediment blockage by a dam: can bed degradation increase flooding risk?” In: American Geophysical Union Fall Meeting. Oral. 2018. [link].
- [17] *Andrew J. Moodie* and Brady Foreman. “SedEdu: developing and testing a suite of computer-based interactive educational activities for introductory sedimentology and stratigraphy courses.” In: American Geophysical Union Fall Meeting. Poster. 2018. [link].
- [16] *Andrew J. Moodie*, Jeffrey A. Nittrouer, Hongbo Ma, Brandee N. Carlson, Michael P. Lamb, and Yuanjian Wang. “Suspended-sediment induced stratification inferred from concentration and velocity profile measurements in the flooding lower Yellow River, China.” In: American Geophysical Union Fall Meeting. Poster. 2018. [link].
- [15] Chenge An, Gary Parker, Hongbo Ma, Kensuke Naito, *Andrew J. Moodie*, 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, *Andrew J. Moodie*, 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, *Andrew J. Moodie*, 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, *Andrew J. Moodie*, 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, *Andrew J. Moodie*, 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] *Andrew J. Moodie*, 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] *Andrew J. Moodie*, 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, *Andrew J. Moodie*, 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, *Andrew J. Moodie*, 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] *Andrew J. Moodie*, 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 *Andrew J. Moodie*. “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, *Andrew J. Moodie*, 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] *Andrew J. Moodie*, 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, *Andrew J. Moodie*, 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] *Andrew J. Moodie* 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].

Invited Presentations

Oral	Science workshop; YELLOW RIVER INSTITUTE OF HYDRO. RESEARCH	2018
Oral	Fu research group; TSINGHUA UNIVERSITY	2017
Oral	Mohrig research group; UT AT AUSTIN	2017
Oral	ExxonMobil and Rice University deltas symposium	2016

Additional Scientific Presentations

Poster	Summer Institute for Earth Surface Dynamics; UMN	2018
Poster	Rice Night; HOUSTON GEOLOGICAL SOCIETY	2018
Poster	Int’l Workshop for Socioeconomic Sustainability of Large River Deltas	2017
Poster	AAPG Rice Industry Geoscience Series	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

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