

# BRANDEE CARLSON

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Department of Earth and Atmospheric Sciences, University of Houston  
Science and Research Bldg. 1, Houston, Texas, 77004

## EDUCATION

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**Ph.D.**, Rice University, Houston, Texas May 2020  
Earth, Environmental and Planetary Sciences  
Thesis title: *The geomorphic evolution of abandoned deltaic lobes and distributary channels*  
Advisor: Dr. Jeffrey Nittrouer

**B.Sc., with Honors**, University of Texas, Austin, Texas December 2013  
Geological Sciences, Major: Hydrogeology  
Undergraduate thesis title: *Basin Depth Control on the Autogenic Timescale of Fluviodeltaic Systems*  
Advisor: Dr. Wonsuck Kim

## APPOINTMENTS

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Assistant Professor, University of Houston, Department of Earth and Atmospheric Sciences 2022–

NSF EAR Postdoctoral Fellow, University of Colorado, Institute of Arctic and Alpine Research  
*The Impact of Varying Sediment Supply on Arctic Delta-front Transport Processes*  
Advisor: Dr. Irina Overeem 2021–2022

Postdoctoral Researcher, Vanderbilt University, Department of Earth and Environmental Science  
*Signal Preservation in the Stratigraphy of the Modern Ganges-Brahmaputra Delta*  
Advisor: Dr. Steven Goodbred 2020–2021

## GRANTS

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1. *Co-PI*. NSF RAPID. The effects of extreme drought on sediment transport and deposition in water-supply reservoirs. \$50,000. (2021-2022)
2. *Lead Author and Researcher*. NSF EAR Postdoctoral Fellowship. The Impact of Varying Sediment Supply on Arctic Delta-front Transport Processes. \$174,000. (2021-2023)
3. *Lead Author and Researcher*. David Worthington Named Grant, AAPG Grants in Aid. The role of deltaic tie channels for shoreline stability: a case study from the Huanghe (Yellow River) delta, China. \$2000. (2019)
4. *Lead Author and Researcher*. David Worthington Named Grant, AAPG Grants in Aid. Channel annealing processes on the Huanghe delta: Applications for Science and Society. \$3000. (2015)

## HONORS & AWARDS

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Outstanding Graduate Student Award, Rice University 2020  
Chair's Award, EEPS, Rice University 2019  
Douglas and Martha Lou Broussard Fellowship 2018  
Best Symposium Talk – Graduate Interdisciplinary Earth Science Symposia (GIESS)  
EEPS, Rice University 2018  
AGU EPSP Young Researcher Spotlight 2018  
Alison Henning Teaching Award in Earth Science 2017

## PUBLICATIONS

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### *Peer-Reviewed Journal Articles (Published)*

1. **Carlson, B.**, Nittrouer, J., Swanson, T., Moodie, A., Dong, T., Kineke, G., Ma, H., Pan, M., Wang, Y., (2021) Impacts of engineered diversions and natural avulsions on delta-lobe stability *Geophysical Research Letters*, 48, doi: 10.1029/2021GL092438
2. Moodie, A. J., **Carlson, B.**, Foreman, Brady, Z., Kwang, J., Naito, K., Nittrouer, J. A., (2021) SedEdu: software organizing sediment-related educational modules *Journal of Open Source Education*, 4(42), 129. 1 doi: 10.21105/jose.00129
3. **Carlson, B.**, Nittrouer, J., Moodie, A., Kineke, G., Kumpf, L., Ma, H., Parsons, D., Wang, H. (2020) Infilling abandoned deltaic distributary channels through landward sediment transport. *Journal of Geophysical Research: Earth Surface*, 125(2) doi: 10.1029/2019JF005254.
4. Moodie, A., Nittrouer, J., Ma, H., **Carlson, B.**, Wang, Y., Lamb, M., Parker, G., (2020) Suspended-sediment induced stratification inferred from concentration and velocity profile measurements in the lower Yellow River, China. *Water Resources Research*, doi: 10.1029/2020WR027192
5. Li, Y., Nittrouer, J. A., Bi, N., Wu, X., and **Carlson, B.**, (2020) Modeling the filling process of abandoned fluvial-deltaic distributary channel: An example from the Yellow River delta, China. *Geomorphology*, doi: 10.1016/j.geomorph.2020.107204.
6. Wu, X., Wang, H., Bi, N., Nittrouer, J., Xu, J., **Carlson, B.**, Lu, T., Li, Z. (2020) Evolution of a tide-dominated abandoned channel: a case study from the Qingshuigou course, Yellow River, *Marine Geology*, 422, doi: 10.1016/j.margeo.2020.106116.
7. Moodie, A., Nittrouer, J., Ma, H., **Carlson, B.**, Chadwick, A., Lamb, M., Parker, G., (2019) Modeling deltaic lobe-building cycles and channel avulsions for the Yellow River delta, China, *Journal of Geophysical Research: Earth Surface*, 124. doi: 10.1029/2019JF005220
8. **Carlson, B.**, Piliouras, A., Muto, T., Kim, W. (2018) Basin water depth control on channel morphology and autogenic timescales in deltaic systems. *Journal of Sedimentary Research*, 88. doi: 10.2110/jsr.2018.52
9. Piliouras, A., Kim, W., **Carlson, B.** (2017) Balancing aggradation and progradation on a vegetated delta: The importance of fluctuating discharge in depositional systems. *Journal of Geophysical Research: Earth Surface*, 122. doi: 10.1002/2017JF004378

### *Peer-Reviewed Journal Articles (Under Review & In Preparation)*

1. Dong, T., Nittrouer, J., **Carlson, B.**, McElroy, B., Il'icheva, E., Pavlov, M., Ma, H., Impacts of tectonic subsidence and variable basin depth on delta lobe building *Journal of Geophysical Research: Earth Surface* (submitted)
2. **Carlson, B.**, Nittrouer, J., Moodie, A., Dong, T., Barefoot, E., Ma, H., Wang, H., Stratigraphy atop abandoned deltaic distributary channels reflects avulsion style *Geology* (In preparation)
3. **Carlson, B.**, Overeem, I., Pierce, E., Moodie, A., Lintern, G., Linking subaerial and subaqueous channel dynamics in glacially-sourced deltas *Geophysical Research Letters* (In preparation)

### *Other publications*

1. **Carlson, B.**, (2020). *The geomorphic evolution of abandoned deltaic lobes and distributary channels*. PhD Dissertation. Rice University.

2. **Carlson, B.**, (2013). *Basin Depth Control on the Autogenic Timescale of Fluviodeltaic Systems*. Undergraduate Honors Thesis. University of Texas at Austin.

## TEACHING & MENTORSHIP

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### Professional Graduate Student Mentor

Minglong Pan (Rice University) *Bar migration on the Yellow River delta, China* 2017–present

### Professional Graduate Student Mentor

Harlan Zhang (Rice University) *Bar accumulation on the Yellow River delta, China* 2016

### Teaching Assistant

ESCI 404 Graduate Interdisciplinary Earth Science Seminar, Rice University Spring 2020

### Teaching Assistant

ESCI 101 The Earth, Rice University Spring 2016, 2017

### Teaching Assistant

ESCI 321 Earth System Evolution and Cycles, Rice University Fall 2015

## OUTREACH & SERVICE

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Peer Reviewer – *NSF EAR Postdoctoral Fellowship Proposal* (total: 1), *NSF Geomorphology and Land-use Dynamics* (total: 2), *Geology* (total: 1), *Water Resources Research* (total: 1), *Global and Planetary Change* (total: 1), *Journal of Geophysical Research: Oceans* (total: 1), *Journal of Geophysical Research: Earth Surface* (total: 2), *Earth and Planetary Science Letters* (total: 2), *Estuarine, Coastal and Shelf Science* (total:1), *Geophysical Research Letters* (total:2)

Volunteer Judge - Outstanding Student Poster Award Contest, AGU Fall Meeting 2020, 2021

Code of Conduct Student Liaison – Coordinated interactions between students and faculty to update field trip policies for EEPS at Rice University 2019

Rice Earth Day, Girl Scouts of San Jacinto Texas 2019

EEPS Reach Volunteer – guest lecturer for Earth Science curriculum at Lanier Middle School, Houston, Texas 2018

EEPS Outcroppings Magazine – Student board member, contributing author 2017–2020

Rice Science Olympiad – Test writer and proctor for Hydrogeology and Remote Sensing 2017–2018

GeoUnion President – Liaison between graduate students and faculty, advocate for graduate student welfare 2015

## WORK AND RESEARCH EXPERIENCE

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### Guest Scientist

2014

*Geological Society of America GeoCorps, Harpers Ferry, WV, USA*

- Inventoried karst features on recently acquired land in Harpers Ferry National Historical Park.

### Research and Laboratory Assistant

2012–2014

*The University of Texas, Austin, TX, USA*

- Assisted and performed flume experiments under varying vegetation densities to understand the control of vegetation on deltaic shoreline morphology. Formulated and performed flume experiments under varying basin depths to understand the role of basin depth on autogenic timescales.

## PRESENTATIONS & POSTERS

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### *Invited Lectures*

1. *Antecedent channel bed elevation dictates stability of delta lobes after avulsions and diversions*, Invited Oral Presentation, American Geophysical Union, New Orleans, LA, December 2021
2. *Seasonal sediment delivery to an abandoned deltaic distributary channel*, Invited Oral Presentation, American Geophysical Union, Washington, D.C., December 10, 2018, Abstract: EP12B-07
3. *Avulsion style control on sedimentation patterns in abandoned deltaic distributary channels: a case study from the Yellow River (Huanghe) delta, China*, Invited Oral Presentation, Los Alamos National Labs, April 19, 2017
4. *Avulsion style control on sedimentation patterns in abandoned deltaic distributary channels: a case study from the Yellow River (Huanghe) delta, China*, Invited Oral Presentation, U.S. Geological Survey, Albuquerque, New Mexico, April 21, 2017

### *Conference Presentations*

1. **Carlson, B.**, Nittrouer, J., Moodie, A., Barefoot, E., Dong, T., Stratigraphy of abandoned deltaic distributary channels and implications for assessing avulsion style (accepted for oral presentation) Fall 2020 Meeting, American Geophysical Union, Virtual Convention, 1-17 Dec. Abstract: EP064-06
2. Wu, X., Wang, H., Xu, J., Bi, N., Nittrouer, J., **Carlson, B.**, Evolution of a tide-dominated abandoned channel: a case of the abandoned Qingshuigou course, Yellow River, (accepted for oral presentation) Spring 2020 Meeting, Ocean Sciences, San Diego, California, 16-21 Feb. Abstract: CP33B-05
3. Kumpf, L., Kineke, G., **Carlson, B.**, Mullane, M., Seasonal infilling of an artificially abandoned distributary channel on the Huanghe (Yellow River) delta, China, (accepted for poster presentation) Spring 2020 Meeting, Ocean Sciences, San Diego, California, 16-21 Feb. Abstract: CP24D-1174
4. Mullane, M., Kineke, G., Kumpf, L., **Carlson, B.**, Seasonal wave attenuation in the muddy nearshore environment of the modern Huanghe delta from in-situ observations in SWAN modeling (accepted for poster presentation) Spring 2020 Meeting, Ocean Sciences, San Diego, California, 16-21 Feb. Abstract: MG44A-2232
5. **Carlson, B.**, Nittrouer, J., Moodie, A., Kineke, G., Ma, H., Swanson, T., Pan, M., The impacts of channel diversion characteristics on retreat rates of abandoned deltaic lobes, as informed by the Huanghe (Yellow River) delta of China (accepted for oral presentation) Fall 2019 Meeting, American Geophysical Union, San Francisco, California, 9-13 Dec. Abstract: EP32A-04
6. Moodie, A., Nittrouer, J., Ma, H., **Carlson, B.**, Lamb, M., Parker, G., Density stratification in open-channel flow due to high sediment concentration in the flooding Lower Yellow River (accepted for oral presentation) Fall 2019 Meeting, American Geophysical Union, San Francisco, California, 9-13 Dec. Abstract: EP52A-05
7. Moodie, A., Nittrouer, J., Ma, H., **Carlson, B.**, Lamb, M., Wang, Y., Suspended sediment induced stratification inferred from concentration and velocity profile measurements in the flooding lower Yellow River, China (accepted for poster presentation) Fall 2018 Meeting, American Geophysical Union, Washington, D.C., 10-14 Dec. Abstract: EP53E-1919

8. **Carlson, B.**, Nittrouer, J., Moodie, A., Ma, H., Tie channels on deltas: A case study from the Huanghe (Yellow River) delta, China (accepted for poster presentation) Fall 2017 Meeting, American Geophysical Union, New Orleans, Louisiana, 11-15 Dec. Abstract: EP43D-1912
9. Kineke, G., **Carlson, B.**, Chadwick, A., Chen, L., Hobbs, B., Kumpf, L., Lamb, M., Ma, H., Moodie, A., Mullane, M., Naito, K., Nittrouer, J., and Parker, G., Morphodynamics and sediment transport on the Huanghe (Yellow River) delta: Work in progress (accepted for oral presentation) Fall 2017 Meeting, American Geophysical Union, New Orleans, Louisiana, 11-15 Dec. Abstract: GC14B-06
10. Kumpf, L., Kineke, G., **Carlson, B.**, Mullane, M., Mechanisms of sediment transport to an abandoned distributary channel on the Huanghe (Yellow River) delta, China (accepted for poster presentation) Fall 2017 Meeting, American Geophysical Union, New Orleans, Louisiana, 11-15 Dec. Abstract: EP13B-1623
11. Moodie, A., Nittrouer, J., Ma, H., Lamb, M., **Carlson, B.**, Kineke, G., Parker, G., Measuring density stratification and understanding its impact on sediment transport in fine-grained rivers, based on observations from the lower Yellow River, China, (accepted for oral presentation) Fall 2017 Meeting, American Geophysical Union, New Orleans, Louisiana, 11-15 Dec. Abstract: EP12B-07
12. Moodie, A., Nittrouer, J., Ma, H., **Carlson, B.**, Parker, G., A quasi-2d delta growth model accounting for multiple avulsion events, validated by robust data from the Yellow River delta, China (accepted for poster presentation) Fall 2016 Meeting, American Geophysical Union, San Francisco, California. 12-16 Dec. Abstract: EP43A-0945
13. **Carlson, B.**, Nittrouer, J., Ma, H., Moodie, A., Channel infilling processes on the Huanghe (Yellow River) Deltaic Coastal Plain, China (accepted for oral presentation) 2015 Fall Geological Society of America Meeting, Baltimore, Maryland, 1-4, Nov.
14. Moodie, A., Ma, H., Nittrouer, J., **Carlson, B.**, Spatiotemporal channel-bed evolution patterns observed for the Huanghe (Yellow River), China: Implications for evaluating system response and complexity to external perturbations (accepted for poster presentation) 2015 Fall Geological Society of America Meeting, Baltimore, Maryland, 1-4, Nov. Abstract: 263313
15. Ma, H., Nittrouer, J., Moodie, A., **Carlson, B.**, Parker, G., 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 (accepted for poster presentation) 2015 Fall American Geophysical Union Meeting, San Francisco, California, 14-18, Dec. Abstract: 82765
16. **Carlson, B.**, Understanding and managing structurally controlled karst in Harpers Ferry National Historical Park (accepted for poster presentation) 2014 Fall Geological Society of America Meeting, Vancouver, British Columbia, Canada, 19-22, Oct. Abstract: 248864
17. **Carlson, B.**, Kim, W., and Piliouras, A., Basin depth control on the autogenic timescale of fluviodeltaic systems, (accepted for oral presentation) 2013 Fall Meeting, AGU, San Francisco, California 9-13, Dec., Abstract: EP23A-04
18. Piliouras, A., Kim, W., and **Carlson, B.**, Building a delta: Interactions between water, sediment, and vegetation in an experimental system, (accepted for oral presentation) 2013 Fall Meeting, AGU, San Francisco, California 9-13, Dec., Abstract: EP31D-04