

# Samuel E. Muñoz

Postdoctoral Scholar  
Department of Geology & Geophysics  
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## I. EDUCATION

- 2010-2015            Ph.D. Physical Geography (Minor: Quaternary Science)  
University of Wisconsin-Madison (Madison, Wisconsin)  
Advisor: John (Jack) Williams
- 2008-2010            M.Sc., Geography  
University of Ottawa (Ottawa, Canada)  
Advisor: Konrad Gajewski
- 2004-2008            B.Sc. (Honors), Physical Geography (Minor: Geomatics)  
Carleton University (Ottawa, Canada)  
Advisor: Michael Pisaric

## II. PROFESSIONAL APPOINTMENTS

- 2015-present        Weston Howland Jr. Postdoctoral Scholar  
Department of Geology & Geophysics  
Woods Hole Oceanographic Institution (Woods Hole, Massachusetts)  
Sponsors: Jeffrey P. Donnelly & Liviu Giosan

## III. PUBLICATIONS

### *Accepted/In Revision*

- [13]    **Munoz SE**, Dee SG. El Niño increases the risk of lower Mississippi River flooding. In Revision with: *Scientific Reports*.
- [12]    Walsh JR, **Munoz SE**, Vander Zanden MJ. Outbreak of an undetected invasive species triggered by a climate anomaly. Accepted: *Ecosphere*.

### *Published*

- [11]    Beach T, Johnson KM, McCusker Hill M, **Munoz SE**, Peros M (2016) The view from the “Anthropocene”: New perspectives in human-induced environmental change. *Anthropocene*, doi:10.1016/j.ancene.2016.09.004
- [10]    Radeloff VC, Williams JW, Bateman BL, Burke KD, Carter SK, Childress ES, Cromwell KJ, Gratton C, Hasley AO, Kraemer BM, Latzka AW, Marin-Spiotta E, Meine CD, **Munoz SE**, Neeson TM, Pidgeon AM, Rissman AR, Rivera RJ, Szymanski LM, Usinowicz J (2015). The rise of novelty in ecosystems. *Ecological Applications* 25(8): 2051-2068.

- [9] **Munoz SE**, Gruley KE, Fike DA, Schroeder S, Williams JW (2015) Reply to Baires et al.: Shifts in Mississippi River flood remain a contributing factor to Cahokia's emergence and decline. *Proceedings of the National Academy of Sciences*, doi: 10.1073/pnas.1509404112.
- [8] **Munoz SE**, Gruley KE, Massie A, Fike DA, Schroeder S, Williams JW (2015). Cahokia's emergence and decline coincided with shifts of flood frequency on the Mississippi River. *Proceedings of the National Academy of Sciences* 112(20): 6319-6324.
- [7] **Munoz SE**, Mladenoff DJ, Schroeder S, Williams JW (2014). Defining the spatial patterns of land use associated with the indigenous societies of eastern North America. *Journal of Biogeography*, 41(12): 2195-2210.
- [6] **Munoz SE**, Schroeder S, Fike DA, Williams JW (2014). A record of sustained prehistoric and historic land use from the Cahokia region, Illinois, USA. *Geology* 42(6): 499-502.
- [5] **Munoz SE** (2013) Review of 'Surviving Sudden Environmental Change (J. Cooper & P. Sheets, eds.)'. *Heritage & Society* 6(2): 203-204.
- [4] Gajewski K, **Munoz SE**, Peros M, Viau A, Morlan R, Betts M (2011) The Canadian Archaeological Radiocarbon Database (CARD): archaeological radiocarbon dates in North America and their paleoenvironmental context. *Radiocarbon* 53(2): 371-394.
- [3] **Munoz SE**, Gajewski K, Peros M (2010) Synchronous environmental and cultural change in the prehistory of the northeastern United States. *Proceedings of the National Academy of Sciences*, doi: 10.1073/pnas.1005764107.
- [2] **Munoz SE**, Gajewski K (2010) Distinguishing prehistoric human influence on late Holocene forests in southern Ontario, Canada. *The Holocene* 20(6): 967-981.
- [1] Peros M, **Munoz SE**, Gajewski K, Viau AE (2010) Prehistoric demography of North America inferred from radiocarbon data. *Journal of Archaeological Science* 37: 656-664.

#### IV. GRANTS, SCHOLARSHIPS & AWARDS

*Grants & Scholarships (>\$400k awarded since 2008)*

- 2016-2018 Ocean and Climate Change Institute (OCCI), "Fingerprinting Mississippi River sediment flux to the Gulf of Mexico", (PI): \$67,342.
- 2015-2017 Woods Hole Oceanographic Institution (WHOI), Postdoctoral Scholarship: \$93,000
- 2014 Competitive Innovation Incentive Fund (CIIF) of the IGERT: \$625
- 2013-2015 National Science Foundation (NSF), Doctoral Dissertation Research Improvement Grant, BCS-1333070: \$14,509
- 2013-2015 Novel Ecosystems NSF-IGERT Traineeship: \$60,000
- 2013 Geological Society of America (GSA), Graduate Student Research Grant: \$1,980
- 2011-2012 National Geographic Society (NGS), Young Explorer's Grant, YEG-9008-11: \$2,844
- 2011 American Association of Geographers (AAG), Paleoenvironmental Change Specialty Group Graduate Student Award: \$500
- 2011 University of Wisconsin-Madison, Trewartha Research Award: \$600
- 2011 National Lacustrine Core Facility (LacCore), Graduate Student Travel Grant: \$1,000
- 2011-2014 University of Wisconsin-Madison, Trewartha Travel Award: \$2,000

- 2010-2012 National Science and Engineering Research Council (Canada), Canada Graduate Scholarship [declined to study abroad]: \$70,000
- 2010-2012 National Science and Engineering Research Council (Canada), Post-Graduate Scholarship: \$42,000
- 2010 University of Ottawa, Dean's Scholarship: \$1,500
- 2008-2010 Ontario Ministry of Training, Colleges, and Universities, Ontario Graduate Scholarship [declined for NSERC-PGS]: \$30,000
- 2008-2010 National Science and Engineering Research Council (Canada), Post-Graduate Scholarship: \$35,000
- 2006 University of Toronto, Center for Global Change Studies Scholarship: \$5,000
- 2006-2007 Carleton University, Chalmers Jack Mackenzie/Hyman Soloway Scholarship: \$2,000

#### *Pending Grant Support*

- 2017-2019 RESTORE Act Center of Excellence for Louisiana, "Diagnosing controls on the delivery of freshwater and sediment to the Mississippi River delta to improve planning and implementation of diversions", (PI) [Pending]: \$399,548 to WHOI.
- 2017-2020 National Science Foundation (NSF), Prediction of and Resilience against Extreme Events (PREEVENTS), "Collaborative Research: Reevaluating the risk of extreme flooding on the lower Mississippi River in the context of hydroclimate variability", (PI) [Pending]: \$560,437 to WHOI.
- 2017-2019 National Science Foundation (NSF), Paleo Perspectives on Climate Change (P2C2), "Collaborative Research: Extreme floods on the lower Mississippi River in the context of late Holocene climate variability", (PI) [Pending]: \$303,061 to WHOI.

#### *Honors & Awards*

- 2015 Geological Society of America North-Central Section, Best Graduate Student Oral Presentation of NC-GSA meeting
- 2013 Geological Society of America, Quaternary Geology & Geomorphology Division, John Montagne Award
- 2012 University of Wisconsin-Madison, Honored Instructor Award
- 2012 University of Wisconsin-Madison, Early Excellence in Teaching Award [nominated]
- 2011 University of Wisconsin-Madison, Dept. of Geography, Trewartha Award for best student paper (*Munoz et al., 2010*)

## **V. TEACHING & MENTORING**

### *Teaching*

- 2016 Guest Lecturer, MIT/WHOI Joint Program, 12.710 (Geological Oceanography)
- 2014 Instructor, Quaternary period in the Great Lakes Summer Short-Course, Kenosha Public Museum, Kenosha, WI
- 2011-2012 Teaching Assistant and Laboratory Instructor, University of Wisconsin-Madison, Department of Geography, Course: Geography 120 (Global Physical Environments)

- 2011-2014 Guest Lecturer, University of Wisconsin–Madison, Geography 120 (Global Physical Environments), Geography 338 (Environmental Biogeography) and Geography 331 (Climatic Environments of the Past)
- 2011-2014 Reader & Grader, University of Wisconsin–Madison, Geography 331 (Climatic Environments of the Past)
- 2009-2010 Teaching Assistant and Laboratory Instructor, University of Ottawa, Department of Geography, courses: Geography 1301 (The Physical Environment), Geography 2304 (Climatology)

*Mentoring*

- 2015 Michelle O’Donnell (B.S. Northeastern U.), WHOI/Northeastern Undergraduate Internship Program, “A sedimentary record of overbank floods along the lower Mississippi River, 1722–1950”
- 2014 Ashtin Massie (B.S. UW–Madison), Directed Study “Preliminary particle size analyses from Horseshoe Lake, Illinois: A late Holocene record of flooding from the central Mississippi River”
- 2014 Christopher Morgan (B.S., UW–Madison), Research Experience for Undergraduates “Cryptotephra: An alternative to radiocarbon dating”
- 2014 Brigitta Rongstad (B.S., UW–Madison), Senior Undergraduate Thesis (co-advised w/ J. Williams) “A methodology for cryptotephra detection in a lacustrine sediment core from Spicer Lake, Indiana”
- 2013 Mason Martinez (Madison East High School), High School Science Research Internship Program, “Recording patterns of prehistoric land use using the loss-on-ignition method in lake sediment cores from the Cahokia region, Illinois, USA”

**VI. PRESENTATIONS**

*Invited*

- 2016 University of Colorado at Boulder, Dept. of Geological Sciences, Boulder CO
- 2016 Coastal Carolina University, Dept. of Marine Science, Conway SC
- 2016 Geological Society of America annual meeting, Denver CO [keynote]
- 2016 Woods Hole Oceanographic Institution, Dept. of Geology & Geophysics, Woods Hole MA
- 2015 Brown University, Dept. of Earth, Environmental, and Planetary Sciences, Providence RI
- 2015 Worcester State University, Dept. of Earth, Environmental and Physics, Worcester MA
- 2015 University of Alabama, Dept. of Geography, Tuscaloosa AL
- 2015 Geological Society of American annual meeting, Baltimore MD [keynote]
- 2015 University of Minnesota, Department of Earth Sciences, Minneapolis MN
- 2015 Chicago Archaeological Society, Chicago IL
- 2014 University of Wisconsin–Platteville, Dept. of Geography, Platteville WI
- 2014 Illinois State Museum, Springfield IL
- 2014 Cahokia Mounds State Historic Site & Interpretive Center
- 2011 Geological Society of America annual meeting, Minneapolis MN
- 2010 University of Ottawa, Department of Geography, Ottawa ON

*Contributed Talks*

- 2016 European Geosciences Union general assembly, Vienna, Austria
- 2016 American Geophysical Union annual meeting, San Francisco CA
- 2016 Geological Society of America annual meeting, Denver CO

- 2015 Association of American Geographers annual meeting, Chicago, IL.
- 2014 American Geophysical Union fall annual meeting, San Francisco, CA.
- 2014 Midwestern Archaeology Conference annual meeting, Champaign, IL.
- 2014 Society for American Archaeology annual meeting, Austin, TX
- 2013 Geological Society of America annual meeting, Denver, CO.
- 2011 American Association of Geographers annual meeting, Seattle, WA

*Posters*

- 2016 PAGES cross community workshop on past flood variability, Grenoble, France.
- 2014 American Quaternary Association biannual meeting, Seattle, WA
- 2012 Midwest Geobiology Conference, St. Louis, MO
- 2012 American Quaternary Association biannual meeting, Duluth, MN
- 2009 Past Global Changes Open Science meeting, Corvallis, OR

**VII. MEDIA COVERAGE**

- 02/01/2016 Smithsonian Channel (US)/Channel 5 (UK) – “Ancient Mysteries: America’s Hidden Pyramid City” Blink Films.
- 06/19/2015 Wisconsin Public Television – “Wednesday Nite @ the lab”, Wisconsin Alumni Research Foundation
- 05/19/2015 National Geographic News – “New evidence may solve mystery of America’s huge ancient city” Kristin Romey
- 05/04/2015 *Nature News* – “Floods might have doomed prehistoric American city” Emma Marris
- 05/04/2015 St. Louis Public Radio – “New insights into the curious disappearance of the Cahokia Mounds builders” Durrie Bouscaren
- 04/25/2014 LiveScience – “City’s Mysterious Fate Explained by Flood” Becky Oskin
- 12/03/2013 MadGeogNews – “Williams, Munoz mentor junior from Madison East” Karen Tuerk
- 10/31/2013 National Geographic News – “Did a Mega-Flood Doom Ancient American City of Cahokia?” Glenn Hodges
- 01/16/2011 Columbus Dispatch – “Climate had a role in changing cultures” Bradley T. Lepper
- 01/05/2011 Lake Effect, Milwaukee Public Radio – “Climate & cultural changes occurred at same time” Stephanie Lecci
- 12/07/2010 USA Today – “Climate shifts change paleo-indian cultures” Elizabeth Weise.
- 12/06/2010 Boston Globe – “Climate, culture linked in prehistoric Northeast” Carolyn Y. Johnson
- 12/04/2010 InsideScience.org – “Indigenous peoples adapt to climate change” Joel Shurkin
- 12/03/2010 *ScienceNow* – “Did climate change drive prehistoric culture change?” Michael Balter

**VIII. SYNERGISTICS**

- Symposia Organized* Paleofloods and related fluvial processes during the Late Quaternary: reconstructions and causes, Geological Society of America annual meeting, Denver CO, co-chaired with Matthew Therrell and Lisa Davis (2016)
- Paleo/Climate Seminar Co-Organizer, Woods Hole Oceanographic Institution (2015-2016)
- New Perspectives in Paleoenvironmental Change and Geoarchaeology (5 sessions), *Association of American Geographers annual meeting*, Chicago, IL, co-chaired with Matthew Peros and Timothy Beach (2015).

<i>Committee Service</i>	IGERT Trainee Affairs (2014-2015); Departmental Seminar Committee (2013-2014); IGERT Social Committee (2013-2015); Graduate Student Peer Mentor Program (2012-2013); Geography Graduate Student Symposium (2011-2012)
<i>Outreach</i>	Panelist, WHOI screening of “Before the Flood” (2016); Speaker, WHOI Summer Student Lecture Series (2016); Featured scientist, “Ancient Mysteries” on Channel5 (UK)/Smithsonian Channel (US) (2016); Speaker, “Wednesday Nite @ the lab” on Wisconsin Public Television (2015); Environmental Education & Outreach Workshop Organizer, Aldo Leopold Nature Center (2014); Saturday Science volunteer, Wisconsin Institutes for Discovery (2014-2015); Mentor for the High School Science Research Internship Program (2013-2014); Water Sentinels program scientist volunteer, Sierra Club Four Lakes Group (2013-2014)
<i>Manuscript Reviewer</i>	Anthropocene; Archeometry; Ecological Monographs; Earth Science Reviews; Frontiers in Earth Sciences; Geology; Holocene; Journal of Biogeography; Journal of Ecology; Scientific Reports; Water
<i>Proposal Reviewer</i>	National Science Foundation (GSS; EAR; P2C2); National Geographic Society; Minnesota Sea Grant

## **IX. SKILLS**

<i>Software/Statistics</i>	ArcGIS, R, Python, ENVI, HEC-RAS, NetCDF, Access, NetLogo, STELLA, Adobe Illustrator
<i>Field/Laboratory</i>	Lake, bog, and marine sediment coring, radiometric dating ( <sup>137</sup> Cs, <sup>210</sup> Pb, <sup>14</sup> C) & chronology building, x-ray fluorescence (XRF) spectroscopy and radiography, stable isotopes ( $\delta^{13}\text{C}$ , $\delta^{15}\text{N}$ ), radiogenic isotopes ( <sup>87</sup> Sr/ <sup>86</sup> Sr, <sup>144</sup> Nd/ <sup>143</sup> Nd), side-scan sonar, ground-penetrating radar, palynology, charcoal analysis, particle-size analysis, loss-on-ignition, magnetic susceptibility, vegetation sampling, chemical safety
<i>Languages</i>	English, Spanish, French

## **X. SOCIETY AFFILIATIONS**

American Geophysical Union, European Geophysical Union, American Quaternary Association, American Association of Geographers, Geological Society of America