

## RYAN N. ENGSTROM

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### EDUCATION

**Ph.D. in Geography, Joint Doctoral Program in Geography** July 2005  
**San Diego State University / University of California, Santa Barbara**

**M.A. in Geography, San Diego State University** May 2000

**B.A. in Geography and Political Science, Villanova University** May 1995  
Membership in Gamma Theta Upsilon Honor Society

### WORK EXPERIENCE

**Associate Professor, Department of Geography** May 2011-Present  
George Washington University, Director of the Spatial Analysis Lab (SAL) and Center for Urban and Environmental Research (CUER)

**Assistant Professor, Department of Geography** August 2005-May 2011  
George Washington University, Director of the SAL and CUER

**Consultant, World Bank** May 2015-Present

- Develop methods for estimating variations in poverty using remotely sensed observations

**Consultant, United States Census Bureau, Geographic Studies Branch** Sept. 2006-Oct. 2011

- Developed methods for distributing census data over space using multi-scale, optical remotely sensed data for the countries of Haiti, Pakistan, and Rwanda

### REFEREED PUBLICATIONS

1. Toure, S., Stow, D., Shih, H.S., Coulter, L., Weeks, J. **Engstrom, R.**, and Sandborn, A. (In Press) An object-based temporal inversion approach to urban land use change analysis. *Remote Sensing Letters*. DOI 10.1080/2150704X.2016.1157640
2. Sandborn, A. and **Engstrom, R** (In Press) Determining the Relationship Between Census Data and Spatial Features Derived From High Resolution Imagery in Accra, Ghana. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (JSTARS)* Special Issue on Urban Remote Sensing
3. Yu, Q., Epstein, H., **Engstrom, R.**, Shiklomanov, N. and Streletskiy, D. (2015) Land Cover and Land Use Changes in the Oil/Gas Regions of Northwestern Siberia under Changing Climatic Conditions. *Environmental Research Letters*. DOI:10.1088/1748-9326/10/12/124020
4. Gregory EF, Chamberlain JM, Teach S, **Engstrom R**, and Mathison DJ. (2015) Geographic Variation in the use of low acuity pediatric Emergency Medical Services. *Pediatric Emergency Care DOI: 10.1097/PEC.0000000000000581*

5. Mathison, D., Chamberlain, J., Cowan, N., **Engstrom, R.**, Fu, L., Shoo, A., and Teach, S. (2013) Association of Primary Care Spatial Density with Non-Urgent Visits to a Pediatric Emergency Department *Academic Pediatrics* 13 (3):278-285 DOI: 10.1016/j.acap.2013.02.006
6. **Engstrom, R.**, Ofiesh, C., Rain, D., Jewell, H., and Weeks, J. (2013) Defining Neighborhood Boundaries for Urban Health Research in Developing Countries: A Case Study of Accra, Ghana *Journal of Maps* DOI:10.1080/17445647.2013.765366
7. Azar, D., **Engstrom, R.**, Graesser, J. and Comenetz, J. (2013) Generation of fine-scale population layers using multi-resolution satellite imagery and geospatial data *Remote Sensing of Environment* 130 219-232. DOI: 10.1016/j.rse.2012.11.022
8. Weeks, J., Getis, A., Stow, D., Hill, A., Rain, D., **Engstrom, R.**, Stoler, J., Lippitt, C., Jankowska, M., Lopez, A.C., Coulter, L, and Ofiesh, C., Connecting the Dots between Health, Poverty, and Place in Accra, Ghana (2012) *Annals of the Association of American Geographers* DOI: 10.1080/00045608.2012.671132
9. Liljedahl, A., Hinzman, L., Harazano, Y., Zona, D., Tweedie, C., Hollister, R., **Engstrom, R.** and Oechel, W.C., (2011) Nonlinear controls on evapotranspiration in Arctic coastal wetlands. *Biogeosciences* 8, 3375-3389. doi:10.5194/bgd-8-6307-2011
10. Jankowska, M., Weeks, J., and **Engstrom, R.** (2011) Do the Most Vulnerable People Live in the Worst Slums? A Spatial Analysis of Accra Ghana. *Annals of GIS* 17:4, 221-235. DOI:10.1080/19475683.2011.625976
11. **Engstrom, R.** and Hope, A.S. Parameter Sensitivity of the Arctic BIOME BGC Model for Estimating Evapotranspiration in the Arctic Coastal Plain (2011) *Arctic, Antarctic, and Alpine Research* 43(3):380-388 DOI: 10.1657/1938-4246-43.3.380.
12. Azar, D., Graesser, J., **Engstrom, R.**, Comenetz, J., Leddy, R., Schechtman, and Andrews, T. (2010) Spatial Refinement of census population distribution using remotely sensed estimates of impervious surface in Haiti. *International Journal of Remote Sensing*. 31: 21, 5635-5655 DOI: 10.1080/01431161.2010.496799.
13. Fu, L., Cowan, N., McLaren, R., **Engstrom, R.** and Teach, S. (2009) Is spatial accessibility to primary care providers associated with vaccination coverage among children with Medicaid insurance? *Pediatrics* 124(6) pp. 1579-1586; DOI: 10.1542/peds.2009-0233.
14. **Engstrom, R.N.**, Hope, A.S., Kwon, H. and Stow, D. (2008) The Relationship between Soil Moisture and NDVI near Barrow, Alaska, *Physical Geography*. 29(1), pp. 38-53; DOI: 10.2747/0272-3646.29.1.38.
15. Stow, D., Peterson, A., Hope, A., **Engstrom, R.** and Coulter L. (2007) Greenness Trends of Arctic Tundra Vegetation in the 1990s: Comparison of Two Normalized Difference Vegetation Index Data Sets from NOAA Advanced Very High Resolution Radiometer Systems *International Journal of Remote Sensing*. Vol. 28 Issue 21, p4807-4822, 16p; DOI: 10.1080/01431160701264284; (AN 27217146).

16. Sitch, S., McGuire, A. D., Kimball, J., Gedney, N., Gamon, J., **Engstrom, R.N.**, Wolf, A., Zhuang, Q. and Clein, J. (2007) Assessing the circumpolar carbon balance of arctic tundra with remote sensing and process-based modeling approaches. *Ecological Applications*. 17(1), pp. 213–234
17. **Engstrom, R.**, Hope, A.S., Kwon, H., Harazano, Y., Oechel, W.C., and Mano, M (2006) Modeling evaporation in Arctic coastal plain ecosystems using a modified version of BIOME BGC. *Journal of Geophysical Research Biogeosciences*- 111, G02021, doi:10.1029/2005JG000102
18. **Engstrom, R. N.**, Hope, A.S., Kwon, H., Stow, D.A. and Zamolodchikov, D. (2005) Spatial distribution of near surface soil moisture and its relationship to microtopography in the Arctic coastal plain. *Nordic Hydrology*, 36 (3): 219-234.
19. Hope, A.S., **Engstrom, R.**, and Stow, D.A. (2005) Relationship between AVHRR surface temperature and NDVI in Arctic Tundra Ecosystems. *International Journal of Remote Sensing*, 26:8, p. 1771-1776.
20. Vourlitis, G.L., Verfaillie, J., Oechel, W.C., Hope, A.S., Stow, D.A. and **Engstrom, R.** (2003) Spatial variation in regional CO<sub>2</sub> exchange for the Kuparuk river basin, Alaska over the summer growing season. *Global Change Biology* 9, p. 930-941.
21. **Engstrom, R. N.**, Hope, A. S., Stow, D.A., Vourlitis, G. L., and Oechel, W. C. (2002) Co-variability of the Priestley-Taylor alpha coefficient and regional NDVI in Arctic landscapes, *Journal of the American Water Resources Association (JAWRA)*, 38:6, p. 1647-1659.

#### **BOOK CHAPTERS**

1. **Engstrom, R.**, Ofiesh, C., Rain, D., Jewell, H. and Weeks, J. (2013). Defining Neighborhood Boundaries for Urban Health Research: A Case Study of Accra, Ghana. In Weeks, J., Hill, A., and Stoler, J. (Eds.), *Spatial Inequalities: Health, Poverty and Place in Accra, Ghana* (pp. 27-38). Netherlands, Springer. DOI: 10.1007/978-94-007-6732-4\_2
2. Rain, D., **Engstrom, R.**, Ludlow C., and Antos, S. (2011). Accra Ghana: A City Vulnerable to Flooding and Drought-Induced Migration, in Global Report on Human Settlements 2011: Human Settlements Background Study for Chapter 4: UN Publications.

#### **REFEREED CONFERENCE PROCEEDINGS**

1. **Engstrom, R.**, Sandborn, A., Yu, Q. and Graesser, J. (2015) Assessing the Relationship Between Spatial Features Derived from High Resolution Satellite Imagery and Census Variables in Accra, Ghana. *International Geoscience and Remote Sensing Symposium (IGARSS)*, Milan, Italy, p. 2544-2547, DOI:10.1109/IGARSS.2015.7326330
2. **Engstrom, R.**, Sandborn, A., Yu, Q. Burgdorfer, J., Stow, D., Weeks, J., and Graesser, J. (2015) Mapping Slums Using Spatial Features in Accra, Ghana. *Joint Urban and Remote Sensing Event Proceedings (JURSE)*, Lausanne, Switzerland, 10.1109/JURSE.2015.7120494
3. **Engstrom, R.**, Ashcroft, E., Jewell, H., and Rain, D. (2011) Using Remotely Sensed Data to Map Variability in Health and Wealth Indicators in Accra, Ghana. *Joint Urban and Remote Sensing Event Proceedings*, Munich, Germany p. 145-148, DOI: 10.1109/JURSE.2011.5764740

**FUNDED GRANTS, FELLOWSHIPS, and AWARDS**

Co-I, USAID, Patricia Solis TTU PI, Mappers without Borders Total Funding Amount: \$999,000: GWU Portion: <u>\$96,000</u>	2015-2018
Co-I, NSF, Robert Orttung PI, NSF Partnerships for International Research and Education (PIRE) Promoting Urban Sustainability in the Arctic, Total Amount: <u>\$3,020,645</u>	2016-2020
Co-PI, GWU Deans Interdisciplinary Collaboration Excellence (DICE) Differential Risk and Response to Community Violence Exposure among African American Youth, This project uses GIS and a mixed methods approach to look at the impacts of community violence in Washington, DC.-Total Funding: <u>\$20,000</u>	2015-2016
Co-I, ROI Grant National Institute of Mental Health (NIMH) Social-Structural Stressors, Resilience, and Black Men's Sexual Risk, The project is a collaboration between GWU Psychology, Public Health and Geography examining the spatial patterns of HIV in black males, Lisa Bowleg (GWU Psychology) is the lead PI, GWU Geography portion <u>\$158,000</u>	2014-2017
PI, Dean's Research Chair Mapping the Urban Environment using Multi-Scale Satellite Data One Course Release and <u>\$6,000</u> for scholarly travel	2014-2017
CO-PI (GWU PI), NASA Interdisciplinary Sciences, The Urban Transition in Ghana and Its Relation to Land Cover and Land Use Change Through Analysis of Multi-scale and Multi-temporal Satellite Image Data, Total Award: <u>\$993,000</u> GWU portion: <u>\$134,000</u>	2012-2015
Co-I, Jody Ganiban, GWU Psychology PI (CCFF) Neighborhood determinants of BMI trajectories among ethnic minority youth: Total Award <u>\$11,000</u>	2012-2013
Co-PI (GWU PI), RO1 Grant NIHCD Health, Poverty and Place: Modeling Inequalities in Accra Using RS and GIS, National Institute of Child Health and Human Development, The project is a collaboration between GWU, Harvard, and San Diego State where John Weeks is the lead PI: Total Award <u>\$3,000,000</u> : GW portion: <u>\$650,000</u>	2007-2012
Academic Advisor, Ford Foundation Leadership Institute on Creative Responses to Global Climate Change This work is with Linda Yarr in the GWU PISA, SIGUR Center Total Two year budget <u>\$253,500</u>	2008-2009
Data Award, GeoEye Foundation Estimating populations over space in Mozambique, Five High Resolution Satellite Images of different areas in Mozambique, M.A. Student Sarah Antos: <u>\$6,600</u> worth of imagery	2007

Earth System Science Fellowship, NASA 2001-2004  
Assessing the affects of variations in soil moisture on the surface energy balance and carbon balance of Arctic tundra ecosystems, Supervisor Allen Hope: \$73,000

Doctoral Dissertation Enhancement Grant, National Science Foundation 2002-2004  
Effects of sub-grid spatial and temporal variability on modeled evaporation fluxes in Arctic coastal plain ecosystems, Supervisor Allen Hope: \$7,750

Ned H. Greenwood Award for Physical Geography SDSU 1999

### **TEACHING EXPERIENCE**

*Digital Image Processing and Analysis (GEOG 3198/6307)* (Three Semesters)  
Department of Geography, George Washington University

*Water Resources (GEOG 2136)* (Eight Semesters)  
Department of Geography, George Washington University

*Introduction to Remote Sensing (GEOG 2107)* (Eleven Semesters)  
Department of Geography, George Washington University

*Intermediate GIS (GEOG 2106)* (Four Semesters)  
Department of Geography, George Washington University

*Field Methods in Geography (GEOG 3196)* (Three Semesters)  
Department of Geography, George Washington University

*Physical Geography (GEOG 1002)* (Seven Semesters)  
Department of Geography, George Washington University

*Geospatial Techniques (GEOG 6221)* (Three Semesters)  
Department of Geography, George Washington University

*Intermediate Remote Sensing of the Environment with Lab (GEOG 588)* Spring 2004  
Department of Geography, San Diego State University

### **INVITED PRESENTATIONS**

1. **Engstrom, R.** (2016) Introduction to Remote Sensing and Mapping Poverty Using Satellite Data, Department of Census and Statistics, Colombo, Sri Lanka, January 11<sup>th</sup>.
2. **Engstrom, R.** (2015) The Urban Transition in Ghana and Its Relation to Land Cover and Land Use Change (LCLUC) Through Analysis of Multi-scale and Multi-Temporal Satellite Image Data, London School of Economics, London, UK, January 20<sup>th</sup>.
3. **Engstrom, R.** (2014) People and Pixels: Mapping Population Variability Using Remotely Sensed Data, San Diego State University Colloquium, San Diego, CA October 23<sup>rd</sup>.

4. **Engstrom, R.** (2014) Utilizing Geospatial Technology to Determine Climate Change Risk, Myanmar Leadership Institute at George Washington University, Washington, DC November 4<sup>th</sup>.
5. **Engstrom, R.** (2013) Introduction to Climate, Climate Change, Remote Sensing and GIS. Myanmar Leadership Institute on Climate Change (MLICC), Nay Pyi Taw, Myanmar, February 19<sup>th</sup>.
6. **Engstrom, R.** (2012) Health, Poverty and Place: Modeling Inequalities in Accra Using Remote Sensing and GIS. World-Wide Human Geography Data Working Group Meeting, Reston, VA November 27<sup>th</sup>.
7. **Engstrom, R.** (2012) People and Pixels: Mapping Population Distributions from Countries to Cities Using Satellite Data. Clark University, Department of Geography, March 2<sup>nd</sup>.
8. **Engstrom, R.** (2012) The contribution of satellite imagery to the study of urban differentiation. Understanding the Social, Economic and Spatial Dynamics of Health and Well Being in Accra. ISSER University of Ghana at Legon, January 16<sup>th</sup>.
9. **Engstrom, R.** (2010) Health, Poverty and Place: Modeling Inequalities in Accra Using Remote Sensing and GIS, Innovation in Environmental and Social Impact Assessment Meeting, World Bank, Washington, D.C.
10. **Engstrom, R.N.** (2008) Global Climate Change and Anticipated Effects on Vietnam's Physical Geography and Climate, Leadership Institute on Creative Responses to Global Climate Change, Hanoi, Vietnam
11. **Engstrom, R.N.** (2006) Modeling Evaporation in Arctic Tundra Ecosystems using a Modified BIOME BGC model, San Diego State University
12. **Engstrom, R. N., Hope, A.S., and Stow, D.A.** (2003) Evaporation modeling with BIOME BGC and remote sensing. Presentation: Synthesis Workshop of current and future status of C storage and ecosystem-atmosphere exchange in the circumpolar North; Processes, Budgets and Projections. Skogar, Iceland.

#### **M.A. THESES SUPERVISED**

Sandborn, Avery (2015) Using High Spatial Resolution Imagery to Assess the Relationship between Spatial Features and Census Data: A Case Study of Accra, Ghana

Burgdorfer, Jason (2013) A Spatial and Statistical Analysis of Childhood Obesity in the District of Columbia

Ashcroft, Eric (2012) Using Remotely Sensed Data and Decision Tree Classifiers to Determine if the Changes in Accra, Ghana are Concentrated in the Most Vulnerable Areas

Colson, Lisa (2012) Using High Resolution Remotely Sensed Data to Assess the Relationship between Population Density and Impervious Surfaces in Accra, Ghana

Jewell, Henry (2010) Using GIS and Remotely Sensed Data to Map Variability in Health and Wealth Outcomes in the Neighborhoods of Accra, Ghana

McWilliams, Katie (2010) The influence of urbanization on tornado development in the central United States: A case study of 30 metropolitan statistical areas

Ludlow, Christianna (2009) Flood Modeling in a Data-Poor Region: A Satellite Data-Supported Flood Model for Accra, Ghana

Antos, Sarah (2008) Sizing up Settlements in Mozambique: A Technique for Estimating Population Distribution using Remote Sensing

Fisherow, Michael (2006). An Examination of Severe Weather and Its Relationship with Atmospheric and Oceanic Circulation Patterns along the Coast of the Mid-Atlantic United States

### **M.A. THESES READER**

Nyland, Kelsey (2015) Climate- and Human- Induced Land Cover Change and its effects on the Permafrost System in the Lower Yenisei River of the Russian Arctic

Voge, Maianna (2012) Understanding the Patterns & Consequences of Foreclosure in Stockton, California

Guthe, Emiko (2012) Mapping Impacts of Foreign Aid: Spatial Methods for Measuring Humanitarian Performance in Haiti

### **STUDENT AWARDS**

Shields, Chloe - George Gamow Undergraduate Research Fellowship (GWU)	Spring 2010
Shields, Chloe – Elliot School Scholar	Spring 2011
Stuhlmacher, Michelle- Udall Scholar	Spring 2013
Stuhlmacher, Michelle- Undergraduate Research Enhancement Fund (UREF)	Spring 2013
Stuhlmacher, Michelle – NOAA Hollings Scholarship	Summer 2014
Sandborn, Avery – Campbell Summer Research Grant	Summer 2014

### **DEPARTMENTAL/UNIVERSITY SERVICE**

<b>Director Center for Urban and Environmental Research (CUER)</b>	Fall 09-Present
<b>Co-Director Center for Urban and Environmental Research (CUER)</b>	Spring 08-Fall 09
<b>Director of the Spatial Analysis Lab-GWU, Department of Geography</b>	Fall 05-Present
<b>Undergraduate Advisor, GWU, Department of Geography</b>	Fall 08-Present
<b>Columbian College Research Advisory Committee</b>	Fall 2013-Present
<b>GIS Minor Advisor, GWU, Department of Geography</b>	Spring 12 -Present
<b>Chair of Hire Committee, GWU Geography</b>	Fall 2011
<b>Hiring Committee Member, GWU Geography</b>	Fall 2008, 09, 12
<b>Speaker Series Coordinator, GWU Geography</b>	Fall 07-Spring 08
<b>Member of the Center for Urban and Environmental Research (CUER)</b>	Fall 07-Spring 08
<b>Member of the CCAS General Curriculum Requirement Committee – Science</b>	Spring 2010
<b>Member of Tenure Review Committee</b>	Fall 2012, 2013
<b>GIS Certificate Committee, GWU Geography</b>	Fall 2013-Present
<b>BASE Committee</b>	Spring 2015

**OVPR Workflow Committee** Fall 2014  
**Multiple CCAS Research Committee Reviews** Spring 2015  
**Campbell Review Committee, GWU Geography** Spring 2015

**PROFESSIONAL SERVICE**

**Committee Member, CSIS Future of Earth Observations** Fall 2007-08  
**Student representative and Ph.D. group coordinator:** SDSU Geography Dept. 1999-2000  
**Student Volunteer:** California Geographical Society Annual Meeting, SDSU May 2000  
**Peer Reviewer:** Journal of Vegetation Science, Geojournal (2 Articles), Landscape Ecology  
Natural Environment Research Council of the UK (IPY), National Science  
Foundation (NSF) Arctic Natural Sciences (2), Blackwell Publishing Book  
Proposal, Civilian Research and Development Foundation (CRDF) (2), Physical  
Geography, NSF Geography and Regional Science Program (3), Water Resources  
Research, International Journal of Remote Sensing (3), National Institute of  
Health (NIH), Ecosystems, Tree Physiology Book Chapter, Hydrologic Processes,  
Canadian Journal of Remote Sensing, Remote Sensing of Environment,  
Photogrammetric Engineering and Remote Sensing (PE&RS), Geocarto,  
International Society for Photogrammetry and Remote Sensing (IPRS), Remote  
Sensing, Computers, Environments and Urban Systems  
**IEEE Geoscience and Remote Sensing Society (IGARRS) Conference Reviewer** Spring 2015  
**Mid-Tenure Reviews:** Colgate University, Geography Fall 2014  
**Panel Reviewer:** NASA Interdisciplinary Studies (IDS)

**MEMBERSHIPS**

Association of American Geographers  
Member: Remote Sensing and Climate Specialty Groups  
American Geophysical Union  
IEEE