

# Chris Shughrue

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## Education

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**Yale University, School of Forestry and Environmental Science**, New Haven, CT

M.Sc., Environmental Science, *Expected 2013*

**University of California, San Diego**, La Jolla, CA

B.S., Earth Sciences *with high distinction*, 2011

Honors Senior Thesis: *Future Oil Spills and Possibilities for Intervention: A Model for the Coupled Human-Environmental Resource Extraction System*

## Research and Professional Experience

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**School of Forestry and Environmental Studies**

**Yale University**

**Urbanization and Global Change Group**

New Haven, CT

*Research Assistant 09/2011 – Present*

Advisor: Karen Seto, Ph.D.

- Constructed dynamical analysis of multi-temporal urban dynamics in Delhi, India through synthesis of published drivers and feedbacks of urbanization within a complex systems framework.
- Developing numerical agent-based model representing dynamics of urban growth for Delhi, India.

**Institute of Geophysics and Planetary Physics**

**Scripps Institution of Oceanography**

**Complex Systems Laboratory**

La Jolla, CA

*Research Assistant IV 06/2009 – 03/2011;*

*Research Associate 03/2011 – 09/2011*

Advisor: Brad Werner, Ph.D.

- Developed an agent-based simulation in Matlab of the social and biophysical dynamics for an urban slum in Nairobi, Kenya including: disease transmission, flooding vulnerability, a commodities market, casual labor markets, a housing market, and cultural transitions.
- Developed an agent-based model of the oil industry hydrocarbon extraction in the Gulf of Mexico and the coupled response of public opinion, resistance, media, and legislation to environmental damage.
- Wrote algorithms in Matlab for heterogeneous agent projections, hill climbing optimization techniques, and multi-agent decision making strategies.
- Derived valuations of oil development ventures and extraction using CARA exponential utility functions.
- Synthesized complexity science principles and theoretical system dynamics to develop annual to decadal scale agent-based models.

**Eco-Informatics Summer Institute**

**Oregon State University**

*Research Experience for Undergraduates (REU) Summer 2010*

Corvallis, OR

Advisor: Julia Jones, Ph.D.

- Developed an empirical model for lithologically controlled evapotranspiration using LiDAR vegetation data and geological surveys to test hypotheses about channel contributions to diel evapotranspiration signal.
- Created mathematical, statistical, and computational models in an interdisciplinary team to investigate the spatio-temporal characteristics of diel hydrological fluctuations.
- Investigated the long-term connection between forest management practices and hydrological patterns.
- Designed and conducted hydrological field surveys to capture relative discharge data.

**Environmental Affairs**

**San Diego County Regional Airport Authority**

*Intern II Summer 2009*

San Diego, CA

- Designed and implemented a stormwater database in Access with automated airport tenant contact features.
- Developed and presented interdepartmental sustainability strategies
- Worked with consultants in stormwater discharge evaluations.
- Contributed to the editing and publication of an annual municipal stormwater report.

## **Teaching Experience**

**Probabilistic Modeling in Ecology, Evolution and Disease (EEB 335/EMD 595)**

*Teaching Fellow III January 2012 – Present*

**Yale University**

New Haven, CT

## **Awards & Honors**

2012, Tropical Resources Institute Research Grant

2012, Hixon Center for Urban Ecology Research Grant

2011, Yale MacMillan Center Travel Grant

2010, Outstanding Student Paper Award, American Geophysical Union Fall Meeting

2010, American Geophysical Union Student Travel Grant

2009, NSF Research Experience for Undergraduates Participant, Oregon State University

2008 – 2010, Provost Honors, University of California, San Diego

## **Publications**

*In preparation for submission*

**Shughrue, C.M.**, Werner, B.T. Future Oil Spills and Possibilities for Intervention: A Model for the Coupled Human-Environmental Resource Extraction System.

Albright, J., Gustafson, N., Nelson, M., Ramirez, J., Rodriguez, B., **Shughrue, C.M.**, Jones, J. Diel Fluctuations in Streamflow Depend on Stream Channel Sediment Storage and Valley-Floor Vegetation in Forested Western Cascades of Oregon, USA.

## **Poster Presentations**

**Shughrue, C.M.**, Seto, K.C. *What is Driving Patterns of Urbanization in Delhi?* India Urban Conference, Mysore, India, November 2011.

**Shughrue, C.M.**, Werner, B.T. *Future Oil Spills and Possibilities for Intervention: A Model for the Coupled Human-Environmental Resource Extraction System.* American Geophysical Union Fall meeting, San Francisco, CA, December 2010.

Albright, J., Gustafson, N., Nelson, M., Ramirez, J., Rodriguez, B., **Shughrue, C.M.**, Jones, J. *Diel fluctuations in streamflow depend on stream channel sediment storage and valley-floor vegetation in forested western Cascades of Oregon, USA.* 2010 American Geophysical Union Fall meeting, San Francisco, CA, December 2010.

## **Relevant Skills**

### **Modeling**

- Agent-based simulations of economic, political, and social behavior (in Matlab).
- Cellular automata models for flooding, fire patterns, and forest succession.
- Geophysical models for analysis of gravity, magnetic, direct current resistivity, and seismic data.
- Empirical modeling with LiDAR datasets.

### **Programming Languages**

- Matlab/Octave
- Java
- C/C++
- GIS (ESRI ArcGIS)

### **Technical**

- Geophysical surveying and analysis/modeling methods: gravity, magnetic, direct current (DC) resistivity, seismic reflection, seismic refraction.
- Geological field surveying methods.
- Optical crystallographic methods.

## **Professional Membership**

2010 – Present, American Geophysical Union