

# Cyndhia G. Ramatchandirane, M.S.

## Coastal Geoscientist, The Water Institute of the Gulf

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### Education

#### **M.S. in Earth and Environmental Sciences, December 2013**

Tulane University, New Orleans, Louisiana

#### **B.A. in Geosciences, May 2011**

Wellesley College, Wellesley, Massachusetts

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### Research Interests

- Physical processes in deltaic and coastal systems
  - Coastal ecosystem restoration and planning
  - Science communication, outreach, and education
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### Professional Experience

#### **The Water Institute of the Gulf**

- *Research Scientist in Applied Geosciences* **2017-Present**
- *Research Associate in Physical Processes and Sediment Systems* **2013-2016**

#### **RESTORE Act Center of Excellence for Louisiana**

- *Director's Assistant* **2019-Present**

#### **Ripple Effect**

- *Board President* **2018-Present**
- *Board Member* **2017-2018**

#### **Coastal Protection and Restoration Authority**

- *Coastal Science Assistantship Program (CSAP) Intern* **2012-2013**

#### **Louisiana Universities Marine Consortium**

- *Graduate Research Assistant* **2011-2013**
- *Summer Intern* **June-August 2010**

#### **Sea Scavenger**

- *Research Intern* **January-April 2009**

**Geosciences Department, Wellesley College**

- *Research Assistant*

**2008-2009**

**NASA Student Airborne Research Program (SARP)**

- *Summer Intern*

**July-August 2009**

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**Key Projects**

**Investigation of Flow, Nutrient, and Sediment Fluxes Through the Barataria Basin Inlets**

*Louisiana Coastal Protection and Restoration Authority (CPRA), Baton Rouge, Louisiana*

Coordinated with nutrients, Basin Wide Model, and hydrodynamics experts to optimize project execution according to scope. Conducting fieldwork at the Barataria Basin inlets (January 2019-present) to improve Basin Wide Model fluxes through the inlets. Ongoing data collection includes hydrodynamics, suspended sediment, and nutrients. Responsible for data processing and project report for modelers and client.

**Mississippi River Spring 2018 Flood Data Collection**

*Louisiana Coastal Protection and Restoration Authority (CPRA), Baton Rouge, Louisiana*

Conducted fieldwork in the Mississippi River during the Spring flood of 2018 at the Bonnet Carré Spillway, and the proposed Mid-Barataria and Mid-Breton sediment diversion locations. Collected data included bathymetry, hydrodynamics, and bed surface and suspended sediments. Responsible for processing data and project report for modelers and client.

**Calcasieu Ship Channel Salinity Control Measures Project**

*Louisiana Coastal Protection and Restoration Authority (CPRA), Baton Rouge, Louisiana  
The Port of Lake Charles, Lake Charles, Louisiana*

Conducted fieldwork in the Calcasieu Ship Channel (Spring 2014, November 2016-January 2018) to investigate sediment dynamics between Calcasieu Lake, the Ship Channel, and the coast. Collected data included bathymetry, hydrodynamics, and bed surface and suspended sediments. Responsible for data processing and analysis, and project report for modelers and clients.

**Barataria Basin Salinity and Suspended Sediment Analysis**

*The Water Institute of the Gulf's Science and Engineering Plan (SEP), Baton Rouge, Louisiana*

Utilized data collected in Barataria Basin to de-convolve effects of the Mississippi River discharge, cold fronts, and the operation of the Davis Pond freshwater diversion on receiving basin salinity and suspended sediment. Collaborated with Dr. Nan Walker at LSU to analyze suspended sediment trends using MODIS satellite imagery.

**Mississippi River Hydrodynamics and Delta Management Study**

*Louisiana Coastal Protection and Restoration Authority (CPRA), Baton Rouge, Louisiana*

Led and conducted fieldwork for one year (June 2014-June 2015). Responsible for deploying and maintaining a network of instruments in Barataria and Breton basins. Collected data included bathymetry, hydrodynamics, suspended sediment, and water quality in the two basins. Deliverables included processed data and data report.

### **Chenier Plain Marsh Formation, Southwest Louisiana**

*M.S. thesis, Tulane University, New Orleans, Louisiana*

Investigated effects of cold fronts and Atchafalaya River discharge on the sediment exchange and reactivation of the Chenier Plain along the coast of southwest Louisiana.

### **Developing an Updated Marsh Salinity Score for the Coast of Louisiana**

*Internship, Coastal Protection and Restoration Authority, Baton Rouge, Louisiana*

Tested a marsh vegetation salinity score algorithm using the Louisiana Coastwide Reference Monitoring System database.

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### **Licences, Certifications, Courses**

- **Leadership and Management Skills for Non-Managers**, Management Concepts, 2019
- **Fundamentals of Project Planning and Management**, University of Virginia via Coursera (online course), 2019
- **Driver's License: Class D**
- **Louisiana Boater Education Program - Boating Safety Education**, Louisiana Wildlife and Fisheries, 11078619
- **Open Water PADI Diver**, 12050V7537

### **Technical Skills**

- **Software:** JMP, ArcGIS, MATLAB (beginner), SigmaPlot, Excel
- **Languages:** English (fluent) and French (fluent)
- **Field:**
  - Operate small boats (Class D License, Louisiana Boating Safety certification)
  - Collect sediment cores and water samples
  - Deploy instruments for hydrodynamic, hydrologic, water quality, and bathymetry measurements
- **Laboratory:**
  - Instrument calibration and data processing for water quality (e.g., YSI, CTD), hydrology (e.g., Aquadopp, ADCP), suspended sediment (e.g., LISST, Campbell Scientific), bathymetry (single- and multi-beam), and GPS (Trimble RTK)
  - Sample preparation and analyses for grain size by laser diffraction,  $\alpha$  and  $\gamma$  spectroscopy for radioisotope dating ( $^{210}\text{Pb}$ ,  $^{137}\text{Cs}$ , and  $^7\text{Be}$ ), and mass spectrometry for  $\delta^{13}\text{C}$ , %OC, TN, and C:N measurements

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### **Peer-reviewed Publications**

- Baustian, M.M., Meselhe, E., Jung, H., Sadid, K., Duke-Sylvester, S., Visser, J., Allison, M., Moss, L., **Ramatchandirane, C.**, van Maren, B., Jeuken, M., and Bargu, S. 2018. Development of an Integrated Biophysical Model to represent morphological and

ecological processes in a changing deltaic and coastal ecosystem. Environmental Modeling and Software. <https://doi.org/10.1016/j.envsoft.2018.05.019>

- Kolker, A.S., Li, C., Walker, N.D., Pilley, C., Ameen, A.D., Boxer, G., **Ramatchandirane, C.**, Ullah, M., and Williams, K.A., 2014. The impacts of the great Mississippi/Atchafalaya River flood on the oceanography of the Atchafalaya Shelf. Continental Shelf Research. <http://dx.doi.org/10.1016/j.csr.2014.04.023>
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### **Professional Memberships**

- Member, American Geophysical Union (AGU)
- Member, Coastal Estuarine Research Federation (CERF)
- Member, New Orleans Geological Society (NOGS)

### **Grants and Awards**

- CERF 2011 Conference Student Travel Award, Coastal Estuarine Research Federation, 2011
- Graduate Studies Student Association Travel Award, Tulane University, 2011
- MIT Lincoln Laboratory Student Conference Travel Award, women in science and engineering, Wellesley College, 2010
- Dean of the College Student Conference Travel Award, Wellesley College, 2010
- Sara Langer Award for Research in Geosciences, summer off-campus grant, Wellesley College, 2010
- Howard Hughes Medical Institute Conference Travel Grant, Wellesley College, 2009
- Kenneth N. Weaver Student Travel Award Program, Northeastern Geological Society of America, 2009
- Outstanding volunteer for Boston Refugee Youth Enrichment for Teens, Harvard University, 2009
- Second place Writing 125 Prize, Wellesley College, 2008

### **Service and Outreach**

- **Ripple Effect**, New Orleans, LA, Fall 2016
    - Ripple Effect is a K-12 water literacy nonprofit
    - Participated in teacher training by presenting geologic background of the Mississippi River Delta and coastal restoration efforts
  - **BRYE-Teen**, Harvard University, Cambridge, MA, 2008-2009
    - BRYE is a Boston Refugee Youth Enrichment program
    - Co-director (Fall 2009) and volunteer member (Fall 08-Spring 09)
    - Participated in and prepared weekly activities for immigrant teenagers in Dorchester, MA. Coordinated transportation logistics for teens and volunteer members. Interacted with teens and discussed teen-related academic, political, cultural, and social issues.
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## Conference Presentations

- Ehab Meselhe, **Cyndhia Ramatchandirane**, Yushi Wang, and Eric White. *Supporting restoration design – data collection and numerical modeling of the Calcasieu Ship Channel estuarine system*. (Presentation). State of the Coast, New Orleans, LA, May 30-June 1, 2018.
- **Cyndhia Ramatchandirane**, *The River's Role in Coastal Restoration*. (Session Moderator). State of the Coast, New Orleans, LA, May 30-June 1, 2018.
- **Cyndhia Ramatchandirane**, Ehab A. Meselhe, Mead A. Allison, Austin Feldbaum, Diana Di Leonardo, Collin Ortals, and Dallon H. Weathers. *Engineering salinity control in Lake Calcasieu, Louisiana to protect fringing wetlands and estuarine ecosystems while preserving deep-draft access to the port of Lake Charles*. (Poster). Bays and Bayous Symposium, Biloxi, MS, November 30-December 2, 2016.
- **Cyndhia Ramatchandirane**, Mead A. Allison, and Dallon Weathers. *Data collection and baseline assessments for the Calcasieu Salinity Control Measures project*. (Presentation). State of the Coast, New Orleans, LA, June 1-3, 2016.
- **Cyndhia Ramatchandirane**, Mead A. Allison, Brendan T. Yuill, Melissa M. Baustian, Ehab A. Meselhe, Nan D. Walker, and Alaric S. Haag. *The impact of the Davis Pond freshwater diversion on water and sediment exchange in Barataria Basin* (Presentation). State of the Coast, New Orleans, LA, June 1-3, 2016.
- **Cyndhia Ramatchandirane**, Brendan Yuill, Mead Allison, Melissa Baustian, Ehab Meselhe, and Nan Walker. *Observational network studies of receiving basin dynamics along lower Mississippi River in coastal Louisiana* (Poster). Coastal Estuarine and Research Federation, Portland, OR, November 8-12, 2015.
- **Cyndhia Ramatchandirane**, Brendan Yuill, Mead Allison, Melissa Baustian, and Ehab Meselhe. *Observations of basin-wide dynamics along the lower Mississippi River via in-situ and remotely sensed data* (Presentation). American Shore and Beach Preservation Association, Broadening Coastal Perspectives, New Orleans, LA, October 14-16, 2015.
- Alexander Kolker, Alex Ameen, Georgia Boxer, Chunyan Li, Chet Pilley, **Cyndhia Ramatchandirane**, and Nan Walker. *Dynamics of a large shelf discharging river: Implications for coastal sedimentology and restoration* (Presentation). Gulf Coast Association of Geological Societies and Gulf Coast Section of SEPM 63rd Annual Convention, New Orleans, LA, October 6-8, 2013.
- **Cyndhia Ramatchandirane**, Alexander S. Kolker, Brittina A. Argow, Jeffrey P. Donnelly, Sergio Fagherazzi, Liviu Giosan, and Anthony Priestas. *Chenier Plain reactivation in southwest Louisiana leads to recent marsh development via fluvial and coastal processes* (Poster). Association for the Sciences of Limnology and Oceanography Aquatic Sciences, New Orleans, LA, February 17-22, 2013.
- **Cyndhia Ramatchandirane**, Alexander S. Kolker, Brittina A. Argow, and Jeffrey P. Donnelly, Liviu Giosan. *Chenier Plain coastal wetland development in southwest Louisiana: possible link to downdrift sedimentation from increased Atchafalaya River flow and storm deposits* (Presentation). Coastal and Estuarine Research Federation, Daytona Beach, FL, November 6-11, 2011.
- **Cyndhia Ramatchandirane**, Alexander S. Kolker, Brittina A. Argow, Jeffrey P. Donnelly, and Liviu Giosan. *Does reactivation of Louisiana's Chenier Plain lead to the development of interior coastal wetlands? Assessing the relative roles of storm impacts*

*and riverine deposits* (Poster). American Geophysical Union Fall Meeting, San Francisco, CA, December 13-17, 2010.

- Asha Stenquist, **Cyndhia Ramatchandirane**, and Brittna A. Argow. *Beach processes on Vieques, Puerto Rico, USA: Effects of Las Rompeolas pier* (Poster). Geological Society of America Northeastern Section Annual Meeting, Portland, ME, March 22-24, 2009.

### **Technical Reports**

- Allison, M.A., Di Leonardo D.R., Eckland, A.C., **Ramatchandirane C.**, Weathers H.D., (2018). Mid-Breton Technical Team Field Data Support. The Water Institute of the Gulf. Prepared for and funded by the Coastal Protection and Restoration Authority. Baton Rouge, LA.
- Allison, M.A., Di Leonardo D.R., Eckland, A.C., **Ramatchandirane C.**, Weathers H.D., (2018). Mid-Barataria Technical Team Field Data Support. The Water Institute of the Gulf. Prepared for and funded by the Coastal Protection and Restoration Authority. Baton Rouge, LA.
- Allison, M.A., Marsh, J.K., Di Leonardo D.R., Eckland, A.C., **Ramatchandirane C.**, Weathers H.D., (2018). Bonnet Carré 2018 Flood Response. The Water Institute of the Gulf. Prepared for and funded by the Coastal Protection and Restoration Authority. Baton Rouge, LA.
- Allison, M.A., Meselhe, E.A., Di Leonardo D.R., Esposito, C.R., **Ramatchandirane C.**, Weathers H.D., and Yuill, B.T. (2018). Identifying Sediment Sources and Optimizing Placement of Dredge Material to Protect Critical Infrastructure – Port of Lake Charles. The Water Institute of the Gulf. Prepared for and funded by the Port of Lake Charles. Baton Rouge, LA.
- Allison, M.A., **Ramatchandirane C.**, Di Leonardo D.R., Esposito, C.R., Meselhe, E.A., and Weathers H.D. (2018). Calcasieu Salinity Control Project: Data Collection Phase II. The Water Institute of the Gulf. Prepared for and funded by the Coastal Protection and Restoration Authority. Baton Rouge, LA.
- Allison, M.A., Ramirez, M.T., **Ramatchandirane, C.**, Weathers, D.H. (2016). TO5.4: Mississippi River Hydrodynamic Study and Delta Management Study: Phase II Data Collection. The Water Institute of the Gulf. Prepared for and funded by the Coastal Protection and Restoration Authority. Baton Rouge, LA.
- Allison, M.A., Baustian, M.M., Moss, L.C., **Ramatchandirane, C.G.**, Yuill, B.T., Weathers, H.D., Bentley, S.M., Xu, K., Chen Q.J. (2015). Chapter 3: Data Collection in the Receiving Basins. In Meselhe, E.A., Baustian, M.M., Allison, M.A. (Eds.) 2015. Basin wide model development for the Louisiana Coastal Area Mississippi River hydrodynamic and delta management study. The Water Institute of the Gulf. Prepared for and funded by the Coastal Protection and Restoration Authority. Baton Rouge, LA.
- **Ramatchandirane, C.G.**, Allison M.A., and Weathers, D.H. (2014). Water and Sediment Surveys of the Calcasieu Ship Channel in October 2013, February 2014, and March 2014. The Water Institute of the Gulf. Funded by the Coastal Protection and Restoration Authority under Task Order 14. Baton Rouge, LA.