

# CYNDI V. CASTRO, P.E.

University of Houston  
Department of Civil & Environmental Engineering  
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## EDUCATION

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### University of Houston

Ph.D. in Environmental Engineering Exp. 2021

### University of Texas at Austin

M.S. in Civil Engineering, emphasis Geographical Information Systems 2016

### Texas A&M University at College Station

B.S. in Civil Engineering, emphasis Water Resources 2011

## PROFESSIONAL APPOINTMENTS

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2019-2020 ***Municipal Flood Resiliency Consultant***  
**City of Houston Mayoral Office**  
Department of Sustainability, Recovery and Resilience | NSF INTERN Fellow

2018-2021 ***Graduate Research Scientist***  
**University of Houston**  
Department of Environmental Engineering | Advisor: Hanadi Rifai

2015-2019 ***Professional Civil Engineer***  
**Jones|Carter Engineering Firm**  
Department of Hydrological & Hydraulic Sciences | Project Manager

2014-2016 ***Graduate Research Scientist***  
**University of Texas at Austin**  
NSF Graduate Research Fellowship Program Fellow | Advisor: David Maidment

2014 ***Municipal Stormwater Management Consultant***  
**City of Houston Public Works**  
Department of Stormwater Engineering (AECOM Sub-consultant)

2013-2014 ***Construction Manager***  
**Ghana National Gas Company**  
Stationed in Takoradi, Ghana (AECOM Sub-consultant)

2011-2014 ***Graduate Civil Engineer***  
**AECOM Technical Services**  
Department of Community Infrastructure & Public Works

2010-2011 ***Undergraduate Research Assistant***  
**Texas A&M University at College Station**  
Department of Ocean Engineering | NSF CAREER Project with Scott Socolofsky

2010 ***Construction Management Intern***  
**Kiewit Corporation**  
Dallas Area Rapid Transport Rail-line Construction

## RESEARCH FUNDING

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2021	<b><u>NSF HEGS Program Grant</u></b> National Science Foundation Human-Environment and Geographical Sciences Lead author. "Assessing the multifunctionalities of nature-based solutions for addressing societal and environmental stressors." (Submitted, in-review).	
2021-2022	<b><u>NSF EAR-PF Postdoctoral Fellowship</u></b> National Science Foundation Earth Sciences Postdoctoral Fellowship PI. Grant No. 2052598. "Green infrastructure scaling from local observations to regional applications as a coupled human-water system."	\$174,000
2019-2020	<b><u>NSF Internship Fellowship</u></b> Non-Academic Research Internship for Graduate Students Awarded supplement to NSF GRFP and NSF RAPID Grant No. 1759440.	\$55,000
2014-2019	<b><u>NSF GRFP Graduate Research Fellowship Program</u></b> National Science Foundation Graduate Research Fellowship Program PI. Grant No. 2013162199.	\$142,000

## ADDITIONAL FELLOWSHIPS, HONORS, & AWARDS

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2021	Cullen Graduate Student Success Fellowship	\$500
2019-2021	Crawford and Hattie Jackson Foundation Fellowship (x2)	\$10,000
2019-2021	Texas Section American Water Works Association (AWWA) Scholarship (x2)	\$4,000
2019-2020	Union Plus Firefighter Scholarship	\$1,000
2019-2020	University of Houston Future Faculty Fellowship	\$3,000
2019-2020	CHI University Award for 2D SWMM Hydraulic Modeling	\$2,000
2018-2019	Southeast Texas Chapter AWWA Award	\$1,750
2018-2019	University of Houston President's Endowed Scholarship	\$4,000
2018-2021	University of Houston Graduate Tuition Fellowship	\$42,000
2014-2016	University of Texas Thrust Endowed Fellowship	\$18,000
2009-2011	Texas A&M Chi Epsilon Honor Society, President	
2009-2010	Study Abroad Scholarship Katholieke Universiteit, Leuven, Belgium	\$6,000
2009-2010	Judy K. and Donald Ray '68 Scholarship	\$1,000
2009-2010	British Petroleum American Scholarship	\$1,000
2007-2011	Texas A&M University President's Endowed Scholarship	\$12,000
2007-2011	Texas A&M Academic Achievement Award	\$10,000
2007-2008	Industrial Engineering Endowed Scholarship	\$1,000
2008-2009	Barnes & Noble Merit Award	\$1,000
2008	Dean McCorkle Endowed Scholarship	\$1,000
2007	National Merit Scholar	

Journal Articles:

**Castro, C. V.** and Maidment, D. R. (2020). HMS-PrePro: A GIS preprocessing tool for rapid initialization of HEC-HMS basin models. *Environmental Modelling & Software*, 104732. <https://doi.org/10.1016/j.envsoft.2020.104732>

Book Chapters (In Progress):

**Castro, C.V.** and Rifai, H.S. (Anticipated Release: 2022) Gulf Coast Rivers of the Southwestern United States: Trinity River, San Jacinto River, Neches River. Chapter 5 in: Delong, M.D. and Jardine, T.D. (Eds.) *RIVERS OF NORTH AMERICA, 2<sup>ND</sup> EDITION*. Elsevier (in press)

Viglione, A., Mukherjee, J., Archfield, S., **Castro, C.V.**, Hirabayashi, Y., Lafaye de Micheaux, F., Mazzoleni, M., Merz, B., Nakamura, S., Nardi, F., Rusca, M., Szolgay, J., Yan, H. (Anticipated Release: 2023) Human-Flood Systems. Chapter 6 in: *COEVOLUTION AND PREDICTION OF COUPLED HUMAN-WATER SYSTEMS: A SYNTHESIS OF CHANGE IN HYDROLOGY AND SOCIETY*.

Articles (In Progress / In Submittal):

**Castro, C. V.**, Penny, G., Gunda, T. Socio-hydrology: A decadal reflection and vision for the future. Submit to: *Hydrologic Processes*.

**Castro, C. V.** and Rifai, H. S. Widespread institutional feedbacks and influences regarding nature-based solutions through the lens of causal loops and participatory modeling. Submit to: *Sustainability*.

**Castro, C. V.** and Rifai, H. S. An integrated social, environmental, and hydrological information system for nature-based solutions using authoritative, web-based geospatial repositories. Submit to: *Sustainability*.

**Castro, C. V.**, Schaefer, K. L., Gonzalez, A., Haces-Garcia, F., Rifai, H. S. Capturing benefits for the air-energy nexus by adopting high-efficiency supercritical CO<sub>2</sub>-based power production. Submit to: *Nature Energy*.

**Castro, C. V.** and Rifai, H. S. Integrating social, economic, and environmental risk into flood management of aging dam infrastructure by combining cost-benefit and multi-criteria decision analyses. Submitted to: *Natural Hazards and Earth System Sciences*.

## INDUSTRY CONTRIBUTIONS

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Select drainage analyses and engineering plans, peer-reviewed by governing agencies and independent licensed firms. Copyright engineer-of-record (EOR). Download available at: [cvcastro.com/background/](http://cvcastro.com/background/).

### Jones|Carter Engineering:

- [14] **Castro, C.V.** (2018). Cypress Creek 2017 disaster recovery channel ID No's K133-00-00-X025, K133-04-00-X026, K133-00-00-X003, K137-00-00-X012, & K149-00-00-X003. Primary EOR. *Harris County Flood Control District*. Project ID Z100-00-00-X274.
- [13] Landry, K., and **Castro, C.V.** (2018). Houston Avenue and White Oak Drive intersection improvements. Primary EOR for drainage analysis. *Memorial Heights Redevelopment Authority/TIRS No. 5*. WBS No. N-T05000.
- [12] **Castro, C.V.** (2017). Post Hurricane Harvey stormwater and drainage impact analysis of earthen channels and reservoirs for Energy Corridor District, Houston, Texas. Primary EOR. *Houston Energy Corridor District*.
- [11] **Castro, C.V.** (2017). Slope stabilization and bench restoration at Buffalo Bayou park Shepherd Drive to 1200 feet West of Sabine Street. Primary EOR. *Harris County Flood Control District*. Project ID W100-00-00-X036.
- [10] **Castro, C.V.** (2017). Legends ranch central detention basin weir repair. FEMA Hazard Mitigation Grant Program. Primary EOR. *Spring Creek Utility District*. City of Houston ILMS No. 17005056. Log No. 17-0088.
- [9] **Castro, C.V.** (2017). Eureka, Parksedge, Rodeo Ditch, & Sharpstown detention basins. Primary EOR. *City of Houston Department of Public Works and Engineering Capital Projects*. WBS No. M-430296.
- [8] **Castro, C.V.** (2017). Floodplain letters of map revisions (LOMRs) for Trails of Katy Sections 1 and 3. *Federal Emergency Management Association National Flood Insurance Program*.
- [7] **Castro, C.V.** (2016). IH-635 Grapevine Creek Bridge hydrologic and hydraulic report. Lead engineer. *Texas Department of Transportation*. CSJ No. 2374-07-063.

### AECOM Technical Services:

- [6] Williford, E. and **Castro, C.V.** (2013). Rice University George R. Brown tennis courts, green infrastructure, and LEED certified stormwater construction plans. Lead graduate engineer. *City of Houston Department of Public Works*.
- [5] **Castro, C.V.** (2013). Western corridor gas infrastructure development project. Primary author. *Ghana National Gas Limited Company*.
- [4] Williford, E. and **Castro, C.V.** (2012). Channel conveyance restoration at Buffalo Bayou Park, Shepherd Drive to 1200 feet West of Sabine Street. Lead graduate engineer. *Harris County Flood Control District*. Project ID W100-00-00-X036.
- [3] Williford, E. and **Castro, C.V.** (2012). Holcombe drainage and paving improvements. Graduate engineer. *City of Houston Department of Public Works*. WBS No. M-420126-0076-4.
- [2] Holder, A., Zeve, M. and **Castro, C.V.** (2013). US-59, Rosenberg TX, highway expansion and drainage analysis from Spur 10 to SH99. Graduate engineer. *Texas Department of Transportation*.
- [1] **Castro C.V.** (2012). Large-scale 2D SWMM hydrologic and hydraulic modeling. Graduate engineer. *Kingdom of Jeddah, Saudi Arabia*. WER06-REP-0040-C.

## CONFERENCES

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### Oral Presentations:

- [9] **Castro, C.V.** (2021). Widespread institutional and societal feedbacks and influences regarding nature-based solution implementation. *Delft Conference on Sociohydrology: Engaging Social Scientists & Water Professionals to Address the SDGS*. Delft University of Technology, Netherlands.
- [8] **Castro, C.V.** (2020). The levee effect and socio-hydrological adaptation. *Women in STEM Symposium*. University of Chicago, Chicago, Illinois.
- [7] Rifai, H.S. and **Castro, C.V.** (2020). At the intersect of engineered systems for flood mitigation, society, and resiliency: the Harvey posed challenge in greater Houston. *HurriCon Conference: Science at the intersection of hurricanes and the populated coast*. East Carolina University, North Carolina. (Co-authored; Presented by Rifai, H.S.)
- [6] **Castro, C. V.** (2017). Public geospatial data sourcing and processing for watershed analyses. *Texas Floodplain Management Administration Conference*, Austin, Texas.
- [5] **Castro, C. V.** (2016). A GIS framework for gathering data and preparing HEC-HMS basins. *Texas Natural Resources Information Systems GeoRodeo*, Austin, Texas.
- [4] **Castro, C. V.** (2016). Living Atlas of the World provides data services for hydrologic modeling. *Esri ArcGIS Water Conference*, Austin, Texas.
- [3] **Castro, C. V.** (2015). Performance assessment of WFDEI satellite data for estimating global rainfall intensity. *Global Flood Partnership Annual Conference*, National Center for Atmospheric Research (NCAR), Boulder, Colorado. (Lightening Session)

### Poster Presentations:

- [2] **Castro, C. V.** (2019). Hydrological, societal, and environmental impacts of flood control reservoir releases on downstream communities using remote sensing and modeling during Hurricane Harvey. *American Geophysical Union Fall Conference*, San Francisco, California.
- [1] **Castro, C. V.** (2015). Performance Assessment of WFDEI Satellite Data for Estimating Global Rainfall Intensity. *Global Flood Partnership Annual Conference*, National Center for Atmospheric Research (NCAR), Boulder, Colorado.

### Participant:

2020	American Geophysical Union Fall Conference, Virtual
2019	SSPEED Post-Harvey Era: Resilient Engineering, Infrastructure, & Policy, Houston, Texas
2019	City of Houston Resilient Cities Collaboration Workshop, Houston, Texas
2019	Greater Houston Flood Mitigation Symposium, Houston, Texas
2019	Houston Regional GIS Expo, Houston, Texas
2018	NSF in Transition: User-Inspired Research and the Geosciences, Houston, Texas
2018	Houston Engagement and Recovery Effort Symposium, Houston, Texas
2018	Innovative Teaching and Learning at a Distance Symposium, University of Houston, Texas
2018	SSPEED Urban Flooding & Infrastructure: Moving Forward from Harvey, Houston, Texas
2016	Esri User Conference, San Diego, California

## PRESENTATIONS

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- 2020\* Urbanization Challenges & Solutions in Public Policy, Engineering, and Academic Research. Houston Early Research Experience, University of Houston, Houston, TX.
- 2019\* Hurricane Harvey: Lessons Learned about Stormwater & Environmental Engineering. Houston Scholars Program, University of Houston, Houston, TX.
- 2018\* Natural Disaster Response and Preparation using Social Media and Citizen Science. Taste of Science Community Event, Houston, TX.
- 2018 Insights into Stormwater and Drainage Impacts after Simultaneous 500-Year Events. Harris County Flood Control District, Houston, TX.
- 2017\* The Future of Flooding. **TEDx** Sugar Land, TX.
- 2017\* Girls in STEM: A Day in the Life. *Girls in STEM Education Conference*, Klein, TX.
- 2017 Regional Stormwater Detention and Environmental Mitigation for Native Vegetative Species and Natural Habitats. City of Houston Public Works Department, Houston, TX.
- 2017 Feasibility analysis of dental college rehabilitation in Ludhiana, India. Jones|Carter Engineering Firm, Houston, TX.
- 2016 ArcGIS Preprocessing for Extracting Geospatial Data from Cloud-based Repositories. Lower Colorado River Authority, Austin, TX.
- 2016 FEMA Floodplain Mapping: Trending toward Data as a Service. City of Austin Public Works Department, Austin, TX.
- 2015 National Flood Interoperability Experiment (NFIE) Geospatial Framework, Precursor to NOAA National Water Model. University of Texas, Civil Engineering Departmental Seminar, Austin, TX.
- 2015\* Hydraulic Modeling Overview and Case Study of Onion Creek Floodplain. David Maidment CE 365K Hydraulic Engineering Class. University of Texas, Austin, TX.
- 2014 Unified Methods for GIS-based Hydrological Modeling. University of Texas, Civil Engineering Departmental Seminar, Austin, TX.
- 2014\* Hydraulics and Hydrologic Largescale Modeling for City of Jeddah, Saudi Arabia. American Society of Civil Engineering, Texas A&M University, College Station, TX.
- 2013\* Urban Design, Land Development, Comprehensive Stormwater Drainage. American Society of Civil Engineering, Texas A&M University, College Station, TX.

### Workshops:

- 2016\* Hydraulic and Hydrologic Engineering and Modeling Frameworks and Best Practices. Sole instructor. Jones|Carter University Program, Houston, TX.
- 2016\* AutoCAD Civil 3D Site Grading and Detention Ponds. Sole instructor. Jones|Carter University Program, Houston, TX.

### **\* Invited Talk**

## SERVICE ACTIVITIES

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### International Community Initiatives:

- 2021 **South African National Biodiversity Institute, Kirstenbosch Research Centre**  
Watershed modeling support for land use impacts and ecosystem adaptation to climate change.
- 2018 **Respire Haiti, Haiti**  
Team leader to support local organization providing community education and medical care.
- 2017-2018 **Intra-American Development Bank, Haiti**  
Drainage modeling for culvert design in flood-prone region.
- 2017 **Engineering Ministries International, India**  
Civil engineering for rehabilitation of medical college and hospital in Ludhiana, India.
- 2014-2015 **Road to Mafraq, Inc., Jordan**  
Board member for 501c organization to expand educational opportunities in refugee camps.
- 2013-2014 **United Nations High Commissioner for Refugees (UNHCR), Ghana**  
Provided engineering assistance to UNHCR refugee camp leaders.
- 2013 **Living Water International (LWI), Nicaragua**  
Drilled and installed water wells in Leon, Nicaragua.
- 2011-2013 **Engineers Without Borders, Houston Professional Chapter, El Salvador**  
Team leader for potable water system design and installation.
- 2012 **Children's Educational Center, Haiti**  
Funded and coordinated installation of two water wells for children's center.
- 2011 **Disaster Assistance Response Team (DART), Haiti**  
Disaster response services and drainage remediation following earthquake.
- 2010 **Water Purification, Zambia**  
Worked with local engineers to employ low-cost water treatment devices.

### Academic Service:

- 2021 **Primary Convener & Session Chair**  
AGU Fall 2021 Conference, Session "Watersheds as Complex Systems: Top-down and Bottom-up Approaches." (Submitted, in-review).
- 2021 **Session Co-Convener**  
AGU Fall 2021 Conference, Session "SocioHydrology: Advancing the Science of Water & Society." (Submitted, in-review).
- 2020-2021 **Diversity and Inclusion Committee Member**  
Texas American Water Works Association (AWWA) Southeast Texas Chapter
- 2020-2021 **Journal Reviewer**  
Journal of Mountain Science
- 2020 **Conference Reviewer**  
AGU Fall 2020 Outstanding Student Presentation Awards
- 2020 **Grant Reviewer**  
Sigma Xi Grants-in-Aid of Research, Scientific Research Honor Society

Media Articles:

**Castro, C. V.** (2021). HMS-PrePro: An automated GIS toolbox for extracting cloud-based data, delineating watersheds, and calculating hydrological parameters. *Esri ArcGIS Water Blog*.

**Castro, C.V.** (2016). The Living Atlas can provide better access to data for hydrologic modeling. *Esri ArcUser Article*, Volume Spring 2016, pp 32-35.

Open-source Products:

**Castro, C. V.** (2021). NBS-Geo: Web-mapping application to explore and download seamless, authoritative, inter-disciplinary social, environmental, and hydrological datasets regarding nature-based solution planning. <https://tinyurl.com/nbsgeo>

**Castro, C. V.** (2019). HMS-PrePro 10.7.1: Global GIS processing tool for HEC-HMS hydrological basin models using cloud-based data and automated spatial analysis. Github Repository. <https://doi.org/10.5281/zenodo.3662765>

**TEACHING EXPERIENCE & TRAINING**

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- 2021            **Center for Integration of Research, Teaching, and Learning (CIRTL)**  
Associate-level certificate for evidence-based STEM instruction.
- 2018-2019    **Future Faculty Fellowship (F<sup>3</sup>) Program**  
University of Houston Graduate School  
Professional development training for student engagement, instruction, & assessment.
- 2009-2011    **Texas A&M Center for Student-Athlete Services**  
Employed tutor for student-athletes in various math and engineering courses.

Community Mentoring:

- College Mentoring**
- 2012-2014    Rice University Engineers Without Borders, Student Chapter Professional Mentor
- High School Mentoring**
- 2020-2021    Galveston Ball High School Life Skills Educational Outreach  
2012-2014    Architecture, Construction, Engineering (ACE) Mentor Program of America
- Intermediate School Mentoring**
- 2017-2018    MathCounts, Texas Society of Professional Engineers  
2010-2013    Save Our Streets Youth Community Mentor
- Elementary School Mentoring**
- 2009-2011    Society of Women Engineers Elementary Reading & Writing Lab Volunteer



## PROFESSIONAL AFFILIATIONS & CREDENTIALS

American Geophysical Union (AGU)	Member
American Society of Civil Engineers (ASCE)	Member
American Water Resources Association (AWRA)	Member
American Water Works Association (AWWA)	Diversity & Inclusion Committee Member
Engineers Without Borders (EWB)	Houston Professional Chapter Officer
Texas Floodplain Mgmt. Association (TFMA)	<b>Certified Floodplain Manager License No. 2977-16N</b>
Texas Board of Professional Engineers (TBPE)	<b>Professional Engineering License No. 123286</b>
Society of Women Engineers (SWE)	Member
United States Green Building Council (USGBC)	<b>LEED Green Associate Certification</b>
Urban Land Institute (ULI)	Hines Student Competition Participant

## TECHNICAL SKILLS

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Air Quality Modeling:	EPA COBRA Program
Computer Coding:	Java, Python, Matlab, R, VBA
Energy Modeling:	EPA AVERT Program
Engineering Design:	AutoCAD, AutoCAD Civil 3D, Microstation
Geographic Systems:	Esri ArcGIS, ArcPy Coding, ArcHydro
Natural Hazards:	FEMA Hazus Program
Remote Sensing:	ENVI Geospatial
Water Distribution:	Bentley OpenFlows WaterGEMS
Watershed Modeling:	HEC-HMS, HEC-GeoHMS, HEC-RAS 1D/2D, HEC-GeoRAS, HY-8 Hydraulics, FlowMaster, Winstorm, SWAT, SWMM 2D

## REFERENCES

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### **Murugesu Sivapalan**

Chester and Helen Siess Endowed Professor  
University of Illinois at Urbana-Champaign  
Grainger College of Engineering  
Department of Geography  
Department of Civil Engineering  
[sivapala@illinois.edu](mailto:sivapala@illinois.edu) 217.333.2675

### **Hanadi S. Rifai**

John and Rebecca Moores Professor  
Director, Environmental Graduate Program  
Associate Dean Research and Facilities  
University of Houston  
Cullen College of Engineering  
[rifai@uh.edu](mailto:rifai@uh.edu) 713.743.4271

### **David R. Maidment**

Hussein M. Alharthy Centennial Chair  
Civil Engineering Emeritus  
University of Texas at Austin  
Cockrell School of Engineering  
Department of Civil Engineering  
[maidment@utexas.edu](mailto:maidment@utexas.edu) 512.471.0065

### **Francisco Olivera**

Associate Professor  
Water Resources Engineering Graduate Advisor  
Texas A&M University  
Zachry College of Engineering  
Department of Civil Engineering  
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