NASA, Jet Propulsion Laboratory, California Institute of Technology: (225) 397-4777

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ALI REZA PAYANDEH

EDUCATION

2021	Ph.D., Louisiana State University, Oceanography and Coastal Sciences
2014	M.S., University of Tehran, Coastal Engineering
2012	B.E., University of Mohaghegh Ardabili, Civil and Environmental Engineering

ACADEMIC EXPERIENCE

2023 – Present **NASA, Jet Propulsion Laboratory** | Postdoctoral Fellow (Advisor: Marc Simard)

NASA DeltaX Project:

- Lead Modeler on Integrating airborne remote sensing data with coupled hydrodynamic-morphology models to predict land loss by 2100
- Integrating multi-sensor airborne datasets (AVIRIS-NG, AirSWOT, UAVSAR) with coupled hydrodynamic–morphodynamic models to improve wetland mapping and predict land loss.
- Developed reproducible Python workflows for processing airborne observations, produced calibrated models and code repositories
- Organized the NASA Delta-X Applications Workshop

NASA BioREaCH Project:

- Using AVIRIS-NG, Sentinel-2, and IceSat-2 stacks to derive bathymetry
- Lead modeler, developing remote sensing-based approaches for modeling data-scarce regions

2021 – 2023 **University of California Santa Barbara** | Postdoctoral Fellow (Advisor: Libe Washburn)

NSF-funded Project:

- Used high frequency coastal radar to analyze submesoscale coastal currents in the Southern California Bight.
- Linked the occurrence and variability to climate drivers such as ENSO events and marine heat waves.
- Developed detection and tracking tools for eddies using a decade of HF radar observations.

2017 – 2021 **Louisiana State University** | Teaching Assistant (Advisor: Dubravko Justic)

- Case Studies in Coastal Ecosystem Modeling - OCS 7029 (~ 20 students)
- Ecosystem Modeling and Analysis - OCS 4410 (~ 30 students)

2015 – 2021 **Louisiana State University** | Research Assistant (Advisor: Dubravko Justic)

- Assessed tidal response to relative sea-level rise and marsh accretion
- Quantified suspended sediment dynamics
- Designed and led a total of 9 research cruises for the research

2014 – 2015 **University of Tehran/Yekom Consulting Engineers** | Adjunct Research Scientist

- Led numerical modeling studies to assess tsunami hazard in the Oman Sea

2013 – 2014 **University of Tehran** | Teaching Assistant

- Physics and Dynamics of the Ocean (~ 40 students)

2013 – 2014 **University of Tehran** | Research Assistant

- Studied hypoxia in the northern Persian Gulf

WORKSHOPS

May – 2024 **Organizer**: NASA Delta-X Applications Workshop (Link to GitHub)

I organized the Delta X workshop and handled everything from coordinating instructors to managing registration and logistics for a diverse group of participants. The workshop delivered instructional sessions on the use of Delta-X remote sensing datasets and modeling applications. The two-day workshop hosted more than 100 participants, including scientists, students, and coastal resource managers (workshop recording).

May – 2024 **Instructor**: NASA Delta-X Applications Workshop (Link to GitHub)

Session1: Hydrodynamic Modeling of Deltas Using Delft3D, Instructed for a group of ~ 100 students (link to recording)

Session2: The Fate of Deltas - Delft3D Morphodynamic Modeling, Instructed for a group of ~ 100 students (link to recording)

Oct – 2018 **Contributor**: Teaching Computation in the Sciences Using MATLAB (Link to Workshop)

Session 1: Tidal analysis and prediction (Link)

Session 2: Computation for Oceanography and Coastal Science (Link)

RESEARCH MENTORSHIP

2022 – 2023 Daniel Belzberg (undergraduate student), Department of Physics, UCSB

BOAT CRUISES

2021 – 2022 **Santa Barbara Channel** (led by Brian Emery and Anthony Kirinkich)

Two research cruises in the Santa Barbara Channel deploying ocean drifters to measure Lagrangian currents

Feb to Apr – 2018 **Northern Gulf of Mexico, Barataria Bay** (led by **Ali Reza Payandeh**)

Designed and led a series of six research cruises to Barataria Bay collecting sediment and water samples

2016 to 2017 **Barataria Bay, Little Lake** (led by **Ali Reza Payandeh**)

Designed and led a series of three research cruises deploying ADVs, ADCP, RBR, and OBS to measure water level, currents waves, and turbidity

Jan to Feb – 2016 **Barataria Bay Transect Project** (led by Eugene Turner)

Two research cruises to Barataria Bay collecting water samples to measure Chlorophyll_a, Total N, Total P, PO4, NH4, and more.

OUTREACH, COMMUNITY SERVICE, PROFESSIONAL ORGANIZATION

2017-Present **Podcast Host:** I started a podcast in June 2019 to share ocean science with Persian speaking audiences in simple words. It is available on: Spotify, ApplePodcast, GooglePodcast, Main Podcast Website. The podcast has about 45k subscribers, and each episode gets around 30k listens. Topics I have covered include global warming, hydrothermal vents, the Mariana Trench, whale evolution, and sea level rise and more.

May 2024 **Organizer**: NASA Delta-X Applications Workshop (Link to GitHub, Link to recording)

Community Involvement: LSU Coast and Environment Graduate Organization (CEGO) committee member for two years. Through this, I engaged in organizing several education and outreach events including:

Spring 2019 Louisiana Earth Day Festival, Baton Rouge, Louisiana

Spring 2019 Sea Grant's Ocean Commotion, Baton Rouge, Louisiana

Spring 2019 Removing invasive plants (water Hyacinth) from Blackwater Conservation area, BR, LA

Spring 2019 Clean-up of the LSU Lakes

Reviewer for

Estuarine, Coastal and Shelf Science

Oceans

Journal of Environmental Protection

Professional Organization

Santa Barbara Coastal Long Term Ecological Research (SBC LTER)

American Geophysical Union (AGU)

The Oceanography Society (TOS)

Coastal and Estuarine Research Federation (CERF)

American Geosciences Institute (AGI)

Collaborated with scientists in the Gulf of Mexico Research Initiative (GoMRI) as part of a project entitled "Coastal Waters Consortium-III: Oil Spills as Stressors in Coastal Marshes - The Legacy and the Future (CWC-III)". Link: https://research.gulfresearchinitiative.org/gomri-funded-researchers/person/?pid=3893

FIELD AND EQUIPMENT SKILLS

High Frequency Radar (CODAR)

Open Water Scuba Certified (Interested to obtain AAUS status)

Nortek Acoustic Doppler Velocimeter (ADV)

Optical Backscatter Sensor (OBS)

RBR CTD

Acoustic Backscatter Sensor (ABS)

Acoustic Doppler Current Profiler (ADCP)

TECHNICAL SKILLS

Satellites and Airborne Sensors: SWOT, ICESat-2, Sentinel-2, Sentinel-1, AirSWOT, UAVSAR, AVIRIS

Remote Sensing Techniques: Multispectral and hyperspectral analysis, Interferometric SAR (InSAR), LiDAR, ICESat-2 bathymetry retrieval, vegetation classification, atmospheric correction

Ocean Models: Delft3D, Delft3D FM, SWAN, FVCOM, MIKE, ROMS, ADCIRC, SMS, COAWST

Programming: PYTHON, MATLAB, FORTRAN, Git, & R

Image Processing Software: Qgis, Snap, Envi, Arcgis

HPC: Expert In working with HPC clusters, Parallel Computing, Bash, Netcdf

Data Analysis: Time series and spatial analysis, harmonic and spectral analysis, machine learning (e.g., Random Forest, XG Boost), uncertainty quantification, and Signal Processing

SELECTED COURSEWORK

Core Oceanography Courses: Physical Oceanography, Biological Oceanography, Geological Oceanography, Chemical Oceanography

Ecosystem Courses: Global Environmental Cycles, Ecosystem Modeling and Analysis, Case Studies in Coastal Ecosystem Modeling

Numerical Modeling Courses: Numerical Modeling of Ocean Circulation, Geomorphological Modeling, Coupled Ocean Atmosphere Modeling, Sediment Dynamics

Remote Sensing Courses: Satellite Oceanography, Remote Sensing Applications in Environmental Studies

Ocean Physics Courses: Estuarine dynamics, Tides Surges and Relative Sea-Levels, Physics of the Ocean

Data Analysis Courses: Ocean Data Analysis, Marine Data Collection and Analysis

AWARDS

LTER Travel Grant, to attend the Long-Term Ecological Research All Scientists Meeting, 2022

Best Poster Award, State of the Coast Conference, New Orleans, LA, 2018

LSU, Graduate Student Association Travel Award, to attend the Gulf Coast Graduate Student Symposium

PUBLICATIONS

In Review/Accepted:

Payandeh, A. R., Simard, M., Jones, C., Christensen, A., Jensen, D, Denbina, M., Oliver-Cabrera, T. (2025). Multi-Sensor Airborne Remote Sensing to Support Calibration of Hydrodynamic and Sediment Transport Models in Deltaic Wetlands. *Water resources research*

Payandeh, A. R., Simard, M., Campbell, A., Deventer, H. (2025). Remote Sensing based Hydrodynamic Modeling in Data-Scarce Regions: Integrating ICESat-2, Sentinel-2, and SWOT for Coastal Monitoring in Langebaan Lagoon, South Africa. *Remote Sensing of Environment*

Peer Reviewed:

Simard, M., Jones, C. E., Twilley, R. R., Castañeda-Moya, E., … **Payandeh, A. R**., et al. (2025). Delta-X: an airborne remote sensing framework to calibrate hydrodynamic and ecogeomorphic processes responsible for land building in coastal deltas. *Remote Sensing of Environment.*

Payandeh, A. R., Washburn, L., Emery, B., & Ohlmann, J. C. (2023). The Occurrence, Variability, and Potential Drivers of Submesoscale Eddies in the Southern California Bight Based on a Decade of High-Frequency Radar Observations. *Journal of Geophysical Research: Oceans*, 128(10), https://doi.org/10.1029/2023JC019914

Payandeh, A. R., Justic, D., Huang, H., Mariotti, G., & Hagen, S. C. (2022). Tidal change in response to the relative sea level rise and marsh accretion in a tidally choked estuary. *Continental Shelf Research*, 234, 104642. https://doi.org/10.1016/j.csr.2021.104642

Payandeh, A. R., Justic, D., Mariotti, G., Huang, H., & Sorourian, S. (2019). Subtidal water level and current variability in a bar-built estuary during cold front season: Barataria Bay, Gulf of Mexico. *Journal of Geophysical Research: Oceans*, 124(10), 7226-7246. https://doi.org/10.1029/2019JC015081

Payandeh, A. R., Justic, D., Mariotti, G., Huang, H., Valentine, K., & Walker, N. D. (2021). Suspended sediment dynamics in a deltaic estuary controlled by subtidal motion and offshore river plumes. *Estuarine, Coastal and Shelf Science*, 250, 107137. https://doi.org/10.1016/j.ecss.2020.107137

Sorourian, S, H. Huang, C. Li, D. Justic, **A. R. Payandeh** (2020). Wave dynamics near Barataria Bay tidal inlets during spring–summer time. *Ocean Modeling*. DOI: https://doi.org/10.1016/j.ocemod.2019.101553

Payandeh, A. R., Niksokhan, M. H., & Naserian, H. (2015). Tsunami hazard assessment of Chabahar bay related to megathrust seismogenic potential of the Makran subduction zone. *Natural Hazards*, 76, 161-176. 10.1007/s10661-014-4097-7

Payandeh, A. R., Zaker, N. H., & Niksokhan, M. H. (2015). Numerical assessment of the nutrient assimilative capacity of Khur-e-Musa in the Persian Gulf. *Environmental Monitoring and Assessment*, 187, 1-11. 10.1007/s10661-014-4097-7

Payandeh, A. R., Zaker, N. H., & Niksokhan, M. H. (2015). Numerical modeling of pollutant load accumulation in the Musa estuary, Persian Gulf. *Environmental Earth Sciences*, 73, 185-196. https://doi.org/10.1007/s12665-014-3409-0

Dissertation/Thesis/Data:

Payandeh, A. R., M. Simard, and C. Jones. 2025. Delta-X: Delft3D FM, Extended Domain Hydrodynamic Model. ORNL DAAC, Oak Ridge, Tennessee, USA. https://doi.org/10.3334/ORNLDAAC/2464

Payandeh, A. R., A.L. Christensen, and M. Simard. (2025). Delta-X: Delft3D FM, Weighted Mean Salinity, MRD, Louisiana, USA. ORNL DAAC, Oak Ridge, Tennessee, USA. https://doi.org/10.3334/ORNLDAAC/2420

Payandeh, A. R., A.L. Christensen, and M. Simard. (2025). Delta-X: Delft3d FM, Weighted Mean Hydroperiod, MRD, Louisiana, USA. ORNL DAAC, Oak Ridge, Tennessee, USA. https://doi.org/10.3334/ORNLDAAC/2421

Payandeh, A. R. (2021). Numerical and Field Study of Tidal and Subtidal Dynamics in a Bar-Built Estuary: Barataria Bay, Gulf of Mexico. Louisiana State University and Agricultural & Mechanical College.

Payandeh, A. R., (2014). Estimation of Nutrients Assimilative Capacity in an Inverse Estuary. University of Tehran, Master's Thesis, 140 P.

Payandeh, Ali Reza, D. Justic. (2019) FVCOM-simulated hydrodynamic variables for Barataria Bay, Louisiana from 2016-12-07 to 2017-03-05. Harte Research Institute, Texas A&M University–Corpus Christi. DOI: 10.7266/N7-S2Q1-5521

Talks/Posters:

Payandeh, A. R., Simard, M., Jensen, D (2025). Bridging Data Gaps in Hydrodynamic Modeling with Remote Sensing: ICESat-2, Sentinel-2, and SWOT Integration. *JPL Postdoc Research Day*, Pasadena, CA., USA

Payandeh, A. R., Simard, M., Jones, C., Christensen, A., Jensen, D (2024). AVIRIS-NG Data Enhances Numerical Models to Predict Land Loss in Coastal Louisiana. *JPL Postdoc Research Day*, Pasadena, CA., USA

Payandeh, A. R., Simard, M., Jones, C., Christensen, A., Jensen, D (2024). Predicting Land Loss in Coastal Louisiana: A Coupled Hydrodynamic and Morphology Model Integrating Remote Sensing Data. *American Geophysical Union (AGU) Fall Meeting*, Washington, D. C., USA (https://agu.confex.com/agu/agu24/prelim.cgi/Paper/1709858)

Payandeh, A. R., Washburn, L., Emery, B., Ohlmann, C (2024). A Decadal Analysis of Submesoscale Eddies in the Southern California Bight Through High-Frequency Radar Observations. *Ocean Sciences Meeting*, New Orleans, Louisiana. Talk.

Payandeh, A. R., Washburn, L., Emery, B., Ohlmann, C (2023). Submesoscale Eddies in the Southern California Bight Derived from a Decade of High Frequency Radar Observations. *European Geophysical Union General Assembly*, Vienna, Austria. Talk.

Payandeh, A. R., Washburn, L., Emery, B., Ohlmann, C (2022). Submesoscale Eddies in the Southern California Bight Derived from a Decade of High Frequency Radar Observations. *Eastern Pacific Ocean Conference*. Mt. Hood, Oregon. Talk.

Payandeh, A. R., Washburn, L., Emery, B., Ohlmann, C (2022). Submesoscale Eddies in the Southern California Bight. *LTER All Scientists Meeting*. Mt. Hood, Oregon. Talk.

Payandeh, A. R., D. Justic, and G. Mariotti. (2020). Seasonal Variability in Hydrodynamics and Suspended-Sediment Transport in a Bar-Built Mississippi River Estuary, *Ocean Sciences Meeting*, San Diego, USA. Poster.

Payandeh, A. R., D. Justic, and G. Mariotti. (2018). Low Frequency Sea Level Variability in a Deltaic Mississippi River Estuary during Cold Front Season. *American Geophysical Union (AGU) Fall Meeting* 2018, Washington, D. C., USA. Talk.

Payandeh, A. R., D. Justic, and G. Mariotti. (2018). Assessing the effects of cold fronts on hydrodynamic characteristics AND Temperature-Salinity patterns in Barataria Bay. *State of the Coast*. New Orleans, Louisiana. Poster. **Best Poster Award.**

Payandeh, A. R., D. Justic, and G. Mariotti. (2017). Dynamics of Low-Frequency Fluctuations in Barataria Bay during Cold Front Season. *Gulf Coast Graduate Student Symposium*. Dauphin Island, Alabama. Poster.

Payandeh, A. R., Niksokhan, M. H., and Naserian, H. Tsunami inundation and hazard mapping in Chabahar Bay. 11th International Conference on Coasts, Ports and Marine Structures (*ICOPMAS 2014*) Tehran, Iran, 24-26 Nov. 2014. Talk.

Payandeh, A. R., Zaker, N. H., & Niksokhan, M. H. (2013, May). Residence times of nutrient in Musa Estuary. Proceedings of the 7th *National Conference on World Environment* Day (29-33). Iran, Tehran. University of Tehran (In Persian). Talk.

Payandeh, A. R., Zaker, N. H., & Niksokhan, M. H. (2013, October). Transport Dynamics and Tidal currents in Musa Estuary. In Proceedings of the *12th Iranian Hydraulics Conference* (57-64). Iran, Tehran. Iranian Hydraulic Association (In Persian). Talk.

REFERENCES

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