<div align="center">**Creating a Cutting-Edge Workforce for Coastal Resilience**
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Introduction

Coastal areas represent some of the most heavily utilized regions on Earth, accommodating growing human populations, a wide array of business and recreational activities, and thriving industries [1]. This extensive utilization has taken a toll on our natural coastal ecosystems, resulting in ecological and landscape degradation or outright destruction. These impacts require new approaches to building coastal resilience that will allow humans to achieve their functional goals to live and thrive, but also build a resilient coastal environment. Within the academic community, the notion of coastal resilience has emerged as a pivotal concept [2,3]. Yet, academic literature suffers two underlying limitations: (a) Arguments that the concept of coastal resilience lacks meaning [4–6] and (b) no studies to date have examined the workforce needs for a coastal resilient workforce. Specifically, a search of the academic literature reveals that no studies, to date, have defined what constitutes a coastal resilient workforce. Yet, the recently passed Inflation Reduction Act has specified the need to create a climate-ready workforce. The dearth of academic and practical work has materialized in the introduction of a grant opportunity from NOAA[1] to create a climate-ready workforce for coastal territories (including Louisiana). It is the objective of this research to: (a) Define the elements of a coastally resilient workforce; (b) Understand the skillsets that will be necessary to create a coastally resilient workforce: and (c) put together a research team that will enable the PI to submit a grant proposal for the NOAA grant that will enable curriculum to be developed and commercialized for a coastally resilient workforce.

Research Objective

The objective of the research is to conduct a study on coastal resilience job vacancies and required skillsets that currently exist across the country and to identify the specific job-related concepts needed by each. We define a coastal resilience job as *a role that contributes to the resilience of coastal communities and ecosystems*. This involves helping coastal areas adapt to changing conditions, withstand, and rapidly recover from disruptions due to emergencies. These jobs can be found in various sectors, including but not limited to:

1. Environmental science and conservation: Professionals in this field might work on preserving and restoring coastal ecosystems, studying climate change impacts, or implementing green infrastructure solutions.
2. Urban planning and community development: These roles might involve planning for sea-level rise, developing evacuation plans for coastal storms, or working with communities to minimize losses from such events.
3. Engineering: Coastal engineers might design sea walls, restore beaches, or develop other infrastructure projects to protect against coastal erosion and flooding.
4. Policy and legislation: Individuals in these roles might work on policies or laws related to coastal management, climate change adaptation, or disaster response.

In all these roles, the goal is to help coastal communities make informed choices to assess risk, minimize losses, protect the things they care about, and bounce back after something bad happens. This can involve a variety of tools, data, services, technical assistance, and training. Utilizing our definition of coastal resilient jobs, we seek to study the necessary elements of job vacancies that need to be extracted from job postings, namely:

1. Education – Secondary education, higher education degrees, vocational and skills training
2. Experience – Professional experience acquired through previous employment, projects, and internships
3. Certifications
4. Skills, both essential and preferred

Our proposed approach is a two-fold approach: (1) to acquire job posting data from both Indeed.com for coastal resilient jobs and (2) to interview key stakeholders within the coastal resilient community. By utilizing both approaches, there will be a convergence of perspectives that will inform the necessary skillsets.

Approach #1: Indeed.com Analysis

Indeed.com has been used in previous studies to analyze other industries including data scientists, data analytics, artificial intelligence and machine learning, human resource analytics, human resource management, and a study on cybersecurity requirements. The following methodology will be used:

Data Acquisition → Data Cleaning → Job Classification → Data Analysis
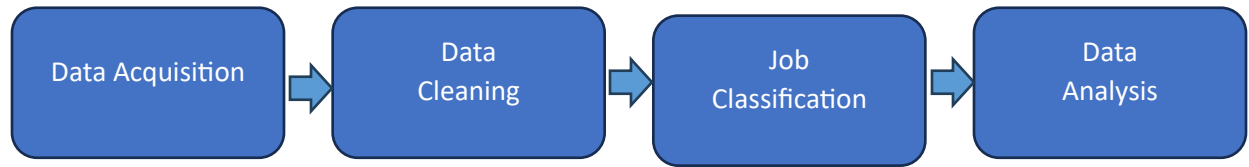
Step One: Data Acquisition

The first step will be the acquisition of the job postings. To acquire the data, a job search query will be conducted on Indeed.com using the search parameter of "Coastal Resilience." Using a python script, information on the postings including the URL link, position title, salary, and position summary will be captured and saved in a database. This initial capture will then move to step 2.

Step Two: Data Cleaning

The second step will be to clean the data. In this step, duplicate positions, noncoastal resilient positions, and blank/corrupted positions will be removed. This step will be completed manually by the PI. The remaining job postings will then be moved to step 3.

Step Three: Job Classification

No previous work can be used to guide our classification of the different types of jobs that exist within the coastal resilient workforce community. Using an emergent approach to coding the jobs, a classification of the different job types will be created. It is this framework that will be the target of an academic journal article that can define a framework that future researchers can utilize on a coastal resilient workforce.

Step Four: Data Analysis

To analyze the data, all job postings will be inspected by both the PI and a graduate student over the course of several weeks. Information corresponding to the elements of the job posting from step one (i.e., education, experience, certifications, essential requirements, and preferred requirements) will be analyzed using thematic analysis. To complete this analysis, the following methodology will be used:

1. A subsample of 25% of the job postings will be analyzed using an open coding (using Atlas.AI) on the essential and preferred requirements to derive an initial dictionary of key terms that can be used in the subsequent analysis.

2. A subsample of 25% of the job postings will be analyzed using the dictionary of key terms as identified by step 1 of the data analysis approach. This will ensure that the dictionary of key terms has been validated.

3. The remaining 50% of the job postings will be analyzed using computer-aided text analysis. Any postings that are unable to be identified using the computer-aided text analysis approach will be manually analyzed by the PI and the graduate student.

Approach #2: Stakeholder Analysis

To triangulate the results found from the analysis of the current job postings, interviews will be conducted with key stakeholders within the coastal resilient workforce community. To assist in the facilitation of the stakeholder analysis, the PI will partner with Do-it-Greener, a minority-managed non-profit based in Lafayette, Louisiana, whose mission is to make communities healthier and more environmentally conscious to ensure a more sustainable future. One pillar of their vision is workforce development and the non-profit recently received a grant from Unity,

a Fortune 500 software company, to create training in workforce development. Through its prior work within the environmental area, Do-it-Greener has established relationships with a variety of key stakeholders that will be utilized to conduct key interviews. Specifically, we will target representatives from the following areas:

1. Federal government, including NOAA and the EPA
2. Non-profit agencies, including the Nature Conservancy and the National Fish and Wildlife Foundation
3. Private industry, including companies such as CSS, Deltares, and Lynker
4. The state of Louisiana
5. Higher education, targeting professors who research areas of coastal resilience

Proposed Research Outcome

The results of this research will be the identification of skillsets that are needed for coastal resilient jobs and that correspond to each job role. In addition, a matrix will be created to analyze the location of these roles within the economy to identify patterns of where each role is necessary (e.g., government, non-profit, or private industry). The result of Objective One will be a 3-dimensional job matrix that combines the role, the skillset, and the agency.

Key Personnel

- The PI and a graduate student will be responsible for conducting Approach 1 and for facilitating the interviews for Approach 2

- Do-it-Greener personnel will be responsible for engaging the necessary stakeholders to be interviewed for Approach 2

Relationship to LSU Priorities

The proposed research aligns with the Pentagon area of the Coast, which states that:

Consistent with our charge as the state's Sea Grant university, LSU will strengthen its position as a global leader in collaborative coastal research. We will find solutions to pressing problems experienced by Louisianans today, with a focus on hurricanes, flooding, land loss, and sea-level rise. Our success in overcoming these challenges today will provide a roadmap for global decision-making in the future. Funding this grant will therefore contribute to research in how to create a resilient workforce for our citizens. Furthermore, the proposed research aligns with the College of Business strategic priority #3, which is expanding Support for Statewide Business. Finally, the proposal aligns with the grant priorities of regional economic development as this will lead to the creation of grant funding to create training for a coastally resilient workforce.

Proposed Scholarly Goals

There are two scholarly goals that will result from the funding of this proposal:

- A journal publication creating a framework of coastal resilient jobs. The target for this type of work will likely be Ocean and Coastal Management, a leading journal in the area
- The creation of a research team that will allow the PI to submit a proposal for NOAA-OAR-SG-2024-2007783 (2023 Inflation Reduction Act Climate-Ready Workforce for Coastal States and Territories Competition)[1]

Funding this proposal is paramount to enabling the PI to be competitive for this grant. Within the grant requirements, it stated that applicants must have all or most of the following characteristics:

- Convening power in the region, which is the ability to catalyze collective action by relevant actors to address regional climate challenges. Exercising convening power is not an end-goal but rather a means to foster collective action to achieve desirable development outcomes.

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[1] https://www.grants.gov/web/grants/view-opportunity.html?oppId=348990

- Committed support of the executive leadership from the region and buy-in from appropriate relevant groups (e.g., a governor, mayor or chief executive of a jurisdiction, chief executives of major employers, heads of labor unions, presidents of two- and four-year institutions of higher education).
- Relationships and credibility with key players in the workforce ecosystem, including employers, governmental entities, state or local workforce development boards, educational institutions, labor organizations, and worker-serving organizations.
- A proven track record of coordinating across sectors and partners and of driving relevant groups to successful action.
- Dedicated full-time employee(s) focused on addressing regional workforce issues to support regional economic development.
- Ability to translate various sectors' objectives and key concerns to other sectors.
- Strong outreach and engagement capabilities.
- Applicants do not need to have a background in climate resilience but are expected to engage with employers that have good jobs that enhance climate resilience, as well as with strategic partners who can work with the applicant and employers to ensure the training provides the skills needed for those jobs.

The goal is to leverage the relationships from Do-it-Greener to create the network of collaborators that are necessary to achieve these objectives. The vision is to create a research network that convenes power and aligns all the regional stakeholders to be successful in the grant application, which will require the PI to move beyond this grant funding to also develop curriculum that aligns with our findings. This seed funding is critical to the ability of the PI to apply for this grant and without this funding, it will hinder the ability of the PI to pursue this grant. A letter of support from Do-It-Greener is included at the end of this proposal.

Proposed Budget

The proposed budget is as follows:

Personnel	
Dr. Andrew Schwarz	$5,000
Graduate Assistant	$4,500
Personnel total	**$9,500**
Fringe	**$4,180**
Subcontractor	
Do-it-Greener	$5,000
Total	**$18,680**

The justification for Do-it-Greener is to pay for the staff time required to facilitate the stakeholder analysis.

References

1. Lazarus, E.D. Toward a global classification of coastal anthromes. Land 2017, 6, 13.
2. Environment Agency. Draft National Flood and Coastal Erosion Risk Management Strategy for England—Consultation Document. Available online: https://consult.environment-agency.gov.uk/fcrm/national-strategy-public/user_uploads/draft-national-fcerm-strategy-for-england---consultationdocument.pdf
3. Beatley, T. Planning for Coastal Resilience: Best Practices for Calamitous Times; Island Press: Washington, DC, USA, 2009.
4. Chaffin, B.C.; Scown, M. Social-ecological resilience and geomorphic systems. Geomorphology 2018, 305, 221–230.
5. Piégay, H.; Chabot, A.; Le Lay, Y.F. Some comments about resilience: From cyclicity to trajectory, a shift in living and non-living system theory. Geomorphology 2018.
6. Tooth, S. The geomorphology of wetlands in drylands: Resilience, nonresilience, or . . . ? Geomorphology 2018, 305, 33–48.

September 29, 2023

To Members of the Kathy and Roy O. Martin III Faculty Research Award Program,

I am writing on behalf of the Do It Greener Foundation to express our enthusiastic support for Dr. Andrew Schwarz and his proposal titled "Creating a Cutting-Edge Workforce for Coastal Resilience." We believe that his research objectives align perfectly with the goals and priorities of the Kathy and Roy O. Martin III Faculty Research Award Program as well as the mission of the Do It Greener Foundation.

Dr. Schwarz's dedication to advancing the concept of coastal resilience and developing a climate-ready workforce is commendable. His proposed research addresses critical challenges facing coastal areas, and we are confident that his work will contribute significantly to the field.

The significance of this research cannot be overstated. Coastal areas are vital regions on our planet, but they face unprecedented challenges due to human activities and climate change. Dr. Schwarz's proposal seeks to define the elements of a coastal resilient workforce, understand the required skillsets, and create a framework for future research in this crucial field. His two-fold approach, which combines data analysis from job postings and stakeholder interviews, demonstrates a comprehensive and innovative methodology. It reflects his commitment to ensuring that the skillsets identified are not only theoretically sound but also grounded in practical application.

We are particularly excited about his collaboration with Do It Greener and our network of key stakeholders. By engaging with federal government agencies, non-profit organizations, private industry leaders, the state of Louisiana, and higher education institutions, Dr. Schwarz is fostering a collective effort to address the challenges faced by coastal communities. His proposed outcomes, including the development of a 3-dimensional job matrix and scholarly publications, will undoubtedly contribute significantly to the field of coastal resilience and workforce development. Furthermore, his alignment with LSU's priorities and regional economic development goals underscores the relevance and impact of his research.

We wholeheartedly endorse Dr. Schwarz's proposal and look forward to supporting his efforts in any way we can. His research has the potential to make a lasting and positive impact on coastal communities and the environment. We are excited to be a part of this important endeavor and are confident in his ability to achieve his objectives.

Sincerely,

Yvette Brown

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