Alabama Center of Excellence
Dauphin Island Sea Lab

2023 Request for Proposals for the Alabama Center of Excellence: Emerging Techniques in Monitoring and Research

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Full Proposals due: June 15, 2023

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ALCoE Summary

The Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act of 2012 (RESTORE Act, P.L. 112-141), established a Gulf Coast Restoration Trust Fund (Trust Fund) in the Treasury of the United States. Eighty percent of the civil penalties paid after July 6, 2012, under the Federal Water Pollution Control Act (33 U.S.C. 1321) in connection with the 2010 *Deepwater Horizon* oil spill will be deposited into this Trust Fund. BP made its first annual payment to the Trust Fund in April 2017 and is expected to continue to make annual payments through mid-2031. The Trust Fund total, currently at $ 2.1 billion, also includes Transocean and Anadarko civil penalty and penalty interest payments. On December 14, 2015, the U.S. Department of Treasury released the Final Rulemaking for the RESTORE Act (at 31 C.F.R. Part 34). This Rulemaking is available, along with the original RESTORE Act legislation, via Treasury's RESTORE Act Website. RESTORE Act programs consist of five components, including the *Centers of Excellence Research Grant Program* (CERGP) (RESTORE Act regulations, subpart H, section §34.700), to receive 2.5% of Trust Fund principal plus 50% of the interest accrued, divided equally among the five eligible Gulf Coast state entities specified at 31 C.F.R. § 34.702.

Alabama's Marine Environmental Sciences Consortium d.b.a Dauphin Island Sea Lab (MESC/DISL) is the state's Center of Excellence that was competitively selected by the Alabama Gulf Coast Recovery Council (AGCRC) and is now known as the Alabama RESTORE Act Center of Excellence (ALCoE).

The regulations and Treasury guidelines found in Section 1605 of the RESTORE Act require that the ALCoE seek to engage the broadest cross-section of participants with interest and expertise in science, technology, and monitoring (RESTORE Act regulations, subpart H, section §34.704, also shown below) in *at least one* of the following eligible disciplines:

1. Coastal and deltaic sustainability, restoration, and protection, including solutions and technology that allow citizens to live in a safe and sustainable manner in a coastal delta in the Gulf Coast Region;
2. Coastal fisheries and wildlife ecosystem research and monitoring in the Gulf Coast Region;
3. Offshore energy development, including research and technology, to improve the sustainable and safe development of energy resources in the Gulf of Mexico;
4. Sustainable and resilient growth, economic, and commercial development in the Gulf Coast Region;
5. Comprehensive observation, monitoring, and mapping of the Gulf of Mexico.

The ALCoE will fund research in disciplines 1, 2, 4 and 5 above, but not number 3.

ALCoE Funding Priorities

Marine environments are changing more now than at any time in human history and changes in climate, land use, coverage of critical nursery habitats, biogeochemical cycles, and the poleward shift of species collectively all will likely alter the fundamental relationships between Alabama's natural resources, the abiotic environment, and coastal economies. These changes will challenge our coastal resource managers' ability to build ecologically resilient coastal communities.

Local populations, communities, and ecosystems are all subject to changing environmental drivers operating across large temporal and spatial extents, in many cases with unpredictable impacts that lack historical analogs. Integration of high-frequency, fine-grained, precision data, that ranges from local to regional scales, and is assimilated and tested with additional observations and experiments, process models, and new scaling algorithms will be essential for understanding and predicting future ecological change. Providing such data describing the cumulative effects of current and possible future stressors to state and federal planners will positively impact the successful management of our future coastal resources and coastal resiliency which are of critical economic importance to Alabama.

The first proposals funded by the Alabama Center of Excellence (ALCoE) focused on understanding how the interacting effects of future multiple stressors and current environmental stressors will interact to affect Alabama's coastal environment and its citizens. Now the ALCoE is soliciting proposals that will use emerging technologies to improve the breadth of our efforts in support of integrated research, developing predictions, forecasting change and improving the affordability of data collection and monitoring in coastal Alabama.

New avenues for environmental data collection can supplement traditional approaches, and once set up, these systems can be relatively autonomous and inexpensive to operate, thereby eliminating the need for costly, frequent, field travel or physical sample collection. For example, automated data collection from distant study sites by remotely operating sensors is one important feature of the NSF Cyber-physical systems infrastructure (https://beta.nsf.gov/funding/opportunities/cyber-physical-systems-cps). Locally, ALCoE supports just such a system in coastal Alabama (the Alabama Real Time Observation System a.k.a. ARCOS)

With this second request for proposals (RFP), the ALCoE encourages proposals that will enhance and advance data collection networks that will benefit coastal research and monitoring. We encourage proposals that will test new methods, and those that may involve significant risk-taking, in efforts to upgrade Alabama's abilities to monitor, understand and predict how coastal resources may change in the foreseeable future. **The manner in which the data obtained by the enhanced methods can be applied to improve the management of Alabama's coastal resources should be clearly explained in each proposal**.

While not intended to limit the scope of proposals, below we provide some examples of emerging techniques, and programs, that could be appropriate topics for proposals solicited by this second ALCoE RFP. Much of this description borrows from a recent report by the National Academies of Science, Engineering and Medicine (NASEM 2022).

Examples include:
Artificial intelligence (AI), machine learning (ML), deep learning (DL)- Recent advancements in AI, ML, DL, cloud, and edge computing are expected to fundamentally transform a great many

disciplines. Traditional remote sensing combined with new technologies and AI can generate high-quality monitoring data for coastal ecosystems (Corbane et al., 2015; Ridge et al., 2020). Field-based monitoring and sensing technologies have also grown substantially this past decade, driven by advancements in cloud computing, crowdsourcing/ crowdsensing, AI, plug-and-play sensors, low-cost computer boards, drones, and small satellites. The use of these advanced multi-platform sensing technologies, data analytics, and visualization methods have the potential to make data collection and analysis targeted, effective, inexpensive, and sustainable over long timeframes (Rundel et al., 2009; Corbellini et al., 2017; Mayton et al., 2017).

Remote Sensing Satellites – Monitoring coastal environments using point-based field data can be time-consuming, expensive, and inadequate to characterize long-term trends. To overcome these difficulties and conduct site and regional scale monitoring and mapping, remote sensing satellite data are often used. Depending on the environmental variables being monitored, scientists have access to open-source satellite data ranging from 10m to 10s of km in resolution. Very high-resolution multispectral image data (1m to 3m) from commercial satellites such as IKONOS (4 $m)^0$, QuickBird (2.4 m), and WorldView (1.38 m) have been available since the 2000s but are expensive and often cost-prohibitive for long-term time-series analysis. The National Aeronautics and Space Administration (NASA) and the European Space Agency (ESA) satellite images are available in an open-source form, and they are typically considered as moderate resolution (10 m -1 km) satellites useful for local and regional analysis.

In the past few years, there has been a substantial growth in the number of small satellites or CubeSats launched to lower earth orbits that provide remote sensing images at various resolutions (National Academies of Sciences, Engineering, and Medicine, 2016; Stephens et al., 2020). These kinds of high temporal frequency data can be valuable in monitoring the impact of acute disturbance events.

Drones – In the past few years, uncrewed aerial systems (UASs) or drones have become ubiquitous in environmental data collection (National Academies of Science, Engineering and Medicine 2020). The most common types of drones for remote sensing observations are multispectral (10s of bands) imaging and thermal imaging drones. Although hyperspectral (100s of bands) drones exist, they tend to be expensive and are not yet commonly used. Drones offer several advantages that satellites currently do not, such as the flexibility of when and how to fly, and drones can fill temporal gaps created by satellite-based monitoring, while offering detailed mapping that satellites often miss (Emilien et al., 2021).

Ground sensor networks- Ground or field-based imaging and non-imaging sensors can be an accurate source of collecting field data that can be integrated and matched with drone and satellite data (Mishra et al., 2020). Imaging, optical or wireless sensors can provide multi- and hyperspectral reflectance data that can be used to monitor water quality, habitat status or other ecosystem indicators (Mishra et al. 2020; Sadinski et al. 2018).

Crowdsourcing or Crowdsensing projects- The proliferation of smart mobile devices, online social media, and cloud computing has significantly lowered the barrier for ordinary citizens to participate in environmental data collection , and researchers have used the crowd sensed data for detecting all sorts of ecological, environmental, and geological phenomena, including plant and animal identifications, coastal flooding and monitoring of temperature (Scott et al. 2018; Earle et al. 2012; Mishra et al. 2020).

Capturing and Analyzing Sound and Video Imagery - Advances in sound and video capture and classification algorithms allow the recognition of species presences and behaviors (LeCun et al. 2015). It is now possible, for example, to accurately catalog different types of natural and man-made sounds (Sethi et al. 2020) and distinguish the identity of different types of organisms as well as their intra- and inter-species interactions (Whytock et al. 2021; Lopez-Marcono et al. 2021). Automated analysis of imagery has also become more accurate and streamlined with the implementation of deep learning models that have improved the capacity to process raw images compared to traditional machine learning methods (LeCun et al., 2015; Villon et al. 2018; Ditria et al. 2021). Deep learning also shows promise for determining animal behavior from underwater videos, and an alternative to time-consuming manual methods of data extraction.

eDNA Research - There is a growing potential for information derived from eDNA detections of species to be more extensively used in decision-making in estuarine systems (Cloern et al. 2016), and a recent review discusses how DNA in coastal waters is increasingly being tested for its ability to accurately characterize the species composition, and abundance of organisms, ranging from the microbial to the megafaunal (Nagarajan et al. 2022). Some areas ripe for future eDNA research include advancements and standardization in methodology, broadened understanding of eDNA's strengths and limitations, and enhanced monitoring and biodiversity data that will increasingly be used in support of management decisions. In addition, the further development of laboratory-on-a-chip types of sensors that reliably quantify "DNA-scapes" *in situ* would be especially valuable.

AWARD INFORMATION

A. PROJECT/ AWARD PERIOD

Proposals submitted in response to this RFP should request funding for 12 to 18 months, with the understanding that these awards cannot be granted no-cost extensions.

B. FUNDING AVAILABILITY

The total amount of funds available for distribution through this RFP is approximately $1,500,000. Funding for each approved proposal should not exceed $150,000 per proposal.
Funding is contingent on availability of funds in the Trust Fund. The ALCoE reserves the right to fund only selected parts of any given research proposal and/or to require modifications to the proposed work, personnel, and budget of any proposal.
To learn more about allowable expenses as directed by the State of Alabama and U.S. Department of Treasury, please visit: http://alcoe.disl.edu/grants/faq

C. COST SHARING OR MATCHING REQUIREMENTS

Cost sharing and/or match is not required.

D. SPATIAL SCOPE

As required by the RESTORE Act, all ALCoE-sponsored studies must be conducted in the Gulf Coast Region (as defined at 31 C.F.R. §34.2), which includes the coastal zones defined under section 304 of the Coastal Zone Management Act of 1972 that border the

Gulf of Mexico and any adjacent land, water, and watersheds, that are within 25 miles of the coastal zone; and all Federal waters in the Gulf of Mexico that are three to nine nautical miles from shore to the 200 nm offshore boundary of the Exclusive Economic Zone.

E. DISCIPLINES

This RFP calls for proposals that address disciplines 1, 2, 4 and 5 listed above. To learn more about ALCoE research, please review: https://alcoe.disl.edu/.
The funds distributed by ALCoE cannot be used by any research institution, PI, or co-PI for the acquisition or construction of physical infrastructure (including, but not limited to ships or laboratories).

No ALCoE entity, including any organization providing administrative support to the ALCoE, shall be under any obligation to provide funding to any specific proposal submitted, and shall not be held liable for any expense incurred in preparation or submission of any proposal or any subsequent discussion and /or negotiations.

By applying in response to this RFP, each PI, research institution and co-PI agrees to be bound by all terms and conditions of the ALCoE and these are not negotiable.

ELIGIBILITY

A. ELIGIBLE APPLICANTS

This RFP seeks submissions from researchers at the 22 Alabama colleges, and universities who will serve as principal investigators of ALCoE-funded research. A MESC investigator must lead all ALCoE-funded projects. Partnering with other MESC institutions and other U.S. entities (including non-profit or for-profit entities, government agencies, and public or private companies) from in or outside Alabama is allowed. An individual may only be the lead Principal Investigator (PI) on one (1) ALCoE grant proposal submitted in response to this RFP and may participate in one (1) others' funded project in any other capacity.

PROPOSAL SUBMISSION

Proposals should clearly and concisely address the emerging technologies theme of the RFP. The proposal must follow the format outlined and all instructions detailed below. Proposals must be submitted to the ALCoE on or before **June 15, 2023 at 5:00pm Central Time** via the MASGC eSeaGrant system at http://eseagrant.masgc.org/. Applicants are strongly encouraged to seek guidance from their institutional contracting officers early in the proposal development process.

A. FORMAT REQUIREMENTS

Applicants are encouraged to conduct an administrative review of the proposal prior to submission to ensure that it complies with the proposal formatting guidelines. Ensuring that all of the required materials included in the application have been properly prepared

is the applicant's responsibility. Applicants are strongly encouraged to seek appropriate technical support in the creation of electronic files and to review the electronic files prior to submission as some materials may require scanning and insertion into the text. Discretion should be exercised in the resolution of figures and scanned materials. Applicants should also be aware that while color figures may be included, applications might be printed in black and white for review.

Since most reviewers will be handling proposals electronically, applicants are strongly encouraged to use only a standard, single-column format in at least 11-point font for the text, with one-inch margins on 8 x 11 paper. While line spacing (single-spaced, double-spaced, etc.) is at the discretion of the applicant, established page limits must be followed. The project description may not exceed 10 pages, exclusive of the cover sheet, project summary, literature cited, budget information, and resumes of investigators.

B. CONTENT REQUIREMENTS

a. Cover Sheet (1 page)

i. Project Title
ii. Applicable RESTORE Act Priority Discipline(s)
iii. PI Information (Name, email, address, and academic institution of the MESC Principal Investigator submitting the proposal shall be clearly indicated)
iv. Co-PI Information (if any)
v. Budget and Duration Information
vi. Proposal Authorization (Signatures, including digital signatures, of those persons duly authorized to sign such documentation on behalf of the Lead Research Institution are required; the names and titles must be typed beneath their signatures)

b. Project Summary (1 page)

The summary should be written in the third person, be informative to persons working in the same or a related field and be understandable to a scientifically or technically literate lay reader. Provide a concise description of the nature of the project and articulate the potential scientific and societal impact of the project if funded.

c. Project Description (10 pages)

All proposals must include the following as part of the Project Description:

- A **Research Description** that describes the technical rationale and approach of the research, including the challenges that drive the research and how it will enhance the research and monitoring capabilities of the ALCoE. This section must also describe how the project outcomes are translational to other applications and how they will improve the protection and management of Alabama's coastal resources.
- An **Evaluation Plan** that describes how proposed efforts can be validated and outlines the metrics for evaluating success.

- A **Broader Impacts** section that describes how the research will be useful and potentially disseminated to a broad and diverse audience. This should go beyond traditional academic publications and include education and outreach from the research team. One required outreach effort for ALCoE RFP2 grantees will be a presentation in dedicated sessions at regional conferences (e.g. GOMCon, Bays and Bayous Symposium) that will take place in late 2024 or early 2025.
- **Data Management Plan** (no more than 1 page of Project Description total page limit) that describes:
    - the types of data, samples, physical collections, software, and other materials to be produced in the course of the project;
    - standards to be used for data and metadata format and content (where existing standards, e.g. ISO 19139, ISO 19115-2 and ISO 19110, are absent or deemed inadequate, this should be documented along with any proposed solutions or remedies);
    - policies for accessing and sharing data, including provisions for appropriate protection of privacy, confidentiality, security, intellectual property, or other rights or requirements;
    - policies and provisions for re-use, re-distribution, and the production of derivatives;
    - plans and timelines for archiving data, samples, and other research products with minimal time delay, and for submitting data and metadata to ALCoE and, if appropriate, a nationally recognized repository for the specific type of data (e.g. GenBank).

  It is essential that provision be made that video and satellite data tagged with appropriate information be included in the data submissions. Each Project is required to submit necessary links to these data submissions as part of their reporting activities. All PIs and co-PIs are required to adhere to all ALCoE data policies. A strong commitment to data management and sharing is required following the F.A.I.R. guidelines.

d. Literature Cited

Applicants must be especially careful to follow accepted scholarly practices in providing citations for source materials relied upon when preparing any section of the proposal. This section must include bibliographic citations only and must not be used to provide parenthetical information outside the 10-page Project Description. Please follow the style guidelines used by the journal *Science* (https://www.science.org/content/page/instructions-preparing-initial-manuscript#science-citation-style).

e. Budget and Budget Justification

(see ALCoE Grant Resources page at alcoe.disl.edu for required template)
Provide an annual budget of proposed research, as well as an overview, summary budget for the Lead Institution as well as for any subawards that will be issued as part of the overall award. The proposed budget should be consistent with the needs and complexity of the proposed project. ALCoE funds shall not be used by any research project, institution, or co-investigator

for the acquisition or construction of physical infrastructure (including, but not limited to ships, or laboratories), except where specifically authorized by the ALCoE. Allocated research funds must be clearly discernible, including those for:

- Ship time, Remotely Operated Vehicle (ROV) time, Autonomous Underwater Vehicle (AUV) time;
- aircraft time;
- sampling technologies;
- computing facilities;
- access to existing long-term monitoring sites or other research facilities;
- reasonable and appropriate costs for development of new technology;
- participation in designated ALCoE meetings;
- public education and outreach; and
- data management, including data submission.

Payroll and personnel reimbursement policies of the home institutions of each research participant will be followed for all participants.

Overhead charges should be no higher than the federally applied overhead rates for corresponding institutions. Overhead for subcontracts must follow the institution's guidelines that have been federally approved. Administrative support should be provided from the indirect costs, unless specific exceptions are requested and accepted through the review and contract process. A copy of the negotiated indirect cost rate agreement should be included as supporting documentation.

Identify and fully justify items of equipment costing more than $5,000. ALCoE funds may only be used for Capital Expenditures to the extent that the investigator was not able to obtain access to the required capital equipment through other collaborations or partnerships, and such funding has been specifically approved by the ALCoE under an active grant or annual continuation of funding under such a grant.

f. Personnel

Provide a 2-page curriculum vitae following categories used by the National Science Foundation that includes sections on Professional Preparation, Appointments, Products most Closely Related to the Proposed Project, as well as Other Significant Products, and Synergistic Activities

g. Current and Pending Support

(see ALCoE Grant Resources page at alcoe.disl.edu for required template) Provide current and pending support information for the PI and co-PI(s) only. This should include titles, amounts, funding source, duration of the award, and amount of time allocated to the effort.

PROPOSAL REVIEW

A. REVIEW PROCESS

Applications will undergo an initial administrative review for requirements outlined above. If a proposal does not meet the administrative guidelines, it will be disqualified without further review. Applications that pass the initial administrative review will be evaluated in an external panel review process organized by the Mississippi-Alabama Sea Grant Consortium (MASGC). The MASGC will maintain a process for evaluating proposals using best practices to ensure no conflicts of interest and a fair and transparent process.

Reviewers will be external to MASGC, will have expertise in the topic areas identified in this RFP, and will review proposals following a set of defined criteria (see **Evaluation Criteria** below). MASGC will establish a Research Technical Review Panel to evaluate the externally reviewed proposals. Panel members will place each proposal into a "fundable" and "not fundable" category and will provide ranked recommendations to the ALCoE Administrative Team. The final funding decision will be made by the ALCoE Administrative Team with input provided by Mobile Bay National Estuary Program Project Implementation Committee (MBNEP PIC) and Alabama Department of Conservation and Natural Resources (ADCNR). Awards will be made in rank order from the independent panel review process unless selection out of rank order is justified by available funding, balance or distribution of funds, duplication of effort, program priorities, an applicant's prior award performance, or other relevant factors. Proposals may require either modification or additional explanation of the proposed work by the Principal Investigator prior to release of funds to their institution.

B. EVALUATION CRITERIA

Following initial administrative review for requirements outlined in Section IV of the RFP, proposals will be evaluated by external reviewers based on importance and relevance, scientific merit, qualifications, and appropriateness of the budget. Reviewers will assign a numerical rating (1-5) to each evaluation category based on their view of how well the applicant met the criteria; the rating will then be weighted using the percentages listed in Table 1.

Table 1: Evaluation Criteria

Category	Criteria
Importance and Relevance (40%)	● How well do the anticipated outcomes of the proposed project address the eligible research disciplines and themes of the ALCoE RFP 2 in the Gulf Coast Region? ● How clearly do the applicant(s) demonstrate the value of the proposed study to research and monitoring capabilities of the State of Alabama?
Scientific Merit (40%)	● How clearly does the application describe project goals and objectives? ● Does the proposed study approach and methods embrace Best Available Science Practices? ● How clearly do the applicant(s) demonstrate the developments in the proposed emerging technology approach?
Qualifications (10%)	● Do PI and co-PIs demonstrate competency in the proposed research domains and in the delivery of focused research? ● Do the PI and co-PIs demonstrate a record of scientific achievement?
Appropriateness of timeline and budget (10%)	● Does the projected timeline indicate the likelihood of successfully completing the project in the allotted 12 to 18-month time period? ● Does the proposed budget accurately reflect the cost of the planned research and demonstrates efficient use of resources?

IMPORTANT DATES

Date	Event
Proposal deadline	June 15th, 2023
Anticipated grantee notification	October 2023
Anticipated project start date	January 2024

GRANT ADMINISTRATION

A. GRANT TERMS AND CONDITIONS

1. The following terms and conditions apply to all proposals:
2. Grants must be hosted by a lead institution that must be an MESC member (the Lead Research Institution)
3. As required by the RESTORE Act, field efforts must occur in the Gulf Coast Region (as defined at 31 C.F.R. §34.2), which includes oceans and coasts off coastal counties that border the Gulf of Mexico, from 25 miles inland from the coastline to the offshore boundary of the Exclusive Economic Zone.
4. The funds distributed by ALCoE may be used for equipment, but cannot be used by any research institution, PI, or co-PI for the acquisition or construction of physical infrastructure (including, but not limited to, ships or laboratories).
5. The funds distributed by ALCoE may not be used to procure or obtain, extend or renew a contract to procure or obtain, or enter into a contract (or extend or renew a contract) to procure or obtain equipment, services, or systems that uses telecommunications equipment or services, as a substantial or essential component of any system, or as critical technology as part of any system produced by Huawei Technologies Company or ZTE Corporation or any subsidiary or affiliate of these companies.
   This prohibition also extends to video surveillance and telecommunications equipment and services produced and provided by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company, or any subsidiary or affiliate of these companies, or by any entities using these companies' equipment, in some circumstances. For more information please refer to section 200.216 of the OMB Uniform Guidance.
6. Grant recipients under the RESTORE Act must comply with guidance issued by the Office of Management and Budget entitled, "Part 200 – Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards" as well as Treasury-specific guidance, ADCNR terms of the agreement between ADCNR and MSEC, and the subaward issued by MESC.

B. REPORTING

ALCoE Administration will coordinate with the grant recipients to fulfill reporting requirements. Report requirements, detailed below, will be used to inform technical and financial reports that must be submitted to ADCNR for compliance with the U.S. Treasury reporting requirements for continuation of program funding. Reports may be made publicly available by ALCoE at the request of ADCNR or U.S. Treasury Department. Applicants are permitted, and encouraged, to include costs for report preparation in the budget and applicants should read the following reporting requirements carefully.

All grant recipients will be required to:

1. Submit monthly expense justification reports along with invoices from their institution in a format provided by ALCoE.
2. Submit quarterly technical reports in a format provided by ALCoE.
3. Participate in routine (i.e., monthly) teleconferences or webinars to highlight and share recent accomplishments.
4. Participate in dedicated sessions at regional conferences (e.g. GOMCon, Bays and Bayous Symposium); costs of these meetings should be included in the proposed budget.
5. Submit a final report within 30 days of the close of the award on research accomplishments in a format provided by ALCoE
6. Acknowledge financial support from ALCoE in all research products and output using language provided by ALCoE.

C. OTHER INFORMATION

Permits

PIs are responsible for compliance with local, state or federal requirements related to their research program, including ensuring they have any permits required to conduct their research. If applicable, copies of permits must be provided to ALCoE.

Research Involving Human Subjects

Research involving human subjects is allowed when the project has been certified by a responsible body. If one is not in place now, each university has the responsibility for setting up an Institutional Review Board (IRB) to review research protocols and ensure the protection of the rights of human subjects. Projects involving human subjects cannot be recommended for funding until this certification or its equivalent has been provided to MESC and Treasury has approved it in writing.

Care and Use of Live Vertebrate Animals

Recipients must comply with all applicable statutes pertaining to the care, handling, and treatment of vertebrate animals held or sacrificed for research, teaching, or other activities.

LINKS*

Alabama Center of Excellence	http://alcoe.disl.edu/
RFP 2	http://alcoe.disl.edu/grants/
RFP FAQs	https://alcoe.disl.edu/grants/faq
Required forms and templates	https://alcoe.disl.edu/grants/grant%20resources
Science Reference Style	https://www.science.org/content/page/instructions-preparing-initial-manuscript#science-citation-style
On Being a Scientist: A guide to Responsible Conduct in Research 3rd Edition	http://www.nap.edu/catalog.php?record_id=12192
MASGC eSeaGrant: Proposal submission portal	http://eseagrant.masgc.org/
RESTORE Act Financial Assistance Standard Terms and Conditions and Program-Specific Terms and Conditions	https://home.treasury.gov/policy-issues/financial-markets-financial-institutions-and-fiscal-service/restore-act/centers-of-excellence-research-grants-program/center-of-excellence-coe-resources
2 C.F.R. Part 200 - Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards	https://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title02/2cfr200_main_02.tpl

*Links have been provided throughout this RFP, as reference material for all applicants. Please review all links when preparing your preliminary and full proposals.

REFERENCES

The following is a list of references used for the rationale and examples in this RFP.

Cloern, J.E., Jassby, A.D. 2010. Patterns and Scales of Phytoplankton Variability in Estuarine–Coastal Ecosystems. Estuaries and Coasts 33: 230–241. https://doi.org/10.1007/s12237-009-9195-3 1100 1101

Cloern JE, Barnard PJ, Beller E, et al (2016) Estuaries: Life on the edge. In: Mooney H,Zavaleta E (eds) Ecosystems of California. University of California Press, pp 133

Corbane, C., S. Lang, K. Pipkins, S. Alleaume, M. Deshayes, V. E. García Millán, T. Strasser, J. Vanden Borre, S. Toon, and F. Michael. 2015. Remote sensing for mapping natural habitats and their conservation status - New opportunities and challenges. International Journal of Applied Earth Observations and Geoinformation 37:7-16. DOI: 10.1016/j.jag.2014.11.005.

Corbellini, S., E. Di Francia, S. Grassini, L. Iannucci, L. Lombardo, and M. Parvis. 2018. Cloud based sensor network for environmental monitoring. Measurement 118:354-361. DOI: 1108 10.1016/j.measurement.2017.09.049.

Ditria, E. M., Lopez-Marcano, S., Sievers, M., Jinks, E. L., & Connolly, R. M. (2020). Deep learning for automated analysis of fish abundance: The benefits of training across multiple habitats. Environmental Monitoring and Assessment, (698), 192. https://doi.org/10.1007/s10661-020-08653-z

Ditria E.M., E. L. Jinks , R.M. Connolly. 2021. Automating the analysis of fish grazing behaviour from videos using image classification and optical flow. Animal Behaviour 177 31e37

Earle, P.S., D.C. Bowden, M. Guy (2012). Twitter earthquake detection: Earthquake monitoring in a 707 social world. Annals of Geophysics, p. 54.

Emilien, A.-V., C. Thomas, and H. Thomas. 2021. UAV & satellite synergies for optical remote sensing applications: A literature review. Science of Remote Sensing 3. DOI: 10.1016/j.srs.2021.100019.

LeCun, Y., Y. Bengio, and G. Hinton. 2015. Deep learning. Nature 521(7553):436-444. DOI: 10.1038/nature14539.

Lopez-Marcano S, Brown CJ, Sievers M, Connolly RM. 2020. The slow rise of technology: Computer vision techniques in fish population connectivity. *Aquatic Conserv: Mar Freshw Ecosyst*. 2020:1–8. https://doi. org/10.1002/aqc.3432.

Mayton, B., G. Dublon, S. Russell, E. F. Lynch, D. D. Haddad, V. Ramasubramanian, C. Duhart, G. Davenport, and J. A. Paradiso. 2017. The networked sensory landscape: Capturing and experiencing ecological change 1316 across scales. Presence: Teleoperators and Virtual Environments 26:182-209. DOI: 1317 10.1162/PRES_a_00292.

Mishra, D. R., A. Kumar, L. Ramaswamy, V. K. Boddula, M. C. Das, B. P. Page, and S. J. Weber. 2020. CyanoTRACKER: A cloud-based integrated multi-platform architecture for global observation of cyanobacterial harmful algal blooms. Harmful Algae 96. DOI: 10.1016/j.hal.2020.101828.

Nagarajan, N.P., M. Bedwell, A. E. Holmes, T. Sanches, S. Acuña, M.Baerwald et al. 2022. Environmental DNA Methods for Ecological Monitoring and Biodiversity Assessment in Estuaries. Estuaries and Coasts (in press).
National Academies of Sciences, E., and Medicine. 2015. Continuity of NASA Earth Observations from Space: A Value Framework. Washington, DC: The National Academies Press.

National Academies of Sciences, Engineering and Medicine. 2016. Achieving Science with CubeSats: Thinking Inside the Box. Washington, DC: The National Academies Press. 4

National Academies of Sciences, Engineering, and Medicine. 2020. Advancing Aerial Mobility: A National Blueprint. Washington, DC: The National Academies Press.

National Academies of Sciences, Engineering and Medicine 2022. An approach for assessing U.S. Gulf Coast Ecosystem Restoration. The National Academies Press.

Ridge, J. T., P. C. Gray, A. E. Windle, and D. W. Johnston. 2020. Deep learning for coastal resource conservation: automating detection of shellfish reefs. Remote Sensing in Ecology and Conservation 6(4):431-440. DOI: 1477 10.1002/rse2.134.

Rundel, P. W., E. A. Graham, M. F. Allen, J. C. Fisher, and T. C. Harmon. 2009. Environmental sensor networks in ecological research. New Phytol 182:589-607. DOI: 10.1111/j.1469-8137.2009.02811.x.

Sadinski, W., A. L. Gallant, M. Roth, J. Brown, G. Senay, W. Brininger, P. M. Jones, and J. Stoker. 2018. Multi year data from satellite- and ground-based sensors show details and scale matter in assessing climate's effects on wetland surface water, amphibians, and landscape conditions. PLOS ONE 13(9):e0201951. DOI: 1499 10.1371/journal.pone.0201951.

Scott, A.L., P.H. York, C. Duncan, P.I. Macreadie, R.M. Connolly, M.T. Ellis, J.C. Jarvis,K.I. Jinks,H.Marsh, and M.A. Rasheed. 2018. The role of herbivory in structuring tropical seagrass ecosystem service delivery. Frontiers in Plant Science 9. https://doi.org/10.3389/fpls. 2018.00127.

Sethi,S.B. N,S. Jones, B.D. Fulcherd, L.Picinalib, D.J. Clinke, H.Klincke et al. 2020. Characterizing soundscapes across diverse ecosystems using a universal acoustic feature set. PNAS 117: 17049-17055.

Stephens, G., A. Freeman, E. Richard, P. Pilewskie, P. Larkin, C. Chew, S. Tanelli, S. Brown, D. Posselt, and E. Peral. 2020. The Emerging Technological Revolution in Earth Observations. Bulletin of the American Meteorological Society 101(3):E274-E285. DOI: 10.1175/bams-d-19-0146.1.

Villon, S., Mouillot, D., Chaumont, M., Darling, E. S., Subsol, G., Claverie, T. et al. 2018. A Deep learning method for accurate and fast identification of coral reef fishes in underwater images. Ecological Informatics 48, 238e24

Whytock, R.C.,, J. Świeżewski,J.A. Zwerts, T.Bara-Słupsk, A.F. Koumba Pambo, M.Rogala et al. 2021. Robust ecological analysis of camera trap data labeled by a machine learning model. Methods Ecol Evol. 2021;12:1080–1092.