



Rhode Island Consortium for Coastal Ecology, Assessment, and Innovation (RI C-AIM) Postdoctoral Fellowship Positions

Application deadlines: January 31, 2019 (first consideration), February 28, 2019 (second consideration)

Through support of the National Science Foundation EPSCoR program, the Rhode Island Consortium for Coastal Ecology, Assessment, and Innovation (RI C-AIM) is seeking creative, motivated, and dynamic candidates for one or more Postdoctoral Fellowship positions that bridge key research areas being pursued by RI C-AIM. These positions will be collaborative in nature and may span multiple RI C-AIM institutions with a co-mentoring approach that is focused on training and development for research independence and career success. The primary appointment will be at the University of Rhode Island with secondary appointments at RI C-AIM partner institutions based on the nature of the project. Postdoctoral Fellows will receive an annual salary of \$50,000 plus benefits and an annual stipend of \$10,000 for research expenses, including materials and travel. Additional funds will be available for research based on the project. RI C-AIM Postdoctoral Fellows will also have open access to RI C-AIM computational, analytical, imaging, biological, and environmental core facilities. Positions will be awarded for one year and renewed for a second year based on performance and the availability of funds. It is anticipated that RI C-AIM Postdoctoral Fellows will begin by June 1, 2019.

RI C-AIM is engaged in interdisciplinary research across eight institutions of higher education within the state, with the goal of assessing the impact of climate change and natural variability on coastal ecosystems by collecting high-resolution, real-time biological and environmental data in Narragansett Bay, relating lab results to field studies, developing comprehensive models to assess and predict changes in coastal ecology that inform decision making, and creating innovative technologies to better monitor and respond to these changes. RI C-AIM Postdoctoral Fellows will be expected to participate in and lead collaborative research projects; mentor undergraduate and graduate students; and participate in RI C-AIM meetings, symposia, and workshops. Research and training activities are conducted across RI C-AIM institutions, and RI C-AIM Postdoctoral Fellows will have the opportunity to collaborate with scholars from a wide range of disciplines and backgrounds. Additional information can be found on our website:

<https://web.uri.edu/rinsfepscor/>.

A list of eligible RI C-AIM Postdoctoral Fellowship projects is provided below.

1. **Data Assimilative Modeling of Coastal Marine Ecosystems.** Coastal marine ecosystem models combine current ideas of fundamental biogeochemical and ecological processes with physical processes of ocean circulation for the purpose of simulating complex ecosystem dynamics. These models are always simplifications, subject to many unavoidable errors, including ecosystem processes, the functioning of various species within the ecosystem and in specifying conditions used to initialize simulations. We seek expertise with methods (e.g. including but not limited to variational techniques and Kalman filter approaches) that can rigorously constrain our Narragansett Bay (NB) 'end-to-end' ecosystem models with physical, chemical and biological observations from both the extensive historical NB database as well as with data from our recently deployed NB Observatory for the purpose of better approximating the natural ecology of the bay. These assimilative models will be used to: 1) evaluate our model output; 2) help evaluate existing and define new observational foci, including sensor development, for augmenting and optimizing the NB Observatory (e.g. via observing system simulation experiments); and 3) ultimately build a reliable forecast system of, for example, hypoxia, harmful algal blooms and other coastal ecological processes for informing stakeholders on maintaining a healthy bay.



2. **Synthetic Biology Approaches to Novel Paper-Based Sensors for the Bay.** New synthetic biology approaches have brought electrical engineering principles to the design of genetic circuits for a wide range of applications including diagnostics and sensing. Synthetic biology has moved well beyond the original toggle switch and is now developing sophisticated, but easy to use, diagnostics and sensors for small chemical compounds, subtypes of viruses (e.g., Zika) as well as distinguishing pathogenic forms of bacteria (e.g., drug resistant). The initial synthetic biology approach relied on genetically engineered reporting circuits into bacteria and using the living bacteria as the reporters. Recently it has been shown that a simple extract of the engineered bacteria is sufficient and further that freeze drying this extract onto paper is equally effective, thus merging the best of both worlds. This approach has not yet been applied to questions of the marine environment so work in this area could develop a new generation of low-cost sensors with a wide range of applications from small molecules to genetic diversity. These would be non-living biosensors. It would also unite efforts within Thrust 3 combining our expertise in living biosensors and paper-based sensors to develop a new, non-living, paper-based biosensor that could be put in the hands of citizen scientists.
3. **Coastal Marine Plankton Ecology.** We are seeking a postdoctoral fellow to join the effort to analyze and interpret existing multi-decadal data collected by a long-term plankton time series in Narragansett Bay. The time series includes an extensive physical, chemical and biological dataset. Statistical analyses and ecological interpretation of the data will require a postdoctoral fellow with experience in time series analysis and knowledge of plankton ecology. The postdoc would work closely with both empiricists and modelers, with the goal of identifying the underlying environmental parameters driving plankton community dynamics in the bay and to facilitate efforts to forecast important phenomena in the plankton that can have ecological, economic and societal impacts, such as harmful algal blooms.
4. **Error: Failure Detection in Coastal Sensor Network.** The acquisition and representation of data from microfluidic sensor networks faces unique challenges from small disruptions to the network. These disruptions can be caused by problems such as biofouling, errors in calibration, aging or defects. Even small faults such as these affect data quality and quantity from the network and can result in data interpretation errors and ultimately incorrect models. Due to the proliferation of small, rapidly deployable sensor networks, there is a growing interest in online systems for sensor fault identification and correction. This interdisciplinary postdoctoral project will focus on the creation of an online system for sensor data validation with a specific emphasis on the detection of sensor failure. This will include identifying common mechanisms of microfluidic sensor failure, creating a deployable network of microfluidic sensors, analyzing complex datasets from sensor nodes and programming an automated system for failure detection based upon big data modeling approaches.

RI C-AIM is committed to diversity and inclusion across all project elements. We believe that research excellence requires equitable access to opportunities and is advanced by diverse cultural, personal, social, and economic experiences. A commitment to promote and practice these values will be a key criterion for selecting RI C-AIM Postdoctoral Fellows.

Required Qualifications

- A Ph.D. or completion of a Ph.D. at the time of appointment in a science or engineering field.
- Demonstrated ability to conduct, publish, and present basic or applied research in science or engineering related to the project(s) of interest.

**RI NSF Established Program to
Stimulate Competitive Research (EPSCoR)**

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Modeling

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- Demonstrated ability to work collaboratively across disciplines and lead independent research projects.
 - Demonstrated ability to supervise and mentor student research assistants.
 - Evidence of a commitment to advancing the diversity and inclusion goals of RI C-AIM.

Preferred Qualifications

- Experience working within research centers or on larger-scale collaborative research projects.
- Demonstrated commitment to engaging and broadening participation of diverse students and researchers.

Application Instructions

All applications are to be submitted by email to Sally J. Beaman, RI C-AIM/NSF EPSCoR Project Administrator, at sbeaman@uri.edu. January 31, 2019 is the deadline for first consideration and February 28, 2019 is the deadline for second consideration. The following material is required as a single PDF document titled "Lastname_CAIM postdoc.pdf".

- Cover letter listing the eligible project or projects you are applying for; describing your interest in the position; describing your commitment to diversity and inclusion; and addressing how the Postdoctoral Fellowship will advance your career goals.
- Current curriculum vitae.
- Names and contact information for four references. These individuals should be familiar with your work, your potential as a leader in your field, your ability to mentor and provide a supporting research environment, and your commitment to diversity and inclusion.

For additional information please contact Sally J. Beaman at sbeaman@uri.edu with reference to the project title in subject line.

The University of Rhode Island is an AA/EEOD employer. Women, persons of color, protected veterans, individuals with disabilities, and other protected groups' members are encouraged to apply.