



## **Special Track - Request for Proposals (RFP) for Course-Based Undergraduate Research Experience (CURE) Working Groups at the National Synthesis Center for Emergence in the Molecular and Cellular Sciences (NCEMS)**

**One sentence summary:** NCEMS will support a working group, made up of two to four faculty, that creates CURE content focused on data sciences applied to molecular and cellular biology and utilize this content in multiple different courses in Fall 2026 and Spring 2027.

### **Background**

The National Synthesis Center for Emergence in the Molecular and Cellular Sciences (NCEMS), funded by the U.S. National Science Foundation (NSF), is dedicated to catalyzing multidisciplinary scientific teams to synthesize publicly available data to address fundamental questions related to emergence phenomena in the molecular and cellular biosciences. NCEMS' efforts are focused on emergent properties at the mesoscale, as described in our [Strategic Plan 2024-2029](#). NCEMS supports community-scale synthesis and integration of existing molecular and cellular data to:

- Answer novel questions
- Solve long-standing puzzles in the molecular and cellular sciences
- Develop innovative research and analytical strategies
- Tap diverse new talent
- Train the future data-savvy workforce

NCEMS invites proposals for Course-Based Undergraduate Research Experience (CURE) Working Groups, to further our mission to expand participation in interdisciplinary synthesis research and engage the next generation of scientists.

CUREs are course-embedded learning experiences in which whole classes of undergraduates contribute to a research question or problem with unknown outcomes that are of genuine interest to the scientific community and other external stakeholders. By embedding authentic research experiences into courses, CURE Working Groups both advance scientific knowledge and expand access to research at scale, particularly for undergraduates at primarily undergraduate institutions (PUIs) and other non-research intensive universities.



### **Key Dates and Timeline**

- Application submission period: September 8 – December 2, 2025 (11:59 PM ET)
- Application review period: December 2 – December 31, 2025
- Applicants informed of decision: January 1, 2025 – February 10, 2026
- Working Group support begins: February 27 – August 31, 2026
  - Note: This corresponds to courses starting in the Fall 2026/Spring 2027

### **Definition**

*Working Groups* are self-organized research teams consisting of scientists from diverse and complementary areas of expertise across the country and world collaborating virtually to accomplish tasks that any individual cannot do alone. CURE Working Groups are a special category of NCEMS Working Groups that couple synthesis-driven research with undergraduate teaching and learning. Like other NCEMS Working Groups, CURE Working Groups will tackle synthesis projects that require interdisciplinary collaboration and NCEMS support. CURE Working Groups will:

- Integrate their research directly into two or more undergraduate courses as a structured, course-based research experience.
- Provide opportunities for whole classes of students to engage in authentic, hypothesis- or data-driven-discovery synthesis research.

CURE Working Groups may be composed of 2 to 4 faculty scientists. Requests to include more than 4 faculty should be made to [ncems@psu.edu](mailto:ncems@psu.edu) before applying. Faculty can be from the same institution, although it is viewed positively if faculty from multiple universities are fully engaged. In unique, justified situations, other external collaborators/subject matter experts may also participate to broaden interdisciplinary scope and cross-institutional team science. Undergraduate course participants are not counted as working group members.

CURE Working Groups are expected to be supported by NCEMS for 12 to 18 months. In-kind support of Working Groups includes staff scientist and staff scientist assistant time, cyberinfrastructure, and facilitation and administrative assistance including some project management. Individuals may participate as a member in only one Working Group application.

CURE Working Group members will have access to optional virtual leadership training as well as open and team science training as part of the Working Group kickoff. These virtual training sessions help foster effective cross-disciplinary collaboration, clarify roles and responsibilities, establish open science best practices, and provide foundational team science skills. Working Group activities, including interactions with the center, are conducted virtually. The Working Group, when first supported by NCEMS, will create a governance document and credit policies.



## **Objectives and Scope**

CURE Working Groups will, with NCEMS in-kind support:

- Advance scientific understanding through synthesis research in molecular and cellular biosciences.
- Embed authentic research in courses by integrating synthesis projects into undergraduate curricula, exposing large numbers of students to real scientific inquiry.
- Expand participation by enabling undergraduates at PUIs and teaching-focused institutions to contribute to interdisciplinary science.
- Support faculty research agendas by aligning synthesis projects with faculty research interests while creating scalable educational impact.
- Leverage existing data sources to develop innovative research and analytical strategies
- Commit to making findings, data, analysis workflows, course materials publicly available in accordance with community-created policies on open, team, and reproducible science.

## **NCEMS Support for Working Groups**

Selected Working Groups will receive in-kind support from NCEMS, including:

- **Staff Scientist Support:** Access to NCEMS staff scientists and staff scientist assistants who provide services including pedagogical consultation on CURE design and integration into undergraduate courses, literature searches, creation of data products and analysis pipelines for classroom use, preliminary analyses, advanced modeling and statistical methodologies, and technical training and mentoring to working group members in data science areas. The default time commitment of a staff scientist to a working group is 20% FTE (Full-time equivalent). Requests for more or less will be considered with appropriate justification. Greater than 33% FTE will not be awarded.
- **Staff Scientist Assistant Support:** Staff scientist assistants work with and augment the capabilities of Staff Scientists, and further support working groups with more domain specific knowledge. Access to NCEMS staff scientist assistants provide services including literature searches, data wrangling, harmonization, metadata creation and curation, preliminary analyses, modeling and statistical methodologies. The maximum time commitment of a staff scientist assistant to a CURE working group is 33% FTE (Full time equivalent).
- **Cyberinfrastructure Resources:** Use of computational and data storage resources facilitated by CyVerse, coordinated through NCEMS.



- **Project manager:** Assistance from a project manager to coordinate efforts between the Working Group and NCEMS staff.
- **Leadership, Team Science, and Open Science Training:** Optional training for Working Group leaders and members to facilitate cross-disciplinary collaboration and effective team management as well as promoting Open Science practices.
- **Publication costs:** Funding to cover open access publication costs up to \$5,000.

This in-kind support for a typical working group requesting 18 months of support, composed of 3.6 months staff scientist time (~20% FTE), 6 months of staff scientist assistant time (~33% FTE), and publication costs.

### **Expected outputs from Working Groups**

NCEMS support for a working group will result in one or more outputs by the time support ends:

- i. A concise, self-contained, and well-documented Course-Based Undergraduate Research Experience (CURE) that can be readily adopted and implemented in undergraduate classrooms;
- ii. A primary literature article (in preparation, submitted, or under review);
- iii. A perspective or review article motivating communities in new directions;
- iv. A curated dataset that makes it easier for the community to answer transformative questions or develop transformative methods;
- v. White papers or policy papers to advise government agencies, policy makers, and funding bodies;
- vi. Products or activities that build inclusive communities across disciplines, education, geographies, or cross-sections of people both academic and non-academic.

### **Proposal Submission**

**\*\* Proposals that utilize Working Group content across multiple, different courses will be viewed favorably, as this is an effective use of resources \*\***

Proposals must be submitted via email in a single PDF format to [ncems@psu.edu](mailto:ncems@psu.edu) by 11:59 PM EST on December 2, 2025, with the subject line 'NCEMS Working Group Proposal - CURE Track - [Project Title]'. You will receive a confirmation email upon receipt.

**Proposal Length:** Proposals should be concise, not exceeding **3 pages** (12-point font; 0.75-inch margins; no smaller than single spaced lines) excluding references, table of participants.

**Proposal Narrative (maximum 3-pages) should be organized as follows:**

1. Title

2. Name and contact information for Working Group Leader(s) and other members



**3. Project Abstract** (250 words max)

**4. Introduction and Goals** – State the outstanding question(s) in molecular and cellular biology data science being addressed, its significance, and broader context. Explain how addressing these research questions will provide an authentic course-based undergraduate research experience (CURE) and why it is well suited for undergraduate courses.

**5. Research and CURE Integration Plan** – Describe the datasets, analytical tools, and synthesis approaches to be used, what hypotheses (if any) will be tested, and what analyses are anticipated. Identify the specific courses/sections (include the course listing number from your institution, so it can be used during the review process) in which the CURE(s) will be implemented, the number of students expected to participate, course modality (in-person, hybrid, online), semester(s) of offering, and anticipated start date of the course. Explain how student activities will achieve the scientific milestones and objectives.

**6. Faculty and Institutional Context** – Provide information on the institutions represented by the faculty in the working group, particularly their status – whether PUIs, teaching-focused, and research-intensive institutions - and describe any existing institutional support for course-based research.

**7. Outcomes and Impacts** – Define the anticipated outcomes of the CURE Working Group across two dimensions:

- *Educational Outcomes* – Specify the learning outcomes for undergraduates (e.g., research literacy, data analysis skills, collaboration experience). Explain how students’ participation will enhance their education while contributing meaningfully to the project’s progress.
- *Scientific Outcomes* – State the expected research outcomes of the project, including contributions to data synthesis, new knowledge, or methodological advances. Clearly distinguish these from the educational outcomes, while showing how they reinforce one another

**8. Proposed Timeline** – State the requested duration of NCEMS support needed (6 to 18 months), as well as the anticipated milestones. The timeline should cover both scientific activities and course-based implementation.

**9. References** - for any items cited in 1-8, please provide any relevant citations. Note, these are not included in the 3-page limit.

**Proposal Review Process**

Proposals will be reviewed internally by NCEMS leadership. Reviews will focus on scientific merit, feasibility, and CURE suitability, as well as alignment with NCEMS resources and mission. Following the written review, NCEMS will schedule a 1-hour virtual meeting with the



proposal team to discuss the project in more detail, clarify resource requirements, and make a final determination shortly thereafter.

Proposals will be evaluated on the following criteria:

- **Scientific Merit and Feasibility** – The significance of the proposed research question in molecular and cellular biology data science, the clarity of the synthesis approach, and the likelihood of achieving meaningful research outcomes within the proposed timeline.
- **Integration of Research and Education** – The strength of the plan to embed authentic research experiences into undergraduate courses, including how student contributions are aligned with and advance the scientific goals of the Working Group.
- **Potential for Impact at Scale** – The anticipated number of students reached, the sustainability of the CURE design across semesters or institutions, and the potential to generate reusable CURE modules.
- **Institutional and Faculty Engagement** – The extent of involvement by PUIs and teaching-focused institutions, and the commitment of faculty leads to both research and undergraduate education.

#### **Proposal Development Support (OPTIONAL)**

- Suitability Review – NCEMS can provide a pre-review of the suitability of your proposal idea and provide comments/suggestions. Proposal ideas (e.g., “1-pagers”) can be sent to [ncems@psu.edu](mailto:ncems@psu.edu) any time until Nov. 11, 2025.
- On-Demand meetings – You can schedule a 15-minute meeting with NCEMS staff to discuss any questions you may have related to this Working Group RFP using our Microsoft Bookings page:  
<https://outlook.office.com/book/NCEMSWorkingGroupQA@PennStateOffice365.onmicrosoft.com/>

#### **Contact Us**

Applicants are encouraged to contact [ncems@psu.edu](mailto:ncems@psu.edu) for feedback on project ideas or questions about the application process. More information regarding NCEMS can be found on our website [ncems.psu.edu](http://ncems.psu.edu)