

## **REVIEW OF THE CENTER FOR MATHEMATICS, SCIENCE, AND TECHNOLOGY**

Classification of Instructional Programs (CIP) Code: 90.1313

Research and Service Center: Teacher Education and Professional Development, Specific Subject Areas

### **OVERVIEW**

The Center for Mathematics, Science, and Technology (CeMaST) was established in 1991 to integrate the efforts of multiple departments across Illinois State University in advancing mathematics, science, and technology education. Authorized by the Illinois Board of Higher Education as a temporary center in 1992 and made permanent in 1997, CeMaST has since become a critical hub for interdisciplinary STEM education, outreach, and research at the university and beyond. This 2024 self-study marks the fifth comprehensive review of the Center. Since its founding, CeMaST has built a national reputation through leadership in curriculum development, teacher professional development, and grant-funded research in STEM education. In recent years, the Center has expanded its focus to include institutional transformation in undergraduate STEM education and a deepened commitment to diversity, equity, inclusion, and access.

CeMaST supports STEM research, education, and service through projects led by Center staff, joint initiatives with university faculty, and collaborations with regional and national partners. While the role of CeMaST varies across initiatives, the Center consistently provides infrastructure, evaluation, and strategic support. CeMaST fellows—faculty based in academic units across campus—collaborate with the Center to conduct research and implement programming aligned with its mission. Since 2019, CeMaST has been under the leadership of its fifth director, who has overseen the development of new strategic directions focused on institutional equity and expanded community engagement.

CeMaST's current mission is "to empower, conduct, and support STEM education and scholarship across the K–16 continuum." Its work is organized around three interrelated goals: (1) empowering Illinois State-led STEM leaders in solving societal problems, (2) supporting the integration of evidence-based instructional practices into STEM classrooms, and (3) serving communities historically marginalized in mainstream STEM education. These goals shape CeMaST's evolving role as a driver of educational innovation, equity, and partnership across the university and central Illinois.

### **EXECUTIVE SUMMARY PROGRAM REVIEW SELF-STUDY REPORT**

#### **Introduction and overview**

The Center for Mathematics, Science, and Technology (CeMaST) at Illinois State University serves as a vital interdisciplinary center for advancing STEM education and scholarship across the K–16 continuum. Its mission focuses on three strategic goals: empowering ISU STEM leaders to address societal challenges, supporting the integration of evidence-based instruction in STEM classrooms, and reaching out to communities historically marginalized by mainstream STEM initiatives. This program review reflects an extensive internal evaluation of CeMaST's structure, initiatives, outcomes, and alignment with institutional priorities.

The self-study process was led by the CeMaST director, acting director, and evaluation specialist and was informed by both qualitative and quantitative data. Annual surveys of STEM faculty and students, records of Center-led programming, and comparisons to peer centers across the state and nation formed the foundation of the analysis. CeMaST's advisory board, composed of campus stakeholders, meets biannually and plays a key role in interpreting findings and advising future strategic directions. This collaborative, data-informed approach supports continuous improvement.

CeMaST operates within the Division of Research and Graduate Studies and is led by a director and associate directors who represent multiple STEM disciplines and colleges. The Center is staffed by professionals specializing in program coordination, evaluation, communications, and grant development. CeMaST also employs student workers and graduate assistants who contribute to outreach, peer mentoring, and event support. The Center is funded through a combination of general revenue and substantial external grants, with recent major awards from the Howard Hughes Medical Institute and the National Science Foundation.

### **Strategic Goals and Achievements**

#### **Goal 1: Empowering STEM Leaders to Solve Societal Problems**

CeMaST supports faculty by facilitating external grant applications, developing broader impact activities, and offering professional development. Since the last review, the Center has contributed to more than 20 grant proposals, supported faculty learning communities, and helped secure major awards, such as a recent NSF CAREER grant. CeMaST's community-engaged programming, such as the *Green Screen* film series, exemplifies how its efforts extend research into public discourse and action.

#### **Goal 2: Supporting Evidence-Based STEM Instruction**

CeMaST has led numerous initiatives to strengthen inclusive, research-informed pedagogy in STEM disciplines. Through HHMI-funded programs like the Inclusive Excellence STEM Fellowship, professional development seminars, and the Inclusive STEM Teaching Project, faculty are supported in creating more equitable learning environments. CeMaST has also helped design new general education offerings and professional development for K–12 educators, extending these efforts beyond the university.

#### **Goal 3: Engaging Marginalized Communities in STEM**

The Center has strengthened its commitment to equity by expanding outreach through summer camps, community partnerships, and support for programs like STEM Ambassadors and SCI-LSAMP. Graduate assistants and undergraduate students are actively involved in promoting inclusive STEM learning. Partnerships with organizations such as the Unity Community Center, YWCA, and local school districts have created accessible opportunities for underserved populations in central Illinois.

### **Alignment with Excellence by Design**

CeMaST's activities are strongly aligned with Illinois State University's strategic plan, *Excellence by Design*. The Center supports student success and belonging through peer mentoring, bridge programs, and inclusive faculty development. Its stewardship of over \$3.4 million in active grants contributes to financial sustainability and innovative programming. CeMaST enhances institutional excellence by mentoring early-career faculty and supporting interdisciplinary research. Its external partnerships reinforce ISU's visibility and impact throughout the region.

### **Assessment and Improvement**

Annual evaluation surveys provide critical insight into the effectiveness of CeMaST's programs. These surveys have revealed general alignment between faculty and student perceptions of STEM instruction and climate, though several key gaps remain. Notably, students perceive less faculty attention to career pathways and less support for inclusive practices than faculty report providing. These discrepancies point to areas where targeted professional development can further close the equity gap. CeMaST has responded by launching a monthly newsletter, *CeMaST Connections*, to improve awareness and engagement among ISU faculty.

### **Challenges and Opportunities**

While CeMaST has made significant progress, challenges persist in increasing campus awareness of its services, expanding faculty-led professional development offerings, and fostering more inclusive STEM environments.

Differences in perceptions between faculty and students, particularly regarding student voice, mentorship, and accessibility, highlight areas for ongoing focus. CeMaST's partnerships and HHMI-funded initiatives provide a strong foundation for meeting these challenges with data-driven, inclusive strategies.

### **Future Priorities**

In the next review cycle, CeMaST will continue to support external funding applications by ISU faculty that align with its mission and goals. The Center will sustain graduate assistantships to support STEM in-reach and outreach and will seek to expand both internal and external partnerships to serve a broader and more diverse population. It will continue to use annual evaluation data to shape programming and professional development opportunities, ensuring that CeMaST remains a responsive, innovative, and inclusive center for STEM education.

## **PROGRAM REVIEW OUTCOME AND RECOMMENDATIONS FROM THE ACADEMIC PLANNING COMMITTEE**

**Review Outcome.** The Academic Planning Committee, as a result of this review process, finds the Center for Mathematics, Science, and Technology (CeMaST) to be in Good Standing.

The Academic Planning Committee thanks CeMaST for submitting a clear and well-organized self-study report. The report reflects a thoughtful and ongoing process of evaluation and improvement, including regular annual assessments that incorporate feedback from faculty, students, staff, and an internal advisory board. The committee noted the effective use of multiple stakeholder perspectives and the integration of data from events, surveys, and strategic initiatives as strengths of the report.

The committee commends the Center's continued leadership in promoting STEM education and its mission to empower ISU-led STEM leaders, support evidence-based instruction, and engage marginalized communities. During the period under review, CeMaST expanded its leadership structure, growing from three to five associate directors. While not inherently problematic, the committee recommends further clarification of how this structural change has influenced Center operations, and whether it has enhanced efficiency, broadened programmatic scope, or yielded other impacts.

The Center's alignment with Illinois State University's previous strategic plan (Educate • Connect • Elevate) was clear and effective. As the University transitions to its new strategic plan, Excellence by Design, the committee encourages CeMaST to examine how its mission, programs, and evaluation processes can be realigned accordingly. Reviewers also discussed the potential for expanded collaboration with the new College of Engineering, noting CeMaST's established role in STEM pedagogy and its connections to early curricular development efforts for the new college.

The committee recognized CeMaST for its many accomplishments, including securing external grant funding, reestablishing its advisory board post-pandemic, and facilitating programming that engaged over 1,000 learners in a single year. The report provided transparent accounts of areas where the Center exceeded, met, or fell short of its goals, and reviewers appreciated the candor and thoughtful reflection throughout.

Although the report's assessment section was strong in its description of advisory board engagement and survey-based evaluation of Center initiatives, the committee noted a gap in the assessment of student learning outcomes. Given the Center's integration of student experiential learning, the committee encourages CeMaST to develop a plan to assess the learning and professional development outcomes of the students it supports.

The committee expressed concern over the limited financial detail included in the report. While CeMaST receives both internal funding and external grant support, the budget section lacked a breakdown of income sources, expenditures, and staffing allocations. Committee members request a follow-up report that clarifies how the Center's \$255,000 general revenue allocation is used, how grants support staffing and operations, and how the Center anticipates responding to ongoing changes in university and federal funding models. The committee acknowledged,

however, that CeMaST recently passed its institutional audit with only minor findings, suggesting responsible financial management.

The committee further encourages the Center to consider expanding the membership of its advisory board to include off-campus stakeholders, especially industry representatives from the region, to enhance relevance, expand impact, and support external funding efforts.

### **Follow-up report**

**Provide a detailed account of the Center's financial model and resource allocation.** The committee requests a follow-up report that outlines CeMaST's revenue sources (e.g., general revenue, grants, program income), how funds are allocated (including personnel costs), and how financial sustainability is planned given ongoing uncertainty in federal and institutional funding. The committee also encourages CeMaST to reflect on how its budgeting practices will adapt under ISU's new budget model. The committee asks that the program faculty submit a progress report on this accounting to the Office of the Provost by October 1, 2025.

### **Recommendations.**

The Academic Planning Committee thanks the CeMaST staff for the opportunity to provide feedback regarding the Center's operations and contributions to the University. The following recommendations are offered in support of continuous improvement and should be addressed in the next scheduled self-study report. The committee congratulates the Center for Mathematics, Science, And Technology on a successful four years.

In addition to the center's noteworthy efforts and accomplishments, the Academic Planning Committee provided recommendations for consideration. The committee's recommendations outlined below are to be addressed within the next regularly scheduled review cycle. Details describing the actions and outcomes associated with each of the committee's recommendations should be included in the next program review self-study report that is tentatively due October 1, 2028.

**Expand assessment efforts to include student learning outcomes.** The committee commends CeMaST's regular assessment practices and recommends that these efforts be extended to include the evaluation of student learning and development outcomes. Students engaged in the Center's work should have clearly articulated outcomes and mechanisms for evaluating their progress and impact.

**Clarify the impact of the Center's expanded leadership structure.** The committee requests that CeMaST assess and report on the effects of its expansion from three to five associate directors and associate directors. This includes describing how responsibilities are allocated, how the change has affected operations, and whether it has helped advance the Center's strategic goals.

**Strengthen connections with external partners and expand advisory board membership.** To increase visibility, external relevance, and funding potential, the committee encourages CeMaST to recruit non-university stakeholders to its advisory board. Representation from industry, nonprofit organizations, or government agencies could provide valuable insights and connections that further the Center's mission.

**Realign with the University's current strategic plan.** CeMaST is encouraged to update its strategic alignment in accordance with Illinois State's new strategic plan, *Excellence by Design*. This includes reflecting on current initiatives and revising goals and strategies as necessary to remain aligned with institutional priorities.

**Continue to promote transparency and self-reflection in self-study reporting.** The committee commends CeMaST for the candid and balanced tone of the current self-study and encourages the Center to continue to embrace transparency in future reports. This includes acknowledging challenges alongside accomplishments and using data to guide continuous improvement.

