



2020 Annual Report

The Center for the Advancement
of STEM Education (CASE)

The Importance of our Mission

At the onset of FY20, we definitely did not have a global pandemic on our radar when considering contingency plans. As stay-at-home orders altered how we live, work and learn, CASE, along with most education centers, suddenly needed to adapt programs for an exclusively virtual world. I am incredibly grateful for CASE staff and faculty, and our K-12 partners, as they continue to overcome enormous challenges to provide creative STEM learning opportunities to K-12 students and members of our regional community.

Throughout this ever-changing time, one constant has been the importance of science, technology, engineering and math. The power of science will lead to development of vaccines. Technology brings families and colleagues together, albeit virtually. Engineering plays a key role in large scale production of COVID tests, therapeutics and vaccines. Mathematical modeling is essential in making informed decisions about pandemic planning. Furthermore, to overcome the pandemic, public acceptance of data-driven science will be essential for people to follow public health guidance and get vaccinated. For this reason, the overarching mission of CASE – to improve scientific literacy – is more important and relevant today than ever before. Through this time, CASE will continue to serve our community to strengthen the understanding of the process and power of science.

-Jennie Aizenman, Director



By the Numbers



10,384 Total Participants



6,814 K-12 Students



2,267 Community Members



574 K-12 Teachers



592 Undergraduate & Graduate Students



137 Faculty & Staff

CASE Grant Program

CASE offers grants to BSU faculty and staff who develop projects that further CASE's mission to build and support a diverse community of

STEM educators and students both regionally and internationally. The following projects received funding and administrative support.

- Nicole Glen, Professor of Elementary & Early Childhood Education
Leading for Change in Science Education
Award of \$3,760
- Samuel Serna Otálvaro, Assistant Professor of Physics
Optics and Photonics Kit: A Bridge Between Non-scientific Audiences and New Light Technologies
Award of \$5,000
- Jeffrey Williams, Professor of Physics & Allison Daubert, Adjunct Professor of Physics
Classroom Size Experiment Kits for BSU Physics Teachers
Award of \$5,000



Grant Funded Programs

Through collaboration with STEM faculty on the NSF-funded SEISMIC and SIMuR programs, CASE provides undergraduate students with opportunities to participate in STEM service learning and outreach experiences. In FY20, 5 SEISMIC and 5 SIMuR students participated in outreach through CASE programs.



The Office of University and Community Partnerships awarded CASE funds to sponsor Bridgewater Raynham students to attend the Summer, Spring and Winter Science Academy.

Open Lab Night

Open Lab Night provides BSU community members the opportunity to explore the Science and Mathematics Center's labs and conduct hands-on STEM activities led by undergraduate students, faculty, and staff. Open Lab Night was attended by approximately 550 community members from across the state.

A total of 109 undergraduate students and 22 faculty and staff from the College of Science and Mathematics and the Departments of Secondary Education, Psychology, Aviation, and Music led hands-on STEM activities. We were also joined by the Bizarbots robotics team, who led robotics activities.



The Massachusetts Region V High School Science & Engineering Fair

The Science and Engineering Fair hosted 132 high school students, 36 judges, including 3 BSU faculty and 7 Region V committee members. Visiting students presented their posters and attended an awards ceremony. Additionally, eleven undergraduate students facilitated tours of the Science and Mathematics Center.



Darwin Day

CASE partnered with Biology faculty and staff to offer a Darwin Day community event, designed to “inspire people to reflect and act on the principles of intellectual bravery, perpetual curiosity, scientific thinking, and hunger for truth as embodied in Charles Darwin.” Four faculty/staff and forty-two undergraduate students led the event that was attended by 109 local high school students, 12 high school teachers, 25 members from the community; 145 BSU students and 31 faculty/staff.



Brockton High School Seminar Series

The Brockton High School (BHS) Seminar Series is designed to inspire students to pursue STEM careers by introducing them to authentic research and supporting their own independent investigations. Five BSU faculty, two of whom graduated from BHS, discussed their career path and research program with 40 BHS students and their teacher.

Gilmore After School Program

In partnership with the SEISMIC program, CASE hosted an after-school program for 4th and 5th grade students from the Gilmore Elementary School in Brockton. Twenty-nine BSU students who were enrolled in *Cultural Psychology: The Culture of STEM* developed and led hands-on STEM activities. Additionally, 9 BSU students enrolled in *The Art of Physics Outreach*, a course that focuses on STEM service learning, also led after school activities. A total of 105 elementary school students and 10 teachers participated. Three BSU faculty were also involved.



Massachusetts STEM Week: See Yourself in STEM

As part of Massachusetts STEM Week, Pembroke Middle School students who participated in the CityLab/Watershed Access Lab school visit program also learned about careers in STEM as part of the *See Yourself in STEM* program. Five BSU alumni, one of whom is a BSU faculty member, led discussions about their career paths.



Watershed Access Lab

The Watershed Access Lab provides science education outreach programs and preK-12 teacher professional development focused on land use, water quality assessment, global water issues, conservation,

and environmental education. A total of 1,106 K-12 students, 45 K-12 in-service and pre-service teachers, 14 BSU undergraduate students, 1 directed study student and 11 BSU faculty and staff participated in Watershed Access Lab visits, use of lending labs and professional development. Pre/Post assessments indicated a 32%



improvement in content knowledge. The number of participating students decreased significantly this year due to COVID-19. As a result of the cessation of on-campus programs, 31 visits to WAL and several school trips to off-site locations were cancelled.

BSU CityLab

BSU CityLab is a biotechnology outreach program for middle and high school teachers and their students. The program provides hands-on, inquiry-based laboratory activities using current equipment and technology. A total of 1,714 K-12 students, 58 in-service and pre-service teachers, 16 BSU undergraduate students, 1 directed study student and 14 BSU faculty and staff participated in CityLab visits, use of lending labs and professional development. Highlights from this year include a redesign of the Crooked Cell lab to make it less expensive and safer. Additionally, we completed development and piloted a lab focused on genetically modified foods. Pre/Post assessments during school visits indicated a 39% improvement in content knowledge.



The number of participating students decreased significantly due to the pandemic, which caused the cancellation of 28 visits to CTY and several lending labs.

Science Academy

CASE offers Science Academy classes for high school and middle school students. Nineteen undergraduate students, including two NSF-funded Noyce Scholars, and eleven BSU faculty and staff taught 80 students in Science Academy classes.



EarthView

Project EarthView has expanded their program and now includes two inflatable globes and giant floor maps of all continents plus Massachusetts.

The program also offers professional development to K-12

teachers so that once trained, they may borrow EarthView resources. The program serves to energize geography education throughout the region. The majority of student participants engage in EarthView within the context of their school curriculum. EarthView also participates in Geography Family Nights and is used in school-based programs and other educational organizations. EarthView is also used in public events, such as professional conferences and legislative visits, including at the Massachusetts State House. A total of 2,777 K-12 students; 94 undergraduates; 8 faculty/staff; 238 K-12 teachers and 789 community



members participated in EarthView programs. The number of school visits was significantly reduced due to COVID.

Project GreenLab

Project GreenLab aims to educate the BSU and regional communities about green chemistry and the impacts of chemicals on human and environmental health. The 18th Annual Symposium on Sustainability and the Environment was held in November. There were 41 poster presentations and 4 panel/oral presentations from 64 undergraduate students. The event was also attended by the students' mentors, including 12 college and university faculty.

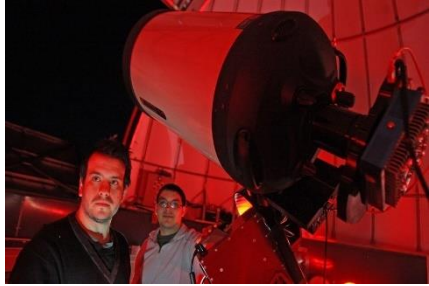


MACS

The Mathematics and Computer Science Collaborative (MACS) provides opportunities for teachers to see the “big picture” of improved mathematics teaching and learning through experiences that broaden and deepen their own understanding of mathematic concepts and effective pedagogy. In FY20, MACS hosted 70 participants in its programs. Additionally, 10 committee members and 2 BSU faculty/staff participate in the program.

Observatory

The Observatory at Bridgewater State University, which is run through the Physics Department, hosts public and private viewing events, offers K-12 workshops, and provides resources for student research, astronomy courses and service-learning. Although more than half of the viewing nights were cancelled due to weather, the Observatory still hosted 1,386 community members, 608 K-12 students, 24 BSU



undergraduates, 113 K-12 teachers and 4 BSU faculty and staff. A few traveling field trips took place in FY20. The risk of Equine Encephalitis Virus spread via mosquitoes and COVID-19 caused cancellation of many events and impacted the number of Observatory visitors.

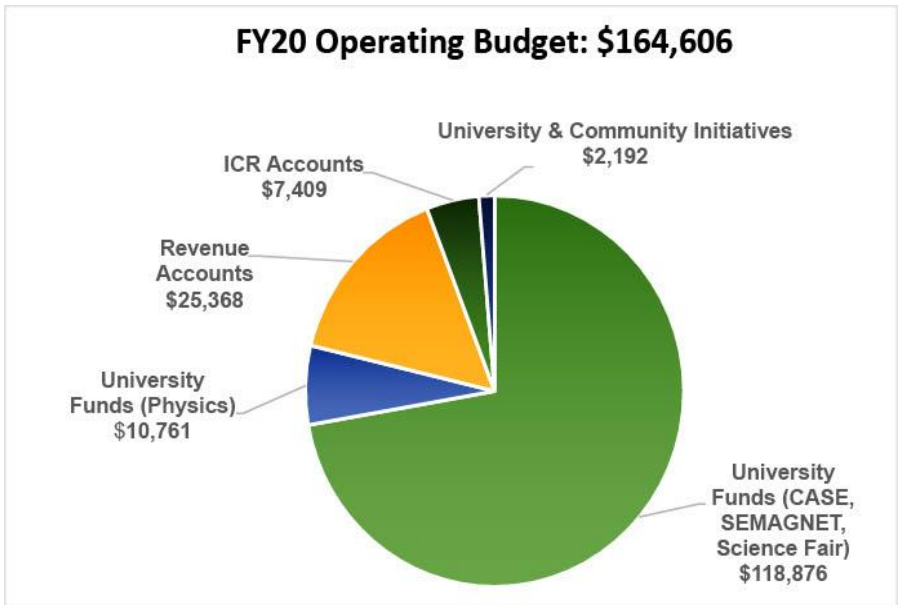
STEM Career Exploration

CASE partnered with the Mass Hire Greater Brockton Workforce Board to host a STEM Career Exploration event for local high school students. Approximately 140 visiting students and 20 teachers met with 20 representatives from STEM industries. 2 BSU faculty/staff and 7 BSU STEM majors led tours of the DMF Science and Math Center. A keynote presentation was provided by faculty from the Aviation Program at BSU.



Financial Information

CASE total Operating budget in FY20 was \$164,606. Funding was provided by the University, University & Community Initiatives, indirect costs, and revenue generated through CASE.



CASE Faculty and Staff

Jennifer Aizenman, Director

Maria Armour, Darwin Day

Martina Arndt, Observatory

Edward Brush, Project GreenLab

Kevin Curry, Watershed Access Lab

Vernon Domingo, EarthView

Caitlin Fisher-Reid, Darwin Day

Nicole Glen, STEM Education Leadership

James Hayes-Bohanan, EarthView

Jamie Kern, Observatory

Kim McCoy, Associate Director, CityLab & Watershed Coordinator

Rebecca Metcalf, MACS

Polina Sabinin, Engage in Math

Sarah Thomas, Greenlight for Girls

Maura Whittemore, Administrative Assistant



CASE Advisory Committee

Martina Arndt, Interim Associate Dean and Professor of Physics;
Faculty Coordinator, Observatory

Margaret Black, Associate Professor of Computer Science

Edward Brush, Professor of Chemical Sciences; Faculty
Coordinator, Project Green Lab

Kevin Curry, Professor of Biological Sciences; Faculty Coordinator,
Watershed Access Lab

Caitlin Fisher-Reid, Associate Professor of Biological Sciences;
Faculty Coordinator Darwin Day

Nicole Glen, Professor of Elementary and Early Childhood
Education

James Hayes-Bohanan, Professor of Geography; Faculty Co-
Coordinator, Project EarthView

Robert Hellstrom, Professor of Geography

Stephen Krajewski, Assistant Professor, Secondary Education and
Professional Programs

Jamie Kern, Observatory Manager

Rebecca Metcalf, Professor of Mathematics

Polina Sabinin, Associate Professor of Mathematics; Faculty
Coordinator, Engage in Math



STEM

Science • Technology
Engineering • Mathematics



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