BUILDING THE STEM EDUCATION AND WORKFORCE:

POLICY RECOMMENDATIONS FOR MAINE
Introduction and Background

Across Maine policymakers have demonstrated an interest in supporting science and engineering but need to act in a more strategic and coordinated way to achieve meaningful and systematic progress in Maine’s STEM ecosystem. Maine’s research and development investment is less than 1% of GDP compared to a regional average of about 4.4%. This disparity in funding for R&D, which is a leading driver of economic growth, limits the state’s ability to prepare the current and future workforce for the growing science and engineering economy and attract and grow business and investment. To bridge this gap, Maine’s PK-12 and postsecondary STEM education, workforce development and research initiatives need improvement and investment.

Over the past two decades, Maine has experienced a decline in its working-age population from 745,000 in 2006 to 703,000 in 2019.¹ A significant factor contributing to the shrinking of available talent is the state’s declining PK-12 enrollment and inability to retain and attract young workers. On the positive side, the University of Maine System is experiencing record out-of-state enrollment (nearly 7,000 students in Fall 2021) and the state also continues to see a steady increase in its minority and immigrant populations. The population of African Americans, Hispanic non-white Latinos, and Asian Americans has grown by 64, 57 and 23 percent respectively since 2010.² Policymakers will need to engage Mainers and potential Mainers across age, racial and socioeconomic levels to address the infrastructure and workforce development necessary to sustain existing industries and cultivate new ones in support of the state’s equitable economic recovery from the COVID-19 pandemic.

Maine must address the skills gap all the way from what students learn during early childhood and pre-kindergarten through higher education and match learning with the skills that are needed for the jobs of today and the future. To meet employer needs for an increasingly educated and skilled workforce, Maine has set a statewide goal that by 2025, 60 percent of Maine adults will have a postsecondary degree or credential, up from the current 53 percent.³ At the same time, it is important that the state continues to address inequities and opportunities that will lead to the full integration of Mainers into high-skilled STEM careers.⁴

A range of postsecondary degrees and credentials, from micro-credentials and short-term certifications, to associates, bachelor’s and advanced degrees are critical to matching students with the knowledge, skills and abilities they will need in the future. State and national projections show growth in the coming decade is projected for jobs like nursing, engineering, teaching, cybersecurity, among other STEM-related professions that will require a four-year or advanced degree, though according to the National Skills Coalition, 51 percent of current Maine’s jobs require less than a 4-year degree. These jobs require students transition from high school into technical training programs.
MAINE HAS SEEN A DECLINE IN ITS WORKING-AGE POPULATION

ILLUSTRATION 1: MAINE’S WORKING-AGE POPULATION DECLINE (COMPARISON)

WORKING-AGE POPULATION IN 2006
745,000

WORKING-AGE POPULATION IN 2019
703,000

MAINE STEM Employment By Level Of Education

60 percent of STEM jobs are held by individuals without a bachelor’s degree

- Less Than a Bachelor’s Degree
- Bachelor’s Degree or Higher

SOURCES
Illustration 2 - STEM JOBS IN MAINE BY EDUCATIONAL ATTAINMENT (PIE CHART)
Talent and Innovation as a Pathway to Maine’s Economic Development and Growth

By focusing on the gaps in STEM education, job training and research, stakeholders can demonstrate the importance of science and engineering, investing strategically, thoughtfully and comprehensively. Representatives from across the public, private and nonprofit sectors in Maine must join forces to address the opportunities and challenges to advance science and engineering and build a framework for future support beyond education and the workforce that ties robust support for science and engineering with success for all Mainers.
STEM Workforce Development Series

Over the course of the pandemic, Science is US partnered with the Maine Chamber of Commerce for a four-part series of virtual discussions on STEM Workforce Development focused on:

1. Maine’s STEM Challenges & Opportunities
2. STEM in Non-traditional Fields & Recruitment Strategies
3. Maine, STEM and COVID-19 Response
4. The Future of STEM Jobs and Innovation in Maine

The goal of these discussions was to capture recommendations that could move Maine forward in achieving progress in STEM Education and Workforce Development. The discussions complement the Maine Economic Development Strategy 2020-2029 and its focus on talent development and innovation as a pathway to the state’s economic growth.  

Appendix A lists the 65 separate organizations that participated in the dialogues. Participants included academic institutions, STEM professionals, students, professors and major industries and businesses across the state of Maine. The discussions from these dialogues explored various policy recommendations and concepts that address Maine’s challenges with R&D investment and the need for greater education and workforce programs.
The education of Maine’s students is the foundation for creating a more robust STEM ecosystem in Maine. While programs exist in Maine to educate students on STEM subjects, increasing focus and access to those programs will be critical to ensuring that students across the state have an adequate science-related education and are prepared with the knowledge, skills and abilities for the jobs of the future. The following recommendations reflect areas of agreement in this area:

Policy Recommendations

The virtual series helped build consensus among participants that warrant attention of policymakers and key stakeholders in the state.
### Education Priorities & Planning

- Maine needs a stronger focus and greater investment in PK-12 mathematics and science education using evidence-based approaches such as the teaching innovations being developed and disseminated to the field through the Maine Mathematics and Science Alliance (MMSA) and the University of Maine’s RiSE center, which have both received significant investment from the National Science Foundation, NOAA, EPA, and the U.S. Department of Education.
- Maine must find ways to teach and leverage a wealth of available mathematics and science curriculum available online for PK-12 students and continue raising standards and expectations of all students.
- Maine’s education system must focus PK-20 training on current and future STEM basic skills needs, including data literacy and management which pertains to a diverse array of STEM professions.
- Maine must prioritize culturally responsive STEM education experiences that are relevant and meaningful to the lived experiences and the cultural contexts of Maine’s youth and the communities they live in.
- Maine must support and value educator professional development in the field of STEM.

### Education Investments

- Maine should consider investing in STEM programs for youth, such as the Maine State Science Fair which encourages rigorous youth-led and designed STEM research.
- Maine should consider investing in growing existing research-based partnerships with organizations and schools across the state to provide improved access to empowering STEM-focused professional development and career awareness programs.
- Greater access to broadband internet in the state is needed for learners, especially those who are place-bound due to work or family responsibilities and much access their education at a distance, and employers.
- Maine should consider greater investments in programs like the Maine School of Science and Mathematics and duplication of such schools around the state.
- Maine must leverage the Harold Alfond Foundation’s recent $500 million investment to grow the STEM workforce including through a new statewide Maine College of Engineering, Computing and Information Science within the University of Maine System (UMS) and other investments in UMS, the Roux Institute at Northeastern University and the University of New England.
- Maine must increase investment in afterschool and summer enrichment STEM programs, similar to Vermont and Pennsylvania.
- Maine must continue strategic investments in high-impact hands-on learning, including through paid internships, co-ops and research learning experiences.

### New Programs

- Maine should create more opportunities to expose PK-12 students to the breadth of meaningful, good-paying STEM career opportunities available in the state.
- Maine should expand the vision of the career exploration program in the State’s 10-year Economic Development Strategy and the Maine Jobs & Recovery Plan.
- Maine must create more interdisciplinary and applied research programs to broaden students’ skillsets and integrate STEM into other subject areas to emphasize how and where STEM is found in the real world.
- Maine should develop a more formal career-shadowing program for critical industries in the State.
- Maine should focus on public early college, which has demonstrated great success in diversifying the curricular options for high school students and putting them on track to greater success in college and career (especially in STEM fields).
- Maine must make a concerted effort to work with PK-12 educators, guidance counselors and others across the state to educate students and families on the pathways to Maine STEM careers, and the financial aid available to affordably access necessary postsecondary education and job training.
- Maine must develop more robust programs and support those that are existing to foster a more diverse STEM workforce and leverage the capabilities of STEM students of various different backgrounds.
Policy Recommendations

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WORKFORCE:
Maine must create a more vibrant and adaptable STEM-based workforce to compete economically and attract new businesses and investments. Workforce development was identified as a critical need for improvement and the following areas were specifically identified.

MAINE NEEDS MORE INVESTMENT IN RESEARCH & DEVELOPMENT CAPABILITIES AND JOBS.
Maine must provide more investment in research and development capabilities and jobs. Targeted initiatives that drive innovation in traditional/heritage industries and emerging STEM fields will ensure that Mainers are able to participate in cutting-edge areas such as artificial intelligence and machine learning, advanced manufacturing and high-performance computing.

Maine should expand investments in the Maine Economic Improvement Fund (MEIF) that supports R&D within the University of Maine System, and especially at UMaine, a land, sea and space grant institution that in 2022, earned R1 Carnegie Classification, putting it among the top-tier of the nation’s research universities. MEIF appropriation have been flat since FY16 and should be expanded, as MEIF has at least a 5:1 return for every dollar invested.

The state should leverage and provide greater support for Finance Authority of Maine (FAME) loans for specific workforce training programs.

Maine should streamline the process for taking advantage of the Opportunity Maine Tax Credit program.

STEM literacy must be stressed for Maine’s entire workforce and the workforce must continually be retooled for the next challenge from cyber security to quantum computing.

Maine’s STEM workforce must be more robust and attract the full continuum of STEM workers.

Maine must think inclusively about traditional industries as STEM jobs of the future and invest in the technology systems to advance the traditional Agriculture, Forestry, Aquaculture and Marine/Shipbuilding/Manufacturing economic sectors.

Underemployed individuals should be provided “returnship” opportunities as internships to acquire new knowledge, skills and abilities and move up the STEM skills ladder.

The state’s workforce would benefit from programs that increase skills in digital delivery and the digital transformation of commerce.

Maine should consider industry specific workforce development councils that focus on the future of specific industries and help foster resiliency and sustainable systems for industries into the future.

Maine must continue to support and build new partnerships at and between higher educational institutions, like UMaine, to translate the data and research that they generate into industries of the future.

Maine must build depth in critical industries such as the biomedical fields that are under stress due to the COVID-19 crisis.

Maine has the potential to be a hub for aerospace investment given the potential for polar orbit satellites. The state’s policymakers should increase investments in infrastructure and innovation, including through the Maine Technology Institute, to support this growing economic sector.
Maine State Chamber of Commerce and Science is US STEM Workforce Development Series Participating Organizations

• Apple
• Attorney
• Baker Co Inc
• Broadturn Farm
• Cabot7
• Central Maine Community College
• Challenger Learning Center of Maine
• Community Concepts Finance Corporation
• Dead River Company
• Department of Professional and Financial Regulation
• Department of Economic NS Community Development
• Destination Moosehead Lake Marketing Organization
• Division of Vocational Rehabilitation
• DVR
• E2Tech
• Educate Maine
• Fair Wind Learning
• FocusMaine
• Frosty Hill Consulting
• Georgia BioEd Institute
• Harriman
• Husson University
• Inquiry Research Group LLC
• International Paper
• JobsInTheUS.com
• Junior Achievement of Maine
• Kennebec Technologies
• Layer Seven Technologies
• Lincoln Academy
• mac fix it pro
• Maine Community College System
• Mainebiz
• MEMIC
• Mount Desert 365
• North Atlantic Capital Corporation
• Northern Light Health
• NSF ATE InnovATEBIO National Center for Biotechnology
• Owls Head Transportation Museum
• Portsmouth Naval Shipyard
• Pro Search, Inc.
• Region 10 Technical High School
• Roux Institute – Northeastern University
• Sevee and Maher Engineers, Inc.
• St. Germain
• State Workforce Board, Maine Department of Labor
• Texas Instruments
• The Jackson Laboratory
• Touro
• University of Maine
• University of Maine System
• University of Southern Maine
• Unum
• WABI
• WEX inc.
• Wild Blueberry Commission of Maine
• Wivern Management
• Woodard & Curran
• XinaBox
References


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