

## PATHWAY 1

### SERVING OUR STATE: CATALYZING MAINE’S REVITALIZATION

*“The University of Maine will align its innovation, entrepreneurship and community outreach with the priority economic and cultural needs of Maine. Our interconnected research, teaching and service mission will be a primary engine that drives Maine’s future. Our research enterprise will increase UMaine’s stature and footprint, and expand “use-inspired research.” We will focus on targeted growth in arenas promising returns on investment that will ultimately benefit all of our constituencies.*

*Following this Pathway will ensure that UMaine is a more responsive, adaptive and powerful partner, and will enable critical growth in areas such as business development, sustainable energy development and entrepreneurship, addressing Maine’s STEM (science, technology, engineering, mathematics) needs, regional research and economic development, P–20 education, and health care and social services. We will promote the state’s cultural heritage while affirming the centrality of a liberal arts education at the state’s flagship university in providing critical thinking and communication skills to all professions, while enhancing quality of life for Maine’s citizens.”*

#### Pathway One Initiatives and Assessment

- 1. Enhance our impact on the economic and social fabric of Maine, including strengthening existing campus/private sector partnerships, while increasing our total partnerships by 50% by 2017**

#### *Growth in Private Sector Partnerships*

Since the inception of the Blue Sky Plan the University of Maine has seen significant growth in the number of UMaine/private sector partnerships as defined by formal contracted activity.

In addition, many more informal partnerships exist.

Table 1. UMaine Commercial Partners

	FY12	FY17	% Increase
Number of Partners	180	389	116%
Number of Projects	305	557	83%
Dollar Value of Projects	\$3,561,826	\$4,973,394	40%

#### *Building Maine Entrepreneurial Ecosystem*

In 2015-2016 a statewide team created Maine Accelerates Growth, the outcome of Blackstone Accelerates Growth which was a statewide initiative to create jobs and economic development through

entrepreneurship and growth. To build on the momentum created by Blackstone, the original partners, the University of Maine, Maine Technology Institute and Maine Center for Entrepreneurial Development, worked to create a fund through the Maine Community Foundation that will allow multiple donors to give in support of activities that enhance the ecosystem. Donors are able to fund specific activities through the fund or make general or matching gifts for the statewide ecosystem. In addition, the team has brought on several additional partner organizations committed to working together for innovation and entrepreneurship. UMaine's role includes managing the Innovate for Maine Fellows program, hosting the Top Gun Entrepreneurial Accelerator in the Bangor region, and partnering on a variety of other initiatives.

#### *Other Statewide Partnerships*

UMaine is actively engaged with partners throughout the state, including the UMS campuses, to support company growth. Key examples of participation and partnerships include:

- Alliance for Maine's Marine Economy
- Bangor Region Chamber of Commerce
- Bangor Target Area Development Corporation
- Board of Agriculture
- Eastern Maine Development Corporation
- Economic Development Council of Maine
- Educate Maine/Project Login
- Maine Aquaculture Innovations Center
- Maine Center for Entrepreneurial Development
- Maine Forest Economy Growth Initiative
- Maine Wild Blueberry Commission
- Maine Potato Board
- Maine Chamber of Commerce
- Maine Development Foundation
- Maine Municipal Association
- Maine Technology Institute
- Portland Region Chamber of Commerce

## **2. Continue to match and more closely align UMaine research strengths with the seven Maine Technology Sectors for Economic Development**

The University of Maine System established Research Reinvestment Fund, to strengthen research and development activities that are tied to Maine businesses and to industries that are critical to the future of Maine. The UMS Board of Trustees (BOT) has committed funding for this initiative through FY 2019.

The State appropriation for the Maine Economic Improvement Fund (MEIF) FY 2016/2017 was increased by \$2.65M/year (\$1.8M/year at UMaine) and supported/expanded research and development in Maine's seven designated technology sectors. Table 2. represents the grant dollars leveraged by MEIF for the University of Maine System from FY13-FY16.

Table 2. UMS Grants and Contracts in MEIF Sectors

FY16 Total Grants and Contracts	Number of Awards		Total Award Value	
Total Proposals Submitted	1,141		\$172,061,414	
Total Proposals Awarded	946		\$76,823,194	
Grants and Contracts Awarded in MEIF Sectors	FY13 MEIF Awards	FY14 MEIF Awards	FY15 MEIF Awards	FY16 MEIF Awards
Forestry and Agriculture	\$8,642,424	\$7,654,060	\$14,194,009	\$10,317,799
Aquaculture and Marine	7,045,322	9,153,389	15,187,566	12,631,690
Biotechnology	1,985,295	6,353,450	1,524,204	2,399,487
Composites	9,230,715	5,135,033	5,247,712	6,974,264
Environmental	5,781,658	7,959,264	4,349,651	5,045,536
Information Tech	7,422,675	2,520,521	4,473,781	11,497,199
Precision Manufacturing	1,130,746	1,414,700	780,694	1,009,921
Cross Sector	2,290,129	4,681,209	1,018,132	507,842
Total	\$43,528,964	\$44,871,626	\$46,775,749	\$50,383,738
			FY16 Dollar Increase	\$3,607,989
			FY16 Percentage Increase	7.71%

### 3. Align technology and educational programs with Maine’s economic development needs

#### *Innovate for Maine Fellows Program FY13-FY17*

Annual program supporting paid internships placing 162 student fellows representing 29 colleges and universities with 168 Maine businesses focused on solving the company’s innovation challenge.

#### *Flagship Internship Program FY17*

A Flagship Internship working group reviewed best practices and model internship programs. In the spring of 2017, an inaugural cohort of 19 students participated in the Flagship Internship. Flagship Internship Maine companies included Poland Spring, Bangor Savings Bank, TRC, Lane Construction Company, WEX and several others.

#### *The Maine Center for Research in STEM Education (RiSE Center)*

The RiSE Center integrates STEM education research into teaching practice, through teacher preparation, education reform, community partnerships, and professional community

In FY14 the center has had a record-breaking year in terms of the number of major new and continuing grants and contracts funded -14 awards bringing over \$10 million to the University of Maine. Their collaborations involve 800+ teachers from more than 50 Maine school districts, and faculty from eight UMaine STEM and STEM education departments and schools.

In 2016, The RiSE Center received a \$2 million National Science Foundation grant to promote STEM education in rural schools. The grant supported 22 fellowships for recent STEM graduates and current STEM professionals to further their knowledge base and become certified STEM teachers in rural, high-need Maine schools. Both U.S. Sens. Angus King and Susan Collins recognized the benefits that the grant would have on Maine schools.

**4. Reaffirm and integrate the core goals of a liberal arts education in community/culture with innovation and economic development**

*Clement and Linda McGillicuddy Humanities Center*

UMaine established the UMaine Humanities Center, now the Clement and Linda McGillicuddy Humanities Center, through the College of Liberal Arts and Sciences. Stimulus funding provided in Spring 2012 came in the form of a three-year, \$300,000 grant from the Presidential Request for Visions of University Excellence (PRE-VUE) Program.

**5. Prepare UMaine graduates for Maine’s future workplace needs**

*Innovation Engineering* minor, undergraduate certificate, and graduate certificate include tools and methods for creating, communicating, and commercializing meaningfully unique ideas and complements any major or field of study including the sciences, arts, humanities, business, engineering, and education.

Table 3. Enrollment in Innovation Engineering Courses by College

	2015-2016		2016-2017	
	n	%	n	%
<b>Liberal Arts &amp; Sciences</b>	44	26%	44	25%
<b>Maine Business School</b>	52	31%	49	27%
<b>Engineering</b>	41	25%	50	28%
<b>Natural Sciences, Forestry, &amp; Agriculture</b>	15	9%	26	15%
<b>Education &amp; Human Development</b>	9	5%	6	3%
<b>Division of Lifelong Learning</b>	1	1%	3	2%
<b>Other</b>	5	3%	1	1%
<b>Total Students</b>	<b>167</b>		<b>179</b>	

*Growing Maine’s Workforce*

Flagship Match, launched in academic year 2016-17, attracted 38 percent more out-of-state students for the fall 2016 semester. A new study by Professor of Economics Todd Gabe shows that out-of-state undergraduate students annually generate about \$160 million in economic activity in Maine. Surveys of recent UMaine graduates found that about 20 percent of students from out of state with bachelor’s degrees choose to stay in the state to live and work.

### *Internships & Fellowships*

UMaine departments offer a variety of programs for students to gain real-world experience and connect students with Maine companies:

- The Maine Business School's new internship office has collaborations with nearly 90 employers.
- The College of Education and Human Development has statewide reach through its connections with nearly every PreK–20 school and educational organizations in Maine. Each semester, UMaine student-teachers are in more than 500 classrooms throughout Maine.
- The Innovate for Maine program, connects the best and brightest Maine college students with Maine's most exciting, growing companies as a way to grow and create jobs across the state of Maine through innovation and entrepreneurship. Students and companies come together through the University of Maine to collaborate on innovative projects that will accelerate company growth and give students a paid, meaningful, hands-on internship experience.
- Maine Darling Marine Center director Heather Leslie and UMM professor Brian Beal developed the SEA (Science for Economic Impact & Application) Fellows Program to catalyze university-industry partnerships related to the state's marine economy and ecosystems on which it depends.
- CSD is the only program preparing Speech-Language Pathologists in Maine. Within six months of graduation, 100 percent of CSD graduates found employment in the field.

### *Career Services*

- UMaine continues to host career center and college specific fairs, events, and workshops - connecting students and employers throughout the state.
  - Delivered career-related presentations to 3,899 students in 2015-16 and 5,927 students in 2016-17 through one-on-one appointments, walk-ins and presentations in academic classes, honor societies, and student organizations, and increased collaborations to include presenting at Mitchell Institute conference, Black Bear Leaders conference, Digital Humanities Week and Pride Week.
  - Organized and hosted the largest Career Fair in the State of Maine in 2015-16; 146 organizations in attendance and the largest Engineering Job Fair in the State of Maine; 96 organizations attending. In 2016-17 the combined attendance was again record-breaking at 281 employers participating.
  - Expanded the Maine Mentor Program to include 30 new mentors and made 106 high quality matches. Our reach and impact of this program remains strong. Students from every college used our program.
  - Encouraged students to utilize the Career and Engineering Job Fairs to explore internship opportunities with 62% of the companies in attendance offering internships.
- Continued the successful MOM (Medical Outreach Maine) program by building on the established partnership with Tufts Medical School students, offering the program in Waldo County, and receiving 100% funding for the program through a lodging donation from Athena Health and financial backing from PCHC and the Maine AHEC network.

**6. Increase commercialization and the number of small businesses developed as a result of technology spin-offs.**

Increase Commercialization – proactive support and visibility for commercialization has increased during the Blue Sky term. Recognizing the lag time from invention disclosure through the patenting process (avg. 5+ years) and the research and development/market development time for moving inventions into the market place, the following table summarizes the annual metrics.

Table 4. UMaine Commercialization Metrics

<b>FY Commercialization Metrics</b>	<b>FY2013</b>	<b>FY2014</b>	<b>FY2015</b>	<b>FY2016</b>	<b>FY2017</b>
License Revenue	\$121,469	\$55,344	\$60,295	\$90,594	\$186,148
New Inventions Disclosures	26	11	19	15	26
US Patents Issued	16	10	6	4	6
US provisional patents applications filed	9	13	9	5	5
non-provisional US or PCT patent applications filed	14	11	12	20	7
# New Licenses signed	4	8	9	4	3

*Statewide Business Incubation*

The Office of Innovation and Economic Development supports business incubation facilities including the Upstart Center for Entrepreneurship, Foster Center for Student Innovation, Darling Marine Center, and the Center for Cooperative Aquaculture Research. In FY17 Ellsworth Maine created the Union River Center for Innovation and UMaine is providing the business support to tenants and affiliates with funding through the department of commerce Economic Development Administration.

Business incubation supports UMaine staff/students starting businesses, companies starting to commercialize UMaine-UMS technology and companies developing their own technology with UMaine support.

IN FY17 at the Upstart Center, the OIED staff provided coaching and counseling to 69 community entrepreneurs, supported seven tenants and one affiliate company. The tenants added 13 new jobs in FY17 and one tenant received an MTI award. Collectively, the companies raised nearly \$2.5 million in grant and equity funding.

Table 5. UMaine Affiliated Business Incubator Activity

Incubator Location	Companies per year					
	2012	2013	2014	2015	2016	2017
Tenant Companies @ UpStart Center for Entrepreneurship - Orono (formerly the Target Technology Center)	8	8	7	11	11	7
Affiliate Companies @ UpStart Center for Entrepreneurship - Orono (formerly the Target Technology Center)	6	3	0	3	0	1
Tenant Companies @ UMaine Center for Cooperative Aquaculture Research - Franklin	6	4	3	3	4	5
Tenant Companies at UMaine Darling Marine Center - Walpole	2	2	1	2	3	5
Tenant Companies at Union River Center for Innovation - Ellsworth (est.FY17)	-	-	-	-	-	1
Affiliate Companies at Union River Center for Innovation - Ellsworth (est. FY17)	-	-	-	-	-	1
Student Companies - Foster Center for Student Innovation	5	4	4	6	3	5
<b>Total Companies per year</b>	<b>29</b>	<b>24</b>	<b>20</b>	<b>31</b>	<b>27</b>	<b>25</b>

Examples of incubating spin-off companies include:

CCAR

- *Sea & Reef Aquaculture*  
*Ocean Resources*  
*Aqua Vida*
- *Springtide Seaweed*  
*Applied Ponics*

Upstart Center for Entrepreneurship

- *Cerahelix*
- *Environetix*
- *Double Blue Sports Analytics*
- *Advanced Infrastructure Technologies*
- *Eagre Games.*

Darling Marine Center

- *American Unagi*
- *Maine Fresh Sea Farms*
- *Field Phyto Nutrients*
- *Maine Shellfish Developers*

### *Foster Center for Student Innovation - Student Business Incubation*

In FY17, the Foster Center provided counseling to 78 students and provided business space for five companies/innovation projects. Successes included Boreal Games receiving a Libra Future Fund and Maine Technology Institute Tech Start grant, two tenants who were finalists in the UMaine Business Challenge, including Boreal Games winning the second place prize.

Former Innovation Center tenants and users had several successes in the past year:

- Cobbler Technologies, Revolution Research and Tip Whip all received Seed Grants from the Maine Technology Institute. Sea & Reef Aquaculture received a Business Accelerator Grant from MTI. Revolution Research also received a \$100,000 EPA grant.
- Tip Whip founded a new business DelWhip, food delivery service, and participated in Greenlight Maine. SCORE named the company American Small Business Champion.
- Innovation Engineering graduate and tenant in Stillwater Posters, Nate Wildes, opened Flight Deck Brewery in Brunswick, which was recently named the best tap room in Maine by Downeast Magazine.
- Flowfold announced a partnership with L.L. Bean to sell an exclusive line of products.
- VegNews magazine listed Redd Bar among its 50 favorite brands of vegan energy bars. It also raised more than half of a \$1.5 million equity investment round.

## **7. Enhance UMaine organizational support for promoting regional economic impact**

To achieve the goals of the Blue Sky Plan and raise the visibility of innovation and economic development efforts at the University of Maine consistent with Pathway 1, the Office of Innovation and Economic Development (OIED) was formed in 2012 under the leadership of Vice President for Innovation and Economic Development Jake Ward. The unit consists of the Department of Industrial, Cooperation, Foster Center for Student Innovation, and Economic Development Programs, Technology Commercialization and business incubation through the Center for Cooperative Aquaculture Research and the Upstart Center for Entrepreneurship.

## **8. Use our resources to highlight Maine's rich cultural heritage, and relate the arts and humanities better to economic development**

### *Clement and Linda McGillicuddy Humanities Center*

UMaine established the UMaine Humanities Center, now the Clement and Linda McGillicuddy Humanities Center, through the College of Liberal Arts and Sciences. Stimulus funding provided in Spring 2012 came in the form of a three-year, \$300,000 grant from the Presidential Request for Visions of University Excellence (PRE-VUE) Program.

### *Fogler Library*

The Fogler Library staff is engaged with communities throughout the state and collaborates with the UMS libraries and other libraries in the state. The library provides resources and services to the state, this sharing helps community engagement and economic development. The University Press collaborates with researchers around the state and produces books that impact local communities.

- The USPTO Patents & Trademarks Research Center, the only in the state, helps address Maine's economic development.

- Canadian materials collection focusing on economic, historical, cultural, environmental, and business links between Maine and both the Maritime Provinces and Quebec. These links help Maine businesses and government agencies increase trade and cooperation with the state's neighboring provinces.

#### *Collins Center for the Arts*

During the course of the Blue Sky plan, the Collins Center transitioned due to a change in leadership. A new Executive Director and Associate Director were hired, and strategic planning for the center moved forward.

CCA hosted the Bangor Region Chamber of Commerce's Business After Hours and the Maine Music Educators Association's Maine All State Festival, in addition to the Maine International Conference on the Arts, which provided resources and training for artists, arts administrators, arts educators and community leaders, and included over 30 professional development sessions, artist showcases and a nationally recognized keynote presenter.

#### *University of Maine Museum of Art*

UMMA hosted conference events and its director served as a panelist for Maine Arts Commission's International Conference on the Arts. The Director also presented professional development sessions for the Chamber of Commerce's Building Bridges Program and the Bangor Region Leadership Institute.

UMMA has also expanded its downtown Bangor location to now include 3,800 works. The museum partners with Maine museums and art programs/camps to provide support to art and humanities development throughout the state.

### **9. Continue to increase support in signature areas, including engineering, environmental and sustainability studies, renewable energy, alternative fuel research, STEM education and literacy.**

In order to achieve these pathway initiatives, the Blue Sky Plan set forward the following strategy: *Working through the Provost and deans, establish interdisciplinary Faculty Task Groups to review signature strength and emerging growth areas for priority funding initiatives, to be submitted in Spring 2013 primarily by:*

*(1) Invest in research funding to promote growth in Signature Areas. Programs in this category are expected to become world leaders in their fields within five years, become largely self-sufficient, and graduate into sustainability, based on their ability to generate external funding from all sources. Programs are necessarily interdisciplinary and make strategic use of all assets and aspects of the University of Maine, and*

*(2) New and Emerging Growth Areas represent those programs that may have not yet achieved critical mass or reputation, but have begun to capitalize on an interdisciplinary collaboration; have a track record of success with external support from a variety of sources; and have the integration of the research, teaching and service mission. Targeted investment, often in the form of matching support, helps promote the collaboration and incents the drive to go to the next level. It is anticipated, and history has shown, that these programs grow from the collaboration of individual researchers and research groups across campus.*

**Signature areas:** The Signature Areas, identified by their strengths in research and education: Forestry and the Environment, Marine Sciences, College of Engineering, Advanced Materials for Infrastructure and Energy, Climate Change, STEM Education, and Honors College. These interdisciplinary Signature Areas are world-class and will feature prominently in UMaine planning for the future.

Table 6. Faculty Investments in Signature Areas through reallocation and new MEIF

Signature Area	FY16	FY17	FY18
Forestry and the Environment	1	1	
Marine Sciences	1		
College of Engineering	1	1	5
Advanced Materials for Energy and Infrastructure			
Climate Change			1
STEM Education	1		
Honors College			

**10. Identify, promote, and invest in key emerging areas, such a biomedical sciences, new media, and the arts and humanities.**

**Emerging areas:** Emerging Areas represent those programs that may have not yet achieved critical mass or reputation, but have begun to capitalize on interdisciplinary collaboration; have a track record of success with external support from a variety of sources; and involve integration of the research, teaching and service missions. They are: the Graduate School of Biomedical Science and Engineering; Northeastern Americas: Humanities Research and Education; Data Science and Engineering; Sustainability Solutions and Technologies; Aging Research; and Finance Education.

Table 7. Faculty Investments in Emerging Areas through reallocation and new MEIF

Emerging Areas	FY16	FY17	FY18
GSBSE			
Northeastern Americas		1	
Humanities Research and Education			
Data Science and Engineering	1	1	2
Sustainability Solutions and Technologies			
Aging Research	1		
Finance Education	1		1