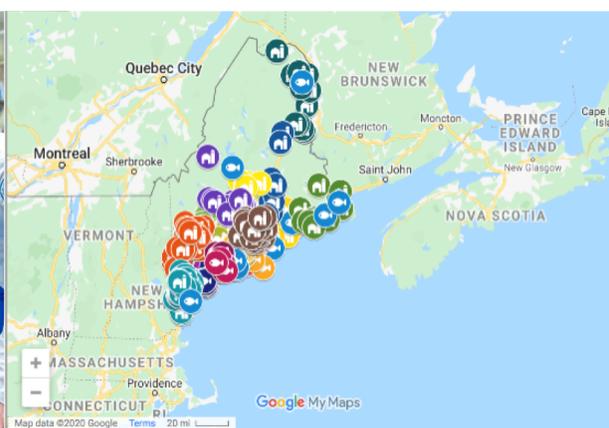




Maine's Research University: Progress & Possibilities for Maine's Future

Joan Ferrini-Mundy, President
January 27, 2021



Updates as of January 26, 2021

2168

Students in residence halls with capacity of 3509

Approx.

224

Rooms on Orono campus reserved for quarantine and isolation

3352

Asymptomatic tests administered to students since the start of the Spring semester

11,108

Current Enrollment (Undergraduate 8,760; Graduate 2,348) with 1,844 first year students

36

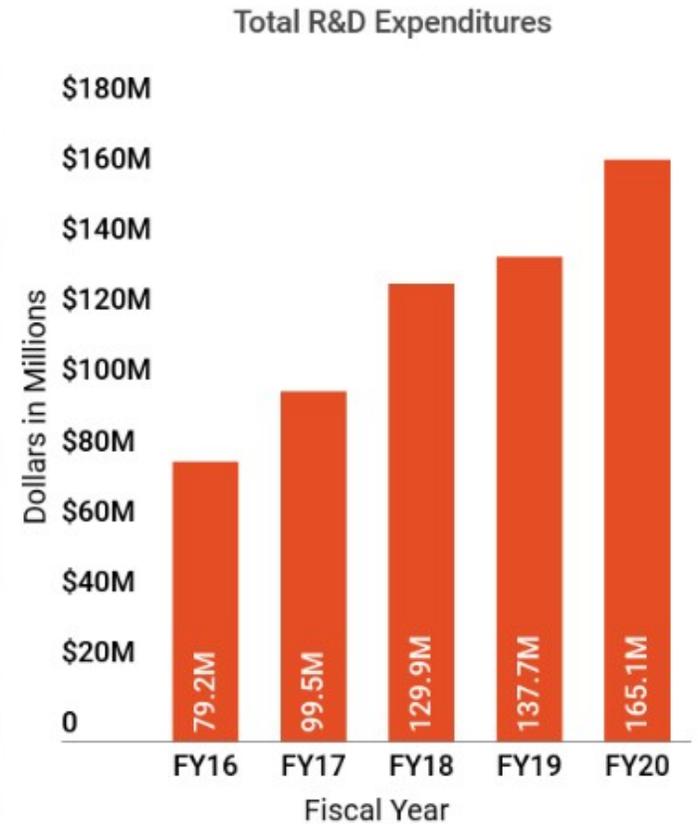
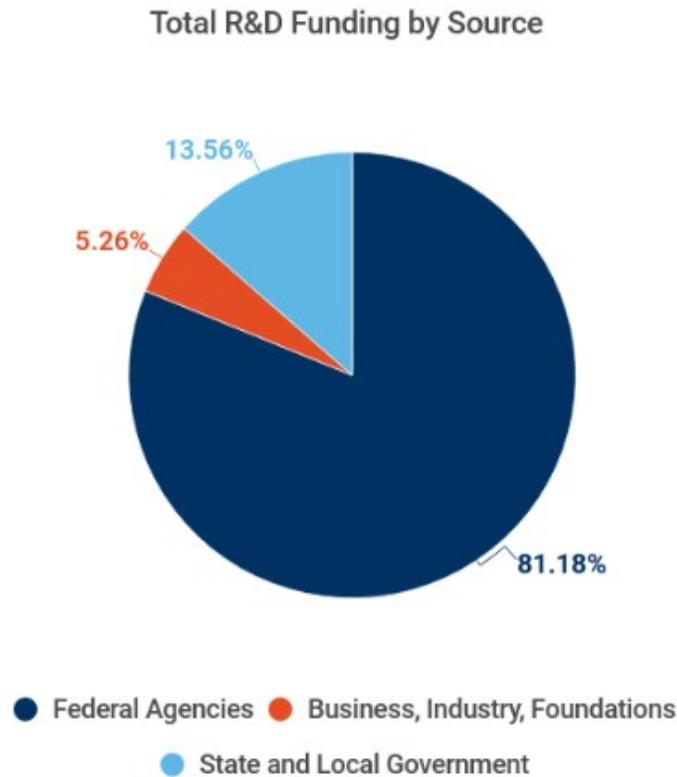
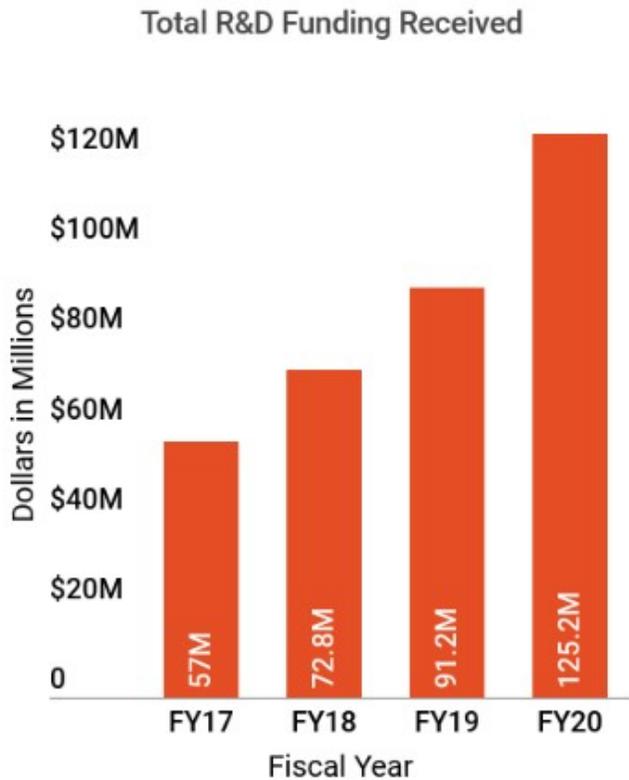
Current COVID positive cases, UMS-wide

65%

Students taking at least one course face to face

Funding by the Numbers FY 2020

New R&D Awards Received	New R&D Funding Received	University Contributions (Cost-Share)	Indirect Costs Awarded
716	\$125,188,029	\$13,804,430	\$16,541,807

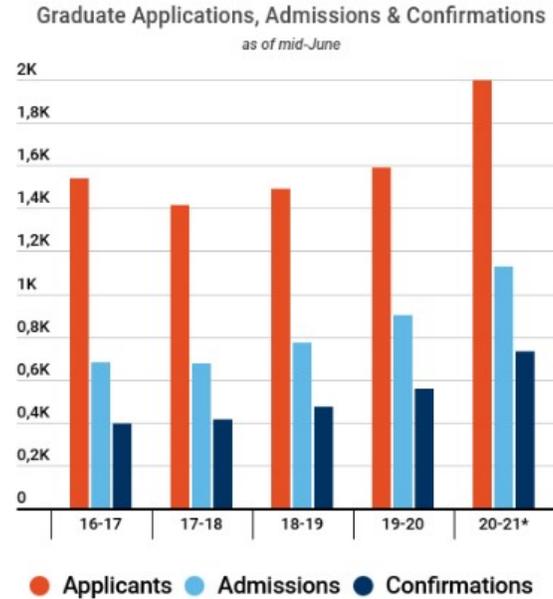
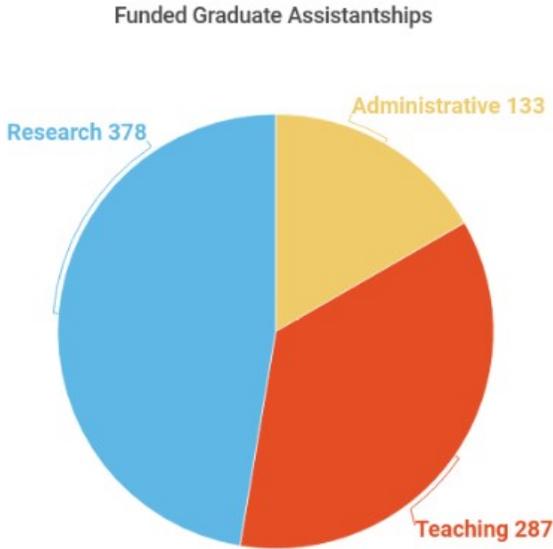
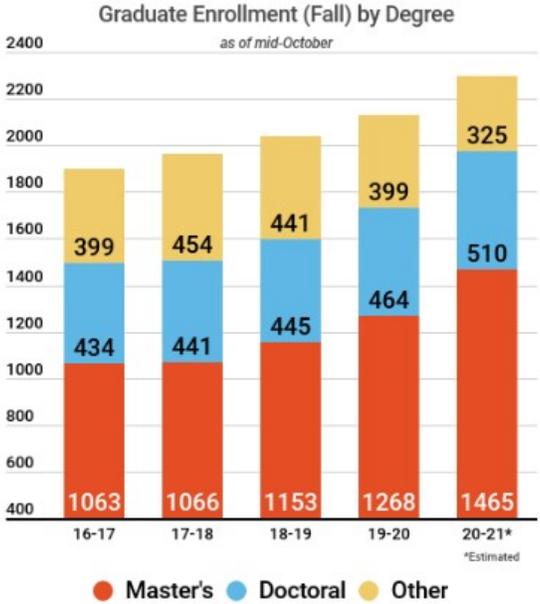


Record breaking year and four-year growth trends in research

Graduate Education Complements Research Performance

Graduate School by the Numbers AY 19-20

Number of graduate programs	138	Graduate enrollment increase over 5 years	42%	Graduate Student Credit Hours	25,037	Ph.D.'s conferred in Maine	96%
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Doctoral student enrollment is over 500 for the first time in UMaine history

UMaine drives & supports key strategies for Maine's Growth

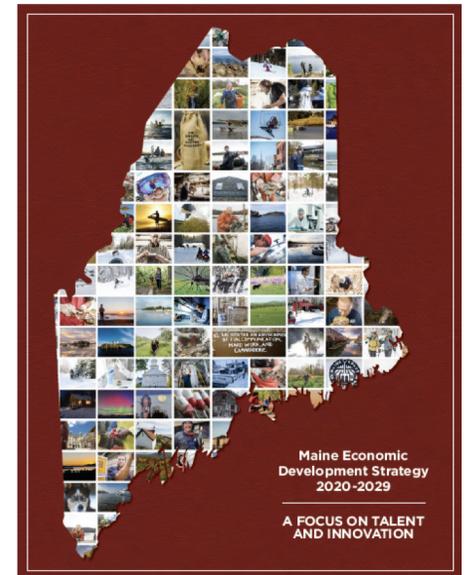
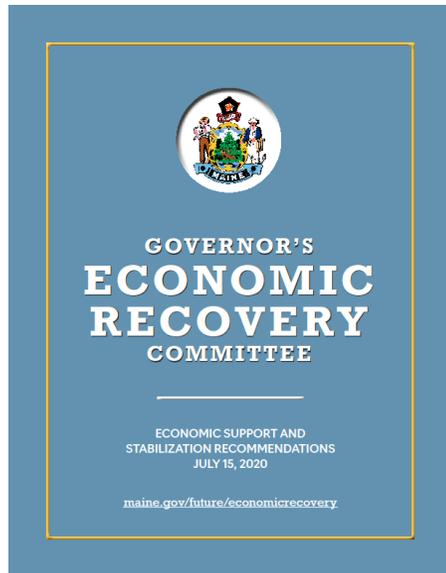
UMaine uniquely positioned to support the economic recovery of Maine, building on 20 years of MEIF investments in talent, infrastructure and innovation, leading to:

Business Growth and Expansion

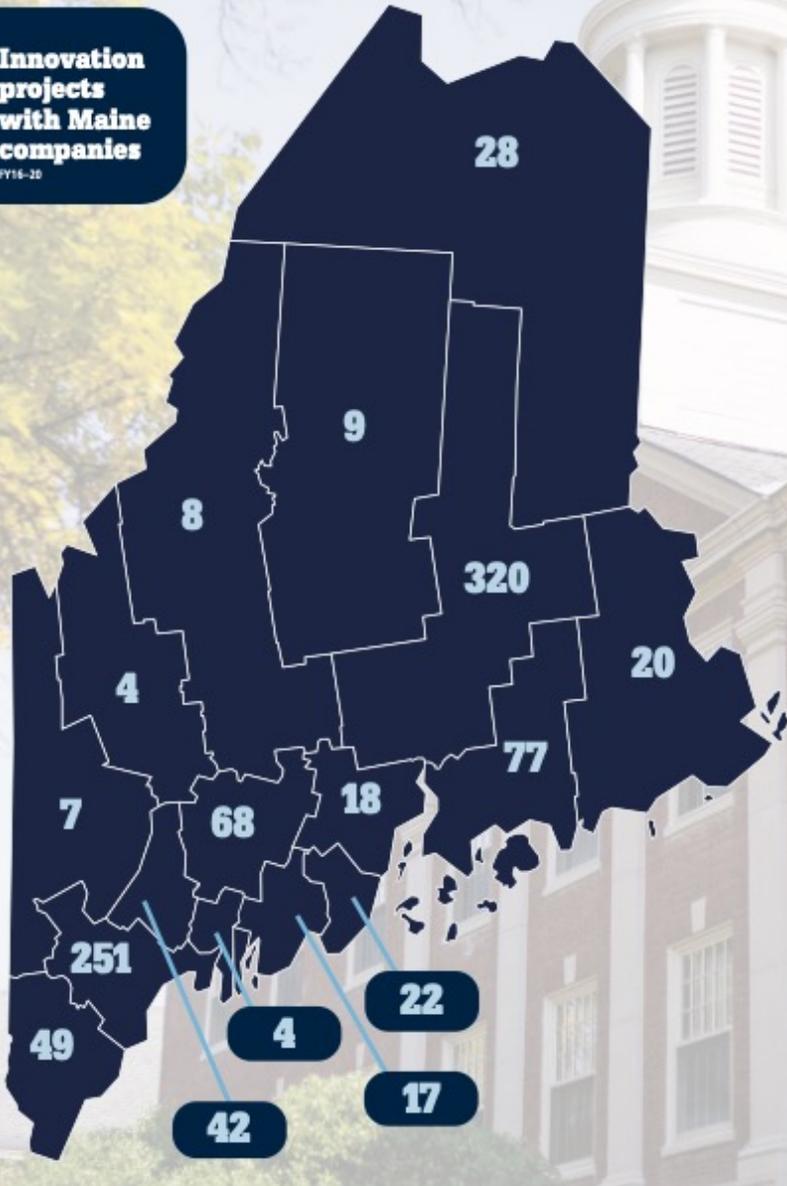
New Business Creation

Business Attraction

Talent Development



944 Innovation projects with Maine companies
FY16-20



The University of Maine is an R&D lab for all Maine companies

- Serve the entire state (and beyond)
- 944 contracted projects in last five years
- Leverage the university's unique facilities and world-recognized expertise developed through years of investment
- Provide access and support in small and medium-sized companies that cannot afford their own R&D resources at UMaine
- These resources also can be used to help attract companies to Maine

UMaine Partnerships in Portland

- Maine Graduate and Professional Center
- Northeastern University's Roux Institute
- Gulf of Maine Research Institute (GMRI)
- Climate Change Institute, Maine Law, and Maine Center
- New England Aqua-Ventus (NEAV)
- Graduate School of Biomedical Sciences and Engineering



New initiatives to spur the creation of new startups and accelerate technology commercialization partnerships

9

Teams in first two cohorts

5

Startups Incorporated



MIRTA

MAINE INNOVATION RESEARCH AND TECHNOLOGY ACCELERATOR



\$2 MILLION +
raised in external funding and prototype sales

3

Teams to National I-Corps

4

Patents filed or in process

29 STARTUPS
based on UMaine IP formed since 2000

Statewide Leaders Business Incubation

UpStart Center for Entrepreneurship

- Orono, Maine
- Partnership with Bangor Target Area Development Corporation (landlord)
- Spinoffs from UMaine and R&D partners

Darling Marine Center

- Walpole, Maine
- Partnership with Maine Aquaculture Innovation Center
- Aquaculture companies

Foster Center for Innovation

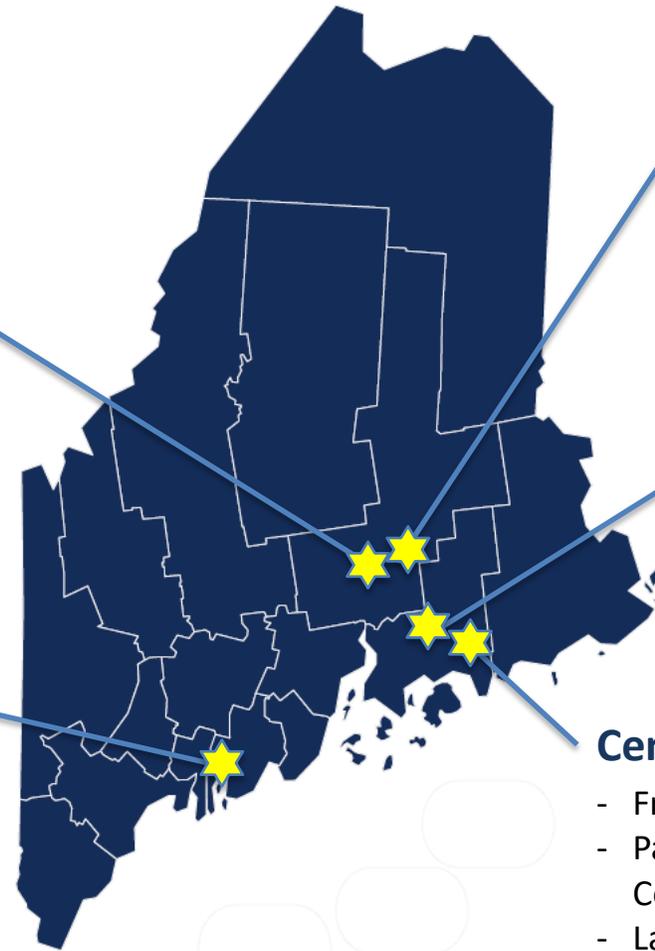
- Orono, Maine
- Student incubator and faculty accelerator
- Average 75 potential student entrepreneurs coached each year

Union River Center for Innovation

- Ellsworth, Maine
- Partnership City of Ellsworth (landlord)
- Biotech and other innovations

Center for Cooperative Aquaculture

- Franklin, Maine
- Partnership with Maine Aquaculture Innovation Center
- Land-based aquaculture facilities



Aquaculture Example



- Unique expertise and land-based aquaculture facilities as a soft landing for companies locating in Maine
- Partner with Maine & Co. and others

“CCAR’s facility offers massive benefits in terms of infrastructure, and the existence of these fish [yellowtail broodfish] presents a unique opportunity for us.”

- Megan Sorby, Operations Manager

UMaine has a strong Research Learning Experience Foundation

- Center for Undergraduate Research/Experiential Programs Innovation Central
- Honors College
- Capstone Courses
- Faculty passionate about mentorship
- Foster Center for Student Innovation
- Research opportunities through centers and institutes



UMaine's Research Strengths and Maine's Unique Assets Create Opportunity

Green Economy: Growing demand for bioproducts creates opportunities to develop products ranging from medical devices to food packaging made from wood

Blue Economy: Growing demand for sustainable protein & energy creates opportunities to utilize marine expertise and assets

New Maine College of Engineering, Computing, and Information Science

- Bolstered by Alfond Foundation investment
- Graduate engineering programs in Portland
- Builds upon new Fernald Engineering Education and Design Center in Orono
- Integration of resources, world-class programs, faculty, students, and facilities to shape the future



CURRENT & EMERGING WOOD PRODUCTS



SAWN TIMBER

Sawn Timber will continue to be a critical component of Maine's forest economy. Demand in the US is largely driven by the number of housing starts, which is expected to continue to strengthen. Lumber is the foundation of forest land ownership and the final product of long-term forest management.



PULP AND PAPER MANUFACTURING

Pulp and Paper Manufacturing continues to be the leader in contributing to Maine's forest economy. Maine's paper mills are shifting production away from print media and into tissue, labeling and packaging grades of paper.



ORIENTATED STRAND BOARD (OSB)

Orientated Strand Board (OSB) is an alternative to plywood. It is used extensively as a structural panel in construction. This technology is produced by two major facilities in Maine.



LAMINATED VENEER LUMBER (LVL)

Laminated Veneer Lumber (LVL) is an engineered wood product used in residential construction that uses layers of dried wood veneer. No manufacturing currently exists in Maine.



MEDIUM DENSITY FIBERBOARD (MDF)

Medium Density Fiberboard (MDF) is a reconstituted wood-based panel product, manufactured from pulpwod and sawmill residues. Over the past 20 years, laminate flooring and modern furniture has become a major end use for MDF. No manufacturing capacity exists in Maine.

Current Wood Products



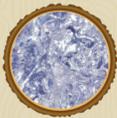
CROSS-LAMINATED TIMBER

Cross-laminated Timber is an engineered wood product that is especially well-suited for buildings between 6-18 stories tall. It is very early in the growth curve in North America and rapid growth is expected. Two CLT facilities have announced they will be opening in Maine.



CELLULOSIC SUGARS

Cellulosic sugars are a platform chemical for bioplastics such as Polylactic acid. Lactic acids which can be used as a preservative in food and beverages, and Succinic acid which is used in resins and coatings. Cellulosic sugars are a platform chemical for bioplastics such as Polylactic acid. Lactic acids which can be used as a preservative in food and beverages, and Succinic acid which is used in resins and coatings.



NANOCELLULOSE

Nanocellulose consists of incredibly light and strong fibers that can be used in a variety of applications, from coatings for packaging papers to high performance textiles and medical products. The University of Maine is a global leader in the R&D of nanocellulose applications.



PYROLYSIS OIL

Pyrolysis oil is a liquid fuel produced from wood, that can be used in heat and power production to substitute for fossil-based-oil.



DISSOLVING PULP

Dissolving Pulp can be made into textiles (Viscose) and competes with cotton and synthetics (nylon and acrylic). There are no facilities with this capability currently in Maine.



INSULATING WOOD FIBER

Insulating wood fiber composites is an alternative wood based insulating product for homes.

Emerging Wood Products

Bringing it all together to grow Maine

- UMaine has a key leadership role in road-mapping the future of the forest products industry, looking global market opportunities
- Strategically leverage existing strengths and create new assets in *talent, innovation and infrastructure*
- Creates opportunities for business attraction, new business creation and the sustainability and growth of current businesses
- Similar efforts underway: SEAMaine, Offshore Wind roadmap, engagement on State Climate Action Plan



Nanocellulose Valley

[Welcome to Nanocellulose Valley](#)

[Explore the Possibilities](#)

[Research at UMaine](#)

[Order Nanocellulose Samples](#)

[Contact Us](#)

Working with FOR/Maine, Maine & Co. and DECD to brand the state “Nanocellulose Valley”

For 200 years, Maine’s economy has been deeply rooted in the forest products industry. Home to sustainably managed forests, skilled workers, and research expertise at the University of Maine, the state is a natural hub for forest-based innovations and the development of cutting-edge new products.

Today, nanocellulose, nature’s super polymer, is helping to build the forest products of the future. This renewable natural material offers virtually limitless potential in a wide range of applications from food packaging to biomedical devices.

Just as Silicon Valley grew up around Stanford University to become the heart of the tech industry, UMaine is driving an unrivaled center of nanocellulose bioproducts innovation right here in Maine.

Welcome to Nanocellulose Valley.

Offshore Wind

- Diamond Offshore Wind and RWE Renewables investing \$100 million to demonstrate the technology at full scale.
- Combined, the two new partners are responsible for nearly a quarter of the world's offshore wind capacity.
- Construction, following all permitting, completion expected in 2023.
- Project is projected to produce more than \$150 million in total economic output and create hundreds of Maine-based jobs during the construction period.

RWE

 Diamond Offshore Wind,
LLC



And more...



Aquaculture Research Institute

Aquaculture Experiment Station with UMaine Aquaculture Research Institute and USDA – ARS first in nation.



\$4.8M will upgrade Forest Bioproducts Research Institute facilities, bolster bioproduct research



Using forest-based materials for biomedical devices and air filters



World's largest 3D printer with goal to print using forest bioproducts

UMaine/Northeastern Research Partnership

- **Five projects selected for one-year collaborative projects:**
 1. Aquaculture vaccines utilizing engineered bacteria
 2. Using AI to study pacifier use and SIDS link
 3. Gene modeling to study of Influenza immune response
 4. Human AI-vehicle interaction for BVI and older adults
 5. Development of a new bio fluid analysis instrument



Biomedical SARS-CoV-2 Research at UMaine

Molecular Biology

Engineering

Medicine

Wheeler Lab
Wastewater Testing



Howell/Maginnis Labs
SARS-CoV-2 Transmission



Saber, Wheeler, Maginnis Labs
Healthcare Transmission



Pandemic-related CUGR Fellowships



UMaine Research Centers and Institutes

- Advanced Manufacturing Center
- Advanced Structures and Composites Center
- Aquaculture Research Institute
- Center for Community Inclusion and Disabilities Studies
- Center for Research on Sustainable Forests
- Center for Undergraduate Research
- Center on Aging
- Climate Change Institute
- Forest Bioproducts Research Institute
- Frontier Institute for Research in Sensor Technologies
- Innovative Media, Research and Commercialization Center
- Institute of Medicine
- Maine Center for the Genomics in the Environment
- Maine Center for Research in STEM Education
- Maine Sea Grant
- Margaret Chase Smith Policy Center
- Sen. George J. Mitchell Center for Sustainability Solutions



The President's Council on Diversity, Equality, and Inclusion

UMaine and Maine Post-Covid



- Covid impact on operations
 - Future of remote learning in Maine
- UMaine Rapid Innovation Team
 - Supported healthcare (PPE, hand sanitizer and more)
 - UMaine design new solutions, provide scientific expertise, fill gaps
 - Connected supply chain of manufacturers to healthcare and response needs

Moving forward

- Changed institution
- Leverage people moving to Maine
- Increasing focus on rapid response to solve Maine challenges and drive immediate opportunities as part of recovery
- Use UMaine's talent, innovation and infrastructure assets as the springboard for recovery and growth



THANK YOU!

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