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ANNUAL ECONOMIC DEVELOPMENT AND TECHNOLOGY TRANSFER REPORT

Action Requested: Receive the report.

Full Reports Available: The full fiscal year (FY) 2020 annual reports from the University of Iowa (UI), Iowa State University (ISU) and the University of Northern Iowa (UNI) are available on the Board of Regents website and will be provided to the General Assembly, Governor's Office, Legislative Services Agency and the Iowa Economic Development Authority as required by law.

Executive Summary: Iowa's three public universities collaborate with business and industry and with each other to foster success for all economic development and entrepreneurship efforts in Iowa. They significantly impact Iowa on a daily basis and demonstrate to the public the value of research through research-based expertise and business assistance directly to Iowa's people, industry and communities in all 99 counties. Conducting academic research also results in intellectual property discoveries and innovations available to business, industry and the marketplace; and it provides Iowa with an educated workforce.

The Regent universities research and economic activities outlined in their reports meet the Board of Regents Strategic Plan, Priority 2, Objective 2.3: The Regent Enterprise will build strategic collaborations among universities and with outside entities to foster opportunities for innovation and economic development. Each institution shall report annually on significant partnership and/or collaboration activities. This includes both quantitative and qualitative metrics that demonstrate the impact of these activities.

FY 2020 Highlights:

The Regent universities work diligently to develop breakthroughs that help to improve Iowa's economy through economic development, technology transfer and commercialization of research. Collectively, the three universities provided over \$1.2 billion dollars in total sponsored funding to the State of Iowa in FY 2020, with over half (\$628.8 million) of it coming from competitive federal grants and awards. The Regent universities faculty and researchers compete with other faculty and researchers from around the world to win this funding for their work. Students are the beneficiaries of this hard work as they get hands-on experience participating in this research.

The Regent universities provide assistance to Iowa businesses and start-up companies across Iowa. The numbers fluctuate on an annual basis, but generally reflect an upward trend over several years. In FY 2020, there were over 4,500 employees in the 191 companies located in the university research parks and incubators, 85 license and option agreements on institutional intellectual property were executed and 176 patents were awarded. However, these numbers only tell part of the story. First, the value added by providing assistance to licensees and startup companies as they take these (usually) early stage research ideas and turn them into revenue is not reflected. In addition, information on revenue from licensed patents is only collected during the patent term, which results in an underreporting of revenue generated from products that contain university technology. Nonetheless, these statistics reflect excellent performance when compared to similar institutions and reflect the economic value the Iowa Regent universities provide to the State of Iowa.

The below charts show the combined statistics for the three universities over the past five fiscal years, FY 2016 through FY 2020. See the chart at end of the docket item for the details from each university.

Licenses, Intellectual Property and Patents	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Patent applications filed	438	305	299	260	250
Patents awarded	84	59	117	88	176
Disclosures of intellectual property	304	234	299	259	237
Total license and option agreements executed on institutional intellectual property	125	145	104	96	85
License and option agreements executed on institutional intellectual property in Iowa	66	59	32	38	34
License and option agreements yielding income	290	330	322	292	260
Revenue to Iowa companies as a result of licensed technology	\$9.6 M	\$14.1 M	\$41.7 M	\$13 M	\$10.3 M
Royalties and license fee income	\$4.9 M	\$5 M	\$6.2 M	\$4.6 M	\$4.6 M

Companies	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Total startup companies formed through licensing activities	28	29	7	10	7
Startup companies formed in Iowa through licensing activities	21	21	5	9	5
Startup companies formed through UNI assistance	142	134	96	94	99
Companies in research parks and incubators	162	185	179	189	191
New companies in research parks and incubators	35	66	60	168	72
Employees in companies in research parks and incubators	3,460	3,493	3,673	4,766	4,596

Income and Funding	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020
Total sponsored funding	\$1,016.8 M	\$1,099.1 M	\$1,102.7 M	\$1,098.5 M	\$1,2078 M
Sponsored funding from federal grants	\$490.2 M	\$465.6 M	\$518.2 M	\$540.4 M	\$628.8 M
Total Corporate-sponsored funding	\$129.7 M	\$145.7 M	\$143.7 M	\$135.3 M	\$143.3 M
Corporate-sponsored funding in Iowa	\$21.2 M	\$25.7 M	\$23.1 M	\$32.2 M	\$21.6 M

State Appropriations. In FY 2020, the Iowa General Assembly appropriated \$10.2 million in total funding for economic development, technology transfer and commercialization of research to the three Regent universities, an increase of \$1.5 million from FY 2019. The two new appropriations in FY 2020, totaling \$1.5 million, are divided as follows:

- \$1.1 million to ISU and UI for a biosciences innovation program. The Board had requested \$4.0 million. The funding is divided \$825,000 to ISU and \$275,000 to UI. The funding will

start the four bioscience platforms identified in the TEconomy report where Iowa has the greatest likelihood of achieving a differentiated leadership position to grow and diversify the state's economy: biobased chemicals, precision and digital agriculture, vaccines and immunotherapeutics, and medical devices. The funding will facilitate technology transfer, incubate start-ups and accelerate technology transfer, attract external funding and provide innovation ecosystem services, and develop a skilled workforce.

- \$400,000 to UNI for the expansion of the Metal Casting Center's additive manufacturing capabilities related to investment castings technology and industry support, which fully funds the Board's request.

The remaining \$8.7 million allocated to the Regent universities, from the Skilled Worker and Job Creation Fund (SWJCF), has not changed since creation of the fund in FY 2014:

- \$3 million to the Regents Innovation Fund, which is used in the areas related to technology commercialization, marketing, entrepreneurship, business growth, and infrastructure projects and programs needed to assist in implantation of activities under Iowa Code chapter 262B (Commercialization of Research). The Regent universities invest the funds received from the legislature in opportunities that yield successful startups, innovative business assistance, and critical research leading to commercialization. The universities are required to match the funding on a one-to-one basis from non-state resources. Research grants, private investors or companies interested in a project, and other university funds are often used as match dollars. The legislation divides the funding: 35% to UI, 35% to ISU, and 30% to UNI.
- \$2 million to UI for implementing the entrepreneurship and economic growth initiative. The appropriation is used to expand public/private partnerships and programing through the Pappajohn Entrepreneurial Center.
- \$209,000 to UI for the UI Research Park, Technology Innovation Center and UI Pharmaceuticals (formerly Advanced Drug Development program). UI must direct expenditures for research toward projects that will provide economic stimulus for Iowa and emphasize providing services to Iowa-based companies.
- \$2.4 million to ISU for small business development centers, the ISU Research Park and the Center for Industrial Research and Service. At least \$735,728 must be allocated for purposes of funding small business development centers. ISU is to direct expenditures for research toward projects that will provide economic stimulus for Iowa and emphasize providing services to Iowa-based companies. The industrial incentive program must focus on Iowa industrial sectors and seek contributions and in-kind donations from businesses, industrial foundations, and trade associations, and that moneys for the Center for Industrial Research and Service industrial incentive program can only be allocated for projects which are matched by private sector moneys for directed contract research or for nondirected research. The match required of small businesses for directed contract research or for nondirected research shall be \$1 for each \$3 of state funds. The match required for other businesses for directed contract research or for nondirected research shall be \$1 for each \$1 of state funds. The match required of industrial foundations or trade associations shall be \$1 for each \$1 of state funds.
- \$1.07 million to UNI for the Metal Casting Center, the MyEntreNet internet application, and the Institute for Decision Making. UNI must allocate at least \$617,638 for purposes of support of entrepreneurs through the university's Center for Business Growth and Innovation and Advance Iowa program. UNI must direct expenditures for research toward projects that will provide economic stimulus for Iowa and emphasize providing services to Iowa-based companies.

FY 2020 University Reports Highlights

University of Iowa: The UI annual economic development and technology transfer report provides a description and activities for their programs and centers in FY 2020, as well as their activities to address the many challenges posed by the COVID-19 crisis.

The University of Iowa once again has been cited as one of the 100 most innovative universities in the world by Reuters. This recognition is indicative of the impact the university can have upon the economy of Iowa and is why economic development is a component of the university's strategic plan. As the university looks to implement its strategic plan through specific strategies, it is important to note that the university is focused on supporting the translation of intellectual work into applications and solutions which enhance economic development and impact the lives of citizens. This strategy is implemented through:

- Creating increased opportunities for entrepreneurial education, new venture creation, and technology transfer, with a specific focus in medtech and edtech innovation; and
- Connecting faculty, staff and students to organizations and subject matter experts to solve unmet needs in social, health, technical and business problems.

Their annual report provides accomplishments from the eight economic development initiatives:

1. Protostudios, a state-of-the-art, rapid-prototyping facility that works with UI researchers, researchers from other Iowa universities and healthcare institutions and community members to develop fully functional prototypes of product ideas, allowing innovators to test, redesign and determine manufacturing paths and demonstrate usability to investors. Protostudios primary focus is on biomedical and electronics prototyping with access to 3D printers (plastics, metals, ceramics) milling, laser/wet jet cutter, printed circuit board fabrication, and consulting from on-staff industrial designers and engineers. Anatomical modeling of human organs prior to complex surgeries is developing into a key value add of Protostudios.
2. UI Research Park, leases building sites and space to growing technology companies that require sustained research relationships with the university. The park is home to a world-class business incubator program that has nurtured over 100 UI start-ups and other new ventures since its founding. Incubator tenant companies can draw on both the research and business resources of the university, including access to UI libraries, hazardous waste management services, support for SBIR/STTR grants (Small Business Innovation Research/Small Business Technology Transfer federal grants), educational seminars, networking opportunities, and shipping/package handling.
3. Translational Research Incubator, serves as the wet-lab counterpart to Protostudio's dry-lab program. The TRI space, located in the Medical Laboratories building on the university's campus is a complement to the UI Research Park as it can house up to four early-stage research-based biomedical or life science companies focused on commercializing technology developed at the University of Iowa.
4. UI Research Foundation, works in conjunction with faculty and staff researchers to transfer their research from the lab to the global marketplace. UIRF assists researchers in securing intellectual property (IP) protection, marketing new technologies, and collaborating with and licensing to industry partners. UIRF also supports faculty start-ups,

through streamlined agreements, connections to resources, patent prosecution management and strategy, and funding referrals.

5. UI Ventures, assists university faculty and staff in creating new companies based upon their research. It facilitates connections between the faculty and outside mentors, services and investors and serves as a liaison between the company and university services. Working closely to support the UI Research Foundation, UI Ventures actively engages with outside investors and business experts to improve visibility of UI companies, and bring business expertise to campus. In addition, UI Ventures manages the TRI incubator and operates the MADE program to encourage faculty and staff innovation and entrepreneurship throughout campus.
6. MADE, is a manufacturing and e-commerce initiative launched in FY 2018. Iowa MADE is a first of its kind program, in the nation, whose mission is to encourage and facilitate the UI community to bring innovative, need-based products to market with the goal of enhancing economic development at the university as an extension of research and scholarship.
7. John Pappajohn Entrepreneurial Center, offers nationally recognized comprehensive entrepreneurial education programs to all Iowans. Iowa JPEC and its university partners play an important role in the development of Iowa-based technology and high-growth start-up companies. Whether providing one-on-one consulting services and group training, working with start-up companies on technology transition, directing UI students on advanced field study projects, or providing training and seminars to business executives, Iowa JPEC seeks to support the next generation of entrepreneurs and business leaders.
8. UI Center for Advancement (UICFA). The mission of the center is to advance the UI through engagement and philanthropy, and its Corporate and Foundation Relations group promotes economic development through connecting corporate partners with the UI's strengths. In addition, the UICFA is a key player in tapping UI's extensive alumni base to support entrepreneurship and technology commercialization through monetary resources and, equally important, advice and expertise.

Iowa State University: The ISU annual economic development and technology transfer report provides a description and activities for their programs and centers in FY 2020, as well as their activities to address the many challenges posed by the COVID-19 crisis.

ISU promotes economic growth in Iowa by providing business and technical assistance to existing companies, supporting the creation of new companies, helping attract new companies and entrepreneurs to Iowa, creating intellectual property and moving research ideas to the market, and contributing to workforce and entrepreneurial development.

As the land-grant institution in the very first state to adopt the Morrill Act, Iowa State University wholeheartedly supports the land-grant ideals of putting science, technology and human creativity to work. Economic development is a top priority for ISU, and the university is very proud of the impact it has on both the lives of its students and the state economy. Iowa State's economic development programs, services and initiatives contribute to the overall positive net impact the university creates on Iowa's business community and return on investment it generates for students, taxpayers and society. Through President Wendy Wintersteen's Innovation and Entrepreneurship Initiative, ISU is embedding innovation and entrepreneurship more deeply into

their culture and curriculum. By doing so, they are cultivating the next generation of innovators and entrepreneurs while responding to the needs of their communities and the state.

ISU pioneered the first statewide extension service in 1906. The extension experiment – universities actively transferring their research and expertise to every corner of every state – was immensely successful across America and remains so today. Each year, more than a million Iowans directly benefit from ISU Extension and Outreach programs. ISU Extension and Outreach, in collaboration with ISU colleges, impacts economic development in the state through all of its programs – Community and Economic Development, as well as Agriculture and Natural Resources, Human Sciences, and 4-H Youth Development.

The Office of Economic Development and Industry Relations (EDIR) serves as the gateway to the university's expertise, capabilities, resources and facilities that support and enhance economic development throughout the state. EDIR works very closely with other university units that contribute to the university's economic development efforts and impact, including the Office of the Vice President for Extension and Outreach, the Office of the Vice President for Research and the academic colleges.

Their annual report provides accomplishments from EDIR, which consists of the following key economic development units that provide integrated and comprehensive business, technical, entrepreneurial support and educational services to ISU's clients and partners:

1. The Center for Industrial Research and Service (CIRAS) works with business and industry across all 99 counties to enhance their performance through service offerings in five general areas: technology, growth, productivity, leadership, and workforce. CIRAS leads three federal business outreach programs and two state-based programs, with staff and partners located across campus and across the state.
2. The Small Business Development Center (SBDC), administered by ISU, consists of 15 regional centers serving all 99 counties in Iowa. SBDC assists individuals interested in starting new companies and provides business services and counsel to existing small companies across Iowa to solve management problems, to improve operations, to seek financing, and to pursue new opportunities. ISU also operates two of the regional centers.
3. Pappajohn Center for Entrepreneurship serves entrepreneurs on campus and in the community, provides entrepreneurial opportunities for students including a student accelerator, hosts statewide and local business plan and pitch competitions and participates in university-wide academic programs in entrepreneurship ranging from a cross-campus minor to a PhD program.
4. ISU Research Foundation and Office of Intellectual Property and Technology Transfer protect, manage, market and license the intellectual property of ISU researchers. The licensed intellectual property rights, in ISU developed innovative technologies, provide rights which may improve the business's manufacturing costs, become a new product line, increase revenue streams or advance product market share. In addition, the ISU Research Foundation supports intellectual property work for the University of Northern Iowa. OIPTT negotiates and implements nondisclosure agreements, material transfer agreement and the industry and commodity agreements related to ISU's research collaborations with industry.
5. ISU Research Park provides a resource-rich environment where innovators flourish. It includes close proximity and easy access to ISU for tenant partners, which include start-ups and established companies that range from growing entrepreneurial ventures to global corporations. The Research Park offers high quality labs and office space, as well as

numerous community events, services and amenities that support the efforts of science- and technology-based organizations.

University of Northern Iowa: The UNI annual economic development and technology transfer report provides a description and activities for their programs and centers in FY 2020, as well as their activities to address the many challenges posed by the COVID-19 crisis.

UNI's economic development outreach programs are housed in the Business and Community Services (BCS) division and works toward supporting the UNI strategic goal of contributing to the economic vitality of the state. Since 2000, BCS has engaged the entire university community in its outreach efforts, including faculty, staff, students and alumni – all of whom play a critical role in enhancing economic development across Iowa. Even though COVID-19 eliminated the possibility of face-to-face interaction for nearly one-third of the year, BCS programs pivoted in their service delivery approach and programming and realized only a minor reduction in overall clients served.

Specific areas of service offered by BCS include: entrepreneurship, community and economic development, market research, environmental research, sustainability, advanced manufacturing, metal casting and additive manufacturing.

In FY 2020, UNI provided economic development assistance throughout all of Iowa's 99 counties for the 21st consecutive year. Every dollar received from the state to UNI's BCS leverages five dollars in private grants, fees or federal funding.

Their annual report provides accomplishments from the 12 programs located within BCS. Together, the programs served nearly 3,206 unique businesses and organizations in the past year and another 76,319 individuals through the IASourceLink.com entrepreneurial development system and the Business Concierge.

1. Advance Iowa
2. Center for Business Growth & Innovation
3. Center for Energy and Environmental Education
4. Geoinformatics Training, Research, Education and Extension Center (GeoTREE)
5. Institute for Decision Making
6. Iowa Waste Reduction Center
7. John Pappajohn Entrepreneurial Center
8. Metal Castings Center and Center for Additive Manufacturing
9. Recycling and Reuse Technology Transfer Center
10. Small Business Development Center
11. Strategic Marketing Services
12. Tallgrass Prairie Center

Indicators	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
	ISU	SUI	UNI	Regent Total	ISU	SUI	UNI	Regent Total	ISU	SUI	UNI	Regent Total	ISU	SUI	UNI	Regent Total	ISU	SUI	UNI	Regent Total
Number of disclosures of intellectual property	143	151	10	304	130	93	11	234	145	143	11	299	165	83	11	259	132	95	10	237
Number of patent applications filed	139	296	3	438	152	148	5	305	143	153	3	299	98	160	2	260	102	146	2	250
Number of patents awarded	15	67	2	84	15	42	2	59	42	74	1	117	32	54	2	88	56 -US only; 98 -Total	76	2	176
Number of license and option agreements executed on institutional intellectual property in total	84	39	2	125	85	58	2	145	51	51	2	104	46	48	2	96	46	37	2	85
Number of license and option agreements executed on institutional intellectual property in Iowa	45	19	2	66	39	18	2	59	21	9	2	32	25	12	1	38	22	10	2	34
Number of license and option agreements yielding income	153	128	9	290	199	122	9	330	185	127	10	322	155	127	10	292	154	95	11	260
Revenue to Iowa companies as a result of licensed technology	\$5.2 million	\$1.26 million	\$3.1 million	\$9.56 million	\$9.9 million	\$0.5 million	\$3.7 million	\$14.1 million	\$36.9 million	\$1.24 million	\$3.6 million	\$41.74 million	\$8.3 million	\$1.2 million	\$3.5 million	\$13 million	\$5.4 million	\$1.1 million	\$3.8 million	\$10.3 million
Number of startup companies formed, in total (through licensing activities)	6	22	--	28	9	20	--	29	2	4	1	7	4	5	1	10	4	2	1	7
Number of startup companies formed, in Iowa (through licensing activities)	5	16	--	21	8	13	--	21	2	2	1	5	4	4	1	9	4	0	1	5
Number of startup companies formed through UNI assistance	--	--	142	142	--	--	134	134	--	--	96	96	--	--	94	94	--	--	99	99
Number of companies in research parks and incubators	74	59	29	162	115	46	24	185	118	41	20	179	130	38	21	189	135	34	22	191
Number of new companies in research parks and incubators	17	4	14	35	43	7	16	66	40	6	14	60	151	1	16	168	53	5	14	72
Number of employees in companies in research parks and incubators	1,709	1,635	116	3,460	1,702	1,704	87	3,493	2,178	1,429	66	3,673	2,253	2,459	54	4,766	2,041	2,500	55	4,596
Royalties and license fee income	\$3.3 million	\$1.62 million	\$21,722	\$4.94 million	\$3.3 million	\$1.67 million	\$35,050	\$5.0 million	\$4.3 million	\$1.72 million	\$21,500	\$6.24 million	\$2.8 million	\$1.77 million	\$29,050	\$4.6 million	\$3.0 million	\$1.57 million	\$45,100	\$4.62 million
Total sponsored funding	\$425.8 million	\$552 million	\$39.1 million	\$1.0169 billion	\$503.6 million	\$557.7 million	\$37.8 million	\$1.0991 billion	\$509.2 million	\$554.0 million	\$39.5 million	\$1.1027 billion	\$469.0 million	\$588.7 million	\$40.8 million	\$1.0985 billion	\$494.7 million	\$666.2 million	\$46.9 million	\$1.2078 billion
Sponsored funding from federal grants	\$229.5 million	\$240.3 million	\$20.4 million	\$490.2 million	\$219 million	\$224.4 million	\$22.2 million	\$465.6 million	\$235.6 million	\$260.5 million	\$22.1 million	\$518.2 million	\$237.1 million	\$281.5 million	\$23.2 million	\$541.8 million	\$253.0 million	\$346.7 million	29.1 million	\$628.8 million
Corporate-sponsored funding in total	\$43.8 million	\$75.9 million	\$435,000	\$120.1 million	\$45.3 million	\$99.5 million	\$875,000	\$145.7 million	\$51.3 million	\$91.6 million	\$803,000	\$143.7 million	\$57.2 million	\$77.1 million	\$1.0 million	\$135.3 million	\$51.2 million	\$91.1 million	\$1.0 million	\$143.3 million
Corporate-sponsored funding in Iowa	\$11.9 million	\$1.9 million	\$435,000	\$14.2 million	\$14.3 million	\$10.5 million	\$875,000	\$25.7 million	\$7.8 million	\$14.9 million	\$400,000	\$23.1 million	\$20.7 million	\$10.9 million	\$560,000	\$32.2 million	\$11.8 million	\$8.8 million	\$1.0 million	\$21.6 million