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MONTANA STATE UNIVERSITY

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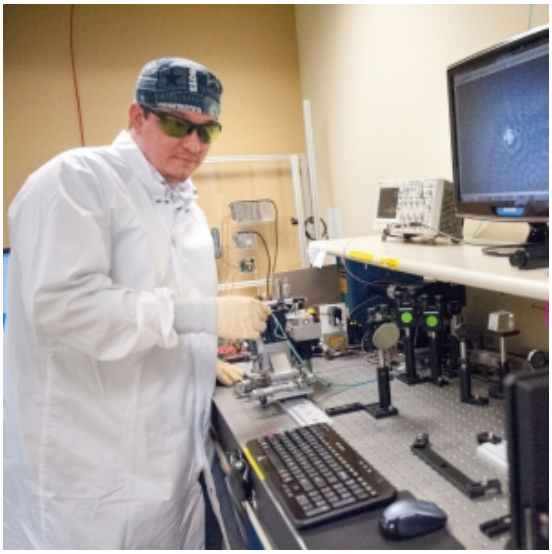
CASE STUDY 2016

IEP CATEGORY • TALENT

Optical Technology Center (OpTeC)

MONTANA STATE UNIVERSITY'S OPTICAL TECHNOLOGY CENTER



MSU's Optical Technology Center (OpTeC), named winner of the 2015 Talent Award from UEDA, integrates two-year certificate programs, an undergraduate minor, graduate degree programs, private sector partnerships, and research and technology transfer to transform the high technology sector in Bozeman, Montana. MSU established the Optical Technology Center in 1995 after observing that three photonics companies located in Bozeman.

The university's vice president for research and the MSU director of EPSCoR determined that integration of faculty across several disciplines could result in new technologies that would spinout companies, create an educated workforce and seed close collaboration with the private sector.

Equal investments were made by MSU, the Montana Science and Technology Alliance (a program under the Montana Department of Commerce to fund research aimed at commercialization) and the NSF EPSCoR, totaling almost $3 million. The Center now boasts more than 20 faculty members in nine departments across three colleges. The world-class research performed by OpTeC faculty has helped establish more than 30 optics related companies in Bozeman. Fifteen of those were started by MSU graduates, most with doctorates, again highlighting the critical role of a research university in targeted economic development. Many others are based on technologies transferred from the university. Bozeman has about six optical companies per 10,000 residents, compared with two per 10,000 in Tucson, Arizona, the most widely recognized center of optics activity in the United States.

Photonics companies in Bozeman have garnered more than $63 million in SBIR/STTR funding, at a rapidly rising rate. MSU has patented more than 70 photonics inventions and all are licensed to Montana companies. MSU works closely with, and responds to the needs of, industry. When area photonics companies expressed a need for a larger employee pipeline, MSU developed a new masters and undergraduate minor in laser and imaging optics. When companies said they needed technicians, Gallatin College MSU, in close collaboration with industry, began working toward an associate degree for photonics laboratory technicians. The first students will enroll in that program in fall 2016.

More than 200 graduate and more than 300 undergraduate students have been trained in photonics/optics. Previously, graduates of doctorate's and master's programs in engineering and the sciences were forced to look outside the state for employment opportunities. Now, OpTeC holds an annual conference at which researchers from both the academic sector and companies present research findings and interests. This conference often results in multiple connections that lead to collaborations and employment for students and graduates.

For the first time in Montana history, the 2015 Legislature set aside research funding for the university system, $15 million awarded competitively to specific projects with promise of economic return for the state. Two and a half million dollars of that total investment was awarded to a collaborative, multi-disciplinary proposal by OpTeC and the MSU College of Agriculture to study and refine remote sensing technologies aimed at increasing crop productivity and risk reduction for Montana farmers. This major investment in a promising partnership will further grow the photonics cluster, providing more students with opportunities in research, while benefiting one of the primary sectors of the state's economy.

An integral part of OpTeC's recent success in local economic engagement has been Gallatin College MSU, the fastest growing unit in the Montana University System, that works directly with industry groups to understand and provide for their needs for current and future employment. The college's commitment to meeting workforce needs of local companies has driven the college's 120 percent growth over a six-year period. To date nearly 500 students have earned one and two-year certificates for programs such as IT health care, aviation, CNC Machining, bookkeeping, business management, design drafting, interior design, medical assistant, welding and more.

Other key components contributing to the success of OpTeC include:

*Research university: A commitment to research must exist, both fundamental and applied research, to train students, and to provide for collaborations and innovative technologies.

*Risk-taking people: A center of excellence requires people who are willing to work with the private sector in ventures that may succeed or fail.

*Pro-industry attitudes at all levels of the university: Relationships rely on this positive and collaborative view of private sector partnerships.

*Recognition of unique roles of academia and industry: Both sides must clearly recognize the strengths and weaknesses of the other partner.

*Constant attention to partnerships: Regular opportunities must exist for students, faculty and industry leaders to build relationships, resulting in employment and entrepreneurship opportunities for students.

*Strategic investment: None of this will occur without meaningful investments in faculty lines and research support.

OpTeC faculty members have received international, national, and regional recognition for their work in optics research and education. In a very competitive awards environment, the University Economic Development Association named OpTeC winner of the Talent Development Award in September 2015, citing the numbers of companies and jobs created in Montana. The Montana Photonics Alliance determined that more than 500 jobs exist among the more than 30 photonics

companies in the Bozeman area, with an average salary of more than $60,000 - twice the average salary for the area. Most employees in this sector are graduates of MSU's photonics programs.

OpTeC has developed and attracted talent, it is on the cutting edge of photonics innovation, and it has impacted the community. By moving talent into positions much more lucrative than the average salaried positions in the area, it has helped transform Bozeman into a recognized optics and photonics center and underpinned economic, cultural, and civic growth in the region.