

2013-15 UW System Biennial  
Operating Budget Request

BOARD OF REGENTS

That, upon the recommendation of the President of the University of Wisconsin System, the Board of Regents approves the submission of its 2013-15 Biennial Operating Budget request, totaling \$20.8 million biennially in GPR/Fees for a Flexible Degree program and improvements in Quality, Access, and Economic Development (QAED), \$1.2 million for Program Revenue increases, and recommended Statutory Language Changes. The Board delegates authority to the UW System President to approve unavoidable costs requests and seek an extension to the September 17, 2012 submission date, if needed. The unavoidable costs requests will be provided to the Board of Regents in October.

The Board is not requesting increased funding for pay plan increases or fringe benefit increases in the 2013-15 biennium at this time. Consistent with past biennial requests, pay plan and future fringe benefit increases will be requested later.



# **2013-15 Biennial Operating Budget**

The University of  
Wisconsin System  
August, 2012

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# **BOARD OF REGENTS 2013-15 BIENNIAL BUDGET**

## **Table of Contents**

<b>SECTION A – EXECUTIVE SUMMARY AND BACKGROUND</b>	<b>PAGE</b>
Executive Summary	i
<b>SECTION B – BIENNIAL OPERATING BUDGET REQUEST</b>	
2013-15 Biennial Budget Requests	B-1
New Initiatives	B-3
Cost to Continue Requests	B-5
Program Revenue Requests	B-6
Statutory Language Changes	B-7
<b>SECTION C – REFERENCE</b>	
2013-15 Major Policy Guidelines	C-1
UWS Share of State GPR	C-9
<b>APPENDIX A – PERFORMANCE IMPROVEMENT GOALS</b>	
2013-15 Performance Improvement Goals by Campus	App A-1
<b>APPENDIX B – PROVIDING FOR THE 21<sup>ST</sup> CENTURY ECONOMY</b>	
Economic Impact	App B-1
Working with Businesses and Communities	App B-4
Workforce Development	App B-41
Internships	App B-42
STEM Disciplines	App B-52

## A. EXECUTIVE SUMMARY AND BACKGROUND

## **2013-15 BIENNIAL BUDGET REQUEST**

### **EXECUTIVE SUMMARY**

#### **BACKGROUND**

Since its April 2012 meeting, the Board of Regents has had a series of conversations centered around ways that the state's public colleges, universities, and extension networks can advance Wisconsin's economy by strengthening the workforce, supporting job creation, and bolstering vibrant local communities.

Regents expressed strong support for these priorities and for greater management flexibilities that would let UW System institutions use limited resources more effectively to serve students and the state as a whole. 2011 Wisconsin Act 32 provided new flexibilities to the UW System institutions, but additional statutory revisions are needed to fully implement those changes. This 2013-15 Biennial Budget proposal addresses both funding and flexibility that UW System institutions require to boost statewide economic development and pursue research and education goals.

The Board of Regents is required to submit a budget request to the Department of Administration by September 15 of each even numbered year. Because September 15 falls on a weekend this year, the submission has been extended to September 17. Although the Governor's Major Budget Policy memo directs most state agencies to assume there will be no new funding other than for unavoidable inflationary costs (also known as cost-to-continue), the University was informed that there will be an exception for its economic and workforce development initiatives. The UW's recommended request meets those parameters, and seeks funding that will move Wisconsin along a path towards greater economic prosperity.

#### **REQUESTED ACTION**

Approval of Resolution 3. That, upon the recommendation of the President of the University of Wisconsin System, the Board of Regents approves the submission of its 2013-15 Biennial Operating Budget request, totaling \$20.8 million biennially in GPR/Fees for a Flexible Degree program and improvements in Quality, Access, and Economic Development (QAED), \$1.2 million for Program Revenue increases, and recommended Statutory Language Changes. The Board delegates authority to the UW System President to approve unavoidable costs requests and seek an extension to the September 17, 2012 submission date, if needed. The unavoidable costs requests will be provided to the Board of Regents in October.

The Board is not requesting increased funding for pay plan increases or fringe benefit increases in the 2013-15 biennium at this time. Consistent with past biennial requests, pay plan and future fringe benefit increases will be requested later.

## DISCUSSION

Investments in the UW System will yield measurable dividends. 2011 Act 32, the 2011-13 biennial budget bill, included a list of performance indicators that the Legislature and Governor determined to be important for the University of Wisconsin System. Each of those performance indicators will be included in the annual accountability reports. If the 2013-15 biennial budget request is approved, each UW System institution will focus on at least four of those performance measures with specific performance benchmarks and goals for improvement. For each institution, at least one of those measures will focus on economic development. The list of performance goals are shown in Appendix A.

UW System institutions are actively engaged in a variety of activities that promote economic development in Wisconsin. For example, faculty, staff and students are working directly with businesses and community organizations through class projects and internships, and encouraging more students to major in one of the STEM disciplines (science, technology, engineering, and math). About 70 pages of examples are provided in Appendix B.

To address these needs during the 2013-15 biennium, **the UW System requests GPR/Fee block grant increases of \$20.8 million biennially.**

Institutions require flexible funding to address the performance goals described above. Flexible GPR/Fee resources, in combination with institutional reallocations, will enable UW System colleges, universities, and extension to address high priority areas, thereby better serving students and the state. Additional flexible funding could be used to:

1. Hire faculty and instructional academic staff to teach high-demand courses in biology, chemistry, mathematics, so more UW students can access classes they need to graduate on time;
2. Expand electronic access to contemporary research materials for students, faculty, and staff across the UW System;
3. Improve advising services for students to help them stay on a path that leads to faster graduation and lower student debt;
4. Encourage more students to pursue degrees in high-growth STEM disciplines;
5. Increase access to courses that provide high school and college credits, enabling more students to get a head start on their college experience and to graduate faster; and
6. Better serve Wisconsin businesses and communities by connecting more faculty and students to Wisconsin businesses and community organizations through classwork, internships, and service-learning experiences.

The UW System also requests funding to develop new flexible degree options that will provide new pathways for working adults and other nontraditional students, while also recognizing competencies gained outside the traditional classroom setting.

UW System institutions will continue to be frugal managers of available GPR/Fee resources. **Administrative costs for the UW System are less than half of the national average per**

**student.** Although this low funding for administration comes with some risks, UW System institutions will continue to focus on directing as many of their resources as possible to direct services to students and to spurring economic development across Wisconsin.

In addition, resources will be needed to attract and retain high quality faculty and staff members—the highly sought-after professionals responsible for nurturing Wisconsin’s educated citizenry and developing the talented workforce of tomorrow. These same faculty and staff provide direct support to Wisconsin businesses, and engage in world-class scientific research. UW faculty members and many of the academic staff are recruited from a national market. In that competitive pool, top quality educators and other personnel can often choose where to live and work. To attract and retain these individuals, UW institutions must be in the position to offer a competitive compensation package. Today, **faculty salaries at UW System institutions have fallen more than 18% below the national average. This large gap is the greatest threat to quality for UW System institutions.**

The legislature’s Special Task Force on UW Restructuring and Operational Flexibilities recommended that the University pay plan request be included in its biennial budget. However, the Board of Regents does not yet have the authority to determine pay plan increases for its employees, but is seeking this authority as part of its recommended statutory language changes.

### **Unavoidable Costs (Cost-to Continue)**

To sustain its vital work and enhance the impact on Wisconsin’s economy, UW System institutions need adequate resources to cover routine inflationary costs and previous commitments. These include debt service for new academic facilities and the higher costs of utilities and employee health insurance premiums. These inflationary costs need to be covered to maintain educational quality and improve student success, while increasing service to Wisconsin businesses and communities. The unavoidable costs for fringe benefit costs in the 2011-13 biennium, along with increases to leases, financial aid, and the student technology fee are estimated at \$58 million.

Consistent with past practice, UW System will submit an advisory request related to utilities costs, which will be added by the state as part of the Governor’s budget along with debt service amounts. Additional funding for health insurance rate increases or increased cost of other fringe benefits in the 2013-15 biennium will be requested later..

### **Program Revenue Funding Requests**

The Board of Regents requests \$1.2 million biennially in Program Revenue funds for the State Laboratory of Hygiene (SLH), and the Aquaculture Demonstration Facility. The SLH is administratively attached to the University of Wisconsin System. Their request is approved by their board and submitted along with the University System’s budget. Funding to support the operation of the Aquaculture Demonstration Facility is requested from tribal gaming revenues.

**Statutory Language Changes**

The University of Wisconsin System seeks increased management responsibility in the areas of Procurement and Personnel Management. A summary of the statutory language changes being requested is included on Pages B7-8.

**RELATED REGENT POLICIES**

None.



**B. 2013-15 BIENNIAL OPERATING BUDGET REQUEST**

UNIVERSITY OF WISCONSIN SYSTEM  
2013-15 BIENNIAL BUDGET  
NEW GPR/FEE FUNDED INITIATIVES

	<u>FY 14</u>	<u>FY15 Increase</u>	<u>Ongoing Base 14-15 FY</u>	<u>Biennial Increase</u>
Quality, Access and Economic Development	\$665,100	\$16,474,500	\$17,139,600	\$17,804,700
Flexible Degree	\$1,000,000	\$1,000,000	\$2,000,000	\$3,000,000
<b>GPR Request</b>	<b>\$1,082,300</b>	<b>\$11,358,400</b>	<b>\$12,440,700</b>	<b>\$13,523,000</b>
<b>Fee (Tuition) Request</b>	<b>\$582,800</b>	<b>\$6,116,100</b>	<b>\$6,698,900</b>	<b>\$7,281,700</b>
<b>GPR/Fee Request</b>	<b>\$1,665,100</b>	<b>\$17,474,500</b>	<b>\$19,139,600</b>	<b>\$20,804,700</b>

UNIVERSITY OF WISCONSIN SYSTEM  
2013-15 BIENNIAL BUDGET  
ESTIMATED COST TO CONTINUE

	<u>FY 14</u>	<u>FY15 Increase</u>	<u>Ongoing Base FY 14-15</u>	<u>Biennial Increase</u>
Full Funding of 2013-15 Fringe Benefits	\$25,000,000	\$0	\$25,000,000	\$50,000,000
M&D Financial Aid Increases	\$829,500	\$875,000	\$1,704,500	\$2,534,000
Full Funding of Lease & Directed Moves	\$735,700	\$61,100	\$796,800	\$1,532,500
Student Technology Fee Increases	\$1,297,500	\$1,368,900	\$2,666,400	\$3,963,900
<b>GPR Request</b>	<b>\$19,262,700</b>	<b>\$936,100</b>	<b>\$20,198,800</b>	<b>\$39,461,500</b>
<b>Fee (Tuition) Request</b>	<b>\$8,600,000</b>	<b>\$1,368,900</b>	<b>\$9,968,900</b>	<b>\$18,568,900</b>
<b>GPR/Fee Request</b>	<b>\$27,862,700</b>	<b>\$2,305,000</b>	<b>\$30,167,700</b>	<b>\$58,030,400</b>

**Quality, Access and Economic Development****REVISED**

	<u>2013-14</u>	<u>Increase in 2014-15</u>	<u>Ongoing Base Increase</u>
GPR	\$432,300	\$10,708,400	\$11,140,700
Fees (Tuition)	\$232,800	\$5,766,100	\$5,998,900
GPR/Fees	\$665,100	\$16,474,500	\$17,139,600

Each UW institution has chosen at least four of the Accountability Measures that were included in the 2011 Act 32 biennial budget, established a baseline for their current level of performance and developed improvement goals for 2015-16. Every campus has included at least one improvement goal in the area of Economic Development. The goals are included in Appendix A.

The improvement goals are dependent upon a strong system of Colleges, Universities, and Extension. The strength of the Colleges, Universities, and Extension is dependent upon the ability to recruit and retain high-quality faculty and staff. Without the faculty and staff, the research, public service and high-quality instruction that our citizens rely upon would not be possible.

The University of Wisconsin System is committed to addressing the state's needs for more graduates, more jobs, and stronger communities by providing increased economic and workforce development, increasing access, and ensuring the success of students. The Colleges, Universities, and Extension have been working with businesses and communities to provide knowledge transfer, create jobs, and utilize new technology to engage students in ways that ensure success. Examples of the work that is being done at the institutions can be found in Appendix B of this document.

Some examples of the work that is being done by UW institutions include: (1) the development of dual enrollment programs for K-12 students with the UW Colleges; (2) the development of Capstone and Master's programs for increased access to UW-Madison; (3) increased collaboration between campuses on degree programs and research; (4) joint ventures to increase K12 participation in STEM areas; (5) increased support to businesses from UW-Milwaukee and comprehensive institutions; (6) increased access and support for transfer students, nontraditional students and students of color; (7) increased opportunities for internships, service learning, and undergraduate research; (8) greater efforts to compete for external federal and gift funding; and, (9) a commitment to helping students succeed and be prepared to contribute to the workforce by utilizing professional training, critical thinking skills, or experiences in the community.

In the 2013-15 biennium, the UW System requests \$665,100 in the first year and an additional \$16,474,500 in the second year to support increased economic development efforts; the development of dual enrollment programs; additional access; and improvements in student retention, graduation and satisfaction.

**Flexible Degree****REVISED**

	<u>2013-14</u>	<u>Increase in 2014-15</u>	<u>Ongoing Base Increase</u>
GPR	\$650,000	\$650,000	\$1,300,000
Fees (Tuition)	\$350,000	\$350,000	\$700,000
GPR/Fees	\$1,000,000	\$1,000,000	\$2,000,000

At a time when the pool of younger college-bound students is predicted to shrink, Wisconsin must do more to enroll adult students. More than one-fifth of all Wisconsin adults have some higher education credits, but no degree. While many Wisconsin citizens are looking for work, many employers are struggling to find qualified workers with the specific knowledge and skills they need to fill available positions. As the economy continues its slow recovery, Wisconsin will need an educated workforce to compete in the new knowledge economy.

As an aggressive move to better position Wisconsin in the post-recovery economy, the UW System and Governor Walker recently announced a competency-based, self-paced Flexible Degree Initiative that will make baccalaureate degrees more accessible to working adults across Wisconsin. One element of this initiative will be the expanded ability for students to demonstrate college-level competencies based on material that they already learned in school, on the job, or on their own.

While some for-profit colleges may also offer degrees that provide some measure of flexibility to adults, the Flexible Degree Initiative will be led by world-class UW faculty, and the degrees offered in this format will reflect the University of Wisconsin's high standards for quality and dedication to affordability. "This new model for delivering higher education will help us close the skills gap at an affordable price to get Wisconsin working again," said Governor Walker. "As states across the country work to improve access and affordability in higher education, I am proud to support this exciting and innovative University of Wisconsin solution."

The UW System has laid the foundation for this advancement with existing online degree programs and tools that help students move credits between institutions easily. Successful efforts to open their doors to adult students taught UW institutions valuable lessons. The competency-based degree will take this foundation another step further.

In the 2013-15 biennium, UW institutions request \$1,000,000 in the first year and an additional \$1,000,000 in the second year to support development of the Flexible Degree Initiative (\$2,000,000 ongoing). These resources will be used to ensure that the degrees offered in this new format meet the same high standards of other degrees offered by UW institutions across the state.

Because adult students may have work or family obligations that keep them away from campus or may be returning to their education after a long break, there must be a strong support infrastructure in place from application to graduation. This request will also fund advisors and tools to support students who enroll in the program.

UNIVERSITY OF WISCONSIN SYSTEM  
2013-15 STANDARD BUDGET ADJUSTMENTS

This section includes items that could potentially be submitted in the UW System's 2013-15 Biennial Budget as Standard Budget Adjustments, if the Department of Administration agrees. Specific dollar amounts that will be submitted to DOA in the final budget request have not yet been calculated. These amounts will be reported to the Board in October.

The following list includes those anticipated items that the UW System will request as Standard Budget Adjustments:

<i>Summary of the UW System's 2013-15 Standard Budget Adjustments</i>
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<b>Full Funding of Fringe Benefits</b>
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This item requests full funding of the Department of Administration (DOA) approved fringe benefit rate changes from the 2011-13 approved rates to the new 2013-15 rates.
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<b>Minor Transfers within the Same Appropriation</b>
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This will make minor position or funding realignments within the same alpha appropriation without any overall dollar or position impacts.
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<b>Increases for Minority and Disadvantaged Financial Aid Programs</b>
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This item requests funding for the Ben R. Lawton Undergraduate Minority Retention Grant (LUMRG) and the Advanced Opportunity Program (AOP) financial aid programs to increase financial aid at the same percentage as estimated tuition increases for the 2013-14 and 2014-15 fiscal years.
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<b>Full Funding of Lease and Directed Move Costs</b>
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This request will fully fund lease rental costs through the 2013-15 biennium.
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<b>Student Technology Fee Increases</b>
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This request increases funding for student technology fee initiatives. The Student Technology Fee is a percentage of tuition and increases as general tuition revenue grows.
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UNIVERSITY OF WISCONSIN SYSTEM  
2013-15 PROGRAM REVENUE REQUESTS

The following list includes those known items that the UW System will request as Program Revenue increases:

<b>Summary of the UW System's 2013-15 Program Revenue Requests (Ongoing Increase Amounts)</b>	
<b>State Laboratory of Hygiene</b>	<b>\$398,600</b>
The board of the State Laboratory of Hygiene at UW-Madison will submit a budget request for Program Revenue funds to support alcohol and drug testing as an attached entity of the UW System.	
<b>UW System Aquaculture Facility Increases</b>	<b>\$210,400</b>
This request increases the UW System's Program Revenue funding levels to reflect the increased operating budget requirements associated with the UW-System Aquaculture Facility at UW-Stevens Point in 2013-15.	

## STATUTORY LANGUAGE CHANGE REQUESTS

### 1. AUTHORITY TO CONTINUE AND EXPAND DISCRETIONARY MERIT COMPENSATION ADJUSTMENTS USING FUNDING FROM ANY SOURCE FOR ALL EMPLOYEES

Existing authority for providing discretionary merit pay for employees will no longer be available to any University employees once separate and distinct personnel systems are in place under Wis. Stat. 36.115. Wis. Stat. 36.09(1)(j) currently states as follows:... “The board may not increase the salaries of employees under this paragraph unless the salary increase conforms to the proposal as approved under s. 230.12 (3) (e) or the board authorizes the salary increase to correct salary inequities under par. (h), to fund job reclassifications or promotions, or to recognize competitive factors.” Exceptional performance is not an approved reason to use base funds to adjust salaries.

The Board seeks statutory authority to continue and expand discretionary merit compensation adjustments using generated and/or reallocated base funding from any source for all employees.

### 2. AUTHORITY FOR THE BOARD OF REGENTS AND THE UW-MADISON CHANCELLOR TO APPROVE COMPENSATION PLANS FOR ALL EMPLOYEES.

Effective July 1, 2013, the Board of Regents and the Chancellor of UW-Madison must submit separate recommendations to OSER for adjusting compensation for all employees. OSER then submits a proposal for adjusting compensation to JCOER for approval.

The Board of Regents seeks modifications to Wis. Stat. 230.12(3)(e) and Chapter 111 to allow the Board of Regents and the UW-Madison Chancellor to approve compensation plans for all employees. UW System’s need for institution-specific competitive compensation was most recently highlighted through the work of the 2010 Competitive University Workforce Commission (CUWC). The findings of the CUWC revealed significant and varied gaps in compensation with existing peer institutions. This recommended change will provide the UW System with an additional tool that is needed to address the findings of the CUWC.

### 3. MODIFICATIONS THAT PROVIDE FOR CONTINUATION OF EXISTING ETF BENEFITS ADMINISTRATION AUTHORITY

Employees in the UW System and UW-Madison personnel systems will remain a part of the Wisconsin Retirement System (WRS). However, it may be that laws which govern the WRS have not yet been amended as necessary to authorize the Department



of Employee Trust Funds (ETF) to continue to administer benefit programs on behalf of UW System employees. Technical changes will be needed in Chapter 40.

4. AUTHORIZE THE BOARD OF REGENTS TO MAKE PURCHASING DECISIONS FOR UW SYSTEM INSTITUTIONS

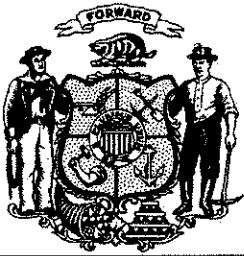
Under Wis. Stat. 16.71, the Department of Administration holds the authority to purchase and delegate purchasing authority.

The Board of Regents requests independent purchasing authority. This authority would streamline the purchasing process and allow the university to respond quickly and efficiently to the rapidly changing higher education purchasing environment. Flexibility would also allow the UW System to use higher education consortia contracts without seeking approval. In addition, sole source processing time could be streamlined by reducing the number of approval levels.

If a mandatory state contract exists, a UW institution would continue to purchase from said contract unless it can demonstrate that the purchase is available at a lesser cost. The Board of Regents would also agree to extend all UW contracts to any state agencies, county, city, village, town, school district, board of school directors, vocational, technical and adult education district, federally recognized indian tribes or any other public body whenever authorized to do so.

In moving purchasing authority to the UW System, DOA would continue to provide appropriate oversight through a post-award audit process.

## C. REFERENCE



**SCOTT WALKER**  
**OFFICE OF THE GOVERNOR**  
**STATE OF WISCONSIN**

P.O. BOX 7863  
MADISON, WI 53707

August 14, 2012

Dear Agency Head:

When our administration took office on January 3, 2011, Wisconsin suffered under a \$3.6 billion budget deficit. Prior administrations delayed payments, raided segregated funds and used federal stimulus for ongoing operational expenses. For years, Wisconsin relied on one-time fixes, accounting gimmicks, and tax increases to balance the state budget. Those days are over.

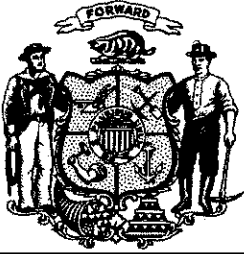
Facing a fiscal crisis on the day of my inauguration, our administration vowed to take immediate action to implement long overdue reforms and fiscal responsibility. By the end of my first year, Wisconsin increased revenue by 6.4 percent, balanced the state budget, and placed \$14.8 million into the budget stabilization fund. Furthermore, we are now poised to deposit an even greater amount as we close this fiscal year.

Other economic indicators continue to move in the right direction. Personal income increased at a rate of 5.2 percent, exceeding the national average. The unemployment rate declined year-over-year. Above average gains in both durable and non-durable manufacturing highlighted our GDP growth of 1.1 percent with manufacturing jobs growing a substantial 2.6 percent in 2011. The new days of responsible fiscal policy are here, and our broader economic recovery is building speed.

The building blocks of our recovery began with Wisconsin Acts 10, 13, 27, and 32. Act 32 brought our spending and revenue in balance. It was a test of our frugality and moderation as we sought sustainable solutions to Medicaid, state employment costs, and local government budgets. Without raising taxes, we solved the \$3.6 billion deficit left by the previous administration.

Wisconsin's financial outlook grows more sustainable. While cost pressures remain in Medicaid, Corrections, K-12, and the higher education systems, the tools and cost saving measures implemented in Act 10 and Act 32 can be more fully realized in the coming biennium. With the reforms we enacted, we saved the hard-working Wisconsin taxpayers more than \$1 billion, helped lower property taxes on a median-valued home for the first time in 12 years, and turned a budget deficit into a surplus. As our fiscal momentum builds, I plan to guide Wisconsin into increasingly stronger fiscal climates, where budget surpluses and positive economic growth become the norm and not the exception.

Others are beginning to take notice of Wisconsin's renewed momentum. After our first year in office, Wisconsin moved up 12 spots to 17<sup>th</sup> from 29<sup>th</sup> on CNBC's "America's Top States for Business" rankings and moved up to 20<sup>th</sup> from 41<sup>st</sup> on Chief Executive magazine rankings, the biggest jump of any state in the nation. Moving forward, we are



# SCOTT WALKER

## OFFICE OF THE GOVERNOR

### STATE OF WISCONSIN

P.O. BOX 7863  
MADISON, WI 53707

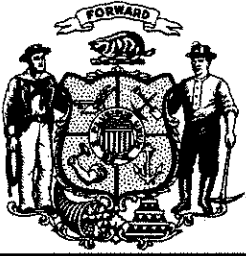
intensely focused on building a better job-creating business climate without raising taxes and encouraging the kind of innovation it will take to build a 21<sup>st</sup> century economy. We will channel some of this momentum into the Wisconsin Economic Development Corporation to foster the efforts of would-be job creators. We will implement various venture capital initiatives to push for and provoke much needed entrepreneurial development. Attracting and fostering job creators in the modern world requires we embrace the tools today's entrepreneurs need at their disposal.

Another critical tool for the job creator is a skilled and modern workforce. By implementing programs to train our friends and neighbors, we can substantially increase our state's reputation for tech-savvy, hard-working and ready-to-go workers. High-end manufacturers must never fear a lack of capable workers, and it is our mission to strengthen the confidence of any employer in Wisconsin as perennially open and ready for business. With innovative and strategic worker training, we will continue to grow a capable and dependable workforce.

Our workforce readiness depends on our ability to transform Wisconsin's education system. We will continue to strive to provide merit-based staffing to give us the best possible education providers and facilities. Reforms include implementation of the teacher evaluation model, a continuing focus on 3<sup>rd</sup> grade reading proficiency, and improved overall education outcomes. With these priorities, school districts and higher education institutions can build successful models, which fit unique local needs and bridge our workforce skills gap.

Economic success requires strong integration of the private sector and educational institutions. Wisconsin curriculum must have a better balance of employment-based learning and liberal arts so our graduates have the right skills for currently available jobs. We must also leverage new technology to increase online learning and allow students across Wisconsin access to world-class educators and industry leaders in other parts of the state. Our students deserve to learn from top-quality educators, so we must reform the system to reward excellent teachers, mentor struggling teachers, and replace failing teachers. With these reforms, Wisconsin will strive to provide educational excellence for all our children.

Investments in our infrastructure, such as transportation, telecommunications and energy, are vital to Wisconsin's economic recovery and competition in a global marketplace. We must diversify our energy supply based on a balance of cost and sound science, ever aware of the environmental impact. We should lift Wisconsin's nuclear moratorium to encourage this clean energy option, as well as continue to invest in energy transmission to move power from outside Wisconsin across the state. We must also get back to the basics of planning for transportation projects, funding common sense projects, and ending the raids on the transportation fund, so we can adequately maintain our roads and bridges. Wisconsin currently enjoys competitive advantages in the Midwest due to our transportation system we cannot afford to lose.



**SCOTT WALKER**  
**OFFICE OF THE GOVERNOR**  
**STATE OF WISCONSIN**

P.O. Box 7863  
MADISON, WI 53707

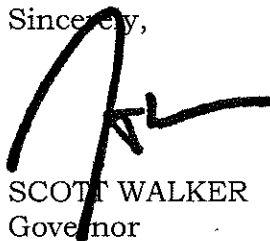
Wisconsin government exists to serve our people and one of our greatest responsibilities is meticulously tending a sound budget. We strive to be good stewards of the taxpayer's trust, while promoting both transparency and efficiency in government. Our continuous reform of government will remain fiscally prudent and will not raise taxes. We will seek every opportunity to re-tool existing programs and fashion additional programs as needed to ensure the most current and beneficial services. To avoid the temptation to once again resort to the gimmicks or one-time fixes typical of Wisconsin's recent past, we will prioritize growing the budget stabilization fund. By removing unwise and unsound budget gimmicks, by seeking a smaller and more efficient government, and by requiring transparency in these efforts, we aim to recover the trust of Wisconsinites and grow their faith in state government.

Given our shared goals, I am calling on most agencies to maintain their overall fiscal year 2013-14 and fiscal year 2014-15 GPR budgets at the fiscal year 2012-13 adjusted base levels minus the statutory and discretionary lapses. The same zero-growth targets will apply to the SEG-funded administrative operations. Agency requests should focus on enhancing the state's economy and advancing the goals discussed above. Funding to accomplish these priorities through modifying existing programs or developing additional programs should be offset by improvements in efficiency of agency operations or by reallocation of base funding.

Agency budget requests are due on September 17, 2012. Please review the Major Budget Policies and Budget Instructions carefully as you prepare and prioritize your requests. Technical budget instructions will be available on the State Budget Office SharePoint site.

Thank you for all your hard work. Together along with our professional state employees, we will meet the challenges before us and exceed the expectations of the people of Wisconsin.

Sincerely,



SCOTT WALKER  
Governor

# MAJOR BUDGET POLICIES 2013-15

## BUDGET TARGETS

- Agencies should prepare their 2013-15 biennial budget requests based on 100 percent of their fiscal year 2012-13 adjusted base level minus the annualized amount of their total 2011-13 biennial GPR lapse related to 2011 Wisconsin Act 32, Section 9255(1)(b). In addition, as required under Section 9255(1)(e)2. of Act 32, agencies must prepare their biennial budget requests to include reductions to their GPR appropriations to reflect the GPR lapses included under Section 9255(1)(d) of Act 32.
- The 2013-15 biennium will present many fiscal challenges brought on by global economic conditions and the continued slow national economic recovery. Addressing these challenges will be the overriding factor in GPR spending decisions for the next budget. As such, there will need to be restraint and reductions in most GPR appropriations in the next budget.
  - In addition to making the lapses permanent, all agencies should assume there will be zero growth in overall GPR appropriations in each fiscal year during the 2013-15 biennium, and specific program needs should be managed within this general constraint.
  - Exceptions will occur only for K-12 school aids; required basic cost-to-continue needs for the state's institutions, i.e., the Department of Corrections and the Department of Health Services institutions; entitlement and related assistance programs in the Department of Health Services (e.g., Medical Assistance), the Department of Children and Families' Division of Safety and Permanence, and the Department of Workforce Development's Division of Vocational Rehabilitation; and housekeeping adjustments like standard budget adjustments, fuel and utilities, and debt service.
  - All agencies that were assigned lapse amounts in the schedule shown in Section 9255(1)(d) of Act 32 must submit a budget request that reduces their GPR appropriations by the GPR portion of the lapses (the difference between the 2011-13 fiscal biennium listed annual amount and the 2013-15 fiscal biennium listed annual amount). This adjustment is required under Section 9255(1)(e)2. of Act 32.
- Under Act 32, the Department of Administration secretary is authorized to lapse or transfer \$174.3 million to the general fund in the 2011-13 and 2013-15 biennia. Agencies have submitted plans for fiscal year 2011-12 and will receive additional information for submitting plans to meet the lapse requirement for fiscal year 2012-13. The GPR portion of the reductions must be built into agency requests for the 2013-15 biennium to make the reductions permanent.
  - The amount of assigned lapse differs between fiscal years in the 2011-13 biennium, but agencies should allocate the reductions to reflect an equal split between fiscal years in the 2013-15 biennium (i.e., half of the 2011-13 biennium's amount in each fiscal year of the 2013-15 biennium).
  - If an agency plans to allocate any portion of its reduction to the permanent or project position salary and/or fringe benefit lines, a corresponding reduction in position authority must be made.

- Agencies will be notified separately of their target reductions related to this item.
  - The remainder of the \$174.3 million biennial lapse requirement for 2013-15 (i.e., the PR transfer portion) will be allocated out to agencies in the next biennium, so agencies should plan accordingly.
  - The Department of Justice, University of Wisconsin System, Department of Children and Families, Department of Workforce Development and the Office of State Employment Relations will not be required to make these reductions; however, the zero growth limitation and Section 9255(1)(c), (d) and (e)2. lapses and reductions do apply to these agencies.
- The zero growth policy will also apply to the SEG-funded administrative operations appropriations in all agencies that are supported by the transportation fund, the conservation fund, the environmental fund and the lottery fund.
  - Agencies are reminded that the program revenue (PR) transfer requirements under Section 9255(1)(c) and (d) of Act 32 continue into the 2013-15 biennium. Agencies should plan accordingly to ensure sufficient funds are available to meet these annual transfers.
  - Funding requests for other types of appropriations and other funding sources in both years should be limited to revenue availability and only the highest priority programmatic needs.
  - Except for standard budget adjustments, routine budget items should be handled in agencies' base budgets regardless of fund source.
  - Proposals that transfer functions or programs, including related costs and staff, between agencies should result in zero growth in overall state appropriations (i.e., the transferring agency should have lower overall appropriations to offset the increase at the receiving agency). All agencies involved in the transfer should notify the State Budget Office during the initial stages of considering any such proposal to facilitate review of the request and allocation of any projected savings between the agencies.

## **PLANNING FOR REDUCTIONS**

- Agencies should use this exercise to fundamentally review missions and priorities, exploring opportunities to reallocate resources, integrate programs and consolidate functions.
- Where reductions and efficiencies in state operations result in reductions in positions, agencies should avoid filling vacancies and make other plans to accomplish this reduction without layoffs.
- Any areas needing additional staff must be met through base reallocations.

Note: Agencies must receive approval from the State Budget Office before proposing to use funding sources in another agency to stay within budget targets, to absorb operations' reductions or to fund any new initiatives.

## **PERFORMANCE MEASUREMENTS IN BUDGETING**

- Agencies need to report on the performance measures they identified for previous biennial budgets. These measures should relate to agencies' broad Chapter 20 budget programs. If needed to capture significant shifts in agency function, additional measures could be added; however, only a few measures should be presented so there is a clear focus on results.
- For the 2013-15 budget, agencies need to report actual outcome measures through fiscal year 2010-11 and fiscal year 2011-12. Planned outcome measures should be listed for fiscal year 2012-13, fiscal year 2013-14 and fiscal year 2014-15. Agencies should track and maintain data going forward to present actual performance data for a fiscal year compared to planned performance. (A calendar year may be used if data is collected on that basis. Please note where calendar years are used.)
- The State Budget Office will include performance measures developed by an agency in the Executive Budget Book, and agencies should reference measures in decision items, where relevant.
- Agency descriptions and performance measures will be included in the state budget system and must be updated in that system. It is important for agencies to follow the prescribed format to ensure consistency and compatibility.

## **BUDGETING FOR INFORMATION TECHNOLOGY**

Requests for funding of information technology projects should identify the link between the project and the state's business goals, conformity to the Department of Administration's Policies and Procedures for Information Technology Management, and provide specific information about each project, including executive sponsorship. Consistent with information technology strategic planning, project definitions must include a standard return on investment (ROI) calculation.

## **BUDGETING FOR DEPARTMENT OF ADMINISTRATION RATE CHANGES**

Agencies should not reflect anticipated rate changes from the various divisions within the Department of Administration in their 2013-15 budget requests. Forecasting of rates and impacts on individual agency budgets will be addressed by the Department of Administration in developing the Governor's 2013-15 budget.

## **FEDERAL FUNDS**

The state has a goal of increasing the ongoing receipt of federal funds where the use of federal funding is consistent with state program goals. In order to increase the amount of federal funds received, agencies should conduct the following review:

- Examine existing grant awards to ensure that they are fully utilized and consistent with agency priorities. If unexpended grant authority is available, the agency should reallocate the funds to other activities to the extent possible under state and federal rules.



- Agencies may also identify, in the form of a policy paper submitted on September 17, additional federal grant opportunities that were not included in the agency's request. Such opportunities may be considered for funding by the State Budget Office during budget deliberations.

## **STATUTORY LANGUAGE GUIDELINES**

- Agencies should seek to limit policy items unrelated to appropriation changes for inclusion in the Governor's budget.

Note: Please contact your State Budget Office analyst to discuss whether a particular initiative is appropriate for submission as a budget request.

- Agencies should not submit extensive lists of technical or housekeeping changes for inclusion in the Governor's budget. Proposed changes for separate nonbudget legislation can be submitted to the State Budget Office for review and approval, separate from the budget request.

Note: Please contact your State Budget Office analyst if these types of changes are sought.

- As in past budgets, prior to September 17, agencies may work directly with the Legislative Reference Bureau in preparing statutory language items related to the budget. After September 17, all drafting and redrafting requests related to the budget must come from the State Budget Office.
- The Legislative Reference Bureau strongly discourages agencies from submitting budget bill drafts that agencies have drafted. Instead, agencies should submit memoranda identifying what they are seeking to accomplish.
- The detailed budget instructions will provide more information on statutory language submittal requirements.

## **BUDGET SUBMITTAL DUE DATES AND PROCEDURES**

- Formal budget requests are due Monday, September 17, 2012. Send four (4) copies to the State Budget Office and two (2) copies directly to the Legislative Fiscal Bureau.
- State Budget Office staff will be available to meet with individual agencies to explain budget policies and procedures, and discuss any agency concerns.
- Implementation of the new budget development system may result in changes in policies and procedures. Additional information will be forthcoming on any changes.

## INFORMATION ON THE WEB

- The Budget Instructions will be available on the State Budget Office Web site at <http://www.doa.state.wi.us/debf/index.asp>.
- Periodic information updates will be posted to this Web site and the State Budget Office SharePoint site, so agencies should check these sites regularly.

UNIVERSITY OF WISCONSIN SYSTEM  
SHARE OF STATE GPR

	UW GPR <u>EXPENDITURE</u>		STATE OF WI GPR <u>EXPENDITURE</u>	UW AS % <u>OF STATE</u>
1973-74	278,743,147		1,933,571,053	14.42%
1974-75	298,522,282	7.10%	2,166,752,155	13.78%
1975-76	310,446,570	3.99%	2,307,619,718	13.45%
1976-77	340,074,169	9.54%	2,470,900,111	13.76%
1977-78	363,899,880	7.01%	2,634,551,777	13.81%
1978-79	390,977,741	7.44%	3,148,901,910	12.42%
1979-80	420,677,864	7.60%	3,278,297,185	12.83%
1980-81	434,183,806	3.21%	3,446,856,743	12.60%
1981-82	478,941,747	10.31%	3,450,863,890	13.88%
1982-83	508,368,220	6.14%	4,078,030,140	12.47%
1983-84	540,472,131	6.32%	3,977,740,308	13.59%
1984-85	555,568,482	2.79%	4,588,188,276	12.11%
1985-86	583,885,301	5.10%	4,868,026,430	11.99%
1986-87	594,259,601	1.78%	5,070,256,284	11.72%
1987-88	633,625,206	6.62%	5,246,094,384	12.08%
1988-89	660,137,195	4.18%	5,451,877,458	12.11%
1989-90	698,155,838	5.76%	5,802,999,036	12.03%
1990-91	740,757,863	6.10%	6,364,528,649	11.64%
1991-92	759,887,369	2.58%	6,650,683,407	11.43%
1992-93	771,832,665	1.57%	6,922,128,169	11.15%
1993-94	814,538,009	5.53%	7,276,614,107	11.19%
1994-95	849,762,860	4.32%	7,789,976,441	10.91%
1995-96	847,482,297	-0.27%	8,131,598,722	10.42%
1996-97	853,360,473	0.69%	9,283,406,651	9.19%
1997-98	883,660,451	3.55%	9,694,461,511	9.12%
1998-99	903,691,964	2.27%	10,009,395,000	9.03%
1999-00	953,800,000	5.54%	11,293,969,000	8.45%
2000-01	1,047,000,000	9.77%	11,077,681,000	9.45%
2001-02	981,400,000	-6.27%	11,265,100,000	8.71%
2002-03	1,063,800,000	8.40%	11,047,900,000	9.63%
2003-04	949,000,000	-10.79%	10,784,000,000	8.80%
2004-05	996,900,000	5.05%	11,859,700,000	8.41%
2005-06	1,011,600,000	1.47%	12,727,100,000	7.95%
2006-07	1,039,500,000	2.76%	13,130,800,000	7.92%
2007-08	1,074,600,000	3.38%	13,526,300,000	7.94%
2008-09	1,136,100,000	5.72%	12,744,300,000	8.91%
2009-10	1,027,400,000	-9.57%	12,824,000,000	8.01%
2010-11	1,100,700,000	7.13%	13,579,300,000	8.11%
2011-12*	1,001,508,980 (a)	-9.01%	14,194,976,500 (b)	7.06%
2012-13*	1,135,221,084 (a)	13.35%	14,832,954,300 (b)	7.65%
Five Year Average		1.52%	(Includes budgeted amounts in FY12 and FY13)	
Ten Year Average		0.95%		
Twenty Year Average		2.15%		

Source for Actuals: State Annual Fiscal Report, Tables 2/3, Department of Administration

Source for budgeted figures, which are indicated by \*:

(a) UW System Annual Operating Budget Document

(b) Legislative Fiscal Bureau, Comparative Summary of Budget Recommendations, Table 1

## APPENDIX A

**APPENDIX A**  
**UNIVERSITY OF WISCONSIN SYSTEM**  
**2013-15 PERFORMANCE IMPROVEMENT GOALS BY INSTITUTION**

The following shows 2013-15 performance indicators by institution, including the specific goals for improvement by the end of the 2015-16 academic year, subject to the receipt of the requested funding.

**UW-Madison**

Performance Indicator	Baseline Level	Improvement Goal
Undergraduate time-to-degree average	4.1 years	4.0 years
Freshmen to sophomore retention	93.9%	95%
Four year graduation rate	55.5%	60%
Six year graduation rate	82.8%	85%
Access: low-income students	16.9%	18%
Institutional need-based financial aid	\$36,800,000	\$40,000,000
Participation in high impact practices	89%	95%
Enrollment in alternate delivery sections	200	2,500
Capstone certificates	3 programs	10 programs
Master's programs in flexible format	10 programs	15 programs
Patent disclosures	356	427
Madison: Milwaukee research teams	20	68
Madison: Milwaukee research funding	\$1,000,000	\$3,400,000

**UW-Milwaukee**

Performance Indicator	Baseline Level	Improvement Goal
Number of graduates	3,740	3,950
Access: low-income students	37%	39%
Access: minority new freshmen	23%	25%
Extramural research	\$38,300,00	\$42,000,000
Corporate-sponsored research	\$2,200,000	\$2,380,000
Businesses receiving assistance	882	900
Madison:Milwaukee research teams	20	68
Madison:Milwaukee research funding	\$1,000,000	\$3,400,000

*Additional UW-Milwaukee Performance Goals*

- 50% of all recent graduates will remain in the Milwaukee area
- Freshmen to sophomore retention will increase to 72%
- Patent filings will increase to 22
- Invention disclosures will increase to 45

**UW-Eau Claire**

Performance Indicator	Baseline Level	Improvement Goal
Access: minority students	6%	8%
Students doing research work with faculty	25%	28%
Graduates employed or pursuing further study		95%
UW-Eau Claire's total annual economic impact		\$161 million

### UW-Green Bay

Performance Indicator	Baseline Level	Improvement Goal
Credits to degree	136.6	130
Access: transfer students	1,121	1,440
Number of graduate and professional degrees	4	10

### UW-La Crosse

Performance Indicator	Baseline Level	Improvement Goal
Bachelor's degrees	1,626	1,800
Freshmen to sophomore retention	85%	87%
Six year graduation rate	71%	72%
Federal research funding	\$2,451,636	\$2,500,000

### UW-Oshkosh

Performance Indicator	Baseline Level	Improvement Goal
Access: headcount enrollments	13,513	13,863
Undergraduate degrees awarded	1,924	2,075
Non-university jobs created in NE Wisconsin	10	150
Businesses/Organizations hosting internships or co-ops	577	697
Service learning, volunteer partnerships	153	185
Cultural or arts partnerships	21	25
Businesses receiving business development assistance	194	234
Businesses hosting clinical/legal/social work placements	583	705
Schools hosting student teachers	181	218
Academic program collaborations with UW institutions	39	47

### UW-Parkside

Performance Indicator	Baseline Level	Improvement Goal
Research grants	\$900,000	\$1,200,000
Students working on economic growth projects	292	350
Internships for course credit	7.7%	10%
Access: Pell recipients	1,630	1,751
Percent of majors involved in economic growth projects	34%	40%

### **UW-Platteville**

Performance Indicator	Baseline Level	Improvement Goal
Freshmen to sophomore retention	78%	80%
Percent of students receiving financial aid	78%	80%
Closing the achievement gap		By 2%
Students in service learning projects	700	1,000

### **UW-River Falls**

Performance Indicator	Baseline Level	Improvement Goal
Freshmen to sophomore retention	71.9%	76.2%
Foundation scholarship dollars (with need component)	\$68,275	\$380,275
Work with faculty on research project	37%	44%
Research grants	\$2,644,552	\$3,702,372

### **UW-Stevens Point**

Performance Indicator	Baseline Level	Improvement Goal
Access: underrepresented minorities	585	917
Freshmen to sophomore retention	80%	83%
Retention of transfer students	75%	82%
Four year graduation rate: new freshmen	22%	26%
Four year graduation rate: transfer students	56%	57%
Six year graduation rate: new freshmen	61%	63%
Six year graduation rate: transfer students	64%	64%

### **UW-Stout**

Performance Indicator	Baseline Level	Improvement Goal
Increase undergraduate degrees	1,545	1,685
Increase graduate degrees	296	330
Reduce credits to degree	138	130
Increase fall transfers	649	705

#### *Additional UW-Stout Performance Goals*

- Increase income from UW-Stout related spending by 3%
- Increase business clients served by 10%
- All undergraduate programs will require 120 credits for a degree by fall 2013.
- Move from #6 ranking in total transfers within the UW Comprehensives in 2010-11 to #2 ranking by 2016-16.
- Maintain #1 ranking in transfers from the Wisconsin Technical Colleges within the UW Comprehensives through 2015-16.

### UW-Superior

Performance Indicator	Baseline Level	Improvement Goal
Access: headcount enrollment	2,825	3,200
Freshmen to sophomore retention	68%	74%
Six year graduation rate	44%	52%
Extramural funding: number of submissions	45	60
Extramural funding: number of awards	34	45
Extramural funding: number of engaged faculty	19	23

### UW-Whitewater

Performance Indicator	Baseline Level	Improvement Goal
Four year graduation rate	26.5%	27.5%
Five year graduation rate	49.5%	50.5%
Credits to degree	136	135
Access: fall transfer students	641	700
Access: non-traditional students	752	900
Access: veterans	230	260
Access: underrepresented minorities	864	1,000
Total student involvement in high impact practices	10,196	11,000
Students involved in U-Lead program	96	120
Student satisfaction with advising, seniors	2.83/4.0	3.0/4.0
New business ventures facilitated	33	40
New jobs created in region	533	600
Private investment facilitated in region	\$5,725,000	\$7,000,000
Dollar value of incentives facilitated	\$2,572,694	\$3,000,000

### UW Colleges

Performance Indicator	Baseline Level	Improvement Goal
Freshmen to sophomore retention: full-time students	59%	61%
Freshmen to sophomore retention: part-time students	46%	48%
Six year baccalaureate graduation rate: students transferring to other UW institutions	71%	73%
Collaborative degree programs with other UWs	29	40
Course and support service collaborations with Wisconsin Technical Colleges	6	10
Limit the annual increase in costs paid by students after financial aid is applied		Less than a 5% increase annually

### UW-Extension

Performance Indicator	Baseline Level	Improvement Goal
Number of new businesses created or spun-off	115	190
Number of jobs created statewide	471	550
New capital infusion into the state	\$40,000,000	\$55,000,000



## APPENDIX B

**APPENDIX B**  
**UNIVERSITY OF WISCONSIN SYSTEM**  
**PROVIDING FOR THE 21<sup>ST</sup> CENTURY ECONOMY**

**August 23, 2012**

## Table of Contents

Economic Impact .....	1
Working with Businesses and Communities .....	4
Workforce Development .....	41
Internships.....	42
STEM Disciplines.....	52

## **Economic Impact**

In 1997, an economic impact report concluded that University of Wisconsin graduates return more than \$3 for every dollar invested in their education through taxes. In 2002, the annual economic impact of the UW System was \$9 billion. Now, with UW-Madison alone providing a \$12 billion economic impact, the annual impact of the UW System is conservatively estimated to fall between \$15 and \$20 billion.

For comparison, the UW's economic impact is 15 to 20 times the \$1.1 billion in GPR funding that the state provides – an extraordinary return on Wisconsin's investment.

Seven UW System institutions have completed individual economic impact studies in recent years. A summary of the findings from these studies follows.

### **UW-Madison**

UW-Madison has a \$12.4 billion total impact on the Wisconsin economy. In 2011, the university brought in \$808 million in new revenue to Wisconsin through research and instructional activities and \$1.1 billion from all activities and sources. In addition, the university generates \$614 million in tax revenue.

In 2010, 109 patents were filed on behalf of UW-Madison researchers, and 133 patents were issued. Sixty-two new licenses or options were executed in 2010. In total, all licensed patents based on research at UW-Madison generated \$54.3 million in 2010.

The University Research Park, which fosters technology transfer and new start-up companies, is home to 126 companies and more than 3,500 employees. In total, the Research Park has an \$826 million economic impact in Wisconsin, including more than 9,300 jobs. It also generates more than \$43 million in local and state tax revenue.

As of October 2011, 279 start-up companies had a UW-Madison association. Of those, 105 were formed around a technology licensed by the Wisconsin Alumni Research Foundation. Directly and indirectly, the University creates and supports 128,146 Wisconsin jobs.

### **UW-Milwaukee**

UW-Milwaukee is vital to the state's economic health. Direct spending by students, employees, visitors, event participants, and the University itself totals about \$713 million per year. Visitors and event participants alone spend \$140 million in the community each year. When indirect spending is included, the institution's economic contribution increases to about \$1.5 billion. Based on an analysis for the 2009-10 academic year, this is a \$13 dollar return for every dollar of state investment.

About 29,400 Wisconsin jobs are attributable to UW-Milwaukee's presence, which excludes individuals directly employed by the university. Based on the same report, estimated construction spending at UW-Milwaukee over three to five years is expected to sustain about 5,300 construction and supplier jobs.

### **UW-Oshkosh**

UW-Oshkosh has a significant direct and indirect economic impact on the state and region. Data from 2009 place the annual economic impact at more than half a billion dollars. The campus helped create more than 9,000 jobs in recent years and generated \$37.5 million in tax revenue. Students and staff also gave well over \$4 million in time and money to local charities.

### **UW-Parkside**

UW-Parkside's Small Business Development Center (SBDC) helps fuel the local economy in Southeastern Wisconsin. In 2011, the SBDC's support of local businesses generated \$37.61 of new business revenues for every State dollar invested. In addition, the SBDC was responsible for \$3.7 million in capital infusions into the regional economy.

UW-Parkside is developing an economic impact statement that will be published in September 2012.

### **UW-Platteville**

Using the IMPLAN model, the combined direct, indirect, and induced contributions of UW-Platteville to the economy of Southwest Wisconsin are estimated at \$168.4 million during 2007-08.

### **UW-River Falls**

UW-River Falls' graduates contribute to Wisconsin through higher levels of discretionary spending and by paying higher taxes. Ninety percent of Wisconsin residents who graduated from UW-River Falls remained in the state.

Degrees in high-need and leading edge fields are important to meet the demand for workers in fast growing occupations such as science, technology, engineering, and mathematics (STEM) fields. In 2010-11, UW-River Falls conferred 347 STEM degrees.

### **UW-Stevens Point**

UW-Stevens Point contributes nearly \$408 million per year to the Wisconsin economy, supports 5,690 Wisconsin jobs, and generates \$16.7 million in state tax revenue. Direct spending in the state by the institution, faculty, staff, students, and visitors total more than \$171 million. This spending feeds the economic engine to generate more than \$236 million in indirect and induced spending.

## **UW-Stout**

The annual economic impact of UW-Stout on the economy is \$347.2 million, or \$9.59 in economic activity for every \$1 invested. UW-Stout supports 7,096 Wisconsin jobs and generates \$18.3 million in state and local sales tax revenue.

## **UW-Superior**

A study based on fiscal year 2007 showed that spending by UW-Superior and its 471 full-and part-time employees generates approximately \$31.7 million and sustains 574 jobs in Superior and Douglas Counties. UW-Superior student spending adds another \$8.1 million and sustains an additional 179 jobs. Tourists who come to Superior to visit students, to attend university conferences, and to participate in athletic contests contribute \$1.5 million, which supports about 32 local jobs.

## **UW-Whitewater**

Two studies by the UW-Whitewater Fiscal and Economic Research Center evaluated the impact of the university on the regional economy. The first examined the economic impact of the Global Education Program, which facilitates international student enrollment at UW-Whitewater. This program alone added 46 jobs, generated \$1,267,386 in employment income, and created \$3,745,119 in spending in Walworth, Jefferson, and Rock Counties.

A second study by the Fiscal and Economic Research Center based on fiscal year 2008-09 showed that spending by UW-Whitewater's 1,018 full- and part-time employees generated an estimated \$53.6 million in direct and indirect expenditures—supporting approximately 497 additional local jobs. Direct and indirect UW-Whitewater student spending totaled \$14.3 million and supported 158 additional local jobs. UW-Whitewater visitors (employee visitors, student visitors, athletic event attendees, and student athletic camp participants) generated \$11.4 million of direct and indirect spending and supported approximately 164 local jobs.

# Working with Businesses and Communities

Over the last decade more and more Wisconsin business are being created, rejuvenated, or expanded through partnerships with UW System institutions. The services that UW institutions provide to communities are also considerable. Examples of these activities follow.

## UW-Madison

### *New Businesses Created or Spun Off*

The University Research Park (URP), which fosters technology transfer and new start-up companies, is home to 126 companies and employs more than 3,500 people. The average URP employee earns more than \$64,000, substantially higher than the average state earnings of \$39,156.

The total direct and indirect economic impact of URP activity in Wisconsin is estimated to be over \$826 million, more than 9,300 jobs created, and more than \$43 million in state and local tax revenue.<sup>1</sup>

As of October 2011,<sup>2</sup> 279 startup companies were directly associated with the university.<sup>3</sup> Of the direct start-ups, 105 were formed around a technology licensed by WARF, and 105 had a link to UW-Madison students.

An additional 68 UW-Madison related start-up companies were founded by any UW-Madison community member who may have launched the company more than one year after ending UW-Madison affiliation.

### *Secondary Businesses Affiliated with System or System-Sponsored Research*

UW-Madison supports Wisconsin businesses through the products and services it purchases. In 2011, more than 407 Wisconsin vendors supplied \$2.9 million in supplies and services to UW-Madison.<sup>4</sup> This figure does not include electronic purchasing, which accounts for 29 percent of purchasing activity. Data from 2009, when e-business accounted for a smaller share of activity, showed 1,262 vendors in Wisconsin.

### *Support Provided To Existing Industries*

UW-Madison provides support to business and industry through a range of venues. An estimated 2,790 businesses or other organizations received business development support in 2010-11.

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<sup>1</sup> The Economic Contribution of the University Research Park, Northstar Economics Inc., August 2010

<sup>2</sup> Creation of UW-Madison start-up companies is tracked by the INSITE Entrepreneurship Census ([www.bus.wisc.edu/insite](http://www.bus.wisc.edu/insite)).

<sup>3</sup> One or more founders were affiliated with the university as faculty, staff, or a student at the time of founding or within one year of ending their UW-Madison affiliation, or the firm was founded around a university technology.

<sup>4</sup> Limited to accounts that represent federal funding and gifts and grants to research projects

UW-Madison hosts 32 consortia in six schools and colleges that provide faculty and staff support to businesses.<sup>5</sup> In 2011, the consortia served 327 businesses, 162 of which are based in Wisconsin.

For example, the meat industry contributes \$12 billion annually to Wisconsin's economy, provides 88,000 jobs, and \$450 million in state and local taxes.<sup>6</sup> The University's technical expertise and experimental results are extended to the industry through websites, conferences, and direct communication. Companies can contact the Food Research Institute, UW-Extension, and the Meat Science Lab with questions. UW-Madison also serves the industry by providing graduates for employment.

Dairy Processing is a \$26.5 billion industry in Wisconsin. The Center for Dairy Research offers 22 short courses to 1,400 students annually and provides technical assistance to more than 200 companies per year. The University also trained 52 Wisconsin-based master cheese makers and developed recipes for Pleasant Ridge Reserve and Seymour Dairy blue cheese. Seymour Dairy alone has grown from 3 employees to 54 in four years.

UW-Madison invests roughly \$2 million in research and outreach to support the state's \$20 million potato industry. Support includes activities on three research stations, training students, and knowledge transfer in partnership with UW-Extension.

#### *Support Provided to Wisconsin's PK12 Students*

The Translational Research Initiative with the 4K PD<sup>7</sup> Program is led by Curriculum and Instruction professors in partnership with Madison Metropolitan School District. This initiative helps four-year-old kindergarten (4K) teachers draw on the knowledge children bring from home and use it to support early mathematics development. The program is funded through a National Science Foundation grant with supplementary funds from the school district, which allows teachers to participate at no cost. The School of Education plans to use the 4K PD program as a pilot for a new "engaged research" initiative between the Wisconsin Center for Education Research and the Education Outreach and Partnerships Office.

Wisconsin Leads in Math and Science (WI Leads) offers an innovative partnership that establishes two new professional development programs in mathematics and science at the middle school level. The program also supports general outreach activities in the sciences like Science Alliance and the UW-Madison Darwin Days committee. It also supports Developing Science Futures, a collaboration between UW-Madison, UW-Oshkosh, and the Wisconsin Society of Science Teachers that is supported by \$250,000 in federal funding.

Art Education Alumna Helen Burish created the Art Outreach Fund to connect high school teachers to the University. Burish organized a series of workshops that provides high school art teachers with hands-on professional development and gives the Art Department's graduate students and recent alumni an opportunity to share their expertise. The Art Outreach Fund will also support

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<sup>5</sup> College of Agricultural and Life Sciences (CALS), Business, Engineering, Human Ecology, Letters and Science, and Pharmacy

<sup>6</sup> Based on a 2007 study by Agriculture and Applied Economics professor Steve Deller.

<sup>7</sup> "PD" is short for "Professional Development"



sending graduate students to visit high schools each semester for short-term residencies and bringing high school students to the Department for workshops led by graduate students.

The Partner School Network is made up of 18 schools across four local districts and various programs in the School of Education. While a key function of this network is to prepare future educators and to secure consistent high-quality sites for clinical experiences, partnerships are also established that enable UW-Madison to play a greater role in strengthening school communities and improving student outcomes. Educational research and professional development activities (supported at over \$26,000 this year) in the partner schools can be more directly connected with the needs of the schools.

World-Class Instructional Design and Assessment (WIDA) advances academic language development and academic achievement for linguistically diverse students through high-quality standards, assessments, research, and professional development for educators. WIDA also facilitates interaction among educators, state and local educational agencies, researchers, policy-makers, and experts worldwide.

## **UW-Milwaukee**

### *Small Business Development Center*

In 2011, the UW-Milwaukee Small Business Development Center (SBDC) provided almost 1,500 one-on-one business counseling hours to more than 350 clients, over 2,300 hours of training to 165 participants interested in starting a business, and over 400 hours of business skill training to 160 participant. The SBDC helped start 38 new businesses with a capital infusion of \$4.4 million and sales growth of \$11.7 million.

The SBDC continues to work with local chambers of commerce to offer educational programming and one-on-one business assistance to their members. The SBDC has also worked with the Department of Workforce Development's HIRE Center to train dislocated workers to start a business.

Beyond education, the SBDC also partners with numerous organizations to support economic development across Milwaukee, Washington, and Ozaukee Counties. Some examples are listed below:

Chambers of Commerce	Business Improvement Districts
Wisconsin Innovation Network	Community Development Corporations
New Venture Business Plan Contest	Inventor and Entrepreneur Clubs
BizStarts Milwaukee	Wisconsin Women's Business Initiative Corp.
SBA Emerging 200	Economic Development Washington County
Ozaukee Economic Development	Silver Street Main Street Milwaukee
Wisconsin Procurement Institute	Milwaukee Urban League
VETransfer	Wisconsin Technology Council
Milwaukee Small Business Development Office	UW-Milwaukee Research Foundation
Wisconsin Economic Development Corporation	The Mosaic on Burleigh
Wisconsin Supplier Development Council	Creative Alliance Milwaukee
Statewide SBDCs	Milwaukee Water Council
Milwaukee Economic Development Corporation	

*Bostrom Center for Business Competitiveness, Innovation, and Entrepreneurship*

The Bostrom Center serves as an interdisciplinary applied research center to develop and disseminate policies and strategies that enhance the vitality of innovation and business competitiveness in entrepreneurial firms. The Center's research projects engage Lubar School of Business faculty, doctoral students, and area corporations to advance topics of business competitiveness and innovation.

One focus area is the Real Time Enterprises Research Program. In the 21<sup>st</sup> century, time may be the most important factor affecting enterprises. Real Time Enterprises can quickly sense and respond to opportunities and threats using massively distributed decision making. Organizations can access up-to-the-minute information on all critical aspects of the organizational environment and operations using intelligent cyber devices attached to objects.

In addition, the Center's activities have broadened the business curriculum and provided additional learning opportunities for students. For example, the Entrepreneurship Certificate offers undergraduate business students the opportunity to study venture financing, business-to-business transactions, marketing, and other entrepreneurship topics.

The Center also supports the La Macchia Enterprises Entrepreneur Internship Program. Since its inception in 2002, over 100 business students interned with entrepreneurs. The program is now supported by a major gift from La Macchia Enterprises and additional gifts from the Brady Corporation and private donors. Nearly 50 percent of the interns have been offered full-time jobs by the sponsoring firms, which contribute to the entrepreneurial ecosystem of the region.

The New Venture Business Plan Competition also fosters an entrepreneurial spirit by inviting students and recent alumni to develop practical business skills and to create new ventures. Thanks to the support of La Macchia Enterprises, the top three winners share \$12,000 in awards. Of the competition's winners, 75 percent launched their proposed start-up ventures.

### *Business and Industry Partnerships*

As a regional leader, UW-Milwaukee is integrally engaged with industry. The following are some examples of that engagement.

- The Wisconsin Energy Research Consortium (WERC) brings together UW-Milwaukee, UW-Madison, Marquette University, Milwaukee School of Engineering, and three technical colleges with the mission of making Wisconsin a nationally recognized center of expertise in energy, power, and control technologies. WERC facilitates innovative research, workforce development, the recruitment of complementary businesses, and strategic partnerships. Since its formation in 2010, the Consortium has grown to 19 industry members and has sponsored 18 seed-funded research projects.
- A new era of collaboration began in Milwaukee when the National Institutes of Health awarded a \$20 million grant to the Clinical and Translational Science Institute of Southeast Wisconsin. The five-year award is being used to create a borderless, synergistic biomedical research enterprise that will accelerate the translation of research discoveries into new and improved medical treatments. The institute's goal is to diminish the barriers between disciplines and institutions in order to encourage novel solutions to complex medical problems. Partners include UW-Milwaukee, the Medical College of Wisconsin, Marquette University, the Milwaukee School of Engineering, the Blood Center of Wisconsin, Children's Hospital and Health System, Froedtert Hospital, and the Clement J. Zablocki VA Medical Center.
- As part of the Department of Energy network of Industrial Assessment Centers, faculty and graduate students in the College of Engineering and Applied Science conduct energy audits with local manufacturers to improve productivity, to reduce waste, and to save energy. Audits typically identify about \$55,000 in potential annual savings.<sup>8</sup> Students also gain hands-on training and experience with industrial process systems, plant systems, and energy systems. These experiences prepare them to contribute directly to a company's bottom line after graduation.
- The Children's Environmental Health Sciences Core Center is a partnership between UW-Milwaukee, the Medical College of Wisconsin, and the Children's Research Institute, and is supported by an \$8.5 million National Institutes of Health grant. The Center unites the university's expertise in basic developmental toxicology with its partners' expertise in clinical childhood diseases. Investigators convert scientific understanding into effective strategies to prevent environmentally-dependent childhood disease. For example, one project is evaluating the effects of an industrial chemical used in plastics (BPA) on normal development.

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<sup>8</sup> U.S. Department of Energy. "Industrial Assessment Centers (IACs)." [http://www1.eere.energy.gov/manufacturing/tech\\_deployment/iacs.html](http://www1.eere.energy.gov/manufacturing/tech_deployment/iacs.html)

- The ANSYS Institute for Industrial Innovation (AI<sup>3</sup>) provides world-class facilities to local industries seeking to partner with the College of Engineering and Applied Science. AI<sup>3</sup> offers clients the ability to investigate new markets or new projects without a significant investment of company resources, access to potential employees already trained in their core technology, and the ability to get an out-of-the-box perspective on product development. Just as important, AI<sup>3</sup> will provide students hands-on experience with state-of-the-art engineering software tools and real-world industry experience. AI<sup>3</sup> is unique in the Milwaukee area and helps to foster economic growth and development.
- The Great Lakes Transportation Enterprise Institute is dedicated to promoting safe, efficient, and cost-effective surface transportation in the Great Lakes region through innovative research and development. The Institute leverages the collective strengths of UW-Milwaukee, UW-Madison, Marquette University, the Medical College of Wisconsin, and business partners. These partnerships facilitate innovations in green technology, transportation safety, and workforce sustainability.
- The new School of Freshwater Sciences (SFS) expands on a tradition of freshwater studies at UW-Milwaukee to become the first graduate school in the nation dedicated solely to the study of freshwater. The mission of SFS is to train freshwater professionals and to advance fundamental and strategic science. SFS works with business partners including the Milwaukee Water Council, Lake Express Ferry, and Sweet Water Organics.
- The Institute of World Affairs (IWA) supports programs on international trade and economic security issues. For example, IWA recently facilitated a special program on U.S. Energy Policy, Green Jobs, and the Wisconsin Economy. IWA collaborates with the Metropolitan Milwaukee Association of Commerce on initiatives to expand trade relations and organizes meetings for regional economic development officers and business leaders. The IWA assistant director serves on the board of the Milwaukee World Trade Association and leads the planning committee of the Wisconsin International Trade Conference.
- The Consortium for Advanced Research in Gas Industries is primarily dedicated to improving ergonomics, safety, productivity, and quality in gas industries. For example, the Consortium has developed training on how to protect against injuries while working on a gas meter. The consortium is made up of member companies representing gas utilities, ancillary organizations, suppliers, and consultants.

### *Technology Transfer*

Scientific discovery at UW-Milwaukee has led to a growing portfolio of intellectual property that now includes 38 issued or applied-for patents and additional copyrighted matters. This intellectual property spans a range of disciplines that includes biological sciences, materials, imaging, water, energy, and communications.<sup>9</sup> The following are some examples of UW-Milwaukee's technology development and transfer activities:

- The Water Equipment and Policy (WEP) research center is a collaborative organization formed by UW-Milwaukee, Marquette University, and industry members to pursue water industry research. Badger Meter, Inc, a charter member of the initiative, already has a patent pending as a result of the research. "We certainly couldn't get the same amount of research (internally) out of putting in the same amount of money," said Badger Meter's vice president of business development.<sup>10</sup> Other technologies with potential commercial application include a polymer foam that removes lead from water, passive wireless sensors that can be read remotely, and ultrasonic sensor technology.
- The UW-Milwaukee Center for Advanced Materials Manufacturing (CAMP) was formed to facilitate advanced materials manufacturing research and application. Backed by a \$1.2 million federal grant, CAMP will support the transfer of UW-Milwaukee's research in bulk nanostructured materials to the manufacturing industry. If these materials can be mass produced, they have the potential to revitalize foundries. CAMP researchers will work with Oshkosh Corporation and other companies to develop an infrastructure for scaling up their production.
- Johnson Controls, the world's leading automotive battery supplier, has partnered with UW-Milwaukee to test and identify innovations with enough commercial potential to warrant more focus. The partnership has led to construction of two research labs supported by Johnson Controls on the UW-Milwaukee campus. In addition, the company is supporting the Johnson Controls Endowed Professorship in Energy Storage Research and graduate fellowships at both UW-Milwaukee and UW-Madison.
- The Milwaukee Institute for Drug Discovery advances research and later-stage development from discoveries at UW-Milwaukee and collaborating institutions. The Institute serves as a unique resource to build the cross-disciplinary collaborations essential in drug development and coordinates research strengths to address major needs in disease therapy. The Institute also develops linkages to the greater Milwaukee community to promote regional economic development. Recent Institute research on a naturally-produced chemical with anticancer properties has promising potential for development.

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<sup>9</sup> University of Milwaukee Research Foundation. *2011 Progress Report*. <http://www.uwmresearchfoundation.org/getdoc/81dc6dc9-7560-4ca4-8082-6dc674268483/2011-UWMRF-Progress-Report.aspx>

<sup>10</sup> "Water research venture yielding results." *The Business Journal*. May 18, 2012.

- Dr. Ching-Hong Yang is collaborating with Wilbur-Ellis, an international agricultural company, to develop and test a new generation of antibacterial compounds. Despite the constant threat of disease in agriculture, says John Frieden, a biologist and manager with Wilbur-Ellis, the industry has not had access to any new antibiotics in many years. U.S. regulatory agencies do not allow agribusiness to use antibiotics that are also used for human health.<sup>11</sup> “The thing that caught my attention,” Frieden says, “was that this was not an antibiotic, but it accomplishes the same thing as an antibiotic.” The company hopes to move to field trials with promising compounds in the near future.
- Dr. Peter Geissinger partnered with Advanced Chemical Systems (ACS), a local water-industry company, to develop and test his laser-based system for detecting impurities in water. Advanced sensors for water monitoring are one of the key technologies identified by many of the water-related companies in the Milwaukee water cluster.<sup>12</sup> Chris Fox, a vice president at ACS said, “We are eager to work with UWM researchers to further develop the technology and ultimately take it to commercialization.” Working with Dr. Geissinger and Paul Henning, his post-doc, the company won a Small Business Innovation Research grant backed by the National Science Foundation.<sup>13</sup>
- When operators of Bell Aquaculture decided to add yellow perch, the Midwest’s fish-fry favorite, to the company’s product line, they initially came up empty-handed. “We went looking for the fingerlings on the market and we couldn’t find them,” says Bell President Norman McCowan. “So we knew early on we would have to partner with someone.”<sup>14</sup> Partnering with Dr. Fred Binkowski, Bell Aquaculture accessed perch-raising techniques that are not available anywhere else in the world. Today, Bell runs the nation’s largest yellow perch farm and recently broke ground on a \$5 million expansion at its production facility in Albany.<sup>15</sup> Binkowski's patented work is licensed to Bell through the UW-Milwaukee Research Foundation.
- Zhen “Jason” He partnered with Mark Murphy, a local entrepreneur, to launch HydroTech Innovations. Hydrotech uses relatively new microbial fuel cell technology to clean water and generate electricity at the same time. Continuing development and commercialization is supported by \$50,000 in National Science Foundation funding. The company is also working on a greener method to soften water.<sup>16</sup>

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<sup>11</sup> Hunt, Lisa L. “An antibiotic effect without the threat of resistance.” <http://www5.uwm.edu/news/2011/09/07/an-antibiotic-effect-without-the-threat-of-resistance/#.UA7tjOz5nTo>

<sup>12</sup> “New local partnership to develop water technology.”

[http://www4.uwm.edu/news/stories/details.cfm?customel\\_datapageid\\_11602=1374775](http://www4.uwm.edu/news/stories/details.cfm?customel_datapageid_11602=1374775)

<sup>13</sup> Hunt, Laura L. “Sensing in a flash.” <http://www5.uwm.edu/news/2012/01/11/sensing-in-a-flash/#.UA7xvez5nTo>

<sup>14</sup> University of Wisconsin Milwaukee. *Research that energizes: Research Report 2012*.

<http://www4.uwm.edu/research-impact/report.cfm>

<sup>15</sup> “Bell Aquaculture is Expanding.” <http://www.bellaquaculture.com/2011/06/bell-aquaculture-is-expanding/>

<sup>16</sup> University of Wisconsin Milwaukee. *Research that energizes: Research Report 2012*.

<http://www4.uwm.edu/research-impact/report.cfm>

- Aurora Spectral Technologies (AST), founded by UW-Milwaukee physicist Valerica Raicu and entrepreneur Thomas Mozer, has developed the first tools for determining the internal structure of protein complexes in living cells. The National Science Foundation's Partnership for Innovation Program has recently awarded UW-Milwaukee a grant to support the collaborative development of laser-scanning microscopy between AST, Madison-based NeoClone, and PolarOnyx of San Jose. The trio's technology already has the attention of a Danish company working in identifying rare cancer cells.
- NanoAffix Science LLC, founded by Associate Professor Junhong Chen, aims to commercialize technologies that Chen has developed. "We have found new ways of combining nanocomponents to produce valuable technologies which are superior to existing approaches," said Chen. His methods of combining structures are not only low-cost, but also yield very high-performance materials that have potential uses in medical diagnostics, green energy technology, and sensors.<sup>17</sup> The company has received grants from the National Science Foundation.
- Promentis, a Milwaukee company that is developing drugs for schizophrenia and other central nervous system disorders, has licensed compounds developed by UW-Milwaukee's James Cook.

#### *Workforce-Specific Training and Education*

UW-Milwaukee supports state industries by providing a well-trained and well-educated workforce. The following are some examples:

- The Sheldon B. Lubar School of Business is filling a knowledge gap in southeastern Wisconsin and beyond with its curriculum emphasizing SAP, a business software suite. The Lubar School's new set of Management Information Systems elective courses focus on SAP skills and offer graduates SAP certification prior to entering the job market. A recent study estimated the shortage of SAP-skilled professionals at over 40,000, creating a high demand for skilled college graduates. Leading Wisconsin companies utilizing SAP include Rockwell Automation, Harley-Davidson, Johnson Controls, and Kohler.
- The College of Nursing is Wisconsin's largest nursing school and one of only two schools to offer students the full range of nursing degrees. The College provides the largest number of new graduate nurses in the state each year. In 2010, the College graduated 189 new registered nurses; 90 percent of whom remain in Wisconsin to work. The Department of Workforce Development lists nursing as one of the high growth occupations over the next decade.<sup>18</sup> Established in 1965, the College is consistently ranked in the top ten percent by U.S. News & World Report.

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<sup>17</sup> "Startup licenses UWM nanotechnology."

[http://www4.uwm.edu/ceas/details/details.cfm?custome1\\_datapageid\\_72827=3998839](http://www4.uwm.edu/ceas/details/details.cfm?custome1_datapageid_72827=3998839)

<sup>18</sup> Please see the following website for more information:

[http://worknet.wisconsin.gov/worknet/joblist\\_highgrow.aspx?menuselection=js](http://worknet.wisconsin.gov/worknet/joblist_highgrow.aspx?menuselection=js)

- Executive Programs offered by the Lubar School are a unique educational opportunity for organizations to develop quality programs tailored to executive-level individuals and teams in their critical areas of need. With the expertise of Lubar faculty and experts, Executive Programs works with hundreds of clients annually to identify, customize, and deliver specific programs to meet the unique management and leadership development needs of their executives and executives-to-be.
- The UW-Milwaukee School of Education is convinced that education's best days lie ahead. The School's mission is to provide leadership and inspiration for learning and human development in urban communities. The School of Education partners with more than 200 schools and community programs to graduate and place more teachers than any other school in the state. There are more than 22,000 alumni of the School of Education, many of whom live and work in Wisconsin. The School also offers the only Deaf education program in Wisconsin.
- The Masters in Human Resources and Labor Relations is the only graduate program in the state that trains professionals equally in human resource management and labor relations. The program prepares students for careers as practitioners and emphasizes a firm educational grounding in both the liberal arts and business administration. Graduates remain largely in the state and can be found in leading corporations, unions, governments, and non-profits. Faculty members have served as sources of expertise to the local office of the Equal Employment Opportunity Commission, the Milwaukee Public Schools, local governments, and private firms.
- Both the undergraduate and graduate programs in the Department of Mathematical Sciences supply numerous alumni to work as actuaries. Actuaries solve financial problems involving future uncertainty by applying their knowledge of mathematics, probability, statistics, and risk theory. Actuaries are also involved in determining the value of a company that is about to merge with another company, projecting Social Security benefits, designing new retirement programs, and many other projects. Of the UW-Milwaukee alumni, at least 8 have achieved an actuarial designation (e.g., Associate or Fellow of the Society of Actuaries) and work in the Midwest. Due to the strength of recent graduates in the actuarial science major, the number of alumni achieving an actuarial designation is expected to double within several years.



## **UW-Eau Claire**

### *Small Business Development Center*

The UW-Eau Claire Small Business Development Center (SBDC) serves the entrepreneurs and small businesses in the eight counties of Northwest Wisconsin. The SBDC builds partnerships with economic development corporations, main street associations, chambers of commerce, and extension community agents to leverage resources and to engage the larger Northwest Wisconsin community. With these collaborations and the hard work of the staff members, the SBDC achieved the following results in fiscal year 2011:

- Held 29 educational programs with over 533 attendees
- Counseled over 110 entrepreneurs and small businesses
- Assisted with 18 business starts
- Helped bring \$4,819,333 into the economy through business starts and expansions
- Worked with over 42 businesses for more than 5 hours per business
- Helped retain 16 jobs
- Facilitated the connection of UW-Eau Claire's College of Business student projects with area businesses

### *Materials Science Center*

The Materials Science Center (MSC) faculty and staff provide elemental analysis, electron microscopy, materials characterization, cooperative research, development support, and consulting to both commercial partners and academic researchers. The MSC supports Wisconsin businesses, and it has ongoing projects with the following companies:

- Super Vitamin D, NanoRite Facility (Eau Claire, WI)
- Rapid Diagnostek, Inc. (Hudson, WI)
- Fiberstar Bio, NanoRite Facility (Eau Claire, WI)
- Minnesota Wire (St. Paul based with a facility in Eau Claire, WI)
- Silicon Graphics (Chippewa Falls)
- OEM Fabricators (Baldwin-Woodville, WI)
- Linetec (Wausau, WI)
- Siemens (Wausau, WI)
- Resonant MicroSystems (Richmond, CA)

In particular, Super Vitamin D, Rapid Diagnostek, Inc., and Fiberstar Bio are startup companies which benefit tremendously from access to the MSC. Technology startups have a significant potential for growth, but tend to lack the financial resources to purchase instrumentation. These companies are also still in the development mode where characterization of their product or process is essential. The MSC can provide both expertise and instrumentation to these companies.

### *Department of Chemistry*

The Department of Chemistry has made specialized scientific equipment available to Wisconsin businesses (e.g., US Filter and Vitamin D) to help with product development and quality control. These efforts are typically coordinated through the Materials Science Center.

### *Department of Physics and Astronomy*

The Department of Physics and Astronomy has collaborations with local businesses including Northern Crossarm of Chippewa Falls, Turbine Technologies in Altoona, and Hutchison Technology in Eau Claire. These collaborations have resulted in internship opportunities for students, student-faculty collaborative research projects that help companies improve their products, and consulting work to improve industrial processes.

### **UW-Green Bay**

During the past federal fiscal year, the Small Business Development Center (SBDC) met the performance goals set by the Wisconsin SBDC Network State Office in the areas of clients served, clients who opened their businesses, and clients who received capital infusion through loans or equity. Of special note, UW-Green Bay SBDC clients received over \$12 million in capital infusion in a year when access to capital was still very difficult to obtain.

	2010	2011 <sup>19</sup>
Jobs Created	26	106
Jobs Retained	758	868
Clients Counseled	271	348
Counseling Hours	1,544	1,434
Capital Infusion	\$3.8 Mil	\$9.9 Mil
Sales Increase	\$2.2 Mil	\$12.4 Mil
Number of New Businesses	22	22

Scott Koffarnus is an example of the successful work of the SBDC. Koffarnus launched his first business, Freshpaintdigital, in Green Bay in 2003. The business quickly earned recognition as a leader in the digital media industry. In 2008, Koffarnus added a second business, Cineviz, which provides interactive brand experiences and advanced visual display technologies. Together, these companies combine innovative thinking with digital technology to create unique promotional brand experiences for national and international companies including Tyco, Intel, Symantec, Nickelodeon, and Verizon. To gain the expertise he needed to strategically grow his businesses, Koffarnus attended the Entrepreneur Training Program at the UW-Green Bay SBDC.

The Entrepreneurship Certificate, developed by the SBDC, is a 12-credit program that provides undergraduate students with the opportunity to learn about business ownership and the skills needed to launch a new venture. Entrepreneurship students will learn from a select team of faculty members and business leaders distinguished by their ability to teach, model, and inspire the entrepreneurial process. This certificate offers critical skill learning in the entrepreneurial approach to acquiring and managing resources, understanding of the planning process, opportunities to network with successful entrepreneurs and business leaders, and participation in experiential learning opportunities.

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<sup>19</sup> Based on the federal fiscal year.

The SBDC also participated in the second Young Entrepreneurs' Program. This international training project, funded by the Department of State, provided entrepreneurial development to nine potential business owners from Israel and Jordan who traveled to Wisconsin for workshops, site visits, mentorship, and cultural activities in the Green Bay area.

## **UW-La Crosse**

UW-La Crosse has positioned itself among the country's best public universities, ranking in the top three Midwestern public institutions by US News & World Report and Kiplinger's Top 100 Best Values. UW-La Crosse offers Wisconsin's only nationally-accredited recreation management and therapeutic recreation degrees, the UW's only nuclear medicine technology program, and the Midwest's only undergraduate archaeology major.

### *Academic Programing*

The academic programs at UW-La Crosse directly interface with PK-12 education endeavors, health care needs (e.g., occupational therapy, physical therapy, radiation therapy), and business support (e.g., health economics, MBA program). UW-La Crosse also has programs in information systems, computer science, computer engineering, and software development that provide employees to local businesses like TRANE Company and SAP.

### *Small Business Development Center*

The UW-La Crosse Small Business Development Center (SBDC) serves seven counties in its region.<sup>20</sup> In 2011, SBDC served over 360 counseling clients, including 17 business starts, and supported over \$4.9 million in capital infusion in regional businesses.<sup>21</sup>

SBDC continues to be a key supporter of local economic development activities. Its efforts have led to the establishment of industry clusters, such as the Equipment and Metal Manufacturers Association, the Food and Restaurant Association Network, and the 7 Rivers Alliance. SBDC also provides support for incubator businesses, local angel investment activities, loan funds, and regional Inventors and Entrepreneur Clubs.

Current SBDC initiatives include increasing export readiness and area collaboration in connection with regional loan funds.

The following are some examples of the support that SBDC can provide to local businesses:

- Dynamic Recycling, which has participated in various courses since 2007, is an example of the impact that SBDC has on local businesses. The company is an electronics and appliance recycling business that has shifted from about 22 employees to 50 employees. Sales have grown by 240 percent from 2009 to 2010. In 2011, the company expects to grow by 85 percent. Dynamic Recycling outgrew their old site, which was 15,000 square feet, and moved to a much larger site with 41,000 square feet.

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<sup>20</sup> La Crosse, Vernon, Trempealeau, Buffalo, Juneau, Monroe and Jackson Counties

<sup>21</sup> Based on the federal fiscal year

- As another example, Linda O'Connell completed the Entrepreneurial Training Grant Program and finished her business plan with assistance from SBDC. Since then she took third place in a local business plan competition and was featured in Coulee Region Women's magazine. Linda now is the founder and owner of Take 5 Productions, a full-service video production company specializing in home movie transfer services, video slideshows, business video production, wedding video production, video editing, and DVD duplication.

Take 5 Productions shows a 30 percent increase in sales and profits over 2009 and was chosen to produce the background video for the Miss Wisconsin Pageant. O'Connell says, "The SBDC provided me excellent insight and expertise and has been instrumental in helping to develop my small business. With their help, a hobby has now turned into my full time business."

- Mark Harrell contacted the SBDC in early 2010 for assistance with increasing online sales and overall business planning. Bad Axe, his company, specializes in producing high-end wood working saws. The SBDC staff helped Mark identify short-term online marketing strategies. With these suggestions, Mark conducted a photo shoot with a local photographer to obtain the visual assets he needed to introduce two new high-end saws. Mark also developed an e-mail campaign and distributed it to customers and prospects.

Bad Axe closed 30 new orders for its high-end saws within about 72 hours of sending the e-mail campaign. The number of Bad Axe Facebook fans also increased from approximately 140 to 217.

- Wacique AK BeMende engaged SBDC to further his passion for financial literacy. He grew up poor, but he realized that saving money and learning to invest was the way out of poverty. He taught himself how to save and invest using dividend reinvestment stock plans in order to grow his money. He then started programs to teach children how to save money and created a new "piggy bank" design to help them visualize the "save then invest" idea. He has also served in several branches of the military and has used his investor experience to reach out to military members.

The UW-La Crosse SBDC assisted Wacique in developing a strategy for his business, his invention, and in forming his business. Wacique considered the SBDC's focus and customized approach instrumental in assisting him to achieve his business objectives. "No one had taken the time to really understand the vision and then give guidance like the La Crosse SBDC did. It was service that was customized specifically to me, instead of cookie cutter."

- Jamie Heiden, a student in the SBDC's "Learning Community of Artists: Best Business Practices" seminar, was featured in a UW-La Crosse newsletter article Jamie's photography business has blossomed since taking the class. She has also received recognitions from Madison's Art Fair Off the Square, Art Fair on the Green, and the Driftless Area Art Festival. She has also been featured in the national publication "The Digital Studio."<sup>22</sup>

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<sup>22</sup> The article can be found at <http://spotlight.uwlax.edu/uw-l-students-find-steps-to-success/>.

### *Emerging Technology Center in Pharmaceutical Development*

The Emerging Technology Center in Pharmaceutical Development is an interdisciplinary community of UW-La Crosse scientists and scholars whose primary purpose is to engage in the discovery and development of new medicines to treat human diseases and save lives. The work being done to isolate anti-microbial agents has significant potential for future development.

### *La Crosse Medical Health Science Consortium.*

As one of five founding partners in the La Crosse Medical Health Science Consortium, UW-La Crosse works with Western Technical College, Viterbo University, Gunderson Lutheran Health System, Mayo Clinic Health System, the La Crosse School District, and the La Crosse County Health Department in collaborative efforts to improve health, enhance health science education, and strengthen the healthcare workforce.

### *Continuing Education and Extension*

In 2011, UW-La Crosse had a total of 4,950 non-credit continuing education course enrollments with 104 non-credit programs offered through Continuing Education and Extension (CEE). CEE offered 247 credit courses in which 1,674 students enrolled with 172 of the courses offered in partnership with school districts, CESA#4, and professional organizations.

New collaborations this past fiscal year include the Wisconsin Space Grant Consortium<sup>23</sup> and the International Environmentrics Society.<sup>24</sup>

## **UW-Oshkosh**

### *Business Development Activities*

The University of Wisconsin Oshkosh Business Success Center (BSC) is a unique consulting firm that connects local businesses with University resources. The BSC offers faculty experts, student interns, research facilities, a data survey center, and more. BSC's staff and students directly assisted 78 companies in the Oshkosh region in 2010.

Within the College of Business, UW-Oshkosh's Wisconsin Family Business Forum (WFBF) and Small Business Development Center (SBDC) are resources for regional entrepreneurs. In 2010-11, the WFBF provided assistance to more than 37 Wisconsin family businesses and nearly 160 other businesses. The consultations are highly strategic for small- and medium-sized enterprises looking for financing and other resources necessary to expand and to hire new employees. Students work alongside faculty and staff, giving them hands-on opportunities to assist local businesses whose success is crucial in the state's economic recovery.

UW Oshkosh, in partnership with Chamco, Inc., is exploring the feasibility of establishing a business accelerator similar to those in Whitewater and Madison. The UW-Oshkosh Business Accelerator would be designed to benefit faculty, staff, and students along with tech entrepreneurs and researchers throughout northeastern Wisconsin.

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<sup>23</sup> For more information, please see <http://www.uwgb.edu/WSGC/about/default.aspx>.

<sup>24</sup> For more information, please see <http://www.environmentrics.org/>

### *Downtown Development and Revitalization*

The partnership between the University foundation and external development groups to acquire the City Center Hotel is a bold effort to diversify resources and to make a \$9 million investment in downtown Oshkosh. These efforts not only provided 150 construction-industry jobs, but the hotel will also support roughly 200 jobs in the hospitality industry when fully operational.

### *Technology Transfer*

The University's biodigester project represents a new form of partnership involving the University's Foundation, external development partners, faculty, and students in applied research activities. The biodigester, which is the first of its kind in the Western hemisphere, produces gas and electricity from decomposing food and agricultural waste. The renewable energy facility is expected to initially produce up to five percent of the campus' electricity and heat.

This effort reduces the University's carbon footprint, creates many new green jobs, strengthens Wisconsin's dairy industry, serves as an applied learning lab for scientific and technological advancement, and will generate revenues to support scholarship and faculty development.

As another example, Professor Charles Gibson started his research on nanomaterials soon after he joined UW-Oshkosh in 1991. With help from WiSys, Gibson formed Shamrock Energy Corp., which is studying better electrical energy storage devices and enhancing green technologies.

Economics Professor M. Ryan Haley is also starting a new business, CoreTxt Plus Inc., to distribute a free digital statistics textbook to UW-Oshkosh students.

### *K-12 Connections*

Following the Wisconsin Association of School Boards' call for UW System institutions to promote their distinct services and programs to local school districts, Chancellor Wells commissioned a comprehensive audit of the University's established, and in many cases long-standing, K-12 collaborations and partnerships. The final report revealed more than 60 programs and campus connections with school districts.

Among the biggest and most directly connected programs is UW-Oshkosh's nationally accredited and acclaimed Cooperative Academic Partnership Program (CAPP). CAPP is the state's largest college-transcripted credit program for high school students. With more than 2,400 enrolled students from 42 Wisconsin high schools, the program had more students than all others in the state combined.<sup>25</sup>

The audit also revealed a tremendous diversity in the partnerships, from a program placing UW-Oshkosh nursing students alongside Madison-area school nurses to a nimble program that serves the professional development needs of school districts in western Wisconsin. As another example, the Child Care and Learning Center is offering four-year old kindergarten in partnership with the Oshkosh Area School District.

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<sup>25</sup> 2010-11 academic year

## UW-Parkside

### *Small Business Development Center*

UW-Parkside's Small Business Development Center (SBDC) helps businesses and entrepreneurs to operate more profitably, which contributes to employment growth and the region's economy. The following chart shows the progress of the SBDC.

Fiscal Year	2005	2006	2007	2008	2009	2010	2011	2012
Counseling Clients	143	202	142	88	119	129	130	214
Training Clients	384	253	226	224	263	310	260	208
Business Starts				6	11	16	17	5
Capital Infusion				\$1.2M	\$1.7M	\$7.3M	\$8.2M	\$3.7M

The SBDC offers and coordinates classes and workshops for youth entrepreneurs, nascent entrepreneurs, and stage-one companies. In addition, the SBDC is planning to work with clients to prepare complete loan packages that are "bank ready" and acceptable to the Small Business Administration.

### *Ralph Jaeschke Solutions for Economic Growth Center*

The Ralph Jaeschke Solutions for Economic Growth Center (SEG Center) is a premier vehicle for project-based learning at UW-Parkside. The SEG Center, located in the College of Business, Economics, and Computing, brings together local businesses and non-profit organizations with students and faculty to create a joint venture that benefits all parties involved. During the 2011-12 academic year, the SEG Center produced 84 projects for 73 clients involving 333 students and 11 faculty and staff.<sup>26</sup> Over 36 percent of students in business and computer science participate in project-based learning each year as part of the curriculum.

The Information Technology Practice Center (ITPC), which is a part of the SEG Center, has also helped students gain valuable project-based experience with regional businesses and nonprofit organizations. In particular, Computer Science and Management Information Systems students, backed by their faculty, are assigned to real-world computer-based projects. The organizations involved gain new perspectives from individuals outside of their operations without a financial burden for the services provided. Businesses also have the opportunity to "preview" the quality of the talented workforce educated at UW-Parkside.

### *Wisconsin Small Company Advancement Program (WiSCAP) Projects*

In March 2011, UW-Parkside, the WiSys Technology Foundation, and two regional businesses - Ictect, Inc. and Procubed - were awarded funding from the Wisconsin Small Company Advancement Program. Ictect, Inc. is developing an Intelligent Content Innovation Program

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<sup>26</sup> The SEG Center website has lists of previous projects dating back to 2003, and can be found at: <http://www.uwp.edu/colleges/business.economics.computing/seg.center/index.cfm>.

designed for organizations looking to improve the delivery and presentation of their content or products on the iPad and other devices. The program will offer technical assistance, resources, and an exceptional learning experience to participating organizations. A UW-Parkside MIS professor is leading this project effort, and is working closely with Ictect, Inc. to bring the Intelligent Content Innovation Program to businesses in southeastern Wisconsin. The project team also includes current and former UW-Parkside graduate students.

Procubed, a start-up mechanical engineering firm, is focused on designing and building a more versatile wheelchair with a modern drive system. Procubed is led by two UW-Parkside graduates, and they have created a testing center for the new wheelchair on campus. Three student teams, led by a UW-Parkside marketing professor, are working with Procubed on engineering, business management, and marketing for the project.

#### *The Center for Community Partnerships*

The Center for Community Partnerships (CCP) bridges the University's presence in southeastern Wisconsin to the surrounding Racine/Kenosha communities and supports projects which develop lasting community partnerships. The following are some examples of CCP projects:

- CCP provides strategic planning, program evaluation, and facilitation for various businesses, schools, and nonprofit organizations including: DeltaHawk Engines, Racine YMCA, Kenosha and Racine Unified School Districts, Racine County Workforce Development Center (WDC), the Racine County Youth Coalition, and the Kenosha Union Park Project.
- CCP partnered with the WDC to create the Summer Youth Employment E3 program, which employed over 400 youth in its first three years.<sup>27</sup> The program received local, national, and international recognition. Over 35 youth in the 2011 program were offered employment beyond the summer.
- CCP, the UW-Parkside Small Business Development Center (SBDC), and the WDC partnered to offer "Launching Green Businesses." The conference attracted 100 people and over 25 entrepreneurs who enrolled in a UW-Parkside entrepreneurial class.
- The CCP and SBDC partnered with the Racine County Economic Development Corporation to complete an analysis and recommendations for the Racine "Launch Box" initiative. Launch Box is a new partnership designed to enhance the growth of small businesses in the City of Racine and to streamline the regulatory and launch process for entrepreneurs.

## **UW-Platteville**

#### *University Support of Business and Industry*

UW-Platteville is committed to supporting regional economic development and bringing the resourcefulness of its students to Wisconsin's challenges. The Pioneer Academic Center for Community Engagement (PACCE) is where students, community partners, and faculty experience,

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<sup>27</sup> 2009 to 2012



grow, and make a difference for each other by working on real community projects. Community partners include businesses, non-profit organizations, municipalities, and governmental agencies.

For this academic year, 1,090 students were involved with 127 community partners. These projects are in real situations and have real consequences. Some projects also involve technology transfer.

In addition to PACCE, the university has engaged with businesses and the community in the following ways:

- Mechanical Engineering undertakes 30-40 projects each year for companies and community partners including: John Deere-Dubuque, MGA Research, John Deere-Horicon, 3M, IBM, Monroe Truck, Rite Hite Doors, Weir Minerals, Columbia Par Car, Kimberly Clark, and Oshkosh Corp. Industrial Engineering students have completed projects for companies in the region including Frito-Lay, HyPro, Bodine Electric, the Wisconsin Department of Health Services, Sauer-Danfoss, Orchid, Nu-Pack, and the Mendota Mental Health Institute.
- Xolve is an early stage nanomaterials company whose core technology was developed at the UW–Platteville. It recently closed a \$2 million financing round to advance commercial application of its proprietary method for dissolving previously insoluble materials in common industrial solvents.
- In 2011, Standard Imaging of Middleton engaged in two independent projects with student teams. The teams developed solutions to improve their manufacturing process that were well received and implemented by the company.
- In 2012, MPC Inc of Walworth engaged two student teams to improve the efficiency of internal manufacturing and testing processes.
- AlfaLight Inc., with the aid of a Wisconsin Applied Research Grant, developed semiconductor laser design software that improved and simplified their design process.
- Ohio Valley Testing, Inc. benefited from a device built by two students that takes pressure measurements across a large pipe.
- Driftless Market in Platteville has two students working on a project to provide an easy assessment of can integrity. The project will reduce the market's waste.
- A class traveled to Ghana with grant support to develop a biodiversity project on cocoa farms. With the support of the Cocoa Research Institute of Ghana and cocoa farmers, students identified a channel for earning extra income by using material from cocoa beans and pods.

#### *Student Entrepreneurship*

Launch Lab, a student incubator, began in Spring 2012 with six students accepted. Projects range from idea inception to start-up companies to established business expansion.

UW-Platteville also developed and coordinated two student entrepreneurial competitions called Elevator Pitch (13 student teams) and Business Plan (8 student teams).

There have also been four student entrepreneurial events: Catch the Culture Symposium (175 participants), Meet-n-Eat with an entrepreneur (50 participants), and two Business Plan workshops (40-50 participants).

#### *Farm Analysis*

UW-Platteville provides anaerobic digestion analysis for dairy farms in Wisconsin, Minnesota, California, Italy, and Korea.

#### *Industry Support of the University*

UW-Platteville and its students also benefit from broad engagement with industry. The following are some examples of how industry supports UW-Platteville:

- BouMatic helps students pay for college and allows students to have a variety of experiences with innovative technology by donating scholarship money, providing internships, and donating two robotic milkers.
- Neenah Foundry hires students as interns and full-time employees. The company also funded projects like the Hot Wheelz Trailer, which is a mobile foundry for portable demonstrations. The company has also donated a significant amount of materials (e.g., coke and steel scrap) for the industrial studies laboratories. Foundry employees serve as guest speakers and support university research projects. Like other industries in Wisconsin, Neenah Foundry struggles to find qualified candidates to fill positions at their company and hopes to prepare students to enter the industry.
- Case IH provides over one million dollars of farm equipment each year at a minimal cost to the University. And, Case IH product specialists are available to support classroom instruction and to participate in hands-on field demonstrations. This support broadens agriculture students' educational experience and better prepares them for farming careers.
- Pointe Precision, Inc. donated machining tools, materials, and other equipment to the industrial studies program. Pointe Precision has a strong affinity for UW-Platteville students because students have the knowledge, background, and experience to be successful in the industry.
- John Deere financially supported the first years of our Systems Analysis Products (SAP) software. John Deere supports the university because of the quality of the graduates and the exceptional applied experience that they receive on campus.
- OnMedia provided guest speakers for classes, has participated in UW-Platteville's Media Day, and has given demonstrations in radio, sales, and other areas of communication.

## **UW-River Falls**

### *The Center for Economic Research*

The UW-River Falls Center for Economic Research encourages all areas of economic research and promotes economic development in the upper Midwest region. The Center assists faculty in the pursuit of research grants, assists in local economic research, supports student research initiatives, provides consulting services to local communities, and organizes a seminar series.

The Center also provides a wealth of regional economic data, like the St. Croix Valley Dashboard and Momentum West Dashboard, through its website.<sup>28</sup> The St. Croix Valley Dashboard, developed in partnership with St. Croix Economic Development Corporation is a snapshot of the economic condition of the labor, consumer, and housing markets in the St. Croix Valley. The Momentum West Dashboard, developed in partnership with Momentum West Development, is a snapshot of the economic condition of Western Wisconsin.

The Center also partnered with the Dunn County Economic Development Corporation and Xcel Energy to conduct a study on the economic impact of a typical Wisconsin fracturing sand mine.

### *St. Croix Valley Educational Collaborative: Economic Development Group (SCVEC)*

The SCVEC represents a compact between educational partners to enhance educational opportunities in the St. Croix Valley with a primary focus on Wisconsin's St. Croix and Pierce Counties. The initial partners in the SCVEC are the Hudson School District, the School District of River Falls, Wisconsin Indianhead Technical College, Chippewa Valley Technical College and UW-River Falls.

UW-River Falls understands that education plays an important role in the economic development of the region and in the lives of those calling the St. Croix Valley their home. It is committed to working with its partners in innovative ways to meet the needs of all learners across their lifespan.

### *Tissue and Cellular Innovation Center*

The Tissue and Cellular Innovation Center fosters research and economic development opportunities related to tissue engineering and stem cell biology research. The Center collaborates with industrial partners including Spring Point Project, River Cancers Center, and Marshfield Clinic. The program provides mentored undergraduate research to between 25 and 30 students per year.

### *Center for Dairy Farm Safety (CDFS)*

The Center for Dairy Farm Safety was established through a collaborative effort with the Wisconsin Extension Center for Agricultural Health and Safety. The CDFS is supported by a Susan Harwood Occupational Safety and Health Administration (OSHA) grant to address dairy farm safety in Wisconsin. The CDFS's goal is to provide information to dairy farmers to better understand OSHA regulations and implement effective health and safety programs on their farms.

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<sup>28</sup> <http://www.uwrf.edu/CenterForEconomicResearch/AboutCER.cfm>

The information and tools provided to farmers will assist them in laying the groundwork for having an OSHA compliant farm.

#### *UW-River Falls Hudson Center*

Opened in August 2010, the UW-River Falls Hudson Center serves the St. Croix Valley with a focus on non-traditional and working adults seeking to complete a baccalaureate degree or to enroll in select graduate and certificate programs. Enrollments at the Hudson Center have grown every semester, reaching 421 in Spring 2012.

The fastest growing degree program offered at the Hudson Center is the undergraduate adult degree completion program in business administration. The average age of a student in this program in Spring 2012 was 41. The Hudson Center also hosts numerous community events, including a recent economic briefing co-sponsored by UW-River Falls and Competitive Wisconsin, Inc.

#### **UW-Stevens Point**

##### *The Wisconsin Institute for Sustainable Technology (WIST)*

WIST at UW-Stevens Point was founded in 2009 to create a fresh approach for today's environmental and economic challenges. Through its three divisions, WIST offers laboratory services, outreach education, and research to create sustainable solutions for businesses and organizations. The technology and ideas developed by WIST and its partners will spur economic growth in the region and across Wisconsin while helping to protect a healthy environment for future generations. WIST also maintains a pilot paper machine for raw material and/or chemical additive studies, equipment evaluation, grade development, and production runs.

The president of Integrated Paper Services in Appleton said that his firm's partnership with the institute could open more doors for the private sector to work with the academic community. "UW-Stevens Point brings a range of technical skills and they have the resources of the state and the people who teach the science (of paper making), plus we can utilize their professors in a consulting role, so there are many opportunities."<sup>29</sup>

WIST signed a Memorandum of Understanding in 2011 with Integrated Paper Services to provide comprehensive research, development, and testing services to the paper and allied industries. This has almost tripled extramural revenue generation in paper services on campus (\$125,000) with funds being invested back into the pilot paper machine and the Paper Science and Engineering Department. The partnership sets the stage for future growth in paper services and end-of-life management options.

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<sup>29</sup> Please see full coverage of the article in The Post-Crescent  
(<http://www.postcrescent.com/article/20111027/APC03/110270478/Integrated-Paper-UW-Stevens-Point-partnership-seen-door-opener>)

### *Northern Aquaculture Demonstration Facility*

Located in Bayfield, the Northern Aquaculture Demonstration Facility (NADF) promotes and advances the development of commercial aquaculture in a northern climate. The NADF is designed with high-tech aquaculture production systems and equipment to allow a wide range of applied research and demonstrations to be carried out.

The NADF promotes development by conducting applied research, providing training opportunities, and developing best management practices for the industry. The facility also serves to strengthen the cooperative relationships among commercial aquaculturists and with tribal, state, and federal agencies.

### *Technology Transfer*

UW-Stevens Point signed agreements in 2012 with Virent and Badger State Ethanol, both from Wisconsin, and Myriant in Massachusetts to evaluate the performance of chemicals derived using a process patented by UW-Stevens Point. These agreements will form the basis for further technology transfer activities.

UW-Stevens Point has also signed non-disclosure agreements with two companies to discuss the development of a proprietary bio-based isoprene technology. This technology has the potential to create a stable supply of rubber for the automotive and defense industries in the United States.

### *Student Entrepreneurship*

The Entrepreneurship Center in the School of Business and Economics helps undergraduate students in all majors develop into entrepreneurs. These students start businesses that are often located in Central Wisconsin.

The Small Business Development Center (SBDC) also teaches an entrepreneurship class in the School of Business and Economics Department that links students to projects for small businesses.

### *School of Health Care Professionals*

The School of Health Care Professionals provides a constant inflow of skilled health care practitioners and clinicians to local health care facilities. Employment information from Ministry St. Michael's Hospital, Aspirus Wausau Hospital, and Marshfield Clinic will show a high percentage of their employees are UW-Stevens Point graduates.

### *Support for Regional Businesses and Economic Development*

UW-Stevens Point actively engages with the community to support local development:

- The Central Wisconsin Economic Research Bureau (CWERB) provides quarterly local economic data to Central Wisconsin businesses and advises local business on topics of interest. The CWERB staff holds quarterly meetings and presentations throughout Central Wisconsin. Most recently, meetings were held in Wausau, Marshfield, and Stevens Point.

- The School of Business and Economics connects with local businesses through the Business Advisory Council, which is a group of 15 CEOs from some of the largest employers in Central Wisconsin. This group keeps the School's academic programs focused on the business and personnel needs of Central Wisconsin.
- Business Outreach and Training, a community outreach component of the School of Business and Economics, is devoted to the development and delivery of exceptional business improvement programming. Business Outreach works to foster practical initiatives, to establish partnerships, and to consistently deliver quality projects.
- The Entrepreneurship Training Program certificate series offered through the SBDC guides participants through the process of creating a written business plan. So far, 553 participants have led to approximately 302 business starts and expansions.
- Continuing Education is partnering with UW-Marathon County and Northcentral Technical College to form a training consortium that is focused on supporting regional economic development. This support may include education and training, grant writing, and company-specific research and development.

#### *Community Engagement*

- Faculty members in the School of Communicative Disorders provide services five days a week at St. Michael's Hospital and provide both in-patient and out-patient speech and language services. The School receives referrals from medical centers and hospitals across the region. Many of the individuals who are seen also take advantage of an Augmentative and Alternative Equipment lending program developed by Dr. Gary Cumley at UW-Stevens Point.
- The Center for Communicative Disorders at UW-Stevens Point is a clinical training facility with a reputation for excellence in serving the University and the Central Wisconsin area. The Center provides unique speech and hearing services and helps residents who may have lost insurance coverage through a fee waiver. Annually, approximately 150 clients are seen at the Center for speech and language services and about 100 patients are seen for hearing tests and hearing aid fittings.
- The Special Needs Aquatic Program, offered through the School of Physical Education and Athletic Training, is affiliated with the Arthritis Foundation of Wisconsin. The program serves between 50 and 70 adults with arthritis from the community each semester.
- The National Information Center for Polymer Education (POLYED) is a consortium of groups interested in general science education and polymer education in particular. The major purpose of POLYED is to nurture education at all levels, from kindergarten through post-graduate. POLYED has working relationships with many education-oriented technical groups.

## UW-Stout

UW-Stout is a comprehensive, career-focused polytechnic university where students, faculty, and staff use applied learning, scientific theory, and research to solve real-world problems, to grow the state economy, and to serve society. Matching business challenges with research questions, the UW-Stout Discovery Center is intent on accelerating technology innovations, advancing economic development, and enhancing global competitiveness in the service region. UW-Stout and its Discovery Center are focused on measuring the impacts of its economic development activities, reporting:

- Over 5,000 technical assistance activities with more than 2,500 companies since 1994. These activities in areas like business and product development, technology deployment, workforce optimization, strategic planning, and quality and process system implementation have resulted in client-reported impacts of more than \$450 million.
- Over \$8.5 million in contracts and grants awarded in 2010-11.
- About 319 jobs created or retained from Discovery Center assistance while also generating over \$23 million in cost savings and increased sales.
- 137 unduplicated company or entrepreneur contacts, four revenue-based financing loan closings, and \$13.4 million in commercial industrial building permits in 2010-11 by UW-Stout staff contracted by Dunn County for economic development efforts.

Additionally, UW-Stout is a partner in the Stout Technology and Business Park, which features 63 firms operating in 28 buildings on 403 acres in Menomonie. There are 1,150 employees in the park with an estimated \$49.9 million annual payroll. The total economic impact of these businesses is \$232 million annually.

The Discovery Center has the full support of UW-Stout to serve as the initial point of contact for technical assistance and applied research applications and to channel them to the appropriate internal or external resources. This integrated approach to delivering UW-Stout's combined UW-Extension, Small Business Development Center, NIST-MEP,<sup>30</sup> and technology business incubation resources is unique within the UW System and is rare in university-based economic development. Most often these resources are housed within "silos" on campuses, but UW-Stout has realized service delivery efficiencies and greatly enhanced impacts by merging these resources into a single unit that facilitates access across all colleges and throughout the region. This unique structure streamlines UW-Stout's engagement processes and ensures efficient collaboration with industry, private and public institutions, and licensing organizations.

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<sup>30</sup> National Institute of Standards and Technology - Manufacturing Extension Partnership

As a result, the UW-Stout Discovery Center is able to execute a strategic plan in alignment with specific regional economic development strategies:

- The Wisconsin Economic Development Corporation (WEDC) Strategic Plan, which outlines bold and ambitious goals, including securing top 10 rankings in the Kauffman Foundation Index of Entrepreneurial Activity for starting a business (currently 28<sup>th</sup>) and expanding a business (currently 29<sup>th</sup>) by 2016. The UW-Stout Discovery Center is a recognized WEDC partner.
- Strategies resulting from the *University of Wisconsin System Growth Agenda* and UW System's *Research to Jobs* task force. The Discovery Center recently received a Growth Agenda award to link non-traditional students and industry partners with campus researchers and faculty to develop a highly-skilled workforce, to advance job creation, and to strengthen Wisconsin communities. The *Research to Jobs* task force focused on advancing research to commercialization to create jobs in companies across a broad range of industries. UW-Stout Chancellor Charles W. Sorensen was chair of the implementation task force and UW-Stout's Discovery Center was identified as a key transformational state resources.
- The *Next Generation Manufacturing Strategies* grew out of a 2009 survey that revealed significant threats to global competitiveness. Developed and executed by the Wisconsin Manufacturing Extension partnership and UW-Stout's Manufacturing Outreach Center, the strategies match the innovation, global engagement, and talent management objectives of UW-Stout and its Discovery Center.

UW-Stout and the Discovery Center have long supported industry clusters throughout the region. The Medical Device Innovations initiative, with the related applied research and technical assistance, is an example. Drawing on UW-Stout's polytechnic programs and its proximity to leading clinical organizations and medical device manufacturers, Medical Device Innovations seeks to create self-sustaining medical device research and development. The initiative includes collaborative product development between UW-Stout and Wisconsin Medical Entrepreneurship Foundation<sup>31</sup> researchers and clinicians as well as professional education at multiple plastics injection molding companies that supply medical device manufacturers.

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<sup>31</sup> WiSys Technology Foundation, Aurora Health Care, BayCare Clinic, and Marshfield Clinic



The Discovery Center's work with private industry leverages a shared-cost model for most center activities that ensures private and public commitment to engagement, execution, and outcomes of the activities. In addition, UW-Stout and the Discovery Center have developed partnerships with the WEDC and other state and federal funding sources. This combined funding has allowed the Discovery Center to add new tools that engage clients, students, faculty, and other partners in results-focused initiatives, including:

- Student engagement in product and business development projects focused on assisting businesses in Wisconsin's distressed communities;
- Creation of a self-directed digital fabrication laboratory to advance innovative products and entrepreneurial activities;
- Technology scouting to match and deploy new and developing technologies with small- and medium-sized business; and
- Comprehensive support for Wisconsin manufacturers that are launching export initiatives.

Examples of Discovery Center product development, business incubation, and technology commercialization efforts include:

- A novel hydrogen fuel cell design and development project that attracted over \$150,000 in external development funding, established a new technology business, and resulted in an UW System Researcher of the Year award; and
- The development of a vibration therapy device that links biomedical engineering, dietetics, and physical therapy researchers to advance scholarship and attracts investment.

Examples of Discovery Center efforts to reinforce the region's industry clusters include:

- Organizing groups of researchers, companies, communities, and institutions around projects that leverage their distinctive assets to advance the region's plastic composites industry cluster; and
- Managing a collaboration of staff, students, consultants, and government agencies to assist companies in improving their performances while reducing their carbon footprint.

## **UW-Superior**

### *Transportation and Logistics*

During the past 12 years, the UW-Superior Transportation and Logistics (T&L) Research Center has brought in over \$8 million in federal and private research funds. The Center uses the funds to engage in applied research that 1) educates and trains the existing workforce to improve operations and opportunities for workers and 2) reduces the cost of shipping and transportation for the logging, mining, paper, trucking, rail, air, and shipping industries.

T&L research benefits Wisconsin-based companies, the Great Lakes shipping industry, and the regional economy:

- During the past 12 years, the Center has brought in over \$8 million in federal and private research funds.
- UW-Superior faculty, students, and industry partners conducted research into intermodal terminal placement as part of exploring shipping from Wisconsin to China. The research findings were shared with industry, railroads, shippers, and economic development agencies. Ultimately, the results contributed to the placement of an intermodal terminal with CN Railroad at Chippewa Falls. The intermodal terminal opens access to markets in Asia by reducing costs for Wisconsin industries and provides Wisconsin with a potential competitive advantage.
- The Great Lakes Maritime Research Institute (GLMRI) was awarded a \$750,000 Environmental Protection Agency (EPA) grant to reduce air emissions from the Edwin H. Gott, the most powerful cargo ship on the Great Lakes. Repowering the Gott reduced air emissions and benefited the environment of the entire Great Lakes basin. The EPA grant leveraged more than \$14 million in private investment and brought almost \$15 million in business to Bay Ship in Sturgeon Bay, Wisconsin.
- Liquid Natural Gas (LNG) Feasibility Research at GLMRI, funded by the U.S. Department of Transportation, looks at both the engineering and logistics factors for converting the Great Lakes ships to LNG. LNG virtually eliminates harmful emissions and reduces engine maintenance. The funding is for \$800,000 in 2012 and will continue for the next five years at up to \$1 million annually. Preliminary engineering estimates indicate that the conversion of 10 steamships to LNG would bring over \$200 million in investments back to the Great Lakes shipyards. The research also includes examining the feasibility of bringing a liquefaction plant to Superior, which would support shipping, other modes of transportation, and mining.

### *Technology Transfer*

The UW-Superior Biofuels Project has partnered with UW-Extension Research Stations for yield studies of two native plant species. These plants have oil extracts that hold proven potential for the production of biodiesel that is suitable for extremely cold climates. Technology transfers implicit in this project include new technologies for oil extraction and collaborations to pilot microwave technologies that reduced processing time. Private partnerships involved with this enterprise include the American Science and Technology Corporation.

Additionally, Dr. Peter Cook's research into dye-sensitized solar cells offers a strong alternative to today's photovoltaics. Current silicon-based photovoltaics have a high manufacture cost which limits their ability to compete with fossil fuels. Dye-sensitized solar cells have the potential to be inexpensive alternatives. While technology transfer in this area will likely be years into the future, the initial findings are promising.

### *National Estuary Research Reserve (NERR)*

The Lake Superior NERR, designated in October 2010, is a collaborative effort between UW-Superior, the University of Wisconsin Sea Grant Institute, the City of Superior, Douglas County, the Fond du Lac Band of Lake Superior Chippewa, the Wisconsin Coastal Management Program, the Wisconsin Department of Natural Resources, and UW-Cooperative Extension.

The Lake Superior NERR is one of 28 areas across the country protected for long-term research, water-quality monitoring, education, and coastal stewardship under the National Estuarine Reserve System. The Reserve works to improve the understanding of Lake Superior freshwater estuaries and coastal resources and to address the issues affecting them through research, education, outreach, and stewardship.

Nationally, for every operational dollar spent at the 28 NERR sites, two dollars are returned directly to the community through tourism, education and training offsets, and research. NERRS partnerships translate to jobs and economic activity:

- Estuaries are nursery grounds for two-thirds of commercial fish and shellfish. In NERRs states, the shellfish and seafood industry contributed over \$2.7 billion to the economy in 2010.
- In 2010, the coastal counties with NERRs supported more than 468,000 jobs in ocean-dependent industries.
- Reserves create more than 60 jobs for each \$1 million of federal construction money spent.
- Nationally, NERRs contribute more than \$4.9 million in education to over 83,000 children.
- NERRs offset more than \$13.4 million in training to more than 66,000 people.

### *Small Business Development Center*

The UW-Superior Small Business Development Center (SBDC) is a founder and facilitator of the nine-member Superior PeerSpectives CEO Roundtable.

After sharing experiences and learning from other company owners in the Roundtable, the local owner of a \$25.5 million industrial lubricant firm initiated plans to expand into a fourth market. The next year he carefully monitored return on investment as well as staff productivity to increase net profits by \$1.45 million. In 2011, he negotiated a sale of the firm to a private equity group, which subsequently sold it to a national company. The local company thus became headquarters of the larger firm's Midwest division, which allowed it to add 11 employees in Superior this year.

The following table shows business growth for PeerSpectives CEO Roundtable participants:

Date CEO Began	Beginning Sales	Current Sales	Beginning Employees	Current Employees	Sales Increase	Staff Increase
1/1/2012	\$680,000	\$680,000	28	28	0%	0%
4/1/2006	\$765,000	\$1,100,000	11	12	30%	9%
4/1/2006	\$870,000	\$1,100,000	7	9	21%	29%
1/1/2012	\$1,124,000	\$1,900,000	13	22	41%	69%
4/1/2006	\$1,300,000	\$1,900,000	13	19	32%	46%
4/1/2006	\$2,100,000	\$2,500,000	35	38	16%	9%
7/1/2010	\$4,900,000	\$3,900,000	38	36	-26%	-5%
1/1/2009	\$5,120,000	\$5,200,000	32	36	2%	13%
4/1/2006	\$7,200,000	\$11,500,000	50	56	37%	12%
5/1/2007	\$7,500,000	\$13,800,000	55	80	46%	45%
4/1/2007	\$25,500,000	\$33,000,000	50	51	23%	2%
<b>Average</b>					<b>20%</b>	<b>21%</b>

As another example of the SBDC's work, a local woman attended First Steps to Starting Your Own Business in 2008 and the Entrepreneurial Training Program in 2009. She completed a business plan for a business near her home in Ashland. One year later, she sought help from the UW-Superior SBDC counselor to review a second business plan.

With her husband, the couple then invested \$5,000 and obtained a \$60,000 line of credit to open a retail store. The business celebrated its first anniversary in May 2012 with gross sales 20 percent over their projections and with the addition of three part-time employees.

This business owner has participated in 13 counseling sessions (37 hours) with the UW-Superior SBDC counselor in addition to 28 hours of training.

## UW-Whitewater

### *Economic Development: State of Ingenuity Initiative*

UW-Whitewater is a partner in the State of Ingenuity Initiative, which is a collaboration of organizations from southeastern Wisconsin and northern Illinois. State of Ingenuity provides a seamless network of entrepreneurial support at every stage of business development. The initiative, which is funded by a start-up grant from the Economic Development Administration, works to foster economic recovery, to develop new industry, to grow and strengthen businesses, to create jobs, and to increase private investment in the region.

UW-Whitewater student assistants will support the State of Ingenuity in the critical areas of virtual network administration, communication, and administrative support. Student assistants will allow the Office of Research and Sponsored programs to focus on supporting the university's goal of providing outreach programs through integrated institutional activities.

The State of Ingenuity Initiative provided counseling services to more than 164 businesses and entrepreneurs (see table below). This includes clients of/participants in the Whitewater Incubation Program at the Whitewater University Technology Park Innovation Center.<sup>32</sup>

Total counseling	164 clients
Number of counseling sessions	822
Client contact hours	947 hours
Counseling prep time	1,393 hours
Total direct client assistance time	2,340 hours
Client referrals	111

*Job Creation: Small Business Development Center (SBDC)*

The SBDC assisted with 20 business starts during 2011, which added at least 20 jobs. Also in 2011, SBDC assistance was associated with 520 created jobs in Jefferson, Rock, Walworth, and Waukesha Counties. About 440 jobs were added at three companies, while manufacturing assistance at smaller companies resulted in an additional 50 jobs.

The UW-Whitewater SBDC is also committed to existing industry. Through the SBDC, 43 employees at a manufacturing business have been provided with intensive bench-strength building training. This is part of the strategic succession planning assistance that the director is providing to the company. An agricultural company also received intensive assistance to help them enter new markets and increase profitability in the face of rising grain prices.

In collaboration with the Department of Workforce Development, the SBDC provided in-depth entrepreneurial technical assistance training and counseling to 15 dislocated workers. Three of these participants started businesses in 2012.

*Student Entrepreneurship: The Whitewater Incubation Program (WhIP)*

The Whitewater Incubation Program launched in 2011 to foster business start-ups and entrepreneurship in the Whitewater community. WhIP includes a full spectrum of programs and services designed to support new business ventures linked to the University and to the Whitewater University Technology Park's Innovation Center.

Two of WhIP's major elements include the Innovation HUB (iHUB) and Launch Pad. The iHUB is both a collaborative space located in the Innovation Center and a series of programs designed to accelerate the successful development of entrepreneurial companies. University-affiliated entrepreneurs, called iFellows, receive support to develop and establish a start-up company or to

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<sup>32</sup> Data represent only businesses served within eligible service area; these data do not represent all clients served by State of Ingenuity partners. Data only include support provided to existing industries through faculty/staff interactions affiliated with the Office of Research and Sponsored Programs, Geographic Information Services Center, the Global Business Research Center, and the Whitewater Incubation Program. These data do not include direct services provided to existing industries associated with faculty/staff/student research, teaching, and/or service.

conduct applied research leading to the development of intellectual property that could be commercialized. The University also supports faculty and staff conducting market analyses and partnering with industry through the iFellowship Program.

The Launch Pad is UW-Whitewater's student business incubator. The program provides students from all disciplines with an immersive entrepreneurial experience. Launch Pad participants also have access to space in the iHUB, intensive coaching, and free business services.

Joe Scanlin, a student entrepreneur and the founder of Scanalytics, conducted much of his product and market research while a member of the Launch Pad. Scanalytics invented a pressure-sensitive mat that can measure consumer behavior using integrated software. The software creates a report on how long someone spends at a location and at what time of day, essentially detailing how shoppers react to products.<sup>33</sup>

Scanlin and his business partner recently won first place - worth \$5,000 - at the 2012 BizStarts Collegiate Business Plan Competition. Scanlin made a major impact on judges by deploying his prototype in front of a vending machine and reporting on the machine's consumers on the day of the competition. "Our mentors inspired us to be creative, but at the same time gave us honest and straightforward advice," Scanlin said.

"There's no magical gap between learning at the university and working in the business world," said Launch Pad's co-director. "These students are running real companies and dealing with all the issues entrepreneurs face."

Having since graduated from UW-Whitewater and the Launch Pad program, Scanlin has secured office space in the iHUB, where he will continue to receive WhIP services, to advance his research, to seek additional investment, and to begin marketing his products.

#### *Technology Transfer and Development: Creative Culinary Solutions*

UW-Whitewater currently has 11 technologies ranging from initial disclosure to a patent issue under review at the WiSys Technology Foundation. As a specific example, John Ejnik, Assistant Professor of Chemistry at UW-Whitewater, is collaborating with Creative Culinary Solutions, a Wisconsin-based company, to develop a food processing technique to lower mercury concentrations in fish.

Currently, the fish industry has no solutions to reducing mercury concentrations in fish other than harvesting fish that are naturally low in mercury. Even though low-mercury seafood is considered a superior product, production is limited by the types and locations of fish that may be harvested.

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<sup>33</sup> From University of Wisconsin-Whitewater University News (<http://www.uww.edu/news/archive/2012-05-scanalytics>).

One possible solution is the use of existing vacuum tumblers. Vacuum tumblers increase food storage time by killing bacteria and removing contaminants left by techniques used in large processing facilities. The successful application of vacuum tumblers to mercury would open waters and varieties of fish that are currently considered undesirable to harvesting.

Wisconsin is home to over one thousand food processing firms that could take advantage of the new process. Since most of the processing companies package frozen foods, low-mercury fish could be distributed throughout the country.

Additionally, the Wisconsin Department of Natural Resources (DNR) may also benefit from this technology. The DNR currently removes invasive carp from Wisconsin waters to prevent damage to the local ecosystem. Because of the high mercury levels, the carp have no economic value and are disposed of in landfills. If the mercury levels in the carp can be reduced, the fish could be sold for animal feed or as fertilizer.

Wisconsin is also home to 15,000 lakes and 42,000 miles of streams and rivers that are enjoyed by 1.4 million anglers.<sup>34</sup> Fishing has a \$2.75 billion economic impact in Wisconsin and supports more than 30,000 jobs. In 2006, 381,000 anglers brought revenue to Wisconsin from out of state.<sup>35</sup>

Since all Wisconsin waters have fish consumption advisories because of mercury, recreational anglers can benefit from a product that reduces mercury levels in fish. Making this process available for home use may reduce concerns about mercury and support an increase in the economic impact of fishing on Wisconsin. Creative Culinary Solutions anticipates offering a consumer version of the tumbler for about \$250.

Part of the process that reduces mercury involves the development of chemicals that are commonly found in spices or marinades. The marinades developed in this research could be patented and licensed to JCB Flavors in Sullivan, another Wisconsin business that would substantially benefit from the new market.

#### *Technology Transfer and Development: Foundry Solutions, LLC*

The UW-Whitewater partnership with Foundry Solutions, LLC on ceramic shell production is another example of technology development. Foundry Solutions was founded in 2007 by Dan McGuire, Professor of Art at UW-Whitewater, and Eric Hellstrom, Professor of Mechanical Engineering at Florida State University.

Typically, ceramic shell systems require numerous steps and multiple material applications over long periods of time. This project addresses these issues through the development of two technologies - refractory foam and a modular molding system.

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<sup>34</sup> From the Spring 2012 Wisconsin Fishing Report (<http://dnr.wi.gov/topic/fishing/wifishingreport.html>).

<sup>35</sup> Wisconsin Department of Natural Resources media kit ([http://dnr.wi.gov/news/mediakits/mk\\_fish.asp](http://dnr.wi.gov/news/mediakits/mk_fish.asp))

The refractory foam is an economical solution to create a one-coat ceramic shell system. The foam is designed to increase in volume at a controlled rate of growth and is formulated to react to heat exposure without detrimental effects on existing industry practices. The refractory foam eliminates multiple material applications, uses fewer resources, offers shorter start-to-finish times, and lowers capital equipment costs. It is also water soluble, which means that it can be easily removed.

The complementary modular molding system was invented as a more cost-effective casting system that can provide the same benefits as current systems in foundries. The modular molding system reduces the amount of volatile material that must be used and reduces the number of steps needed in the process. This dramatically decreases the cost of the process.

Ferrous metal foundry products in the United States constitute an \$18.7 billion market.<sup>36</sup> Nonferrous metal foundry products manufacturing is a \$12 billion market. Since this technology is expected to be readily adopted by this substantial market, the potential opportunity is large.

#### *New Business Creation*

The Small Business Development Center (SBDC) assisted a total of 266 people with counseling during the previous 12 months. Of these clients, 113 were in business and 153 were nascent/not yet in business.

Tyler Sailsbery, founder of the off-campus student housing locator company NoMoreDorms.com, is an example of the support that clients can receive from the SBDC. Sailsbery connected with the SBDC as a student seeking advice for a class project. What began as a class assignment became a catalyst for a real business and rapidly developed into a successful enterprise.

Through hard work with its clients and partners, NoMoreDorms.com has captured 80 percent of the market share for the UW-Whitewater campus during their first sales cycle. For Sailsbery, one indicator of success is the income from the business this past year. He adds, "One of my favorite indicators of success is when I am asked where I work, and I tell them NoMoreDorms.com, people comment how great of a tool it is and how it must be exciting getting to work for a business like that. Most do not realize that it is my business and assume it's a national housing website (which hopefully it will be soon)."

Sailsbery sees the networking he has done as essential for his success as an entrepreneur. "Last year, I attended the UW-Whitewater Ideas to Profits conference. I also received feedback from SBDC representatives at the Wisconsin Entrepreneurs' Conference in Milwaukee." Sailsbery and other young entrepreneurs he has come to know through conferences and other events meet weekly to discuss opportunities to grow and improve their businesses. This network of peers helps him vet new ideas and build new revenue streams.

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<sup>36</sup> From IBIS World



Sailsbery is now working with the SBDC on another business idea and continuing to grow NoMoreDorms.com into a national provider.

As another example, Chad Sullivan, a 14-year law enforcement veteran with the Janesville Police Department, became the 2011 Rock County 5.0 business plan competition winner for his new business, Street Cop Spanish Seminars. His business teaches police officers to more effectively communicate with Spanish-speaking members of the community. Chad had no previous business planning experience prior to entering the competition and received help from mentors, including an SBDC councilor.

Sullivan said the SBDC counselor he worked with “was very knowledgeable and knew what he was talking about in regards to the business plan.” The counseling he received from the SBDC was very helpful in making his plan more professional and effective, according to Sullivan. “I took all the information I received to heart and really tried to make it work for me,” Sullivan said.

Sullivan initially provided his services on a volunteer basis. Later, as he realized the level of interest in his sessions, he saw an opportunity to form a business. Just this year, Sullivan has scheduled eight classes across the country. He also added two new employees to the company, allowing him to schedule more training sessions.

As a part of the Rock County competition award, Sullivan is currently receiving market research from the Wisconsin Innovation Service Center (WISC), a specialty center of the SBDC. “The sky’s the limit now,” Sullivan said. “We’re anxiously waiting to see what [WISC] thinks of the product and what kind of competition is out there.”

The SBDC also offers a free, online class to the local community called First Step to Starting a Business. Participants are guided through the process of evaluating their business ideas and their preparedness for becoming entrepreneurs. An online discussion group allows participants to interact with instructors and others taking the class. Between April 2011 and March 2012, 42 people participated in the class.

In addition, the broader educational opportunities at UW-Whitewater provide students with the basic industry knowledge and expertise required to operate a business. For example, two successful companies were created by alumni of the Occupational and Environmental Safety and Health program.

## **UW-Extension**

UW-Extension leads both the Small Business Development Center (SBDC) Network, and the Wisconsin Entrepreneurs' Network (WEN). The SBDCs provide statewide counseling and training to business owners and are located on 12 of the UW campuses. WEN works closely with the Wisconsin Economic Development Corporation to provide resources and expertise in support of high-potential entrepreneurs. During FY11:

- 3,343 clients were counseled by the SBDC network,
- 1,864 clients were counseled through the Business Answer-Line,
- 12,956 people participated in business and entrepreneurship training programs, and
- 11 clients received over \$3 million in federal grants to advance their business ideas.

UW-Extension and UW-Madison also support the Entrepreneurs' Resource Clinic. The Clinic is a "one-stop shop" where entrepreneurs and potential entrepreneurs can find assistance in a single space. Services include advice on legal business issues, technology licensing, business development ideas, finance, budgets, leadership mentoring, and marketing. In 2011, about 250 individuals or businesses received assistance

The following are five examples of success stories from the collaborative efforts of UW-Extension to support entrepreneurs and to foster new businesses.

### *AquaMost, Inc*

AquaMost's patented purification technology developed by UW-Madison scientists can rapidly, economically, and effectively remove chemicals, viruses, and bacteria from water. Terence Barry sought business assistance from WEN early in the formation of the company. WEN provided funding through its Early Planning Grant and helped AquaMost secure an \$80,000 grant from the U.S. Department of Agriculture. WEN further assisted AquaMost with two Small Business Innovation Research (SBIR) grants totaling over \$1 million.

"WEN is an excellent resource for Wisconsin entrepreneurs," says Barry. "We received invaluable assistance from WEN staff writing our SBIR commercialization plans, and WEN staff gave us excellent insights on how best to craft our grant proposals to satisfy the unique requirements of different federal funding agencies."

The business employs 12 people, and it expects to double in 2012. AquaMost received \$989,206 in SBIR funding and \$3 million in venture financing in 2011.

### *Transthermal, LLC*

Transthermal is a newly formed Wisconsin company that specializes in cooling technologies. WEN directors conducted extensive competitive and market analyses and assisted Transthermal with its venture capital presentation. Additionally, WEN facilitated contact with thermodynamics expert Dr. Timothy Shedd at the UW-Madison School of Engineering for technology testing and helped identify potential beta customers

At the end of 2011, Governor Walker certified Transthermal as a Qualified New Business Venture, which makes investors eligible for a tax credit on their investment. Transthermal expects to support 234 new jobs over the next three years.

#### *Melthouse Bistro*

In 2011, Milwaukee entrepreneurs Troy and Susan Davis opened the Melthouse Bistro. The restaurant showcases gourmet grilled cheese sandwiches made with all Wisconsin cheeses.

Before starting his business, Davis enrolled in the Entrepreneurial Training Program (ETP) at the UW-Milwaukee SBDC. The 12-week program combines facilitated instruction, small-group learning, individual coaching, and valuable resources to help entrepreneurs create the best business plan for their concept and to learn critical skills for operating a new business. Davis said the following about the program:

Without the ETP, I don't think we would be as successful as we are. I have an MBA, and I thought I had thought of everything, but when I took the ETP I discovered there were things I hadn't considered.

The business currently employs 16 people.

#### *O'so Brewing*

In four years, O'so Brewing Company in Plover has expanded its facility and more than doubled production. Marc Buttera, the company founder, has this to say about the UW-Stevens Point SBDC:

I took the business plan writing class. That business plan was crucial for us to get financing in this economy. We had some denials, but we found a small local bank that believed in us, because we were able to show on paper where we were going.

O'so Brewing Company employs eight people.

#### *SnowShoeFood*

A group of UW-Madison graduate students utilized the SBDC to take their business idea to the next level after winning the 2011 Climate Leadership Challenge, a business plan competition held annually at UW-Madison. With regular guidance from their SBDC counselor, the students formed SnowShoeFood, which offers a smartphone application that enables consumers to make more informed food purchasing decisions. One student said the following about their counselor:

He helped us work through our business plan. He read numerous drafts of the plan and helped us make decisions as we evolved the company. He had an instrumental role in helping us figure out what we wanted to do and where we could provide value to the consumer.

The business currently employs five people and expects to release additional versions of their product in the near future.

# Workforce Development

The core of the UW System's mission is the preparation of a well-prepared and flexible workforce. People with a degree from a UW System institution are well equipped to contribute to a variety of business in the emerging economy. Their analytical, communication, and problem-solving skills are of value to a wide range of business, including those that have not been imagined yet.

National data show the value of a baccalaureate degree. In 2011, at a time when people without a high school degree had a 14.1 percent unemployment rate and those with only a high school degree had a jobless rate of 9.4 percent, the unemployment rate for people with a baccalaureate degree was 4.9 percent, and the rate was just over 2 percent for those with advanced degree. Even in a tough economy, those with a baccalaureate degree are much more likely to be employed.

Data also show a clear link between education attainment and median incomes across the country. In 2011, 30.4 percent of Wisconsin residents had a bachelor's degree. This lagged behind the national average, and was well behind Minnesota's 34 percent. The importance of these percentages is reflected in the 2011 per capita income figures. In Wisconsin, it was \$40,073. The national average was \$41,663, and the per capita income in Minnesota was \$44,672. Having more Wisconsin residents with college degrees will appeal to existing and potential new businesses. And, many of these talented and well-prepared individuals will develop their own businesses, further spurring Wisconsin's economy.

Among the strategies for improving student success are internships and programs to encourage students to pursue degrees in a STEM (science, technology, engineering, or math) discipline. Examples of each follow.

# Internships

Internships are an excellent ways to strengthen the ties between Wisconsin businesses and students. These experiences provide students with experience working at a local business, which can lead to employment after graduation at that business. UW System institutions have worked with local businesses to provide these valuable internship opportunities.

## UW-Milwaukee

In 2010-11, 749 businesses and other outside organizations hosted UW-Milwaukee cooperative education (co-op) or internship students. In a survey of recent graduates from the Lubar School of Business, 24 percent of the 147 respondents reported that their current position was a continuation of employment held while attending UW-Milwaukee. Sixty percent also indicated that they had worked in a position directly related to their major while attending UW-Milwaukee.

The following is a sampling of business internship sites:

ALDI, Inc	GMR Marketing	Quad/Graphics
Artisan Partners	Grant Thornton, LLP	RitzHolman CPAs
Baker Tilly	Harley-Davidson Motor Co.	Robert W. Baird
BDO USA	ICM Corporation	Rockwell Automation
BMO Harris Bank	Johnson Controls	S.C. Johnson
Brady Corp.	Journal Sentinel, Inc.	SBC Global
Briggs & Stratton	Kerry Americas	Schenck Business Solutions
Charter Steel	Kohl's Department Stores	Stark Investments
Chortek & Gottschalk	Kohler Co.	Strategic Wealth Management
CliftonLarsonAllen	Kolb+Co.	SVA Certified Public Accountants
Consolidated Graphics	KPMG	Target
DCI Marketing	Lowe's Department Store	The Bon-Ton
Deloitte, LLP	Manpower, Inc.	U.S. Bancorp Fund Services
Dieringer Research Group	Mark Travel	U.S. Bank
Direct Supply	Master Lock Co.	Vogel Consulting Group
Edward Jones	Medical College of Wisconsin	Wacker Corporation
EMTEQ, Inc.	Menards	Walgreens
Enterprise Rent-A-Car	MillerCoors	WE Energies
Ernst & Young	MLG Commercial	Wells Capital Management
Extendicare Health Services	Modine Manufacturing Company	Wells Fargo Financial
FIS	Northwestern Mutual	Wipfli
Fiserv	P & H Mining	Wisconsin Department of Revenue
GE Healthcare	Penske Truck Leasing	Wisconsin Legislative Audit Bureau
GE Medical	Phoenix Marketing Group	Ziegler Co.

## UW-Eau Claire

The following is a select summary of recent student internships leading to full-time employment, by major:

Major	Company	City
English	JAMF Software	Eau Claire, WI
	Royal Credit Union	Eau Claire, WI
Management	Stepan Company	Chicago, IL
	Nestle USA	Eau Claire, WI
	Graco, Inc.	Minneapolis, MN
	Lockheed Martin	
	Hormel	
Psychology	Big Brothers Big Sisters of Northwestern Wisconsin	
Biology	State of Wisconsin Department of Natural Resources	
Mathematics/Actuarial Science	Milliman	Brookfield, WI
	Assurant Health	Milwaukee, WI
	Allianz	Minneapolis, MN
	Allstate	Northbrook, IL
	Humana	Green Bay, WI
Latin American Studies	Puentes/Bridges	Alma, WI
Computer Science	C. H. Robinson	Eden Prairie, MN
	JAMF Software	Eau Claire , WI
	Liberty Mutual	
Physics, Dual Degree Engineering	Trane	La Crosse, WI
Accounting	Boulay, Heutmaker, and Zibell	
	McGladrey & Pullen	
	Wipfli	
Chemistry with a Business emphasis	ChemCeed	Chippewa Falls, WI
	Hydrite	Milwaukee, WI
	Stepan Company	Chicago, IL
	Nestle USA	Eau Claire, WI
Social Work	Eau Claire County Work Force Resource	
	Eau Claire County Department of Human Services	
	Chippewa County Department of Human Services	
	Phoenix Alternatives	
	Catholic Charities	

## **UW-Green Bay**

UW-Green Bay's Environmental Sustainability and Business Institute has developed a certificate in Environmental Sustainability and Business. A requirement includes an internship or cooperative learning experience in a business, nonprofit, or government setting. Examples of these experiences are listed below:

- Aurora BayCare - Three students working on energy, water, and waste reduction projects since 2010. This project was funded at about \$75,000 per year.
- Briess Malting - Preparation of an Environmental Management System for Green Tier certification. This was done in 2011-12 and funded at about \$7,000.
- Tosca - Life Cycle Assessment of reusable packaging containers by comparing Tosca's wood boxes to plastic boxes from their competition.
- Brown County Port and Solid Waste - One student looked at sediment management from the dredging of the port and another was involved in a landfill gas project. Two new students will be working with the zero waste committee recently established by the Brown County Executive (funded at \$4,500).
- Green Bay Packers - Three students worked on game day recycling efforts and another worked in the Pro Shop on more environmentally friendly packaging options.

In addition, at least 50 communication majors are involved in internships with local media outlets each semester.

Jacqueline Frank is one example of how internships can start a career path. While earning a bachelor's degrees in history and English from UW-Green Bay, Jacqueline conducted an internship with the Neville Public Museum. After graduating and attending graduate school at UW-Milwaukee, she returned to become the executive director of the National Railroad Museum in Green Bay.

## **UW-La Crosse**

In 2010-11, 459 UW-La Crosse students participated in internships at over 406 partner institutions. Although UW-La Crosse does not track direct employment numbers, many students gained direct employment as the result of these internships. For example, one student interned for Baker Tilly and was hired as a staff accountant after graduation.

Numerous students complete health professions internships with Mayo Clinic, Marshfield Clinic, and Gunderson Lutheran Health System. Many of these programs are designed to seamlessly evolve interns into employees. For example, a microbiology graduate student is now employed full-time in one of the clinical laboratories at the Mayo Clinic in Rochester.

## **UW-Oshkosh**

Students from the UW-Oshkosh College of Business participated in cooperative education or internship at nearly 240 businesses in 2010-11. Many of these interns are such valuable contributors that they evolve into highly-skilled, high-impact employees with regional companies.

For example, accounting major Jonathan Dudzinski won the 2012 Cooperative Education and Internship Association Academic Internship Student Achievement Award for his work at a New York City investment firm.<sup>37</sup> During the internship, Jonathan helped a senior analyst to condense a large amount of information and to develop a challenging and complex mathematical model. “I am proud to say that our experience with UW-Oshkosh interns has confirmed my expectations,” the company’s president said. “Not only have they stacked up well against our other interns from around the country and around the globe, in most cases they have excelled. This was particularly true with Jonathan. He hit the ground running and never stopped.”

The interns at the UW-Oshkosh Business Success Center are also proving invaluable to the NEW Manufacturing Alliance, which is a group of manufacturers that work with regional organizations to promote northeastern Wisconsin manufacturing. A 2011 BSC survey, executed by student interns, showed that two out of five manufacturing companies planned to hire more employees in 2011.<sup>38</sup> The survey’s findings are invaluable insights and validate that the region’s manufacturing strategies are aligned with the broader state economic recovery goals.

Through internships, nursing and human services majors are also helping Wisconsin serve its neediest populations in community-based agencies. For example, in collaboration with Winnebago County’s Department of Human Services, community health class students helped support 3,600 visits from uninsured patients at the Living Healthy Community Clinic in 2011. Additionally, social work student interns were instrumental in starting services at the Oshkosh-based Day by Day Warming Shelter, a free community refuge for homeless people.<sup>39</sup> The future workforce value of these practical experiences to students and to Wisconsin is priceless.

## **UW-Parkside**

A \$50,000 gift from the Mary Frost Ashley Charitable Trust was used to expand the Advising and Career Center’s Ranger Link Program. The Program provides compensated externship and internship opportunities with campus programs, local small businesses, large companies, and non-profit organizations to first generation and underrepresented minority students. To launch this program, UW-Parkside’s Employer Relations Coordinator made 30 visits to build connections with Southeastern Wisconsin businesses and to discuss internships and employment opportunities.

As part of the Ranger Link Program, 50 UW-Parkside students gained valuable career-related experience with over 35 local employers. This program will continue in 2012-13, and \$75,000 has been provided by two area foundations to support students in gaining 21<sup>st</sup> century skills.

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<sup>37</sup> “UW Oshkosh student wins national internship achievement award.” <http://www.uwosh.edu/today/16908/uw-oshkosh-student-wins-national-internship-achievement-award/>

<sup>38</sup> “UWO survey collaboration shows manufacturing growth expected in region.”

<http://www.uwosh.edu/today/8905/uwo-survey-collaboration-shows-manufacturing-growth-expected-in-region/>

<sup>39</sup> “UWO students help Oshkosh warming shelter thrive.” <http://www.uwosh.edu/today/15717/uwo-students-help-oshkosh-warming-shelter-thrive/>



RangerTrak, UW-Parkside's online career posting service, posted over 400 internship opportunities, 266 part-time employment opportunities, and 620 full-time job opportunities during the 2011-12 academic year. Career Services planned, promoted, and hosted the annual UW-Parkside Career Fair with 45 employers from Southeastern Wisconsin. This is 10 more employers than attended in 2011.

## UW-Platteville

The Pioneer Academic Center for Community Engagement (PACCE) at UW-Platteville has connected students, faculty, staff, and community partners in meaningful scholarship opportunities since 2009. The internships and projects are with employers that do not currently have the means to pay an intern, but have the need for the student's specialty. About 10 to 20 percent of the employers are start-up entrepreneurs.

The following table shows the number of internships and projects funded by PACCE.

Semester	Proposals and Internships Submitted	Proposals and Internships Funded	Faculty/ Staff Involved	Courses Involved	Dollars Approved	Number of Students Involved	Number of Community Partners
2011-12 <sup>40</sup>	77	77	59	71	\$276,500	1,090	127
Since Beginning	299	269	179	196	\$830,942	3,812	427

As part of the PACCE entrepreneurial program, Austin Glendenning completed a summer internship with Peter Flanary of Foundry Arts in Mineral Point, WI. Mr. Flanary primarily works with stone and bronze media, and his sculptures have been installed throughout the Midwest and in Ireland. "My internship has been a great learning experience," said Glendenning. "We would typically work an eight-hour day in and around his studio doing various jobs like working on sculptures and building a crane for heavy lifting."<sup>41</sup>

## UW-River Falls

UW-River Falls has long-standing relationships with numerous regional corporations, particularly in the financial and agricultural fields. The university's College of Agriculture, Food, and Environmental Sciences places 150 interns per year with industry and agency partners. The College of Business and Economics has, on average, twenty interns in Wisconsin companies each year.

AgStar Financial Services, a cooperative providing a broad range of financial services and business tools for agricultural and rural clients in Minnesota and northwest Wisconsin, has been an outstanding partner for many years. AgStar is a major supplier of internships for UW-River Falls students with agricultural and financial interests. AgStar has employed about 15 interns from the

<sup>40</sup> Based on the 2011-12 academic year.

<sup>41</sup> For more information on PACCE, please see the following brochure: [www.uwplatt.edu/pacce/files/pacce\\_mission\\_brochure\\_2011.pdf](http://www.uwplatt.edu/pacce/files/pacce_mission_brochure_2011.pdf)

UW-RiverFalls campus over the past five years. Many of these internships lead to full-time employment with AgStar once students have completed their studies.

UW-River Falls also regularly has interns and employees working at BioDiagnostics, a Wisconsin-based seed testing company.

Annually, 350 to 450 students from multiple disciplines participate in internships across a wide variety of settings. An additional 200 to 300 students annually participate in student teaching.

### **UW-Stevens Point**

- Over 90 percent of students in the College of Professional Studies are placed in local businesses, health care centers, K-12 public schools, parochial schools, and community agencies through internships, externships, practicum, and fieldwork courses each year. They provide well over 80,000 person-hours each year at these sites.
- The College of Natural Resources (CNR) strongly supports a large intern program that has been in existence since the early 1970s. CNR has placed about 120 to 148 students per year over the last decade through cooperative agreements with 145 agencies. CNR generates over \$700,000 annually for intern student salaries. Essentially every Wisconsin Department of Natural Resources office currently employs at least one UW-Stevens Point alumni who interned with the agency in the past.
- Internships in graphic design have regularly placed students around the country. Design students also intern internationally on a regular basis. Many students are offered jobs at internship host locations, contributing to the near 100 percent placement after graduation. There are currently 180 students in the graphic design major.
- Over the last decade, the number of arts management majors has at least doubled in part because of these professional placements and because of the strong association with the School of Business. Students are regularly placed in the London internship program.
- Media studies internships and externships regularly place students in many of the media markets in Wisconsin and London. These experiences lead to employment opportunities in many instances.
- Though more rare in Theatre, Dance, Studio Art, and Music, internship opportunities do exist domestically and internationally with students taking full advantage of these opportunities.
- UW-Stevens Point students do thousands of hours of tutoring and volunteering in local classrooms. They also work in many daycares and before/after school programs, including the YMCA and the Boys and Girls Club.
- Students in the Division of Interior Architecture are incorporating sustainable designs with the Sorenson Greenhouse and Community Garden project. The goal of the project is to renovate an abandoned warehouse in downtown Stevens Point.

## UW-Stout

One of the ways to strengthen the ties between students and Wisconsin business is the Cooperative education (co-op) program at UW-Stout. These co-op opportunities provide students with experience working at businesses, which in many cases leads to employment with their co-op employer after graduation.

Cooperative education at UW-Stout is part of a nationwide college program that integrates career-related work experience with academic course work. The co-op program supports UW-Stout's polytechnic designation by providing students the opportunity to experience an active and applied focus on learning in their professional field. The success of the co-op program is based on a framework of collaborative partnerships between employers, students, and the university.

UW-Stout emphasizes early and ongoing experiential learning opportunities. Co-ops are one such opportunity, with 876 students participating in 2010-11. Co-op students consistently earn high salaries, with salaries above \$12 per hour for the past six years.<sup>42</sup>

Eighty-four percent of UW-Stout graduates participate in some form of experiential learning before they graduate, including student teaching, field experience, cooperative education, internships, study abroad, practicum, and independent study. UW-Stout students participate in co-ops, service learning, and research with faculty at rates at or above the national and peer averages.

These experiences help UW-Stout graduates find employment as evidenced by placement rates that have consistently exceeded 97 percent for more than 10 years, far exceeding peer and national comparisons.<sup>43</sup> Furthermore, salaries exceed national and UW System comparisons. The 2010-11 median starting salary of UW-Stout graduates from undergraduate programs was \$37,000 per year.

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<sup>42</sup> The full 2010-11 annual cooperative education report can be found online:  
<http://www.uwstout.edu/services/careerservices/upload/cooprpt.pdf>

<sup>43</sup> The full *2010-2011 Career Services Annual Employment Report* can be found online at  
<http://www.uwstout.edu/services/careerservices/upload/anrpt.pdf>

Many companies who recruit Cooperative Education students from UW-Stout use this co-op experience as their talent pipeline for professional positions. Some of the companies who hired UW-Stout co-op students in 2010-11 included:

3M	Grand Hotel Marriott Resort	Nestle USA
AFLAC	Greenheck Fan Corporation	Nosco, Inc.
American Family Insurance	Ho-Chunk Gaming	Prent Corporation
American Medical Systems	Wisconsin Dells	Quaker Oats/ Pepsico
Arandell Corporation	Hormel Foods	Rockwell Automation
Belmark, Inc.	Imagine Print Solutions	Scientific Molding
Bemis Company	J.F. Ahern Co.	Corporation
Biltmore	J.M. Smucker Co.	Scotts Company
Boston Scientific	JC Penney Company	Sentry Insurance
Carlson Hotels	Kimberly Clark Corp.	St. Jude Medical
Chevron USA	Kohl's Department Stores	Ten-E Packaging Services
Color Ink	Kwik Trip, Inc.	Thomson Reuters
Crenlo	Land O'Lakes	TIC-The Industrial Company
E.O. Johnson Company	Land's End	Toro Company
Enterprise Rent-A-Car	Malt O-Meal Company	WalMart Stores, Inc.
Ethicon Endo-Surgery	Marcus Hotels & Resorts	Western Summit
Footlocker / Eastbay	Medtronic	Construction, Inc.
General Mills	Miller Coors	Xcel Energy

## **UW-Superior**

In 2011, the Richard I. Bong Veterans Center posted an announcement for their first marketing internship. This position was tasked with planning, marketing, and executing the center's inaugural Military Vehicle Show. In reviewing the internship, the Center said:

Peter Stone turned out to be more than we had hoped for in an intern. It quickly become evident that his youthful enthusiasm was complimented with insights and ideas from his Business and Marketing courses, all of which he was ready to implement. Pete took a measured approach to the task; he spent time getting to know our organization, helped define what we hoped to accomplish with the event and then worked with sponsors, board members, staff, volunteers, vendors and vehicle owners to bring together all the threads that made up the fabric of the event. Throughout the weeks of event preparation Pete was also happy to help promote the Center in general. He spent time off-site with a classic military vehicle and dressed in an historic military uniform to promote museum visitation and to build excitement for the event. When the day of the event arrived Pete's efforts on behalf of the Center paid off handsomely as we welcomed over 600 visitors to our grounds and galleries. This one day attendance represented over 6% of the Center's paid visitation for all of 2011. Perhaps more importantly, the success of the event demonstrated to those of us who worked with Pete the value of seeing our organization through a fresh set of eyes and, left us with an appreciation for a local talent pool we had not heretofore tapped.

Jake Anderson is another example of a successful UW-Superior internship experience. The real-world scenarios in his classes at UW-Superior and experiences as a store manager at Duluth's Miller Hill Mall helped Jake Anderson get into a ten-week internship management program at Target. "I have worked retail for about 5 years," says Jake, "over that time I acquired many skills that help to put me into the position to succeed with my internship at Target." Recently graduated, Jake is running ahead of the pack a position as an Executive Team Leader at Target.

## **UW-Whitewater**

Students in every college have the opportunity to participate in internships, which can be paid or unpaid. Frequently, these internship placements result in full-time employment following graduation. UW-Whitewater students were involved in 2,764 internship experiences in 2011. The following table shows how these experiences are broken out by college:

College of Arts and Communication	362
College of Business and Economics	879
College of Education and Professional Studies	663
College of Letters and Science	335
All others	525

### *College of Arts and Communication*

The goal of the internship program in the College of Arts and Communication is to provide students with a grounded, real-world experience in a professional environment under the supervision of an experienced professional. The internship program contributes to the professional preparation of students and provides an invaluable opportunity to further implement the skills that they acquire in the classroom.

### *College of Business and Economics*

Business students may take an internship for credit during their junior or senior year. Some students take multiple internships, one for credit and the others for the added experience. The College of Business and Economics also has opportunities for students to work with faculty in real business projects through the Wisconsin Innovation Service Center, the Global Business Resource Center, the Fiscal and Economic Research Center, and the Volunteer Income Tax Assistance program.

### *College of Education and Professional Studies*

All clinical and field experiences in teacher education align with the conceptual framework through the use of the ten Wisconsin Standards for Teacher Development and Licensure or specialty standards for advanced programs. Every clinical and field experience is evaluated through the use of multiple rubrics keyed to these standards to ensure quality and rigor.

### *College of Letters and Sciences*

All majors in the College of Letters and Sciences include an internship option. These opportunities link knowledge and skills to applied experiences that lead to future employment. Internships are

provided in a range of contexts including government offices, parks and forests, highway departments, veterinary offices, and healthcare practices.

A notable example of the value of internships was the recent experience of Ron Chester.<sup>44</sup> Chester, a geography student from Williams Bay, spent a month in Yellowstone tracking grizzly bears with world-renowned biologist Jim Halfpenny. His work is part of an ongoing effort to identify individual bears in the Yellowstone Park area and is published in a new book titled *Grizzly Gallery: Grizzly Bears of Yellowstone's Northern Range 2012*. Chester said, "I walked out of Yellowstone with a lot of knowledge. I received valuable experience and had my work published, which will help when applying for grad schools."

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<sup>44</sup> *Student tracks grizzly bears at Yellowstone, appears on national TV* (<http://www.uww.edu/news/archive/2012-07-grizzlies>)

## STEM Disciplines

The emerging economy will require many more college graduates with a background and training in science, technology, engineering, and math, often referred to as STEM fields. UW System institutions are producing more graduates each year with majors in a STEM area and are undertaking efforts to encourage more students to study in a STEM discipline. Examples of these efforts follow.

### UW-Milwaukee

In keeping with its research mission, UW-Milwaukee offers a rich array of K-12 STEM activities that are aimed at improving young people's performance in STEM classes and increasing interest in STEM careers. The following list outlines the variety and scope of the University's K-12 STEM activities

#### *Upward Bound Math and Science*

UW-Milwaukee Upward Bound Math and Science (UBMS) is a pre-college program funded through the U.S. Department of Education and sponsored by the University of Wisconsin-Milwaukee. The program helps students in grades 9 through 12 to realize that they can excel in math and science and encourages them to pursue a STEM degree. Services provided by UBMS include the following:

- Tutoring
- Academic advising
- Career exploration
- College admissions information and application assistance
- Financial aid and scholarship information and application assistance
- Academic workshops
- College campus visits
- Cultural activities
- Parent workshops

During the school year, students attend after school tutoring on the UW-Milwaukee campus at least two days a week. Students also meet with UBMS advisors to discuss their academic performance. Students participate in other academic enrichment activities, STEM workshops, and cultural activities.

During the summer, participants attend classes, tutoring sessions, STEM workshops, and educational activities, and cultural activities.

#### *School of Education*

The Department of Chemistry and Biochemistry became involved in the Better Elementary Science Teaching (BEST) Project in 2008. This is a three-year project under the School of Education, and it is funded through the Wisconsin Department of Public Instruction. BEST was designed to improve elementary education teachers' knowledge about science and to promote effective science teaching methods.

Under BEST, sixty teachers from the Milwaukee Public School District were divided into two groups, kindergarten through second grade and third through eighth grade. Final assessments revealed that the participant's knowledge of chemistry concepts in both groups significantly improved over the three years.

The Framework for Science Teaching Project, which is a continuation of BEST, began in 2012. It is funded by and involves teachers from the School District of West Allis - West Milwaukee and the Milwaukee Science Academy. The program will also run for three years and will have similar instruction scheduling.

Additionally, beginning in 2012, the Department of Curriculum and Instruction collaboratively developed and piloted Pedagogical Content Laboratory Courses. In the Chemistry course, K-12 teachers are instructed on science content and are then expected to develop lesson plans complete with instruction, activities, and assessments. The course is framed around the National Science Education Standards.

Early results indicate that teachers better understood the necessity for content knowledge when preparing to teach science in K-12. They also better understood how many pedagogical components are required to successfully teach science (e.g., identifying misconceptions, age-appropriate instruction, writing valid and reliable assessments). The funding for this project was provided by the Carnegie Teachers for a New Era project.

The Alliance for Teaching Mathematics to Special Education Learners is another forum for teachers to strengthen their knowledge of mathematics content and to enhance teaching. "Even though it's a growing area within special education, there has not been as much emphasis on teaching math as on teaching literacy," Associate Professor Winn says. "We've always had, at least on the academic side, more emphasis on literacy because so many students struggle with literacy. We just haven't had the knowledge base on how to do interventions for students struggling with math, especially older kids." To increase that knowledge base, teachers have been meeting with educators since spring 2010 and participate in coursework like algebraic reasoning, geometry, statistics, and probability.

#### *College of Letters and Science*

The NIEHS-NIH Children's Environmental Health Sciences Core Center, housed in the Department of Chemistry and Biochemistry, has received national competitive funding for K-12 STEM programming in the Milwaukee Public School System and surrounding school districts for 16 years. Currently, the Center is funded to provide high school science teachers with professional development and their students with authentic research experiences in their biology courses. Activities include intense experimentation relating biological science concepts and environmental health, communicating their results in the form of papers, and presenting posters and talks at an annual student conference. Teachers receive extensive scientific support throughout the year from this ambitious program.

In 2011-12, 23 teachers and 742 students from 21 schools participated in these activities.



In addition, the Departments of Physics, Chemistry, and Geosciences also work in collaboration with the Manfred Olsen Planetarium to improve local science instruction. With the support of a National Science Foundation grant, the Research Experience for Teachers program assists teachers in deepening their science knowledge and reconsidering how they teach the chemistry, geosciences, and physics curricula. Teachers work full-time with their faculty mentors to develop an original teaching project suitable for incorporation into classes that they regularly teach.

The UW-Milwaukee Math Circle is another program targeted at middle and high school students. Math circles are gatherings of motivated students and teachers looking for new challenges in mathematics and a deeper understanding of the subject. While problem solving is emphasized, the circles focus on the process of discovery and are designed to introduce students to deeper mathematical thinking that is absent in most curricula.

Collaborations also occur between the University and high schools in more direct ways. Physics Associate Professor Vali Raicu collaborates with Kristin Michalski, a science teacher from Mukwonago High School, to introduce students to research done in the Physics Department. Students visit Raicu's lab once a year to learn about current research topics and to conduct simple measurements.

Students also participate in occasional research projects that Michalski developed in collaboration with Raicu. During these projects, students measure the perimeter of natural and human-made objects (e.g., the contour of the football field versus that of a pond) at different length scales. The purpose is for the students to understand the concept of fractality and how that affects length measurements. This project has been well received by students and was covered by the local media.

The collaboration between Michalski and Raicu started several years ago as a grant-supported summer research project and has continued with support from Raicu's research funds. Currently, these activities are an integral part of Raicu's National Science Foundation grants as well as a Research Growth Initiative grant.

The University also hosted local high-school and middle-school participants in the 2012 North American Computational Linguistics Olympiad. Competitors have three hours to solve approximately four linguistic puzzles that challenge them to decipher texts in rare languages using logic and computational skills. There is strong participation from suburban schools, urban schools, and homeschool students. The Departments of Linguistics, Computer Science, and Mathematical Sciences participated in the event with collaboration from the Milwaukee Art Museum.

#### *School of Continuing Education*

STEM Today, Degree Tomorrow provides 12 weeks of Saturday workshops that focus on project-based learning. Students have opportunities to make presentations to the community, to collaborate with other teams, and to take a field trip to the Museum of Science and Industry in Chicago. In 2011 and 2012, a total of 79 students in the fifth through eighth grades participated. About 95 percent of the students were from racial or ethnic minority backgrounds, and 71 percent were female. After the program, 79 percent indicated an interest in going to an institution of higher education. Students were also able to list more careers opportunities in STEM fields following participation.

Water Field Adventure, offered by the office of WATER Education Outreach, is a week-long summer camp program dedicated to STEM activities with a focus on water-related curriculum. Each summer, 12 to 16 middle school students participate from all areas of the Milwaukee region.

#### *School of Freshwater Sciences and School of Continuing Education*

The Lake Sturgeon Bowl is a round-robin, double-elimination tournament for students who excel in math and science. Students receive national recognition for their skills while broadening their understanding of the oceans and Great Lakes. Each year, 125 students from 25 high schools across the state compete. Students who compete in the regional bowl are eligible to apply for scholarships from the National Ocean Scholar Program sponsored by the Consortium for Ocean Leadership.

The Bowl's Ocean Odyssey recruits under-represented Milwaukee high school students and teachers to utilize a scaled approach to prepare for the competition. Students have the opportunity to extend their knowledge of the Great Lakes and oceans and to participate in actual fieldwork on Lake Michigan.

Another collaborative competition, Building the Water Generation ROV (Remote Operated Vehicle) Competition, was developed in partnership with the Milwaukee Water Council, School of Freshwater Sciences, School of Continuing Education, and Discovery World. The competition challenges students to design and to build an ROV that can undertake a simulated mission. For example, in 2010, ROVs simulated a series of tasks based on an undersea Hawaiian volcano.

To build the ROV, high school student teams are matched with water-sector professionals who volunteer their time and technical expertise as mentors and technical assistants. The projects are organized through a 'pseudo' company structure with an investment of \$200. The competition helps students to develop technical, communication, teamwork, problem-solving, and critical thinking skills. The competition also raises awareness of freshwater career opportunities.

A team from Milwaukee has made the finals the last two years and last year was runner up in the national finals.

#### *School of Freshwater Sciences*

- With support from the National Science Foundation Division of Ocean Sciences, university students have participated in the Research Experience for Undergraduates. Over the summer, students participate in hands-on research, network with professionals, and are exposed to aquatic science careers. Participants are directly involved in cutting-edge investigations of large water bodies using modern equipment and concepts. About 12 students participate in the program per year.

- The Aquatic Sciences Exploration: Onboard and Online Program provides immersion science learning to middle and high school students as well as teachers during authentic research cruises on Lake Michigan. Distance learning communication technologies, such as wireless shipboard-based interactive videoconferencing, allow participants to share their findings with others. The program provides the mechanism to test both the hands-on, hypothesis testing components (“onboard”) and the distance learning component (“online”) using evaluations as components of the program material. The program encourages the inclusion of under-represented students from the Milwaukee area.
- The goal of the five-year Great Lakes Sea Grant Network project is to implement a Great Lakes Center for Ocean Science Education Excellence (COSEE). COSEE will help teachers deliver high-quality educational programs in aquatic sciences by creating dynamic linkages between Great Lakes researchers, fourth- to tenth-grade educators, and students. The seven regional COSEEs strive to help U.S. citizens become more scientifically literate and environmentally responsible through standards-based science curricula and programs.
- In conjunction with the National Geographic Society JASON Project, faculty produced an in-class curriculum on invasive species and a web video game about ecological invasions. Both products were aimed at middle- and high-school audiences.

#### *College of Engineering and Applied Science*

The FIRST Tech Challenge, hosted by UW-Milwaukee, is an intermediate robotics competition designed for high-school students. Student teams work alongside mentors to apply real-world math and science concepts to an annual challenge in sports-type tournaments. Through their involvement with FIRST, students discover the rewards of collaboration, and they develop a deeper understanding of innovation and engineering.

In January, approximately 200 students in 24 teams competed in this year's Championship. Team registration was filled within 10 weeks of the Challenge announcement, which is a testament to the quality of the program. Teams come from Wisconsin, Illinois, Iowa, Indiana, Michigan and Minnesota. Two teams from the Wisconsin tournament win an invitation to the World Competition.

#### *Department of Mathematical Sciences*

- In 2004, the Department of Mathematical Sciences took a leadership role in a \$20 million National Science Foundation (NSF) grant for improving the mathematical preparation of pre-service elementary and middle school teachers.<sup>45</sup> UW-Milwaukee's Center for Mathematics and Science Education Research administered the award and coordinated efforts between UW-Milwaukee, the Milwaukee Public Schools (MPS), and the Milwaukee Area Technical College.
- Faculty and other instructional staff have expanded their outreach to include the professional development of in-service MPS teachers with grant support from the Wisconsin Department of Public Instruction and NSF.

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<sup>45</sup> For more information, please see the Milwaukee Mathematics Partnership website (<http://www4.uwm.edu/Org/mmp/>)

- Graduates of the Department's PhD program are important faculty members of numerous two-year and four-year colleges in the UW System. Alverno College and the Milwaukee School of Engineering also have alumni on their faculty.
- The Department offered two national American Mathematics Contests this year, which are sponsored by the Mathematical Association of America. While the exams are typically administered by the students' schools, the University supported a number of students in the Milwaukee area whose schools were not offering the exams.

### *Student Success In Mathematics*

At UW-Milwaukee, 46.8 percent of new freshmen need help bringing their math skills up to college level.<sup>46</sup> To serve these students and open the door to a STEM education, UW-Milwaukee supports several dynamic programs:

- For the past three years, Panther Math Prep offers online or on-campus classroom sessions over the summer to help incoming first-year students place into a higher-level math course. This helps students avoid taking non-credit remedial math courses that may slow their time to graduation. These sessions are offered as a free service to students. Last year, 234 students registered for Panther Math Prep, and 56 percent improved their performance when retaking the math placement test.
- As part of the Access to Success Program, UW-Milwaukee has introduced the ALEKS<sup>47</sup> program for remedial math instruction. The ALEKS system is an automated website driven by artificial intelligence that is designed to present students with regular math practice assignments and to assess their retention of the practice material. Each student works through the course content at his or her own pace and in the order in which the student is ready to learn the concepts. In 2010, students using ALEKS were 7.5 percent more likely to enroll in the following academic year and 19.2 percent more likely to achieve satisfactory performance than those not using ALEKS.<sup>48</sup>
- The Academic Opportunity Center recognizes that some students' educational experience may not have prepared them to succeed at UW-Milwaukee. The Summer Bridge Program offered by the Center helps students with their transition from high school by providing four weeks of intensive instruction, advising, and networking opportunities. Students, taught by experienced college instructors, complete college-level assignments and learn basic math skills necessary to succeed in college.

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<sup>46</sup> UW System Office of Policy Analysis and Research. *The New Freshman Class: Fall 2011*. [http://www.uwsa.edu/opar/orb-im/im/new\\_freshman/nfcf11.pdf](http://www.uwsa.edu/opar/orb-im/im/new_freshman/nfcf11.pdf).

<sup>47</sup> Assessment and Learning in Knowledge Spaces (ALEKS)

<sup>48</sup> Of the Fall 2010 cohort participating in a remedial math redesign course, 68.8 percent enrolled in the second fall semester and 75.0 percent achieved satisfactory performance. Of the cohort that did not participate in a remedial math redesign course, 61.3 percent enrolled in the second fall semester and 55.8 percent achieved satisfactory performance.

- The Student Support Services Program has conducted a summer bridge program for incoming freshmen every summer since 2001. This experience serves two general purposes: 1) to increase academic preparation, including Math preparation, and 2) to ease students' psychological transition by familiarizing them with the campus, available resources, staff, and instructor expectations. Last year, 107 new freshmen completed the summer bridge program. Of the 84 who had a bridge Math course, 79 retook the Math placement test at the end of bridge. Of the 79 students, 20 advanced at least one Math course.

## **UW-Eau Claire**

### *Materials Science Center.*

- The UW-Eau Claire Materials Science Center hosts NanoDays for kids and adults to learn about materials at the nanoscale. Visitors can tour the Center, see the instrumentation used by scientists to investigate materials, and enjoy hands-on activities.
- Blugold Beginnings Presentations educate and inspire students, especially underrepresented, low-income, or first-generation students, to believe that a post-secondary education is important, attainable, and available at UW-Eau Claire.
- Nanoscience presentations are made at local schools across the area.
- Materials science career presentations are made to over 850 students at local schools.

### *Department of Physics and Astronomy*

- Science Theater physics demonstrations reaches over 1,500 every year. Several faculty also do presentations outside of this program to reach an additional 200 students each year.
- The Planetarium is a popular destination for many residents of the Chippewa Valley. In a typical year, over 2,000 people see a show. The majority of visitors are K-12 students or are part of youth groups.
- In collaboration with other STEM departments, faculty members provide continuing education opportunities for teachers. Faculty members are also active in the Wisconsin Association of Physics Teachers, an organization which fosters communication and collaboration between high school physics teachers and post-secondary educators.

### *Department of Chemistry*

- The Chemistry Demo Show, which is a one-hour presentation featuring fundamental physical and chemical principles, introduces local students to science in a fun, interactive way.
- Faculty members serve as science fair judges for local middle schools.
- Professor Scott Hartsel has initiated a science-based program called SciEncounters with the Eau Claire Boys and Girls club. This program involves UW-Eau Claire students with local youth to work on science-based activities.

### *Department of Mathematics*

- The students and faculty of the department recently hosted the 30<sup>th</sup> Annual Regional Mathematics Meet for area high school students. Entrants in individual events attempt to solve three math problems, worth from two to five points, in a period of fifteen minutes. This year, 31 teams from 16 public and private schools in the Chippewa Valley participated. Team trophies and individual scholarships were awarded to winners.
- Dr. Manda Riehl, an assistant professor, is the director of Opportunities for Outstanding Mathematics Performance for Hmong Students. The program stimulates interest in mathematics among Hmong high school students in the Eau Claire area, and it recently received funding for a third consecutive year from the Mathematical Association of America's Tensor-SUMMA: Strengthening Underrepresented Minority Mathematics Achievement grants program.
- Dr. Sherrie Serros, a professor, is involved in a number of active projects related to K-12 STEM like the UW System PK-16 Teacher Quality Initiative<sup>49</sup>, the Coaching Mathematics Learning Community program<sup>50</sup>, Communicating about Mathematics with Students through Podcasting, and Creating Mathematics Excellence.
- The Chippewa Valley Math Teachers' Circle is a teacher-led mathematical problem-solving and professional development experience for middle and high school teachers.<sup>51</sup> The goal of the program is to help today's teachers and students become flexible, creative, and collaborative problem solvers. In a nationwide survey conducted in Fall 2010, Math Teachers' Circle participants reported increased enthusiasm for mathematics and greater use of interactive, student-centered problem solving in their classrooms. Many said the program has enabled them to see themselves as mathematicians. Teachers also reported that participating in a Math Teachers' Circle has increased their belief that all of their students are capable of doing mathematics.

### **UW-Green Bay**

- UW-Green Bay offers the Eco U: Water Resources summer camp to students in tenth grade and beyond. Led by UW-Green Bay's outstanding natural resources faculty, campers gain fieldwork, classroom, and laboratory experience as they build awareness of some of the many issues confronting fresh water ecosystems. In addition to being fun, challenging, and engaging, campers have the option to attend this camp for one unit of college credit.

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<sup>49</sup> For more information, please see <http://tqi.uwsa.edu/index.htm>

<sup>50</sup> For more information, please see <http://www.cesa11.k12.wi.us/prodev/CMLCGrant.cfm>

<sup>51</sup> Please see the Math Teachers' Circle Facebook page at <http://www.facebook.com/MathTeachersCircleChippewaValley?ref=nf>

- Life's a Lab summer camp, offered in partnership with Bellin College, provides an ideal experience for high school students interested in pursuing a college degree in science or a profession that requires a science foundation. Each day, campers spend their mornings in UW-Green Bay's state-of-the-art science labs for anatomy and physiology classes. In the afternoons, the team from Bellin College coordinates on-site tours for campers to observe and to encounter an array of health science professions.
- UW-Green Bay offers an exciting computer camp for students in eighth grade and up. The camp immerses students into the world of object-oriented programming and provides an introduction to developing software in a gaming environment. Students will learn how to make objects interact with each other through events and will learn how to program some basic games.
- The federally funded Upward Bound Regional Center for Mathematics and Science (RCMS) is a federally-funded, six-week pre-college program designed to enhance and enrich high school students' understanding of science, mathematics, and the nature of scientific research. RCMS serves approximately 60 students annually. Generally, more than 90 percent of RCMS students complete high school and enroll in college, and a high percentage of participants also enroll in STEM programs of study.
- The Lower Fox River Watershed Monitoring Program is a collaborative watershed education and stream monitoring program that focuses on identifying nonpoint source pollution within the Fox River watershed. In the program, teams of high school students and teachers assess the health of aquatic ecosystems by performing a variety of monitoring activities in selected watersheds of the Lower Fox Basin. The use of standardized methods and teacher training allows the teams to collect quality assured data. Data from the student monitoring is shared at the annual Student Watershed Symposium. There are currently 12 Green Bay-area high schools involved in the monitoring efforts.<sup>52</sup>
- UW-Green Bay offers a number of credit courses in Green Bay-area high schools, including Principles of Chemistry.

## **UW-La Crosse**

Degrees in high-need and leading-edge fields are important to meet the demands for workers in fast-growing occupations, such as in science, technology, engineering, and mathematics (STEM). In 2010-11, UW-La Crosse conferred 351 STEM degrees and 248 degrees in health fields. The university anticipates continued growth in these areas.

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<sup>52</sup> For more information, please see <http://www.uwgb.edu/watershed/>

### *UW-La Crosse Physics Department is No. 3 Nationally*

The UW-La Crosse Physics Department has been consistently ranked among the top ten bachelor's degree only departments according to the American Institute of Physics Statistical Research Enrollment and Degrees data. In 2008-2010, UW-La Crosse ranked 3 based on 23 graduates per year. In 2012, UW-La Crosse graduated 27 undergraduate degrees.

### *Improving Teacher Standards*

There is a critical shortage of qualified physics and physical science teachers. Two-thirds of new physics teachers lack a physics degree, and over 90 percent of middle school physical science students are taught by teachers without a physical science major or certification.<sup>53</sup>

To help combat this trend, the UW-La Crosse Physics Department received Physics Teacher Education Coalition (PhysTEC) funding to further develop its physics teacher education program and increase the number of physics majors interested in teaching high school physics. The department received \$73,330 from PhysTEC. The UW-La Crosse's College of Science and Health more than matched the grant, bringing the total to \$152,203.

UW-La Crosse was one of only seven institutions chosen from 35 national applicants as PhysTEC sites for 2012-15. "Our department has a strong record of recruiting physics majors to its very successful undergraduate program," explained the department chair. "Our faculty members are committed to education."<sup>54</sup>

In another effort to improve education and educational standards, UW-La Crosse implemented the Secondary Teacher Education Preparation (STEP) Program in various STEM disciplines. Teacher candidates earn a bachelor's degree in an appropriate content major (e.g., biology) combined with professional education coursework and multiple field experiences. A key feature of the program is having the subject coursework provided by the specific discipline in order to provide teacher with greater depth in the field. Ultimately, STEP leads to Early Adolescence-Adolescence teaching licensure. To support the goals of the STEP program, the Science Departments hired new faculty in the areas of biology education, physics education, and chemistry education.

### *Community Outreach*

Girls in Science is a summer workshop to encourage girls' interests in science and math with hands-on learning and activities in an environment that is empowering, enriching, and fun. Programs are offered to girls entering sixth through eighth grade. Programming includes activities like examining a mock crime scene for blood samples, finger prints, and other evidence to solve a crime.

Because of the popularity of the Girls in Science summer workshop program over the past 15 years and in response to community interest in a similar program for young boys, the Boys Science Exploration summer workshop program was developed and successfully offered during the past two years.

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<sup>53</sup> From the Physics Teacher Education Coalition (<http://www.phystec.org/about/index.php>)

<sup>54</sup> UW-L physics dep. Is No. 3 nationally. (<http://spotlight.uwlax.edu/physics-department/>)



In addition, the Physics department conducts outreach to regional elementary schools where demonstrators show students fun physics phenomena.

#### *The River Studies Center*

The UW-La Crosse River Studies Center (RSC), created in 1972, focuses on research and informational programs pertinent to the Upper Mississippi River. During the past 30 years, the RSC has expanded its research program to rivers, streams, lakes, and wetlands across Wisconsin, the Midwest, and the nation. Faculty affiliated with the RSC are highly competitive and successful in securing financial support for sustained aquatic environmental research.

Scholarly investigations by the RSC have provided research opportunities to nearly 100 graduate students and more than 250 undergraduates. The RSC has extensive interdisciplinary partnerships with several state and federal agencies, including the U.S. Geological Survey, the Wisconsin Department of Natural Resources, the Minnesota Pollution Control Agency, the National Park Service, and the Environmental Protection Agency.

#### *The SMATHIE Grant Program*

The Sports Medical Athletic Therapist International Exchange (SMATHIE) helps students and faculty study the fields of sports science, athletic training and sports medicine in the United States and the European Union. The collaborative efforts of the international partners will develop international models of health care delivery and will enhance the field of exercise-related health care. The program is funded by Department of Education grants.

#### *McNair Scholar Program in STEM*

The McNair Scholars program provides low-income, first-generation, and underrepresented minority students with support and preparation for graduate school. The McNair Scholars program at UW-La Crosse currently serves 26 students annually, approximately 42 percent of whom are STEM majors. This proportion will increase to 50 percent of 28 students in 2012-13. At least two McNair Scholars each year complete a 10-week summer undergraduate research project through a collaborative partnership with the Upper Midwest Environmental Sciences Center.

#### *First Year Research Exposure*

The First Year Research Exposure (FYRE) program at UW-La Crosse is a new academic diversity initiative in the College of Science and Health. FYRE employs an informal learning community model in order to improve achievement and retention of ten first-year students of color in the STEM fields.

Students are provided with the introductory coursework and career exploration necessary to help them progress expediently toward graduation with a STEM degree. In particular, students participate in a comprehensive introduction to college-level math and science coursework, ongoing tutoring, academic support, and peer mentoring. This initiative is partially funded by the Wisconsin Alliance for Minority Participation.

## **UW-Oshkosh**

In the College of Education and Human Services, the Alternative Careers in Teaching Program (act!) is a teacher licensure program designed specifically for working professionals with a bachelor's degree and at least five years of work experience who desire to teach secondary-level mathematics or science. This partnership between the UW Colleges and UW-Oshkosh is a response to the statewide demand for highly-qualified math and science teachers.

In Summer 2011, the five-year-old program admitted its 100<sup>th</sup> student. Thirty individuals have already completed the program, several of whom received offers for teaching positions before completing the program.

Since its inception in 2006, 29 students have been awarded nearly \$350,000 from one of two Robert Noyce National Science Foundation grants that total \$1.5 million dollars. The act! program's creators expect to present another \$850,000 in Noyce awards to students who are currently enrolled or who are accepted into the program in the future.

## **UW-Parkside**

UW-Parkside hosts a series of events that foster curiosity and engagement in science and technology disciplines. These events reach current and future students in the region and are designed to encourage exploration and increase interest in careers in sciences and technology-related disciplines.

### *Biological Sciences and Computer Sciences Department*

The Biological Sciences and Computer Sciences Departments host aspiring scientists from regional high schools for the annual DNA Days. Students engage in hands-on experiments and research on DNA and in molecular biology. Participants also have a chance to explore potential careers associated with majoring in biology and computer science.

UW-Parkside's Biological Sciences Department hosts regional middle and high schools students, teachers, and community members for Science Night presentations annually.

The Computer Science Department actively participates in the Educator Outreach Project. The goal of this project is to encourage local high schools with finance, accounting, business management, human resources, marketing, and IT/computer science courses to promote secondary and post-secondary education in these fields. Business and information technology educators from Gateway Technical College, Milwaukee Area Technical College, the College of Lake County, Westosha High School, Union Grove High School, and St. Joseph Academy visited the UW-Parkside campus to discuss articulation agreements and other potential collaborations.

### *College of Business, Economics, and Computing Outreach*

The College of Business, Economics, and Computing (CBEC), in partnership with the Office of Admissions, hosts local educators and counselors from high schools and colleges in Milwaukee, Racine, Kenosha, and Lake Counties to share information about majors and careers in business, economics, and computer science. Outreach has also served as a vehicle to foster partnerships, to

build community engagement, and to educate secondary school students about their opportunities in business and related technical fields.

Students, faculty, and staff in STEM disciplines also participate in presentations to high school business classes. The UW-Parkside representatives discuss business career possibilities and the benefits of attending UW-Parkside to pursue a degree in business. These events also include an admissions presentation to provide students with individualized attention regarding their career and educational goals.

### *MATHCOUNTS*

MATHCOUNTS is a national contest designed to enhance students' skills and promote mathematics excellence. Mathletes from the Prairie School of Racine and Kenosha's Mahone, Lance, and Washington middle schools participate in the annual competition. MATHCOUNTS is sponsored by UW-Parkside Enrollment Management, the Computer Science Department, the Wisconsin Society of Professional Engineers-Southeast Chapter, Kenosha Unified School District, Raytheon, the National Defense Education Program, Northrop Grumman Foundation, National Society of Professional Engineers, CNA Foundation, ThinkFun, Texas Instruments, and 3M Foundation.

### **UW-Platteville**

- About 40 high school students attend the summer Pre-Veterinary Camp hosted by UW-Platteville. Students can practice skills like suturing, injections, dissection, and large-animal physicals. Participants also have the opportunity to observe animal behavior and surgery.
- Each year, more than 500 students tour the cadaver lab. Through a combination of enthusiasm, humor, and real-life application, professors explain the basic anatomy and physiology of the human body to each high school class, emphasizing respect for the cadavers themselves. This positive learning experience allows students a unique opportunity to view a cadaver close up and to gain some understanding of how the many systems of the body interact. "It's definitely interesting," exclaimed one of the students. "The cadavers were totally different than I expected ... it's really neat."<sup>55</sup>

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<sup>55</sup>“UWP offers cadaver tours to high school students.” (<http://www.uwplatt.edu/news/2007/05/uwp-offers-cadaver-tours-to-high-school.html>)

- The Society of Plastics Engineers-Milwaukee and the Center for Plastics Processing Technology at the UW-Platteville offer a helping hand to middle and high school science and technology programs in the region. Dr. Majid Tabrizi, professor of plastics technology, played a major role in creating the program. “We have a multi-million dollar investment in our center. This is perhaps the most efficient way for the state to offer science and engineering to a middle and high school curricular program without any additional cost. Our goal is to open our laboratory to high these students to prepare a workforce for the ever-growing plastics industry in the region,” he said. “We’re also trying to expose students to higher education and teach them about the field of manufacturing at a young age so they can plan their future more wisely.”<sup>56</sup> Under the supervision of UW-Platteville students and faculty, pre-college students can operate equipment like injection molders, compression molders, transfer molders, and sheet-fed thermoformers.
- High school students participating in the Explore Engineering Summer Program receive hands-on experience from university professors in multiple engineering disciplines, math, and chemistry. Students who successfully complete the summer course and decide to enroll at UW-Platteville will be given college credit for the program.
- This year, UW-Platteville offered a week-long forensic science summer camp. High school students processed and evaluated crime scenes and analyzed the forensic evidence. Students explored the theory behind DNA analysis, chromatography, spectroscopy, and microscopy.<sup>57</sup>
- As a result of a Chancellor's Opportunity Fund award, students from Messmer High School in Milwaukee have the opportunity to tour and explore the educational opportunities offered by the biology department at UW-Platteville. About 25 students at Messmer High School participate in the biology workshop.
- Pioneering Your Future, which is held in conjunction with the Girl Scouts Science and Technology Day, helps girls learn about career opportunities in STEM fields. Topics include areas like material science, robotics, and agriculture engineering.
- UW-Platteville also works to support Boy Scout troops in their STEM interests. For example, the Society of Physics Students helped Boy Scouts earn their Nuclear Science merit badge.
- UW-Platteville’s Pioneer Farm, a research and demonstration facility, offers tours to grade school students. One teacher said, “Many of the places we visited in person, the fourth graders had learned about during the year. We love visiting Pioneer Farm, as it is a unique hands-on experience for the children. We think it is important that they see and understand the importance of what goes on at the farm. We feel it is especially important for them to see the big picture of farming.”<sup>58</sup>

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<sup>56</sup> Milwaukee SPE Newsletter. [http://www.milwaukee-spe.org/newsletters/newsletter\\_2011\\_09.htm](http://www.milwaukee-spe.org/newsletters/newsletter_2011_09.htm)

<sup>57</sup> For more information, please see [http://www.uwplatt.edu/cont\\_ed/ForensicScienceCamp/](http://www.uwplatt.edu/cont_ed/ForensicScienceCamp/)

<sup>58</sup> “Milwaukee Students Experience Pioneer Farm.” ([http://www.uwplatt.edu/pioneerfarm/news/2003\\_06\\_18.html](http://www.uwplatt.edu/pioneerfarm/news/2003_06_18.html))

- One of UW-Platteville's agricultural-based Greek organizations, the Sigma Alpha (SA) sorority, is dedicated to scholarship, leadership, and service. During the spring semester, SA's biggest activity is Ag in the Classroom. "We go to area elementary schools and meet with fourth-grade students and teach them basic facts about agriculture," said Kimberly Forrester, SA chapter president. "We want people to understand that everything is somehow tied to agriculture and to take the time to think about where their food comes from."<sup>59</sup>
- About 2,200 students compete annually in the Future Farmers of America Agronomic Skills Contest. High school students participate in events ranging from agricultural mechanics to poultry judging to agronomy. One student said, "I not only learned more about animals, but I also got to see what college was all about."<sup>60</sup>
- The UW-Platteville Block and Bridle Club hosts the annual Livestock Judging Contest. The contest is designed to be challenging for experienced judges, yet a good introduction for beginning judges. Up to ten students can be on each school team, and coaches can bring several teams.
- About 200 students compete annually in the Land Judging Contest. The contest is sponsored by the UW-Platteville Agronomy Club to encourage high school students to participate in land judging.
- Agri-Ambassadors is a student organization that represents UW-Platteville and the School of Agriculture. Agri-Ambassadors are chosen on the basis of excellence in academics, leadership, and student activities as well as a desire to promote the School of Agriculture.<sup>61</sup> Ambassadors visit high schools in Wisconsin, Illinois, and Iowa to reach out to students.

## UW-River Falls

### *Science Olympiad*

In January 2012, UW-River Falls hosted about 600 students from 13 Minnesota and 10 Wisconsin high schools for the UW-River Falls "Border Battle" Science Olympiad Open Invitational Tournament. The event, organized by physics Professor Earl Blodgett, featured high school teams competing in 23 National Science Olympiad events as well as 6 trial events.

UW-River Falls was chosen as an ideal location for the event due to its close proximity to both western Wisconsin high schools and various Twin Cities schools. The event also highlighted UW-River Falls' strength in science programs, including the physics program. The Physics program ranked fourth in number of graduates compared to all comprehensive institutions across the nation in 2010.

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<sup>59</sup> "Greek organizations at UWP serve campus and community." <http://www.uwplatt.edu/news/2010/02/greek-organizations-at-uwp-serve-campus.html>

<sup>60</sup> "High school students participate in FFA activity for skills." *The Exponent*.

<http://www.uwpexponent.org/2009/04/02/high-school-students-participate-in-ffa-activity-for-skills/>

<sup>61</sup> For more information, please see <http://www.uwplatt.edu/soa/agclub/agambass.html>

### *Vincent High School Program*

A collaborative Agricultural and Environmental Studies program between Vincent High School in Milwaukee and the UW-River Falls College of Agriculture, Food, and Environmental Science (CAFES) was initiated in 2001. Principal funding for the program comes from the Milwaukee Area Workforce Investment Board.

CAFES faculty and admissions staff visit Vincent High School for classroom outreach to students during the academic year. Additionally, a group of Vincent High School students and teachers engage in a weeklong program on campus involving classroom instruction and field studies each summer. The third program component involves providing supervised summer work activities at Vincent High School where selected students apply science-based skills in summer employment.

A key factor in the program's initial and continuing success is the involvement of teachers and administrators at Vincent High School.

### **UW-Stevens Point**

#### *Wisconsin Center for Environmental Education*

The Wisconsin Center for Environmental Education (WCEE) at UW-Stevens Point actively engages Wisconsin teachers and industry to provide students with access to STEM opportunities. WCEE was created by the legislature in 1992 to "promote, develop, and evaluate environmental education in the K-12 schools of Wisconsin." WCEE has a number of partnerships that allow it to offer award winning STEM programs. Three specific programs - KEEP, LEAF, and ESN - are discussed below.

The K-12 Energy Education Program (KEEP) is a partnership program with the state's energy community. The five largest utilities in Wisconsin have supported this program for the last 15 years. KEEP has developed award-winning energy curricula and has trained thousands of teachers in its use. KEEP is honored by the fact that the U.S. Department of Energy recommends the KEEP curriculum framework as a national model.

The Wisconsin K-12 Forestry Education Program (LEAF) is a partnership program with the forestry community of Wisconsin. Both public and private forestry funds have supported the development and offerings of the LEAF program for twelve years. The LEAF program is a national model for K-12 forestry/science education and has provided training to thousands of Wisconsin's teachers.

The WCEE Environmental Science Network (ESN) provides a statewide network of environmental science teachers with resources, information, and networks to improve their STEM-related curricular offerings.

As a result of programs like KEEP, LEAF, and the ESN, many quality private-public partnerships have been formed and tens of thousands of Wisconsin students have had value added to their STEM opportunities.

### *STEM Career Day*

In addition to the work done by WCEE, Continuing Education annually offers a STEM Career Day to students in ninth through twelfth grades. Students choose from a selection of workshops in STEM topics offering a variety of different hands-on and discussion activities. Each workshop is presented by a STEM career professional from either on or off campus. The conference includes exhibit exploration activities, a morning keynote, three selected workshops across campus, and lunch. A conference on careers in science for middle schools boys is planned.

### *Women and Science Day*

Continuing Education also coordinates the UW-Stevens Point Women and Science Day. Tailored to seventh- and eighth- grade young women, this conference offers participants a chance to explore UW-Stevens Point for the day and attend three, one-hour workshops presented by professionals in a wide variety of science-related careers. The conference provides young women with early exposure to science careers and highlights that female professionals hold these careers.

### *The School of Education*

The School of Education also encourages students to think about higher education. The Gifted/Talented program provides enrichment programs for thousands of area elementary-age students through two programs. First, Youth in College offers summer enrichment experiences on a wide range of topics and is open to high academic ability students in kindergarten through eighth grade. The second program, College Days for Kids, encourages high-ability sixth graders to set appropriate educational goals.

## **UW-Stout**

UW-Stout offers a multitude of STEM programs to get K-12 students interested in STEM careers and interested in going to college. Examples of ongoing, long-standing programs include:

- Science, Technology, and Engineering Preview at UW-Stout for Girls (STEPS) is a program originating at UW-Stout and currently in its 16<sup>th</sup> year. Middle school girls participate in workshops that give them hands-on experience with high-tech equipment and processes. Outstanding professors from the engineering, technology, and sciences programs teach the workshops. Campers also enjoy activities such as bowling, swimming, a pizza party, and karaoke. Surveys of the STEPS alumni from 1997, 1998, and 1999, all of whom could have graduated from college by now, indicate that STEPS was a tremendous success. The results showed that a girl who attended STEPS at UW-Stout was 2.9 times more likely to enroll in a college engineering or math program and 2.3 times more likely to enroll in natural science programs. The campers choosing STEM majors indicated that STEPS had a major influence on their choice.
- UW-Stout hosts the Skills USA regional competition at which high school competitors demonstrate skills needed by 21<sup>st</sup> century employers. Approximately 300-350 students participating annually.
- UW-Stout sponsors the STEM Career Days event with approximately 300-350 high school students participating annually.

- The State Science Olympiad brings 700 middle and high school students to campus annually.
- UW-Stout hosts the regional Rube Goldberg competition at which high school participants demonstrate engineering, teamwork, and problem-solving skills.

UW-Stout also has many grant programs to encourage involvement in STEM programs:

- The National Science Foundation Science, Technology, Engineering, and Mathematics Talent Expansion Program (STEP) forms a sustained partnership among high schools, UW-Manitowoc, and UW-Stout. STEP is a pipeline of seamless educational opportunities based in real laboratory research for 90 students over five years. STEP supports collaborative research, mentorship, and instructional programs.
- Through the U.S. Department of Education, Mathematics, and Science Partnership Grant, the Wisconsin Department of Public Instruction funded a consortium project serving nine school districts and 60 K-12 teachers to improve student achievement in mathematics and science. The project improves teachers' content knowledge and pedagogy in STEM areas using evidence based practices, including contextual teaching and learning strategies, differentiated instruction, balanced assessment, and technology integration.
- In collaboration with Menomonie High School teachers, UW-Stout mathematics faculty members were funded through the UW System Growth Agenda program to align the math curriculum between Menomonie High School and UW-Stout, to identify and eliminate gaps in student competencies, and to enhance content knowledge and teaching skills.
- "Polytechnic Mission, Applied Science Vision," a National Science Foundation S-STEM project, provided \$200,000 in scholarships to financially disadvantaged and under-represented UW-Stout STEM students.

## **UW-Superior**

- The Rail and Intermodal Transportation Program helps youth, grades 9 through 11, explore careers in Transportation and Logistics and Engineering. Participants ride trains, enjoy technical tours of transportation facilities, and experience life on a college campus with others who have similar interests. This program is offered through a longstanding partnership between the UW-Superior Transportation and Logistics program and the Rail Transportation program at Michigan Technological University.



- The Lake Superior Rivers2Lake Program connects teachers and students to the ecology and history of the St. Louis River and the Great Lakes. Rivers2Lake brings engaging interdisciplinary experiential learning experiences to 15 teachers in 6 schools. The program also assists teachers with integrating Rivers2Lake topics into their curriculum. These teachers will, in turn, reach 300 students in their classrooms during the 2012-13 school year. Rivers2Lakes was awarded competitive funding from the National Oceanic and Atmospheric Administration's B-WET, an environmental education program that promotes meaningful watershed educational experiences.
- For more than four decades, high school students from northwestern Wisconsin and northeastern Minnesota have gathered at UW-Superior to match wits in the Math Meet. Teams of eight students from each high school compete as a group and as individuals to solve an array of problems in geometry, calculus, algebra, analytic geometry, trigonometry, elementary functions, probability, and statistics. Events are timed, and problems call for multiple choice or short answer responses. In April 2012, more than 100 high school students participated.
- K-12 students and their parents from throughout northwestern Wisconsin and Minnesota participate in the annual Science Night. Some of the exotic displays featured snakes, roaches, live trout, shark dissection, and entomology.<sup>62</sup> In 2012, over 400 students interacted in a hands-on environment with college students and faculty to learn more about science and career opportunities.
- The Wisconsin Space Grant Consortium (WSGC) is a joint effort between NASA and organizations across the state.<sup>63</sup> WSGC is dedicated to helping provide students, researchers, educators, businesses, not-for-profit organizations, and other stake-holders with the tools, connections, and resources they need to make the Wisconsin aerospace community grow and thrive. WSGC awards Aerospace Outreach and Special Initiatives across Wisconsin for projects that imbue the youngest Wisconsinites "with an excitement for math, science, and technology through projects involving aerospace." UW-Superior is a participant in the Consortium and hosted the annual conference in 2007.

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<sup>62</sup> For more information, please see <http://www.uwstinger.com/?p=8832>

<sup>63</sup> For more information, please see <http://www.uwgb.edu/wsgc/>

## **UW-Whitewater**

### *Education Outreach Grant Program*

UW-Whitewater Education Outreach Grants provide funding for initiatives that improve PK-12 education in Southeastern Wisconsin. Education Outreach projects develop partnerships and collaborations with area schools or foster mutually beneficial relationships between UW-Whitewater and the Cooperative Educational Service Agency 2. Projects focusing on the following areas are given special consideration:

- Implementation of Common Core State Standards, particularly in math and reading;
- Curriculum redesign and assessment initiatives that promote the development of 21<sup>st</sup> Century Skills; and
- Development of innovative partnerships or programs in the areas of globalization, use of technology, and meeting the needs of diverse student populations.

Education Outreach award recipients in 2011-12 that focus on STEM initiatives included the following:

- Reaching Interests Beyond Boundaries Inquiry Trips connect UW-Whitewater volunteers and Whitewater Unified School District students and staff. Participants work to identify local frog species by call and report their findings. This program provides students with experience in asking and answering scientific questions, augments science literacy, facilitates conservation, and teaches students about amphibians.
- Computational and quantitative biology outreach to southeastern Wisconsin.
- And building leadership capacity for Common Core State Standards with a focus on Mathematics implementation among a cadre of area educator.

### *Wisconsin Department of Public Instruction Math and Science Partnerships*

Virginia Pease, Assistant Professor of Curriculum and Instruction, has partnered with the Johnson Creek School District and the Waukesha STEM Academy to increase teaching capacity. The program takes advantage of best practices in mathematics professional development in an effort to increase local teachers' content knowledge, problem-solving skills, and conceptual understanding of mathematics. This project will provide professional development experiences for approximately 44 teachers in partnered schools.

### *College of Letters and Sciences Science Outreach Coordinator*

The College of Letters and Sciences recently hired a Science Outreach Coordinator to increase science-related outreach in K-12 schools across the region. This position will:

- Develop relationships with regional K-12 schools;
- Develop and implement summer camp opportunities in the natural sciences;
- Develop and implement science teacher continuing education and professional development opportunities;
- Assist K-12 teachers with curriculum development;
- Offer pre-college exploration of science as a career;
- Increase public exposure to and understanding of contemporary issues in science;
- Encourage, increase, and facilitate public access to science faculty expertise;
- Improve regional K-12 Wisconsin Knowledge Concepts Exam state testing results in the science sub-category;
- Develop science education kits;
- Develop internship opportunities for UW-Whitewater students in STEM fields.

### *Modularization of Developmental Mathematics Courses*

Dr. Geetha Samaranayake, Associate Professor of Mathematical and Computer Sciences, has worked with collaborators across the University of Wisconsin System to assist students in remedial mathematics courses. The goal of this project is to increase both the student completion rate in developmental math courses and the transition rate into credit-bearing mathematics courses.

### *Wisconsin Alliance for Minority Participation (WiscAMP) Programs*

UW-Whitewater has been awarded a number of small grants designed to increase minority participation in the sciences. The current project, WiscAMP Scholars Program for Research Experiences and Public Outreach in the Sciences, has two goals: 1) Provide underrepresented minority (URM) students part-time, paid research assistantships in their STEM majors, and 2) employ URM undergraduate students to present chemical demonstrations to students at the elementary and secondary levels. Past projects have ranged from testing water quality at Whitewater Creek to breeding fish.

Research assistantships may enhance retention and graduation rates by building student relationships with mentors and by helping students see how skills learned in the classroom are applied to real research problems.

### *Ronald E. McNair Post-Baccalaureate Achievement Program*

The McNair Scholars Program prepares first-generation and multicultural students for doctoral study and careers as college faculty. Many of the participants included in the McNair Program are seeking advanced degrees in STEM disciplines. The program is funded by the U.S. Department of Education.

The program matches each student with a faculty mentor in their major and enhances students' quantitative computer, test-taking, research methods, and critical thinking skills. Additionally,

students have access to resources for undergraduate research projects and opportunities to present research findings at regional and national conferences.

#### *Department of Mathematics and Computer Science*

The Academic Transformation Project in the Department of Mathematics and Computer Science has re-focused how basic algebra, a foundation math course, is delivered. Results from the pilot sections show that a higher percentage of students are successful using this approach. Consequently, the re-focused approach will be implemented more broadly.

The department has also developed a Computer Science major. The new major complements a robust technology presence on campus, which already includes programs in Information Technology and in Media Arts and Game Development. The major is geared toward students who want to pursue careers in software engineering, commercial software production, network design, systems programming, database design, Web development, or computer design. According to the Bureau of Labor Statistics, computer and mathematics occupations are expected to grow by 22 percent over the next decade.<sup>64</sup>

In addition, the department also hosts the Purple Comet! Math Meet, which is an international mathematics competition for middle and high school students. The contest is entirely administered over the Internet. Teams of one to six students compete by submitting solutions to a list of mathematics problems. There is a ten-day window during which teams may compete by choosing a start time most convenient for them. The problems range in difficulty from fairly easy to extremely challenging. In 2012, over 10,000 students competed on over 2,200 teams from 39 countries.

#### *Geographic Information Systems Center*

UW-Whitewater has recently established a Geographic Information Systems Center. The Center merges demographic data with maps in order to provide businesses and organizations with new ways to reach customers and strengthen their operations.<sup>65</sup> "Think of it as integrating Microsoft Excel and Adobe Photoshop," said project manager Alvin Rentsch. "We have all this data out there. If we can depict that as a meaningful image, the possibilities for business growth are endless."

To further promote partnerships with the schools and area employers, a science outreach coordinator has also been hired recently. She will provide central leadership for outreach activities currently underway. Those activities include Upham Hall Nights, during which area science teachers come to campus for meetings with the science faculty; demonstrations by Chemistry and Physics faculty in area schools; school presentations by trained science students; science fair judging at area high schools; and the development of new internships placements.

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<sup>64</sup> Bureau of Labor Statistics. Employment Outlook:2010-2020. *Overview of projections to 2020*. <http://www.bls.gov/opub/mlr/2012/01/>

<sup>65</sup> "Mapping opportunity: GIS Center opens at UW-Whitewater." <http://www.uww.edu/news/archive/2011-05-gis>

### *Nanoscience Symposium*

Faculty in the Departments of Biological Sciences, Physics, and Chemistry collaborate to organizing the annual Nanoscience Symposium. Nanoscience is a rapidly developing field that promises to offer countless technology advancements and has been termed the next industrial revolution. The symposium increases nanoscience awareness on campus and in the surrounding community. It also encourages undergraduate research and student involvement. The symposium draws an enthusiastic audience of students and includes presentations by faculty and by employers.

### *Undergraduate Research*

UW-Whitewater has a national reputation in undergraduate research because of its commitment to providing first-rate opportunities and because of the exceptional students engaged in research.<sup>66</sup> All of the science programs at UW-Whitewater are actively engaged in undergraduate research, and faculty have also opened their labs to interested middle school students. Undergraduate researchers present their work at the National Council for Undergraduate Research and discipline-specific conferences.

UW-Whitewater has made major investments in science equipment including tools for imaging, measuring, and manipulating matter at the nanoscale.<sup>67</sup> This equipment is integrated into classes, undergraduate research, and presentations to younger students in an effort to engage students in applied learning and to prepare them to enter the work force.

Alexander Steeno is one example of the many students doing meaningful undergraduate research. Alexander's work with faculty mentors focuses on understanding the complex role of certain metals in cancer metastasis. His research could open new doors for cancer therapies and provide cancer patients with a better window of opportunity for treatment.<sup>68</sup>

## **UW Colleges**

### *Collaborative Engineering Program*

Since 2001, UW Colleges and UW-Platteville have offered a collaborative degree program in engineering. This program allows students at UW-Fox Valley and UW-Rock County to complete a bachelor's degree in either mechanical or electrical engineering. Since the collaboration began in 2001, UW Colleges enrollments in freshman- and sophomore-level engineering courses have increased 400 percent.

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<sup>66</sup> For more information, please see the UW-Whitewater Undergraduate Research Program website (<http://www.uww.edu/urp>)

<sup>67</sup> Specifically, UW-Whitewater has invested in an atomic force microscope. UW-Whitewater is one of few college campuses in the nation to own the machinery. Please see the media release for more information (<http://www.uww.edu/news/archive/2011-10-nanoscience>)

<sup>68</sup> For more examples of award-winning student work at UW-Whitewater, please see the following website: <http://www.uww.edu/urp/student-awards>

### *Portals of Discovery*

Portals of Discovery, a partnership between UW-Manitowoc and UW-Stout, addresses the issues of engagement and retention in STEM fields through collaborative research. Students move through a pipeline of STEM education beginning in high school, continuing through a two-year institution, and achieving degree completion at the baccalaureate institution. The complete integration of research, coursework, and mentorship across institutions ensures that STEM students have a persistent support network throughout their undergraduate career.

The project includes summer research workshops and research-based curriculum development at the high school level. At the two-year campus, students access financial support, peer tutoring, faculty and peer mentoring circles, curriculum development, and participation in undergraduate research. At the four-year institution, students participate in a 10-week research immersion program for transferring students, continue to engage in faculty mentoring, participate in undergraduate research, and have opportunities to serve as peer mentors.

Since the start of the program in 2009-10, enrollments in STEM disciplines have increased 26 percent at UW-Manitowoc, and over 250 students have participated in research projects. Portals for Discovery is now being developed for expansion across the UW System.

### **UW-Extension**

4-H Gateway Academies are week long summer experiences that involve middle school aged youth in STEM learning activities. The program has been carried out in cooperation with certified Project Lead the Way instructors from throughout Wisconsin and the Society of Manufacturing Engineers. The program emphasizes rigorous, informal learning, focused on experimentation and discovery. In 2011, 523 students participated in 33 locations around Wisconsin. More than 1,300 youth have participated over the four years of the program.

Another UW-Extension program, 4-H Tech Wizards, engages youth from economically depressed areas in robotics and STEM related activities while providing a strong mentoring environment. Youth ages 8 through 17 are matched with adult mentors who are trained in positive youth development and evidence-based standards. The 1-to-4 adult-mentor groups meet weekly afterschool to build LEGO Robots that perform tasks and race to complete robotic challenges. The program is funded through the Office of Juvenile Justice and Delinquency Prevention.

In 2011, the first year of the program, there was a 90 percent mentor retention rate and 75 percent youth retention. Assessment tools show that the program not only helped youth develop self-efficacy and STEM skills, but allowed the adult mentors to improve their STEM, communication, and leadership skills. In Wisconsin, the program serves approximately 100 youth and 19 adult mentors in Kenosha, Racine, Crawford, and Milwaukee Counties.