



Remarks as Prepared "The State of Research: 2014 Annual Report"

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THE STATE OF RESEARCH: 2014 ANNUAL REPORT

Welcome Chair Beeson, Vice Chair Johnson, Regents, President Kaler, Friends:

- Thank you for the opportunity to come and speak with you today. I am honored to present the annual "State of Research" report as Vice President for Research at the University of Minnesota.

Research Priorities

- When I first spoke to this Board in July 2013, I described a set of overarching principles that should drive our research enterprise. To review, these were:
 - Produce excellence
 - Be transformative, lead not follow
 - Advance transdisciplinary work
 - Focus on critical, global challenges
 - Present real, measurable results
- I still believe strongly that these are the correct principles that we should apply in all of our missions.
- I am particularly pleased to see that these principles are being incorporated in the Twin Cities Strategic Plan as well.
- I have good news for you today; in partnership with our faculty, research community, university system, the President's office, and our external stakeholders, we have started on a path to furthering the research excellence of the university
- Today, I will present our latest performance measures, including:
 - The annual and ten year trends of sponsored research funding at the university
 - An update of our technology commercialization endeavors
 - And a comparative analysis of our research activity as measured against our regional, national and global peers.
- As you will see, these performance measures continue to show a strong research enterprise sustaining its ranking and performance among an elite group of public research institutions.
- During today's discussion, I hope to provide moments of reflection and celebration over some of our early wins within the framework set forth by our research strategic plan, Five Years Forward through Collective Inspiration and Discovery.
- I came to the university to help it apply its excellence to some of our society's greatest challenges and to make a difference in our community.
- I know you, too, are here because you want to make a difference for our university and

for Minnesota, so I look forward to a robust and engaging discussion to follow.

RESEARCH STATISTICS

Awards by Source

- In fiscal year 2014, University of Minnesota faculty and staff competed successfully for \$741 million in externally sponsored research, up 6.8% from 2013.
- The result is a \$47.2M increase in annual funding and is largely attributed to the receipt of 337 more awards.
 - If we dig into the data a bit more, we will find that these increased totals reveal the university received 86 awards of \$1M or more last year;
 - Six of these awards were over \$5M.
- This slide also displays annual totals of externally sponsored research data by external funding source.
- Funding increases are seen for all major funding sources - federal, state and private.
- Funding levels from individual federal sources varied among agencies but overall resulted in a net increase of \$15 million or 3.1%.

Federal Funding

- Another view of this same federal funding is to compare university totals with respect to the agency's total budgets.
- Using the American Association for the Advancement of Science figures on federal funding for fiscal years 2013 and 2014, we find that the budgets for federal R&D for the following agencies, DOD, DOE, HHS, NIH, NSF and USDA, increased by 1.1%.
- The University of Minnesota increased its funding from these agencies by 2.4% during the same period.
- In other words with regards to federal funds available, the U of M is doing about twice as well as expected in competing for these funds.

Awards by Source

- Returning to this slide to review state funding, you can see the State of Minnesota funding increased as well, up \$12M or 21% from last year.
- The increase was due to more awards (63 compared with 40 last year).

Susan Galatowitsch

- Let me take a moment to celebrate the accomplishments of one of our esteemed faculty contributing to Minnesota's success.
- Susan Galatowitsch is professor and department head of Fisheries, Wildlife and Conservation Biology in the College of Food, Agricultural and Natural Resource Sciences and is the director of the Minnesota Aquatic Invasive Species Research Center.
- In her role as director, Susan is overseeing an \$8.7M grant from the State of Minnesota to further discoveries in aquatic invasive species research.
- This is great recognition from our State that the university can be a trusted research partner in helping to protect one of Minnesota's greatest resources.

Awards by College & Campus

- In a comparable way, this next slide illustrates how award funding is distributed within the university by both college and system campus.
- The 6.8% annual increase in externally sponsored research funding overall translates into increased funding for more than half of the U of M units identified in this chart.
- The College of Science and Engineering tops the list in terms of increased amounts with \$22 million more than in 2013, or an 18.8% increase.
- The Medical School showed the next greatest total increase with \$15 million (or a 7.9% increase).

Awards by Major Source Category

- Moving on from our annual data review to one with a 10-year analysis for university funding, we see on this next slide a distribution trend of university externally sponsored research for the fiscal years 2005 through 2014.
- Despite some year-to-year variations in the proportions of funding and a leveling off over the five most recent years seen, funding totals for 2014 are at a level comparable to the maximum amount ever received by the institution in 2012 without continuing ARRA funding.
- One area I want to emphasize today is the university's growing strength with regard to developing key and strategic partnerships.
- The Greek orator Demosthenes said, "Small opportunities are often the beginning of great enterprises." And that is certainly the case with the university.
- Our renewed outreach to partners might be in the building phase, but we are beginning to see the initial rewards from forming effective partnerships within the university and with external entities.
- While increases in the categories of federal activity, private sponsors and state funding are all positive, the Other Private group, which includes funding from University & College collaborations and partnerships increased \$10.8 million (or 21.6%) in 2014.
 - An example of this positive growth can be seen through the work and partnerships undertaken by researchers such as physicist Keith Goetz, principal investigator for the university's Solar Probe Plus mission.
 - Currently this research is being undertaken in collaboration with NASA and the UC California Berkeley.
 - This partnership has garnered nearly \$2 million for U of M research as we work with an international team to develop a small spacecraft that can get into close proximity to the sun.
 - The mission and funding from UC Berkeley is expected to run at least until 2025.
- This trend with regard to collaborations –with our federal, state, business and university partners-- underscores the importance of our research priority to advance transdisciplinary partnerships.

Awards by CIC Institution

- One more comparison worth noting is the ten year analysis outside of the university with the members of the Committee on Institutional Cooperation (CIC or more commonly referred to as the "Big Ten").

- Within this group of universities, the U of M ranks third in annual externally sponsored research award totals for 2014. This has further significance because both Wisconsin and Michigan show declines in their 2014 annual funding totals.

TECHNOLOGY COMMERCIALIZATION

- As I've just discussed, opportunity and success for university research relies on our ability to form effective partnerships and collaborations with university, business and research partners.
- The Office for Technology Commercialization does just that.
- The OTC continued its strong performance and productivity in 2014, and with a few exceptions, all metrics show growth over the previous fiscal year, as is seen on this slide.
- A record 15 startup companies were launched in 2014, and to celebrate this win in a few words, you could say our ability to innovate stands out.
- The Washington D.C.-based publication, National Journal—which is read by national business leaders and public policy makers alike—this year highlighted OTC's effectiveness in an article called, "This Urban Research University Is Also an Economic Powerhouse."
- This article describes how the university, OTC and our pioneering initiatives have made it easier than ever for University of Minnesota inventions to make it to market and to make a difference in economic terms and in the lives of our citizens.
- Economic Powerhouse—those are words I like to hear in association with our university.

Jian-Ping Wang

- Part of this powerhouse includes university faculty member and prolific innovator, Jian Ping Wang who was highlighted in this same article for his 39 patents and three start up companies that have spun out.
- One of those companies, Zepto Life Technology, is based on his research in helping to detect diseases in their early stages.
 - Wang's invention is a highly accurate, hand-held biosensing device that detects traces of up to 64 different diseases or medical conditions, from malaria to cancer, all at once.
- The Golden Gopher Magnetic Biosensing team, led by Professor Wang, was selected as one of five Distinguished Award Prize winners for their work with this technology in the Nokia Sensing XCHALLENGE, a global competition to develop breakthrough medical sensing technologies.
- Wang's work is truly transformative—it is portable, inexpensive, and could improve access to care in geographically isolated areas.

Celebrating University Innovators

- In this same spirit of highlighting the successes of our innovative faculty, I should mention our celebration last night, which was held to recognize the growing and rich entrepreneurial landscape we have at the university.
- U of M faculty, Kechun Zhang; Daniel Voytas; and Robert Vince were all recognized by their peers for their outstanding accomplishments at various stages in their careers and

in the commercialization cycle.

- University innovation is important, and this area is one of the goals we've articulated in Five Years Forward –to accelerate the transfer of knowledge from the university for the public good.
- In other words, we want to use our talent, expertise and resources to make a difference.
- I think we are doing that.

Technology Commercialization

- In order to keep making a difference, and having anticipated challenges related to the loss of Glaxo revenues due to the patent period ending for Ziagen, the OTC has put in place several new programs designed to significantly increase opportunities with our partners for entrepreneurship and technology commercialization.
- This past year, we have seen a significant rise in non-Glaxo revenues, which is a good sign.
- One such program we can give credit to for this rise is MN-IP, also known as the Minnesota Innovation Partnerships program.
- In 2014, 51 new sponsored research agreements had been signed through the MN-IP program, and to date, 140 research agreements with more than 100 companies are in place.
- MN-IP is a program with national prominence among our peer institutions, coined by our colleagues and partners as the “Minnesota Method.”
- During 2014, the university expanded its MN-IP program to include “Try and Buy.”
- This new feature of the program allows companies to determine the commercial potential behind existing university technologies before committing to a license. “Try and Buy” offers a fee-free “test run” to gauge the viability of an innovation under pre-negotiated licensing terms.
- Part of the benefit of doing business with the U through MN-IP means that our partners will not incur any U.S. patent costs until a patent is issued, and Minnesota companies benefit from an added discount.

Minnesota Innovation Partnerships (MN-IP)

- Like innovation itself, our ability to re-work or reengineer partnerships to help advance university innovation is gaining national attention, and this program has been recognized recently by both Bloomberg's BNA and Forbes.com, highlighting our institution as trendsetters, putting out a “Welcome mat” to more effectively reach potential industry partners.

NATIONAL AND GLOBAL ANALYSIS

- Before I turn away from research statistics to speak to strategic research investment and partnership opportunities, I want to take a moment to discuss Peer Comparison Data—I have more good news to share.

Top 15 Institutions

- According to the Higher Education Research and Development, or HERD, Survey data for

2013, the university maintained its top ten position among public research universities, posting over \$858 million in research expenditures.

- If all U of M campuses were reported together, the total would grow to \$882 million.
- As is evidenced here, the university remains among an elite group of top public research universities.
- While there is no single indicator or composite number that accurately represents what an individual institution has done, can do, or will do, the HERD survey data does provide a credible and nationally accepted basis for comparison.

Center for Measuring University Performance (CMUP)

- While we've been among the elite for some time, there is another very notable accomplishment I can speak to today: The 2013 Center for Measuring University Performance—or CMUP—rankings indicate that the university has made an impressive move into the top group of public research universities.
- This achievement means the U of M, for the first time in its history, is part of a distinguished group of universities that rank in the top 25 on all nine indicators CMUP has determined gives a reasonable approximation of the institution's research performance, accomplishment and strength.
- We have a great story to tell about the success of the University of Minnesota research engine.
- As the data show, we are moving in the right direction and making a difference.
- But there are a number of other great institutions with whom we compete, so we must be careful not to rest on our laurels and continue to do everything we can to remain competitive.

OPPORTUNITIES: INVESTING IN INNOVATION

- Today, I would like to identify areas of research strength we can expand, as well as identify further opportunities to help support university research.
- Success for the university will continue to be dependent upon our ability to forge effective transdisciplinary and public-private partnerships.

The Triple Helix

- A way to more simply represent this collaborative relationship is through the "Triple Helix," model of innovation and business development.
- The triple Helix represents the complex and dynamic relationship that takes place between the entrepreneurial university, business and industry partners and government entities.

MnDRIVE: Year One

- MnDRIVE is an example of the State's vision to create such a partnership with academia and industry.
- Last year I spoke about our approach to the \$36 million investment by the State Legislature in four university research areas to address issues of societal impact.
- One year later, the program is exhibiting some initial and great progress, as more than

- 75 external partners are supporting MnDRIVE research,
- 354 researchers are collaborating on 120 projects;
- 111 faculty, students and staff have been hired and 21 patents and licenses based on MnDRIVE discoveries have been submitted.
- I'm happy to speak more to MnDRIVE's successes and progress during our discussion.

Engagement: Effective Partnerships

- To continue to drive partnerships and progress across the university system, the OVPR is working through goals set out by the Five Years Forward strategic plan and through the University Economic Development Office.
- The University of Minnesota Foundation and the OVPR are now partnering on a comprehensive corporate engagement strategy that supports the university's strategic plan, known as the Corporate Engagement Workgroup.
- Through this partnership, the Foundation and the OVPR are well-positioned to work as "facilitators," partnering to lead a university-wide corporate relations community and ready to communicate a three-part vision for corporate engagement: connect, convene and collaborate.
- When I next meet you in February 2015, I'll provide a more comprehensive update regarding these efforts, our progress, and our partnerships.

Five Years Forward

- Last year I came before you and asked for your input on the research strategic plan.
- I'm pleased to say that Five Years Forward through Collective Inspiration and Discovery is taking root throughout our research community.
- We are in the process of creating action plans that will lead us to specific, measurable goals.
- These plans have been in the works for the past year with our community that include faculty, staff, business leaders and partners, and they have been working on specific goals to fully embrace the commitment to excellence, innovation and community engagement that is critical to advancing the university's research mission.
- We will be releasing these action plans early next year.

The 3% Solution

- As we move forward and in order for us to be successful, we must ensure that we are maximizing the potential return on investment and strongly supporting these plans.
- I have determined that in order to provide funding for strategic research initiatives emerging from the Five Years Forward work groups, it will be necessary to reallocate and direct some of the O&M funds provided to OVPR departments.
- The OVPR will reallocate 3% of its own O&M apportionment into a Five Years Forward strategic allocation fund in order to provide funds for investment back into the university's system-wide research strategic plan.
- As a result, the OVPR provides assurance that it stands ready to fully invest and finance the plan the institution worked so hard to create.

Grant-in-Aid

- A key ingredient for research success at the university and for the Five Years Forward plan is through institutional funding.
- I've included this information in the full, written report for review, but I want to highlight—through some return on investment data—why programs like these I'll speak to next, and tracking their metrics, are important in meeting our research and partnership goals, as well as to make decisions on how to strategically invest our institutional funds.
- The Grant-in-Aid program funds are awarded in the belief that the quality of faculty research or artistic endeavors is a major determinant of the overall vitality of the institution.
- And we've heard from many recipients that the aid the university offers really makes a difference for our faculty at pivotal points in their careers.
 - Support from the OVPR during the past five years includes approximately \$15 million for 560 projects in all disciplines.
 - And our return on investment for programs that have external funding availability is 1-to-6—every \$1 we invest yields us an average of \$6 coming into the institution.
 - This program also supports the Arts and Humanities, with 21% of the grants in this program from these areas.

Minnesota Futures

- The Minnesota Futures awards are large grants of approximately \$250 thousand that support collaborative research, encourage faculty to advance new ideas and reach across academic disciplines.
- In five years of administering the program, there were many successes, including Professor Vipin Kumar's project using satellite imagery to track changes in forest cover that has helped scientists, policymakers and others around the world to better understand climate change and its impact.
- His project alone leveraged approximately \$13 million in external funding; and overall leveraging for Minnesota Futures was 1-to-7, or for every \$1 invested leverages \$7 coming into the institution.

Institutional Funding

- As I reported earlier, University of Minnesota's total R&D expenditures for all campuses is \$882 million.
- Of these expenditures, a growing and significant portion is our institution's \$175 million investment of our own funds to finance research, as we do for the Grant in Aid and MN Futures programs.
- While it's important we keep mission-critical research moving forward, this trajectory of institutional support of research is, unfortunately, unsustainable.
- We must find other ways to help us invest in research, and at the same time, we must find out how to more strategically invest these dollars to maximize our return on investment.

Culture of Serendipity

- We see tremendous potential to continue to refine and transform our research enterprise in a way that will create opportunities for faculty, students, staff and external partners.
- A healthy research enterprise is not only determined by funding and by diversifying our partnerships
- We must remain keenly focused on our ability to drive change and address our world's grand challenges, which, in reality, often span multiple disciplines and areas of research.
- Our Five Years Forward plan addresses this reality as we seek to create a culture of serendipity.
- To create this culture, we need to bring together people from many different backgrounds who possess synergistic knowledge that, together, can lead to impactful, comprehensive solutions.
- Nolan Bushnell, American engineer and entrepreneur who founded Atari said, "The best ideas lose their owners and take on lives of their own."
- This is exactly the culture we are striving to create, where through serendipity ideas blossom beyond their originators and result in even better ideas.
- In order for serendipity to take root, we must break down silos of research, individual departments, separate colleges, system campuses--and bring together groups of people from different backgrounds and competencies to think about –and address—the large problems facing us all.
- By building upon the university's existing strengths, nurturing a collaborative research environment, and working with public and private partners, we will advance research outcomes that increase our competitive advantage, nationally and internationally, and generate new knowledge and discoveries that, indeed, make our world a better place.

Questions

- And now I look forward to your questions and discussion.