

Statement of

Dr. John S. Hickman
Director, Global University Relations and Life Sciences
Deere & Company

Before the

Subcommittee on Research and Science Education
Committee on Science, Space and Technology
U.S. House of Representatives

For the Hearing on

The Relationship Between Business and Research Universities: Collaborations
Fueling American Innovation and Job Creation

1 August 2012

Good morning.

My name is John Hickman, and I am the director of Global University Relations and Life Sciences with Deere & Company.

I am pleased to have this opportunity to share Deere & Company's perspectives on our collaboration with U.S. research universities and how that impacts both people and innovation in the company.

Deere & Company is a leading global manufacturer of agricultural, construction, forestry and turf care equipment, and provides advanced products and services, including financial services, to customers whose work is linked to the land - those who cultivate, harvest, transform, enrich and build upon the land to meet the world's dramatically increasing need for food, fuel, shelter and infrastructure. We are headquartered in Moline, Illinois, with sales in over 100 countries and more than 60,000 employees globally. Founded in 1837, this year Deere is celebrating its 175th anniversary of delivering innovative products of superior quality built on a tradition of integrity.

The world faces two major challenges in coming decades: How to feed a population growing in size and affluence and, at the same time, how to develop the infrastructure required to support massive urbanization. Deere is strongly and uniquely positioned to help our customers meet both challenges by providing premier equipment solutions. In so doing, we are supporting a higher quality of life around the world. We find our passion – and our purpose – in helping customers do their life's work more profitably and more productively.

Our products help our customers use the land to do their work in intelligent and sustainable ways. Our research and development efforts are aimed at creating the high-quality equipment solutions which customers can rely on to run their businesses – allowing them to be more productive and more profitable. And the need for technology solutions has never been greater. We spend over \$1 billion a year – around 4 percent of sales -- to develop products that set the standard for productivity and value.

Deere's strategic direction over the coming years will reflect the increasingly large role that relatively new technologies play in our businesses. All industries are seeing the rise of smart machines, equipment that is monitored and directed by computer systems to ensure safer and more-efficient operation. In agriculture, those smart machines are being brought together with remote sensor networks and farm management systems to create integrated solutions that are changing how agriculture is done.

In turf care, construction, and forestry, too, smart machines are increasing efficiency and automating fleet management. Deere and others use GPS positioning devices, embedded sensors, and actuators to provide agriculture and construction industry customers better site-specific information.

It's clear as we expand into new markets, we cannot conduct business and innovation activities as usual. We can't simply take existing products and de-spec or retrofit them for new customers. There is yet another kind of technology that is having a big impact on our business. It has been called frugal engineering or value engineering. Most commonly done in the developing economies where resources are scarce, value engineering is an approach in which design and manufacturing decisions are made in favor of keeping product cost extremely low.

It is not just a way to cut costs, however. It is, instead, a way to intensely focus innovation on the customer, delivering precisely the features needed to get the job done at a price customers can afford to pay. Using the principles of value engineering will not only help us develop customer solutions in developing economies, but also will help us control our own costs to build a better business.

The pace of growth and the breadth of application of these fundamental technologies make it clear that no one company has the resources to develop, maintain, and support all of the hardware and software applications being demanded in even one industry. To fulfill our commitment to those linked to the land, Deere understands the needs to partner with others such as universities, companies, governments and others to develop and deliver long-lasting, intelligent equipment solutions. Our collaborations with research universities play an important role in delivering such innovation.

Delivering customer value through innovation is one of several factors that Deere has identified as critical success factors. Collaborations with research universities also play a role in additional critical success factors, particularly attracting and developing employees and understanding our customer's local needs both today

and into the future. For Deere, these benefits of collaborations with U.S. research universities that help meet our business aspirations and the aspirations of our customers will lead to innovation and job creation for decades to come.

Deere formed a Global University Relations initiative in 2011 to develop and sustain strategic alignment among the strong university relationships currently in place and guide direction for future relationships globally that help accomplish Deere's business objectives. The focus of this initiative is to address and leverage all functions and purposes for university collaborations including:

- Access to talent
- Access to innovation
- Support for locally-focused customer understanding
- Employee development for future success and employee retention
- Political support for business development
- Support for philanthropic objectives

The Global University Relations strategy will support all functions of the business, be driven by metrics, and focus on establishing university strategies in global growth regions. A long-term objective is to have a global footprint of university relationships that mirrors our global business footprint. Today our university relationships, especially R&D university relationships, are heavily concentrated in the United States and Germany and do not reflect our current and especially future global sales reach.

Each of the participants was asked to consider the following topics / questions in their testimony:

Please provide an overview of Deere & Company's research efforts in coordination with U.S. research universities.

Deere has a broad reach of R&D activities at U.S. research universities.

- Historically, the majority of our research efforts have been with faculty and students in colleges of engineering. Many engineering disciplines are represented in these research activities. However, research activities also occur in agriculture, forestry, business, information technology, and some other disciplines.
- Research activities with universities represent span a wide range of technology development. Some projects are more developmental in nature and would not expect to appear in commercial products for many years. At the other end of the range, some university research involves activities such as material testing and can be completed nearly immediately upon initiation.
- There are a variety of different types of research projects with universities. Many research projects are sponsored research projects with agreements covering many IP, publication, confidentiality, and other terms. Other types of research activities include professional service agreements, faculty consulting, consortium memberships, equipment loans or transfers, and research gifts or grants.

- The size of research projects with universities varies from multi-million dollar multi-year sponsored research projects to memberships in niche consortiums ranging from harsh environment electronics for the vehicle industry to R&D in workforce effectiveness.

Based on your experience, what is the role of industry in the future of U.S. research universities, and why is this role important?

Industry plays an important role in advising universities as to the relevance of research and workforce programs in addressing current and future business needs. Specific examples include:

- Engagement activities such as curricula reviews, serving on advisory boards, attending or presenting workshops & seminars, supporting government proposals, guest lectures, hosting visiting faculty, serving on MS & PhD committees, co-authoring publications, and developing collaborative outreach programs provide a win-win to both parties. Historically, Deere has experienced good engagement with U.S. research universities, especially in colleges of engineering.
- Industry activities with university partners should address all facets of U.S. research universities including research, teaching, extension, and economic development activities.
- Business can also play a role in industry – university relationships through memberships in organizations that specifically address these relationships such as the Government University Industry Research Roundtable (GUIRR) and the University Industry Demonstration Partnership (UIDP).

Why does Deere & Company work with U.S. research universities? How do these arrangements take shape and progress?

As discussed in our introductory comments, Deere recognizes the importance of collaborations with U.S. research universities in helping meet our critical success factors around innovation, attracting and developing talent, and local customer understanding. Examples of how such arrangements take shape and progress include:

- We utilize our Global University Relations initiative (described above) to develop and sustain strategic alignment among the strong University relationships currently in place and guide direction for future relationships.
- Where possible, we try and focus university research activities at those universities where we can also leverage other company activities on campus such as recruiting or employee development.
- We try and negotiate a Master Research Agreement between the university and Deere at those universities we expect will have significant research activities. The Master Research Agreement addresses various IP, publication, confidentiality, and other issues and makes the agreement process of establishing a new research relationship relatively simple.
- At some universities, Deere has a presence on or very near research universities. Examples include the John Deere Technology Innovation Center in Champaign Illinois and our European Technology Innovation Center in

Kaiserslautern, Germany. We also have isolated cases of individual employees housed on university campuses. Such co-location provides excellent access to university resources and as well as companies and organizations located in university research parks. Physical presence on or near university campuses also fosters an environment and workforce focused on innovation.

- Deere's access to U.S. research university innovation cannot always be measured by our specific university projects. Deere is not often the first in line to commercialize a university innovation. The university innovation may move from the university laboratory to the research park to a third-party supplier before reaching and utilized by Deere.

How do collaborations with research universities affect research and workforce development at Deere & Company? How do they affect the universities and students engaged in the collaborations?

Research and workforce development at research universities typically have mutually beneficial relationships. Industry research activities often influence curriculums to better reflect contemporary business needs. Other aspects of such collaborations include:

- Research collaborations are often as much about "people" as they are about the specific intellectual property development or research results. Research collaborations help maintain peer-to-peer relationships between university and industry researchers and provide a glimpse into our future workforce.
- Exposure to industry via research collaborations will often begin in undergraduate curriculums, senior capstone classes, and an increasing number of student research organizations. These opportunities also provide excellent exposure to potential talent.
- Research universities also provide opportunities to develop existing industry workforce through advanced and professional degree programs. These include company sponsored degree programs like EMBA or professional engineering advanced degrees, employees attending professional development or certification programs at universities, and programs where university faculty come to Deere locations and conduct training. Deere employees often initiate their own degree programs through our tuition aid benefit program.

What are the major challenges facing Deere & Company in terms of its ability to partner and collaborate with universities and the outcomes derived through these collaborations?

At Deere, we like to focus on the complementary benefits of working with universities and creating a win-win from our collaborations. As our Global University Relations initiative matures, we intend on measuring the benefits that accrue to both parties to the best of our ability and acting upon those results. That being said, there are a number of challenges that are frequently discussed in university - industry relationships.

- A challenge frequently mentioned by industry and universities is the long period of time to negotiate a research agreement. As mentioned earlier, we try and negotiate a Master Research Agreement between the university and Deere at

those universities we expect will have significant research activities. The Master Research Agreement makes the agreement process of establishing a new research relationship relatively simple.

- An excellent resource for contract guidelines and general research industry relationship guides is University Industry Development Partnership (UIDP) organization. The UIDP “Researcher Guidebook” addresses key challenges in university industry collaborations from both perspectives including managing expectations, developing proposals, budgeting, compliance, confidential information, consulting, and intellectual property concerns.
- Internally within Deere, we also plan to develop internal toolkits (some based off UIDP resources) to help streamline our internal processes and assure we are in internal compliance with our university activities.
- Immigration issues associated with foreign nationals attending U.S. research universities is another commonly mentioned challenge, especially in engineering where a significant number of graduate students hold temporary visas.

In light of the release of the National Academies report, Research Universities and the Future of America, please comment on the strengths and weaknesses of the recommendations.

Numerous recommendations from the National Academies report, Research Universities and the Future of America resonate positively with Deere as they do with other businesses and universities. The recommendations reflect the importance of research universities not only in innovation, but also in educating and training the current and future workforce in the United States and around the world. As discussed earlier, Deere considers these as critical success factors needed to meet our business aspirations and the needs of our customers. The recommendations also address funding, productivity improvements, and other factors that will help sustain a competitive leadership position that U.S. research universities have enjoyed in recent history.

Two of the recommendations included items of specific interest to Deere in even a broader context, the federal Research & Development Tax Credit and policies that enable U.S. employers to seek and retain high-skilled workers, including those trained at U.S. research universities.

- The R&D tax credit allows U.S. manufacturers like Deere to establish research centers in the U.S. as well as research collaborations with universities. These create high quality engineering positions for U.S. employees. These positions also create additional positions related to the support of the engineering centers. As a global company, we have research and development activities in many different locations around the world. There is clearly strong global competition to attract R&D jobs and centers. The R&D tax credit helps create a level playing field with foreign competition allowing for competitive pricing of our products. Deere supports the extension of the R&D tax credit in the U.S. because we believe it helps companies to remain globally competitive.
- Deere supports policies that enable U.S. employers to seek and retain high-skilled workers, including those trained at U.S. research universities. Legislation to remove the per country cap in our legal immigration employment-based (EB)

green card system is important to Deere because it would improve our ability to utilize the talents and skills of many highly-qualified EB applicants from large countries. Instead of creating new jobs and products here, the per country cap encourages highly-skilled workers to take their talents to foreign competitors abroad. In short, removing this cap will help keep U.S. manufacturers competitive in a global marketplace.

We expect the recommendations will provide for future discussion at university – industry meetings. We look forward to continued discussion alongside universities and others via our memberships in organizations such as the Government University Industry Research Roundtable (GUIRR) and the University Industry Demonstration Partnership (UIDP).

Let me again reiterate Deere's appreciation for this opportunity to appear before the Committee today. I would be pleased to answer your questions.

Thank you.

Bio

Dr. John S. Hickman
Director, Global University Relations and Life Sciences
Deere and Company

Dr. Hickman is Director of Global University Relations and Life Sciences at Deere & Company. The Global University Relations group is developing and sustaining a global network of university relationships to support Deere's strategic business objectives. Dr. Hickman also directs and provides leadership to Enterprise life science and STEM (Science Technology Engineering and Math) efforts.

Dr. Hickman is a native of Indiana, obtaining a Bachelor of Science Degree at Purdue University in Natural Resources and Environmental Sciences. He obtained his MS and Ph.D. at Oregon State University in Soil Science. He worked for 10 years as a faculty member at Kansas State University specializing in soil management and environmental quality before joining Deere in 1994.