

First Facilitated Discussion

“What makes us uniquely qualified for research and business in the life sciences?”

Strengths-

- Engineering School
- Common sense approach to problem solving and networking
- People who can “connect the dots”, get things done, valuable skillsets
- Centers of Excellence in Life, Biological Sciences throughout the valley- “tremendous infrastructure”
- Largest graduate school between Minneapolis and Seattle- gives us the ability to develop needed intellectual capital to drive research
- REAC helps companies get started, favorable political support in the RRVRC
- Investment in research infrastructure and facilities
- Access to equity and tax credits
- Success stories in the region put us in a good light
- Workforce has high integrity, able to “get things done”, work ethic is good
- Strong economy, good investment tax credit structure in the state, enhance access to capital for business
- Opportunity to pull talent back to the state from Minneapolis, other areas
- Critical mass has developed over the past several years, as new life sciences and research companies have started and expanded in the region
- With regards to work ethic- every region claims to have a strong work ethic- have to give potential companies examples (timelines in previous projects, for example) showing just how efficient and effective our workforce can be
- Talent pool available in the ND diaspora. Need to find ways to draw them back, make use of the experience they’ve gained elsewhere.
- Streamlined business development process (UND and region).
- Ability to match interests and assets.
- Strong work ethic (point repeated by an international entrepreneur who moved here to start a business)
- Small enough that silos aren’t as “tall”
- “Cheap land, smart people, hard workers”, “logistics are not a big deal” anymore- can ship products everywhere
- Faculty are, for the most part, in “hard money” positions, funded by the state. Gives the faculty a better opportunity to seek out collaborative possibilities.

Challenges-

- North Dakota is often perceived as a “negative brand” outside the state
- Work ethic message not enough – must use examples (ie we can meet deadlines...)
- Companies must jump from work to innovation
- Gap in the funding chain- early capital is available, but it’s hard to get into the larger pools needed later in the process. Need to find new ways to find that funding, investment capital. (B and C state financing)
- Need coordination with 2 year programs and NDSU
- Need changes to health systems to meet opportunities.

Other Thoughts-

- Dr. Carlson thinks that our research community at the university needs to reach out to local companies, seek out ways to work together- “opportunities are nearly endless”. Opportunity for researchers to complement what they are doing by working with private industry, but need to step out of the comfort zone
- Ralph Kingsbury thinks we need to “blow our own horn” more often, trumpet our successes
- Need to encourage university/private interaction, find ways for research faculty to work with companies in the region

Facilitated Discussion Two-

“Defining Actionable Strategic Objectives and Impacts”

- Being able to say “because of the work done here, x number of lives have been saved/improved”
- Realized value, return on investment
- Find ways to get UND and NDSU to work together, increase collaboration, leverage our regional strengths in agriculture, manufacturing
- Better systems to do clinical and translational work
- See increases in agriculture with biopharma and fuels
- Find ways to build and improve tele-health system, improve rural healthcare provision
- Need to focus on certain opportunities, not spread ourselves too thin
- Want to see more native Nodaks, regional students stay here for the training, not go elsewhere. Find ways to connect students and their training with companies in the

region and their needs. Find ways to place students with local companies, to enhance their education, and help companies find the talent they need.

- Consider moving towards a manufacturing focus, to complement and add to our current R&D focus
- Need manufacturing (including contract services) in step with regional research and development.
- Moving to manufacturing- “if we don’t, we’re stupid” - Carlson
- Find ways to do contract R&D for smaller companies who don’t have the facilities needed to do all of their own work. Use income to finance laboratories, facilities for faculty driven research.
- 35 new companies, with cash flow of 300-400 million
- Packaging (and quality assurance) would be a big opportunity.
- Have companies in the region being backed by capital from both coasts
- Need to increase resources available to back research in the public and private sectors- state needs to step to the plate, support the industry, give the money needed to “let the ponies run”
- More coordination with 2 year programs and NDSU
- Research to drive increased agricultural productivity, solve worldwide hunger. Smarter ag, value-added ag. Opportunities to diversify the local ag economy.
- Expand research in biofuels, biomass, embrace interdepartmental work (chemistry, biology, engineering)
- Develop expertise in regulatory issues (ie FDA)

In ten years have students stay here due to job opportunities locally/regionally

In ten years, increase successes and talent

In ten years, an increase in medical device companies

Mobilize high net worth individuals into private life sciences fund

Leverage federal directed funding.

Develop relationships with Big Pharma

Establish State fund for grant research. (1 or 2)

Proactive engagement with business community, faculty engagement with business

Develop course on intro to intellectual property (faculty and students)

Hire full-time tech transfer at UND

Reach out beyond region (Life Science Alley, LSAM/Manitoba)

Gap funds – for when ideas need proof of concept – overcoming the “Valley of Death”

Implement management recruitment initiatives to move IP out of university

Develop more efficient contracting process at University

Hold regular roundtable meeting for business/government/University in the life sciences for problem and information sharing

Hold UND info and networking sessions in cities with high concentrations of UND graduates

Need organized game plan to connect faculty with companies for internship placement

Educators must visit industry to improve communication and cooperation

Expand regulatory curriculum by hiring FDA “burnouts” as professors

Required Q & A course for all science and tech based programs

More QC, QA and technique as part of curriculum at all levels (top 5)

More statistics and basic math competency

Business management course for all science grads - entrepreneurship

More 2 year techs especially in electronics and maintenance, HVAC, plumbing/water

Address STEM college readiness in k-12 (top 5)

Fermentation lab (5 to 50 liter to grow capacity, 50 to 100 to attract pharma) (top 5)

Incubator structured with business foundation coupled with tech and science

Need a modern research facility that takes advantage of technology (number 1)

Educate investors regarding: angel investment tax credit; research expense credit (state); research expense credit (federal); EB5 program.

There is a disconnect between what UND does, and what the ND public know. Need to find ways to “brag without bragging”, find ways to market our university capabilities while marketing the state (top5)

Keep state agencies in the loop on good things that are happening in R & D at UND

Make more effort to communication institutional capabilities to other universities and colleges in the state and enhance collaboration

Establish a position/hire someone responsible for promotion/marketing UND R & D (top 5 or 6)

Increase efforts to work with office of University Relations to promote activities, publicize what is happening

Outreach to k-12 students, teachers to expose kids to careers and opportunities in science and research.

Define success by the number of lives saved

“value creation” Tim Cook --- what is the value of the industry --- multiplier? Value to local economy.

Bruce Gjovig – agriculture potential, biopharma, biofuels... plants, bioplastics, any number of things.

Tie it to local competencies.

How do we get UND nad NDSU to work more closely together.

Manufacturing sector is very effective. Rural health systems and networks provide testing ground.

Jonathan Geiger – hard to imagine increasing testing ground without systems that allow for translational work. Basic discoveries can easily be paired w/ industry. But will require fundamental changes in hospital structure.

Nursing lady - Decentralize source of healthcare. Hope we are served by tele-health system.

Joey benoit - Focus development on those things that will provide significant jobs for the region.

Petell – many of the companies already here have many job openings – need local programs in molecular biochem, etc. how do we synergize companies with university. One challenge – if we don't focus we could get spread too thin.

Joey benoit - 5 year investment for doctoral program could mean 2-2.5 million dollars. Need to decide what to focus on, must be more than just 20 students. Must know that demand will be sustained.

Biology guy – would like to see people stay here for training in the first place,... bringing in molecular biology degree, more hands on experience, more focus on upper level courses. Must get input from companies, and then connect students to opportunities. Perhaps sr research projects or co-op experience. Companies must know we have the necessary skills in place to recruit companies. Companies know we don't have to recruit everyone.

John ballantyne – vast majority of folks are native born. Had to overcome knowledge gap, were very bottom heavy. Had to skill up quickly. Some recruitment. Many of the ND grad students we wanted were in CA and Madison. Some of the best kids came in through governor's school, worked here over time in college, senior research projects are great idea. Don't necessarily have to focus too finely on grad programs or microdisciplines. Can get a long way focusing on basic skills for industry. Love the idea of people who came back.

Keith lund – can't recruit the 5-10 year experience mid level people. Non scientific survey says many plan to leave, at least half of those who've left say they're interested in returning. We will be working on recruiting strategies, must have key messages. Also must cultivate deeper labor market.

Barry milavetz – in 10 years we'd like to see --- can we have manufacturing industry presence in LS here, and if so what is it they will need.

Dan Hodgson – brought in a Utah guy who founded 7 companies there.... The product is now going to be manufactured here. In an 80 mile square there, there's about the same population as ND and outstate MN but have 5000 life sciences companies. They've been forced to rely on own wits and less on natural resources. "do we have people that walk the halls of the universities looking for commercial opportunities" this guy views this area as fresh and new. We are a commodity based economy here, which is a different set of people. Innovation economy scares the commodity economy people. We have to get top talent some way or another – we have to find the top technology and get strategic about finding tech, investing in its research, and connecting with commercializers. It absolutely could flourish. What would it take to get to 1000 companies. The company came here because they needed 2.5 million dollars, on threshold of angel and venture capital... left alone when VCs moved up the ladder. Were able to raise 1.8 million w/ angels and an in-kind manufacturing partner. Some state programs. Got them to put marketing element here to meet 10 person requirement for state programs because of a team built by referrals from Sharon Miller, etc.

Jim Carlson – manufacturing. If we don't, we're stupid. Why don't university systems set up contract services? When you're small getting started you don't have all the parts, it would have been nice when I was getting started for someone to have taken hold of the drug assay – but it died. What is it you need? What is it that we've got? We need a contract lab. Research methods were developed at PRACS, methods and techniques and staff trained, then after 2 years we're done with it... then move on to the next. Once we developed our protocol we sold it to other companies. Contract lab could also serve the university researchers, and keep the equipment busy and maintained (30-35000 per year maintenance) and the lab serves both private sector and the university researchers and companies and provide better commercialization.

He's talked to the vaccine companies, but not about manufacturing. What about a packaging company for all the vaccine company. Gives us a facility, and QA and capacity. Really hard to find QA people. Gotta start small.

10 year vision: we'll have a lot going on in 10 years. Guess there will be 35 companies, cash outflow of 300-400 million. Its time to take vaccines out of treating small pox and into preventing diseases, that's where the money is... preventing diseases. Immunology was not in the vocabulary when I was in college.

Medical devices – pick a number between 10 and 1000. Talking with a variety of device companies, but only if the whole company will come to the valley.

Erica – medical device guru... I have a sense of what is done. Would like to see the region develop a capacity in regulatory issues, interaction with FDA and on the drug side as well. Regulatory negotiation is an art and requires much expertise. University could add curriculum to educate on certification

policies. We could use people who have this expertise. Lack of this expertise could be a constraint to locating companies here.

Would like to see companies located here to be backed by VC on the coasts. Some here are happy to fund to a certain level, but not the companies with 100 billion under management. Companies might leave the region at the point they need this financing. Perhaps we can have bigger funds coinvest at the series A level with the local seed people. Locals must have relationship in the bay area and be a trusted resource for new deals. Money is chasing deals in the bay area, we'd love to "mine the plains."

Pam – Dorgan is still very committed and interested in RRVRC. We know that investment in these companies is critical. We'll be working this year on venture capital. We're really going to focus on that portion of it this year.... How can we attract additional capital. We know our story is not getting told as well as it needs to be. We will be showcasing.

Eric Murphy – I've been in the trenches somewhat. He's done it in the past. There is an opportunity there for contract research. Capitalization is an important thing. We must get to the next step. Quit talking about it and more action... more fail than succeed. That's life. Must overcome risk aversion. Agrigen --- local edcs and commerce dept and public finances sources don't 'get' bioscience, commerce dept treats us like we are making chairs, worrying about FTEs the same way as basic financing. Bank of ND is an asset. State is good... good staff, but don't have the reigns (cash) to let it run. We are here because of interface between science and agriculture, that's why we're here. Some of the challenges we face are people. Indian hills in Iowa has a program for technicians – anything, they do it... we need that in Wahpeton. Minds are an export. If I wanted to go out and hire 10 technicians right now, where would I get them???

Larry Pate – plugging the entrepreneurship programs. Indiana University has a great model of interface between life sciences and entrepreneurship. They have an office of entrepreneurship program right inside the med school and the law school.

Gerald Colmbs – Nat lab. We will be adding 850 million people to the world... in the next 40 years we'll see huge food shortages. We will need to double food production. This economy will be driven by increasing food prices which could be an opportunity. How do we double food production on the same amount of acres? Smarter agriculture, with value added. Could also diversify local ag. I don't understand why our center isn't better utilized, he is open and eager. Sees himself as a collaborator. We get brownie points for tech transfer. Pushing the center – it will be here for the foreseeable future.

Lets start thinking about intersections.

Erica – this area is very strong in neuroscience. This is the holy grail... huge needs here. A ton of money is going into companies in this space. What does the university do in this area? Where is the IP going? She would love to know.

Joey benoit – probably over 100 high level courses with some level of neuroscience connection. Lots of activity, some may not have direct translations yet.

Jonathan Geiger – neuroscience is strong. Also at NDSU. COBRE grants. Cognitive visual at NDSU. At and is neurodegenerative and inflammatory diseases of the brain... 10 years of funding after 2nd renewal. Started small and hired strategically. Especially in research... just hired one more. For the most part our top picks have said yes. Does not see recruiting problems for people, because we have great opportunities. Tired of hearing it's hard to recruit here. A number of faculty now have individual funding that grew out of "center" grand opportunity.

We must convince the state that this is something to be proud of. Would like the state to ante up and invest and recognize. State should be investing directly and investing in buildings and faculty.

State has not built a building on this campus in 25 years.

Joey benoit – we need to negotiate administrative and facility costs at a much higher rate. We can't use federal buildings as part of the calculation in the overhead investment, only state buildings. State buildings allow universities to raise more money by leveraging this local investment.

Eric Murphy – intersection with biofuels. "food or fuel" debate could open opportunities. Big companies are investing in this sector. How do we use colleagues in biology, chemistry and engineering, to address plants making better food and fuel with less inputs.

Mark Hoffman – fine chemicals, from biofeedstock. Look at the 5% of the petroleum that is used for chemicals, plastics etc, not just burning. That's where the value added is, and that's where the bio industry opportunity is. Need some way to work on conversion of biological feedstock into fine chemicals. Huge incentive for expertise, federal money is going into this already, this is core of federal

investment in the core SUNRISE project. Now there is an opportunity for state govt and industry to step into this area of SUNRISE. Could be the core of a growing chemical industry. All fo this also helps ag industry.