Fostering Innovation and Commercialization in Healthcare

8.21.20

Michael Dixon, Ph.D.
President and CEO, UNeMed Corporation
UNMC research awards top $174 million, up 26% from prior year
by Vicky Cerino
August 03, 2020

UNMC research funding, at $117.1 million, surpasses record of fiscal 2016

By Julie Anderson / World-Herald staff writer
Oct 12, 2017 Updated 23 hrs ago  

Ganapati Bhat, a postdoctoral research associate, works on his studies of cancer-associated carbohydrate antigens at the Durham Research Center in this 2015 file photo.

RYAN SODERLIN/THE WORLD-HERALD
Technology Transfer

Three basic ways to share knowledge:

- Publications
- Presentations
- Patenting and Licensing

Technology Transfer is the process of transferring advances in knowledge from research laboratories to the commercial sector in order to develop and market useful products.
Technology Transfer 101

Invention → Protection → Licensing → Commercialization → Revenue

the science of innovation
UNeMed’s Mission: To Foster and Commercialize Innovation from the University of Nebraska and Nebraska Medicine

- Income
- Create Industrial Collaborations
- Transfer Research for Public Use
- Technology Development
- Economic growth
- Education
- Reward, retain, and recruit faculty
- Compliance with Federal Law
Inventions
IP Protection
Marketing
Licensing
Economic Impact

101 New Inventions
145 Patent applications Filed
64 Patents Issued
48 Foreign Patents Issued

16 Licenses
100 Active Licenses
37 Products on Market
2 New Startups

Core Metrics
“The good work of our technology transfer offices is helping our talented faculty and students generate broad impact from their innovations – a benefit not just to our economy, but to the people whose lives are ultimately transformed by research born at the University of Nebraska.”

HANK BOUNDS
President, University of Nebraska
University Innovation

~$100M Research Funding

50 New inventions

25 patent applications

15 licenses

? Products
University – Industry Interface

University Funnel

Industry / VC Funnel

~ 1 in 6 inventions get licensed

~ 1 in 100 pharma compounds gets approved

~ 1 in 10 venture investments is a significant hit

Successful Product
Predicting the Future is Hard

“We will never make a 32 bit operating system.” — Bill Gates

“There is not the slightest indication that nuclear energy will ever be obtainable. It would mean that the atom would have to be shattered at will.” — Albert Einstein

“There is no reason anyone would want a computer in their home.” — Dan O’Lorcan, president, chairman and founder of Digital Equipment Corp.

"There’s no chance that the iPhone is going to get any significant market share. No chance." — Microsoft CEO Steve Ballmer, 2007

"X-rays will prove to be a fad." — Lord Kelvin, President of the Royal Society, 1883.

"The energy produced by the breaking down of the atom is a very poor kind of thing. Anyone who expects a source of power from the transformation of the atoms is talking moonshine." — Ernest Rutherford.

"The telephone has too many shortcomings to be seriously considered as a means of communication." — William Gion, president of Western Union, in 1876, when Alexander Graham Bell tried to sell the company his invention.
University Discoveries Can Create Big Value

<table>
<thead>
<tr>
<th>University</th>
<th>Drug</th>
<th>Price</th>
<th>Date</th>
</tr>
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<tbody>
<tr>
<td>Northwestern</td>
<td>Lyrica</td>
<td>$700 million</td>
<td>11/07</td>
</tr>
<tr>
<td>New York University</td>
<td>Remicade</td>
<td>$650 million</td>
<td>5/07</td>
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<tr>
<td>Emory University</td>
<td>Emtriva</td>
<td>$525 million</td>
<td>7/05</td>
</tr>
<tr>
<td>UCLA</td>
<td>Xtandia</td>
<td>$1.2 billion</td>
<td>3/16</td>
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Entrepreneurship

“It’s not enough to just show up. You have to have a business plan.”
“The innovation that is happening at UNMC not only creates the chance to significantly improve health care—it also forms the backbone of new biotech startup companies that help create jobs and wealth at a local level. I’m proud to advance biomedical research and help grow Nebraska’s economy.”

MICHAEL DIXON
President, UNeMed
Challenge - The Valley of Death

Technology Development Phase

- Scientific Discovery
- Lab Model
- Proof of Concept
- SBIR Funding
- Prototype
- Development
- Market Assessment
- Business Plan
- Manufacturing

Business Building Phase

- Create Business Mgt Team
- Seed Capital
- Angel Capital
- Venture Capital
- First Customers
- IPO or Acquisition

Resources

Low

High

Commercialization Progression

Early

Advanced
Caveats for Successful Start-ups

- Must select science with commercial potential
- Secure intellectual property
- Bet on the jockey, not on the horse
- Have a great team
- Have a Plan (and don’t be afraid to change the plan)
- Execute the Plan and stay focused on the final product
What is unique about a Life Science Start-up Company?

- Raise Capital for a decade or more before self-financing
- Regulatory pathway before access to customer
- New products may increase cost to system (understanding reimbursement/payment mechanism)
- User (patient), doctor (prescriber), Provider (hospital, clinic), Payer (insurance company, managed care, government agencies [Medicare, Medicaid]) all de-linked
- Global from day one
Startup Model

Inventions → $ → Early Stage Technology → Royalties → Startup Biotech Company → Products/Targets → Royalties → Pharma

Stock ↓ Cash ↑ Venture Capital
Funding
Different types of companies offer different risk/reward

<table>
<thead>
<tr>
<th>Regulatory Requirements</th>
<th>Medical Devices</th>
<th>Therapeutics</th>
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</thead>
<tbody>
<tr>
<td>510(k) or PMA</td>
<td></td>
<td>IND, Clinical Trials (Phase I-III, NDA)</td>
</tr>
<tr>
<td>Development Time (to market)</td>
<td>1.5 to 5 years</td>
<td>3 to 9 years</td>
</tr>
<tr>
<td>Cost</td>
<td>Million to 10’s of millions</td>
<td>10’s to 100’s of millions</td>
</tr>
<tr>
<td>Exit Opportunities</td>
<td>Market Approval</td>
<td>End of Phase I or beyond…</td>
</tr>
<tr>
<td>Revenue Potential</td>
<td>Moderate to High</td>
<td>High to Phenomenally High</td>
</tr>
</tbody>
</table>
With 74% of biotech VC invested in just 2 states, the research of >25,000 investigators across ~500 research institutions, representing ~$19B in annual science prioritized by the NIH, lacks access to VC⁹

**Huge Mismatch in NIH Grants vs. VC Focus**

- **Top 2 States**: 75%
- **Remaining 48 States**: 25%

**Biotech VC Geographic Bias Illustrated¹⁰:**

*THIRD ROCK VENTURES*
Investments by region over last 5 years (data from Pitchbook)
Funding - Resources

Resources to Start Your Business

Nebraska Academic Research and Development Grant
This program offers Nebraska businesses a matching competitive grant for research and development activities done in conjunction with a Nebraska college or university.

Nebraska Innovation Fund Prototype Grants
The Nebraska Innovation Fund (NIF) Prototype Grant is a competitive matching grant that provides financial assistance for product development to businesses operating in Nebraska.

Nebraska Seed Investment Program
This program can invest in a Nebraska business for commercialization of a product or process.

Nebraska Small Business Innovation Research / Small Business Tech Transfer (SBIR/STTR) Grant Program
The Nebraska SBIR/STTR Initiative is a matching grant that provides financial assistance to Nebraska businesses that are applying to or have received a Federal SBIR or STTR.

https://opportunity.nebraska.gov/start-your-business/resources/
INVEST NEBRASKA

- 54 High-Growth Companies
- 540+ Direct jobs created
- ~$90M Matching private capital investments and financial support
- ~$140M Follow on capital raised by portfolio companies
- $20M+ Of investments and financial support in Nebraska companies

SUPPORTING SOME OF THE MOST INNOVATIVE COMPANIES IN THE STATE

- Adjuvance
- Alpha
- Basicblock
- Bulu Box
- Capstone Technologies
- CompanyCam
- CropMetrics
- CRUMB
- Centese
- Amplified
- Banking
- DriveSpotter
- Ecomitize
- Encounter Telehealth
- Fourstarzz
- Fanbox
- FTNI
- Gazella
- Realm
- LifeLoop
- LiveBy
The NE Business Innovation Act is a key driver for economic development.
Funding → Jobs

FIGURE 1

Venture capital-backed companies drive economic growth

- Investment: 0.1-0.2% of U.S. GDP
- Employ 11% private sector workforce
- Growth rates ~50% higher than total private sector
- Employment growth ~8x higher than average private company
- Revenue = 21% U.S. GDP

Source: Annaleena Parhankangas, “The Economic Impact of Venture Capital”
We are positioned to attract even more biomedical companies, with the added bonus of being able to offer development-ready technologies formulated right here at our exceptional university medical center.”
- Gov. Dave Heineman  4/22/2009

April 2009
3 employees
1750 sq ft plant space
2 clients
7 products being produced

April 2011
12 employees
4500 sq ft
5 clients
more than 42 products being produced
Groundbreaking for a major expansion

“Over the next three years, we will pump $20 million into the local economy and create 200 to 300 good paying jobs.”

- Mark Faulkner, CEO

Local and state dignitaries on Tuesday overturned the first mounds of dirt for a major expansion project of Vireo Resources just west of U.S. Highway 75 in Plattsmouth. Nebraska Gov. Pete Ricketts attended the ceremony and spoke about the progress being made in Cass County.
Innovation Fast Track to Market

Every year, faculty, students and other innovators make valuable discoveries that could help save and improve lives. Getting those discoveries to patients can prove enormously challenging.

Created in 2018, the Sustainable Heartland Accelerator Regional Partnership (SHARP) Hub helps fast track early stage life sciences technologies into startup companies to develop technologies into products and services. The innovative technology transfer SHARP Hub collaborates and shares resources and best practices with partners in a five-state region — Kansas, Nebraska, Oklahoma, North Dakota and South Dakota.

SHARP Hub Program accomplishments since 9-1-2018

- **37+** Companies Accepted
- **15** SBIR/STTR Proposals Submitted with 1:1 assistance
- **44+** Onsite and Virtual Training and Networking events hosted
- **38** Training Modules Developed
UNeTech lands $750,000 matching federal grant

OMAHA, Neb. (Aug. 1, 2019)—Omaha Medical Technology Pipeline—a joint effort among the University of Nebraska Medical Center, the University of Nebraska at Omaha, the Nebraska Business Development Center, Metropolitan Community College, and the Omaha Chamber of Commerce—was one of 26 organizations chosen to receive a $750,000 matching grant over three years through the U.S. Department of Commerce’s i6 Challenge program for 2019.

The grants were announced July 23 by U.S. Secretary of Commerce Wilbur Ross under the 2019 Regional Innovation Strategies (RIS) program competition through the U.S. Economic Development Administration (EDA).
Invention to Startup

UNeMed → UNeTech → Startup

**Invention**
1. STAC Review
2. IP Protection
3. Validated Commercial Strategy

**UNeMed Portfolio**

**UNeMed STAC Committee**

**Proposed Project**

**New Startup**

**Project**
Translational Research

**UNeTech Staff**

**Startup**
Periodic updates as project progresses; Final report including commercial outcome

**Entrepreneurs**
The incubator takes on different roles

Landlord
UNeTech serves as a space for companies seeking a relationship or engagement with UNO or UNMC. In addition to running a building we help set and achieve milestones and serve as a concierge for companies seeking to work with the University.

Partner
UNeTech is usually paid in an equity share of our incubatees so we want to leverage our resources to make them successful: making introductions, educating on the startup process or otherwise using what we have and know to create value.

Manager
UNeTech seeks to create startups around opportunities to attract entrepreneurs, so UNeTech staff often serves in an interim leadership role seeking future management.
Nebraska customer discovery program teaches entrepreneurship skills

by Alyssa Amen / NUtech Ventures

The “Introduction to Customer Discovery” program was recently held via Zoom. It will be offered again in the fall.
Startup Support requires a village
UNeMed is the technology transfer & commercialization office for the University of Nebraska Medical Center and the University of Nebraska at Omaha

LEARN MORE:

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