

Competitiveness Conversations Across America

Nebraska: Leading the New Frontier in the Global Bioeconomy

April 29–30, 2026
Durham Museum
Omaha, NE 68108

A low-angle photograph of three men in a field of tall grass. The man on the right, wearing a pink shirt and glasses, is kneeling and holding a clump of dark soil in his hands, looking at it intently. The man in the middle, wearing a blue plaid shirt, is also kneeling and looking at the soil. The man on the left, wearing a blue button-down shirt and glasses, is kneeling and looking towards the camera. The background is a bright blue sky with white clouds and a large, bright sun with lens flare. The grass is tall and green, with some golden stalks in the foreground.

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All photos by: Mia Walter, University of Nebraska System, and University Communication and Marketing, University of Nebraska—Lincoln.

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From the Leadership

The Hon. Deborah L. Wince-Smith, President and CEO,
Council on Competitiveness, and Dr. Jeffrey P. Gold,
President, University of Nebraska System

Dear Colleagues,

For too long, the United States' innovation policy, capital, and attention have concentrated in a handful of coastal metros, with roughly 40 percent of venture investment flowing to just five regions. While those hubs remain essential to national competitiveness, this concentration leaves enormous reservoirs of talent, infrastructure, industrial capacity, natural resources, and entrepreneurial potential underutilized across the rest of the country. The Competitiveness Conversations series advances a clear and increasingly urgent objective: to expand the innovation economy to more places and more people across the United States.

The series seeks to identify, elevate, and connect these assets into what we call “place-making innovation”—the deliberate alignment of a region's industries, research institutions, workforce, infrastructure, capital, and policy environment to create a vibrant innovation economy. The goal is not to replicate Silicon Valley, but to unlock the distinctive competitive advantages of places such as Omaha, Lincoln, and rural innovation corridors, and connect them to a broader national innovation strategy. By doing so, we can build a larger, more distributed, and ultimately more resilient U.S. innovation system, and one capable of fielding a stronger, more expansive innovation team for the nation.

Nebraska, the second stop in 2026 and the twelfth convening in the series since 2024, offers a compelling illustration of this model in action. Nebraska combines more than \$32 billion in annual agricultural output, 24 ethanol plants, world-class livestock and grain production, a growing biomanufacturing base, and one of the nation's most strategic logistics networks. Home to U.S. Strategic Command (USSTRATCOM) at Offutt Air Force Base, the Nebraska innovation corridor spanning Omaha, Lincoln, and Fremont is strengthening its position as a rising innovation hub. Venture investment surpassed \$500 million in 2025, philanthropic giving reached record levels, and entrepreneurial activity continues to accelerate across the state.

The [Nebraska edition of our Competitiveness Conversations Across America series](#) focused on two interconnected priorities: understanding the dynamics of the Nebraska and broader Midwest innovation ecosystem, and accelerating U.S. leadership in the bioeconomy, a central pillar of the Council's work and one of the most consequential competitiveness arenas of the 21st century.

What distinguishes Nebraska, however, extends beyond its economic assets. We encountered a University of Nebraska System, led by Council on Competitiveness Executive Committee member and National Commissioner Dr. Jeffrey P.

Gold, that is deeply connected to both research excellence and community impact; a business community committed to long-term growth; and a civic culture defined by trust, accessibility, and collaboration.

In Nebraska, leaders pick up the phone, institutions work together, and ideas move quickly from conversation to action. That culture of execution may be one of the state's most important competitive advantages.

Across two days of discussions, participants explored how these strengths position Nebraska, and the broader Midwest, to play a leading role in the next chapter of U.S. competitiveness. The conversations surfaced both the scale of the opportunity and the challenges ahead, particularly as the nation seeks to build a stronger bioeconomy, expand advanced manufacturing, strengthen supply chains, accelerate commercialization, and ensure that innovation-driven prosperity reaches more communities across America.

Crosscutting Themes and Big Ideas

Across two days of dialogue, with sessions spanning the bioeconomy, national security, commercialization, workforce development, and the convergence of artificial intelligence with biology and advanced manufacturing, several core themes emerged:

1. The United States must lead in both bioeconomy discovery and production at scale, or it will not lead at all.

The global bioeconomy now approaches an estimated \$4 trillion in value, with the United States contributing roughly \$210 billion in direct GDP and far more in downstream economic impact across agriculture, biomanufacturing, and advanced materials. The U.S. leads in discovery, but leadership will

increasingly depend on domestic scale-up and production capacity. Past technology waves—from semiconductors and solar to 5G and, now, pharmaceuticals—show the same pattern: without manufacturing scale, scientific leadership erodes into economic dependency.

2. Global competition in biotechnology has grown into an industrial strategy race.

China, Europe, Brazil, India, and others are deploying coordinated national strategies to build biomanufacturing capacity as a core economic and security priority. China, in particular, embeds biotechnology directly into long-term industrial planning. The United States retains the world's strongest research base, but structural bottlenecks risk limiting its ability to convert that advantage into industrial leadership.

3. The United States has a scale-up problem.

The country continues to lead in early-stage discovery, but it consistently underperforms in moving from laboratory breakthrough to commercial-scale manufacturing. The “scale-up gap” reflects fragmented financing, permitting complexity, infrastructure limitations, and misaligned markets that prevent proven technologies from reaching industrial deployment. Additionally, regulatory friction slows the transition from innovation to deployment. When regulatory timelines lag technological readiness, even strong technologies stall.

4. Demand certainty is a critical missing accelerator for scaling the bioeconomy.

Capital exists, but investors price risk tied to unclear markets, uncertain demand, and decades-long regulatory approvals. When governments, major purchasers, and industrial partners establish stable procurement signals, offtake agreements, and policy-backed mar-

kets, investment accelerates. Without those signals, or modest subsidies to reprice the risk, promising technologies remain trapped at pilot scale.

5. The convergence of AI, biology, and advanced manufacturing is reshaping both speed and scale of innovation.

Artificial intelligence now accelerates nearly every stage of the bioeconomy—from genomic discovery and protein modeling to lab automation, facility design, and supply chain optimization. This convergence compresses development timelines and expands what is technically and economically feasible.

6. These same technologies introduce dual-use risks that require modern governance frameworks.

The tools that drive breakthroughs in agriculture, health, and materials science also introduce new biosecurity and national security risks. Governance systems must evolve to manage acceleration and risk in parallel, ensuring that oversight enables innovation while safeguarding against misuse.

7. Workforce capacity remains the binding constraint across the bioeconomy system.

Talent gaps span the full pipeline—from early STEM exposure and technical education to university commercialization pathways and the skilled labor required to build and operate biomanufacturing facilities. Without sustained investment in workforce development, even the strongest innovation ecosystems cannot scale.

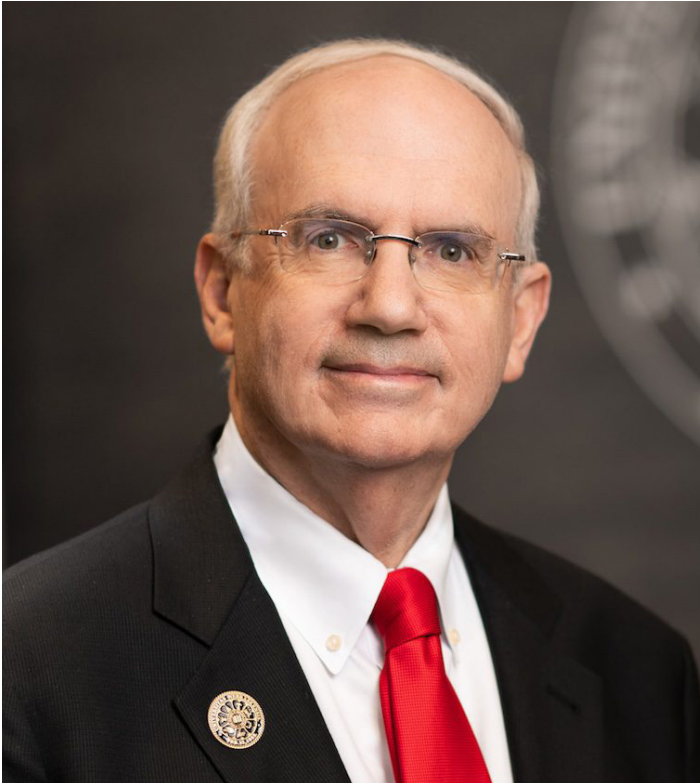
Nebraska and the Bioeconomy Imperative

The Nebraska Competitiveness Conversation brought together farmers, rangers, entrepreneurs, university leaders and national laboratory scientists, industry executives and public officials—all aligned around a conviction that the bioeconomy represents one of the most consequential frontiers for U.S. economic and national security competitiveness, and Nebraska will play a defining role in shaping its outcome.

Ethanol production, long a cornerstone of Nebraska's industrial base, now serves as a platform for next-generation bio-based industries, including sustainable aviation fuels, renewable chemicals, carbon management systems, and precision biomanufacturing. The state's agricultural scale, bioindustrial systems, water resources such as the Ogallala Aquifer, and national logistics infrastructure position it as a critical hub for scaling U.S. leadership in the bioeconomy.

Nebraska demonstrates the power of place-making innovation and the untapped potential that exists across America. If the United States is to lead the bio century, it must strengthen the connections between discovery and deployment, research and manufacturing, innovation and markets. The country must unlock the capabilities of regions from coast-to-coast and build a larger, stronger, and more resilient national innovation system.

The sessions captured in the pages that follow offer both a roadmap and a call to action. They reflect the insights of leaders who understand the future of U.S. competitiveness will be built by a nation fully mobilizing its talent, resources, and innovative capacity.



Nebraska demonstrates what is possible when its world-class research institutions, industry, capital, communities, and government align around a shared opportunity. The opportunity now is to build on that foundation, deepen partnerships, and connect Nebraska's technology, talent, investment, and infrastructure in ways that take its bioeconomy leadership to the next level, creating greater value for the state and the nation.

We will carry the lessons from Nebraska forward through the Council's ongoing bioeconomy work. This fall, the Council will convene leaders in a series of virtual workshops to develop strategic recommendations to strengthen U.S. competitiveness and leadership in the global bioeconomy.

We invite leaders across Nebraska and the region to help shape this work and bring their experiences to a national conversation, culminating in the Council's 40th Anniversary and 2026 National Competitiveness Forum, December 16-17.

With great appreciation and optimism for the work ahead,

Dr. Jeffrey P. Gold

President
University of Nebraska System

The Hon. Deborah L. Wince-Smith

President and Chief Executive Officer
Council on Competitiveness



Agenda

Wednesday, April 29, 2026

AFTERNOON

2:00 Registration at the Durham Museum

2:30 A Vision for Nebraska and the Nation: Innovation Driven Growth in the Bioeconomy

These opening remarks will frame this Competitiveness Conversation by spotlighting Nebraska's statewide leadership in innovation, particularly within the bioeconomy, and connecting it to a broader national competitiveness strategy. The session will also introduce the Council on Competitiveness' vision for expanding the innovation economy to more communities across the country, while highlighting the organization's new national initiative to strengthen and scale the U.S. bioeconomy.

Dr. Jeffrey P. Gold
President, University of Nebraska System

The Hon. Deborah L. Wince-Smith
President and CEO, Council on Competitiveness

2:45 Keynote: The National Perspective on the Bioeconomy Imperative and the Future of U.S. Competitiveness

Introduction

The Hon. Deborah L. Wince-Smith
President and CEO, Council on Competitiveness

The Hon. Scott Hutchins
Under Secretary for Research, Education, and Economics (REE), United States Department of Agriculture

3:00 Nebraska—At the Heart of Innovation and U.S. Competitiveness

Nebraska has developed a distinctive model of competitiveness—one that combines innovation with the capacity to scale and deliver lasting economic impact. This panel will examine how the state's leaders align business, infrastructure, and research to strengthen Nebraska's competitiveness and what lessons the Nebraska model holds for the rest of the country.

Mr. Jim Clifton
Chairman, Gallup

Ms. Maureen Larsen
Director of Economic Development, State of Nebraska

Ms. Sandra Reding
President, Aksarben Foundation

Mr. Hunter Traynor
Executive Vice President, Legislation and Policy,
Nebraska Chamber of Commerce and Industry

Moderator

Dr. Jeffrey P. Gold
President, University of Nebraska System

3:45 Omaha in Motion—Building a City for the Next Economy

Omaha is emerging as a dynamic hub for innovation—drawing talent, investment, and economic growth. In this discussion, city, business, and civic leaders will explore the forces driving—and constraining—Omaha's growth today, and how strategic investments, public-private collaboration, and civic leadership are positioning the city as both a great place to live and a major competitive player in the next economy.

Mr. Bruce Carpenter
Central Region Civic Director, HDR

The Hon. John Ewing
Mayor, City of Omaha

Mr. Heath Mello
President and CEO, Greater Omaha Chamber of Commerce

Moderator

Mr. Mike Cassling
Founder and Executive Chairman, CQuence Health; Chair, Aksarben Foundation

4:15 A National Advantage—Scaling the Bioeconomy

Nebraska unites an unmatched combination of agricultural production, bioprocessing capacity, investment, research, talent, geographic centrality, and industry leadership—all helping to position the state as an engine for the U.S. bioeconomy. This panel will examine how Nebraska's integrated ecosystem is accelerating innovation from farm to market, enabling scale, and strengthening U.S. competitiveness across food, fuels, materials, and biomanufacturing.

The Hon. John Bode
CEO and President, Corn Refiners Association

Mr. Kelly Brunkhorst
Executive Director, Nebraska Corn Board

Mr. Billy Hagstrom
CEO & Co-Founder, Bluestem Biosciences

Mr. Ben Rhodes
Executive Director, Nebraska Ethanol Board

Mr. Craig Uden
Nebraska Cattlemen President, Central Nebraska Cattleman & Feedlot Owner

Moderator

Mr. Dan Hoffman
President, Invest Nebraska

5:00 Break/Networking

5:30 President's Reception

6:30 Competitiveness Conversation Dinner and Keynote

Gen. (Ret.) Anthony J. Cotton
Former Commander, United States Strategic Command (USSTRATCOM)

8:30 Day 1 Concludes

Thursday, April 30, 2026

MORNING

8:00 Breakfast and Networking

8:30 Keynote address from Nebraska's Statehouse

Welcome and Introduction

Dr. Jeffrey P. Gold
President, University of Nebraska System

The Hon. Joe Kelly
Lieutenant Governor, State of Nebraska

8:45 Opening Perspectives—Bioeconomy at the Intersection of Productivity, Security, and Prosperity

Building on Day 1's discussions of Nebraska's innovation economy and its central role in the bioeconomy, this opening session will set the stage for Day 2 by exploring how the bioeconomy intersects with national security, higher education, evolving innovation and finance models, and the rapid advancement of artificial intelligence.

Dr. Jeffrey P. Gold
President, University of Nebraska System

Mr. Jim Stutelberg
CEO, Primient

Moderator

The Hon. Deborah L. Wince-Smith
President and CEO, Council on Competitiveness

9:15 Tech Talk: Promises and Perils in the Biology Century

Maj. Gen. (Ret.) Paul Friedrichs
Former Deputy Assistant to the President and
Former Director of the White House Office of
Pandemic Preparedness

9:25 Securing the Future—National Defense, Biosecurity, and the Bioeconomy

Panelists will examine biological risks and how emerging technologies, heightened vulnerabilities, and strategic partnerships are shaping the United States' approach to biosecurity and resilience. Discussions will focus on the imperative of safeguarding national interests while advancing economic growth—and explore strategies to achieve both.

Dr. Tiffany Heng-Moss
Vice Chancellor, Institute of Agriculture and
Natural Resources (IANR), University of
Nebraska-Lincoln

Dr. James Lawler
Associate Director of International Programs and
Innovation, Global Center for Health Security

Dr. Gina Ligon
Director, National Counterterrorism Innovation,
Technology, and Education Center (NCITE)

Dr. Marty Vanier
Director, National Agricultural Biosecurity
Center, Associate Director, Biosecurity Research
Institute, Kansas State University

Moderator

Maj. Gen. (Ret.) Paul Friedrichs
Former Deputy Assistant to the President and
Former Director of the White House Office of
Pandemic Preparedness

10:10 Commercializing Bioeconomy Innovation Through Universities and National Laboratories

Leaders from academia, industry, and the U.S. Department of Energy national laboratories will share insights, challenges, and opportunities for translating research into commercial solutions, fostering partnerships, and preparing the next generation of innovators.

Dr. Kirk Dombrowski
Vice President of Research and Economic Development, University of Vermont

Dr. Peter Dorhout
Vice President for Research, Iowa State University

Mr. Steve Marshall
Vice President, Process Innovation, Cargill

Dr. Todd Pray
Chief Strategic Partnerships Officer, Lawrence Berkeley National Laboratory

Moderator

Dr. Ken Bayles
Vice Chancellor for Research, University of Nebraska Medical Center

10:55 Break

11:10 Lightning Rounds: Big Ideas in the Bioeconomy

Three rapid-fire talks spotlighting breakthrough ideas to unleash the bioeconomy. Fast-paced, forward-looking, and built to spark what's next.

11:10 Ms. Veronica Breckenridge
Managing Partner, First Bight Ventures

11:20 Dr. Todd Pester
Vice President, Corteva Agriscience

11:30 Mr. Mark Warner
Co-Founder and Chief Technology Officer, Liberation Bioindustries

11:40 Tech Talk: Public Opinion and the Bioeconomy—Insights from Gallup's global research

Mr. Dan Foy
Principal, Global Analytics, Gallup

11:55 No Demand, No Bioeconomy: Why Consumers Hold the Key and What They Should Care

For all the investment in biomanufacturing and innovation, the bioeconomy will not reach scale without strong market demand. This conversation focuses on the often-overlooked demand side—how consumers, corporate buyers, and public procurement can create the conditions for growth. Panelists will discuss strategies to build trust in biobased products, align price and performance with consumer expectations, and translate scientific advances into everyday value that makes people open their wallets.

Mr. Carlos A. Cabrera
Executive Chairman, Genomatica

Dr. Lee Ellen Drechsler
Senior Vice President, Corporate R&D, The Procter & Gamble Company

Dr. Jason Thomas
CEO and Founder, The Pennycress Company

Moderator

Dr. Jonathan “Jon” McIntyre
Founding Partner, Nodl Advisors; Distinguished Fellow, Council on Competitiveness

AFTERNOON**12:30 Lunch & Leadership Perspective****12:55 The Hon. Neal Robbins, Deputy Under Secretary, Rural Development, United States Department of Agriculture****1:20 A Global Perspective on Leading the Bioeconomy Race**

This session will explore global trends, innovations, and strategies shaping the bioeconomy, highlighting lessons for U.S. leadership and Nebraska's role in the evolving global ecosystem.

Mr. Rob Hanson
Co-Founder and CEO, Monolith Materials

Mr. Joe Sanders
Executive Director, Daugherty Water for Food Global Institute, University of Nebraska

Mr. Gustavo Sergi
CEO, Sustainea

Moderator

Mr. Gregory Jaffe
President, Jaffe Policy Consulting and Ambassador, World Bioeconomy Association

1:50 How Converging Next-Generation Technologies are Ushering in a New Era of Bio Innovation

Artificial intelligence is transforming the bioeconomy and driving breakthroughs in personalized medicine, transportation, sustainable agriculture, climate solutions, and more. This panel brings together leaders from industry, academia, and government to explore how AI is accelerating innovation and shaping the future of the bioeconomy.

Dr. Sarah Glaven
Visiting Fellow at Princeton University's Andlinger Center and former Principal Assistant Director for Biotechnology and Biomanufacturing, White House Office of Science and Technology Policy

Mr. Tom Kent
President and Chief Executive Officer, Nebraska Public Power District

Mr. Edward Shenderovich
CEO, Roebling

Dr. Mark Stone
Professor of Biological Systems Engineering and Director of the PRAIRIE Initiative, College of Engineering, University of Nebraska-Lincoln

Moderator

Dr. Santosh Pitla
Professor of Biological Systems Engineering,
University of Nebraska-Lincoln, and Co-Director
of the AI Institute, University of Nebraska System

Thank you to our Gold Sponsor



**2:30 Reflection on the Conversation—
Shaping the Future of the U.S.
Bioeconomy**

In this closing conversation, the co-hosts from the Nebraska Competitiveness Conversation will reflect on insights from the day's discussions and explore the emerging opportunities for Nebraska and the Council's bioeconomy initiatives. The session will highlight priorities for innovation, collaboration, and investment, setting the stage for the next phase of advancing Nebraska's innovation economy and the U.S. bioeconomy.

Dr. Jeffrey P. Gold
President, University of Nebraska System

The Hon. Deborah L. Wince-Smith
President and CEO, Council on Competitiveness

2:45 Adjourn

A Vision for Nebraska and the Nation: Innovation-Driven Growth in the Bioeconomy

These opening remarks framed this Competitiveness Conversation by spotlighting Nebraska's statewide leadership in innovation, particularly within the bioeconomy, and connecting it to a broader national competitiveness strategy. The session also introduced the need to expand the innovation economy to more communities across the country, which is at the heart of the Competitiveness Conversations Across America series.

Key Insights

- Nebraska is positioned as a national anchor for the emerging bioeconomy, with more than \$32 billion in agricultural output, leadership in beef exports, and a dense ecosystem of bioindustrial assets spanning ethanol production, biomanufacturing, and carbon capture at commercial scale.
- The U.S. bioeconomy already contributes an estimated \$210 billion to the U.S. Gross Domestic Product (GDP) in direct activity and roughly \$830 billion when broader economic effects are included, while globally the sector is valued at about \$4 trillion and accelerating through convergence with AI, quantum, and advanced manufacturing.
- Nebraska's innovation foundation includes 40 colleges and universities, 138,000 postsecondary students, and more than 31,000 STEM degrees annually, supporting a growing pipeline for advanced industries.
- The state's economy blends global-scale corporations such as Berkshire Hathaway and Gallup with agribusiness and energy leaders like Cargill and ADM, alongside a maturing startup ecosystem that has expanded significantly since the early 2010s.

EVENT EMCEE

Dr. Chris Kratochvil

Vice President for External Relations,
University of Nebraska System

SPEAKERS

Dr. Jeffrey P. Gold

President, University of Nebraska System

The Hon. Deborah L. Wince-Smith

President and Chief Executive Officer, Council on Competitiveness

Opening Remarks—Dr. Jeffrey P. Gold, President, University of Nebraska System

Dr. Jeffrey P. Gold opened the Nebraska Competitiveness Conversation by welcoming participants to Omaha and situating the gathering within a broader national effort to align innovation, industry, and regional economic development. He thanked the Durham Museum for hosting and recognized the cross-sector teams from the Council on Competitiveness and the University of Nebraska who organized the event, noting that convenings like this are essential for translating ideas into action across industry, academia, and government.

Dr. Gold acknowledged elected officials, university leadership, and partners in attendance, and the importance of bringing together policy-makers, researchers, and private-sector leaders in a shared forum focused on the future of the bioeconomy. He framed Nebraska as uniquely positioned for this discussion: **a state where agriculture, research universities, and industrial innovation intersect at scale.**

The University of Nebraska System, he noted, spans four campuses, nearly 50,000 students, and 16,000 faculty and staff, with a statewide footprint that connects urban centers and rural communities through education, research, and Extension. That structure reflects a broader national model for how innovation ecosystems can be distributed rather than concentrated.

Dr. Gold then focused his remarks on a major opportunity for the state, describing the bioeconomy as both a present force in the state and an accelerating global opportunity. He pointed to estimates that the U.S. bioeconomy contributes roughly \$210 billion in direct economic activity and up to \$830 billion when indirect effects are included, supporting more than one million jobs



“The Conversation we are beginning today is not just timely, it is essential, speaking directly to both our present reality and the future we are actively shaping together.”

Dr. Jeffrey P. Gold

President, University of Nebraska System

across industries ranging from agriculture and energy to health and advanced manufacturing.

The sector is dynamic and evolving, as biological science converges with artificial intelligence, advanced computing, automation, and new materials. These technologies, he said, are shortening innovation cycles and enabling entirely new production systems that blur traditional boundaries between sectors. In his words, “breakthroughs that once took decades are now unfolding in years, months, and sometimes even weeks,” and in doing so, accelerating the transformation and acceleration of bio-based products.

Dr. Gold described the bioeconomy as a “foundational platform for innovative growth,” one that will influence nearly every major sector of the economy. He pointed to agriculture, healthcare,

energy, and manufacturing as areas already being reshaped by bio-based technologies and noted that these shifts have direct implications for both economic strength and national security.

At the same time, he cautioned that global competition is intensifying. Countries across Europe and Asia are making coordinated investments in biotechnology, biomanufacturing, and related fields, raising the stakes for sustained U.S. leadership. Without strategic alignment across sectors and regions, the United States risks losing ground in a domain that will help define global economic leadership in the decades ahead.

To address this challenge, Dr. Gold pointed to the Council on Competitiveness' cross-sector initiative designed to bring together industry, academia, labor, and the U.S. Department of Energy national laboratories around a shared national strategy for the bioeconomy. He described the effort as both practical and urgent, aimed at converting technological opportunity into scalable industrial capacity and long-term economic growth.

Dr. Gold closed his remarks by situating Nebraska within this national and global context. The state's agricultural productivity, research institutions, and emerging bioindustrial infrastructure make it a natural setting for advancing the conversation on how the United States can build a more resilient and innovation-driven economy.

Opening Remarks—The Hon. Deborah L. Wince-Smith, President and CEO, Council on Competitiveness

The Hon. Deborah L. Wince-Smith followed by framing the Nebraska gathering as part of the Council on Competitiveness' nationwide series of [Competitiveness Conversations Across America](#), now in its twelfth iteration and second stop of 2026. She noted that the series is designed

to surface and scale regional innovation strengths while connecting them to a broader national strategy for productivity, security, and prosperity.

Ms. Wince-Smith situated the discussion within two defining global megatrends. The first is the rapid convergence of transformative technologies, including artificial intelligence, quantum science, advanced biology, and new materials systems. These technologies are accelerating discovery and fundamentally reshaping industries, supply chains, and national security dynamics. The second is intensifying global competition, particularly in dual-use technologies where economic leadership and security outcomes are increasingly inseparable.

She also pointed to structural imbalances in the U.S. innovation system, noting that approximately 40 percent of venture capital is concentrated in just five metropolitan regions. This geographic concentration limits national capacity and leaves much of the country underutilized in the innovation economy.

In response, she described the Council's "10x strategy," which aims to expand innovation participation by increasing the speed of discovery, multiplying the number of innovations, and significantly broadening the base of Americans engaged in technology-driven growth. "Right now we are only fielding about 10 percent of our population on our team," she said, and we need to tap the full potential of the national workforce and regional economies.

A shift is needed from isolated innovation hubs toward a more distributed national system of "place-making innovation," where regional strengths are integrated into a cohesive national strategy. She framed Nebraska as a compelling example of such a system in practice.



“In this emerging multi-trillion-dollar bioeconomy, if we want to understand where and how the next chapter of U.S. competitiveness will be built and turbocharged, Nebraska is where we need to be.”

The Hon. Deborah L. Wince-Smith

President and Chief Executive Officer, Council on Competitiveness

She described Nebraska as a global center of gravity for the bioeconomy, citing its extensive agricultural base, advanced biomanufacturing infrastructure, and growing innovation ecosystem. The state produces more than \$32 billion in agricultural sales annually, ranks among the top national producers of beef, corn, and soybeans, and hosts a significant ethanol industry supported by 24 operating plants and expanding carbon capture initiatives.

Beyond agriculture, she highlighted Nebraska's broader economic architecture, including Fortune 100 headquarters such as Berkshire Hathaway, global analytics leader Gallup, and major agri-

business firms, including Cargill and ADM. She also pointed to the state's 40 colleges and universities, 138,000 postsecondary students, and more than 31,000 STEM degrees awarded annually as critical assets for future competitiveness.

Ms. Wince-Smith further noted the rapid maturation of Nebraska's startup ecosystem, which has evolved from minimal venture activity a decade ago to hundreds of millions of dollars in annual investment in recent years. This evolution, she suggested, reflects a broader shift toward diversified innovation capacity in the Midwest.

She concluded by positioning Nebraska at the center of the emerging global bioeconomy, describing it as a domain spanning agriculture, health, energy, materials, and national security. In her view, biological data, biosynthesis, and biomanufacturing are becoming strategically significant platforms to global competitiveness, like semiconductors and advanced computing.

The challenge ahead, she said, is not only to advance innovation within leading regions but to ensure that the benefits and opportunities of the bioeconomy extend across all communities in the United States.



KEYNOTE

The National Perspective on the Bioeconomy Imperative and the Future of U.S. Competitiveness

Key Insights

The bioeconomy is an Extension of U.S. agricultural strength, with agriculture serving as the “foundation of commerce” and a central driver of national economic and security resilience.

Innovation in agriculture is being directed toward scalable bio-based markets, including sustainable aviation fuels, intermediate oilseed crops, fermentation-based feed systems, and domestic alternatives to critical imports such as natural rubber and vitamins.

U.S. agriculture faces near-term structural pressures, including fertilizer volatility and global supply chain dependence, prompting the U.S. Department of Agriculture (USDA) to prioritize profitability, resilience, and market development for farmers and ranchers.

New USDA initiatives, including a National Proving Grounds Network for ag technology, aim to accelerate deployment of precision agriculture tools such as real-time soil fertility mapping, automated harvesting, and digital crop management systems.

There is a need for a coordinated national innovation strategy that aligns research, commercialization, and deployment, rather than relying on fragmented R&D investments.

INTRODUCTION

The Hon. Deborah L. Wince-Smith

President and CEO, Council on Competitiveness

KEYNOTE

The Hon. Scott Hutchins

Under Secretary for Research, Education, and Economics (REE), United States Department of Agriculture

Session Summary

Following an introduction from the Hon. Deborah L. Wince-Smith, President and CEO of the Council on Competitiveness, the Hon. Scott Hutchins, Under Secretary for Research, Education, and Economics at the USDA, opened his remarks by reflecting on recent visits to agricultural research institutions across the Midwest, including the University of Nebraska–Lincoln, Iowa State University, and North Dakota State University. He described the region as a “home base” for agricultural innovation and noted the value of seeing research translated into practical outcomes for producers.

Dr. Hutchins framed U.S. agriculture as the historical foundation of national economic development, stating that agriculture is “the foundation



“We have a lot of great startups. We do not have as many stay-ups.”

The Hon. Scott Hutchins

Under Secretary for Research, Education, and Economics,
U.S. Department of Agriculture

of commerce,” a principle reflected in the USDA seal. In his view, the evolution of American agriculture has underpinned broader industrial growth across sectors.

At the same time, Dr. Hutchins cautioned that the agricultural sector is operating under significant near-term pressure, particularly related to input costs and global supply chain vulnerabilities. He noted that fertilizer volatility and external dependencies present immediate risks to farm profitability and rural economic stability.

“The profitability of our farms and ranches is our number one research priority,” he said, describing USDA’s focus on ensuring that agricultural systems remain economically sustainable as well as

environmentally and socially viable. He added that without farm profitability, broader goals for sustainability and rural development cannot be achieved.

Expanding Markets Through Bio-Based Innovation

Dr. Hutchins outlined a set of USDA research priorities aimed at expanding new markets for agricultural products within the bioeconomy. He described sustainable aviation fuels as one of the most promising near-term opportunities, supported by a range of domestic feedstocks including oilseed crops and woody biomass. These pathways, he said, represent a critical bridge between agricultural production and industrial decarbonization.

He also pointed to ongoing research into intermediate oilseed crops such as carinata and pennycress, which can function as both biofuel feedstocks and cover crops, providing dual economic and environmental benefits.

A recurring theme in his remarks was the importance of identifying “multi-use” agricultural systems that increase value per acre while improving resilience in production systems.

Dr. Hutchins further highlighted efforts to develop domestic sources of natural rubber through research into guayule, a desert-adapted shrub capable of producing latex. He noted that the United States remains heavily dependent on imported rubber, despite its critical role in automotive manufacturing and defense applications. Current synthetic alternatives, he said, have not fully met the performance requirements needed for military-grade use.

He acknowledged that current domestic production costs for guayule-derived rubber remain significantly higher than imported alternatives, but argued that long-term strategic considerations, including supply chain security, justify continued investment in scaling production systems.

Biomanufacturing, Fermentation, and Industrial Applications

The Under Secretary also described expanding USDA investment in biomanufacturing and fermentation technologies, including applications in animal nutrition, bio-based materials, and industrial inputs.

He cited research efforts that use fermentation processes to enhance the nutritional value of canola meal, transforming it into a higher-value feed ingredient for swine, poultry, and aquaculture. Similar approaches, he noted, are being explored across biofuels and industrial bioproducts.

Dr. Hutchins referenced historical precedents in agricultural innovation, including George Washington Carver's work on diversified peanut applications and Henry Ford's early efforts to integrate agricultural feedstocks into manufacturing systems, illustrating the long-standing relationship between agriculture and industrial innovation in the United States.

Additional applications include bio-based plastics, packaging materials, asphalt binders, and biochar, which is being studied for its potential to improve soil health and carbon retention.

Supply Chain Security and National Strategy

Dr. Hutchins' remarks also focused on supply chain vulnerabilities affecting agriculture and related industries. He noted that the United States is heavily dependent on foreign sources for key inputs, including vitamins, amino acids, and rubber, creating potential risks for both food production and national security.

Fertilizer supply chains, in particular, are an area of immediate concern, referencing recent federal actions aimed at stabilizing input markets and improving resilience.

In response, USDA is developing new frameworks for agricultural innovation deployment, including a National Proving Grounds Network for agricultural technology. The initiative is designed to accelerate the testing and adoption of innovations in precision agriculture, including soil nutrient sensing, automated fertilization, digital crop scouting, and autonomous harvesting systems.

Dr. Hutchins described the initiative as a research platform and also as an "accelerator" for startups and technology transfer, linking land-grant universities, federal research agencies, and private-sector innovators. He stressed that while the United States has strong innovation capacity, it lacks sufficient mechanisms to transition technologies from development to widespread adoption in the agricultural sector.

Toward a National Innovation Strategy for Agriculture

In closing, Dr. Hutchins called for a more structured national innovation strategy that moves beyond fragmented research investments. He argued that the United States needs coordinated strategies in areas such as weed management, precision fertilization, digital scouting, automated harvesting, food safety systems, and animal health monitoring.

"We need a genuine innovation strategy and not just a budget for research," he said, and elevating the need to align research goals with practical outcomes for farmers and ranchers. He concluded with a call for collaboration among USDA, land-grant universities, industry, and regional ecosystems. A coordinated approach, he said, would strengthen U.S. leadership in agriculture and the broader bioeconomy.

"We need to know where we are going and follow that path with focus and commitment."

Nebraska—At the Heart of Innovation and U.S. Competitiveness

**MODERATOR**

Dr. Jeffrey P. Gold

President, University of Nebraska System

PANEL

Mr. Jim Clifton

Chairman, Gallup

Ms. Maureen Larsen

Director of Economic Development, State of Nebraska

Ms. Sandra Reding

President, Aksarben Foundation

Mr. Hunter Traynor

Executive Vice President, Legislation and Policy, Nebraska Chamber of Commerce and Industry

Nebraska has developed a distinctive model of competitiveness—one that combines innovation with the capacity to scale and deliver lasting economic impact. This panel examined how the state’s leaders align business, infrastructure, and research to strengthen Nebraska’s competitiveness and what lessons the Nebraska model holds for the rest of the country.

Key Insights

Nebraska’s competitiveness model is rooted in a “grow, make, move” economy with unusually strong cross-sector alignment. Leaders pointed to agriculture, manufacturing, and logistics as mutually reinforcing strengths.

Commercialization and scale-up capacity remain the critical gap in turning innovation into economic growth. A recent Business Innovation Act-supported startup in Nebraska reached a roughly \$2 billion valuation, while more than \$500 million in venture capital flowed to Nebraska startups last year.

“Brain drain” losses both after high school and again after five to seven years in the workforce are problematic for the state, which invests roughly \$17,000 per student per year.

Nebraska’s competitiveness is diminished by transmission bottlenecks, local moratoria on energy projects, and the need for clearer pathways to approve infrastructure required for bio-based production and electrified industry.

Entrepreneurship talent is not identified or developed soon enough, and stronger connections between education, market demand, and startup formation are needed.



“We grow stuff, make stuff, and move stuff. We are very good at all three. When you combine those strengths with Nebraska’s culture of showing up and collaborating, that creates opportunity.”

Mr. Hunter Traynor

Executive Vice President, Legislation and Policy, Nebraska Chamber of Commerce and Industry

Session Summary

Dr. Jeffrey P. Gold, President of the University of Nebraska System, moderated the first panel discussion of the Competitiveness Conversation. He opened the discussion by framing Nebraska as both large enough to support diversified industries and small enough to enable rapid collaboration. Dr. Gold described a culture where “you can make a call to anybody here” and quickly mobilize action. Nebraska is a place where proximity and trust accelerate problem solving across sectors.



“Nebraska is unique because there is a network of people who will support you and fund you if you have a good idea. That accessibility is a real competitive advantage.”

Ms. Maureen Larsen

Director of Economic Development, State of Nebraska



“I will invent something that changes the world. Fifty percent of America’s students tell us that. There is no place in the world with that level of ambition. Our job is to nurture it, not let it fade.”

Mr. Jim Clifton

Chairman, Gallup

Mr. Hunter Traynor of the Nebraska Chamber of Commerce and Industry argued that Nebraska’s core advantage lies in the integration of agriculture, manufacturing, and logistics. “We grow stuff, make stuff, and move stuff,” he said, adding that the state’s collaborative culture allows those capabilities to reinforce one another. Yet he also warned that energy infrastructure and permitting constraints are becoming serious barriers to scaling the next generation of investment, particularly in bioeconomy and data-driven industries.

From the perspective of state economic development, Ms. Maureen Larsen of the State of Nebraska described a growing innovation pipeline supported by public financing tools such as the Business Innovation Act. She cited a recent Nebraska startup that reached a multi-billion-dollar

valuation and more than \$500 million in venture capital raised statewide last year. Still, she cautioned that Nebraska faces a persistent “gap between innovation and funding and being able to do something on a large scale,” particularly when it comes to building facilities for commercialization. “We are losing kids,” she added, pointing to both post-secondary migration and early-career attrition.

Ms. Sandra Reding of the Aksarben Foundation focused on workforce retention and human capital loss, noting that Nebraska’s investment in education is effectively exported when graduates leave the state. “Our [agricultural] producers are the original entrepreneurs,” she said, highlighting the innovation embedded in agriculture and the opportunity to better connect that mindset to



“Our producers are the original entrepreneurs. Every day, they are figuring out how to make something work better, faster, and less expensive.”

Ms. Sandra Reding
President, Aksarben Foundation

emerging bioeconomy industries. She argued that Nebraska must better understand why workers leave after five to seven years in the labor market and design interventions that retain talent through later career stages.

Mr. Jim Clifton, Chairman of Gallup, offered a broader critique of how the United States identifies and develops entrepreneurial talent. He argued that innovation systems are strong at early-stage discovery but weak at commercialization and startup formation. “We do not find you early, and we do not put you in a great school,” he said, suggesting that entrepreneurship is not being systematically cultivated. He pointed to the need for a more intentional approach to identifying individuals with high potential to build companies.



“The young men and women coming through our colleges today are among the most talented, energetic, and visionary of any generation. If we provide the opportunity and inspiration, they will build the future bioeconomy and much more.”

Dr. Jeffrey P. Gold
President, University of Nebraska System

In closing, Dr. Gold returned to the role of education in sustaining competitiveness, noting that students in Nebraska are “among the most talented, energetic, visionary young men and young women of a generation.” He argued that the central challenge is not talent availability but inspiration and alignment, ensuring that students see clear pathways into the bioeconomy and other growth sectors.

Across the discussion, panelists converged on a shared view: Nebraska’s structural advantages are real, but unlocking their full potential will require tighter integration of education, capital, infrastructure, and talent systems to move ideas more reliably from discovery to scale.

Omaha in Motion—Building a City for the Next Economy

**MODERATOR****Mr. Mike Cassling**

Founder and Executive Chairman, CQuence Health; Chair, Aksarben Foundation

PANEL**Mr. Bruce Carpenter**

Central Region Civic Director, HDR

The Hon. John Ewing

Mayor, City of Omaha

Mr. Heath Mello

President and CEO, Greater Omaha Chamber of Commerce

Omaha is emerging as a dynamic hub for innovation—drawing talent, investment, and economic growth. In this discussion, city, business, and civic leaders explored the forces driving—and constraining—Omaha’s growth today, and how strategic investments, public-private collaboration, and civic leadership are positioning the city as both a great place to live and a major competitive player in the next economy.

Key Insights

- Omaha’s competitiveness paradox is widening between livability and job growth. The metro has been ranked among the nation’s best places to live by Forbes, yet the Greater Omaha Chamber reports it ranks 18th of 23 peer cities for job growth, with population growth of only about 0.47 percent annually versus 4 to 6 times faster growth in comparable metros.
- Higher education and defense form a core innovation backbone. Institutions including the University of Nebraska at Omaha (ranked #11 nationally in cybersecurity with dual NSA designation), Creighton University, and the University of Nebraska Medical Center collectively anchor workforce development, research capacity, and a \$4.5–\$6.4 billion regional economic impact.
- The next growth frontier is talent retention and regional integration. Leaders warned that young professionals often leave after their first job, and called for deeper Omaha–Lincoln collaboration.
- Emerging bets include AI leadership and the bioeconomy.



“We need to be intentional about growing small business and entrepreneurship. If we want more jobs, we must actively create pathways for emerging businesses to win contracts and scale here at home.”

Mr. Mike Cassling

Founder and Executive Chairman, CQuence Health; Chair, Aksarben Foundation

Session Summary

Omaha’s trajectory as a Midwestern economic hub came into focus in a discussion that balanced strong quality-of-life indicators with persistent challenges in job creation, wage growth, and talent retention. Moderated by Mr. Mike Cassling, Founder and Executive Chairman of CQuence Health and Chair of the Aksarben Foundation, the panel brought together civic, business, and infrastructure leaders who described a region with significant assets but uneven economic momentum.

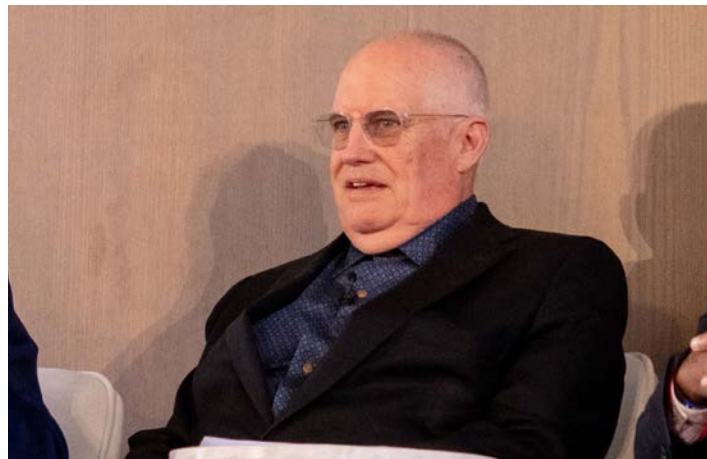


“We must tell people how great Omaha is. Quit being Nebraska nice and modest. If we want to compete, we have to be intentional about showing the world that Omaha is open for business and ready to win.”

The Hon. John Ewing
Mayor, City of Omaha

Cassling opened by framing the central tension. “It’s a great place to live, but we have a jobs problem,” he said, noting Omaha’s strong safety and education rankings alongside lagging job growth relative to peer cities. He pointed to what he called a “perception gap,” where nearly half of prospective residents surveyed would not consider moving to Nebraska despite strong satisfaction among current residents.

Building on this theme, Mayor John Ewing of the City of Omaha argued that the city must translate its strengths into sustained economic expansion. “We can compete with anybody in the country,” he said, citing recent policy wins including LB 1165 and LB 784, which aim to strengthen business attraction and apprenticeship pathways.



“We are not just building quality of life, we are building the conditions for creativity, because that is what ultimately drives long-term competitiveness.”

Mr. Bruce Carpenter
Central Region Civic Director, HDR

Ewing also stressed the need for more intentional small business development, proposing targeted use of public contracts to help emerging firms scale. “Failure is not an option. We have to get this done,” he said.

Mr. Heath Mello, President and CEO of the Greater Omaha Chamber of Commerce, described Omaha’s defining advantage as its unusually high degree of cross-sector collaboration across business, government, and education. “That ability to collaborate, the ability to connect with people, the accessibility makes us a unique distinct metro area,” he said. At the same time, he cautioned that collaboration must extend beyond Omaha itself to include stronger integration with Lincoln and other parts of Nebraska. He characterized the current lack of coordination as a structural constraint on scale, arguing that a unified “super region” could better compete for talent and investment.



“Omaha is uniquely positioned to become an AI city of the future, built on the strength of our industries and the depth of our university and innovation ecosystem.”

Mr. Heath Mello

President and Chief Executive Officer, Greater Omaha Chamber of Commerce

Mr. Bruce Carpenter, Central Region Civic Director at HDR, pointed to Nebraska’s long-standing philanthropic and civic culture as a foundational asset. “We have something very unique,” he said, referencing the region’s investments in cultural institutions, public spaces, and education. He also highlighted workforce development and creativity as central to future competitiveness. “I think we need to foster the creativity. There are no bounds in creative thinking,” Carpenter said, adding that Nebraska’s bioeconomy potential, grounded in its agricultural and ecological systems, could become a differentiating strength.

Across the discussion, higher education and defense emerged as structural pillars of Omaha’s economy. Leaders cited the University of Nebraska at Omaha’s cybersecurity leadership, including its NSA designation, as well as the combined economic impact of the broader University of Nebraska system, estimated at up to \$6.4 billion. Offutt Air Force Base and U.S. Strategic Command were repeatedly referenced as strategic assets, particularly as cybersecurity and national defense missions expand.

Looking ahead, participants converged on two forward-looking themes: artificial intelligence and the bioeconomy. Mello suggested Omaha could become “one of the leading AI cities” given early investments in academic programs and cross-sector alignment. Ewing argued that sustained business-friendly governance could position Omaha among the fastest-growing job markets in the Midwest within five years.

Cassling closed strong: Omaha, he suggested, is positioned better than at any point in decades, but its next phase will depend on converting collaboration into measurable growth in jobs, wages, and talent retention across the broader Nebraska economy.

A National Advantage—Scaling the Bioeconomy



MODERATOR

Mr. Dan Hoffman

President, Invest Nebraska

PANEL

The Hon. John Bode

CEO and President, Corn Refiners Association

Mr. Kelly Brunkhorst

Executive Director, Nebraska Corn Board

Mr. Billy Hagstrom

CEO & Co-Founder, Bluestem Biosciences

Mr. Ben Rhodes

Executive Director, Nebraska Ethanol Board

Mr. Craig Uden

Nebraska Cattlemen President, Central
Nebraska Cattleman & Feedlot Owner

Nebraska unites an unmatched combination of agricultural production, bioprocessing capacity, investment, research, talent, geographic centrality, and industry leadership—all helping to position the state as an engine for the U.S. bioeconomy. This panel examined how Nebraska’s integrated ecosystem is accelerating innovation from farm to market, enabling scale, and strengthening U.S. competitiveness across food, fuels, materials, and biomanufacturing.

Key Insights

- Bioeconomy framed as a global industrial competition, not an agricultural niche. Participants pointed to China’s 15th Five-Year Plan prioritizing biomanufacturing and warned that the United States must treat bio-based production as a strategic sector tied to national security, trade, and industrial policy.
- Nebraska’s integrated agriculture-to-industry system is a structural advantage. With over \$31 billion in annual agricultural output, leading ethanol production, extensive cattle feeding operations, and water and transport infrastructure, the state was described as uniquely positioned to scale bio-based manufacturing.
- Ethanol is serving as the foundational “platform” for broader bioindustrial expansion. Leaders cited E10 adoption since the 1970s and emerging opportunities in sustainable aviation fuels, maritime fuels, CO₂ pipelines, and chemical production as evidence that ethanol infrastructure is evolving into a broader biomanufacturing ecosystem.
- Commercialization and customer demand, not just science, are becoming the decisive bottleneck. Successful bioeconomy scale-up depends on securing offtake agreements, stable policy signals, and clear market demand, rather than research breakthroughs alone.
- Policy consistency and cross-sector coordination remain limiting factors. Regulatory fragmentation, uneven fuel standards adoption such as E15, and siloed collaboration among academia, industry, and government are barriers to scaling Nebraska’s bioeconomy potential.

Session Summary

Moderated by Mr. Dan Hoffman, President of Invest Nebraska, the panel argued that bio-based manufacturing is shifting from an agricultural Extension to a core pillar of industrial strategy. Opening the discussion, Mr. Hoffman noted accelerating international competition, citing China’s



“I think of ethanol as the point of the spear. What has happened in ethanol is that there are hundreds, thousands of other products waiting to come on behind that. And the real opportunity is Nebraska and the Midwest as the great Corn Belt.”

The Hon. John Bode

CEO and President, Corn Refiners Association

15th Five-Year Plan, which elevates biomanufacturing as a strategic industry tied to national security and growth. “They want to invest in biomanufacturing to ensure their national security and economic growth,” he said. The United States must scale up manufacturing capacity in bio, as well.

The Hon. John Bode described the bioeconomy as far larger than traditional agricultural markets, calling ethanol “the point of the spear” for a wave of emerging bio-based products. He added that “American agriculture is very diverse,” rooted in land-grant university innovation and a manufacturing base that remains deeply tied to agricultural inputs.



“We have a strong livestock industry and a biofuels industry, and we can continue to add value to those crops with value-added industries.”

Mr. Kelly Brunkhorst

Executive Director, Nebraska Corn Board

From a production perspective, Mr. Kelly Brunkhorst, Executive Director of the Nebraska Corn Board, focused his comments on Nebraska’s capacity to convert agricultural surplus into value-added industries. “We have a strong livestock industry, we have a biofuels industry, we have feedstock production,” he said, arguing that the state’s challenge is not output but expanding demand pathways beyond ethanol.

Mr. Ben Rhodes, Executive Director of the Nebraska Ethanol Board, positioned ethanol as the foundational industrial platform for the broader bioeconomy. “Ethanol solves problems,” noting the fuel’s origins in addressing both grain surplus and fuel octane needs. Mr. Rhodes described modern expansion into aviation fuel, maritime fuel, and carbon capture systems, including a CO₂ pipeline project enabled by federal tax incentives that now transports captured carbon for permanent sequestration.



“Back in the 70s, we were facing twin problems: we needed to find a new market for grain, and we needed a cheaper, homegrown octane booster for the fuel supply. Ethanol solves all those problems at once.”

Mr. Ben Rhodes

Executive Director, Nebraska Ethanol Board

Nebraska Cattlemen President, Central Nebraska Cattleman & Feedlot Owner, Mr. Craig Uden, connected livestock production directly to bioindustrial circularity. “Nebraska should be on the leading edge of the bioeconomy because we have everything,” he said, pointing to distillers grains from ethanol production, water resources, and processing infrastructure. Mr. Uden also warned of a demographic gap in agriculture leadership: “We are missing that 45 to 65 generation,” calling for stronger mentorship and succession pathways to sustain rural capacity.

Entrepreneurial perspectives came from Mr. Billy Hagstrom, who described building a chemical production platform derived from corn. “Bluestem is trying to create a new platform technology that



“Our mission is to create chemicals out of corn. At the core of what we do, we grind corn in the state of Nebraska today, and when we strip out that renewable starch to make our chemical, the feed goes back to the livestock industry, and the circularity continues. We are trying to create a new platform technology that can drive innovation and demand across the Midwest.”

Mr. Billy Hagstrom

CEO & Co-Founder, Bluestem Biosciences

can really drive innovation,” he said. Mr. Hagstrom noted early skepticism from coastal investors but argued Nebraska’s proximity to “94,000,000 acres of corn” and established bioprocessing facilities creates unmatched structural advantages. He added, “We want to under promise and over deliver,” underscoring a commercialization-first approach.



“The beef industry in Nebraska has always been innovative. Ethanol production was the byproduct, and distillers grains is a big benefit to us. We have to support it and continue to kick this industry into high gear.”

Mr. Craig Uden

Nebraska Cattlemen President, Central Nebraska Cattleman & Feedlot Owner



“Just six months ago, the Communist Party of China announced in its 15th 5-year plan they want to invest in biomanufacturing to ensure their national security and their economic growth. We are already six months into that five-year plan.”

Mr. Dan Hoffman

President, Invest Nebraska

Across the discussion, speakers converged on a shared concern that policy inconsistency and fragmented execution could slow momentum. Mr. Bode warned that the United States is competing against state-directed industrial policy abroad, saying China is “subsidizing biomanufacturing and driving competition out of existence where it can.” Mr. Rhodes pointed to stalled E15 adoption as an example of policy friction limiting market expansion, while also noting that new markets such as sustainable aviation fuel and renewable chemicals could unlock the next phase of growth.

Despite these challenges, the tone of the session remained forward-looking and positive. Mr. Hagstrom captured the sentiment of opportunity:

“We have cheap energy, plentiful water, unbelievable infrastructure, and incredible people that want to build new economies.” Taken together, the panel portrayed Nebraska not only as a leading agricultural state, but as an emerging hub for industrial-scale biomanufacturing, where feedstocks, energy systems, and innovation ecosystems are increasingly converging into a unified competitiveness strategy.

Behind the Scenes





KEYNOTE

Address from Nebraska's Statehouse

WELCOME AND INTRODUCTION

Dr. Jeffrey P. Gold

President, University of Nebraska System

KEYNOTE

The Hon. Joe Kelly

Lieutenant Governor, State of Nebraska

Key Insights

- Nebraska positions the bioeconomy as a national competitiveness strategy, not just an agricultural initiative. Lieutenant Governor Joe Kelly framed bio-based manufacturing as central to U.S. energy security, supply chain resilience, and industrial leadership, noting that Nebraska already ranks second nationally in cattle production and among the top states in corn and soy output.
- The state's logistics, water, and infrastructure assets are foundational to scaling bioindustrial production. The "Ogallala Aquifer" is a strategic water reserve enabling industrial-scale biomanufacturing, alongside Nebraska's rail and highway network anchored by the I-80 corridor and Union Pacific's headquarters in Omaha.

- Nebraska is shifting from commodity production to value-added biomanufacturing. Projects such as the DG Fuels sustainable aviation fuel facility, which converts agricultural byproducts into high-value energy products, is creating "hundreds of high-wage jobs" and new revenue streams for agricultural producers.
- University-industry alignment is central to scaling innovation. The University of Nebraska System is a bridging institution connecting research, commercialization, and workforce development, enabling faster movement from laboratory discovery to commercial deployment.
- Policy coherence and cross-sector coordination are treated as competitive advantages. Nebraska's intentionally aligned ecosystem integrates state government, universities, private capital, and industry to accelerate the deployment of bio-based technologies at scale.

Session Summary

Dr. Jeffrey P. Gold, President of the University of Nebraska System, introduced Lieutenant Governor Joe Kelly as a public servant with a career spanning county prosecution, state leadership, and federal service as U.S. Attorney for Nebraska. Dr. Gold described Kelly as a leader with "dedica-



“We are not just feeding and fueling the world. We are building the materials the world runs on, ensuring Nebraska remains a leader in the next industrial frontier.”

The Hon. Joe Kelly

Lieutenant Governor, State of Nebraska

tion, discipline, and a very clear focus on results,” situating the keynote within a broader effort to align state leadership, higher education, and industry around long-term competitiveness.

Nebraska Lieutenant Governor Kelly framed his remarks around the idea that “our global bioeconomy is a major driver of future economic growth and competitiveness,” emphasizing that Nebraska is actively building leadership in the sector.

He argued that Nebraska’s competitive position rests on a unique combination of assets: large-scale agricultural production, strategic logistics infrastructure anchored by the I-80 corridor and Omaha-based Union Pacific Railroad, and

abundant water resources. Kelly described the Ogallala Aquifer as “Nebraska’s ultimate strategic reserve,” noting that reliable water supplies are becoming an increasingly important advantage for industrial-scale bio-based production and advanced biomanufacturing.

A central theme of the keynote was Nebraska’s transition from commodity production to value-added manufacturing. The state, Kelly said, is moving beyond “feeding and fueling the world” toward producing the fuels, materials, and products that underpin modern industry. He highlighted investments in sustainable aviation fuel and precision biomanufacturing, including the DG Fuels facility, which converts agricultural byproducts into high-value energy products while creating high-wage jobs and new revenue opportunities for rural communities.

Kelly also emphasized the importance of ecosystem coordination, describing Nebraska’s approach as one that intentionally aligns state policy, research institutions, private investment, and workforce development. He cited the University of Nebraska System as a key catalyst, helping translate research into commercial technologies while building the talent pipeline needed to support industry growth.

Throughout the address, Kelly linked Nebraska’s bioeconomy strategy to broader national priorities, including energy security, supply chain resilience, and advanced manufacturing competitiveness. He concluded that Nebraska is positioning itself as a leading hub for the American bioeconomy and offers a model for how coordinated regional ecosystems can strengthen U.S. competitiveness in the next industrial era.

Opening Perspectives—Bioeconomy at the Intersection of Productivity, Security, and Prosperity

**MODERATOR**

The Hon. Deborah L. Wince-Smith

President and CEO, Council
on Competitiveness

PANEL

Mr. Jim Stutelberg

CEO, Primient

Dr. Jeffrey P. Gold

President, University of Nebraska System

Building on Day 1's discussions of Nebraska's innovation economy and its central role in the bioeconomy, this opening session will set the stage for Day 2 by exploring how the bioeconomy intersects with national security, higher education, evolving innovation and finance models, and the rapid advancement of artificial intelligence.

Key Insights

- The bioeconomy has already shifted from concept to execution, but scaling depends on de-risking investment. New biomanufacturing infrastructure is needed to help startups cross the “scale-up gap.”
- Demand certainty, not just R&D funding, is the missing catalyst for scaling U.S. bio-manufacturing. Procurement signals, such as mandated domestic sourcing for critical materials or defense applications, could rapidly unlock private capital by stabilizing market demand.
- Talent and workforce gaps remain a binding constraint, especially in technical trades. The United States lacks sufficient electricians, technicians, and other frontline workers needed for industrial-scale bio-manufacturing.
- Workforce development must span K–12, higher education, and industry-aligned training pipelines.

Session Summary

Nebraska's emergence as a national bioeconomy hub framed the opening panel discussion on the morning of April 30, Day Two of the Nebraska edition of the Competitiveness Conversations Across America series. Opening the discussion, Dr. Jeffrey P. Gold, President of the University of Nebraska System, and Mr. Jim Stutelberg, CEO



“The workforce pipeline is critical. We must start early by providing role models in agriculture, engineering, and healthcare. The secret is simple: hard work, visibility, and showing young people how they can change the world.”

Dr. Jeffrey P. Gold

President, University of Nebraska System

of Primient, joined the Hon. Deborah L. Wince-Smith, President and CEO of the Council on Competitiveness, to explore how the bioeconomy is evolving from a research-driven field into an integrated industrial system spanning agriculture, advanced manufacturing, and national security applications.

Ms. Wince-Smith framed Nebraska as an increasingly important testbed for “the bioeconomy of the future.” There is a growing recognition that competitiveness depends on linking innovation systems to production capacity and secure supply chains, which is happening in the state.



“The bioeconomy is no longer a future opportunity; it is a national imperative. And demand certainty is what ultimately unlocks investment, de-risks innovation, and brings manufacturing and jobs back into the United States.”

Mr. Jim Stutelberg
CEO, Primient

Stutelberg, reflecting on his experience across the U.S. bio-manufacturing sector, reinforced that the industry has moved beyond theoretical potential. “This is no longer an interesting opportunity that might manifest into the future. We are riding the wave right now,” he said, citing Primient’s acquisition of a Tennessee facility producing 1,3-propanediol (PDO) through fermentation and a new biomanufacturing incubator in Decatur, Illinois, designed to help startups scale from pilot to commercial production.

However, Stutelberg cautioned that the United States remains constrained not by invention but by scale-up barriers and labor shortages. Beyond research talent, he stressed the urgent need for



“We need to continue building the bioeconomy, which connects innovation to national security and supply chain resilience, because when there is clarity of purpose, investment follows, and ecosystems come together.”

The Hon. Deborah L. Wince-Smith
President and CEO, Council on Competitiveness

electricians, technicians, and skilled tradespeople. Without them, he warned, the industrial build-out required for the bioeconomy will stall.

A central theme of the discussion was how to unlock capital for scale. Stutelberg argued the key constraint is demand uncertainty. He suggested that procurement policy, particularly in defense and essential supply chains, could serve as a catalyst. If government established clear domestic sourcing requirements for critical materials, he said, private capital would rapidly follow. “The money is going to show up when the business model is good,” he noted.

Dr. Gold connected these themes to the broader research and education ecosystem, highlighting how universities must bridge discovery and

commercialization. He argued that high-impact research must be oriented toward real-world application and acknowledged the long-standing tension between academic norms and entrepreneurial outcomes. “Commercialization is not a dirty word,” he said, stressing that universities must support researchers through partnerships that provide regulatory, financial, and business expertise.

Dr. Gold also brought up that workforce development must begin early, and K–12 systems must build early exposure to technical fields. He described efforts to introduce students to role models in agriculture, engineering, and health-care, arguing that sustained engagement is necessary to build the next generation of bioeconomy talent.

Across the discussion, participants converged on the view that the bioeconomy now sits at the intersection of industrial policy, national security, and technological transformation. Energy availability, water resources, AI-driven compute demands, and supply chain vulnerabilities were all cited as interconnected constraints shaping future competitiveness.

Ms. Wince-Smith closed the session by framing the moment as an “unprecedented challenge and opportunity” to innovate. The panel’s consensus reflected that duality, with Nebraska positioned as a regional leader and proving ground for how the United States might align science, manufacturing, and security priorities in a rapidly evolving global economy.

TECH TALK

Promises and Perils in the Biology Century

Key Insights

- Biotechnology is now a central national security concern, not just a scientific or industrial frontier. Maj. Gen. (Ret.) Paul Friedrichs warned that a 2035 Department of Defense war game identified biotechnology as one of five major risk domains, particularly due to its dual-use potential in both civilian innovation and biological weapons development.
- The United States is no longer the undisputed leader in global innovation capacity. Intellectual property and technology leadership data show China rising from approximately #35 to #10 globally in innovation output over two decades, while broader assessments suggest China now leads in most of 68 tracked technology domains.
- AI is rapidly lowering barriers to biological design, increasing biosecurity risk. Large language models can be used to generate step-by-step pathways for biological weapon design, raising concerns about non-state actor access to high-impact capabilities.
- The same technologies driving advances in agriculture, medicine, and manufacturing can also be repurposed for biological threats affecting crops, livestock, and humans, making governance and regulatory adaptation urgent.

- The current moment in biotechnology is comparable to early aviation safety regimes. Governance frameworks must evolve to enable innovation while ensuring system-level safety, particularly as AI, biotechnology, and global competition converge.

Session Summary

The “Tech Talk: Promises and Perils in the Biology Century” session placed biotechnology at the center of U.S. competitiveness and national security debates, with Maj. Gen. (Ret.) Paul Friedrichs, former Deputy Assistant to the President and former Director of the White House Office of Pandemic Preparedness and Response, offering a forceful assessment of both the promise and vulnerability embedded in the emerging bioeconomy.

Dr. Friedrichs opened by situating biotechnology within a national security context increasingly shaped by geopolitical rivalry and rapid technological diffusion. Drawing on recent Department of Defense war-gaming exercises, he noted that biotechnology was identified as one of five key risk areas for the 2035 security environment.

He cautioned against complacency in U.S. innovation leadership, citing long-term trendlines in global intellectual property creation. “We have not actually been number one in innovation for years,” Dr. Friedrichs said, pointing to data showing the

United States maintaining a top-five position while China rose from roughly 35th to 10th globally over the past two decades. Referencing broader analyses of global technology leadership, including the Australian Strategic Policy Institute's mapping of 68 advanced technology domains, he noted that the United States has lost its dominant position across most sectors.

That shift, he argued, carries direct implications for biotechnology, where innovation capacity is increasingly tied to strategic power. “We cannot let another country out-innovate us and hope to somehow maintain our world leadership,” he said.

A core concern raised by Dr. Friedrichs was the dual-use nature of modern biotechnology. While it offers transformative potential in medicine, agriculture, and industrial production, it also lowers barriers to misuse. He traced the evolution of biological threats from historical precedents, including ancient and World War II-era biological weapons programs, to today's emerging risks enabled by computational biology and AI systems.

Recent developments in generative AI further complicate the threat landscape. Dr. Friedrichs referenced public reporting, including analysis in The New York Times, indicating that large language models can be prompted to generate detailed pathways for biological weapon develop-



“We are at an inflection point in the biology century—where biotechnology can transform medicine, agriculture, and our economy, but also be misused in ways that threaten security. The United States must innovate and regulate wisely, or risk losing both leadership and safety.”

Maj. Gen. (Ret.) Paul Friedrichs

Former Deputy Assistant to the President; Former Director, White House Office of Pandemic Preparedness and Response

ment. “That’s not supposed to happen,” he said, noting that such accessibility raises concerns about non-state actors acquiring capabilities that were previously confined to nation-states.

He also pointed to ongoing concerns among national security leaders and technology figures, including Bill Gates, who has warned that AI-enabled access to biological design tools could pose greater risks than naturally occurring pandemics. Dr. Friedrichs noted that adversarial states are actively modernizing biological capabilities alongside other advanced military systems, underscoring that these risks are not hypothetical.

At the same time, Dr. Friedrichs argued that the same technologies driving concern are essential to future competitiveness. Biotechnology will reshape agriculture, medicine, and industrial systems, but only if governance structures evolve to manage its risks. He compared the current moment to early aviation, when safety regulations emerged only after systems became widely used and publicly consequential. “This is an opportunity to create a regulatory environment that allows innovation to flourish and allows us to be more competitive.”

Dr. Friedrichs closed with a broader warning about the consequences of inaction in a rapidly shifting global landscape. The United States has historically led through technological transformation and now faces a decisive moment to determine whether it will continue to do so in the biology century.

Securing the Future—National Defense, Biosecurity, and the Bioeconomy



MODERATOR

Maj. Gen. (Ret.) Paul Friedrichs

Former Deputy Assistant to the President and Former Director of the White House Office of Pandemic Preparedness

PANEL

Dr. Tiffany Heng-Moss

Vice Chancellor, Institute of Agriculture and Natural Resources (IANR), University of Nebraska-Lincoln

Dr. James Lawler

Associate Director of International Programs and Innovation, Global Center for Health Security

Dr. Gina Ligon

Director, National Counterterrorism Innovation, Technology, and Education Center (NCITE)

Dr. Marty Vanier

Director, National Agricultural Biosecurity Center, Associate Director, Biosecurity Research Institute, Kansas State University

Panelists examined biological risks and how emerging technologies, heightened vulnerabilities, and strategic partnerships are shaping the United States' approach to biosecurity and resilience. Discussions focused on the imperative of safeguarding national interests while advancing economic growth—and exploring strategies to achieve both.

Key Insights

- Biology is a dual-use domain with significant implications for national security. Advances in synthetic biology, coupled with rapidly evolving artificial intelligence capabilities, are accelerating both beneficial applications and opportunities for misuse. The growing ability to automate research and experimentation raises concerns about the development of engineered biological agents that could evade existing detection and countermeasure systems.
- Agriculture represents a particularly vulnerable target within the bioeconomy security landscape. Crop diseases, livestock pathogens, invasive species, and other biological threats have the potential to disrupt production systems at scale. The decentralized nature of agricultural operations and the difficulty of securing large, distributed biological systems create unique challenges for risk management and resilience.
- The range of potential threat actors is expanding beyond nation-states to include ideological extremists, agro-terrorists, and criminal organizations. As the bioeconomy grows in strategic importance, biological systems, food production networks, and related infrastructure may increasingly become targets for those motivated by ideology, disruption, or financial gain.



“Agriculture is a soft target in national security—decentralized, biologically vulnerable, and deeply interconnected—which makes food and agriculture security inseparable from national resilience.”

Dr. Tiffany Heng-Moss

Vice Chancellor, Institute of Agriculture and Natural Resources (IANR), University of Nebraska-Lincoln

- Supply chains are increasingly digital, interconnected, and data-driven, creating new opportunities for both efficiencies and attack.
- Sustained investment in education, workforce development, Extension systems, and public-private partnerships is required to build resilience.

Session Summary

The panel on “Securing the Future: National Defense, Biosecurity, and the Bioeconomy” brought together national security, agriculture, and health security experts to examine how converging technologies are reshaping both U.S.



“The intersection of artificial intelligence and synthetic biology represents an existential risk—one where systems could eventually design biological threats outside of human control or understanding.”

Dr. James Lawler

Associate Director of International Programs and Innovation, Global Center for Health Security



“The most concerning threats are not only state actors, but nihilistic violent extremists and agro-terrorists who may be newly empowered by emerging technologies to target the bioeconomy itself.”

Dr. Gina Ligon

Director, National Counterterrorism Innovation, Technology, and Education Center (NCITE)

competitiveness and vulnerability. Moderated by Maj. Gen. (Ret.) Paul Friedrichs, Former Deputy Assistant to the President and Former Director of the White House Office of Pandemic Preparedness, and building off his “Tech Talk,” which he gave just prior to this session, the discussion centered on the accelerating intersection of artificial intelligence, synthetic biology, and global supply chains.

Dr. Friedrichs opened by framing the bioeconomy as a “golden goose that’s going to lay golden eggs, unless we screw it up.” He pointed to the rapid diffusion of biotechnology capabilities and warned that innovation without governance could erode U.S. leadership. “We cannot let another

country out-innovate us and hope to somehow maintain our world leadership,” he said, referencing global shifts in innovation capacity and the strategic importance of maintaining domestic advantage in biotechnology and related fields.

Dr. Tiffany Heng-Moss focused on agriculture as a foundational yet underappreciated component of national security. Crop and livestock systems are inherently vulnerable due to their biological and distributed nature, noting that “agriculture is really a soft target.” Disruptions in the Midwest would have cascading national and global consequences. With an eye towards building resilience in the system, Heng-Moss highlighted Nebraska’s integrated ecosystem of research, surveillance,



“It is not enough to identify threats—we have to prepare ‘left of boom’ by training responders, integrating agriculture into security planning, and translating risk awareness down to the field level.”

Dr. Marty Vanier

Director, National Agricultural Biosecurity Center, Associate Director, Biosecurity Research Institute, Kansas State University

and Extension, including partnerships such as the National Strategic Research Institute (NSRI) and forthcoming USDA-linked initiatives on digital precision agriculture. She also pointed to emerging efforts like the National Consortium for Ag Security Education (NCASE), designed to train security professionals, producers, and students in biosecurity risk awareness.

Dr. James Lawler of the Global Center for Health Security situated the conversation at the intersection of AI and synthetic biology, describing it as an emerging existential risk. Drawing on historical analogies from World War I and contemporary AI discourse, he warned that the world may be



“We are at a true inflection point in biotechnology, and the question is whether we harness it to lead, or fall behind as others set the rules, standards, and trajectory of innovation.”

Maj. Gen. (Ret.) Paul Friedrichs

Former Deputy Assistant to the President and Former Director of the White House Office of Pandemic Preparedness

approaching a point where “we will have no idea how these machines think” and therefore limited ability to control outcomes. He argued that future biological threats may be generated through automated systems capable of designing pathogens beyond human oversight, potentially producing agents “we will not be able to detect” or counter. Despite this, Lawler cautioned against halting innovation, instead calling for stronger governance and leadership to ensure the United States shapes global norms and standards.

Dr. Gina Ligon of the National Counterterrorism Innovation, Technology, and Education Center (NCITE) expanded the security lens to include state-sponsored IP theft, ransomware-driven

transnational crime, and extremist ideologies. Of particular concern were nihilistic violent extremists, which she described as motivated by destruction rather than gain. Dr. Ligon also highlighted agro-terrorism as an evolving threat, noting that advances in accessible technology are lowering barriers for actors previously constrained by limited capability.

Dr. Marty Vanier, Director of the National Agricultural Biosecurity Center and Associate Director of the Biosecurity Research Institute at Kansas State University, spoke about operational readiness and ground-level resilience. She described efforts to integrate intelligence analysis with field-level response systems, as well as the importance of training first responders and agricultural producers to operate within a shared framework, citing the complexity of livestock movement and disease transmission across state and production networks. “There are not enough farmers and ranchers in the country to do this by themselves,” she said. The capacity for a coordinated response is essential.

Across the discussion, speakers converged on a central conclusion that the United States must simultaneously accelerate innovation and strengthen safeguards across biology, data systems, and workforce development. Lawler called for renewed investment in universities and a stronger “triple helix” linking academia, industry, and government. Heng-Moss and Vanier elevated the importance of Extension systems and workforce training, while Dr. Ligon wanted greater focus on mitigating the risk of nontraditional adversaries in an increasingly digital and ideologically fragmented threat environment.

Commercializing Bioeconomy Innovation through Universities and National Labs



PANEL

Dr. Kirk Dombrowski

Vice President of Research and Economic Development, University of Vermont

Dr. Peter Dorchout

Vice President for Research, Iowa State University

Mr. Steve Marshall

Vice President, Process Innovation, Cargill

Dr. Todd Pray

Chief Strategic Partnerships Officer, Lawrence Berkeley National Laboratory

MODERATOR

Dr. Ken Bayles

Vice Chancellor for Research, University of Nebraska Medical Center

Leaders from academia, industry, and the U.S. Department of Energy national laboratories will share insights, challenges, and opportunities for translating research into commercial solutions, fostering partnerships, and preparing the next generation of innovators.

Key Insights

- Bioeconomy commercialization is constrained by the investment gap between pilot-scale innovation and bankable market demand.
- Market pull, not just technical readiness, is a central bottleneck, with offtake uncertainty limiting investment in first-of-a-kind facilities. This is a chicken and egg problem, where financing depends on offtake agreements, but offtake agreements require proven commercial-scale production.
- Commercialization depends on end-to-end integration across research, supply chains, and operations.
- Universities and national labs are rethinking traditional tech transfer and partnership models to accelerate innovation and reduce friction.
- Regional innovation ecosystems are increasingly competing on talent infrastructure, not just research output, with lab-coworking and embedded entrepreneurship models emerging as key tools.

Session Summary

Dr. Ken Bayles, Vice Chancellor for Research at the University of Nebraska Medical Center and moderator of the session, framed the discussion around a persistent gap between innovation and commercialization, noting that the country must better connect “the innovation engine of the



“Universities play a critical role in cultivating the talent and ideas that drive the bioeconomy, but commercialization requires more than breakthrough research... The future of the bioeconomy will depend on our ability to bridge discovery, talent, and scale.”

Dr. Kirk Dombrowski

Vice President of Research and Economic Development,
University of Vermont

United States in the academic sector with the incredible resources of the federal government’s national laboratories.”

Dr. Todd Pray, Chief Strategic Partnerships Officer at Lawrence Berkeley National Laboratory, pointed to structural barriers that extend beyond technical risk. Drawing on experience in industrial biotech, including work connected to companies such as Impossible Foods, he argued that the problem is not a single failure point but a layered set of barriers. “There’s a lot of great technology innovation happening at universities and labs,” but the hardest challenge often lies in market forma-



“No single institution can move breakthrough technologies from the laboratory to the marketplace alone. By building durable networks that connect research, workforce development, manufacturing, and entrepreneurship, we can accelerate innovation while ensuring that the benefits reach people, regions, and industries across the country.”

Dr. Peter Dorhout

Vice President for Research, Iowa State University

tion itself, describing a “chicken and egg problem” where financing for first commercial plants depends on offtake agreements that cannot be secured until production is demonstrated at scale. Pray called for stronger federal engagement to “de-risk not just the technology itself, but the market adoption of those products.”



“A scientific breakthrough becomes an innovation only when it can be produced reliably, at scale, and at a cost customers are willing to pay.”

Mr. Steve Marshall

Vice President, Process Innovation, Cargill

From industry, Steve Marshall, Vice President for Process Innovation at Cargill, argued that commercialization success depends on disciplined integration across the entire value chain, from lab concept to industrial operation. Reflecting on decades of experience in bioindustrial systems, including work at Cargill’s Blair, Nebraska, facility, he said, “If you can’t build it into a reliably running facility that produces a product at a cost that the consumer is willing to pay, then it’s just a good idea.” Marshall described innovation as a “bridge to the future,” where incremental engineering improvements, energy integration, and supply chain design often determine whether technologies succeed commercially.

University leaders focused on institutional structures that shape innovation outcomes. Dr. Kirk Dombrowski, Vice President for Research and



“By helping de-risk technologies, supporting entrepreneurs, and expanding access to world-class facilities and expertise, [the U.S. Department of Energy national laboratories can accelerate the path from innovation to deployment and strengthen America’s leadership in the bioeconomy.]”

Dr. Todd Pray

Chief Strategic Partnerships Officer, Lawrence Berkeley National Laboratory

“Our greatest opportunity is to build sustained partnerships that break down silos, align resources, and accelerate the movement of ideas from the laboratory to the marketplace. When we work together as one innovation ecosystem, we can unlock the full potential of the American bioeconomy.”

Dr. Ken Bayles

Vice Chancellor for Research, University of Nebraska Medical Center (Moderator)

Economic Development at the University of Vermont, argued that technology transfer systems have not kept pace with modern innovation pathways. “We are often our own worst enemies,” he said, describing licensing and patenting frameworks that can slow startup formation and fail to reflect how value is created in contemporary

biotechnology markets. He pointed to the contrast between regions with dense venture ecosystems, such as Cambridge, Massachusetts, and institutions seeking to bridge between biomass-based and technology-driven biotech sectors. Domrowski also commented on ecosystem design and relatively small enhancements that can make

NSF RuralSTAMINA Biomanufacturing Engine in Iowa and Nebraska

A few months after our Competitiveness Conversation in Omaha, the National Science Foundation (NSF) announced twelve new regional innovation engines, including the [NSF RuralSTAMINA Biomanufacturing Engine in Iowa and Nebraska](#), an investment over ten years of up to \$160 million in a critical core technology ecosystem that will be the catalyst that accelerates the bioeconomy in the region. Combined, Nebraska and Iowa boast the largest agriculture production in the nation, and with new core infrastructure in place to support it, U.S. biomanufacturing needs to go where we grow.

Led by Iowa State University, in partnership with the University of Nebraska-Lincoln, the University of Iowa, the Des Moines Area Community College, and Southeast Community College, RuralSTAMINA advances rural prosperity by accelerating advanced biomanufacturing across Nebraska and Iowa with more than 70 partners. By connecting agriculture, innovation, manufacturing, workforce development, and federal, state, and private sector investment, RuralSTAMINA aims to transform

regional strengths into new products, new companies, skilled jobs, and long-term economic opportunity.

RuralSTAMINA is accelerating advanced biomanufacturing. It brings together industry, universities, entrepreneurs, investors, educators, and communities. Together, these partners help move research breakthroughs from discovery to commercialization, creating new opportunities for rural economies. By leveraging the region's agricultural leadership, manufacturing capabilities, research expertise, and workforce strengths, RuralSTAMINA is helping position Iowa and Nebraska as America's leading center for advanced biomanufacturing and value-added production.



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a big difference, citing wet lab coworking models that allow universities to compete for talent by providing infrastructure comparable to leading coastal hubs.

Dr. Peter Dorhout, Vice President for Research at Iowa State University, noted the role of deeply integrated regional partnerships spanning federal laboratories, universities, and state institutions. Describing collaborations involving Ames Laboratory, USDA research centers, and large-scale biomanufacturing initiatives, he noted that alignment is most effective when partners share clear mission goals. "When there's a common set of

goals...that's when we can pull together, and... pull off a miracle," he said, pointing to federal "lighthouse" initiatives like the DOE's Genesis Mission as an example of coordinated innovation at scale.

Across perspectives, the panel converged around the idea that U.S. competitiveness in the bioeconomy will depend on system-level integration. That includes aligning incentives across agencies, rethinking university commercialization models, building regional talent ecosystems, and connecting laboratory innovation directly to industrial deployment.

Lightning Rounds: Big Ideas in the Bioeconomy

Three rapid-fire talks spotlighting fast-paced, forward-looking breakthrough ideas to unleash the bioeconomy.

First Bight Ventures



“The unlock is first-of-its-kind and pilot facilities. They have to actually scale. If they don’t scale, you can’t build products to sell.”

Ms. Veronica Breckenridge
Managing Partner

Key Insights

- Capital is available, but returns remain the central constraint for scaling the bioeconomy.
- Most failures in industrial biotech are not technology-driven but business-model failures.
- Early commercialization success depends on focusing beyond total addressable market (TAM) toward near-term, margin-positive niches.
- Demand creation and public understanding of bio-based products are as important as technical innovation. Reframing the sector around accessible health and environmental narratives, and citing concerns such as microplastics exposure and PFAS-related risks, may drive greater consumer pull.
- Pilot- and first-of-kind facilities are the critical bottleneck for commercialization. Rather than billion-dollar mega-projects, faster deployment of scaled demonstration infrastructure is needed to de-risk a lot of the early innovations and scale them to market.

Session Summary

Ms. Veronica Breckenridge, Managing Partner at First Bight Ventures, delivered a direct critique of how the biotechnology sector approaches investment and commercialization, arguing that the central challenge is not scientific capability but the absence of reliable pathways to profitability.

Breckenridge challenged the prevailing assumption that the bioeconomy is primarily constrained by a lack of capital. Instead, she argued that capital is abundant but selective. “We are the best market for the world to invest in,” she said, “but we need to deliver the returns to get the capital to actually invest in this industry.” In her view, the sector’s underperformance in attracting sustained investment stems from weak business models rather than weak science.

Drawing on a retrospective analysis from First Bight Ventures’ “Graveyard Report” on industrial biotechnology, Breckenridge noted that “over 80% of the reasons had nothing to do with technology.” Instead, she pointed to failures in scaling, cost competitiveness, and product-market fit as the dominant causes of venture underperformance. The implication, she argued, is that improving commercialization outcomes requires re-centering attention on industrial execution rather than laboratory innovation alone.

A key theme of her remarks was the importance of targeting viable market entry points rather than large theoretical demand pools. She cautioned against “going after the TAM,” or total addressable market, early in a technology’s lifecycle. Citing lessons from Apple’s early pricing strategy and Tesla’s high-end vehicle launch, she noted that successful industrial transformations often begin with premium or niche applications that can sustain margins while manufacturing systems

mature. “Let’s make these companies profitable,” she said, arguing that early-stage bioeconomy ventures must prioritize financial sustainability over scale aspirations.

Breckenridge also stressed the importance of reshaping how the bioeconomy is communicated to policymakers, investors, and the public. She argued that abstract narratives such as carbon pricing and credits are insufficient to drive demand. Instead, she called for framing the sector in terms of tangible human outcomes, particularly health. In her view, linking bio-based innovation to health outcomes such as longevity, fertility, and chronic disease risk would better align consumer demand with investment incentives.

The final pillar of her argument centered on scaling infrastructure. Breckenridge warned that the most significant bottleneck in the sector is the lack of sufficient first-of-a-kind and pilot-scale facilities capable of bridging lab research and industrial production. Early-stage demonstration plants are more important than large-scale capital-intensive facilities, she argued. These assets are essential for de-risking technologies, validating cost structures, and enabling investor confidence.

Breckenridge concluded that accelerating the bioeconomy requires aligning incentives across science, industry, and capital markets, with a sharper focus on profitability, demand creation, and rapid deployment of scalable infrastructure. Without that alignment, she warned, even strong scientific pipelines will fail to translate into durable economic value.

Corteva Agriscience

Key Insights

- Long-cycle agricultural innovation is increasingly shaped by regulatory timelines and market volatility, and product development often spans more than a decade, with “T minus 6” years typically required after regulatory submission before a trait reaches farmers.
- Corn and soybean systems are functioning as a mature “model bioeconomy,” linking genetics, manufacturing, logistics, and end-use markets.
- Genetic gain is accelerating, driven by AI-enabled breeding and gene editing technologies.
- Data scale and AI are becoming central to agricultural R&D, with more than 20 petabytes of field trial data now used to guide breeding decisions.
- Regulatory clarity and stable trade policy are increasingly viewed as prerequisites for sustaining bioeconomy competitiveness and scaling gene-edited crops.

Session Summary

Dr. Todd Pester, Vice President for R&D Strategy at Corteva Agriscience, used corn and soybean systems as a lens through which to examine how

long-cycle innovation, regulatory frameworks, and digital technologies are reshaping global agricultural competitiveness.

Pester framed agriculture as central to addressing converging global pressures, including population growth, resource constraints, and shifting nutritional demands. “We are trying to sustain a growing population, while wrestling with climate change, evolving pests and disease pressures, increasing energy demands, and reduced resources,” he said. He added that the bioeconomy is both a productivity engine and a systems integrator for food, energy, and environmental outcomes.

Using corn and soybean systems as a reference point, Pester described what he called a “model system” of the bioeconomy, built over a century of coordinated investment in genetics, infrastructure, and policy support. The system is deeply embedded in regional economies such as Nebraska, where seed production facilities, research hubs, and Extension services connect innovation directly to farm-level decision-making. These outputs then flow into downstream value chains, including ethanol production and livestock feed markets, reinforcing what he described as a “working bioeconomy.”

Yet Pester cautioned that the system's success is also constrained by its structural rigidity. Crop innovation timelines are long, often exceeding a decade, and once regulatory submissions begin,



“The products we will be selling 10 years from now have already been predetermined. That is the reality of innovation in agriculture...We need science-based regulations, timely approvals to move technology from the lab to the field, fair and transparent trade policies, and expanded partnerships across the value chain.”

Dr. Todd Pester
Vice President

“it’s at least six years” before new traits reach commercialization. As a result, today’s product pipeline already determines what farmers will be planting ten years from now, limiting agility in responding to emerging pressures such as trade disruptions or new pest dynamics. “What we are going to be selling 10 years from now has already been predetermined,” he said.

To remain competitive, Pester argued that the agricultural sector must align scientific innovation with regulatory modernization and trade stability.

He called for “science-based regulations, timely approvals,” alongside “fair and transparent trade policies” and stronger cross-sector partnerships. Without these conditions, gene editing and other emerging technologies risk being slowed at precisely the moment when innovation velocity is increasing.

A major theme of Pester’s remarks was the acceleration of biological innovation through data and artificial intelligence. Corteva now leverages more than 20 petabytes of field trial data drawn from over a million trials, enabling predictive agronomic recommendations across millions of acres. AI systems are used to identify the top 1 percent of genetic crosses, dramatically improving breeding efficiency and reducing development cycles.

He also pointed to advances in gene editing that are reshaping trait development. In one example, Corteva has used genome editing to consolidate disease resistance traits into a single genetic locus in corn, simplifying breeding decisions and improving efficiency. “Instead of having these genes all over the genome, you can put them into a single location,” he said. Similar approaches are being extended to herbicide tolerance and insect resistance, further compressing development timelines.

Despite these advances, biological complexity remains a limiting factor, particularly in crops such as wheat, which has a genome exceeding 17 billion base pairs. AI, Pester argued, is becoming essential to interpret this complexity and translate it into deployable traits and agronomic insights.

Looking forward, Pester positioned the corn and soybean system as a template for broader bio-economy development, with potential applications extending to wheat, sorghum, canola, and even fruit, vegetable, and animal products. However, he cautioned that sustaining momentum will require continued investment in partnerships, regulatory coherence, and global market access.

Liberation Bioindustries

Key Insights

- Biomanufacturing scale-up is emerging as the critical bottleneck in U.S. bioeconomy leadership, with first-of-kind facilities struggling to reach completion despite technical readiness and commercial demand.
- U.S. innovation leadership is increasingly disconnected from manufacturing capacity, a dynamic that has already played out in semiconductors, solar, nuclear, and rare earths.
- Existing federal programs are misaligned with manufacturing realities, particularly where loan guarantees and “manufacturing readiness” frameworks (TRL 5–8 vs. TRL 9–10) blur the line between development and true commercial production.
- Global capital flows are addressing U.S. structural gaps, which are leading to offshoring of biomanufacturing capacity to regions such as India, Mexico, and China.
- A lack of “hardware-oriented” investment culture in the U.S. is accelerating industrial drift, as domestic investors remain heavily concentrated in software.



“Manufacturing and technology development are interdependent. One without the other means we are simply developing technologies and handing them to others.”

Mr. Mark Warner

Co-Founder and Chief Technology Officer

Session Summary

Mark Warner, Co-Founder and Chief Technology Officer of Liberation Bio Industries, argued that the United States is at risk of repeating a familiar cycle in which it pioneers breakthrough technologies only to lose the manufacturing base that turns innovation into durable economic and strategic advantage.

“Our first facility in Richmond, Indiana, is about 75 percent complete, but we have been slow rolling construction for two years because we cannot complete the capital stack,” Mark said. Despite secured offtake contracts, profitability projections, and a \$115 million budget, the project has struggled to attract sufficient financing. “There is no infrastructure in the United States to fund first-of-kind biomanufacturing facilities, even when the demand is there.”

The result, he argued, is a widening dependency on foreign capital and offshore production. Liberation Bioindustries has raised more than 70 percent of its funding from outside the United States, despite engaging more than 300 domestic venture and infrastructure investors. “We fund software, not hardware,” he said, describing what he sees as a structural bias in U.S. capital markets that disadvantages capital-intensive manufacturing.

Warner placed this challenge in historical context, pointing to repeated cycles of U.S. technological leadership followed by manufacturing offshoring. Semiconductor fabrication, he noted, originated and scaled in the United States before shifting to Taiwan by the 1990s, as engineers and firms relocated production. A similar trajectory followed in solar manufacturing, nuclear technologies, and rare earth processing, including the loss of domestic refining capacity at Mountain Pass in the early 1990s. “It’s déjà vu all over again,” he said, invoking Yogi Berra to describe what he views as a recurring pattern of industrial erosion.

Biotechnology is now approaching a similar inflection point. While the United States remains the global leader in biotechnology discovery and early-stage innovation, manufacturing capacity is increasingly shifting to India, China, and other regions. “The good news is we have not lost biotechnology yet. The bad news is we are heading that way and picking up speed,” he said.

A central issue, Mark argued, is the mismatch between federal policy tools and the realities of manufacturing development. Programs from entities such as the Department of Energy, USDA, and the Office of Strategic Capital, including loan guarantees, often fall short of enabling actual construction. “A conditional loan guarantee is not the same as getting money,” he said, noting that many such commitments fail to reach financial close because they are not structured to complete capital stacks for industrial facilities.

He also pointed to confusion in how “manufacturing readiness” is defined in policy frameworks. “Manufacturing is creation of a product for sale or commerce. It is not research or development,” he said, distinguishing between technology readiness levels focused on prototyping and the final stage of commercial-scale production. He cautioned that conflating these stages leads policy-makers to believe manufacturing is being funded when in practice it is not. “Without a material change in how we do business, we will continue developing technologies here and handing them to others,” Warner said.

Warner concluded by calling for a recalibration of U.S. industrial strategy that places manufacturing on equal footing with research and development, particularly for first-of-kind facilities. While acknowledging the importance of scientific discovery, he argued that innovation ecosystems cannot function without parallel investment in physical production capacity. “One without the other will not get us where we need to go.”

TECH TALK

Public Opinion and the Bioeconomy: Insights from Gallup's Global Research

Key Insights

- Global confidence in U.S. leadership is eroding amid rising multipolarity. China has recently surpassed the United States in perceived global leadership, while roughly 45% of countries now disapprove of both powers.
- Energy and environmental issues are increasingly polarized in U.S. public opinion.
- Consumer support for bio-based products exists but is highly price sensitive. Around 70% of Americans say they would choose renewable-material products if cost is equal, but willingness drops significantly when premiums are introduced.
- Manufacturing localization remains a unifying national priority. Across party lines, overwhelming majorities agree that it is important for the U.S. to manufacture essential goods domestically.

Session Summary

Gallup Principal in Global Analytics Dan Foy presented a data-rich assessment of how shifting public opinion, global sentiment, and consumer behavior intersect with U.S. competitiveness and the emerging bioeconomy. Drawing on Gallup's World Poll across more than 140 countries, and its long-running U.S. Social Series, Foy argued



“If looking for messages that resonate, that message of making it at home, and bringing manufacturing home, is going to resonate with the largest possible audience.”

Mr. Dan Foy

Principal, Global Analytics, Gallup

that the competitiveness challenge is increasingly defined not only by technological capacity, but by geopolitical perception, economic trust, and the ability to translate innovation into products that consumers will adopt at scale.

Foy opened with a sobering view of global leadership perceptions. “China has moved into first place ahead of the United States for leadership approval overall,” he noted, pointing to a broader shift toward multipolarity in which “about 45% of countries around the world...disapprove of both the U.S. and China.” The result, he argued, is a world in which traditional superpower alignment is breaking down, replaced by fragmented blocs and declining confidence in global leadership institutions. The trend is mirrored domestically, where Americans’ satisfaction with the country’s global position has declined sharply since the early 2000s, with only brief, episodic recoveries. Foy cautioned that growing partisan divergence in these perceptions complicates national cohesion: “The gap between how people view the world...is really getting wider over time.”

Turning to economic conditions, Foy highlighted a paradox in global recovery. While post-pandemic sentiment has improved significantly, especially relative to the 2008 financial crisis, the benefits have not been evenly distributed. BRICS-plus economies now report stronger perceptions of improving local economic conditions than G7 nations, including the United States. “We have the edge that we used to have over all of the world,” he said, noting that the United States had previously outperformed both peer and emerging economies on optimism measures before 2020.

Environmental and energy data further underscored the role of polarization in shaping public attitudes. Only about a third of Americans rate environmental conditions positively, and a majority believe the government is not doing enough to address environmental challenges. Foy observed

that “at no point, since we have been tracking it, have more Americans felt like the environment was getting better than getting worse,” with partisan gaps widening over time.

Energy security shows a similar pattern. While concerns about availability remain significant, Foy noted that energy is increasingly viewed through a political lens, even though “we all fill up our tank the same way.”

Foy also identified areas of convergence in consumer attitudes relevant to the bioeconomy. Survey data suggest that familiarity with renewable materials remains moderate but not deeply embedded in purchasing decisions, creating room for growth in public engagement. When cost is held constant, approximately 70 percent of Americans prefer renewable-material products. However, price sensitivity remains decisive, with behavior diverging sharply once premiums are introduced. “At the end of the day...a lot of times you’re probably going to tip over into the item that costs less,” Foy said.

Foy concluded with a more unifying signal: strong bipartisan agreement on domestic manufacturing. Overwhelming majorities across political lines believe it is important for the United States to produce essential goods domestically, suggesting that re-shoring and industrial capacity building could serve as a rare point of consensus. “If we are looking for messages that resonate,” he said, “that message of making it at home...is something that really is going to resonate with the largest possible audience.”

No Demand, No Bioeconomy: Why Consumers Hold the Key and Why They Should Care

**MODERATOR****Dr. Jonathan “Jon” McIntyre**

Founding Partner, Nodl Advisors; Distinguished Fellow, Council on Competitiveness

PANEL**Mr. Carlos A. Cabrera**

Executive Chairman, Genomatica

Dr. Lee Ellen Drechsler

Senior Vice President, Corporate R&D, The Procter & Gamble Company

Dr. Jason Thomas

CEO and Founder, The Pennycress Company

For all the investment in biomanufacturing and innovation, the bioeconomy will not reach scale without strong market demand. This conversation focused on the often-overlooked demand side—how consumers, corporate buyers, and public procurement can create the conditions for growth. Panelists discussed strategies to build trust in biobased products, align price and performance with consumer expectations, and translate scientific advances into everyday value that makes people open their wallets.

Key Insights

- Consumer demand is the gating factor for bioeconomy scale, but price and performance still dominate purchasing decisions.
- Industrial partnerships are essential to bridge the “valley of death” between lab innovation and market adoption, aligning technology, manufacturing, and market access while managing cost and supply chain risk.
- Biotechnology can unlock performance and sustainability simultaneously in consumer products when integrated into existing product performance systems.
- New feedstocks and crops are creating flexible supply chains that connect agriculture to energy and aviation markets.
- Premium consumer markets are currently the most reliable entry point for bio-based materials, but mass adoption depends on cost parity and clear functional advantage.

Session Summary

Dr. Jonathan McIntyre, Founding Partner of Nodl Advisors and Distinguished Fellow of the Council on Competitiveness, opened with a framing argument that “the U.S. economy is a consum-



“Whatever we innovate on, whatever we sell, has to be significantly better than any other way you could get that job done.”

Dr. Lee Ellen Drechsler

Senior Vice President, Corporate R&D, Procter & Gamble

er-driven economy,” warning that despite extensive discussion of technology and supply chains, “we haven’t heard the term consumer all day.”

Illustrating the stakes, McIntyre contrasted two early bio-based technologies. Monsanto’s Nature-Mark genetically modified potato failed commercially after consumer backlash over engineered proteins in food, while botulinum toxin, commercialized as Botox, became a multibillion-dollar market, because it aligned with consumer demand for aesthetic improvement. As he put it, “The science of consumers is way harder than the science of biotechnology.”

Dr. Lee Ellen Drechsler, Senior Vice President of Corporate R&D at The Procter & Gamble Company, grounded her remarks in the operating logic of one of the world’s largest consumer product companies. She described P&G’s decision framework as a “trifecta” of superior performance, sustainability, and value. “Whatever we sell has to be



“If your supply chain does not give you a low-cost product and your demand is not willing to pay for it, you do not have a business.”

Mr. Carlos A. Cabrera

Executive Chairman, Genomatica

significantly better than any other way you could get that job done,” she said, noting that sustainability alone is insufficient without functional excellence and consistent availability. Drechsler pointed to enzyme-enhanced detergents such as Tide, which enable effective cleaning in cold water, as an example where bioengineering has simultaneously improved performance and reduced environmental impact. However, she cautioned that “people still will not pay more to get the bio version.”

Mr. Carlos Cabrera, Executive Chairman of Genomatica, reinforced the primacy of economics over aspiration in scaling bio-based production. “At the end of the day, it’s a question of supply and demand,” he said, arguing that sustainability gains must be matched with equal or lower cost relative to petrochemical alternatives. Cabrera described Genomatica’s joint venture model as



“Cover crops are a known technology for sustainable agriculture, but farmers need a return, not just a promise.”

Dr. Jason Thomas

CEO and Founder, The Pennycress Company

a way to overcome scale-up barriers and align incentives across the value chain. Partnerships with Unilever, Kao Corporation, and L’Oréal were presented as examples of how technology providers, manufacturers, and consumer brands can jointly reduce risk while accelerating commercialization. “If your supply chain does not give you a low-cost product and your demand is not willing to pay for it, you do not have a business,” he said.

Dr. Jason Thomas, CEO and Founder of The Pennycress Company, brought an agricultural systems perspective, describing how winter oilseed crops such as pennycress can be integrated into Midwest rotations to produce feedstock for sustainable aviation fuel while improving soil health. “We are trying to decarbonize industries that are difficult to decarbonize,” he said, pointing to aviation as a sector where battery-electric solutions remain limited. Pennycress, he noted, can be planted between corn and soybean cycles, providing both a revenue stream and agronomic



“The science of consumers is way harder than the science of biotechnology.”

Dr. Jonathan “Jon” McIntyre

Founding Partner, Nodl Advisors; Distinguished Fellow,
Council on Competitiveness

benefits such as reduced erosion and improved biodiversity. Thomas also pointed to early-stage academic investment of roughly \$100 million in the crop category, signaling growing institutional validation.

The group concluded that consumer adoption is not driven by the “bio” label itself, but by tangible benefits in cost, performance, and trust. Premium markets may lead early adoption, but broad bio-economy scale will require integration into everyday product expectations and existing industrial systems.

Lunch and Leadership Perspective



“The winners of the 21st century will not be nations with the most white papers. They will be the nations with unbreakable supply chains, ferocious creativity, and total resilience.”

The Hon. Neal Robbins

Deputy Under Secretary, Rural Development,
U.S. Department of Agriculture

Key Insights

- Rural development is becoming central to bioeconomy scale-up through financing, infrastructure, and demand creation. The USDA Rural Development portfolio spans 80+ loan, grant, and technical assistance programs supporting housing, utilities, broadband, and business development.
- Manufacturing capacity and supply chain control are framed as national competitiveness imperatives. Nations that cannot reliably feed, fuel, and supply themselves will fall behind.
- Bioeconomy strategy is increasingly tied to rural revitalization and workforce activation.
- Policy emphasis is shifting from research outputs to deployment and commercialization.

Session Summary

The Hon. Neal Robbins, Deputy Under Secretary for Rural Development at the United States Department of Agriculture, delivered a luncheon address framing rural America as a central engine of U.S. competitiveness and a foundational platform for the emerging bioeconomy. His remarks connected federal rural development programs, industrial supply chains, and agri-

cultural production into a unified argument for accelerating domestic manufacturing and bio-based industry growth.

Deputy Under Secretary Robbins opened by grounding his perspective in the character of rural communities, noting that “rural America has all kinds of unique events, places, products, and food,” and warning against approaches that would dilute local identity in pursuit of uniform economic development. He described rural America as “a tapestry that represents the history, imagination, and the grit of our nation,” arguing that its distinctiveness should be preserved even as it becomes more deeply integrated into national innovation strategies.

He pointed to USDA Rural Development as a critical but often underrecognized lever of economic transformation. The agency manages more than 80 programs spanning housing, infrastructure, utilities, broadband, and business development. In Nebraska alone, he noted, Rural Development has deployed approximately \$4 billion over the past two decades, including substantial investments in infrastructure and enterprise development. More recently, he cited a 55 percent increase in business projects in Nebraska year-over-year, framing it as evidence of accelerating rural investment momentum.

Deputy Under Secretary Robbins tied these investments directly to national competitiveness, arguing that supply chain fragility in sectors such as fertilizers, energy inputs, and critical minerals poses strategic risks. “A nation that cannot reliably feed, fuel, and supply itself cannot stay great,” positioning domestic production capacity as a prerequisite for long-term economic strength. He added that the winners of the 21st century will be defined by “unbreakable supply chains, ferocious creativity, and total resilience.”

Throughout the address, the Deputy Under Secretary returned to the role of government in enabling, rather than constraining, market activity. While acknowledging historical concerns about regulatory burdens, he argued that current rural development efforts are focused on “cutting the red tape that turns ideas into free market, bio-based businesses, processing plants, precision ag tech, and thriving rural communities.” He positioned this approach as “durability, not dependency”—long-term economic resilience over short-term intervention.

He concluded by situating the bioeconomy within a broader geopolitical context, stating that America is reasserting leadership in global supply chains and innovation ecosystems. “The future is bright,” Deputy Under Secretary Robbins said, “and the bioeconomy is ours for the taking.”

A Global Perspective on Leading the Bioeconomy Race

**MODERATOR****Mr. Gregory Jaffe**

President, Jaffe Policy Consulting and Ambassador, World Bioeconomy Association

PANEL**Mr. Rob Hanson**

Co-Founder and CEO, Monolith Materials

Mr. Joe Sanders

Executive Director, Daugherty Water for Food Global Institute, University of Nebraska

Mr. Gustavo Sergi

CEO, Sustainea

This session explored global trends, innovations, and strategies shaping the bioeconomy, highlighting lessons for U.S. leadership and Nebraska's role in the evolving global ecosystem.

Key Insights

- The global bioeconomy is rapidly institutionalizing through multilateral frameworks and national strategies, with momentum visible across the G20, COP 30 in Brazil, FAO working groups, and initiatives such as Brazil's Global Bioeconomy Challenge focused on metrics, finance, markets, and social dimensions.
- The United States retains major structural advantages but faces a scale-up gap, particularly in translating innovation into industrial deployment.
- Subnational execution capacity is a decisive competitive factor, with Nebraska and other Midwest states emerging as case studies in permitting speed, infrastructure alignment, and industry partnership.
- Resource constraints, especially water, will define long-term competitiveness in bio-based industries.
- Market formation and demand signals remain the missing link in U.S. bioeconomy scaling.

Session Summary

Moderator Gregory Jaffe, President of Jaffe Policy Consulting and Ambassador to the World Bioeconomy Association, described a world in which “the train has left the station,” but asked which countries will lead its direction and capture its value.

Jaffe pointed to a surge in global institutional activity in advancing the bioeconomy, including the G20's first-ever bioeconomy track in Brazil. He also highlighted the creation of Brazil's Global Bio-



"The United States is still the best country in the world to have an idea. It is the best country in the world to turn that idea into a company and to grow that company. It is not necessarily the best country in the world to build, to have a new process, put steel in the ground, and get that plant up and running."

Mr. Rob Hanson

Co-Founder and CEO, Monolith Materials

economy Challenge, structured around metrics, finance, markets, and social inclusion, alongside parallel efforts within the FAO and the World Economic Forum. These developments, he argued, signal a shift towards more coordinated economic statecraft.

Against this backdrop, Mr. Rob Hanson, Co-founder and CEO of Monolith Materials, focused on the United States' strengths in innovation and its persistent challenges in commercialization. Reflecting on Monolith's scale-up journey—including the construction of a Nebraska



"Water is the enabling system behind the bioeconomy. The bioeconomy is water intensive, and nations that produce products with the lowest cost per output will win on price and sustainability."

Mr. Joe Sanders

Executive Director, Daugherty Water for Food Global Institute

facility following a 600-fold increase in technology scale—he argued that while the United States remains an unparalleled environment for generating new ideas, it often struggles to translate innovation into large-scale industrial deployment. Hanson highlighted Nebraska as a notable exception, citing streamlined permitting processes and strong infrastructure alignment as key advantages. He contended that success in the bioeconomy will hinge less on invention than on the ability to achieve rapid scale, pointing to Nebraska's execution-oriented approach as evidence that state-level leadership and decentralized decision-making can accelerate industrial development.



"The U.S. is very competitive on biomass and agriculture. It surprised us how the cost of production of our product could be better here than anywhere else."

Mr. Gustavo Sergi

CEO, Sustainea

Mr. Joe Sanders, Executive Director of the Daugherty Water for Food Global Institute at the University of Nebraska, shifted attention to resource systems, particularly water. Sanders argued that global competition in the bioeconomy is increasingly defined by integrated national systems linking water, agriculture, energy, and policy. "Water, of course, is the enabling system behind the bioeconomy," he said, warning that countries that fail to manage water efficiently risk becoming raw-material exporters while importing higher-value bio-based products. He added that leadership in water productivity and accounting could become a defining advantage in setting global standards.

From an industrial commercialization perspective, Mr. Gustavo Sergi, CEO of Sustainea, focused on market formation as the central constraint. The

United States offers strong feedstock availability, logistics, and business infrastructure, but Sergi argued other regions have moved faster in creating demand signals for bio-based products. “No one is paying for premiums,” he said, explaining that without policy or regulatory mechanisms to create early markets, value chains struggle to materialize. Sergi contrasted U.S. advantages in agricultural productivity and scale with more coordinated demand-side policies in Brazil, Europe, and Japan, where long-term incentives have helped build early bio-based markets.

Jaffe closed the session by asking each panelist to identify a single action to advance U.S. leadership. The responses converged on communication, alignment, and visibility: build stronger narratives about success, strengthen collaboration between industry and research institutions, and ensure policymakers in Washington hear grounded, specific examples of what is working. In synthesis, the panel portrayed the bioeconomy as an emerging global system already in motion, with competitiveness increasingly determined by a country’s ability to translate resources and innovation into scaled, market-driven industrial production.



"The bioeconomy train has left the station. It is gaining speed and momentum. The question is whether the United States is in the first car, the second car, or the third car."

Mr. Gregory Jaffe

President, Jaffe Policy Consulting; Ambassador, World Bioeconomy Association

How Converging Next-Generation Technologies are Ushering in a New Era of Bio Innovation

**MODERATOR****Dr. Santosh Pitla**

Professor of Biological Systems Engineering, University of Nebraska-Lincoln, and Co-Director of the AI Institute, University of Nebraska System

PANEL**Dr. Sarah Glaven**

Visiting Fellow, Princeton University's Andlinger Center, and former Principal Assistant Director for Biotechnology and Biomanufacturing, White House Office of Science and Technology Policy

Mr. Edward Shenderovich

CEO, Roebbing

Dr. Mark Stone

Professor of Biological Systems Engineering and Director of the PRAIRIE Initiative, College of Engineering, University of Nebraska-Lincoln

Mr. Tom Kent

President and Chief Executive Officer, Nebraska Public Power District

Artificial intelligence is transforming the bioeconomy and driving breakthroughs in personalized medicine, transportation, sustainable agriculture, climate solutions, and more. This panel brought together leaders from industry, academia, and government to explore how AI is accelerating innovation and shaping the future of the bioeconomy.

Key Insights

- Converging technologies are reshaping the bioeconomy workflow now.
- Infrastructure constraints, particularly energy, workforce, and supply chains, are emerging as binding limits to the bioeconomy.
- Biology and manufacturing integration remain underdeveloped relative to scientific potential, and many bio-based materials still lack the underlying scientific breakthroughs needed for scalable, cost-competitive production.
- AI is increasingly viewed as “knowledge-moving” infrastructure rather than just a tool.

Session Summary

Dr. Sarah Glaven, Visiting Fellow at Princeton University’s Andlinger Center and former Principal Assistant Director for Biotechnology and Biomanufacturing at the White House Office of Science and Technology Policy, described the current moment as one in which AI is already deeply embedded in biological research, even if it is not always labeled as such. “We have been using AI for a very long time, we just did not call it AI,” she said, pointing to systems biology, genomics, and microbial ecology as longstanding examples of computational biology.

Glaven argued that near-term gains are likely to come less from breakthroughs in understanding biology and more from applying existing tools to



“In the next three to five years, what we are going to see in research are these tools being implemented to accelerate the mining of data that we currently have—whether that be genomics data that has been structured and cataloged in a way that’s useful to use the types of generative models that we’re seeing come online now, or simply students doing data analysis on systems that have collected a lot of data.”

Dr. Sarah Glaven

Visiting Fellow at Princeton University’s Andlinger Center and former Principal Assistant Director for Biotechnology and Biomanufacturing, White House Office of Science and Technology Policy

unlock value in large, underutilized datasets. She cited university researchers already using public utility and environmental data to inform energy and climate-related studies. At the policy level,



“That process of capital project development is really broken...it takes a very long time because what we generally think about building out manufacturing is just hiring lots of consultants, and then there’s a lot of back and forth, months and months of back and forth.”

Mr. Edward Shenderovich
CEO, Roebling

she noted that early federal bioeconomy strategies did not fully account for the emergence of generative AI, leaving “a wide open space” for updated governance frameworks that encourage responsible deployment while managing biosafety and biosecurity risks.

Mr. Edward Shenderovich, CEO of Roebling, took a more aggressive view of AI-driven transformation. He argued that biological and chemical systems, combined with advanced computing, will increasingly be designed and operated by machines rather than humans. “When humans



“I’ve been thinking more and more lately about AI tools as a new form of infrastructure. Instead of moving products around, we’re moving knowledge around—and I think that really unlocks a lot of new potential for us.”

Dr. Mark Stone
Professor of Biological Systems Engineering and Director of the PRAIRIE Initiative, College of Engineering, University of Nebraska-Lincoln

look at DNA, they do not see anything. When machines look at DNA, they can see patterns,” he said. He pointed to rapid automation of laboratory processes such as pipetting and experimental design, as well as emerging “world models” that simulate biological and physical systems at scale.

However, Shenderovich emphasized that the primary constraint is not scientific discovery but the inability to scale production. “Capital project development is really broken,” he said, describing fragmented engineering and financing processes that slow the construction of biomanufacturing facilities. He suggested that even in an optimis-



“Electricity is kind of the most fundamental of all critical infrastructure—pretty much everything else depends on it... we’re at the front end as a nation and as a state in building out energy infrastructure like we haven’t seen since post-World War II.”

Mr. Tom Kent

President and Chief Executive Officer, Nebraska Public Power District

tic scenario, the United States will likely see only incremental increases in large-scale bioindustrial deployment over the next three to five years unless systemic barriers are addressed.

Dr. Mark Stone, Professor of Biological Systems Engineering and Director of the PRAIRIE Initiative at the University of Nebraska–Lincoln, framed AI as a new form of infrastructure analogous to roads or electricity. “This became a shared infrastructure, and instead of moving products around, we



“When you have these platform technologies like AI, advanced computing, energy systems, biology—when all these are converging together...what magic is going to happen?”

Dr. Santosh Pitla

Professor of Biological Systems Engineering, University of Nebraska-Lincoln, and Co-Director of the AI Institute, University of Nebraska System

are moving knowledge around,” he said. Stone highlighted applications in precision agriculture, regenerative farming, and rural automation, including robotics-enabled systems that could offset labor shortages in agriculture. He described AI as both “awesome and awful,” capturing its transformative potential and disruptive implications for workforce structures and education.

From the energy sector perspective, Mr. Tom Kent, President and CEO of Nebraska Public Power District, underscored the physical constraints that underpin digital and biological innovation. He pointed to supply chain delays of four to

five years for major electrical equipment and rising competition for skilled labor from AI and data center industries. “We are in a marketplace with a shrinking workforce demographic,” Kent said, adding that utilities are increasingly turning to AI to improve grid planning, reliability, and system optimization. NPPD’s \$6 billion capital expansion plan, he noted, is aimed at increasing generating capacity by roughly 40 percent to meet rising demand.

Across the discussion, panelists converged on a central theme: the U.S. has strong scientific capacity and resource advantages, but its ability to translate innovation into scalable production systems remains uneven. While AI is accelerating discovery and optimization, the transition from laboratory success to industrial deployment continues to depend on workforce development, infrastructure investment, and streamlined commercialization pathways.

The panel closed with a shared recognition that the bioeconomy is no longer a future construct but an emerging industrial system already in motion. Its trajectory, they suggested, will be shaped less by individual breakthroughs than by whether the United States can integrate science, capital, infrastructure, and policy into a coherent scale-up ecosystem.

Reflection on the Conversation—Shaping the Future of the U.S. Bioeconomy

In this closing conversation, the co-hosts from the Nebraska Competitiveness Conversation will reflect on insights from the day's discussions and explore the emerging opportunities for Nebraska and the Council's bioeconomy initiatives. The session will highlight priorities for innovation, collaboration, and investment, setting the stage for the next phase of advancing Nebraska's innovation economy and the U.S. bioeconomy.

Key Insights

- Global competition is accelerating, with China, Europe, Brazil, and India all advancing coordinated bioeconomy strategies.
- The U.S. bioeconomy opportunity is increasingly framed as a national competitiveness and national security imperative, not just an industrial transition.
- Nebraska is positioned as a core innovation and production hub, with advantages in agriculture, infrastructure, and research collaboration.
- A major constraint remains the scale-up gap between R&D and commercial manufacturing, requiring faster, de-risked deployment pathways.

Dr. Jeffrey P. Gold

President, University of Nebraska System

The Hon. Deborah L. Wince-Smith

President and CEO, Council on Competitiveness

- The future bioeconomy depends on system integration across the full value chain—from discovery to manufacturing to markets.

Session Summary

The closing session of the Nebraska Competitiveness Conversation brought together Dr. Jeffrey P. Gold, President of the University of Nebraska System, and the Hon. Deborah L. Wince-Smith, President and CEO of the Council on Competitiveness, to reflect on two days of discussions centered on advancing the U.S. bioeconomy and Nebraska's emerging role at its core.

Ms. Wince-Smith opened with a note of thanks for the University of Nebraska System's leadership, and ecosystem partners, for shaping a "tremendous" and highly substantive Competitiveness Conversation that made the case for the urgency and scale of opportunity in the bioeconomy transition, and the state of Nebraska within it.



“The secret sauce will be the individuals in this room. And as each of you leave here today, keep asking the question: are you satisfied? And keep answering, no, or we’re never going to get there.”

Dr. Jeffrey P. Gold

President, University of Nebraska System

“The United States can and must lead in the global bioeconomy,” with Nebraska serving as “the critical engine” of that leadership, said Ms. Wince-Smith. She stressed that the bioeconomy transition is not only an economic transformation, but also a matter of national security, resilience, and supply chain stability.

She also focused her remarks on the importance of integration across the innovation lifecycle, arguing that the United States must “move as a system, integrate the entire value chain from R&D to manufacturing products for profit with customers.”

Dr. Gold echoed the importance of systems thinking and long-term competitiveness, drawing on themes raised throughout the convening. He high-



“We know that the United States can and must lead in the global bioeconomy. Nebraska is at the center, the critical engine of that leadership—but turning that leadership into reality requires knitting together the entire ecosystem, from R&D to manufacturing products for profit, with customers.”

The Hon. Deborah L. Wince-Smith

President and CEO, Council on Competitiveness

lighted the concept of “speed to scale,” noting that regulatory timelines, commercialization pathways, and supply chain readiness are decisive factors in determining whether innovation translates into real-world impact in the United States.

At the same time, Dr. Gold identified investment confidence as a primary factor for enabling industrial growth, observing that “nobody is going to invest in the billions of dollars it takes to build

manufacturing in this country if they do not think this is a sustainable market in which to commercialize that intellectual property.”

Dr. Gold also reflected on the importance of identifying breakthrough opportunities, encouraging participants to rethink innovation archetypes by considering “what a unicorn is as a unique human being, as a unique corporation, as a unique aspect of public or private innovation.” He challenged stakeholders to look beyond incremental gains toward transformational innovation ecosystems capable of reshaping regions and industries.

Together, the two leaders framed the bioeconomy as a converging system of agriculture, biotechnology, energy, advanced computing, and manufacturing—one that will define the next industrial era and require coordinated action across sectors to fully realize its potential.



“What is special about Nebraska is that people show up. We have a culture of collaboration, a willingness to roll up our sleeves, and a shared belief that when we bring the right people together, big things can happen. This conversation is a great example of that Nebraska spirit—and it was made possible by an incredible ecosystem of partners who believe in the future we can build together.”

Dr. Chris Kratochvil

Vice President for External Relations
University of Nebraska System

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While the players may have changed since its founding in 1986, the mission remains as vital as ever—to enhance U.S. productivity and raise the standard of living for all Americans.

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