



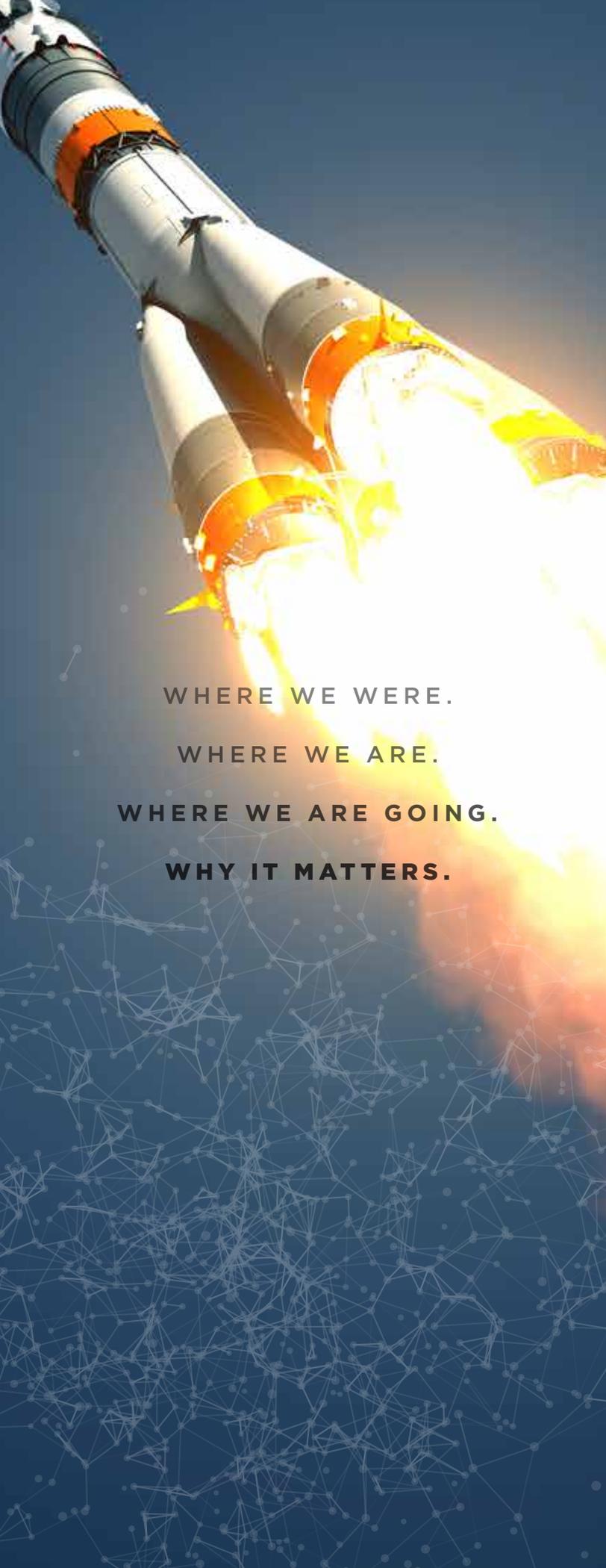
Northeastern University  
*Center for Research Innovation*

[northeastern.edu/cri](http://northeastern.edu/cri)

# IMPACT

MMXVI





**WHERE WE WERE.**

**WHERE WE ARE.**

**WHERE WE ARE GOING.**

**WHY IT MATTERS.**

## **A QUESTION AFTER 5 YEARS...**

2016 marks five years since the Northeastern University Center for Research Innovation (CRI) was launched with a generous gift from Richard D'Amore, DMSB'76. As we mark this milestone and reflect on the journey, we are filled with excitement as we set our sights on the next phase of impact that is the future of Northeastern's vibrant research ecosystem.

The CRI's mission is to address societal needs by leveraging commercial vehicles to deploy the university's use-inspired research. In the fulfillment of this mission, we support the university's leadership role as it continues to develop solutions to the most pressing global challenges of our time.

Reflecting on the CRI's five years of dedication and service to Northeastern, the fulfillment of our mission and our impact are evident. It is fitting to frame the CRI's fifth-year annual report with a review of Where We Were, Where We Are, Where We Are Going, and Why It Matters.

As part of the Northeastern ecosystem, our vision for the future continues to evolve as the university builds on the momentum of its unprecedented growth trajectory. For those of you who know Northeastern, it will come as no surprise to see the successes of the past five years, and to hear that we at the CRI believe we are just getting started!

Successful innovation requires iteration, critical analysis of the past, objective understanding of the present, and courageous visioning of the future. Northeastern embodies this mindset across all corners of its community, and the CRI is no exception. We continue to build programs, tools, and services to accelerate connections, access resources, and garner visibility for our innovators and entrepreneurs. Our commitment is to ensure that the CRI is an asset that continues to serve Northeastern's community as its research programs accelerate in scope and scale.

As a resource here to serve, we hope you find this five-year report a helpful reminder of the university's commitment to use-inspired research. The CRI's commitment is to our internal researchers and entrepreneurs, and our industry partners, investors and talent. You are the fabric that bring solutions to life. Without you, there is no use-inspired.

So, I close with a simple question: How can we help?

A handwritten signature in white ink, appearing to read "Tracey Dodenhoff".

Tracey Dodenhoff, Founding Director  
Center for Research Innovation  
Northeastern University

## PATENTING PROCESS: DISCLOSURES, FILINGS, ISSUANCES

### WHERE WE ARE GOING

With the mission of addressing society's most challenging problems, prosecuting discoveries enables Northeastern's most promising assets to be primed for investment and commercial launch.

A patent committee integrating academic rigor and industry intelligence ensures the highest quality innovations are selected for intellectual property protection.

### WHY IT MATTERS

Northeastern's use-inspired research is dedicated to addressing the most pressing societal needs. The vibrancy of the university's disclosure rates and the quality of the patents are outcomes of the fulfillment of this needs-driven research imperative.

Quality patent protection accelerates translation of enriching technologies from the lab to society, enabling the fulfillment of the university's research mission.

### ISSUED PATENTS

#### Patent No. 9,365,946

Damascene Template for Directed Assembly and Transfer of Nanoelements

#### Patent No. 9,249,382

Devices and Methods for the Selective Isolation of Microorganisms

#### Patent No. 9,145,618

High Rate Electric Field Driven Nanoelement Assembly on an Insulated Surface

#### Patent No. 9,198,821

Lower Extremity Exoskeleton for Gait Retraining

#### Patent No. 9,187,329

Microparticle Organization

#### Patent No. 9,173,840

Multifunctional Self-Assembling Polymeric Nanosystems

#### Patent No. 9,078,294

Nanoheater Elements, Systems, and Methods of Use Thereof

#### Patent No. 9,129,969

Nanoscale Interconnects Fabricated by Electrical Field Directed Assembly of Nanoelements

#### Patent No. 9,377,528

Roaming Mobile Sensor Platform Collecting Geo-Referenced Data and Creating Thematic Maps

#### Patent No. 9,244,035

Saliva Glucose Monitoring System

#### Patent No. 9,117,601

System and Method for Integrating a Single Nanowire into a Nanocircuit

#### Patent No. 9,363,991

System, Methods, and Devices for Frozen Sample Distribution

#### Patent No. 9,142,870

Voltage Tuning of Microwave Magnetic Devices Using Magnetolectric Transducers

## INVENTION DISCLOSURES

2011 | 57 2016 | 96

+  
**68%**  
INCREASE

## PATENT APPLICATIONS FILED

2011 | 78 2016 | 214

+  
**173%**  
INCREASE

## QUALITY PATENTS ISSUED

2011 | 7 2016 | 13

+  
**86%**  
INCREASE

## INDUSTRY ENGAGEMENT

### WHERE WE WERE

**2013:** Hosted 10 companies, revenues of \$300 billion, R&D budgets of \$10 billion

### WHERE WE ARE

**2016:** 25 multinationals hosted, more than \$600 billion in revenue, \$40 billion in R&D

CRI expert insight brought to:

- Judging roles for organizations such as the New Technology Venture Accelerator
- Northeastern inventors preparing for MTTC grant meetings
- Advisory Board Roles:
  - Northeastern's Center for High-rate Nanomanufacturing
  - Massachusetts Medical Device Industry Council
- Elite assembly of North African university presidents

#### Conference Attendance

Front End of Innovation, MassBio Partnering, MATTO, Swissnex, AUTM

### WHERE WE ARE GOING

The university continues to expand and deepen its relationship with industry across various dimensions, including developmental research, licensing, cooperative education, executive education, co-located labs and philanthropic initiatives.

The CRI acts as a concierge to facilitate this engagement, seeking to support long-term relationships between industry and the university for mutual value and benefit.

### WHY IT MATTERS

Long-term relationships are where ground-breaking innovation takes root and transforms the world. Northeastern's commitment to deep and sustained relationships with industry is woven into the fabric of the university, and will continue to be one of our richest assets.

## HOSTED INDUSTRY SPOTLIGHT

DuPont, Merck, Mitsubishi Heavy Industries, OvaScience, Roche, Sanofi

**\$600b**  
2016 REVENUE ●

**\$300b**  
2013 REVENUE ●

REVENUE  
VALUE OF  
HOSTED  
COMPANIES

**\$40b**  
2016 R&D ●

**\$10b**  
2013 R&D ●

## LEADING THE FIELD

### WHERE WE WERE

**2011:** Outmoded technology transfer reimagined and the Center for Research Innovation unveiled

### WHERE WE ARE

**2016:** Stimulating innovation and conveying expertise

- Ranked sixth most innovative university in the nation by U.S. News & World Report
- Listed among the top 100 universities worldwide for U.S. patents in 2016
- Launched targeted educational webinars including: "Navigating FDA's Regulatory Framework for Medical Products"
- Awarded speaking engagements at highly regarded innovation conferences including:
  - ISPIM Innovation Conference
  - ISS R&D Conference
  - University-Industry Interaction Conference
  - Front End of Innovation

### WHERE WE ARE GOING

As a champion of entrepreneurial innovation, the CRI continues to launch groundbreaking approaches to empower new entrepreneurs, forge connections between ventures and industry, and contribute to the overall innovation and entrepreneurship ecosystem at Northeastern with university-wide assets such as the Research, Innovation and Scholarship Expo, VentureCrowd, funding programs such as Venture Catalyst and innovation commercialization programs such as Tech2Venture.

The CRI continues to develop new programs, tools, and relationships to support the ventures and innovators that are the catalysts for growth at Northeastern.

### WHY IT MATTERS

The Northeastern ecosystem is rich with opportunities; the CRI connects the people and the resources that are the pulse of this ecosystem.

Northeastern, industry, and government converge through "Navigating FDA's Regulatory Framework" webinar and seminar and the regulatory expertise of Jeremiah Kelly, Esq., attorney for the U.S. Army.



## AGREEMENTS

### WHERE WE WERE

**2011:** Transactional Thinking  
2 License & Option Agreements Executed

### WHERE WE ARE

**2016:** Relational Mindset  
16 License & Option Agreements Realized

### WHERE WE ARE GOING

Swift commercialization of technologies depends upon a number of factors, e.g., understanding industry needs, real-time knowledge of university capabilities and innovations, and an agile licensing process.

The CRI is expanding its process improvement protocol to include Sponsored Research Agreements. This evolution will ensure mutually favorable terms, presenting tailored pathways for early stage technologies to realize commercial viability.

### WHY IT MATTERS

Through agile transactions, Northeastern's innovations are transformed into solutions.

The university's commitment to use-inspired research is fulfilled in part when innovations are deployed for positive societal impact. These successes continue to support the continuation of innovation at Northeastern, contributing to our ongoing momentum of pioneering use-inspired research programs.

## LICENSEE SPOTLIGHT

Unleashing the limitless capacity of nanotechnology is the mission of Vexti Corporation, one of Northeastern's 2016 licensees. Vexti intends to utilize Northeastern technology to protect patients from infection by eliminating bacteria from surgical devices and shortening recuperation through growth promoting, nano-coated implants.

## LICENSE & OPTION AGREEMENTS

2011 | 2    2016 | 16

7000%  
INCREASE

16

2

## ENTREPRENEURIAL CULTURE

### WHERE WE WERE

2011: 1 University Tech Spin Out

### WHERE WE ARE

2016: 10 University Tech Spin Outs

- BioAnalytics
- BioNet Sonar
- Empirical Support Systems
- Flaskworks
- Giaran
- Keyghobad
- MesoGlue
- NanoFoundry
- PPS
- RisQ

### WHERE WE ARE GOING

From founding to licensing, business strategy to branding, first sale to venture funding, the CRI continues to expand its resources and programs to propel university spinouts to scalability.

With its portfolio of tools, venture investors, industry mentors, and Northeastern entrepreneurial student organizations, the CRI continues to leverage its experience and connections to scale the convergence of venture resources in fulfillment of its service mission.

### WHY IT MATTERS

Entrepreneurship is a natural extension of Northeastern's culture of use-inspired research and provides expanded opportunity for faculty, students, and alumni to fulfill visionary aspirations.

The ventures also play an important role in Northeastern's relationships with industry partners; as pioneers, these ventures can mitigate the risk inherent in earlier stage technologies, creating a synergistic dynamic between nascent ventures and established companies with global reach.

### SPIN OUT SPOTLIGHT

MesoGlue, the transformative game-changer of soldering and gluing.

Processes like electronics manufacturing and pipefitting and common, everyday gluing — changed forever.

What used to require expensive equipment, extreme temperatures, and complicated steps, upon steps, upon steps, has now been reduced to room temperature, straightforward application.

*TechCrunch* calls MesoGlue "an amazing development," "a boon for high-performance computing folks," and "a really cool technology that may change the way we make electronics."

2016

10  
SPIN OUTS

900%  
INCREASE

1

2011

SPIN OUT

## REVENUE

### WHERE WE WERE

2007-2011: \$2,220,000 in Licensing Revenue

### WHERE WE ARE

2012-2016: \$9,421,463 in Licensing Revenue & Major Gifts\*

### WHERE WE ARE GOING

The trend toward increasing invention disclosures and quality patents combined with agile industry engagement support the next wave of investment to integrate Sponsored Research engagements and expand technology spinout services. These strategic investments are aligned with the CRI's vision for revenue acceleration and growth.

### WHY IT MATTERS

While generating revenue from nascent technologies requires out-of-the-box business strategies, it also requires a long-term vision and patience for return-on-investment from the university. The university's vision for supporting its use-inspired research mission is manifested in part through its support of the CRI.

There is no-one-size-fits-all approach so the CRI continues to refine and optimize the path to sustainability through an iterative process.

Like a venture, the CRI has demonstrated the heartbeat of a business, and is reinvesting assets in those areas that have shown the most return. Long-term growth in revenue is one of many measures of success for the CRI.

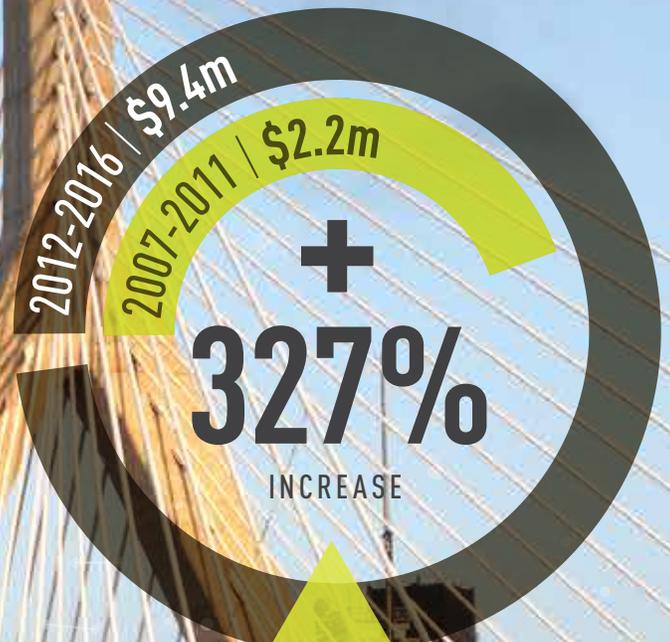
\*\$7,126,463 License Revenue  
\$2,295,000 - Major Gifts

## LICENSING REVENUE

2007-2011 | \$2.2m

## LICENSING REVENUE AND MAJOR GIFTS

2012-2016 | \$9.4m



## HITTING YOUR TARGET: PITCH TRAINING

*Hitting your Target:* Northeastern's premier pitch training event instructs students and faculty in the craft of articulating value

### WHERE WE WERE

**2013:** The inception of *Hitting your Target*

### WHERE WE ARE

Partnering with professional pitch instructor Stuart Paap, the CRI hosted a not-to-be-missed event instilling confidence and competence in Northeastern attendees.

### WHERE WE ARE GOING

The CRI is committed to deploying programs that are university-wide assets. Therefore, the CRI is forging partnerships with Northeastern departments such as Cooperative Education and Career Development and student-led organizations, like IDEA to extend the reach of this foundational skill-building event.

### WHY IT MATTERS

The ability to convey the value of one's research, enterprise, and experience simply and concisely is priceless.

"The pitch event was fantastic. I can't imagine now what my presentation would be like without having attended. These emphatic, deliberate reminders of the process of elevating quality are invaluable, really."

**-David Varon, graduate student, College of Science**



OVER  
500

# RISE: RESEARCH, INNOVATION AND SCHOLARSHIP EXPO

## WHERE WE WERE

### 2011 Research and Scholarship Expo

- 312 Research Presentations
- 18 Northeastern Judges
- \$3,500 in Gift Certificate Awards

## WHERE WE ARE

### RISE: 2016

- 440 Research Presentations
- 108 Industry Judges
- 2,000+ Attendees
- \$9,000 in Cash Prize Awards
- RISE Website and Judging Platform
- Tailored Pitch Training
- Video Pitching and Virtual Judging
- Distinguished Awards Ceremony
- Notable Publicity and Brand Awareness

## WHERE WE ARE GOING

RISE:2017 is the sixth year of this pivotal event. This year, the vision manifests in expanded corporate presence, as well as an emphasis on relationship engagement. Through the event as well as through its virtual platform, RISE:2017 promises to be the next generation of an event that is already the largest university research expo of its kind.

## WHY IT MATTERS

RISE is a leading edge showcase of university innovation, and rivals even the best industry showcase events. This is because of the emphasis on forging connections between the university and industry; it is these connections that are the fabric of Northeastern's innovation and entrepreneurship ecosystem. RISE is a highly visible, scalable platform for continuing the expansion of critical relationships and forging new connections.

Engendering opportunity for faculty, students, entrepreneurs, venture capitalists, R&D teams, and Northeastern initiatives - this is RISE.

# RISE:2016

RESEARCH, INNOVATION AND SCHOLARSHIP EXPO

**JUDGES**  
2011 | 18    2016 | 108

+  
**500%**  
INCREASE

**PRESENTATIONS**  
2011 | 312    2016 | 440

+  
**41%**  
INCREASE

## MEDIA PRESENCE

### WHERE WE WERE

**2011:** Meticulously crafted and announced the CRI brand

### WHERE WE ARE

**2016:** Increased brand awareness

- Selected as one of Boston's 50 top innovators
- Launched an e-newsletter with readership exceeding 2,500
- Multiplying media exposure: Facebook, Twitter, Instagram

### WHERE WE ARE GOING

Taking media presence to a whole new level, the CRI is enacting a multifaceted marketing strategy to showcase innovations, ventures, and industry engagements, including:

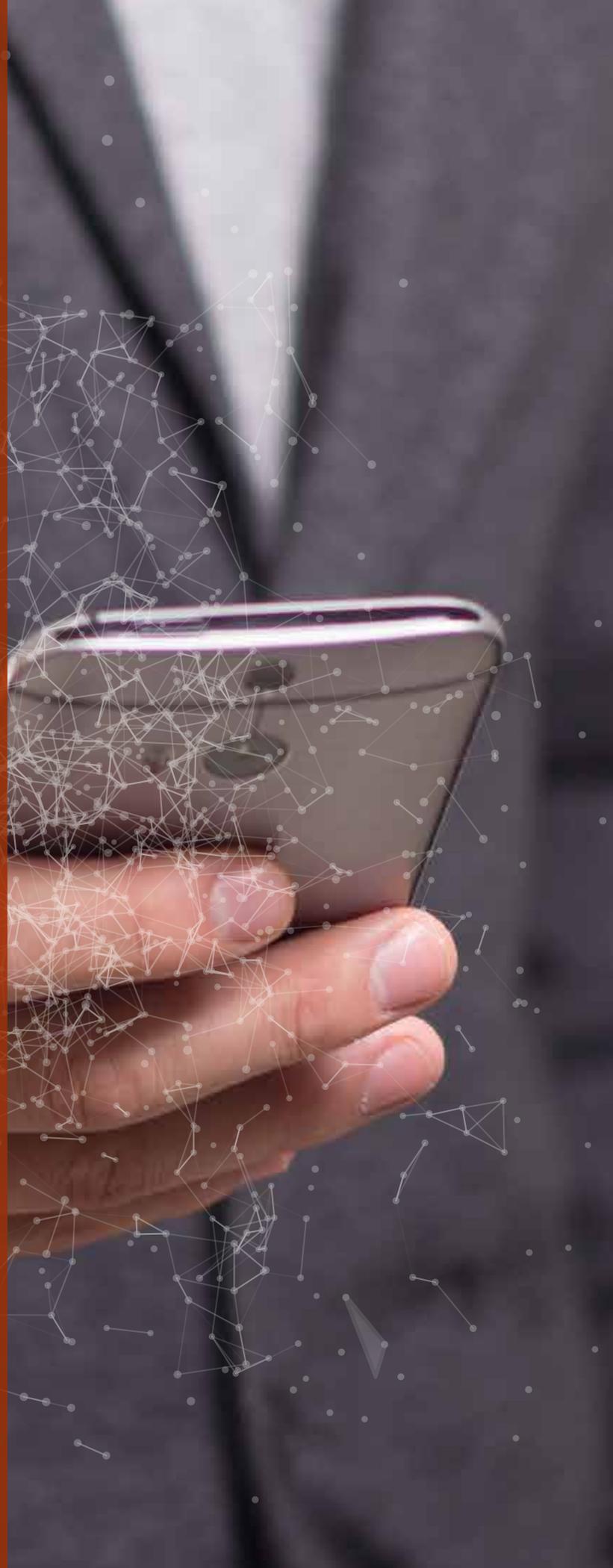
- Editorial calendars to publish needs and capabilities for easy access and tracking
- Expanded use of interactive formats and media channels to support industry followers
- Guest contributors conveying actionable, relevant content to increase value to followers

### WHY IT MATTERS

Media presence establishes and deepens critical relationships across the spectrum of stakeholders, including Northeastern's innovation and entrepreneurship ecosystem, as well as external investors, industry partners, and entrepreneurially-minded talent.

## MEDIA SPOTLIGHT

Each year, *BostInno* recognizes 50 of Boston's most "on fire inventors, disrupters, luminaries, and newsmakers." Out of 2000 nominations, Tracey Dodenhoff, Director of the CRI, rocketing into the final round of 200 and was then named one of Boston's top 50 blazing innovators alongside other prominent celebrants such as the Harvard Business Review.



# NORTHEASTERN'S INNOVATION AND ENTREPRENEURSHIP ECOSYSTEM

WHERE INNOVATIONS ARE BORN AND ENTREPRENEURS ARE MADE

