

Annual Report 2023

The Power of Transformation

CENTER FOR RESEARCH INNOVATION

Vision

Expanding Frontiers and Pushing Boundaries

As Northeastern continues its commitment to solution-focused research, the CRI serves as a nexus of inspiration and invention, empowering Northeastern innovators and entrepreneurs to transform their boldest ideas into societal impact. Translating research findings into practical applications ensures that the knowledge generated benefits society and drives positive change.

| | |
|--|----|
| A Message from the Executive Director | 2 |
| Mission and Process | 3 |
| Metrics | 4 |
| Innovated Issued Patents | 5 |
| Elevated Funding Ventures | 9 |
| Driven Highlights | 13 |
| Inspired Events Speaking Engagements | 19 |
| Informed Education and Programs CRI News | 24 |

A MESSAGE FROM THE EXECUTIVE DIRECTOR

Embracing Change

Transformation. A word we are all familiar with and readily use. Yet, when we pause to reflect on its linguistic origin, we find the concept “change in shape.” This meaning discloses a hint of mystery, of effort, intentionality, and purposefulness.

There are many catalysts that transform one substance into another, and the Center for Research Innovation (CRI) is Northeastern’s catalyst for transforming theory-bending ideas into concrete, life-bettering solutions. To play a pivotal role in bringing laboratory discoveries to life, transforming them from patent to product, is astonishing. Knowing the alchemy we perform, the drugs we make more efficacious, the algorithms we make more adaptable, the biodegradables we make more functional, and how these transformations tangibly impact lives, locally and globally, is inspiring. The CRI experienced a number of “changes in shape” during FY23, most notably in supporting ventures, empowering inventiveness, and increasing resources. Accelerating the growth of early-stage technology ventures is a cornerstone of CRI’s commercialization strategy, and to

increase the viability of these early-stage ventures, the CRI created “Ignite,” a suite of customizable, tailored services. One of Ignite’s most valuable services pairs faculty founders with seasoned entrepreneurs who advise and educate. These Entrepreneurs in Residence transform faculty passion and vision into acumen and aptitude, laying the groundwork for sustained commercial success. Northeastern has a legacy of inventiveness, and FY23 was a watershed moment when these currents of innovation received formal support through the inauguration of Northeastern’s chapter of the esteemed National Academy of Inventors (NAI). The activities of this chapter dissolve academic silos, spur innovative solutions through dialogue, and provide mentorship to burgeoning inventors, whether faculty or student. The presence of NAI on campus enhances institutional and individual

prestige and transforms one-time inventors into serial innovators. The CRI experienced shapeshifting during FY23 with the addition of new team members. We added expertise in commercialization, agreements & contracts, marketing & programs, and operations & finance. New personalities provide fresh perspectives on established patterns and unlock horizons of untapped opportunity. Their presence addresses long-standing need and advances the CRI’s ability to protect, accelerate, and commercialize Northeastern innovation. The CRI embodies the agility and dynamism of Northeastern. This means that transformation is a practice, not an anomaly, and that it will continue and compound as the weeks and months pass. Northeastern’s commitment to hiring hundreds of research faculty will infuse the culture with energy and insight, and based on the new faculty I have met, I see a zeal

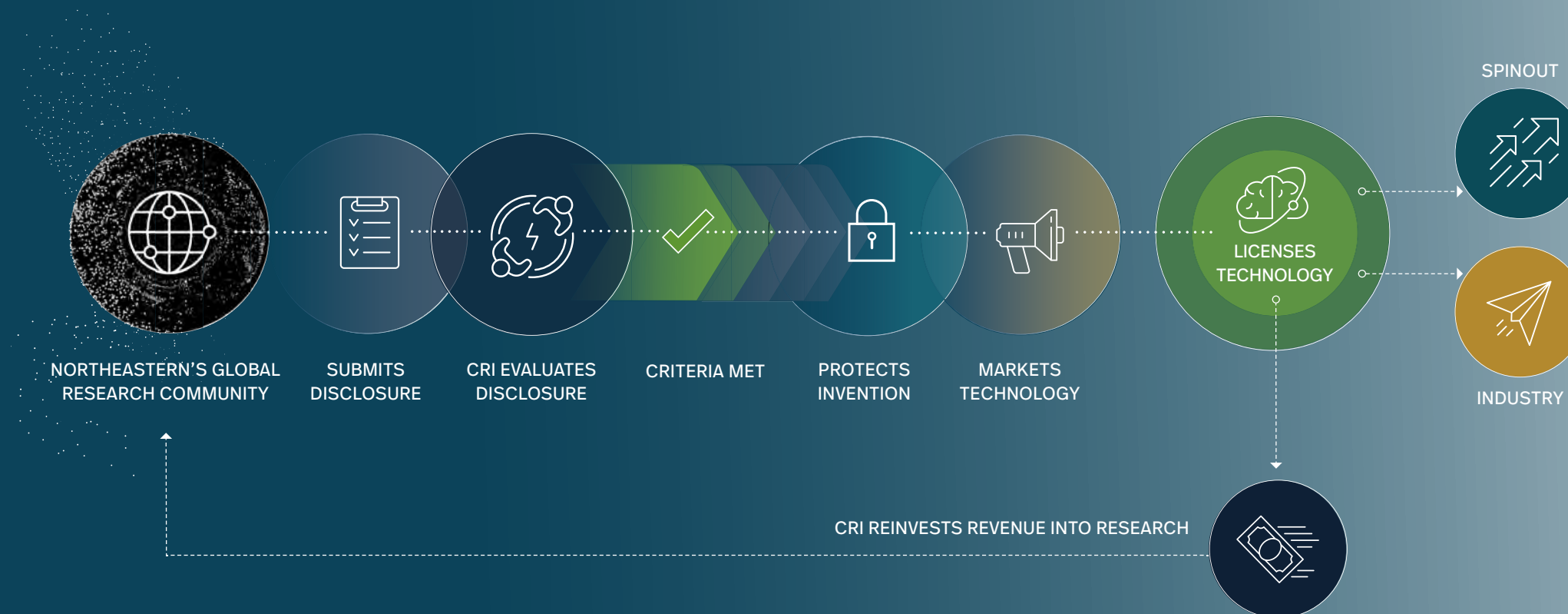
for creating technologies that transform global need into abundance. Industry engagement will increase as new partnerships are discovered and licenses inked. This zeal will generate more ventures, and the CRI will match this demand by recruiting proven CEOs who guide product application, strategize avenues for commercial entry, and lead ventures to acquisition or beyond. With this influx of innovation, the CRI will expand staffing levels, attracting talent that magnifies the ingenuity, foresight, and determination of the team as we continue to direct the course of applied innovation at Northeastern and fundamentally transform living landscapes on a global scale.

Jennifer Boyle-Lynch
Executive Director



Process

The CRI plays a vital role in preserving Northeastern's technological innovation. We take proactive steps to discover groundbreaking innovations in our labs and safeguard them by securing commercially viable patents. Additionally, we actively support the growth and prosperity of startups and forge strong partnerships with industry.



Mission

The CRI pairs solution-oriented research with real-world needs for the enrichment of society through the protection, acceleration, and commercialization of Northeastern innovations.

Fiscal Year 2023 in Review

PATENTS AND LICENSING

95

New Inventors

104

Invention Disclosures

15

Licenses and Options

115

Techs Licensed

257

Patent Applications

54

Issued Patents

VENTURES

\$6.8m

Venture Capital & SBIR Funding

6

Spinouts

Innovated

Securing Research and Innovations

Northeastern's use-inspired research is dedicated to addressing the most pressing societal needs. Quality patent protection accelerates this translation of enriching technologies from the lab to society, enabling the fulfillment of the university's research mission.

ISSUED PATENTS

College of Engineering

Ali Abur

Non-divergent state estimator for large scale power systems

Kaushik Chowdhury

Wireless charging of unmanned aerial vehicles

David Medina Cruz

Citric juices-mediated tellurium nanomaterials with biomedical applications

Salvatore D’Oro

Methods for reliable classification of wireless signals

Yunqing (Amy) Du

Durable enzyme-based biosensors platform enabled by a drop deposition immobilization process

Hui Fang

A bilayer nanomesh based electrophysiological microelectrode
Magnetic matrix connector for high density, soft neural interface

Yun Fu

Multi-person pose estimation using skeleton prediction
Frontal face sythesis from multiple low-resolution images

Jonathan Kim

A series and parallel AC arc fault detection algorithm using the voltage waveform - joint with Mersen Corp

Laura Lewis

Pathways to high energy product FeNi-based alloys using multiple drivers

Tommaso Melodia

SEANet: Software-defined wireless underwater technologies

Shashi Murthy

Instrument to convert monocytes to dendritic cells
Bioreactor for autologous T cell stimulation

Michele Polese

DeepBeam: Coordination-free mmWave beam management with deep waveform learning

Francesco Restuccia

Hardware and software for underwater networking with amphibious smartphones
Mechanism for real-time spectrum-driven embedded wireless networking through deep learning in the RF loop

Matteo Rinaldi

Zero-power plasmonic microelectromechanical infrared digitizer

Kunal Sankhe

Method and apparatus for efficient access point discovery based on learning CSI in dense wi-fi networks

Aatmesh Shrivastava

Self-powered analog computing architecture with energy monitoring to enable machine-learning vision at the edge

Jonathan Soucy

Gelatin/elastin composites for peripheral nerve repair

Srinivas Sridhar

Neuro-dot sensors for electric field encephalography

Ming Su

Enhanced radiation shielding with conformal light-weight nanoparticle-polymer composite

Morris Vanegas

Optically monitoring brain activities using 3D-aware head-probe

Thomas Webster

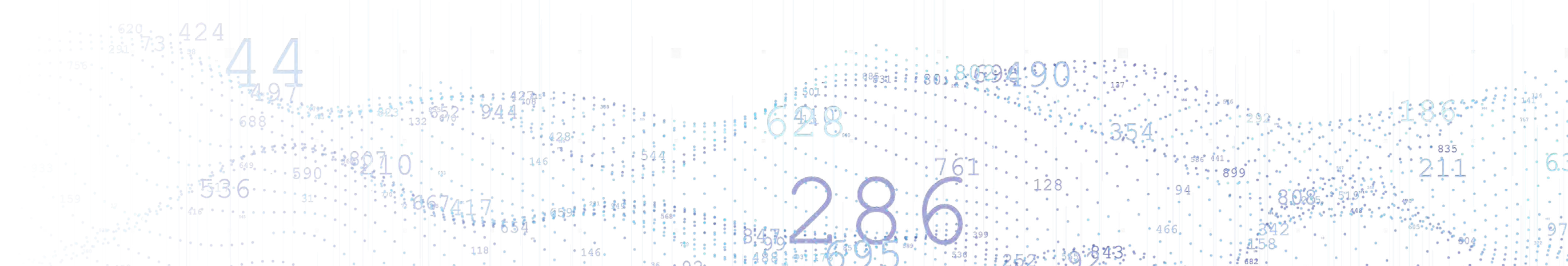
Nanostructured surfaces

Edmund Yeh

System and method for joint computation, caching, and forwarding in data-intensive dispersive computing network

Yao Yu

Microelectromechanical tunable delay line



ISSUED PATENTS

College of Science

Paige Baldwin

Nanococktail for combination therapy, compositions, methods, and uses

Peter Bex

Optimal adaptive scheduling of clinical assessments

Leila Deravi

IR reflective colorants from natural light scattering nanoparticles

A multifunctional cosmetic comprised of bio-inspired light scattering nanomaterials

Neel Joshi

Electrically conductive protein nanofibers and biofilms

Istvan Kovacs

Link prediction based on 3-step connectivity (3SLP)

Kim Lewis

A compound with antimicrobial properties

Srinivas Sridhar

Neuro-dot sensors for electric field encephalography

Meni Wanunu

Porous transition metal dichalcogenides nanosheets and quantum dots fabrication thereof

Lipid-free anchoring of thermophilic bacteriophage G20C portal adapter into solid-state nanopores

Bouvé College of Health Sciences

Mansoor Amiji

Combination taxoid nanoemulsion with immunotherapy in cancer

Pushkar Kulkarni

On-surface mass tagging

Giulia Menichetti

Foodome platform

Khoury College of Computer Science

Qi (Rose) Yu

Aortic pressure forecasting with deep sequence learning

**TOP 100**

NAI Top 100 for the eighth consecutive year

Northeastern University's enduring presence on the NAI Top 100 list for the eighth consecutive year reaffirms its status as a distinguished institution for innovation and entrepreneurship.

This recognition underscores the university's dedication to research excellence and its unwavering support for inventors. Through the CRI, Northeastern researchers find comprehensive assistance for their innovative projects, from conception to realization. This accomplishment reflects Northeastern's commitment to fostering a culture of innovation and excellence while setting the stage for continued growth in these domains.

Newly appointed NAI members:



Vince Harris
Fellow NAI



Srinivas Tadigadapa
Senior Member NAI



Fourier

Challenge

As electronic products become smaller and more powerful, they generate higher amounts of heat, resulting in reliability and performance issues. Cost-effectiveness, size limitations, manufacturing methods, and material compatibility have all proven to be hurdles in achieving comprehensive and efficient thermal management solutions for modern electronics.

Solution

Fourier, led by Dr. Jason Bice and Professor Randall Erb, pioneered a revolutionary technology known as thermoformable ceramic matrix composites (CMCs). This innovative technology redefines the way heat dissipates in electronic devices, enhancing their reliability and performance while overcoming the limitations of existing solutions. By providing a highly efficient, cost-effective, and versatile material, Fourier's thermoformable CMCs open new possibilities for manufacturing methods and materials, enabling electronic devices to achieve higher levels of performance and reliability by extending their lifespan, reducing electronic waste, and contributing to a greener and more sustainable future.

Impact

By addressing the thermal management challenges, Fourier's solution can extend the lifespan of electronic devices, reducing electronic waste and its environmental impact. The increased efficiency of thermal management can lead to energy savings, contributing to a greener and more sustainable future. Moreover, with electronic devices playing an essential role in sectors such as healthcare, communication, and transportation, Fourier's technology can enhance the reliability of critical systems, positively impacting the lives of people around the world. A collaboration with Raytheon Technologies opens opportunities for Fourier to make a significant impact in the aerospace and defense sectors, where reliability is paramount for mission-critical applications. Fourier's revolutionary thermal management solution has the potential to create a more connected, sustainable, and efficient world, benefiting both individuals and industries alike.

CRI Support

- Academic founders are Spark Fund awardees
- CRI brokered a licensing negotiation with Raytheon Technologies
- Entrepreneurship consultant
- Marketing and design consultant
- Scroobious full access subscription

Elevated

Funding Researchers and Innovators

The CRI offers customized programs to catalyze technology development and support early-stage, intellectual property-based, ventures in a meaningful way. All of our programming is designed to accelerate the advancement of technologies along their path to impact.

FUNDING

Spark Fund

At the heart of Northeastern’s innovation ecosystem lies the CRI Spark Fund – an essential catalyst that propels visionary concepts from the lab bench to the market forefront. Bridging the gap between promising research outcomes and practical prototypes, this fund empowers researchers to cross the transformative journey of technological advancement.

The CRI Spark Fund assists Northeastern researchers by bridging the gap between promising lab results and demonstrating a commercially viable prototype. Our grants and programs catalyze state-of-the-art technologies, advancing Northeastern inventions through prototyping, validation, and industry input.

Within the landscape of Northeastern’s innovation endeavors, the Spark Fund shines as a beacon of support for pioneering minds. Through strategic grants and purposeful programs, it drives the evolution of inventive concepts, amplifying their potential to reshape industries. From refining processes to adapting technologies to industry needs, the Spark Fund encapsulates the essence of innovation, propelling Northeastern’s groundbreaking ideas toward real-world realization.

The CRI Spark Fund offers awards to commercially valuable inventions from any field in the early stages of development.

Recipients of the Spark Fund are awarded \$50,000 to advance a technology or suite of technologies towards commercialization readiness to license either through a new company creation or industry, or to continue proof of concept work for state, federal or corporate funding projects.

Spring 2023

Ryan Koppes
Yaning Li
Diomedes Logothetis
Carolyn Lee-Parsons
Edmund Yeh
Ke Zhang

Fall 2022

Mansoor Amiji
Peter Bex
Sara M. Hashmi
Purnima Makris
Mohsen Moghaddam
Emily Zimmerman

From internal translation-oriented grant opportunities ranging from the university’s Impact Engines to the CRI’s Spark Fund all the way through the hiring of heads of entrepreneurship across Northeastern’s global campuses, the collaborative, entrepreneurial spirit within Northeastern’s research community is high and will continue to grow as the university invests further in innovative inventors.

Katie Hemphill

Director of Technology Ventures and Talent Network



VENTURES

Ignite

In the dynamic realm of innovation and entrepreneurship, the CRI stands as a source of support and guidance. Through its program, Ignite, the CRI is instrumental in transforming visionary ideas into thriving enterprises.

Ignite is not merely a service; it's a lifeline for inventors seeking to navigate the challenging journey from concept to commercial success. This initiative is the compass that leads Northeastern University's Intellectual Property out of the labs and into the world, with a focus on ensuring these ventures hit their stride and make a significant impact on the market.

With 35 participating spinouts already benefiting from Ignite's resources, it's clear that the CRI's commitment to nurturing innovation is bearing fruit. The CRI offers a comprehensive suite of services that empowers these nascent companies every step of the way. Ignite isn't just about creating businesses; it's about creating success stories. Through rigorous testing, strategic road mapping, and expert guidance, Ignite sets the stage for these startups to flourish, ultimately contributing to the ever-evolving landscape of technological innovation and entrepreneurship.

With university investment the CRI can better support the entrepreneurial spirits of the Northeastern inventor community and create better outcomes for the startups, increasing the likelihood of success.

Veronique Corrdin

Associate Director of Finance & Operations

2023 Spinouts

Convergent Research

GRIK Therapeutics, Inc

Marathon Bio

NeuroSense

TwinAI

ViralNPQ

Offered Services

- Grant writing support
- Event fee assistance
- Marketing materials creation
- Investor pitch support
- Entrepreneurship consultant





Raymond Fu

Challenge

Amidst the ever-evolving landscape of computer vision, a complex puzzle has stymied researchers—the intricate task of multi-person pose estimation. Conventional methodologies have grappled with the intricate chore of accurately deciphering and correlating the body parts of multiple individuals within a single image. This intricacy presents a formidable hurdle, particularly for applications such as motion analysis and human action recognition, where the precise capture of intricate human movements stands as a foundational requirement.

Solution

Raymond Fu, a distinguished professor in the College of Engineering’s Electrical and Computer Engineering department, has led an innovative charge to surmount this challenge. His inventive approach revolves around a novel deep convolutional neural network that assumes the remarkable dual role of predicting both body parts and human skeletons. Unlike traditional methodologies, Fu’s network harnesses confidence maps to anticipate the precise locations of individual body parts and limbs. This trailblazing strategy not only guarantees the accurate identification of body constituents but also facilitates the seamless assembly of these components into coherent human skeletons. The core intrinsic ingenuity of this innovation lies in the fusion of human skeleton predictions and body part detection, culminating in heightened efficiency and unprecedented accuracy.

Impact

Raymond Fu’s pioneering work holds implications that resonate well beyond the academic arena. By enabling the precise estimation of multi-person poses within a single image, this breakthrough ushers in a realm of new possibilities across various domains. Industries such as motion analysis and sports technology are poised to reap significant benefits from the meticulous tracking of intricate body movements, a transformation that promises to revolutionize training methodologies and performance evaluations. Moreover, the seamless integration of this cutting-edge technology into surveillance systems has the potential to elevate security and safety in public spaces. In terms of its commercial prospects, the technology’s applications span sports analysis, surveillance, and beyond, underscoring its substantial economic potential.

CRI Support

- Intellectual Property protection
- Commercialization support of technologies on the path to impact
- Spark Fund awarded to company
- Company website creation

Driven

Supporting Groundbreaking Innovation that Leads the Way

Easy access to Northeastern's intellectual property and venture portfolios is paramount. The CRI facilitates that visibility with our external colleagues. Our regional and global industry and venture partners across the ecosystem continue to validate and recognize Northeastern's cutting-edge research.

HIGHLIGHTS

Invented Here!

The CRI is proud to have nominated multiple members of the Northeastern academic community to be recognized and honored at the prestigious contest Invented Here!

This esteemed competition, conducted by the Boston Patent Law Association (BPLA), serves as a testament to the ingenuity and inventive spirit that thrives within our university's research ecosystem.

These exceptional innovators from Northeastern University have left an indelible mark on the field of invention. Their contributions span a diverse array of groundbreaking ideas, each pushing the boundaries of knowledge and practical application. As we celebrate their recognition in the Invented Here! contest, we commend their dedication to advancing innovation not only within our local New England community but also on a global scale. These inventive minds serve as an inspiration to all, embodying the university's commitment to fostering creative exploration and impactful research.

The CRI is playing a critical role in the translation of technologies from the lab to the market through licensing to industry and spinouts. It is exciting to see the fruits of our efforts assisting the Northeastern community, leading their inventions on the path to impact.

Myron Kassaraba

Director of Commercialization

This years recognized inventors:

Brush polymer-assisted compaction of oligonucleotides

Ke Zhang
Xueguang Lu

Encoding and decoding data in communication frames of a communications protocol

Kaushik Chowdhury
Yusuf Naderi

Reconfigurable implantable medical system for ultrasonic power control and telemetry

Tommaso Melodia
Raffaele Guida
Giuseppe Enrico Santagati





ADATech

Challenge

In the fast-paced world of design and product development, one of the significant challenges researchers and entrepreneurs face is understanding and connecting with their target audience. Often, traditional design processes lack the necessary data-driven insights to create products that truly resonate with customers. This disconnect between designers and end-users can lead to the development of products that fail to meet market demands or address users’ real needs. Furthermore, the design process itself can be time-consuming and costly, hampering innovation and progress for startups with limited resources.

Solution

ADATech revolutionizes AI-infused design augmentation platform by seamlessly integrating advanced artificial intelligence, empowering researchers to harness the power of user data and predictive analytics. The platform allows companies to gain valuable insights into customer sentiment, evaluate design concepts efficiently, and generate unparalleled solutions that meet the needs and desires of their target audience. This transformative approach not only accelerates the design process but also ensures that the resulting products are better aligned with market demands, significantly increasing the chances of commercial success for startups. ADATech’s suite of technologies provides a fresh perspective on product development, where human creativity collaborates with AI-driven insights to create innovative solutions that have a real impact on end users.

Impact

By enabling companies to design products that resonate profoundly with target audiences, ADATech reduces the prevalence of failed products and wasted resources in the market. Increased efficiency in the design process fosters a culture of sustainability, where products are more likely to address market needs. ADATech’s commitment to enhancing, rather than replacing, people in the design process ensures that the human element remains integral to innovation. By using AI as a tool to complement human creativity, ADATech promotes an inclusive approach to design that encourages collaboration between technology and human ingenuity. This approach has the potential to inspire other industries to embrace AI and technology as tools, anabling more informed and innovative solutioning in the future.

CRI Support

- Executed a startup express license through the CRI
- Academic founders are Spark Fund awardees
- Subsidized grant writing support
- Entrepreneurship consultant
- Marketing and design consultant
- Scroobious full access subscription

HIGHLIGHTS

The Eddies

The Massachusetts Innovation Network’s annual innovation competition, The Eddies, stands as a testament to the vibrancy of the New England startup ecosystem. Formerly known as the NE Innovation Awards, this competition has carved a legacy as the oldest and most enduring innovation platform in the region. Its doors are open to visionary startups across New England equipped with groundbreaking prototypes or technologies and boasting a team of no more than 150 members.

The competition, aimed particularly at nurturing the growth of early-stage startups pre-Series C funding, presents an invaluable opportunity for Northeastern’s spinouts collaborating with the CRI. Showcasing the finest in innovation, The Eddies’ finalists are meticulously selected by a panel of seasoned judges, their innovations scrutinized for their potential to disrupt existing norms and drive positive transformations across users, industries, and markets.

This year’s edition of The Eddies marks a significant achievement for the CRI, as five of its spinout companies have secured coveted positions among the competition’s finalists.

With innovations spanning diverse domains, these companies—PerZeption, Zepsor, Planck Energies, DeepCharge and Ainnoation—have not only demonstrated their groundbreaking ideas but also showcased the impact of their ingenuity. The recognition received as finalists amplifies the reputation of these startups and their collaboration with Northeastern’s CRI, underscoring the university’s commitment to fostering pioneering ventures that possess the potential to reshape industries, create positive user experiences, and drive lasting market change.

Northeastern’s entrepreneurial ecosystem continues to evolve, attracting talent to the university interested in innovating and transforming the way the world works through impactful translation of research from lab to market.

Katie Hemphill

Director of Technology Ventures and Talent Network

FINALISTS

Ainnoation
DeepCharge
PerZeption
Planck Energies
Zepsor





Cristian Cassella

Challenge

Associate Professor Cristian Cassella, a faculty member in the Department of Electrical and Computer Engineering, undertook a formidable challenge in the realm of temperature monitoring and violation detection. The challenge was two-fold: creating a system that accurately senses temperature violations and having the ability to store and recall these incidents. This challenge was particularly pertinent due to the shortcomings of existing technologies in meeting these dual objectives. Conventional resonant micro-acoustic temperature sensors, although highly sensitive, lacked the capability for threshold sensing and historical violation tracking. In critical sectors like food and pharmaceuticals, where temperature control is paramount, these limitations could lead to health hazards and substantial economic losses. Addressing this challenge required a novel approach that merged existing sensor technologies to devise an innovative solution.

Solution

Drawing from his expertise, Professor Cassella introduced a pioneering solution that ingeniously combined two distinct components—a micro-acoustic resonator and a ferroelectric varactor—to overcome the limitations of conventional temperature sensing technologies. This groundbreaking system not only facilitated the detection of temperature violations but also memorized these occurrences. The system had two main parts: a small temperature measuring sensor and another part connected to it called an inductor. When a signal was sent to the sensor, any change in temperature around it caused the sensor's reading to change. This shift amplified the voltage across the ferroelectric varactor, leading to a ferroelectric switch when the temperature exceeded a predetermined threshold, a value determined by the selected frequency of the signal. Importantly, this switching event prompted a non-volatile change in the resonance frequency, enabling the system to capture and retain records of temperature violations for future analysis.

Impact

Professor Cassella's research holds immense potential for addressing a persistent challenge across diverse industries, particularly those reliant on maintaining temperature-sensitive goods. By accurately detecting and permanently recording temperature violations, this innovation can significantly enhance safety and quality control measures throughout supply chains. In sectors like food and pharmaceuticals, where compromised products pose serious risks, this research could avert health hazards and substantial economic losses. The implementation of this technology fosters better compliance with temperature regulations and standards, thereby augmenting consumer confidence. Notably, this interdisciplinary approach not only signifies technological advancement but also underscores the value of collaborative efforts in addressing multifaceted challenges.

CRI Support

- Intellectual Property protection
- Supporting commercialization of technologies on the path to impact
- Commercialization support

HIGHLIGHTS

Acorn Innovation Awards

In the dynamic landscape of innovation, Massachusetts continues to forge ahead with its commitment to transforming groundbreaking research into real-world solutions.

This coveted grant initiative serves as a vital conduit for Massachusetts' research institutions, propelling their nascent technologies closer to commercial success. Supported by the state's Innovation Commercialization Seed Fund and expertly administered by MassVentures, the Acorn Awards celebrate ingenuity, technical prowess, and entrepreneurial spirit. Among the luminaries is **Dr. Yi Zheng** from Northeastern, whose pioneering work on **"Self-cleaning and Fireproof Fiber-based Meta Paint for Passive Cooling"** exemplifies the transformative potential of academic-industry collaboration. **Sarah Ostadabbas, Mohammad Moghadamfalah and Deniz Erdogan** of Northeastern developed

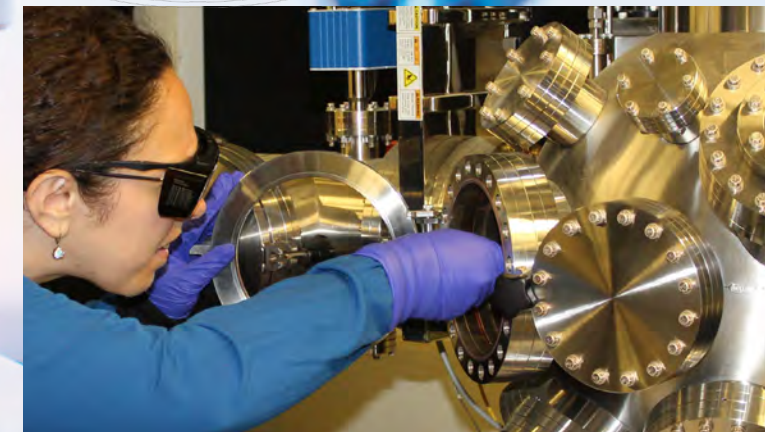
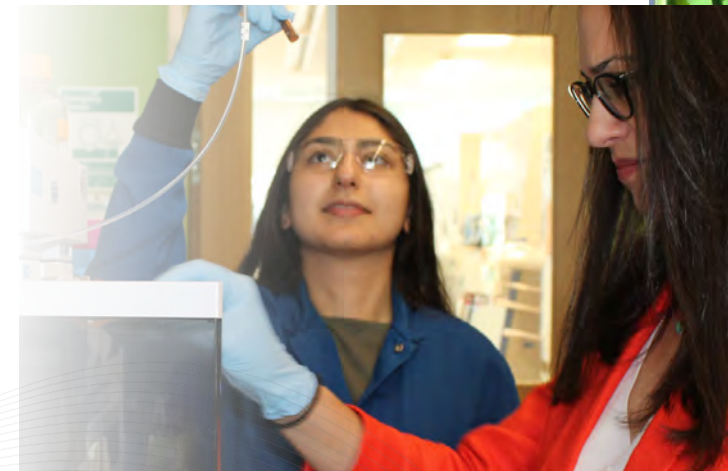
a first-of-its-kind AI-guided cloud-based baby monitoring system called **"AiWover"** which tracks a baby's every movement, categorizes their pose/postures, and analyzes their motor function.

The Acorn Innovation Awards stand as a testament to the prowess of Massachusetts' research community and the pivotal role of strategic investment in propelling scientific advancement. This synergy of visionary research, financial support, and entrepreneurial zeal underscores the state's position at the forefront of innovation and underscores MassVentures' role as a driving force behind Massachusetts' transformation into a hub of technological ingenuity.

With the rapid progress of AI, machine learning, augmented reality, and other advanced technologies in life sciences, engineering, and medicine, the CRI assumes an indispensable position as a catalyst for innovation at Northeastern University. The CRI recognizes the paramount importance of establishing a robust infrastructure that nurtures a culture of creative ideation, enabling the translation of these groundbreaking innovations into tangible, real-world applications.

Elmira Zenger

Agreements & Contracts Manager



Inspired

Connecting with the Community

The CRI team has nurtured strong connections with various sectors, including industry, peers, and government organizations, and we are delighted to extend our specialized knowledge to a broader international audience. Our foremost commitment lies in enlightening and instructing our expanding global research community about the most effective methods for managing intellectual property and advancing commercialization, thus bolstering their capacity to translate research into tangible societal benefits.



BrilliantStrings Therapeutics

Challenge

The field of ortho-musculoskeletal healing has long faced significant challenges in providing effective and rapid recovery solutions for connective tissue injuries and degeneration. Traditional approaches often involve lengthy recovery times and limited success rates in fully restoring damaged tissues. Patients suffering from such injuries often endure prolonged pain and restricted mobility, impacting their quality of life.

Solution

BrilliantStrings Therapeutics has made a significant breakthrough in the field of mechano-therapeutics by leveraging decades of academic research to create a unique healing biomaterial called Complete Human Collagen (CHC™). The CHC™ mechano-therapeutic represents a first-in-class achievement, capable of rapidly repairing damaged tissues with exceptional efficacy. By developing a complete human collagen biomaterial and a precise delivery platform, BrilliantStrings has taken a quantum leap forward in achieving unparalleled healing outcomes. The CHC™ delivery platform not only accelerates the healing process but also strengthens the injured tissue, significantly reducing recovery time for patients.

Impact

Through their groundbreaking approach to healing using Complete Human Collagen, BrilliantStrings is positively impacting countless lives by improving patient outcomes and reducing suffering. By significantly minimizing recovery times, BrilliantStrings is enabling patients to return to their daily lives and activities more quickly, thereby enhancing their overall quality of life. As BrilliantStrings continues to make strides in mechano-therapeutics, their work holds the promise of inspiring other researchers and entrepreneurs to explore novel solutions to critical healthcare challenges.

CRI Support

- Academic founder is a Spark Fund awardee
- Subsidized conference fee support
- IP protection

EVENTS

Intellectual Property Awareness Summit

In a world driven by innovation and creativity, the significance of Intellectual Property (IP) rights cannot be understated. These rights stand as the guardians of groundbreaking ideas, fostering an environment where inventions, artistic expressions, and businesses thrive.



Anchored in the commitment to emphasize the importance of IP rights, the Center for Intellectual Property Understanding (CIPU) and the CRI hosted the Intellectual Property Awareness Summit (IPAS) 2023 annual meeting at Northeastern. Under the banner of ‘Bridges, Not Barricades,’ this gathering aimed to illuminate the role of IP rights within society, celebrating their role as catalysts for creativity, innovation, and economic progress.

IPAS 2023 bore testament to the resolute dedication of leaders, experts, and luminaries across various domains to the safeguarding of intellectual property. As they congregated in

Boston, the discussions spanned the critical aspects of IP – from the balance between protection and accessibility to the integration of IP education. These insightful conversations echoed the essence of the event’s theme, “Bridges, Not Barricades,” transcending barriers and fostering an environment where ideas flourish, creators thrive, and the human spirit of imagination remains unshackled. IPAS 2023 not only upheld the value of intellectual property but also championed the cause of nurturing innovation and creativity in a world where automation and progress often walk hand in hand.

The CRI is making a profound impact on the community of creators, inventors, educators, and lawyers through its transformative initiatives, such as the Intellectual Property Awareness Summit (IPAS).

Jennifer Boyle-Lynch
Executive Director





Sarah Ostadabbas

Challenge

In the realm of infant healthcare, researcher Sarah Ostadabbas encountered a pressing challenge: the early detection and assessment of torticollis in infants, a condition characterized by a persistent neck tilt or twist. Timely identification and treatment of this condition are crucial, as untreated torticollis can lead to deformities, pain, limited motion, and even the need for invasive interventions. The existing process for screening, diagnosis, and monitoring requires laborious professional assessments, hindering prompt intervention. With the advent of computer vision technology specializing in infant face and body pose analysis, the researchers questioned whether algorithmic techniques could aid in remote monitoring, automated screening, and diagnosis. In this context, they sought to explore the feasibility of employing computer vision to assess geometric measures of symmetry in infants' faces and upper bodies, gleaned from existing medical literature on torticollis. This endeavor presented a unique challenge due to the distinct physical characteristics of infants compared to adults, necessitating specialized techniques for accurate assessment.

Solution

The solution offered by Sarah Ostadabbas, in collaboration with her team including Michael Wan from the Roux Institute campus, involved applying computer vision pose estimation techniques specifically designed for the data-scarce infant domain to the study of torticollis. They employed facial landmark and body joint estimation techniques tailored for infants, focusing on a range of geometric measures associated with face and upper body symmetry. These measures were carefully selected from research literature in physical therapy and ophthalmology related to torticollis. The researchers leveraged advances in infant-domain estimation of facial and upper body landmarks to provide accurate assessments. By using neural networks designed for infants' unique characteristics, they demonstrated improved accuracy in geometric measurement estimates compared to widely known networks designed for adults. Their approach aimed to establish the potential of algorithmic assessments from casual photographs taken in natural infant environments, potentially paving the way for automated monitoring, screening, and diagnosis.

Impact

The research led by Ostadabbas holds significant potential for positively impacting infant healthcare and treatment of torticollis. The introduction of algorithmic techniques into the assessment process could lead to more accessible and timely identification of the condition, reducing the need for extensive professional assessments. This could be particularly valuable for remote monitoring and underserved areas where access to specialized medical expertise is limited. The ability to detect torticollis at an early stage could prevent complications, deformities, and invasive interventions, thus enhancing infants' overall quality of life. The researchers' emphasis on employing specialized neural network models tailored to infants underscores the importance of domain-specific approaches in medical applications of computer vision. As this field continues to advance, the methods and insights from this research could pave the way for a broader range of applications in infant healthcare, demonstrating the transformative potential of technology in enhancing medical diagnostics and treatment.

CRI Support

- Intellectual Property protection
- Business planning workshops
- Entrepreneurship consulting

SPEAKING ENGAGEMENTS

Spreading the Word

The CRI team is frequently called upon to act as subject matter experts in discussions related to the technology transfer field. Below, you can find a selection of events where the CRI contributed their expertise.

Venture Cafe

The Venture Cafe event brought together a panel of distinguished experts, including David Graves-Witherell, Deirdre Sanders, Katie Hemphill, and Mitch Sanders, each sharing invaluable insights on entrepreneurship. Notably, Katie Hemphill, the Director of Technology Ventures & Talent Network at Northeastern University's CRI, offered profound advice on alternative funding avenues, intellectual property protection, and resources available for budding entrepreneurs.

Katie Hemphill shared her expertise, emphasizing the pivotal role of timing, networking, and alternative funding methods. Moreover, the event underscored the wealth of resources accessible at Northeastern University, exemplified by the McCarthy(s) Venture Mentoring Network and the Innovation Campus in Burlington, MA.

Industry Day 23

The Industry Day 23 event, held at Northeastern University, marked a significant milestone, as WIOT unveiled its latest strides in technological breakthroughs and collaborations with eminent partners from government, industry, and academia.

Panel speakers included Myron Kassaraba, Director of Commercialization at the CRI, who outlined the significance of protecting and commercializing IP in the long term. Myron emphasized that Northeastern is one of the first investors in ideas emerging from academia, supporting its researchers in funding their ideas and protecting their IP through patents. He also underscored the importance of filing patents and transforming them into something fruitful, which he believes depends on the investor or entrepreneur's ability to bring the idea to life. "In the end, a patent is just a piece of paper," Kassaraba said. "It is up to the entrepreneur or investor to turn that piece of paper into something truly valuable." He encouraged entrepreneurs to be patient, emphasizing that the now is a great time to pursue one's entrepreneurial goals.

New Founders Equity

The New Founder's Equity offered a webinar which navigated the journey of a startup, illuminating the strategic utilization of equity and potential outcomes for visionary founders. Katie Hemphill, Director of Ventures at the CRI, was on the panel emphasizing how founders are committed to making sure ventures are rewarded with greater ownership.



Informed

Cultivating Unconventional Ideas that Lead the Way

One of the CRI's goals is to increase researcher engagement, support viable spinouts, deepen strategic partnerships across global campuses, and position Northeastern as a commercialization thought leader.

EDUCATION AND PROGRAMS

National Academy of Inventors

In the world of experiential education, translational research, and global outreach, Northeastern University's National Academy of Inventors (NAI) chapter plays a pivotal role in empowering innovation and entrepreneurship.

It achieves this by recognizing, inspiring, educating, and connecting individuals within academia and industry. This commitment is a testament to Northeastern's long-standing leadership in these areas. The inaugural event held for Northeastern's NAI chapter on the Boston campus, marked a significant milestone. The event, graced by distinguished speakers including Jennifer Boyle-Lynch, Executive Director, and David Madigan, Provost and Senior Vice President of Academic Affairs, showcased the

commitment of the university in extending its culture of innovation beyond the Boston campus and into the global arena. This event exemplified Northeastern's dedication to cross-disciplinary collaboration, real-world engagement, and the pursuit of actionable solutions. The chapter's inauguration and the enthusiastic engagement of new members further underline the university's steadfast determination to drive innovation from the lab to the market, echoing its ethos of turning world-changing ideas into tangible reality.

Northeastern's NAI Chapter is one of over 250 Universities, Government, and Institutes with a worldwide institutional presence. The 4000+ members and fellows have generated momentous social and economic impact.

The new chapter is a vehicle to nurture research innovation and entrepreneurship across the global network. It will recognize and celebrate inventors and entrepreneurs both individually and as part of the community, educate and inspire the next generation of inventors, promote industry collaboration, and more broadly, amplify messaging about research accomplishments.

Jennifer Boyle-Lynch
Executive Director



CRI NEWS

New Website Launch

In a remarkable stride towards enhancing user experience and facilitating innovation, the CRI proudly presents its newly redesigned website **cri.northeastern.edu**. This dynamic online platform has been meticulously crafted to empower innovators, entrepreneurs, and industry professionals with seamless access to a wealth of resources.

As the CRI website aligns even more closely with Northeastern's overarching mission and vision, it serves as a catalyst for translating faculty's boldest ideas into real-world societal impact. By simplifying navigation and eliminating unnecessary complexities, the CRI empowers users to embark on their innovative journeys with unparalleled ease. The CRI website will showcase features like the "Ventures' List" and the "Researcher Spotlight" series, which will spotlight remarkable achievements made by Northeastern faculty. Our commitment to user experience and innovation is unwavering, and the CRI encourages you to explore this evolving hub of inspiration.



Team Expansion

Welcoming new additions to the CRI team:

Shivani Aryasomayajula
Contracts Specialist

Veronique Corrdin
Associate Director of Finance & Operations

PJ Dupuis
Assistant Director of Marketing & Programs

Myron Kassaraba
Director of Commercialization

Vaibhav Saini
Senior Commercialization Manager

Elmira Zenger
Agreements & Contracts Manager

New personalities provide fresh perspectives on established patterns and unlock horizons of untapped opportunity. Their presence addresses long-standing need and advances CRI's ability to protect, accelerate, and commercialize Northeastern innovation.

Jennifer Boyle-Lynch
Executive Director

CRI Team



Jennifer Boyle-Lynch
Executive Director

The CRI team is agile and responsive—focused on the translation of university innovations into tangible solutions through licenses, spinouts and collaborations. Our dedication to establishing ongoing dialogue with industry informs Northeastern’s progressive research, enabling a productive balance between exploration and implementation.

INTELLECTUAL PROPERTY AND COMPLIANCE



Andy Curtin
Director
Intellectual Property



Rhonda Kivlin
Manager
IP and Compliance



Monika Kasprzak
Paralegal
Intellectual Property

COMMERCIALIZATION



Myron Kassaraba
Director
Commercialization



Mark Saulich
Associate Director
Commercialization



Vaibhav Saini
Senior Manager
Commercialization

MARKETING AND PROGRAMS



PJ Dupuis
Assistant Director
Marketing & Programs



Elizabeth Ortiz
Marketing Communications
Manager



Veronique Corrdin
Associate Director
Finance & Operations

FINANCE AND OPERATIONS

CONTRACTS



Elmira Zenger
Manager
Contracts



Shivani Aryasomayajula
Contracts Specialist

VENTURE DEVELOPMENT



Katie Hemphill
Director
Technology Ventures
and Talent Network



Sal Darji
Spinout Program Consultant



Jacqui Mitchell
Finance and Technical
Specialist



Kim Shea
Administrative Coordinator

TER FOR RESEARCH INNOVATION

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