NEW YORK STATE OF OPPORTUNITY.

Division of Science, Technology & Innovation

A Division of Empire State Development

Centers of Excellence

Annual Report 2025

Contents

Program Overview and Purpose....3
Small Scale Systems Integration and Packaging Center of Excellence 5
Center of Excellence in Healthy Water Solutions 10
Center of Excellence for Food and Agriculture at Cornell AgriTech 16
Center of Excellence in Digital Game Development (NYU) 21
Center of Excellence in Digital Game Development (RPI) 25
Center of Excellence in Digital Game Development (RIT)....29
Center of Excellence in Precision Medicine and Responses to Bioterrorism and Disasters 34
Center of Excellence in Advanced and Sustainable Manufacturing 38
Center of Excellence in Advanced Energy Research and Technology 44
Center of Excellence in Wireless and Information Technology 51
Syracuse Center of Excellence in Environmental and Energy Systems....61
Center of Excellence in Nanoelectronics and Nanotechnology 66
Center of Excellence in Weather & Climate Analytics 70
Center of Excellence in Bioinformatics and Life Sciences....74
Center of Excellence in Materials Informatics....79
Center of Excellence in Data Science 85

Program Overview and Purpose

Empire State Development (ESD) is New York's chief economic development agency. The mission of ESD is to promote a vigorous and growing economy, encourage the creation of new job and economic opportunities, increase revenues to the State and its municipalities, and achieve stable and diversified local economies. Through the use of loans, grants, tax credits and other forms of financial assistance, ESD strives to encourage private business investment and growth to spur job creation and support prosperous communities across New York State (NYS).

ESD's Division of Small Business & Technology Development (SBTD) supports the growth of small businesses, defined as firms with 100 or fewer employees, providing and implementing programs and services that facilitate access to capital, technical assistance, technology assistance, and venture funding.

Empire State Development's Division of Science, Technology & Innovation (NYSTAR), a division of SBTD, manages the Centers of Excellence (CoE) program with the goal of fostering collaboration between the academic research community and business sector to develop and commercialize new products and technologies; to promote critical private sector investment in emerging high-technology fields in New York State; and to create and expand technology-related businesses and employment. This program enhances and accelerates the university research centers' operations, which facilitates joint university-industry research and development, product commercialization, and workforce training.

Included in this report are individual summaries for each of the 14 CoEs covering the 2023-2024 reporting period with information as reported by each CoE that includes:

1. Technology Focus
2. Importance of the CoE and related activities to NYS
3. Purpose, for which center facilities, equipment, and personnel are utilized
4. Impacts, including jobs and financial
5. Designations and Recognitions
6. Operating Budget
    - Table including detailed use of state and match funds
    - Breakdown of match, including:
        - Total Federal Match: Total match funds coming from federal sources. This is a subset of the "Other sources" total reported.
        - Total In-Kind Match: Total match provided as "in-kind" (non-cash). This is a subset of the "Other sources" total reported.
7. Capital Expenditures
8. Companies served and projects
9. Actual or anticipated new products or processes with commercial application
10. Start-ups formed
11. Licensing agreements
12. Science and technical activities with students
13. Strategic Plan

Summary Statistics

Centers	New Jobs	Retained Jobs	Increased Revenues	Cost Savings	Government Funds	Non-Government Funds	Capital Improvements	Total Impacts
14*	452	324	$41,681,910	$197,933,636	$43,384,387	$231,852,869	$15,919,293	$530,772,094

Centers	Companies Served	Small NYS Companies Served	Projects On-Going	Projects Completed	Students Engaged with Companies
14*	872	704	261	362	1,526

*The Center of Excellence in Digital Gaming Development is one CoE, although it is across three universities.

Center of Excellence in Small Scale Systems Integration and Packaging - S3IP
Binghamton University
Prof. Bahgat Sammakia, Director

Technology Focus
Electronics and Energy Storage Manufacturing

Importance to NYS
Electronics Packaging / Energy Storage are key growth areas for the world economy that attract federal and private investments to NYS. Providing research focus will generate high paying jobs to a workforce of skilled manufacturing labor, educated professionals and college graduates to enable a better quality of life to New Yorkers.

Purpose
The S3IP Center of Excellence provides advanced laboratory capabilities and technical expertise to help companies solve complex challenges and improve manufacturing processes for electronic products. The Center brings extensive experience in failure isolation, root-cause analysis, and mitigation, enabling member organizations to address electronics-related issues efficiently and effectively. S3IP also draws on the broad expertise of Binghamton University faculty and collaborates with other Centers for Advanced Technology (CATs) and Centers of Excellence (COEs) to deliver comprehensive, multidisciplinary solutions.

The Center offers a wide range of services, including design investigation and optimization, prototype fabrication, failure analysis, reliability improvement, and performance testing for electronic systems and advanced lithium-ion batteries. These capabilities provide industrial partners with valuable insights to improve both product performance and manufacturing processes.

The Analytical and Diagnostics Laboratory within S3IP plays a critical role in supporting both university research and external industry partners. Equipped with advanced analytical and diagnostic tools and supported by experienced staff, the lab helps identify failure mechanisms and provides actionable feedback to prevent future issues. Through these activities, S3IP contributes positively to the economic growth of New York State and its technology-based companies.

Key technologies and services include materials characterization (such as solder and thermal interface materials), mechanical and thermal modeling, thermal management, and prototyping and assembly process development. Additional areas of expertise encompass hybrid and flexible electronics, heterogeneous integration design and thermal management, energy-efficient system design for large-scale electronics such as data centers, and advanced cooling technologies, including liquid and two-phase heat exchangers. The Center also supports thin-film deposition for electronics, solar cells, and supercapacitors, as well as advanced materials, design, prototyping, and performance analysis for lithium-ion batteries.

Impacts

New Jobs	Retained Jobs	Increased Revenues	Cost Savings	Govt Funds	Non-Govt Funds	Capital Improv's	Total Impacts
8	0	$1,117,500	$375,250	$278,500	$0	$797,000	$2,568,250

Companies Served and Projects

Annual Period	# of Companies Served	# of Small NYS Companies Served	# of projects on-going	# of projects completed	# of students engaged with companies
2023-24	12	4	12	0	9

Designations and Recognitions

Awards / Recognition	Date Received	Recognizing Organization	Link
Zhen Lei, Clifford Myers Summer Research Grant, 2024	May 2024	Binghamton University Chemistry Department	https://www.binghamton.edu/chemistry/graduate/student-awards.html
Mark Poliks, Million Dollar Award		Thomas J. Watson School, Binghamton University	https://www.linkedin.com/posts/watson-college_at-our-watson-research-recognition-luncheon-activity-7133167266115772417-V15R?trk=public_profile_like_view
Olva Shamsian, Best Presentation Award		2024 New York State Nanotechnology Network Symposium	
John Swierk, 2024 Young Investigator Award		Inter-American Photochemical Society	https://www.binghamton.edu/chemistry/faculty/profile.html?id=jswierk

2023 -2024 Operating Budget (include Federal, State, local funds & in-kind)

		Matching Funds		
Operating Budget Description	**NYSTAR Funding**	**Company Cost Share**	**Other Sources**	**Total Budget**
Salaries & Fringe	$799,344	$452	$830,925	$1,630,721
Indirect Costs	$119,902	$68	$124,639	$244,609
Equipment	$0	$0	$17,125	$17,125
Materials & Supplies	$30,634	$0	$86,102	$116,736
Tuition	$0	$0	$84,499	$84,499
Travel	$10,569	$0	$12,887	$23,456
Subcontractors	$0	$0	$98,262	$98,262
Other	$98,894	$0	$52,415	$151,309
Total	$1,059,343	$520	$1,306,854	$2,366,717

Total Federal: $987,299
Total In-kind: $0

Capital expenditures
None

Commercialization Plan Summary
With the advent of the new AI era, electronic packaging will be the key to AI success. Silicon will continue to scale down to smaller features; the industry is now working towards the successful implementation of 2nm nodes. Packaging is seen now as a major part of the success of AI. Packaging is what provides the means to deliver up to 1KW of power to an AI processor, new materials must be developed to support the new data rates needed to provide the computation needs of AI. New advanced thermal solutions need to be studied, modeled and ultimately put into production to be able to successfully remove the 1KW of heat that each processor will emit. The majority of this work will be done in the Center for Energy-Smart Electronic Systems (ES2) with the help of the IEEC and the ADL. The design and fabrication of advanced test vehicles will be done at IEEC, assembling these test vehicles will be in the Smart Electronics Manufacturing Lab (SEML), testing and failure analysis throughout the ADL and IEEC. All this effort will result in unique solutions for the centers and to our members companies through shared IP and licensing opportunities.

Actual or anticipated new products or processes with commercial application

Patent Name	Inventor	Co-inventor	Patent Number	Description
Energy Aware Processing Load Distribution System and Method	Kanad Ghose		11,809,254	Method for controlling data centers, comprising a plurality of server systems, each associated with a cooling system and a thermal constraint.
Low-Power Wearable Smart ECG Patch with On-Board Analytics	Kanad Ghose		11,883,176	A wearable ECG sensor, needing low power, that can detect cardiac parameters and transmit the information to an external monitor
Fluid Cooling System Including Embedded Channels and Cold Plates	Bahgat Sammakia		11,876,036	A method to cool stacked chips by placing micro channels in the stack and cool the chips within the stack itself
Control Systems and Prediction Methods for IT Cooling Performance in Containment	Bahgat Sammakia		11,985,802	A method to control a data center having a cold air cooling system and at least one containment structure

Start-up Companies Formed
None

Description of each research sponsorship agreement, intellectual property ownership agreement, intellectual property license agreement or any other agreements entered into between the CoE and research partner

Project	Inventor	Licensing Partner
Compact Condensers Enabled by Print-to9-Cast Additive Manufacturing	Project Investigator: Bahgat Sammakia, Srikanth Rangarajan	Sponsor: ERG Aerospace Corporation
GOALI: ASCENT: Online Stability Assessment, Flexibility, and Enhancement of IBR-Dominated Power Systems	Project Investigator: Ziang (John) Zhang	Sponsor: NSF
DOE SBIR Phase II: Polymer-Based Conformal Space Radiation Shield with Thermal Management Manufactured by Five-Axis 3D Printing Platform	Project Investigator: Pu Zhang	Sponsor: Advanced Cooling Technologies
A Systemic Approach to Predict the Excretion of Antidepressants into Breast Milk	Project Investigator: Gretchen Mahler, Huiyuan Guo	Sponsor: US Food and Drug Administration
Optimization of Laser Structures for Laser and Other Applications	Project Investigator: David Klotzkin	Sponsor: Best Epitaxy Manufacturing Company

Description of any relationships with secondary schools and community colleges designed to foster student interest in scientific and technical careers

S3IP works to interest pre-college students in science and technology. During the July 2023-June 2024 period, Center staff presented a STEM program for Girl Scouts ages 5-15. The staff made a presentation to 7th Graders from Johnson City Schools and another presentation to 5th graders from Johnson City Islamic School. In addition, the staff set up a table at Oakdale Commons for the public to familiarize them with what the CoE at Binghamton University does.

Strategic plan

The Center supports the electronics manufacturing and advanced energy storage industries in New York. Faculty research activity and contacts with industry informs the focal area. We are active participants in NYSTAR outreach activities to industry and participate in FuzeHub forums. We are a resource for the local MEP office. S3IP research centers receive funding from NSF, the NextFlex national manufacturing innovation institute, and most recently, the federal Build Back Better Regional funding. S3IP is supporting several teams preparing for funding under the U.S. CHIPS Act. S3IP engages with and is funded in part by the Semiconductor Research Corporation (SRC), which represents leading global manufacturers of integrated circuits and many manufacturers of electronics systems. The CoE is authoring sections of the IEEE's Heterogeneous Integration (HI) roadmap, which lays out the course of HI in electronics manufacturing for the future. The Center assists the university in capital investment proposals to local and state economic development agencies including the Southern Tier Regional Economic Development Council, the Upstate Revitalization Initiative, and Empire State

Development investments. The Center also assists faculty in pursuit of grants from state agencies such as the New York State Energy Research and Development Agency.

The CoE's business-oriented performance metrics include the economic impacts reported by industry partners, the number of industrial member companies and projects, the level of industrial project activity in CoE labs, and patent activity; academically oriented metrics include number of CoE-affiliated students graduated with MS and PhD degrees, and scholarly publication activity for CoE-affiliated faculty and researchers

Governance Structure

The governance of the S3IP is headed by Bahgat Sammakia, director of the S3IP, the associate director Benson Chan along with the Industrial Advisory Board members of the S3IP. The Center is in the process of updating members of the IAB to better align with the anticipated changes related to the electronic packaging industry. The Center will be searching for younger board members from its large membership base with a focus on AI related companies such as NVIDIA, AMD and IBM. The Center will use the input from these new board members to better align the research being conducted by Binghamton University faculty in ECE, Mechanical and SSIE to enhance the value of faculty for external funding sources in addition to Center related funding.

Center of Excellence in Healthy Water Solutions
Clarkson University/SUNY ESF
Stefan Grimberg and Stephen Shaw, Co-Directors

Technology Focus: Technology to assess water contamination and develop treatment technologies for the remediation of emerging and primary contaminants in water.

Importance to NYS
Access to clean water is vital to NYS tourism, agricultural and manufacturing industries. The mission of the Center is to generate solutions that help protect and improve waters for sustainable, natural environments, healthy populations, resilient communities, and sound economies.

Purpose
The Center provides access to state-of-the-art analytical facilities located at Clarkson and SUNY ESF to quantify contaminants in natural and treatment waters. In addition, the Center provides access to a range of experts to characterizing natural and engineered water systems. Through its grants program the Center is engaging industry to work with faculty to develop relevant technologies improving water quality in NYS. The Center is further providing training opportunities for students in industry through its internship program; and is developing workforce development programs for water and wastewater treatment operators.

Impacts

New Jobs	Retained Jobs	Increased Revenues	Cost Savings	Govt Funds	Non-Govt Funds	Capital Improv's	Total Impacts
3	0	$231,010	$565,000	$21,884	$200,000	$30,000	$1,047,894

Companies Served and Projects

Annual Period	# of Companies Served	# of Small NYS Companies Served	# of projects on-going	# of projects completed	# of students engaged with companies
2023-2024	6	4	6	28	7

Designations and Recognitions
None

2023 -2024 Operating Budget (include Federal, State, local funds & in-kind)

		Matching Funds		
Operating Budget Description	**NYSTAR Funding**	**Company Cost Share**	**Other Sources**	**Total Budget**
Salaries & Fringe	$401,168	$295,402	$584,328	$1,280,898
Indirect Costs	$59,940	$40,263	$81,954	$182,157
Equipment	$48,313	$39,105	$39,802	$127,220
Materials & Supplies	$176,420	$28,302	$87,386	$292,108
Tuition	$28,875	$27,000	$159,778	$215,653
Travel	$36,522	$7,652	$18,535	$62,709
Subcontractors	$958,963	$93,500	$653,816	$1,706,279
Other	$104,193	$23,749	$61,198	$189,140
Total	$1,814,394	$554,973	$1,686,797	$4,056,164

Total Federal: $490,679
Total In-kind: $0

Capital expenditures
None

Commercialization Plan Summary
The HWS CoE provides the diverse expertise essential to addressing the transdisciplinary nature of many pressing water resource problems. Namely, the HWS CoE has a team of experts in chemistry, process engineering, modeling and analytics, ecology, biology, and social science.

While many companies and organizations have some elements of this expertise, they often have gaps that limit their ability to fully address critical problems and identify solutions. For example, an organization may have modeling and analytics expertise but not ecological expertise to collect and characterize input data; or an organization may be able to collect samples but not have chemical analytical facilities to run the samples.

Through its grants program the Center supports commercialization efforts for faculty and industry developed products. The Center has funded participation in NSF funded I-Corps workshops, and has co-founded projects with FuzeHub to manufacture prototypes for harmful algae or PFAS treatment and USDA-STTR funding for sensor development.

Actual or anticipated new products or processes with commercial application

Patent Name	Inventor	Co-inventor	Patent Number	Description
Electrochemical process to mitigate Harmful Algae Blooms (HAB)	Yang Yang	Stefan Grimberg, Shasha Yang, L. Cardenas	1215195	Invention has been disclosed and nonprovisional patent has been awarded Nov. 2024

Start-up Companies Formed
None

Description of each research sponsorship agreement, intellectual property ownership agreement, intellectual property license agreement or any other agreements entered into between the CoE and research partner

Project	Inventor	Licensing Partner
Identification of Nitrification Inhibitors within Semiconductor Manufacturing Wastewaters	**PI**: Stefan Grimberg **CO-PI:** Thomas Holsen	David Speed, GlobalFoundries
Smart CNF-based Filter Media for PFAS Removal from Contaminated Water	**PI**: Deepak Kumar, Assistant Professor, Chemical Engineering Department, SUNY ESF **CO-PI:** Bandaru Ramarao, Professor & Department Chair, Chemical Engineering Department, SUNY ESF	Biljana Bujanovic, Project Leader, Fiber and Chemical Sciences Research, USDA Forest Service - Forest Products Laboratory
Struvite Recovery for Organic Production	**PI**: Wendong Tao, Professor, Department of Environmental Resources Engineering, SUNY College of Environmental Science and Forestry	
PFAS Removal and Destruction from Semiconductor Manufacturing Wastewater	**PI**: Thomas Holsen, Professor, CEE, Clarkson University Selma Mededovic-Thagard, Professor, CBE, Clarkson University **CO-PI:** Diana Aranzales, Research Assistant Professor, CEE, Clarkson University	David Speed (Global Foundries)
Development of an AI-Vision Enabled Environmental Monitoring Sensor System for the Real-time Detection of Microplastics in a Waterbody	**PI**: Abul Baki, Assistant Professor, Civil and Environmental Engineering Department, (abaki@clarkson.edu) **CO-PI:** Thomas Holsen (tholsen@clarkson.edu) and Masudul Imtiaz (mimtiaz@clarkson.edu)	
Clarkson University Team Science Project	**PI**: Thomas Holsen, Professor, CEE, Clarkson University **CO-PI:** Selma Mededovic, Professor, CBE, Clarkson University	DMAX Plasma, Inc
Ammonia recovery from anaerobic digestion dewatering sidestream using bipolar membrane electrodialysis coupled with membrane stripping	**PI**: Taeyoung Kim, Assistant professor, Department of Chemical and Biomolecular Engineering & Institute for a Sustainable Environment, Clarkson University **CO-PI:** Stefan Grimberg, Professor, Department of Civil and Environmental Engineering, Clarkson University	Potsdam Sewage Treatment Plant and Cortland Wastewater Treatment Plant / Department of Energy
Development of PFASTrack for commercialization; a Low-Cost Portable Sensor Technology for Field Monitoring of Per and Polyfluoroalkyl Substances (PFAS)	**PI**: Silvana Andreescu, PhD, Chemistry and Biomolecular Science, Clarkson University **CO-PI:** Daniel Andreescu, PhD, Chemistry and Biomolecular Science, Clarkson University	Montrose/ECPT SensorLife LLC

Developing WRF-Hydro Ensembles for Drought Assessment in New York State	PI: Charles N. Kroll	Dr. Adao Matonse Deputy Chief, Operations Modeling & Analysis New York City Department of Environmental Protection (NYC DEP) Bureau of Water Supply
Development of a chemoselective electrochemical sensor for perfluorooctanoic acid in real aqua environments	**PI**: Gyu Leem, Associate Professor, Department of Chemistry, SUNY ESF **CO-PI:** Chang Geun Yoo, Assistant Professor, Department of Chemical Engineering, SUNY ESF Ian T. McCrum, Assistant Professor, Department of Chemical & Biomolecular Engineering, Clarkson University	
Use of continuous monitoring sensor technology for high school water science educational workshops	**PI**: Timothy Morin, Assistant Professor, Environmental Resources Engineering, SUNY-ESF	
Watershed Protection through Microplastics Pollution Participatory Research in a Tributary of Hudson River Under Climate-Driven Change	**PI**: Asher Pacht - Clarkson University, Beacon Institute - apacht@clarkson.edu Brigette Walsh - Clarkson University, Beacon Institute - bwalsh@clarkson.edu **CO-PIs:** Abul Baki - Clarkson, Civil & Environmental Engineering - abaki@clarkson.edu Katie Kavanagh - Clarkson, Institute for STEM Education - kkavanag@clarkson.edu	Fishkill Creek Watershed Association, Beacon City School District, Wappingers Central School District
Exposing engineering undergraduate and K-12 STEM students to technological advances in healthy water research.	**PI**: Masudul Imtiaz, Assistant Professor of Electrical and Computer Engineering Department, Clarkson University, email: mimtiaz@clarkson.edu. **CO-PI:** Abul BM Baki, Assistant Professor of Civil and Environmental Engineering Department, Clarkson University, email: abaki@clarkson.edu.	Potsdam Central School District, North Country Children's Museum, Institute for STEM Education at Clarkson University
Assessing Attitudes towards Rights of Nature (AARoN)	**PI**: Michael Twiss, Professor Emeritus, Clarkson University and Professor, Department of Biology, Algoma University **CO-PI:** Seema Rivera, PhD, Associate Professor and Associate Director of STEM Education	Blake Lavia, Member of the Talking Wings Collective and founder of Talking Rivers, Inc. Tzintzun Aguilar-Izzo, Member of the Talking Wings Collective and founder of Talking Rivers, Inc. Abraham Francis, Aronia Collective Founder (and Clarkson University PhD Candidate, Environmental Science & Engineering)

Be the Microbiologist, a Collaboration with the Museum of Science and Technology	PI: Hyatt Green, Assoc. Prof., Dept. of Environ. Biology	
Evaluation of Aeration for the Mitigation of Harmful Algal Blooms	Boyer, Gregory L, (Professor of Chemistry, SUNY-ESF)	
The abundance and distribution of microplastics pollution in a canal system at a temporal and spatial scale	**PI**: Abul BM Baki, Assistant Professor of Civil and Environmental Engineering Department, Clarkson University, email: abaki@clarkson.edu. **CO-PI:** Thomas Holsen (tholsen@clarkson.edu), Leanne Powers (lcpowers@esf.edu)	
Biochar-based materials for electrochemical removal of scaling ions and heavy metals	**PI**: Taeyoung Kim, Assistant Professor, Department of Chemical and Biomolecular Engineering & Institute for a Sustainable Environment, Clarkson University **CO-PI:** Sitaraman Krishnan, Professor, Department of Chemical & Biomolecular Engineering, Clarkson University, Chang Geun Yoo, Associate Professor, Department of Chemical Engineering, SUNY ESF	Seneca Farms BIOCHAR and ElectraMet
Early Warning of Harmful Algal Blooms Enabled by a Novel CRISPR-based Biosensor	**PI**: Siwen Wang, Department of Civil & Environmental Engineering, Clarkson University, swang@clarkson.edu; Yaqi You, Department of Environmental Resources Engineering, SUNY ESF, yyou@esf.edu.	
Meeting drinking water needs in New York State: Improvements in desalination technology and degradation of disinfection byproducts using visible-light induced photoelectrochemical cells	**PI**: Leanne Powers (lcpowers@esf.edu) **Co-PI:** Gyu Leem (gyleem@esf.edu), Taeyoung Kim (tkim@clarkson.edu), Sitaraman Krishnan (skrishna@clarkson.edu)	Clarkson Ignite Fellowship; Onondaga County Water Authority
Blueback Herring Spawning Runs During and After the Time of Covid – Setting a New Baseline for a Key Forage Fish	**PI**: Karin Limburg, SUNY Distinguished Professor, Department of Environmental Biology, SUNY ESF, klimburg@esf.edu; Abul B. M. Baki, Assistant Professor, Department of Civil and Environmental Engineering, Clarkson University, abaki@clarkson.edu	
Understanding the Emergence of Harmful Algal Bloom from Temporal Profile of Lake Water Microbiome	**PI**: Shantanu Sur, Associate Professor, Department of Biology, Clarkson University **CO-PI:** John M. Farrell, Professor, Department of Environmental and Forest Biology, SUNY ESF	

Advanced Sequencing to Assess Risks Associated with Antibiotic Resistance as An Emerging Contaminant in Great Lakes Sediment and Fish	**PI**: Yaqi You, Assistant Professor, Environmental Resources Engineering, SUNY ESF **CO-PI:** Susan Bailey, Associate Professor, Department of Biology, Clarkson University; Thomas Holsen, Professor, Department of Civil and Environmental Engineering & Center for Air and Aquatic Resources Engineering and Science, Clarkson University	US EPA Great Lakes Fish Monitoring and Surveillance Program, General Dynamics Information Technology, Aquatec Environmental Inc.

Description of any relationships with secondary schools and community colleges designed to foster student interest in scientific and technical careers

More than 250 students were reached through the poster presentations workshop on emerging contaminants and sensors: Silvana Andreescu, Portable sensors and easy-to-use analytical approaches for low-cost detection of PFAS, EPA webinar, May 2nd, 2024. Andreescu was engaged in an EPA workshop and outreach event on environmental science and sensing technologies. Her presentation on May 2nd described recent work on the development of low-cost portable methods for the detection of emerging contaminants, with focus on per/poly-fluorinated substances (PFAS), highlighting novel detection mechanisms, analytical performance and potential for field deployment, and opportunities to translate these technologies into the field. 103 students participated in field science activities centering around microplastics in Beacon, NY and 52 students participated from Potsdam K-12 school.

Strategic plan

The Healthy Water Solutions Center of Excellence (HWS CoE) has played out with a limited and sometimes uncertain state budget allocation. Despite this, the HWS CoE has identified research focus areas (emerging contaminants e.g. harmful algal blooms and PFAS treatment), funded a portfolio of projects with potential for private industry partnerships or commercialization, and initiated an external advisory council. The vision of the Center is to ensure a healthy and sustainable future through the protection and conservation of water resources while the Center's mission is to generate solutions that help protect and improve waters for sustainable natural environments, healthy populations, resilient communities, and sound economies. The Strategic Plan developed by the Center is focusing on increasing seed and commercial grant opportunities while providing educational programs to co-sponsor internships at industry and non-profit organizations.

Governance Structure

The Center is one of two CoE's that is administered by two academic institutions (Clarkson University and SUNY ESF) and is not associated with any significant capital investment. A Steering Committee consisting of three faculty of each institution together with the two co-directors determine the agenda and priorities of the Center. The committee meets biweekly to discuss Center progress. In addition, the Center has established an Advisory Committee consisting of representatives from industry (consulting), government agencies (NYDEC, USGS, USDA) and not-for-profit organizations (e.g. Finger Lakes Institute). The advisory committee meets with the steering committee at least twice per year to provide input and guidance to Center activities. As Center funding levels increased the Center hired one part time administrative staff at each institution increasing efficiency in financial accounting and industry – center outreach/interactions. Most importantly administrative staff helped the Center more efficiently coordinate stakeholders within the two institutions to assist industrial/municipal stakeholders within NY State.

Center of Excellence for Food and Agriculture at Cornell AgriTech
Cornell University
Catharine Young, Executive Director

Technology Focus

Farm robotics and automation; breeding of new varieties of fruits and vegetables and developing new food and beverage products; novel crop protection technologies; developing biomaterials; precision and biomass fermentation, food safety and traceability.

Importance to NYS

The Center of Excellence for Food and Agriculture at Cornell AgriTech (CoE) is the gateway to Cornell University's food and agriculture assets, enabling our clients to grow their businesses while putting New York State on a global stage for innovation with agrifood systems and products.

Purpose

Cornell University, a global agrifood pioneer, drives economic resurgence through its Center of Excellence (CoE). Employing a dynamic "push, pull, grow" strategy, the CoE propels startups to grow, attracts agrifood enterprises to New York State, and nurtures existing companies. The CoE serves as a crucial link, connecting private sector entities with Cornell's research, innovation, and technology for impactful commercialization. Its expert team provides strategic advice and valuable linkages to resources, facilitating success statewide.

The CoE's cutting-edge facilities on the Cornell AgriTech campus offer private sector companies laboratory, office, and co-working spaces, transforming research into real-world applications. Simultaneously, the CoE collaborates with the Cornell Food Venture Center and across the Cornell ecosystem to fortify the entrepreneurship ecosystem, establishing new facilities that bolster the food industry and foster innovation in New York State. The CoE launched the Cornell Fermentation Farming Laboratory (FFL) to support and grow New York's agriculture and food sectors by attracting investment in precision and biomass fermentation. Led by Dr. Bruno Xavier, the lab offers cost-effective services that reduce barriers for companies to innovate and expand in the state, drawing interest from both local and out-of-state businesses.

In essence, the CoE is a transformative catalyst, seamlessly blending academic excellence with private sector dynamism, driving economic growth and innovation in New York. Strategic partnerships and state-of-the-art facilities position Cornell and the state at the forefront of global agrifood advancements.

Impacts

New Jobs	Retained Jobs	Increased Revenues	Cost Savings	Govt Funds	Non-Govt Funds	Capital Improv's	Total Impacts
127	123	$17,407,085	$404,800	$571,902	$11,113,401	$2,887,331	$32,384,519

Companies Served and Projects

Annual Period	# of Companies Served	# of Small NYS Companies Served	# of projects on-going	# of projects completed	# of students engaged with companies
2023 - 2024	343	343	0	153	0

Designations and Recognitions

None

2023 -2024 Operating Budget (include Federal, State, local funds & in-kind)

		Matching Funds		
Operating Budget Description	**NYSTAR Funding**	**Company Cost Share**	**Other Sources**	**Total Budget**
Salaries & Fringe	$865,490	$0	$966,889	$1,832,379
Indirect Costs	$129,823	$0	$0	$129,823
Equipment	$333,546	$0	$607	$334,153
Materials & Supplies	-$22,094	$0	$121,067	$98,973
Tuition	$0	$0	$0	$0
Travel	$24,900	$0	$15,480	$40,380
Subcontractors	$0	$0	$0	$0
Other	$42,554	$0	$659,501	$702,055
Total	$1,374,219	$0	$1,763,544	$3,137,763

Total Federal: $0
Total In-kind: $0

Capital expenditures (include Federal, State, local funds & in-kind)

Capital Equipment Purchases	NYSTAR Funding	Federal	Other Sources	In-kind	Total
American Laboratory Trading - Coy Laboratory Products Dual Airlock 6' And 4' Vinyl Anaerobic Chambers With Cam 12 O2/H2 Monitor	$8,287.50	$0	$0	$0	$8,287.50
American Laboratory Trading - HP/Agilent 1100 Series HPLC System G1312A Binary Pump G1362A RID G1316A Colcom	$9,975.00	$0	$0	$0	$9,975.00
Agilent Technologies - Microplate reader 800 TS abs reader with touchscreen. 400 to 750 nm wl range, inc. to 50 deg C	$8,080.86	$0	$0	$0	$8,080.86
American Laboratory Trading - Eppendorf Innova S44i Triple Stack Biological Shakers Eppendorf Model #S44I21000500	$22,407.50	$0	$0	$0	$22,407.50

B&W Supply - VCS 2000 Ventless cooktop. 208V/60/3ph	$38,799.00	$0	$0	$0	$38,799.00
Multica Inc. – Vacuum sealer C350 Chamber Machine with MAP -MN 108444640	$12,432.30	$0	$0	$0	$12,432.30
Addium AquaLab – water activity meter - REFURBISHED Aqualab 4TE	$278.96	$0	$7,281.04	$0	$7,560
KaTom Restaurant Supply – Cleveland Direct steam mixer kettle, stainless steel, 20 gal capacity	$15,436.54	$0	$15,436.55	$0	$30,873.09
Restaurant Supply – Combi Oven, Electric Model No. ICC 6-HALF E 208/240V 3 PH	$10,793.83	$0	$0	$0	$10,793.83
GEA Systems North America - MOBILE MINOR Pressure Shock Resistant Spray Dryer.	$210,000	$0	$0	$0	$210,000

Commercialization Plan Summary

The CoE's support has fostered innovation and economic growth in agricultural technology, as well as research in the food and beverage sectors, empowering members to commercialize and launch their products. The CoE's close connection with Cornell food science assets has played a pivotal role in supporting the research projects described below:

> The New York Tree Crop Alliance, from January 2024 report – A cooperative of 10 farmers, partnered with the Center of Excellence to commercialize New York-grown hazelnuts, chestnuts, and other tree nuts. With support including business mentoring, product development through Cornell Food Venture Center, and guidance on facility setup, the alliance is launching a new processing plant in Cortland and expects its hazelnut products to reach local grocery shelves by early 2024, marking a major milestone in regional tree nut commercialization.
>
> Crover, from July 2024 report – A Scotland-based startup that develops robotic devices for monitoring grain storage. The company partnered with the Center of Excellence after being named a finalist in the Grow-NY business competition. With support from the CoE, including business mentoring, CoE lab space at Cornell AgriTech, and industry connections, Crover established its U.S. operations in New York. The company is now positioned to grow its presence in the region and expand the applications of its technology beyond grain to other granular materials.

These are just two examples from the Center’s reported research projects over the 23-24 fiscal year.

Actual or anticipated new products or processes with commercial application

None

Start-up Companies Formed

Company Name	City	Product/Service	Sector
ProAgni	Ithaca, NY	Cattle feed supplements	Agriculture
Climate Cookery	Brooklyn, NY	Tamarind Sauce	Food
Mush Foods	Poughkeepsie, NY	Mushroom mycelium food ingredient	Food
Life Itself	Buffalo, NY	Chaga mushroom products	Food
Nonn Pop's Gourmet	Brooklyn, NY	Seafood sauces	Food
FoodNerd	Buffalo, NY	Children's fruit and vegetable-based meals, snacks, and entrees	Food
Kulture Rebellion	Buffalo, NY + Canada	AI-powered fermentations	Food
Spekld	Ithaca, NY	Prepared culinary brown butter	Food
Hazy Fudge	Dundee, NY	Alcohol-infused fudge	Food
Nourrir Drinks	Bronx, NY	Caribbean drinks	Beverage
Ofio Foods	Brooklyn, NY	Plant-based yogurt	Food
Endure Sport Nutrition	Brooklyn, NY	Sport nutrition	Food
The Baking Coach	Huntington, NY	Cookie dough	Food
Blake Farms	Wolcott, NY	Hard apple cider	Beverage
ABCD Kitchen	Purchase, NY	Gourmet chutneys and sauces	Food
Aunt Flo's Kitchen	Ithaca, NY	Snack bites created to ease symptoms of menstrual cramps	Food
Field Day	New York, NY	Canned products	Food
Flutter Butter Bakery	Brooklyn, NY	Bakery shop	Food
Haipei	Brooklyn, NY	Food products	Food
Pumpkin Seed (Tori)	Patterson, NY	Pumpkin seed milk	Beverage
SoupaPOTamus	Painted Post, NY	Packaged individual soups	Food
True Treats	New York, NY	Buttercream frosting	Food
Udderly	LaFayette, NY	Flavored milks	Beverage

Description of each research sponsorship agreement, intellectual property ownership agreement, intellectual property license agreement or any other agreements entered into between the CoE and research partner

None

Description of any relationships with secondary schools and community colleges designed to foster student interest in scientific and technical careers

During this reporting period, the CoE participated in training to inspire the next generation in future scientific and technical careers in food, beverage and agriculture. In 2023, CoE Executive Director

Catharine Young gave a presentation to assist with the hands-on, experiential learning opportunity for high school science educators who visited Cornell AgriTech for Edible Science, Professional Development for Ag in the Classroom Program. Participants engaged in each step of the food safety program and became familiarized with CoE and other Cornell AgriTech resources, learned the science of food preservation, and made products to demonstrate the program outcomes. Those who completed this program took their learning outcomes back into their respective high school classrooms.

Strategic plan

The CoE is dedicated to fortifying New York's agriculture, food, and beverage economy through collaboration with entrepreneurs, startups, and established companies in these sectors. Strategies involve facilitating connections with Cornell University's research, services, technology, and innovation, offering business mentoring, establishing business-to-business partnerships, and accessing supply chain assets. The "push, pull, grow" methodology urges startups to scale up, attract companies to New York, and support the expansion of existing businesses.

Utilizing this approach, the CoE stimulates the growth of entrepreneurs and startups, draws companies to New York State, and nurtures the development of established businesses. Operating within Cornell University systems, the CoE identifies high-tech prospects, channeling Cornell's excellence into the market. Collaborations with entities like the Cornell Food Venture Center, Cornell Fermentation Farming Lab, and the Seneca Foods Foundation Pilot Plant facilitate the expansion of food and beverage manufacturing statewide. The CoE engages with diverse Cornell entities, including the Cornell Dairy Program, Cornell Institute for Digital Agriculture, and Cornell Cooperative Extension offices. Other partnerships span economic development entities and the neighboring incubator and industrial park known as the Cornell Agriculture and Food Technology Park.

Metrics for ensuring the CoE maintains its focus and fulfills its mission include the number of companies served, number of contacts with each company, and increases in company jobs; revenues; federal, state and local funding; and capital investment.

Governance Structure

The CoE operates within the Cornell College of Agriculture and Life Sciences (CALS) at Cornell University, located at Cornell AgriTech in Geneva, NY. It functions under the leadership of Christine Smart, Director of Cornell AgriTech, as an experimental station committed to furthering over 130 years of scientific discovery and continuing to drive economic development. In addition, the CoE works under Julie Suarez as the director of translational research programs in Cornell CALS, to maximize the real-world impact of state-funded centers.

The effectiveness of the CoE is regularly assessed and adapted as needed, with valuable input from various Cornell programs collaborating with the CoE and Executive Director Catharine Young. Under her leadership, the CoE team comprises four business development specialists, an administrative assistant, a project manager, and a marketing and communications coordinator. In addition, the CoE also supports roles such as an extension support specialist based at the Saratoga CCE office.

Center of Excellence in Digital Game Development
New York University
Naomi Clark, Director

Technology Focus
Software and Digital Media – Games

Importance to NYS
The Center of Excellence in Digital Game Development at New York University's ("NYU Game Center" or "Center") efforts are primarily targeted at small business development and workforce development. Part of the Center's strategy is to raise the profile of the presence of the game industry in NYS nationally and globally.

Purpose
The NYU Game Center is a program with more than 250 undergraduate and graduate students enrolled, working to complete degrees in game design. The Center is the number one program in the US as ranked by the Princeton Review. The Center is an incredible resource for companies looking to hire students with backgrounds in technical and artistic aspects of game design. For both Take-Two and the companies the Center works with in its Internship Matching program, companies are provided access to students who are eager to gain experience in the industry, and companies provide students with the professional training they need to thrive in the game industry.

Furthermore, with the Incubator program, the Center is able to support new teams and small businesses to get the professional development they need to start successfully in the industry right after college. Even with an entrepreneurial attitude it's difficult for fresh graduates to orient themselves in the game development market; thanks to NYU's access to industry veterans, the Center is able to offer in-depth mentored professional development to help the selected teams to ease their launch.

Impacts

New Jobs	Retained Jobs	Increased Revenues	Cost Savings	Govt Funds	Non-Govt Funds	Capital Improv's	Total Impacts
0	0	$75,000	$26,125	$0	$0	$0	$101,125

Companies Served and Projects

Annual Period	# of Companies Served	# of Small NYS Companies Served	# of projects on-going	# of projects completed	# of students engaged with companies
2023-2024	14	9	9	5	34

Designations and Recognitions

Awards / Recognition	Date Received	Recognizing Organization	Link
Named #2 UGrad and #1 Grad program in the US	3/20/25	Princeton Review	https://www.princetonreview.com/press/game-design-press-release-2025

2023 -2024 Operating Budget (include Federal, State, local funds & in-kind)

		Matching Funds		
Operating Budget Description	**NYSTAR Funding**	**Company Cost Share**	**Other Sources**	**Total Budget**
Salaries & Fringe	$110,357	$0	$121,846	$232,203
Indirect Costs	$16,554	$0	$18,277	$34,831
Equipment	$0	$0	$0	$0
Materials & Supplies	$0	$0	$13,625	$13,625
Tuition	$0	$0	$0	$0
Travel	$21,449	$0	$0	$21,449
Subcontractors	$0	$0	$0	$0
Other	$199,033	$0	$215,086	$414,119
Total	$347,393	$0	$368,834	$716,227

Total Federal: $0
Total In-kind: $13,625

Capital expenditures (include Federal, State, local funds & in-kind)
None

Commercialization Plan Summary
In 2008, the Center's department began organizing free, game-related events for the community, such as Strategy Guide, our annual career fair. Since 2014, the Center has also run a successful game incubator that provides workspace, support, and connections to publishers for dozens of developers in NYS. As the first game-specific co-working space in NYC, the Center provided free, dedicated workspace for NYC-based developers before the pandemic.

Recurring events that returned to in-person in 2023 includes the Lecture Series, a program of 6 to 8 industry expert and creator talks that have attracted more than 800 people in 2023. This public outreach has given the Center the opportunity to create a unique relationship with not only businesses involved in game development in NYC, but also local companies, consumers, and up-and-coming entrepreneurs. Main goals were:

- To strengthen CoE and industry partnerships. This was achieved through hosting Incubator advisory board nights after the Center's expansion of membership from different backgrounds and skillsets, including several from publishers. This was also supported by the Game Design Days event series, a community-oriented festival about game design at local businesses and community spaces. NYU is funding microgrants for small studios in the city, provided they will match the funds. The goal is to have them familiarize themselves with grants and matchmaking but also to, in the long run, create an independent festival around games like Amaze (Berlin) or

Playtopia (Johannesburg). Attendance at the events was stellar and all the organizers were overwhelmingly satisfied by the support that the CoE was able to provide.

- To further expand the network. This was achieved through the Center's presence at GDC - The Game Developers Conference. For the first time, teams that are part of the Incubator program were able to attend at discounted cost and showcase their game on the Exhibit floor while at the same time taking meetings and pitching their game to publishers for extra funds. The experience was of great growth and expanded the brand awareness of the Center of Excellence in Game Development to stakeholders that could have a long-lasting impact on the industry.

Actual or anticipated new products or processes with commercial application
None

Start-up Companies Formed

Company Name	City	Product/Service	Sector
Glass Jury LLC	New York City	DEEPMESS	Digital Games

Description of each research sponsorship agreement, intellectual property ownership agreement, intellectual property license agreement or any other agreements entered into between the CoE and research partner
None

Description of any relationships with secondary schools and community colleges designed to foster student interest in scientific and technical careers
The Center held the Future Game Designers program in May 2024 with 16 New York high school students from under-represented backgrounds in the arts participating in a 14-week game design program. From June through August 2024 they held the Tisch Game Designers Summer Program. 16 high school sophomores and juniors took college-credit granting classes at NYU. Many of these students end up applying to the undergraduate program.

Strategic Plan
The broad focus of the NYU Game Center is to retain the incredible pool of talent that graduates both at the Graduate and Undergraduate level in New York State and make a career in game design and development here.
The fundamental belief is that if successful in this goal, the entire community will benefit and it will create a virtuous circle that will, in the end, positively impact the Center itself.

The Center is supporting various aspects of the game development community. First, through the Incubator, new talent is fed to it, by supporting 4 to 5 companies to get their games out and professionalized. Second, new content and networking opportunities are brought to the alumni and game design community at large, with public events, showcases and playtest nights. The KPI that the Center tracks in these areas (attendance, company success rate, etc.) are what ultimately defines its success.

Governance Structure
The Center's governance structure is agile and expands when needed for special events, planning and decision making. The core group is composed of 4 colleagues supported by other administrators, faculty and technicians around the University. Specifically for the Incubator project there is a dedicated Governance body, the Incubator Advisory Board, with voting powers (1 person, 1 vote) composed of over 60 professionals from the international Game Design industry.

The core members are:

- Naomi Clark - Department Chair, NYU Game Center. A game industry veteran and co-author of A Game Design Vocabulary (2014).
- Matteo Uguzzoni - NYU Incubator Program Administrator. Architect and award-winning game designer, co-founder of Urban Games Factory.
- Jake Weidner- Center of Excellence Administrator & Industry Liaison, NYU Game Center. Experienced Games Industry Producer and advisor for GDC Experimental Games Showcase.
- Charles Pratt - Game Designer and Associate Professor, NYU Game Center and Faculty Liaison.

*The Digital Game Development Center is shared among NYU, RIT, and RPI

Center of Excellence in Digital Game Development
Rensselaer Polytechnic Institute
Professor Benjamin Chang, Director

Technology Focus

Digital Game Development, Analog Game Design, Virtual Reality, Augmented Reality, Artificial Intelligence

Importance to NYS

Games are a transformative medium, combining the cutting edge of technological innovation with entertainment, creativity, and real-world problem-solving. New York State is a growing hub for the games industry, with $2 billion in annual economic impact supporting over 11,000 jobs in a vibrant ecosystem of large companies, independent studios, and nationally ranked college programs.

Purpose

The Center of Excellence in Digital Game Development works to grow the games industry in New York State, establish the Capital Region and the state as a hub in the global games industry, and advance research in games. The Center leverages the expertise of RPI's Games and Simulation Arts and Sciences Program and works with industry partners, community organizations, economic development agencies, and other partners. The overall strategy includes (1) the talent pipeline, (2) supporting new companies and independent developers, (3) promoting the work of developers in the Capital Region and the outstanding games made in New York, (4) advancing research in games and connecting research to industry, (5) expanding opportunity and diversity in games. The Center's activities and collaborations include incubators and entrepreneurship programs, public events, internships, mentoring, STEM and STEAM educational programs, teacher training, game jams and hackathons, graduate student research in games, and exhibitions at trade shows and conferences. The Center and associated faculty advance research in games pertaining to a variety of topics, including game AI, virtual reality, educational and serious applications of games, wargaming, historical simulation, and the connections between visualization, perception, and cognition.

Impacts

New Jobs	Retained Jobs	Increased Revenues	Cost Savings	Govt Funds	Non-Govt Funds	Capital Improv's	Total Impacts
3	0	$0	$92,168	$0	$60,000	$0	$152,168

Companies Served and Projects

Annual Period	# of Companies Served	# of Small NYS Companies Served	# of projects on-going	# of projects completed	# of students engaged with companies
2023-2024	8	4	0	8	45

Designations and Recognitions

Awards / Recognition	Date Received	Recognizing Organization	Link
Houdini Certified School Partner	7/30/2024	SideFX	https://www.sidefx.com/rensselaer-polytechnic-institute/

2023 -2024 Operating Budget (include Federal, State, local funds & in-kind)

		Matching Funds		
Operating Budget Description	**NYSTAR Funding**	**Company Cost Share**	**Other Sources**	**Total Budget**
Salaries & Fringe	$212,798	$0	$290,842	$503,640
Indirect Costs	$0	$0	$0	$0
Equipment	$9,527	$0	$0	$9,527
Materials & Supplies	$761	$0	$890	$1,651
Tuition	$39,930	$0	$10,938	$50,868
Travel	$32,194	$0	$0	$32,194
Subcontractors	$0	$0	$0	$0
Other	$87,198	$0	$217,991	$305,189
Total	$382,408	$0	$520,661	$903,069

Total Federal: $0
Total In-kind: $0

Capital expenditures (include Federal, State, local funds & in-kind)
None

Commercialization Plan Summary
The Center of Excellence in Digital Game Development leverages broad faculty experience in digital games, analog games, and related technologies and methods from virtual reality to game-based learning. The interdisciplinary team has expertise in areas including AAA and Indie game production; serious games and games for learning; virtual reality, augmented reality, and mixed reality; artificial intelligence; interactive narrative; data visualization; analog and tabletop game design; and 3D modeling and animation. Specialized infrastructure includes a CAVE virtual reality environment, performance motion capture suite, digital fabrication lab, and audio production studio.

The Center's primary sector focus is the games industry: incubating new game studios; providing technical and business expertise; connecting faculty research expertise with industry needs; workforce development, outreach; promoting the work of game studios in the Capital Region; and supporting the game development community.

Key initiatives include Level Upstate, an incubator for indie developers; GameFest, an annual festival showcase of game design students; global events, such as the Game Developers Conference; and working with community partners on game jams, mentoring, and other programs to advance education and access to career opportunities.

The Center is a key partner in establishing RPI's new Office of Strategic Alliances and Translation, OSAT, a major new University level investment in commercialization and tech transfer serving hi-tech fields including games. A Consolidated Funding Application proposal was awarded, which will support a new physical space for incubator/accelerator programs.

Actual or anticipated new products or processes with commercial application
None

Start-up Companies Formed
None

Description of each research sponsorship agreement, intellectual property ownership agreement, intellectual property license agreement or any other agreements entered into between the CoE and research partner
None

Description of any relationships with secondary schools and community colleges designed to foster student interest in scientific and technical careers
The Center works with local partners to foster student interest in not only the fun of playing games, but also the technical innovation, imagination, and teamwork involved in creating games. The Center partners with **Tech Valley Game Space**, which offers after-school programs in game design and youth game jams and hackathons in addition to their work supporting independent game developers.

The Center submitted a proposal to the Unity Workforce Development Grants program, a grant program run by Unity, makers of the industry-standard Unity 3D game engine. The grant proposal is to provide targeted training in Realtime 3D, or RT3D development, which encompasses interactive 3D graphics applications in training, simulation, and visualization in industries such as construction and manufacturing.

The Center began work on establishing a game design summer camp for secondary school students in the Capital Region, which will run in the summer of 2025. The program is designed as a week-long summer intensive that will introduce students to all stages of the game development pipeline and each student will design their own game from scratch over the course of the week.

Strategic Plan
The broad focus and mission of the Center is to advance research in games, support and grow the games industry in the Capital Region. The Center works closely with local companies, economic development entities, and community groups to identify needs and opportunities. The overall strategy incorporates multiple approaches to different parts of the challenge:

- Build and Refine the Talent Pipeline
    - Prepare students to work and innovate in the games industry through undergraduate and graduate education at RPI.
    - STEM, STEAM, teacher training, and other outreach programs.
    - Work with partner organizations to provide opportunity and alternate pathways.

- Assist New Studios and Companies
    - Level Upstate, the Center's incubator for early-stage studios and independent developers.
    - Provide mentoring and networking opportunities.
    - Provide technical expertise.
    - Work with local partners to create and "scale up" accelerator programs.
- Established Companies
    - Identify and work to address workforce needs.
- Regional Profile
    - GameFest, the Center's annual public exhibition and symposium of student and indie games. GameFest features student games from colleges and universities around the Northeast and has been hosted by RPI since 2004.
    - Promote the work of companies in the cluster, as well as opportunities in the region and the State, at conferences and trade shows. The primary example is the Game Developers Conference (GDC) in San Francisco, CA.
- Technology Innovation and Application
    - Pursue research in VR/AR, AI, and other areas relevant to games.
    - Apply game technologies to problems in other related industries.

Governance Structure

The Center of Excellence in Digital Game Development is housed in the School of Humanities, Arts, and Social Sciences (HASS). The Director reports to the Dean of the School of HASS. The Center is closely aligned with the Games and Simulation Arts and Sciences Program (GSAS), an interdisciplinary program in the School of HASS with connections to the School of Science and the Lally School of Management. GSAS offers B.S, M.S., and Ph.D. degrees with faculty from multiple Departments, including Arts, Cognitive Science, Computer Science, Communication and Media, and Science and Technology Studies. The Center and the GSAS Program work closely with industry and community partners in the Capital Region on curriculum design; workforce development; the entrepreneurship ecosystem; diversity and inclusivity; public events; and promoting the Capital Region and New York State game development sector.

*The Digital Game Development Center is shared among NYU, RIT, and RPI

Center of Excellence in Digital Game Development
Rochester Institute of Technology
David Long, Director

Technology Focus
Digital media research, production and publication - including games, live-action film, animation, digital design VR/AR/XR and more

Importance to NYS
The RIT Center for Media, Arts, Games, Interaction & Creativity (MAGIC) | MAGIC Spell Studios fosters collaboration between the academic research community on campus and business, studio and technology sectors in the Rochester community. MAGIC leverages its state-of-the-art facilities, professional and academic networks, and faculty and student expertise in digital media research and production to develop and commercialize new media and technologies; promote investment in digital media production in New York state; help incubate and expand technology-related businesses and employment opportunities; and retain a highly educated workforce in the Rochester area and within the state.

Purpose
MAGIC utilizes resources, equipment, facilities, and personnel to grow the digital media field, and specifically the games industry, in New York state by fostering community and talent in K-12 schools and programs; supporting college-level students who are interested in publishing games through our MAGIC Maker program; supporting regional indie developers through our Community Incubator program; showcasing and playtesting games being developed in our community at the annual Rochester Game Festival; and advocating for the region at conferences/festivals and events in around New York state and across the country (i.e. GDC, PAX East).

Impacts

New Jobs	Retained Jobs	Increased Revenues	Cost Savings	Govt Funds	Non-Govt Funds	Capital Improv's	Total Impacts
0	0	$0	$29,525	$0	$0	$0	$29,525

Companies Served and Projects

Annual Period	# of Companies Served	# of Small NYS Companies Served	# of projects on-going	# of projects completed	# of students engaged with companies
2023-2024	15	8	16	11	38

Designations and Recognitions

Awards / Recognition	Date Received	Recognizing Organization	Link
Animation program national ranking	January 31, 2024	Animation Career Review	https://www.rit.edu/news/rits-school-film-and-animation-ranked-no-16-nationally

Game Design program national ranking	March 13, 2024	Animation Career Review	https://www.rit.edu/news/rit-ranked-among-top-game-design-schools-united-states
National finalist, Coca-Cola Refreshing Films competition	March 21, 2024	Coca-Cola Refreshing Films	https://www.rit.edu/news/graduate-students-selected-as-finalists-2024-coca-cola-refreshing-films-program
Awards: RPI GameFest	May 28, 2024	RPI	https://www.rit.edu/news/rit-student-video-game-wins-big-gamefest-2024
Film and animation programs national ranking	August 15, 2024	Hollywood Reporter	https://www.rit.edu/news/rits-school-film-and-animation-ranked-among-top-25-american-film-schools
Film and animation programs national ranking	October 31, 2024	The Wrap	https://www.rit.edu/news/rits-school-film-and-animation-named-among-top-50-best-film-schools-thewrap
Game Design program national ranking	March 21, 2024	Princeton Review	https://www.rit.edu/news/rit-game-design-and-development-programs-ranked-among-top-10

2023 -2024 Operating Budget (include Federal, State, local funds & in-kind)

		Matching Funds		
Operating Budget Description	**NYSTAR Funding**	**Company Cost Share**	**Other Sources**	**Total Budget**
Salaries & Fringe	$224,214	$0	$131,034	$355,248
Indirect Costs	$33,632	$0	$18,869	$52,501
Equipment	$0	$0	$0	$0
Materials & Supplies	$1,803	$0	$531	$2,334
Tuition	$0	$0	$0	$0
Travel	$29,653	$0	$35,000	$64,653
Subcontractors	$0	$0	$0	$0
Other	$50,560	$0	$80,669	$131,229
Total	$339,862	$0	$266,103	$605,965

Total Federal: $0
Total In-kind: $0

Capital expenditures (include Federal, State, local funds & in-kind)
None

Commercialization Plan Summary

The Center focuses on the promotion of all digital game activities in the Rochester region and plays a leadership role in developing the narrative of digital games in NYS while establishing RIT and the MAGIC Center as the recognized resource (hub) for game-related activity and the starting point for game development in the Rochester region. MAGIC has continued leadership of the Digital Games Industry Association, an organization founded to help enhance and influence the economic growth of our local digital games industry by increasing the local studio and community groups' participation and collaboration. The Center is positioning the MAGIC Community Incubator Program (now in its 6th cohort) to become a vital community asset and support new projects on an annual basis. Finally, MAGIC will help to develop and disseminate a viable entrepreneurism roadmap for local independent game developers, start-up studios, and students and create a shared view on the pipeline of student talent to NYS studios.

Actual or anticipated new products or processes with commercial application

Patent Name	Inventor	Co-inventor	Patent Number	Description
Cyber Surfer	Caleb Vaccaro	NA	NA	Video Game
Gravity	Jeff Hube	NA	NA	Video Game
Reflectile	Joseph Aquire	NA	NA	Video Game
So To Speak	Erik Andreson	NA	NA	Video Game

Start-up Companies Formed

None

Description of each research sponsorship agreement, intellectual property ownership agreement, intellectual property license agreement or any other agreements entered into between the CoE and research partner

Project	Inventor	Licensing Partner
EPIC Games: Previsualization and Virtual Production Curriculum Development	David Long	MAGIC Center
Improving And Modernizing Machinist Training And Education	Rui Liu	MAGIC Center
Enhancing Privacy Notices Visceral Interfaces for Eye Tracking	Evan Selinger Shaun Foster	MAGIC Center
KMT MAGIC Charter School Program	David Long	MAGIC Center
Visual Information about surface curvature from patterns of image shading and contours	Thomas Phillips	MAGIC Center

Description of any relationships with secondary schools and community colleges designed to foster student interest in scientific and technical careers
MAGIC continues to engage the K-12 population by raising awareness of career opportunities in the digital media fields and specifically the games industry. Outreach efforts included multiple K-12 workshops as well as with several community organizations including The Strong Museum and ROC Game Dev, and by hosting the annual Rochester Game Festival, now in its 8th year.

Strategic plan
MAGIC is a resource for the RIT and Rochester communities and beyond. MAGIC provides unique facilities that are available for film, games, and interactive media design. MAGIC facilities were built for delivering hands-on curriculum in game design, 2D and 3D animation, filmmaking, and digital design. RIT students learn using the same hardware and software platforms found in industry while honing their technical and creative skills. A fully outfitted sound stage and post-production studio further enhances experiential education opportunities and permits faculty to introduce real-world film, animation, and digital media workflows to the classroom.

The Center's activity and engagement in the community spans the physical studio and post-production spaces to co-work suites available to host companies for long-term engagements. MAGIC's strengths and strategic priorities are: teaching, scholarship, exhibition, entrepreneurism, and economic development. MAGIC is a catalyst for economic growth throughout the Rochester region and New York State. Students are hired to work as co-ops/interns and full-time employees at MAGIC to develop their own IP as well as to contribute to contracted for-hire services in digital media production for external clients wishing to engage with RIT. MAGIC facilities serve to showcase the creative output of RIT students and faculty and provide a performance platform for the campus and the Rochester community. Magic serves as a premier campus event space for academic and community activities associated with the MAGIC core mission.

MAGIC provides a home for start-up incubation and the commercialization of digital media products. Students bring their ideas and are supported with funding, business start-up mentorship, and access to a full suite of technical tools. Core to entrepreneurial support is the MAGIC Maker program, a competitive program that allows students to pitch digital media product ideas and can earn both experiential education co-op credit and start-up funding for publication and commercialization. The Center supports indie developers in the Rochester community through our Community Incubator Program, a program that was modeled after the successful student Maker program. A new program was added last year, the Traver Creative Technologists Founders program which focuses on entrepreneurism and matching problems that creative industries face with software and technology solutions. For more information about all of our programs, visit: https://www.rit.edu/magic/make-publish

MAGIC was built in collaboration with RIT's nationally ranked academic programs from the School of Film and Animation, School of Interactive Games and Media, and School of Design. Faculty from all three programs engage in research and production in the building, developing curriculum and engaging students at the undergraduate and graduate levels. MAGIC is an RIT-designated Research Center of Excellence housed within the Office for the Vice President of Research and is also home to the Frameless Labs initiative in AR/VR/XR immersive media development and hosted the 9th annual Frameless Symposium in November 2024.

MAGIC projects run the gamut from traditional entertainment-based publications in film, animation, games and immersive media to 'serious' games applications such as for simulation, visualization, digital therapeutics, skills training, and social services.

Governance Structure

MAGIC does not have a governance structure (i.e. board), but instead a staffing structure that includes (https://www.rit.edu/magic/contact):

- Dr. David Long, Director
- Jennifer Hinton, Chief of Staff | Director of Game Industry Relations
- Brenda Schlageter, Financial Operations Manager
- Amanda Hughes, Technology and Studio Manager
- Aaron Nieboer, Digital Game Hub Associate
- Eva Sarachan-Dubay, Events and Social Media Manager
- Dennis McCorry, Digital Game Hub Coordinator
- Andrew Sevigny, Media & IT Systems Engineer

*The Digital Game Development Center is shared among NYU, RIT, and RPI

Center of Excellence in Precision Medicine and Responses to Bioterrorism and Disasters
New York Medical College
David Markenson, Director

Technology Focus
Education and Consulting for response to disasters, terrorism, mass casualty events, medical and traumatic emergencies and public health emergencies.

Importance to NYS
The Center is a unique resource with no other facility possessing both the technological and research expertise nor the simulation and training capabilities to address the needs of the audiences served and assure preparedness in NYS for public health emergencies, natural disasters, mass violence including mass shootings and terrorism events.

Purpose
Since 2005, the Center of Excellence in Precision Medicine and Responses to Bioterrorism and Disasters (the Center) has been a leader in the fight against pandemics, mass casualty incidents, terrorism, public health emergencies and natural disasters. The Center combines NYMC's globally recognized assets, expertise and research findings encompassing natural disasters, terrorism, operational and tactical medicine, and public health preparedness, with competence in the unique needs of children, people with disabilities, and healthcare systems preparedness. The Center is a unique and widely sought resource for law enforcement, EMS, fire services, healthcare, public health, business, and education sectors. Offering education and training, structured simulation exercises with feedback, drills and expert consulting. The center provides these services to critical sectors in NYS including first responders, law enforcement, healthcare organizations, public health, schools and business in disaster, operational and tactical medicine. This also includes education in the novel model and unique training provided in the Rescue Task Force Model which based on the Center's research has been validated to improve survival from events. The Center also provides critical education to school districts and the professionals who work at schools in emergency preparedness, verbal de-escalation, emergency medical response and response to opioid overdose including student education and community engagement. The Center employs in its education the latest methodologies to include augmented and virtual reality. This is delivered with the Center's developed Immersive and Visionary Medical Technologies (IVMT) and Advance Full Dive Virtual Reality (FDVR).

Impacts

New Jobs	Retained Jobs	Increased Revenues	Cost Savings	Govt Funds	Non-Govt Funds	Capital Improv's	Total Impacts
0	0	$125,525	$0	$0	$0	$0	$125,525

Companies Served and Projects

Annual Period	# of Companies Served	# of Small NYS Companies Served	# of projects on-going	# of projects completed	# of students engaged with companies
2023-2024	72	0	8	59	964

Designations and Recognitions
None

2023 -2024 Operating Budget (include Federal, State, local funds & in-kind)

		Matching Funds		
Operating Budget Description	**NYSTAR Funding**	**Company Cost Share**	**Other Sources**	**Total Budget**
Salaries & Fringe	$718,919	$0	$845,645	$1,564,564
Indirect Costs	$107,838	$0	$0	$107,838
Equipment	$3,960	$0	$0	$3,960
Materials & Supplies	$1,342	$0	$0	$1.342
Tuition	$0	$0	$0	$0
Travel	$14,697	$0	$0	$14,697
Subcontractors	$42,181	$0	$0	$42,181
Other	$44,814	$0	$95,548	$140,362
Total	$933,751	$0	$941,193	$1,874,944

Total Federal: $0
Total In-kind: $0

Capital expenditures
None

Commercialization Plan Summary
The Center has developed a dedicated multi-function facility with advanced capabilities in virtual-reality and real-time simulations of response and recovery. Emphasis on human response factors utilize dramatized patients, critical decision making, responders' overload and fatigue, artificial intelligence models, augmented and virtual reality training in a metaverse environment, and tactical capabilities. In addition, the center has continued its development and further refinement of medical care under austere conditions for victims, responders, and suspected offenders. Advanced simulations will utilize the most technologically advanced educational approaches including augmented reality/metaverse and virtual-reality sensors embedded in the walls that change environments in real time. This approach uses unique models to the Center called Immersive and Visionary Medical Technologies (IVMT), Full Drive Virtual Reality (FDVR) and Rescue Task Force. Additional tactical hardware and devices will provide under-fire and gas-release training. Innovative disaster management modules will be provided for senior executives in government and business to engender advanced competencies in incident command and control, as well as continuity of operations (COOP).

Actual or anticipated new products or processes with commercial application
None

Start-up Companies Formed
None

Description of each research sponsorship agreement, intellectual property ownership agreement, intellectual property license agreement or any other agreements entered into between the CoE and research partner
None

Description of any relationships with secondary schools and community colleges designed to foster student interest in scientific and technical careers
The Center continues to provide education to student physicians, public health students, allied health students and dental students at New York Medical College. The didactic and hands-on emergency, prehospital and disaster medicine education provided by the Center allows student physicians, dental students and public health students to apply their new clinical skills at hospitals, healthcare institutions, public health departments and corporations in the Westchester County and New York City area. These students are representative of the over 200 healthcare and public health providers produced by New York Medical College each year, many of which choose to remain in New York.

In addition, the Center continues to provide center developed and customized MCI, operational and tactical medicine, trauma, hemorrhage control, emergency management education for healthcare, EMS, Law Enforcement, Fire Service, Public Health and Emergency Management. This education leads to workforce development in all these sectors as well as scope and capacity increases for these employees.

Lastly, the Center supports programs at local colleges and schools in Disaster Medicine to stimulate interest in this area of Science and Technology.

Strategic plan
The Center for Disaster Medicine is a specialized asset that promotes resilient communities by enhancing preparedness for mass-casualty emergencies, such as severe weather, and the effects of climate change, active shooters and mass violence, disease outbreaks, terrorism and cyber-attacks, chemical spills, nuclear accidents, opioid rescues, and other life-threatening events. The Center's greatest strength is its focus on principles of preparedness instead of rigid protocols. The Center brings unique and specialized expertise to inform the critical strategies and tactics required for broad community-based preparedness and response. These include vital analytic proficiencies, site-specific education, training and drills. The Center places a special emphasis on equity and underserved populations, as well as medically indigent, disabled, children, and elderly. The Center houses advanced capabilities, informed by years of earlier research, in an applied educational facility with designated training modules for personnel from diverse community sectors –first-responders, health providers, fire services, hospital systems, and the public health, education (K-12 and higher education), law enforcement, government, and business communities. The Center also provides consultative resources to augment State and community planning and guidance creation. The center annually develops metrics guided by its advisory board and approved by the director. Quarterly these metrics are reviewed against targets and then presented to the Advisory Board. Planning for further expansion of our physical plan to allow an increased deliver of programs both in terms of numbers of students accommodated and types of programs offered is in place. This plan includes identification of financial support for expansion.

Governance Structure

The New York Medical College CoE in Precision Responses to Bioterrorism and Disasters is a division of the New York Medical College Center for Disaster Medicine (CDM). CDM is a college level center authorized by the NYMC Board of Trustees. Day to day management rests with the Center's Director. The Director reports to the Dean of the School of Health Sciences and Practice who in turn reports to the Chancellor and Chief Executive Officer, New York Medical College and Provost for Biomedical Affairs, Touro College and University System.

The New York Medical College CoE in Precision Responses to Bioterrorism and Disasters has an Advisory Board comprised of representatives from the sectors served, stakeholders in the community and partners. The Advisory Board provides input on the strategic plan and annual metrics. The Advisory Board also provides input on annual review of the Center's success and achievement of annual metrics.

Center of Excellence in Advanced and Sustainable Manufacturing (CoE-ASM)
Rochester Institute of Technology
Dr. Michael Thurston, Director

Technology Focus

Advanced and Sustainable Manufacturing

Importance to NYS

Available to NYS manufacturers in all industries, CoE-ASM's technical assistance improves product and process sustainability, strengthens operations, and enables advanced manufacturing technology adoption, while CoE-ASM technology development and manufacturing readiness assistance supports startup success. These efforts enable a more competitive and resilient manufacturing sector and manufacturing job growth in NYS.

Purpose

CoE-ASM's purpose is to provide technical expertise to NYS companies to improve manufacturing sustainability, competitiveness, and to increase the number of manufacturing jobs. CoE-ASM focuses on three primary activities: 1) technical assistance to NYS manufacturers and start-ups, 2) applied research and development to provide solutions to commonly faced technology challenges, and 3) new technology awareness and training.

CoE-ASM assists NYS manufacturing companies with identification and adoption of existing technologies to improve the performance and efficiency of their products and processes. CoE-ASM research and development focus is three-fold: 1) improve overall manufacturing efficiency and effectiveness, 2) reduce product material and energy intensity over the life cycle, and 3) develop and support transition to advanced manufacturing processes. Activities include engagement with Manufacturing USA Institutes, development of metrics and assessment tools for advanced and sustainable manufacturing, technology proof-of-concept demonstration and evaluation, technology deployment and commercialization support through manufacturing readiness assessment and advancement, and technology design troubleshooting and refinement. Deployment activities include, but are not limited to, licensing of technology resulting from research, technical and economic assessments of candidate technologies, manufacturing process assessments, and technical training (e.g., training in sustainable design, manufacturing readiness, digital manufacturing).

CoE-ASM's Industry 4.0 initiative links NYS companies with the work of Manufacturing USA Institutes, including MxD (digital), and ARM (robotics), to advance integration of advanced manufacturing technologies, such as machine learning, business intelligence, and robotics, in manufacturing operations – with a focus on supporting small and medium-sized NYS manufacturers.

Impacts

New Jobs	Retained Jobs	Increased Revenues	Cost Savings	Govt Funds	Non-Govt Funds	Capital Improv's	Total Impacts
25	10	$2,342,532	$578,955	$8,364,759	$1,832,694	$85,000	$13,203,940

Companies Served and Projects

Annual Period	# of Companies Served	# of Small NYS Companies Served	# of projects on-going	# of projects completed	# of students engaged with companies
2023-2024	53	39	15	21	5

Designations and Recognitions

None

2023 -2024 Operating Budget (include Federal, State, local funds & in-kind)

		Matching Funds		
Operating Budget Description	**NYSTAR Funding**	**Company Cost Share**	**Other Sources**	**Total Budget**
Salaries & Fringe	$984,585	$60,754	$356,324	$1,401,663
Indirect Costs	$147,688	$30,391	$559,990	$738,069
Equipment	$0	$0	$83,290	$83,290
Materials & Supplies	$24,111	$2,201	$48,163	$74,475
Tuition	$0	$0	$0	$0
Travel	$5,251	$68	$5,727	$11,046
Subcontractors	$0	$0	$8,179	$8,179
Other	$18,139	$2,333	$57,316	$77,788
Total	$1,179,774	$95,747	$1,118,989	$2,394,510

Total Federal: $724,561
Total In-kind: $0

Capital expenditures

None

Commercialization Plan Summary

The CoE-ASM commercialization plan considers four primary commercialization pathways:

1) Identify and apply under-utilized technologies to resolve specific business challenges faced by NY State manufactures – this may include established and emerging technologies;
2) Work with specific NYS companies to develop product and process technologies that address a particular product manufacturing opportunity or challenge, and facilitate adoption of the technology within the company while considering other broader dissemination opportunities;
3) Research and develop new technologies that advance the state-of-the-art in Advanced and Sustainable Manufacturing, and license CoE-ASM developed technologies that have unique intellectual property and/or disseminate the findings more broadly. CoE-ASM prioritizes outcomes that may result in licensing and dissemination within NY State;
4) Provide support to companies to prepare new technologies for commercialization – this includes working with start-ups and existing manufacturers to address technology and manufacturing readiness challenges impeding their product launch or the company's growth within NY State.

Actual or anticipated new products or processes with commercial application

Patent Name	Inventor	Co-inventor	Patent Number	Description
NA	Frank Zelinger	Mark Walluk Brandon Baker	NA	Method for Handling of and Fluid Delivery to Gene Transfer Discs for Advanced Gene Therapy
NA	Catherine Swail,	James Larrabee, Marty Schooping	NA	Mechanical and electrical design for robustness and manufacturing readiness of bottle sorting machine for Evtek, Inc.
NA	Catherine Swail	Mark Walluk	NA	Design for performance and manufacturing of end plate for vanadium flow battery. For Ashlawn Energy
NA	Christopher Piggott	Timothy Murtaugh	NA	Development of software system for remote monitoring of commercial laundry equipment. For G.A. Braun, Inc.

Start-up Companies Formed

None

Description of each research sponsorship agreement, intellectual property ownership agreement, intellectual property license agreement or any other agreements entered into between the CoE and research partner

Project	Inventor	Licensing Partner
Next Generation Mammography	Brandon Baker, Mark Walluk, Scott Nichols, Ronald Holding	BiRed Imaging
Duet and Optical Sensor EMC and DFM Design Review	James Larrabee	TelosAir Corp
Glass Showcase Prototype Build & Test - Phase 1	Ryan Parsons	Gaylord Bros, Inc.
EcoCount 3.0 Design for Manufacturing - Electrical System Redesign	Scott Nichols	Evtek, Inc. (Recycletek)
Heat Sink Design Assistance	Brandon Baker	MIMiC Systems Inc.
Glass Showcase Prototype Build & Test	Ryan Parsons	TDO for Gaylord Bros, Inc.
IIoT Implementation: Condition Monitoring System for Press Equipment	Kim Pendelberry	Hendrickson Medina (Brunner)
Standard optical microscopy failure analysis of ceramic bearings after temperature exposure	Joha Shamsujjoha	Optimation Technology
Implementation of Temperature Monitoring System	Christopher Piggott	Craft Cannery

Beet Handling Automation Assessment	Adam Agosti	Love Beets
Manufacturing Operations Software Selection Assistance	Gerry Hurley	ITAC for YULA
Design and Prototype Methods for Handing and Delivering Fluid to Gene Transfer Discs	Frank Zelinger	Advanced Gene Transfer Company (AGTC)
Scanning Electron Microscopy and Energy Dispersive Spectroscopy Analysis of Component and Contamination	Joha Shamsujjoha	Optimation Technology
Steel Chemistry Literature Review and Data Analysis	Joha Shamsujjoha	Markin Tubing
Razor Concept and Prototype Design	Catherine Swail	Peelz On Wheelz
Property Evaluation of Reclaimed Aluminum Foundry Sand	Joha Shamsujjoha	K&H Precision Products, Inc.
Fault Detection Feasibility Study	Nenad Nenadic	Clever Devices
EcoCount Manufacturing Support and Diverter Design - Phase 1	Catherine Swail	Evtek, Inc. (Recycletek)
EcoCount Manufacturing Support and Diverter Design - Phase 1	James Meyer	Seating, Inc.
Ceramic Composite Tensile Testing	Catherine Swail	AlchLight, LLC
Stitch NYC – Shop floor Workflow Engineering Assistance	Gerry Hurley	ITAC for Stitch NYC
Finish Development of Web Application for Remote Monitoring of Industrial Laundry Systems	Timothy Murtaugh	G.A. Braun Inc.
Electric Motor Test Stand Dyno Integration Continuation	Scott Nichols	Raymond Corp.
Ashlawn Energy, LLC End Plate Design and Analysis	Catherine Swail	AM&T for Ashlawn Energy, LLC

The first entry is a license agreement. The remainder are research sponsorship agreements. Projects under a sponsored research agreement during the reporting period are listed with the Principal Investigator/Project Lead in place of the “Inventor” and the partner and/or sponsoring company/organization in place of the “Licensing Partner.”

Description of any relationships with secondary schools and community colleges designed to foster student interest in scientific and technical careers

CoE-ASM collaborated with Monroe Community College and RIT’s College of Engineering on a National Science Foundation-sponsored project entitled, “Improving and Modernizing Machinist Training and Education for Machining Workforce Preparation in the Finger Lakes Region of New York,” to support workforce development in smart and sustainable manufacturing. In December 2023, CoE-ASM gave a tour of smart and sustainable manufacturing activities in RIT laboratories for students and manufacturing companies participating in the project.

The Center also provides outreach to students in grades K-12 through direct outreach as well as hosting events to engage students in STEM activities. In March 2024, CoE-ASM provided tours of RIT labs and testbeds to more than 85 students that were in attendance for RIT's First Robotics competition. Students from across NY were shown RIT's industry-leading facilities and gained insight into the labs capabilities to educate them on career opportunities in this sector. In July 2024, CoE-ASM hosted students from local middle schools for a ManufactuRIT event. CoE-ASM also hosted students who were at RIT for the 2024 Finger Lakes Regional FIRST Robotics Competition. Students were able to speak directly with engineers and learn about projects involving cobots and how CoE-ASM assists companies across the state.

In Spring of 2024, CoE-ASM engineers aided two FIRST robotics teams with engineer design, fabrications, and advice. This included an engineer mentoring Penfield High School's Team 1511 Rolling Thunder, helping the students learn Computer Aid Design (CAD) methodologies in Autodesk Inventor, design manufacturable parts, create shop drawings, and assemble their robot. The team made it to the playoffs at their first regional of the season. Another CoE-ASM engineer was a mechanical and CAD mentor for the Finney Falcons, Team 1405. His role included teaching the basics of parametric modeling and how to create parts in OnShape. He also set up a new laser cutter and taught the students how to use it safely. Team 1405 ranked 8th out of 54 teams at the Finger Lakes Regional at RIT and reached 3rd place in the Cleveland Buckeye tournament. In December 2024, a CoE-ASM team member was a judge for the regional competition of the Y-Y-Upstate Junior Science and Humanities Symposium for grade 9-12, supported by the Department of Defense. Participants perform original STEM research, showcase their findings in an oral presentation or research poster, and compete for both scholarships and invitations to represent the region at the National JSHS event.

Strategic Plan

CoE-ASM focuses on activities that directly enhance the competitiveness of NY State companies resulting in economic growth in the state and that promote increased federal funding for Advanced and Sustainable Manufacturing in NY. Specific strategies employed include: Identifying opportunities for new company creation or job creation at existing companies, supporting smart products and systems, and providing value added sustainability services to industry; Leveraging relationships with FuzeHub and the MEP network as well as with other NYS Centers; Strengthening and building relationships with industrial partners and NY trade organizations; Developing/maintaining a diverse and highly qualified advisory board; Maintaining a qualified engineering staff and scientific team dedicated to company and grant funded projects; Partnering/collaborating with existing programs to facilitate outreach and marketing; Supporting/advancing growth of existing NY State clusters including Energy Storage and Food Processing, and supporting state investments in clean technology company incubation; Engaging in Manufacturing USA Institutes in aligned technology areas.

To determine how to tailor support of companies and outreach to the community related to CoE-ASM's mission, CoE-ASM will continue to annually collect, analyze, and react to the ESD-required metrics from companies assisted (e.g., jobs created, retained, and monetary impact). These metrics along with the general progress toward the above stated strategies will be periodically reviewed with the CoE-ASM advisory board in order to assess and revise the strategy to maintain pertinence to NYS needs in the Center's technology focus area.

Governance Structure
CoE-ASM is governed by the terms of the contract between NYS and RIT. RIT's Sponsored Research Services and Sponsored Program Accounting departments ensure contractual and financial compliance.

CoE-ASM is led by its Director, Dr. Michael Thurston, who is engaged in development and outreach, program leadership, project review, and educational activities. He is responsible for developing relationships with CAT and CoE Centers, as well as national initiatives. CoE-ASM Program Manager, Mark Walluk, manages the day-to-day operations of the Center, oversees technical staff, and engages prospective NYS industrial partners.

CoE-ASM is advised by an industry advisory board led by Dr. Nabil Nasr - a global leader in sustainability and an expert in Industrial and Systems Engineering. The board consists of a cross-section of business leaders, as well as representation from Empire State Development's NYSTAR division.

Advisory Board Members (during the 2023-2024 reporting period):

- Christine Whitman - Chairman and CEO, Complemar Partners Inc. RIT Trustee
- John Batiste - CEO, Buffalo Armory
- John Perrotti - Chairman and CEO Gleason Corporation
- Kevin Surace - Chairman & CTO, Appvance.ai
- Judith Tholl - Director of University Relations, Empire State Development's Division of Science, Technology and Innovation
- Ben Verschueren - Executive Director, Empire State Development's Division of Science, Technology and Innovation (NYSTAR)
- Richard Kaplan - CEO and Director, CurAgeis, RIT Trustee
- Jerry Joliet - CEO, Newtex Industries Inc.
- Arunas Chesonis - Managing Partner, Safar Partners
- Bruno Glavich - CEO, Applied Image Group Inc.

Center of Excellence: Advanced Energy Research and Technology (AERTC)
Stony Brook University
Abdelrahim Brown, Center Director

Technology Focus
Focus areas are offshore wind, grid resilience, energy storage, low-carbon fuels, and emerging decarbonization solutions.

Importance to NYS
Through applied research and targeted partnerships, AERTC contributes directly to New York State's clean energy and climate mandates. Its initiatives stimulate economic growth via workforce expansion, capital investment, and public-private funding, while addressing technical barriers to statewide decarbonization and energy transition goals.

Purpose
AERTC supports the development and commercialization of energy technologies by addressing gaps in technical capacity, communication, and education. The Center empowers partner organizations to scale innovations aligned with New York's climate and economic priorities. Activities include product development, pilot demonstrations, and market deployment, complemented by outreach and workforce initiatives.

Leveraging institutional strengths from Stony Brook University, Brookhaven National Laboratory, and its Advisory Board, AERTC continues to expand its influence across the regional clean energy ecosystem. Its 50,000-square-foot facility offers specialized labs and collaborative workspaces for faculty, students, and industry partners.

AERTC hosts educational and training events to build awareness and capacity across the energy sector. Engagement spans K–12 schools, community colleges, elected officials, and industry stakeholders. Workforce programs provide hands-on experience and career pathways for students, while offering companies access to emerging talent and collaborative research opportunities.

Impacts

New Jobs	Retained Jobs	Increased Revenues	Cost Savings	Govt Funds	Non-Govt Funds	Capital Improv's	Total Impacts
142	138	$96,000	$466,777	$25,000	$1,342,000	$976,331	$2,906,108

Companies Served and Projects

Annual Period	# of Companies Served	# of Small NYS Companies Served	# of projects on-going	# of projects completed	# of students engaged with companies
2023-2024	17	10	28	11	61

Designations and Recognitions

Awards / Recognition	Date Received	Recognizing Organization	Link
Fellow National Academy of Inventors (NAI)- Dr Devinder Mahajan	Dec-2024	NAI	https://academyofinventors.org/nai-announces-2024-class-of-fellows/
Awardee, TAF- Dr. Devinder Mahajan	September 2024	Technology Accelerator Fund (TAF) Turbo	https://www.suny.edu/impact/research/taf/taf-awards/
Secretary of Energy Achievement Award- Dr Esther Takeuchi	April 23	Department of Energy	https://www.bnl.gov/newsroom/news.php?a=121071
Special Festschrift Issue in The Journal of Physical Chemistry - Dr Esther Takeuchi	March 24	Festschrift	https://pubs.acs.org/page/jpccck/vsi/takeuchi-festschrift
Chair of the American Chemical Society's (ACS) Environmental Division. - Dr Alexander Orlov	December 2023	American Chemical Society's (ACS)	https://news.stonybrook.edu/newsroom/press-release/awards/stony-brook-scientist-named-new-chair-of-acss-environmental-division/
2023 Motohisa Kanda Award- Dr Fang Luo	August 2023	IEEE Electromagnetic Compatibility (EMC) Society	https://www.stonybrook.edu/commcms/electrical/news/2024/FangLuo2024.php
KIChE-US Chapter Service Recognition Award - Dr Tae Jin Kim	November 2023	Korean Institute of Chemical Engineering US Chapter	https://www.kicheuschapter.org/past-awardees-03 https://www.kicheuschapter.org/

2023-2024 Operating Budget (include Federal, State, local funds & in-kind)

		Matching Funds		
Operating Budget Description	**NYSTAR Funding**	**Company Cost Share**	**Other Sources**	**Total Budget**
Salaries & Fringe	$869,489	$100,431	$576,477	$1,546,397
Indirect Costs	$130,423	$15,064	$86,472	$231,959
Equipment	$0	$0	$284,749	$284,749
Materials & Supplies	$0	$67,542	$77,931	$145,473
Tuition	$0	$5,652	$47,503	$53,155
Travel	$0	$5,836	$58,764	$64,600
Subcontractors	$0	$0	$0	$0
Other	$0	$493,353	$310,064	$803,417
Total	$999,912	$687,878	$1,441,960	$3,129,750

Total Federal: $566,409
Total In-kind: $0

Capital expenditures
None

Commercialization Plan
The Advanced Energy Research and Technology Center (AERTC) drives innovation across a focused portfolio of clean energy technologies that support New York State's decarbonization agenda, address regional energy priorities, align with strategic industry goals, and reflect the research strengths of Stony Brook University faculty. Each initiative draws on the expertise of AERTC personnel, affiliated faculty, student researchers, advisory board members, and industry collaborators, leveraging the Center's facilities to deliver impactful outcomes for sponsors and stakeholders.

Project outputs span technical breakthroughs, pilot demonstrations, and validation of market-ready solutions in key areas such as offshore wind integration, grid modernization, energy storage systems, sustainable fuel development, and next-generation decarbonization technologies. Research efforts encompass topics such as offshore wind grid modeling, advanced battery chemistries, utility-scale storage, renewable natural gas production, energy-efficient industrial processes, and low-carbon fuel combustion. Each project is guided by both technical and commercial objectives, shaped in collaboration with industry partners. A dedicated Project Coordinator oversees communication, milestone tracking, and execution to ensure timely delivery. Reporting includes metrics that quantify economic contributions to New York State and technical benefits such as cost reduction, improved energy efficiency, and enhanced grid reliability.

Actual or anticipated new products or processes with commercial application

Patent Name	Inventor	Co-inventor	Patent Number	Description
Magnet System and Method for Electric Motor	Shikui Chen (SBU)	Jon Longtin, Fang Luo, Jiawei Tian, David Torrey	63/520,437	Topology optimization of rare-earth magnets for GE wind generators to reduce weight without performance loss.
Nano Crystalline Alloy Compositions and Methods of Preparing the Same	Jason Trelewicz (SBU)	Bin Cheng, David Sprouster	63/583,462	Powder metallurgy and alloying techniques for nanocrystalline microstructure retention in nuclear energy applications.
Creep resistant Cu-based CuCrNbZr alloy with high thermal conductivity	Lance Snead (SBU)	Lizhen Tan, Ling Wang, Ying Yang, Steven Zinkle	18/234,461	High-temperature copper alloy for efficient heat transfer in turbines, rockets, electronics, and fusion components.

Oxidized Cellulosic Materials and Method of Manufacturing the Same	Ben Hsiao (SBU)	Rasel Das, Grenalynn Ilacas, Ken Johnson	63/465,561	Confidential unpublished provisional patent application.
System and Method for Hydrogen Storage and Separation of Hydrogen from Blended Mixtures	Dr. Devinder Mahajan (SBU)	—	63/498,842	Enables hydrogen separation from methane blends and long-term storage using surplus renewable electricity.
Electrolyte Compositions	David Bock (SBU)	Amy Marschilok, Esther Takeuchi, Kenneth Takeuchi	63/506,848	Confidential unpublished provisional patent application.
Systems and Methods for Self-Cleaning Solar Panels Using an Electrodynamic Shield	Alexander Orlov (SBU)	—	18/227,504 (US), 2023-123903 (Japan), ZL201880058934.7 (China)	Low-power electrodynamic shield for self-cleaning solar panels using redesigned electrodes and electric fields.
Method and Apparatus for Sulfur Removal	Dr. Devinder Mahajan (SBU)	Saurabh Patel	18/452,850	Nano-metal reactor for removing H_2S from methane-rich gas streams from renewable sources like landfills.
HVAC Control Fine-Grained Occupancy Pattern Estimation	Shan Lin (SBU)	Munir Sirajum	11,719,458	HVAC energy savings through predictive control based on occupant count estimation.
Multi-Cell Multi-Layer High Voltage Supercapacitor Apparatus Including Graphene Electrodes	Vyacheslav Solovyov (SBU)	Zemfira Abutalibova, Vladimir Samuilov	11,721,494	Graphene-based supercapacitor design with improved performance over traditional EDLCs.
New Electrolyte Enabling Stable Extended Cycling under Extreme Conditions	Dr. David Bock (SBU)	Amy Marschilok, Esther Takeuchi, Kenneth Takeuchi	63/597,883	Confidential unpublished provisional patent application.

Plastic Processing Using Subcritical/Supercritical Fluids	Dr. Surita Bhatia (SBU)	Robert Grubbs, Maya Koga, Tadanori Koga, Alexander Orlov	63/591,955	Confidential unpublished provisional patent application.
System and Method for Hydrogen Enriched Pre-Chamber Ignition Ammonia Combustion	Dr. Dimitris Assanis (SBU)	Dario Lopez Pintor	PCT/US2023/034482	Enables ammonia combustion without fossil fuel ignition sources.
ALD-enabled high performance membranes for gas separation	Sr. Leqing Hu (SBU)	Kim Kisslinger, Won-Il Lee, Haiqing Lin, Chang-Yong Nam, Ashwanth Subramanian	63/601,542	Confidential unpublished provisional patent application.
Synthetic Methods for Crystallite Size Control of Bimetallic Polyanionic Battery Compositions	Dr. Amy Marschilok (SBU)	Esther Takeuchi, Kenneth Takeuchi	11,909,046	Microwave synthesis method for battery materials with controlled crystallite size and reduced reaction time.
Ultra-Low Power Core for Lightweight Encryption	Dr. Milutin Stanacevic (SBU)	Yuanfei Huang, Yasha Karimi, Emre Salman, Tutu Wan	11,838,402	Ultra-low power processor core for secure, lightweight encryption in smart systems.
Method for control of advanced combustion through split direct injection of high heat of vaporization fuel or water fuel mixtures	Dr. Brian Gainey (SBU)	Benjamin Lawler, Mozhgan Rahimi Boldaji	11,834,983	Reduces energy use and emissions in transportation through advanced combustion control.

Start-up Companies Formed
None

Description of each research sponsorship agreement, intellectual property ownership agreement, intellectual property license agreement or any other agreements entered into between the CoE and research partner
None

Description of any relationships with secondary schools and community colleges designed to foster student interest in scientific and technical careers.
AERTC continues to strengthen its partnerships with regional educational institutions to cultivate student interest in energy, engineering, and advanced manufacturing careers. Collaborations with Suffolk County Community College and SUNY Farmingdale are expanding through planned workforce

development initiatives, including hands-on training aligned with emerging industry needs. These efforts support future employment opportunities in the utility and clean energy sectors, with programs such as the Offshore Wind Training Institute serving as key pillars of this strategy.

Outreach to secondary schools has grown significantly through sustained engagement with the NYS BOCES network and the SUNY Master Teacher Fellowship. These programs have enabled access to a wide range of high schools across Long Island, resulting in a series of interactive, technology-focused visits to the AERTC. Schools such as Half Hollow Hills, Miller Place, Jericho, and Plainview-Old Bethpage have participated in guided lab tours and career-focused discussions with researchers and industry leaders. Students explored advanced topics in battery storage, hydrogen, combustion, and power electronics, while guest speakers from organizations like Ørsted, Amogy, and Unique Electric Solutions introduced real-world applications and workforce opportunities in offshore wind, biofuels, and electric vehicle technologies.

These visits have consistently received enthusiastic feedback from both students and educators, who noted the value of direct engagement with scientists and engineers in active research environments. The Center's role in hosting events such as the Graduate Women in STEM Life Design Fellows Program and the Robotics Summer Youth Workplace Training Program further demonstrates its commitment to inclusive and experiential learning.

Looking ahead, AERTC plans to formalize a recurring schedule of educational tours, speaker sessions, and hands-on demonstrations for K–12 students and educators. These activities will continue to serve as a gateway for young learners to envision careers in science, technology, and clean energy innovation, while reinforcing AERTC's role as a regional hub for workforce development and academic-industry collaboration.

Strategic plan

The Advanced Energy Research and Technology Center (AERTC) is committed to catalyzing innovation that delivers measurable economic and environmental benefits through the advancement of clean energy technologies. As a central hub within New York's energy innovation landscape, AERTC strategically aligns its efforts with academic institutions, industry leaders, and public sector partners to foster a collaborative ecosystem that accelerates technology development and deployment.

This vision is supported by deep integration with the technical capabilities of Stony Brook University, Brookhaven National Laboratory, and other premier research institutions, including NYSTAR-supported centers. These partnerships enable AERTC to lead and contribute to multi-institutional funding proposals, a key indicator of success in building durable alliances across the cleantech sector.

The AERTC Advisory Board—comprising senior leaders from across the energy industry—plays a pivotal role in shaping strategic direction. Strengthening engagement with these organizations enhances insight into emerging market needs and fosters new collaborative opportunities. In parallel, AERTC continues to expand outreach to high-potential small and mid-sized technology firms, to cultivate a robust pipeline of innovative, commercially viable projects.

Governance Structure (including respective roles of partners)
AERTC is one of several programs associated with SBU's Economic Development (EcoDev) enterprise. EcoDev is part of SBU's Office of the Vice President of Research (OVPR). The top-level organizational structure with oversight of the Centers' performance consists of the VP of Research and the Associate VP of Technology Partnerships. AERTC is led by the Center Director, who is responsible for direction, operation and performance of the program. The AERTC Advisory Board, under the leadership of the board chairman, provides consultative feedback from its many industry representatives and input on the strategic direction. A designated project coordinator supports AERTC projects. Support staff for AERTC and the other EcoDev centers are managed under a shared services organization. Support staff functions include, for example, administrative, workforce development, reporting and contracting, financial, marketing and communications and project management functions.

Center of Excellence Wireless and Information Technology (CEWIT)
Stony Brook University
Rong Zhao, PhD, MBA, Center Director

Technology Focus
Artificial Intelligence (AI), Machine Learning, Large Language Models (LLM), Finance, Healthcare, Cybersecurity, Internet of Things (IoT), and Immersive Visualization.

Importance to NYS
CEWIT fosters industry-university partnerships to drive innovation, create jobs, support entrepreneurship, and cultivate the next-generation workforce. CEWIT provides unmatched resources for its partners across New York State to develop advanced technology-based solutions for healthcare, defense, energy, finance, manufacturing and other industries.

Purpose
CEWIT's mission is to drive innovation through collaboration, support commercialization and entrepreneurship, and train the next-generation workforce. The Center works closely with industry partners to develop advanced wireless and information technologies to solve real-world problems and create economic and societal impact.

Leveraging the expertise of Stony Brook University faculty members and hundreds of student researchers, CEWIT initiates and supports proposals to pursue externally funded projects to develop impactful technological innovations. Center staff contributes to Stony Brook University's translational research by assisting "product-market fit" analysis, prototype development, and testing and evaluations using our research facilities and testbeds. These collaborations connect organizations in our ecosystem with the University's unparalleled brainpower and unique assets, while at the same time enable our faculty and students to tackle real-world challenges and explore commercialization and entrepreneurship.

CEWIT's 100,000-square-foot building offers 40 laboratories, a powerful GPU cluster for AI and Generative AI research and development, and advanced visualization facilities including the Reality Deck (largest immersive display in the world with >1.5 billion pixels) and Silo (600-million-pixel cylindrical stereo display), bringing critical resources to aid research and innovation in cancer diagnostics, drug discovery, smart infrastructure, digital manufacturing, environmental sensing, climate modeling, disaster response, homeland security, and many other applications.

CEWIT organizes many impactful workforce development and STEM outreach programs, including our international conference, hackathons, webinars, and podcast series. CEWIT offers experiential learning experience through internships, AI and robotics camps, summer research programs, monthly visits by students and teachers from local schools, and other events for community members.

Impacts

New Jobs	Retained Jobs	Increased Revenues	Cost Savings	Govt Funds	Non-Govt Funds	Capital Improv's	Total Impacts
41	26	$232,600	$2,341,882	$1,135,430	$2,656,774	$125,462	$6,492,148

Companies Served and Projects

Annual Period	# of Companies Served	# of Small NYS Companies Served	# of projects on-going	# of projects completed	# of students engaged with companies
2023-2024	139	124	31	9	205

Designations and Recognitions

Awards / Recognition	Date Received	Recognizing Organization	Department	Link
Fusheng Wang: Very Large Database (VLDB) Endowment Test of Time Award	2024	VLDB	Computer Science	https://news.stonybrookmedicine.edu/news/faculty-duo-win-the-vldb-test-of-time-award/
Michael Bender: ACM SIGMOD Research Highlight Award	2024	ACM SIGMOD	Computer Science	
Michael Bender: Fellow of the American Association for the Advancement of Science (AAAS)	2024	AAAS	Computer Science	
Michael Bender: PODS Best Paper Award. ACM SIGMOD-SIGACT-SIGAI Symposium on Principles of Database Systems	2024	ACM SIGMOD/PODS	Computer Science	
Michael Bender: Fellow of the European Association of Theoretical Computer Science (EATCS)	2023	EATCS	Computer Science	
Michael Bender: TREES Award (Teachers Rated Excellent Educators by their Students)	2023	SBU CEAS	Computer Science	
Steven Skiena: ACM SIGKDD Test of Time Award	2024	ACM	Computer Science	https://www.cs.stonybrook.edu/about-us/News/2024-kdd-test-time-award-research
Aruna Balasubramanian: ACM IMC Test of Time Award	2023	ACM	Computer Science	https://www.cs.stonybrook.edu/about-us/News/test-time-award

Aruna Balasubramanian: TREES Award (Teachers Rated Excellent Educators by their Students)	2023	SBU CEAS	Computer Science	https://www.stonybrook.edu/commcms/ceas/faculty/faculty-awards.php#TeachersRatedExcellentEducatorsbytheirStudents(TREES)
Niranjan Balasubramanian: TREES Award (Teachers Rated Excellent Educators by their Students)	2023	SBU CEAS	Computer Science	https://www.stonybrook.edu/commcms/ceas/faculty/faculty-awards.php#TeachersRatedExcellentEducatorsbytheirStudents(TREES)
Niranjan Balasubramanian: ACM IMC Test of Time Award	2023	ACM	Computer Science	https://www.cs.stonybrook.edu/about-us/News/test-time-award
Niranjan Balasubramanian: ACL 2024 Best Resource Paper Award	2024	ACL	Computer Science	
Stanley Bak: NSF CAREER Award	2023	NSF	Computer Science	https://www.cs.stonybrook.edu/about-us/News/third-2023-career-awardee
Stanley Bak: Stony Brook Trustees Faculty Award	2024	SBU	Computer Science	
Stanley Bak: Best Artifact Evaluation Award (ICCPS)	2024	IEEE	Computer Science	
Stanley Bak: Common Road Competition IVEX Prize (ITSC)	2023	IEEE	Computer Science	
Anthony Scarlatos SUNY Chancellor's Excellence In Teaching Award	2024	SUNY	Computer Science	https://www.cs.stonybrook.edu/about-us/News/scarlatos-honored-suny-chancellors-award-excellence-teaching
Anshul Gandhi: TREES Award (Teachers Rated Excellent Educators by their Students)	2023	SBU CEAS	Computer Science	https://www.stonybrook.edu/commcms/ceas/faculty/faculty-awards.php#TeachersRatedExcellentEducatorsbytheirStudents(TREES)
Anshul Gandhi: Millionaires Club Award	2023	SBU CEAS	Computer Science	https://www.stonybrook.edu/commcms/ceas/research/research-awards.php#MillionairesClub
Anshul Gandhi: Graduate Education Award	2024	SBU CS Dept	Computer Science	

Jeannette R. Mahoney; 2024 Women Innovator Award	2024	Westfair Business Journal	Neurology	https://westfaironline.com/combined/women-business-leaders-driven-to-move-forward/
Peng Zhang: Outstanding Associate Editor	2024	IEEE	Electrical and Computer Engineering	https://cmte.ieee.org/tpwrs/twprs-resource-site-outstanding-editors/

2023 -2024 Operating Budget (include Federal, State, local funds & in-kind)

		Matching Funds		
Operating Budget Description	**NYSTAR Funding**	**Company Cost Share**	**Other Sources**	**Total Budget**
Salaries & Fringe	$869,477	$537,213	$959,919	$2,366,609
Indirect Costs	$130,421	$80,582	$143,988	$354,991
Equipment	$0	$116,580	$72	$116,652
Materials & Supplies	$0	$21,347	$171,284	$192,631
Tuition	$0	$15,283	$51,569	$66,852
Travel	$0	$8,081	$13,455	$21,536
Subcontractors	$0	$0	$3,779	$3,779
Other	$0	$50,115	$508,635	$558,750
Total	$999,898	$829,201	$1,852,701	$3,681,800

Total Federal: $840,249
Total In-kind: $0

Capital expenditures (include Federal, State, local funds & in-kind)

Capital Equipment Purchases	**NYSTAR Funding**	**Federal**	**Other Sources**	**In-kind**	**Total**
SMART Cluster upgrades	$0	$0	$65,108	$0	$65,108
Reality Deck upgrades	$0	$0	$60,795	$0	$60,795

Commercialization Plan

Guided by industry leaders and strategic partners, CEWIT continues to seek external funding and spearhead interdisciplinary collaborations to create economic and societal impact. Harnessing the power of emerging technologies such as AI/ML and Generative AI, this industry-university partnership will usher in newly developed competitive edge and an upskilled workforce for companies across NYS and beyond. Besides, CEWIT will allocate more resources, including seed funding and personnel to support aspirational entrepreneurs, startups, and small companies to pursue SBIR/STTR and other technology commercialization opportunities. CEWIT fosters industry-university partnerships to drive innovation, support entrepreneurship, and develop the next-generation workforce.

The Center leverages the expertise of faculty members and hundreds of student researchers, and the center's own team of engineers and research scientists, with unique capabilities in identifying technology trends, developing project proposals, and conducting research, development and testing. The Center connects unmatched brainpower and resources to industry partners, enabling the development and commercialization of impactful innovations for key industry sectors such as healthcare, energy, defense, manufacturing, and financial services.

Actual or anticipated new products or processes with commercial application

Patent Name	Inventor	Co-inventor	Patent Number	Description
Ultra Low Power Core for Lightweight Encryption	Dr. Emre Salman	Yuanfei Huang, Yasha Karimi, Milutin Stanacevic, Tutu Wan	US 11,838,402	This patent provides an energy-efficient AC computing methodology to facilitate lightweight encryption in RF powered devices such as RFIDs
Method for Passive Wireless Channel Estimation in Radio Frequency Network and Apparatus for Same	Dr. Milutin Stanacevic	Dr. Akshay Athalye, Samir Das, Petar Djuric, Yasha Karimi, Jihoon Ryoo	US 11,763,106	This patented method provides a system that operates on a passive tag network, miniature tags can be attached to objects and infrastructure at minimal cost and without the need for batteries.
System, Method and Computer-Accessible Medium for Processing Brain Images and Extracting Neuronal Structures	Dr. Arie Kaufman	Saeed Boorboor	US 11,854,281	This patented method provides a system and a method for extracting neuronal structures from microscopy, such as wide-field microscopy images of brain slices.
System, Method, and Computer-Accessible Medium for Subsurface Capillary Flow Imaging By WaveLength-Division-Multiplexing Swept-Source Optical Doppler Tomography	Dr. Yingtian Pan	Wei Chen, Congwu Du	US 11,771,321	This patented technology provides an optical imager that enables high spatiotemporal resolution imaging of 3D capillary blood flow networks and the local cellular function as well as tissue morphology for medical diagnosis.

System and Method associated with predicting segmentation quality of objects in analysis of copious image data.	Dr. Wei Zhu	Yi Gao, Tahsin Kurc, Joel Saltz, Sampurna Shrestha, Si Wen, Tianhao Zhao	US 11,748,877	This invention is a system for performing quality assessment of the segmentation of digital pathology images using a machine learning approach.
Method and System for Color Rendering in Augmented and Mixed Reality.	Dr. Arie Kaufman	Saeed Boorboor	63/617,386	This technology provides an innovative method and system to facilitate the effective visualization of scientific and informational data, displayed as virtual object(s) in augmented and mixed reality technologies.
System and Method for Quantum Secure Microgrids.	Dr. Peng Zhang	Walter Krawec, Zefan Tang	18/578,146	The presented testbed is the first in the world that integrates both quantum key distribution (QKD) and software defined networking (SDN) into a real-time power system simulator, i.e., RTDS, using real SDN switches.
System and Method for Fault Location in Microgrids.	Dr. Peng Zhang	Dmitrii Etingov, Soumitri Jena	63/620,323	Unpublished application. Confidential.
Method for Passive Wireless Channel Estimation in Radio Frequency Networks and an Apparatus for the Same.	Dr. Milutin Stanacevic	Akshay Athalye, Samir Das, Petar Djuric, Yasha Karimi, Jihoon Ryoo	18/469,763	This continuation patent application is directed to a method that operates on a passive tag network, miniature tags can be attached to objects and infrastructure at minimal cost and without the need for batteries.
Self-Powered Load Sensing Circuitry for Total Knee Replacement.	Dr. Milutin Stanacevic	Ibrahim Alwatiqbellah, Nabid Hossain, Manav Jain, Emre Salman, Shahrzad Towfighian, Ryan Willing	PCT/US2023/031916	This technology enables smarter knee implants for patients that go through total knee replacement surgery. The technology enables monitoring the load that the implant exhibits during daily activities of living.
System and Method Associated with Determining Physician Attribution Related to In-Patient Care Using Prediction-Based Analysis	Dr. Vikas Ganjigunte Ashok	Todd Griffin, Erin Healy, IV Ramakrishnan	11,923,075	A system related to in-patient care based at least on prediction of disorders associated with patient-physician attribution.

System and Method for Tracking Human Behavior Real-Time with Single Magnetometer	Dr. Shan Lin	N/A	12,060,002	A method for tracking human behavior (activity, movement, gesture and the like) recognition and analysis.
System and Method for Identifying Fractures in Digitized X-Rays	Dr. Imin Kao	Fazel Khan, Jafar Khan, P.E., Sajid Khan	12,033,324	Methods and apparatus for reading a digitized x-ray and generating an output for identifying whether or not there is a fracture present on the x-ray.
System and Method Associated with Expedient Determination of Location of One or More Object(s) Within a Bounded Perimeter of 3D Space Based on Mapping and Navigation to a Precise POI Destination Using a Smart Laser	Dr. Fan Ye	Bing Zhou	11,946,761	System and method associated with expedient determination of the location of one or more objects of interest in a 3D space using a smart laser pointer and related object mapping system.
Creating and Updating Problem Lists for Electronic Health	Dr. IV Ramakrishnan	Mark Henry	12,002,557	This technology is for automated creation and updating of problem lists for particular patients for Electronic Health Records (EHR) management, and more particularly to grant and/or restricting access to creating, viewing, and updating portions of problem lists for particular patients.
System and Method for AI-enabled, programmable, resilient networked microgrid	Dr. Scott Smolka	Scott Stoller, Xin Wang, Peng Zhang, Yifan Zhou	63/561,089	A programmable platform that integrates continuous-depth deep neural networks, reachability analysis, formal control, and cybersecurity technologies to enable ultra-resilient microgrids for coordinating distributed energy systems and cultivating smart communities and cities.

Automated Identification and Documentation of Co-Morbidities from Patient's Electronic Health Record	Dr. IV Ramakrishnan	Mark Henry	18/649,283	invention relates to automated creation and updating of problem lists for particular patients for Electronic Health Records (EHR) management, and more particularly to granting and/or restricting access to creating, viewing, and updating portions of problem lists for particular patients by a plurality of healthcare professionals with different specialties and problem list permissions in real time.
System and Method for Quantum Microgrid State Estimation	Dr. Fei Feng	Zefan Tang, Peng Zhang, Yifan Zhou	18/718,281	System and method for performing enhanced quantum microgrid state estimation that addresses many of the current issues in the field.

Start-up Companies Formed

Company Name	City	Product/Service	Sector
Quantex, LLC	Garden City	AI-enabled financial services	Financial Services

Description of each research sponsorship agreement, intellectual property ownership agreement, intellectual property license agreement or any other agreements entered into between the CoE and research partner

Project	Inventor	Licensing Partner
050-9152: “High Speed 3D Facial Scanning System”	Dr. Xianfeng Gu	Orchid Imaging, Inc.
R-8377 Automated Identification and Documentation of Co-Morbidities from Patient's Electronic Health Record	Dr. IV Ramakrishnan	Retrieve Medical Inc

Description of any relationships with secondary schools and community colleges designed to foster student interest in scientific and technical careers

CEWIT offers a variety of STEM outreach and educational programs for students in secondary schools and community colleges. These programs also engage our industry partners to connect both parties for career pathway awareness and future workforce development.

In February 2024, CEWIT organized its first ever High School Hackathon for 70 students from six high schools across Long Island: Longwood, Mt. Sinai, Plainview Old Bethpage, Smithtown East, Smithtown West, and Ward Melville. This event provided experiential learning experience to these high school participants and demonstrated pathways they can embark upon if they were to either come to Stony Brook or continue in our ecosystem of education partners.

CEWIT successfully organized the 8th annual Hack@CEWIT student hackathon on March 1-3, 2024. As a 3-day in-person event, students were challenged to develop projects that look at ways to innovate and develop new solutions that can be used to transform the world's technological landscape. Participants, including students from community colleges in the region collaborated in cross disciplinary teams with projects spanning the breadth of multiple sectors and majors through projects in artificial intelligence (AI), the Internet of things, healthcare, sustainability and cybersecurity. The event included 140 registered students and resulted in the creation of 25 rapid prototype project submissions.

Patrick Farrell, a Suffolk County Community College student, worked on the winning project called “Clusteroo,” which aimed to tackle the Softheon-sponsored challenge of “Best Integration of Customer Segmentation Utilizing AI.” and came in first place. “We built a Software as a Service (SaaS) that would allow small e-commerce businesses to implement artificial intelligence techniques that big companies such as Amazon and Spotify use to market their products to more targeted audiences,” said Farrell, who also said he will be interning this summer with SRC, an opportunity he gained through networking at the event. “Between the workshops and networking events offered by both SRC and Softheon, and the fun games and events CEWIT offered, I could not ask for a better experience.” Both SRC and Softheon are NYS companies that have partnered with CEWIT and SBU for internship projects and are supporting our experiential learning initiatives such as Hack@CEWIT.

As part of Hack@CEWIT 2024, CEWIT hosted “Community Day" on March 3, 2024. Recruited by the Workforce Development Manager, an external UX and Digital Product Designer facilitated the judging of submissions and mentoring of students; to close the event, Workforce also acquired sponsorships and prizes from local businesses and Stony Brook campus stores for competitors. Community Day was attended by local K-12 school districts, where technology demonstrations were showcased.

CEWIT, in partnership with the Advanced Energy Research and Technology Center (AERTC), hosted monthly field trips by high schools across Long Island. Students and teachers from STEM and AP courses toured labs, interacted with faculty and student researchers, and engaged in lunch-and-learn and other activities with industry partners. For example, students participated in self-driving demos presented by Sunrise Technology, a startup company in CEWIT, and learned about enabling technologies, such as remote sensing and deep learning. In summer 2024, CEWIT sponsored multiple cohorts of the AI and Robotics Summer Camp, a two-week hands-on research program organized by Sunrise Technology. Dozens of high school students from across NYS and other states participated in this experiential learning program.

As part of the Economic Development-run Summer Youth Employment Program, CEWIT hosted an Offshore Wind Pre-apprenticeship and Community Engagement event on August 1, 2024, in partnership with NYSERDA. All five offshore wind developers participated, in addition to the Haugland Group, all trade labor organizations, and government agencies. Underserved students participating in

Summer Youth Employment got networking opportunities with the companies and the reality deck showcased offshore wind videos, imagery, and simulations. The event hosted more than 250 attendees.

Strategic plan
CEWIT aims to drive innovation through collaboration, foster entrepreneurship and startup development, and develop the next-generation workforce. The Center approached industry partners to seek guidance on industry trends and market demands and conducted analysis on federal and state funding programs, such as SBIR/STTR. Three key sectors were identified - healthcare, energy, and defense - to drive our growth strategy. CEWIT organized impactful events such as the annual CEWIT Conference, the CEWIT-IEEE “Talking Tech” webinars, and CEWIT podcasts, etc. CEWIT has participated in AI, defense tech, climate tech, TechWeekNY, and other events to develop new partnerships.

CEWIT measures its performance using NYSTAR’s impact metrics, including both jobs and non-jobs impact. Additional indicators being tracked include number of students engaged in projects/internships, number of participants in training programs, and events and outreach initiatives. CEWIT also monitors impact within the University, including increase in faculty engagement and support for translational research activities. Regularly scheduled program reviews and annual planning are conducted by CEWIT’s core team along with Economic Development personnel. CEWIT also reaches out to industry and academic partners and other stakeholder groups for feedback and guidance.

Governance Structure
During the reporting period, CEWIT was under Peter Donnelly, Associate Vice President for Technology Partnerships, and David Hamilton, Director of Programs in SBU’s Economic Development Office (EcoDev). Dr. Rong Zhao was the Center Director for CEWIT. Center team includes Dr. Arie Kaufman, Chief Scientist, Dr. Manoj Mahajan, Senior Research Scientist, and engineers Christopher Lange, Zachary Lerman and Tianyun Ling. The team was supported by EcoDev’s MarComm team, led by Kathleen Ferrell, and Workforce Development Manager Derek O’Connor. For a portion of this reporting period, CEWIT was supported by an EcoDev project coordinator.

CEWIT’s projects and programs are guided by industry partners. Key partners providing recommendations for research directions include ESC Aerospace, Eversource, IBM, National Grid, NYS Department of Health, Office of Naval Research, Redshred, Softheon, SRC, SUNY Albany, SUNY Buffalo, Zebra Technologies, among others.

Center of Excellence in Environmental and Energy Systems (SyracuseCoE)
Syracuse University
Jianshun "Jensen" Zhang, Director

Technology Focus

Energy and Environmental Systems

Importance to NYS

SyracuseCoE connects industries and universities to develop, test, and commercialize innovations in building systems, clean energy, and water resources, providing technical expertise, R&D labs, and educational programming linking businesses with faculty and students. SyracuseCoE advances New York State's economic development, public health, decarbonization, and climate resilience goals.

Purpose

Led by Syracuse University and in collaboration with academic and industrial partners, SyracuseCoE's mission is to connect cutting-edge academic expertise and talent with industry research and development needs to create commercialized innovations and to tackle the most challenging problems across multi-scales of the built environment and urban ecosystems. SyracuseCoE's vision is to become the most engaging and impactful center for innovation in environmental control and energy technologies, locally, regionally, nationally and internationally.

SyracuseCoE accomplishes its mission through active engagement of faculty, staff, students and industrial partners in the use-inspired research, development, testing and demonstration of innovative technologies for healthy and efficient buildings, clean energy, and resilient low-carbon communities and cities. SyracuseCoE serves both industries and academic researchers by connecting the two, supporting them with state-of-the-art testing and modeling facilities and expertise, providing seed funding, and supporting proposals to seek externally funded projects.

Impacts

New Jobs	Retained Jobs	Increased Revenues	Cost Savings	Govt Funds	Non-Govt Funds	Capital Improv's	Total Impacts
13	0	$11,590,683	$25,000	$1,925,220	$4,337,000	$12,000	$17,889,903

Companies Served and Projects Annual Period	# of Companies Served	# of Small NYS Companies Served	# of projects on-going	# of projects completed	# of students engaged with companies
2023-2024	35	32	62	17	64

Designations and Recognitions

Awards / Recognition	Date Received	Recognizing Organization	Link
SyracuseCoE Assoc. Director Bing Dong received Distinguished Service award, the only NYS honoree	August 2023	ASHRAE	https://centerofexcellence.syracuse.edu/syracusecoe-associate-director-bing-dong-receives-ashrae-recognition-leads-iea-project-task/
Prof. Bing Dong designated IBPSA World Fellow	October 2023	International Building Performance Simulation Association (IBPSA)	https://ecs.syracuse.edu/about/news/mechanical-and-aerospace-engineering-professor-bing-dong-awarded-as-ibpsa-world-fellow

2023 - 2024 Operating Budget (include Federal, State, local funds & in-kind)

		Matching Funds		
Operating Budget Description	**NYSTAR Funding**	**Company Cost Share**	**Other Sources**	**Total Budget**
Salaries & Fringe	$802,779	$0	$31,141	$833,920
Indirect Costs	$120,416	$0	$	$120,416
Equipment	$0	$0	$0	$0
Materials & Supplies	$25,728	$0	$0	$25,728
Tuition	$0	$0	$0	$0
Travel	$1,574	$0	$0	$1,574
Subcontractors	$0	$11,001	$3,500	$14,501
Other	$106,045	$0	$1,089,343	$1,195,388
Total	$1,056,542	$11,001	$1,123,984	$2,191,527

Total Federal: $165,498
Total In-kind: $0

Capital expenditures (include Federal, State, local funds & in-kind)
None

Commercialization Plan Summary:
SyracuseCoE strategically targets innovations that improve indoor environmental quality and energy efficiency in buildings, provide clean and renewable energy, and enhance urban community resilience to storms. It engages New York State firms in four key industry sectors: clean technology, digital and electronic devices, advanced manufacturing, and research and engineering services. In Central New York's five-county region, these sectors employ over 15,000 workers.

SyracuseCoE's headquarters facility has earned international recognition for its innovative design and unique laboratories, including the Willis H. Carrier Total Indoor Environmental Quality (TIEQ) Laboratory. This lab has conducted groundbreaking research on indoor air quality's impact on knowledge workers' cognitive function and currently hosts academic and industry research on COVID-

19, IAQ, and occupancy sensing-based smart building controls. The entire headquarters building and three-acre site serve as a laboratory and testbed for research, development, and demonstration projects relating to environmental and energy systems in urban environments.

SyracuseCoE engages dozens of faculty members at its partner institutions—Syracuse University, SUNY College of Environmental Science and Forestry, and SUNY Upstate Medical University—accessing over 20 associated laboratories and personnel for collaborative projects.

SyracuseCoE develops industry-academic teams to shape projects, attract external funding, commercialize new products, and establish relationships with global leaders as strategic partners. It offers technical expertise, outreach opportunities connecting industry with university faculty and students, and economic development programming to address industry challenges with their capabilities and competencies.

Actual or anticipated new products or processes with commercial application

Patent Name (2)	**Inventor**	**Co-inventor**	**Patent Number**	**Description**
Method,Apparatus and system for reducing pathogens in a breathable airstream	Tom Dunbar		11,766,502 B2	Personal Protective Equipment: A handheld air sanitization device with initial applications for immunocompromised individuals in environments with suspect air quality.
Method,Apparatus and system for reducing pathogens in a breathable airstream	Tom Dunbar		CA 3189201	Personal Protective Equipment: A handheld air sanitization device with initial applications for immunocompromised individuals in environments with suspect air quality. This is the Canadian patent for content in US 11357882; EU GB and India equivalents under review
Controlled Environment Agriculture System	Tom Dunbar		PCT/US23/32630 (application)	An illumination and pathogen reduction system for a controlled environment agricultural system having a clean airflow system.
Solid Oxide Fuel Cell Modular Hybrid Powertrain for Small Unmanned Aircraft System	Jeongmin Ahn	Thomas Welles	11,787,549	A hybrid power system for an unmanned aerial system (UAS) having a liquid fuel engine and a solid oxide fuel cell coupled to the exhaust of the engine for generating electricity that is used by the electric motors of the UAS to create lift and control flight.
Microcombustion Microtubular Flame-Assisted Fuel Cell for Power and Heat Cogeneration Without Soot Formation	Jeongmin Ahn	Ryan Milcarek	11,799,115	A non-catalytic microcombustion based FFC for the direct use of hydrocarbons for power generation.

Start-up Companies Formed
None

Description of each research sponsorship agreement, intellectual property ownership agreement, intellectual property license agreement or any other agreements entered into between the CoE and research partner

Project	Inventor	Licensing Partner
Compact High Efficiency Air Handling Unit	John DiMillo	Upstate Parts & Supply
Adsorber Material Preparation Station	Richard Dausman	Cryomech
Building Design Project	Tong Lin, Ph.D.	ASHRAE CNY Chapter
Development of a Water Quality Databasing and Extraction Tool	Igor Mrdjen, Ph.D.	BloomOptix
Fast Site Survey	Herb Dwyer	EMPEQ
Laser Diode Stadium Lighting Module	Chris Nolan	M3 Innovation
HydroPod XL: Pilot Phase Demonstration	Tom King	TK Fabricate
Thermal Runaway and Combustion Analysis	Jeongmin Ahn, Ph.D.	Lockheed Martin

Description of any relationships with secondary schools and community colleges designed to foster student interest in scientific and technical careers
During the period of 7/1/2023 – 6/30/2024, SyracuseCoE held a competitive application process to provide funding support resulting in awards supporting four (4) summer internships at partner companies, including M3 Innovation, Mission Drives, MicroEra Power and Kermise. SyracuseCoE continued to recruit and support area companies that sponsor teams of undergraduate senior mechanical engineering students from Syracuse University as part of the Capstone project offered at SU's College of Engineering and Computer Science. SyracuseCoE co-hosted the annual NYS Green Building Conference, held in Syracuse on March 1-2, 2024, and Research & Technology Forum series was open to the community, including schools and colleges throughout the region; a clean energy career fair was held as part of this event. Lastly, work began on the development of a proposed interdisciplinary Masters of Science in Science, Technology and Design for the Built Environment in collaboration with faculty members from Syracuse University's College of Engineering and Computer Science and School of Architecture.

Strategic plan
SyracuseCoE is a hub for innovation that researches, develops, and demonstrates commercial solutions for healthy and efficient buildings, clean energy, and resilient, low-carbon communities. It tackles challenging problems across the built environment and urban ecosystems, driving economic development and accelerating technology transfer from labs to market.

SyracuseCoE's headquarters facility has earned international recognition for its innovative design and unique laboratories, including the Willis H. Carrier Total Indoor Environmental Quality (TIEQ) Laboratory, which conducts groundbreaking research on indoor air quality's impact on knowledge

workers' cognitive function. The entire headquarters building and three-acre site serve as a laboratory and testbed for research, development, and demonstration projects relating to environmental and energy systems in urban environments.

SyracuseCoE engages dozens of faculty members at its partner institutions—Syracuse University, SUNY College of Environmental Science and Forestry, SUNY Upstate Medical University, and SUNY Oswego—accessing over 20 associated laboratories and personnel for collaborative projects. This deepens research and development activities in environmental and energy systems regionally and statewide while strengthening capabilities available to companies engaged in product development and growth.

SyracuseCoE develops industry-university teams to shape projects, attract external funding, commercialize new products, and establish relationships with global leaders as strategic partners. It offers technical expertise, outreach opportunities connecting industry with university faculty and students, and economic development programming to address industry challenges. Key capabilities include advanced building energy and environmental systems, clean and renewable energy, and water resources.

Governance Structure
SyracuseCoE is structured as a public-private partnership, led by Syracuse University. SyracuseCoE was established in 2002 under New York State's Center of Excellence program, combining activities of the New York Indoor Environmental Quality (NYIEQ) Center, Inc. (a non-profit organization established in 2000) and the Environmental Quality Systems Strategically Targeted Academic Research Center (EQS STAR), a multi-institutional research center competitively awarded to Syracuse University and 11 partners in 2001. Governance of SyracuseCoE activities is led by Syracuse University and the College of Engineering and Computer Science, with input and advice from industry and academic partners, including, during the reporting period, SUNY College of Environmental Science and Forestry (ESF), SUNY Upstate Medical University and SUNY Oswego. Members of SyracuseCoE's Industry Partner Council meet at least annually at our Partners Day event to review progress on projects and provide guidance on activities that are supported using funding provided by partner firms and institutions.

Center of Excellence in Nanoelectronics and Nanotechnology (CENN)
University at Albany – College of Nanotechnology, Science, and Engineering (CNSE)
Ross F. Goodman, Director

Technology Focus

Nanoelectronics and nanotechnology, mostly focused on transitioning NYS companies to commercialize semiconductor and related technologies such as integrated photonics, power electronics, quantum computing, and neuromorphic computing (AI hardware). CENN established, maintains, and updates a 200mm Si wafer prototyping facility to serve NY companies.

Importance to NYS

UAlbany's CNSE is home to CENN and scores of global corporate partners. CENN has been an integral part in establishing the most advanced nanotechnology research, development, and deployment complex in the world serving as a component in attracting companies such as GlobalFoundries, Wolfspeed, and Micron to the State.

Purpose

CENN's dual mission to enable a robust innovation pipeline by supporting applied research while operating manufacturing scale-up facilities to enable the commercial deployment of these innovations is key to catalyzing a nanotechnology eco-system that has resulted in significant job creation and private sector investment. CENN's fully integrated 200mm Si wafer research, development, prototyping, and educational facility, the CNSE Innovation Lab, provides NYS companies of all sizes strategic support through outreach, technology acceleration, business incubation, pilot prototyping, and test-based integration support. The CENN supported CNSE Innovation Lab's manufacturing scale-up facilities at UAlbany's CNSE are co-located with the fully integrated, 300mm computer chip pilot prototyping and demonstration lines within 135,000 square feet of Class 1 capable cleanrooms.

During this reporting period, the CENN continued to work with the New York Center for Research, Economic Advancement, Technology, Engineering and Science (NY CREATES) to collaborate with New York based industry and universities in continuance of its mission and objectives as defined in the Center of Excellence Program statute.

Impacts

New Jobs	Retained Jobs	Increased Revenues	Cost Savings	Govt Funds	Non-Govt Funds	Capital Improv's	Total Impacts
28	0	$4,407,883	$189,250,351	$0	$0	$10,305,000	$203,963,234

Companies Served and Projects

Annual Period	# of Companies Served	# of Small NYS Companies Served	# of projects on-going	# of projects completed	# of students engaged with companies
2023-24	14	6	19	6	7

Designations and Recognitions
None

2023 -2024 Operating Budget (include Federal, State, local funds & in-kind)

		Matching Funds		
Operating Budget Description	**NYSTAR Funding**	**Company Cost Share**	**Other Sources**	**Total Budget**
Salaries & Fringe	$862,157	$397,568	$1,140,202	$2,399,927
Indirect Costs	$129,323	$26,477	$171,030	$326,830
Equipment	$79,352	$439,594	$0	$518,946
Materials & Supplies	$60,553	$13	$0	$60,566
Tuition	$112,772	$10,833	$0	$123,605
Travel	$2,134	$24,781	$0	$26,915
Subcontractors	$219,495	$9,810	$0	$229,305
Other	$4,360	$0	$0	$4,360
Total	$1,470,146	$909,076	$1,311,232	$3,690,454

Total Federal: $0
Total In-kind: $0

Capital expenditures (include Federal, State, local funds & in-kind)
None

Commercialization Plan Summary
CENN's dual mission to enable a robust innovation pipeline by supporting applied research while operating industry-compliant manufacturing scale-up facilities to enable the commercial deployment of this innovation is key to catalyzing a nanotechnology ecosystem that has resulted in significant job creation and private sector investment. Combined with UAlbany's CATN2 and its focus on the formation of technology platforms, alignment initiatives, and business programs that enable the "Development-phase." industry partners are supported through each phase of the RD&D commercialization continuum. This approach supports a highly integrated continuum of support for technology commercialization projects, entrepreneurial support initiatives, workforce education programs, and regional development strategies all operated under the CNSE umbrella.

Industry is increasingly confronting the need for multi-disciplinary collaboration, access to capital-intensive nanofabrication infrastructure, adoption of industry-wide standards, access to a highly skilled workforce and tighter coupling to end applications. In response, the CENN has and will continue to target three technology focus areas due to their dependence upon access to expensive infrastructure, need for tighter coupling within the supply chain and end manufacturers, openness to collaboration among small and large companies, and their potential to impact NYS economic growth. These three technology focus areas are: **nanoelectronics-** advanced CMOS, advanced device packaging, metrology, process control, and reliability assessment; **nanobiohealth-** nanomaterial characterization and correlation with toxicological bioassays, high throughput screening using bioassays for pharmacological assessment, portable & low-cost laboratory testing, and wearable real time health

monitoring; and **clean energy technologies-** SiC power electronics, energy creation, and energy storage.

Actual or anticipated new products or processes with commercial application

Patent Name	Inventor	Co-inventor	Patent Number	Description
SELECTOR DEVICES FOR A MEMORY CELL	Karsten Beckmann	Nathaniel Cady	11,737,286	A selector layer is disposed between the first and second electrodes and is composed of a dielectric material
WAFER SCALE BONDED ACTIVE PHOTONICS INTERPOSER	Douglas Coolbaugh	Douglas La Tulipe, Gerald Leake	11,841,531	An optoelectrical device, comprising: a substrate; an interposer dielectric stack including a base interposer dielectric stack, a photonics device dielectric stack, and a bond layer.

Start-up Companies Formed
None

Description of each research sponsorship agreement, intellectual property ownership agreement, intellectual property license agreement or any other agreements entered into between the CoE and research partner
None

Description of any relationships with secondary schools and community colleges designed to foster student interest in scientific and technical careers
CENN NanoEducation efforts have focused on the construction and operation of facilities that support the growth of an industry centric workforce pipeline that focuses on the following three areas: 1) Engagement; 2) Enrichment; and 3) Education. The CENN NanoEducation efforts have allowed UAlbany to develop robust programs and activities that address the needs of the regional workforce by creating a continuous supply of interested and excited students with the appropriate aptitude to succeed in the high-tech workforce. The following represents a sample of the activities that took place during this reporting period: NanoCareer Days, Women in STEM, Girls Inc. Eureka, Cohoes High School Career Fair, Teacher and Industry representative Tours, Girl Scout of Northeastern New York – STEM badge, Hoosick Falls 4th graders, Tech Valley High Microscopy Engagement Activities, Farnsworth Middle School, Stillwater Center School District received demos and a tour, 25 Union College physics students were provided a tour of the facility and learned about career paths, Greenville High School received demos and a tour, CNSE alumni and engineers hosted a group of middle school girls from all over the region as part of the Tech Valley High School President's Week STEM camp, Coda Middle School from Shenendehowa School District to learn about various career sand learn about the vacuum tech demo, Thomas O'Brien Academy of Science and Technology (TOAST) – third graders from this STEM magnet elementary school visited for a tour and activities.

Strategic Plan
The CENN's strategic plan remains focused on open innovation within the RD&D technology transitioning process that targets specific commercialization targets that include the expansion of: RD&D Infrastructure to Support Innovation Pipeline, the National Network for Manufacturing Innovation, Technology Standardization (design enablement, standards), and Securing the Talent Pipeline (scientist and engineering education). Specifically, this can be accomplished by activities such as the following:

1. **Adjacent Market Technology Solutions**
   CENN acts as a commercialization "bridge" to companies, universities, and regional economic development entities by focusing on the deployment-phase with manufacturing scale-up process support
2. **Scientists, Engineer, and Technician Education**
   With access to industry-compliant infrastructure and unmatched characterization equipment, undergraduate, master's and doctoral study is supported by the CENN through UAlbany's unique multi-disciplinary hands-on training curriculum.
3. **Supply Chain Test Beds**
   CENN is supporting the CATN2's recent launch of the Advanced Manufacturing Performance Center (AMP) with its focus on RD&D test-beds to support the advanced manufacturing supply chain.

Successes of this program are measured in the number of companies the Center supports with CENN Fellows and manufacturing scale-up services; post-secondary students that are trained in career path training activities; and k-12 students exposed to STEM related curriculum to encourage more people to see the semiconductor industry as a viable career path.

Governance Structure
The award of a CAT and a CoE in a single field, nanotechnology, to UAlbany CNSE is unique and allows a unique governance structure. Combined, the CATN2 and the CENN provide NY companies with a highly integrated continuum of programmatic support and facility test-bed operations for technology commercialization projects, hands-on workforce education programs, and regional development strategies. Resulting in a seamless transition of innovation to commercialization as each phase in the RD&D continuum is operated under the UAlbany CNSE umbrella. The Principal Investigator of the CENN is Michal Fancher, and the Director, is Ross Goodman, both of which have roles in CATN2 which allows seamless continuity between the two centers.

In collaboration with the CATN2, CENN has created an Industrial Advisory Board (IAB) with a focus on identifying major gaps in nanofabrication capabilities including required investment and allocations of resources, timing, and opportunities. CENN will also incorporate the guidance and input from NY-Creates with a focus on product platforms and market roadmaps to capture input on necessary downstream investment and activities for deployment of the fully integrated system for targeted emerging technology areas. Other than participating in the IAB, industrial partners do not serve an active role in the governance of the Center.

Center of Excellence in Weather and Climate Analytics
State University of New York at Albany
Jan Woodcock, Director of Operations

Technology Focus

Atmospheric Science's (Weather's) impact on NYS Industry

Importance to NYS

The NYS CoE in Weather and Climate Analytics is critical to the New York State economy, addressing the estimated $58 billion annual economic impact, which is 3.4% of the state's economy, due to weather sensitivity.
The Center's core functions include: expanding preparedness for weather, climate, and emergency events within the new Emerging Technology and Entrepreneurship Complex (ETEC) building; growing Artificial Intelligence (AI) for weather prediction modeling; and establishing New York's eminence in the global weather and climate analytics arena.

Purpose

The CoE's core purpose is to drive economic development in New York State by fostering strategic partnerships across critical, weather-sensitive industries. These partnerships include, but are not limited to, Energy (Grid Resilience, Renewable Energy, Outage Management), Transportation (Autonomous Vehicles, UAS), Agriculture, Finance, Healthcare, Advanced Communications, and AI.

To support this mission, the CoE maintains two primary functional areas described herein. *Core Research and Facility Development***:** The Center is building a highly accessible core research facility within ETEC dedicated to quickly delivering research-based solutions for business problems. This includes supporting the xCITE laboratory (ExTreme Collaboration, Innovation, and Technology), a state-of-the-art facility equipped with high-end GPU-based scientific visualization and Machine Learning (ML) platforms to advance scientific weather research. *Mesonet Collaboration***:** The CoE collaborates with the New York State Mesonet, a network of 126 weather stations across the state. This partnership ensures the real-time collection, archiving, and processing of high-quality weather data, which is vital for feeding advanced prediction models and decision-support tools used by industries across the greater New York region.

Impacts

New Jobs	Retained Jobs	Increased Revenues	Cost Savings	Govt Funds	Non-Govt Funds	Capital Improv's	Total Impacts
5	13	$1,225,786	$521,562	$5,512,225	$1,000,000	$0	$8,259,573

Companies Served and Projects

Annual Period	# of Companies Served	# of Small NYS Companies Served	# of projects on-going	# of projects completed	# of students engaged with companies
2023-2024	42	4	19	9	13

Designations and Recognitions
None

2023 -2024 Operating Budget (include Federal, State, local funds & in-kind)

		Matching Funds		
Operating Budget Description	**NYSTAR Funding**	**Company Cost Share**	**Other Sources**	**Total Budget**
Salaries & Fringe	$699,552	$1,024,000	$0	$1,723,552
Indirect Costs	$104,933	$104,933	$0	$209,866
Equipment	$5,022	$300,000	$0	$305,022
Materials & Supplies	$0	$50,000	$0	$50,000
Tuition	$0	$0	$0	$0
Travel	$30,385	$60,000	$0	$90,385
Subcontractors	$0	$200,000	$0	$200,000
Other	$19,556	$110,051	$0	$129,607
Total	$859,448	$1,848,984	$0	$2,708,432

Total Federal: $0
Total In-kind: $0

Capital expenditures (include Federal, State, local funds & in-kind)
None

Commercialization Plan Summary
The Center partners with companies to jointly develop, evaluate, and improve atmospheric sciences technologies, helping them achieve the necessary Technology Readiness Level (TRL) for market success and revenue generation. As a leading research institution, the Center provides crucial technical validation. By evaluating technologies and publishing results in peer-reviewed journals, the Center helps accelerate commercialization by gaining vital industry traction, customers, and partners. The Center actively supports the local innovation ecosystem by collaborating with the Innovate 518 Hot Spot (i518). The Center offers technical advisory services to i518 companies, guiding them through the complex due diligence and commercialization process. Furthermore, the Center works directly with the UAlbany Office of Innovation Development and Commercialization and the Research Foundation (RF). We utilize the RF's Research Agreement Contracts (RA), which contain comprehensive legal provisions to effectively manage and govern the commercialization of promising new technologies. As one of the world's leading atmospheric sciences research institutions, evaluating technology and publishing the results in a peer-reviewed journals provides technical validation helping commercialization gain industry traction. Gaining industry traction, i.e., acquiring customers and partners will accelerate commercialization.

Actual or anticipated new products or processes with commercial application
None

Start-up Companies Formed
None

Description of each research sponsorship agreement, intellectual property ownership agreement, intellectual property license agreement or any other agreements entered into between the CoE and research partner
None

Description of any relationships with secondary schools and community colleges designed to foster student interest in scientific and technical careers
The University is committed to promoting science, technology, engineering, and mathematics (STEM) education through a variety of programs for students of all ages and backgrounds. The Science and Technology Entry Program (STEP) is dedicated to preparing historically underrepresented and economically disadvantaged elementary and secondary school students. The goal is to ensure they acquire the necessary aptitude and skills to pursue post-secondary degree programs and careers in scientific, technical, health-related, or other licensed professions.

The Education Program Center promotes STEM education in local schools by supporting elementary school bus trips to NYS Mesonet weather stations. Students participate in hands-on learning taught by University at Albany atmospheric sciences faculty. Elementary school students are invited annually to visit the University's Atmospheric Sciences Research Center (ASRC). Here, they learn about weather modeling, forecasting, and instruments, and get to watch a weather balloon launch. The UAlbany Girls Inc. program introduces girls to STEM while encouraging personal development, sportsmanship, and career exploration.

The University hosts a week-long series of events culminating in a weekend of activities to promote Earth Day and encourage school-aged children to pursue STEM degrees. Activities exposing children to atmospheric sciences include: creating Arctic creature mobiles, a traveling nitrogen game demonstrating how clouds are formed, a glacier then and now demonstration, and face-to-face meetings with celebrity meteorologists to discuss careers in atmospheric science.

The Weather & Climate Camp is a free, week-long day camp open to Capital District teens. High-school aged students gain a unique opportunity to learn to forecast, visit a weather observatory, and conduct experiments. The Center also provides various opportunities to learn about careers and college options in the atmospheric sciences field.

The center hosts the NYS Mesonet Annual Symposium, which provides a forum for people from academia, government, and the private sector to present research, operational uses, and other topics related to the NYS Mesonet.

Strategic Plan
The Center's strategic plan focuses on leveraging expertise to address the significant annual cost of weather on the U.S. economy (~$930 billion). The primary target industries are Energy (Renewable Energy, Outage Management, Grid Resilience) and Transportation (Autonomous Vehicles, UAS,

Space). Building on this momentum, the Center will expand positioning into new sectors, including Agriculture, Finance, Healthcare, Advanced Communications, and AI. The Center will leverage its over 4,000 executive relationships.

The Center executes a four-phase strategy to enter new markets. Phase I: Industry Analysis – Prioritizing weather-sensitive sectors (with Energy and Transportation as the current top priority). Phase II: Customer Discovery – Gaining a deep understanding of industry-specific weather problems, solution value, R&D spending, and key stakeholders. Phase III: Use Case Development – Defining specific solutions and quantifying the Return on Investment (ROI) for potential partners. Phase IV: Business Development – Promoting well-defined use cases to stakeholders to secure partnerships.

The Center aims to develop ~5 high-profile enterprise partnerships and partnerships with small- to mid-size companies; expand existing Weather-Energy initiatives and public-private partnerships; support community engagement through Weather Health Initiatives for disadvantaged communities; and continue the "Mind the Gap" initiative to promote student interest in science and technical careers via secondary schools and community colleges and maintain a focus on monitoring and promoting internships.

Governance Structure

The Center operates as a business unit under the Vice President for Research (VPR), who provides high-level oversight. The Directors set objectives and guides staff execution. An Internal Oversight Committee meets monthly to ensure the Center meets its economic development mission. Strategic guidance, particularly concerning business engagement, is provided by the Industry Advisory Board. Research is organized into Interdepartmental Research Groups where faculty collaborate across disciplines to solve complex, partner-driven problems. Day-to-day functions, including finance, marketing, and partner engagement, are managed by the Operations Management unit. Finally, the Research and Development unit manages and supports all Center research activities.

Center of Excellence in Bioinformatics and Life Sciences
University at Buffalo
Dr. Alan Rae, Director

Technology Focus
Bioinformatics and Life Sciences

Importance to NYS
The NYS Center of Excellence in Bioinformatics and Life Sciences (CBLS), one of the original four Centers of Excellence, is a hub for innovation and technology-based economic development, driving scientific discoveries and facilitating collaboration among academia, industry and the public sector. The Center's mission is to actively support development of emerging technologies that have a positive impact on societal health and to strengthen the regional and state economy.

Purpose
A one of a kind facility in Western New York, the Center of Excellence in Bioinformatics & Life Sciences (CBLS) connects New York State businesses and entrepreneurial faculty to life sciences resources inclusive of office and laboratory incubator space, access to shared equipment, advanced computing solutions, student talent, proof-of-concept funding and programming aimed at supporting entrepreneurs to advance translational research and commercialization of novel technologies that positively impact health and well-being. In addition to being an economic development driver, CBLS's investment in sequencing and bioinformatics experts and technologies more than a decade ago with support from NYSTAR enabled us to support the State's effort to battle the COVID-19 pandemic through active COVID-19 variant surveillance thereby demonstrating the Center's impact on public health.

Impacts

New Jobs	Retained Jobs	Increased Revenues	Cost Savings	Govt Funds	Non-Govt Funds	Capital Improv's	Total Impacts
26	12	$853,776	$1,224,996	$6,299,805	$208,780,000	$141,169	$217,300,046

Companies Served and Projects

Annual Period	# of Companies Served	# of Small NYS Companies Served	# of projects on-going	# of projects completed	# of students engaged with companies
2023-24	33	28	15	3	14

Designations and Recognitions

Awards / Recognition	Date Received	Recognizing Organization	Link
CoE supported UB Center for Integrated Global Biomedical Sciences was nominated under "Incubators, Accelerators, Equity"	2023	Prix Galien USA	the-galien-foundation-announces-2023-prix-galien-usa-nominees

CoE supported start-up, Abceutics, acquired by Merck.	April 2024	Merck	5 Major ADC Deals This Year Highlight Investment Uptick - BioSpace
CoE supported start-up, Canget Biotek Pharma, LLC., awarded orphan drug designation for pancreatic cancer drug.	Jan 2024	U.S. Food and Drug Administration (FDA)	FL118, Drug Candidate Discovered at Roswell Park, Granted FDA Orphan Drug Status for Pancreatic Cancer
AI Institute for Exceptional Education established through $20M NSF award	2023	National Science Foundation	https://www.buffalo.edu/ubnow/stories/2023/01/nsf-award-ai.html

2023 -2024 Operating Budget (include Federal, State, local funds & in-kind)

		Matching Funds		
Operating Budget Description	**NYSTAR Funding**	**Company Cost Share**	**Other Sources**	**Total Budget**
Salaries & Fringe	$576,104	$0	$0	$576,104
Indirect Costs	$86,416	$0	$0	$86,416
Equipment	$5,073	$0	$0	$5,073
Materials & Supplies	$129,259	$0	$0	$129,259
Tuition	$0	$0	$0	$0
Travel	$5,113	$0	$0	$5,113
Subcontractors	$84,936	$0	$0	$84,936
Other	$110,642	$0	$3,969,601	$4,080,243
Total	$997,543	$0	$3,969,601	$4,967,144

Total Federal: $0
Total In-kind: $0

Capital expenditures
None

Commercialization Plan Summary
The New York State Center of Excellence in Bioinformatics & Life Sciences (CBLS) is a unique technology-based economic development program in Western New York which connects businesses and entrepreneurial faculty to life sciences resources, shared equipment, advanced computing solutions, funding, access to student talent and provides programming aimed at supporting entrepreneurs to advance translational research and commercialization of novel technologies that positively impact health and well-being. In the 2023-24 fiscal year, CBLS supported 33 life sciences companies developing technologies in therapeutics, medical device and diagnostics. As a facility, the CBLS offers 19,000 square feet of office space, 4,600 square feet of meeting space and 25,000 square feet of BSL2 designated lab space and is home to 18 life sciences start-up companies, entrepreneurial faculty, and shared scientific instrumentation. It also houses three core facilities with subject matter experts that offer services and expertise in high performance computing, gene sequencing, proteomics, and bioinformatics. Start-ups and established companies find this comprehensive offering invaluable to

further their respective R&D goals. The CBLS has been a tremendous asset to attract companies to NYS. Examples are Norgen Biotek, Aesku Diagnostics and PatComm Medical. The CBLS is conveniently located in the heart of the Buffalo Niagara Medical Campus (BNMC), a world-class medical campus for clinical care, research, education and entrepreneurship. This helps with networking and access to facilities and resources outside of the CBLS such as the Hauptman Woodward Institute, UB Clinical and Translational Research Center, Jacobs Institute, ecosystem mentors and angel investor networks. In addition, CBLS also funds early-stage proof of concept and validation studies to generate new technology disclosures, patents and spin-offs.

Actual or anticipated new products or processes with commercial application

Patent Name	Inventor	Co-inventor	Patent Number	Description
Phosphoserine Containing Compositions for Immune Tolerance Induction	Balu-Iyer, Sathy	Bankert, Richard B. / Ramakrishnan, Radha /Dingman, Robert / Iyer, Vandana / Schneider, Jennifer/ Yau Glassman, Fiona /Nguyen, Nhan H.	US11701328	Compositions and methods for inducing immune tolerance to proteins and subsequence administration of the proteins are disclosed.
Transmembrane pores formed by aromatic oligoamide foldamers and uses of same	Bing Gong		US11,912,646, B2	The compounds and compositions of the subject invention can be used in cryoprotection, nanopore-facilitated transport and/or uptake of therapeutic molecules (or drug delivery) and/or other pharmaceutical or biological applications,

CBLS support has led to 13 other patent filings that are confidential and not for public release. Listed are patents received.

Start-up Companies Formed

Company Name	City	Product/Service	Sector
Immunotolerx	Buffalo	Immunotherapy	Life Sciences-Biotech
Mimetic Medicines Inc	Florida	Therapeutics	Life Sciences-Pharma

Description of each research sponsorship agreement, intellectual property ownership agreement, intellectual property license agreement or any other agreements entered into between the CoE and research partner

Confidential information. Not for public release.

Description of any relationships with secondary schools and community colleges designed to foster student interest in scientific and technical careers

The Center offers a multitude of workforce development opportunities for a variety of ages and education levels which include science career education outreach, genomics, and bioinformatics education in formal and informal K-16 environments, Career Experience Program, and interfacing with new and growing companies to help fulfill their workforce needs. UB CBLS continues to partner with the Buffalo Public School District (BPS) to support quality science education and hands-on experiences for students through programs such as the Research Laboratory High School in Bioinformatics and Life Sciences, the Expanded STEM Workforce Pipeline, Cullen Foundation supported Science education Fellow program, and the Summer Research Program in collaboration with Erie County Summer Youth Employment Program. CBLS through an NIH SEPA award has developed a teacher and student training program in bioinformatics. CBLS also hosts annual Summer Bioinformatics workshops open to high school students in WNY.

Strategic plan
The CBLS serves life science companies across the state through access to our faculty experts, student talent, incubator space and advanced technology infrastructure with the primary mission of driving ideas to market and creating economic impact in NYS.

The Center will pursue an economic development strategy including but not limited to:

- Driving economic development through supporting innovation and commercialization.
- Increasing and enhancing collaborative relationships with state, federal industry, and academic partners.
- Increasing corporate and public funding for research and commercialization efforts.
- Providing workforce development, business development & commercialization programming and services.
- Advancing the state-of-the-art through interdisciplinary, collaborative, life sciences translational research.

Several strategies are deployed in achieving our strategic goals. These include leveraging expert guidance from our Industry Advisory Committee, Faculty Experts, Consultants with domain expertise and state economic development groups on emerging technologies and markets. The CBLS team with support from our marketing team does extensive internal and external outreach to attract new businesses and to deepen relationships with existing companies. Internal network includes complementary programs such as the Center for Advanced Technology in Big Data and the Health Sciences, Start Up NY, Buffalo Institute of Genomics and Data Analytics, Center of Excellence in Material Informatics, Office of Technology Transfer, NSF I-Corps programs; external outreach includes other NYSTAR assets, CoEs, CATs, local Techstars, Buffalo Niagara Medical Campus partners, Fuzehub, Medtech networking events, Upstate Capital to name a few.

The Center has also adopted Business Friendly University commercialization policies which include modified IP terms and ease of access to university resources, faculty expertise and student interns. These are designed to reduce friction in the partnering process, and to enhance the University's reputation as a good industry partner.

Our key indicators for measuring success are in alignment with NYSTAR metrics:
1. Creating Economic Impact locally and across NYS

2. Supporting industry-sponsored research to develop novel products
3. Collaborate on SBIR/STTR with NYS companies
4. Federal grants enabled by industry collaboration
5. Support creation of new startups in the Life Sciences sector
6. Provide experiential learning opportunities to students
7. Generate positive media reports about our activities

Governance Structure

The CBLS is part of UB's Office of Business and Entrepreneur Partnerships (BEP) that serves as the economic development arm in the Office of the Vice President for Research and Economic Development. The office is led by UB's Associate Vice President (AVP) for Economic Development. The Center Director and PI report to the AVP and oversees all aspects of the Center's activities along with the Senior Associate Director. The Center is supported by a team of scientific, operations, business development and marketing experts to manage and administer the program.

The CBLS Industry Advisory Board (IAB) comprised of industry experts in the fields of big data, drug development, diagnostic tools, healthcare IT and medical devices meet annually to review and advise on emerging technologies and review projects. The board is on hand informally throughout the year to provide recommendations and guidance on how the CBLS can best meet industry partner needs.

Center of Excellence in Material Informatics
University at Buffalo
Adrian Levesque, Interim Director

Technology Focus
Cutting-edge materials science and informatics

Importance to NYS
UB's New York State Center of Excellence in Materials Informatics (CMI) has importance to New York State because it leverages the University's cutting-edge materials science, big data analytics, and advanced manufacturing expertise and infrastructure to drive critical R&D activities that directly impact private sector growth.

Purpose
The CMI's purpose complements many of UB and New York State's goals. It raises awareness of local industrial capabilities and needs and drives collaboration among UB faculty to address these needs. The Center provides funding opportunities to UB faculty who are partnering with industry to find solutions to materials informatics related challenges and enables student experiential learning opportunities within local companies. The CMI contributes to the university's translational research, which enhances UB's visibility and economic impact, locally, statewide, and globally. In addition, the CMI collaborates with several UB initiatives in the fields of advanced manufacturing and materials innovation including the Sustainable Manufacturing & Advanced Robotic Technologies (SMART) Community of Excellence, the Research and Education in eNergy, Environment & Water (RENEW) Institute, the Computational and Data-Enabled Science & Engineering (CDSE) Program, the Center for Computational Research (CCR) and the Department of Materials Design & Innovation (MDI).

Together with UB's Center for Advanced Technology (UB CAT) and the New York State Center of Excellence in Bioinformatics & Life Sciences (CBLS), the CMI anchors UB's technology-based economic development (T-BED) infrastructure. The three NYSTAR-supported Centers bring critical and unique assets to the region in terms of both technologies and teams with scientific, business development, economic development, finance, and legal expertise.

Impacts

New Jobs	Retained Jobs	Increased Revenues	Cost Savings	Govt Funds	Non-Govt Funds	Capital Improv's	Total Impacts
9	0	$250,000	$535,745	$270,000	$250,000	$554,700	$1,860,445

Companies Served and Projects

Annual Period	# of Companies Served	# of Small NYS Companies Served	# of projects on-going	# of projects completed	# of students engaged with companies
2023 - 2024	47	34	10	8	35

Designations and Recognitions
None
2023 -2024 Operating Budget (include Federal, State, local funds & in-kind)

		Matching Funds		
Operating Budget Description	**NYSTAR Funding**	**Company Cost Share**	**Other Sources**	**Total Budget**
Salaries & Fringe	$753,852	$0	$699,202	$1,453,054
Indirect Costs	$113,078	$0	$0	$113,078
Equipment	$61,225	$0	$0	$61,225
Materials & Supplies	$88,396	$0	$0	$88,396
Tuition	$30,520	$0	$0	$30,520
Travel	$4,247	$0	$0	$4,247
Subcontractors	$101	$0	$0	$101
Other	$135,184	$0	$421,270	$556,454
Total	$1,186,603	$0	$1,120,472	$2,307,075

Total Federal: $0
Total In-kind: $0

Capital expenditures
None

Commercialization Plan Summary
UB's New York State Center of Excellence in Materials Informatics (CMI) leverages the University's cutting-edge materials science, big data analytics, artificial intelligence, machine learning and advanced manufacturing expertise and infrastructure to drive critical R&D activities that directly impact private sector growth.

The CMI works with over 100 materials research faculty with extensive funding from federal agencies and private industry with expertise in domains such as: Development of advanced nanomaterials for plasmonic nanostructures, graphene, carbon nanotubes, and upconverting nanoparticles, batteries, fuel cells, printable electronics, sensors, catalysts, for example.

The CMI Industrial Advisory Board provides recommendations for research directions based on industry trends and needs, assists with strategic pursuit of federal funding opportunities and new center designations, and serves as ambassadors in the Western New York region within the community and the greater industrial base.

The CMI annually funds the Faculty-Industry Applied Research (FIAR) program with Industry. The FIAR program's objective is to align university research expertise and resources with industry needs and commercial interests. This alignment is a critical criterion in vetting and evaluating FIAR funding proposals. To date, 57 FIAR projects, totaling approximately $2,437,928 have been awarded to faculty with industry collaborations. Examples of FIAR projects from the period include anti-ice coatings for wind turbines, life cycle assessment for battery storage, low-cost on-site hydrogen production using ammonia, and a data driven study of electrostatic surface properties for low-dimension glass materials.

The CMI's strategy for expanding its existing base of companies includes business development and scientific participation in materials and related engineering symposia, events and trade expositions across New York State and nationally.

Actual or anticipated new products or processes with commercial application

Patent Name	Inventor	Co-inventor	Patent Number	Description
Metal Alloy/Oxide Metal Alloy/Nitride Composite Catalyst for Ammonia Decomposition	G. Wu	S. Mukherjee Z Tang L Zhong	18/351,539	A series of supported catalysts that enable ammonia decomposition at temperatures below 500oC and pressures up to 30 atm.
High Speed System and Method for Identifying and Sorting Plastic Waste in a Material Recovery Facility	P. Chakraborty	T. Thundat, Y. Zhao A. Goyal	63/588,800	Thermal barcoding system to rapidly screen large volumes of plastics at the rate required by Material Recycling Facilities.
System and Method for Non-Contact Epidermal Sensing	W. Xu	J. Xia X. Yang	63/604,890	Synthetic Aperture Radar (SAR) based system using radio waves to penetrate dressings/clothing to provide information on wound size/water content.
Metal Alloy/Oxide Composite Catalyst for Ammonia Decomposition	G. Wu	S. Mukherjee Z. Tang B. Lu	11,738,332	This invention is for a catalyst for ammonia breakdown of metal alloy/oxide composites.
A Linear Coding Method for Communication in Networks	C. Qiao		18/633,500	This technology improves road geometry estimation and vehicular state tracking by harnessing data from sensing devices like smartphones and tablets.
High-Performance Anode Materials for Lithium-Ion Batteries using MoS2/MXene/CNT	H. Li	F. Yao	18/627,294	This invention improves lithium-ion batteries by using nanocomposites and carbon nanotubes via a solvothermal method.
Deep Etching Carbonaceous Substrates Using a Bi-Layer Etch Mask	J. Seo		11,886,122	This novel technique provides a way to selectively etch and pattern diamond.
Graphene-enabled quantum transistors using Dirac electrons	H. Li	F. Yao	12,002,877	This technology uses graphene and other 2D materials to be a key component of quantum computing structures.

Start-up Companies Formed
None

Description of each research sponsorship agreement, intellectual property ownership agreement, intellectual property license agreement or any other agreements entered into between the CoE and research partner

Project	Inventor	Licensing Partner
Life Cycle Assessment of Viridi Battery Storage Products	John Atkinson	Viridi Parente Inc.
Advancing Pharmaceutical Manufacturing: Materials Informatics Approach to Spray Drying Optimization	Martin Trebbin Praveen Arany	Optimed Technology Inc.
Pathway to commercialize Algal-based products for manufacturing in New York State through photosynthetic improvements via optical Quantum-Profiles	Tim Thomay James Berry	Helios-NRG, LLC
Anti-Ice Coatings for Wind Turbine Blades	Chong Cheng	Integument Technologies, Inc.
Low-Cost On-Site Hydrogen Production Using Ammonia as Carbon-Free Hydrogen Carrier	Gang Wu	Bettergy Corp.
Data-driven study of electrostatic surface properties of low-dimensional glass materials	Jun Liu	Corning Inc.
Computational Modeling of the Electrochemical Microenvironment Adjacent to Cathodically Stimulated Orthopedic Implant Systems with Augmented Supporting Electrolyte and Time Variable Stimulation Patterns	Mark Ehrensberger	Garwood Medical Devices
pH Sensors – Option to exercise	Albert Titus	Garwood Medical Devices
Novel foldamer synthesis to treat Cystic Fibrosis - Exclusive License	Bing Gong	Empire Discovery Institute (EDI)

Description of any relationships with secondary schools and community colleges designed to foster student interest in scientific and technical careers
CMI offers a multitude of workforce development opportunities for a variety of ages and education levels. Sandra Small, Ph.D., the Science Education Manager, leads these initiatives. Her duties include science career education outreach, STEM education in formal and informal K-16 environments, directing the Career Experience Program, and interfacing with new and growing companies to help fulfill their workforce needs.

Dr. Small was selected by The Research Laboratory High School and Buffalo Public elementary school #54 as their community partner. Through this collaboration, Dr. Small was awarded a contract to plan and implement science and engineering-themed family events for the school community with school administrators.

In collaboration with the Erie County Summer Youth Employment Program (SYEP), the Jacobs Institute, and UB's Jacobs School of Medicine, high school students from The Research Laboratory High School participated in a summer research experience. Students spent a week training in basic laboratory skills, two weeks in the Jacobs Institute's Summer Internship Program and four weeks working in a research lab.

In March 2024, UB welcomed over 300 high school students to spend time on the campus and learn about careers in STEM. Researchers and students from UB, along with STEM professionals from local companies offered activities, lab tours, demonstrations, and presentations in a conference-style event. The day has not occurred since 2019, due to the Covid-19 shutdowns. UB's CAT, CBLS, and CMI led a group of UB faculty and outside community members to re-establish Science Exploration Day in March 2024 as a UB-supported event.

Finally, UB's Center for Computational Research, in collaboration with The Center of Excellence, hosted the annual "Eric Pitman Summer Program" for high school students interested in computer science. Adrian Levesque, Associate Director, Industry Engagement and Visualization for CCR, co-led this program for eleven students.

Strategic plan

Focus & Mission: The CMI's broad focus and mission is to serve as a critical nexus between industry and faculty expertise to solve technical and business-related challenges. The CMI, through its business development efforts, connects companies to faculty and faculty to companies, and also student experiential learning engagements through its Career Experience Program (CEP). The CMI's strategy for expanding its existing base of companies includes business development and scientific participation in materials and related engineering symposia, events and trade expositions across New York State and nationally. The CMI employs a Key Account management strategy to maximize the Center's overall value proposition, including UB as an institution, and the regional and statewide resources CMI represents.

The CMI Industrial Advisory Board provides recommendations for research directions based on industry trends and needs, assists with strategic federal funding opportunities and new center designations, and serves as ambassadors within the community and the greater industrial base.

Metrics: The CMI tracks its commercialization performance metrics with the goal of engaging UB's applied research expertise and capabilities for the advancement of manufacturers in NYS as well as supporting industry-oriented education and training. Engagements are tracked by companies, faculty and students who have worked with the Center. The outcomes measured by these metrics are dependent on many factors beyond the immediate control of CMI, and that they are subject to large year-to-year fluctuations. Rough numerical targets are set, with the emphasis on positive outcomes over the long-term including licenses executed, patents, research agreements, additional funding achieved, for example.

Governance Structure

CMI Staff:

- Dr. Alan Rae, Director (50% effort)
- Dr. Quanxi Jia, Scientific Director (summer salary)
- Christopher Janson, Senior Business Development Manager (100% effort)
- Adrian Levesque, Computational and Data Visualization Lead (25% effort)
- Kimberly Kohl, Senior Finance & Grants Manager (20% effort)
- Steven Shepler, Finance & Grants Manager (35% effort)
- John Root, Finance & Grants Associate (20% effort)
- Dr. Sandra Small, Science Education Manager (20% effort)
- Thomas Matheny, CRM Development (15% effort)
- Debra Oberg, Marketing (15% effort)
- Diane Plinke, Operations Associate (35% effort)

CMI Industrial Advisory Board (IAB):

Company	**IAB Representative**
Buffalo Manufacturing Works	Alex Kitt, Product Manager
Harper International Corp	Prasad Apte, PhD, Director of Technology
Linde	Jonathan Lane, PhD, Senior Technology Expert
Moog	Lance Johnson, Manager, Manufacturing Engineer
Copprium	Brian Bischoff, President
S. Howes, Inc.	Fred Mertz, President
Tapecon, Inc.	Steve Davis, President
Unifrax	Donghui Zhao, Manager, Materials Research
Viant Medical	Ashish Shah, PhD, VP, R&D and Engineering
Washington Mills	Matthew Creedon, PhD, Technical Development Manager

Center of Excellence in Data Science
University of Rochester
Mujdat Cetin, Director

Technology Focus: Data science, artificial intelligence (AI), machine learning

Importance to NYS
The Center of Excellence in Data Science (CoE) is part of a unified strategy to establish the region and the state as a hub for new talent and a leader in analyzing and commercializing the limitless uses of data, machine learning, and artificial intelligence to improve quality of life and to fuel economic growth.

Purpose
The Center of Excellence in Data Science (CoE) at the University of Rochester is dedicated to supporting businesses in New York through the application of data science methods and tools that solve challenges and deliver critical insights. The Center leverages and further supports the data science expertise at the University of Rochester's Goergen Institute for Data Science (GIDS). The Center interacts with faculty across a variety of disciplines including computer science, medicine, brain and cognitive sciences, biomedical engineering, optics, electrical and computer engineering, mechanical engineering, physics, chemistry, biology, earth & environmental sciences, business, economics, political science, linguistics, and education. The Center is focused on developing and expanding industry partnerships with a broad range of data science related research areas and technologies including but not limited to artificial intelligence (AI), machine learning, data mining, and statistical and computational methods.

The Center leverages University infrastructure and expertise in data science and high-performance computing, while building collaborations with other academic partners, industry, and government agencies. With support from New York State and IBM, the University is among the most powerful university-based supercomputing sites in North America. Major investments have developed a high-performance computing infrastructure supporting data science research and analytics. The Center for Integrated Research Computing provides support services for computational and data analytics technology. The Health Sciences Center for Computational Innovation at the University hosts a Linux cluster, BlueHive 2, one of the most powerful university-based supercomputing sites in the nation. The VISTA Collaboratory houses a 1,000-square-foot interactive wall that renders massive data sets in real time, allowing visualization of complex data instantaneously.

Impacts

New Jobs	Retained Jobs	Increased Revenues	Cost Savings	Govt Funds	Non-Govt Funds	Capital Improv's	Total Impacts
23	2	$1,726,530	$1,495,500	$18,979,662	$281,000	$5,000	$22,487,692

Companies Served and Projects

Annual Period	# of Companies Served	# of Small NYS Companies Served	# of projects on-going	# of projects completed	# of students engaged with companies
2023-2024	22	17	11	14	25

Designations and Recognitions

Awards / Recognition	Date Received	Recognizing Organization	Link
Zhen Bai – Asaro Biggar Fellow in Data Science	Fall 2023	Goergen Institute for Data Science	https://www.hajim.rochester.edu/dsc/people/asaro-biggar-professorships-fellowships.html
Lee Murray – Asaro Biggar Fellow in Data Science	Fall 2023	Goergen Institute for Data Science	https://www.hajim.rochester.edu/dsc/people/asaro-biggar-professorships-fellowships.html
Arunaggiri Pandian Karunanidhi (student) – Micron Innovation Award	Fall 2023	Micron Technology	
Aakanksha Dutta (Student) – 2023-24 Suzanne O'Brien Book Award for Outstanding First Year Students	Fall 2023	Iota Chapter of Phi Beta Kappa	https://www.rochester.edu/college/pbk/book.html
Susana Marcos – Best Investigator Award, 2023 Smart Woman Forum & Awards	Fall 2023	Spanish Federation of Healthcare Technology Companies	https://www.rochester.edu/newscenter/july-august-2023-faculty-awards-accolades-564332/
Zhen Bai – NSF Career Award	Fall 2023	National Science Foundation	https://www.nsf.gov/
Ehsan Hoque – 10-year impact award at ACM UbiComp	Fall 2023	Association for Computing Machinery (ACM)	https://www.ubicomp.org/ubicomp-iswc-2025/
Aaron White – NSF Career Award	Fall 2023	National Science Foundation	https://www.nsf.gov/
James McGrath – Goergen Award for Excellence in Undergraduate Teaching	Fall 2023	University of Rochester	https://www.rochester.edu/college/goergen-awards/index.html

Ben Noe (student) – First place, Student Division, 2024 Big Data Cup Toronto, Canada	Spring 2024	Stathletes	https://stathletes.com/big-data-cup
Ehsan Hoque – Selected to join the UK Academy of Medical Science and the US National Academy of Medicines bilateral policy project regarding climate and health leaders	Spring 2024	The National Academy of Medical Sciences	https://acmedsci.ac.uk/next-gen-researchers-exploring-climate-health#tab4
Jiebo Luo – William Riker University Award for Excellence in Graduate Teaching	Spring 2024	University of Rochester	https://www.cs.rochester.edu/news-events/news/2024/2024-04-05_luo-rikeraward.html
Susana Marcos – 2023 Mamalis Award	Spring 2024	American Society of Cataract and Refractive Surgery	https://journals.lww.com/jcrs/pages/default.aspx
Tolulope Olugboji – NSF Career Award	Spring 2024	National Science Foundation	https://www.nsf.gov/awardsearch/show-award?AWD_ID=2339370
Sreepathi Pai – Collaborative NSF award	Spring 2024	National Science Foundation	https://www.nsf.gov/awardsearch/show-award?AWD_ID=2446083
Huaxia Rui – Best Information Systems Publications Award	Spring 2024	Association for Information Systems and the International Conference on Information Systems	https://ishistory.aisnet.org/awards/ais-best-information-systems-publications-awards/
Jannick Rolland – Inducted into Augmented World Expo's inaugural class of the XR Hall of Fame	Spring 2024		https://www.awexr,com/hall-of-fame

2023 -2024 Operating Budget (include Federal, State, local funds & in-kind)

		Matching Funds		
Operating Budget Description	**NYSTAR Funding**	**Company Cost Share**	**Other Sources**	**Total Budget**
Salaries & Fringe	$783,362	$0	$878,832	$1,662,194
Indirect Costs	$117,234	$0	$131,824	$249,058
Equipment	$131,750	$0	$278,713	$410,463
Materials & Supplies	$11,769	$0	$3,972	$15,741
Tuition	$8,350	$0	$0	$8,350
Travel	$18,797	$0	$9,800	$28,597
Subcontractors	$94,758	$0	$0	$94,758
Other	$40,313	$0	$23,998	$64,311
Total	$1,206,333	$0	$1,327,139	$2,533,472

Total Federal: $0
Total In-kind: $0

Capital expenditures

Capital Equipment Purchases	**NYSTAR Funding**	**Federal**	**Other Sources**	**In-kind**	**Total**
PowerEdget R660xz-Intel 6448Y	$57,069	$0	$0	$0	$57,059
Collaboratory Refresh - Cinemassive Displays	$74,545	$0	$0	$0	$74,545

Commercialization Plan Summary

The Center of Excellence in Data Science (CoE) at the University of Rochester drives regional and statewide economic growth by fostering innovation through research, education, and industry collaboration in data science. By leveraging cutting-edge expertise, the Center supports academia-industry partnerships that advance technology transfer and commercialization. Its funding program enables collaborative projects between researchers and businesses, promoting the application of data science to solve real-world challenges. Currently, the CoE collaborates with over 40 New York State companies, contributing to economic development and technological advancements.

In addition to funding opportunities, the Center serves as a vital link between businesses and the Goergen Institute for Data Science. This connection provides access to a pipeline of skilled student talent, enabling companies to engage in data science practicum projects and internships. Faculty partnerships further enhance innovation by driving research initiatives that address industry needs and facilitate the commercialization of new technologies. Through these efforts, the CoE strengthens New York's position as a leader in data science, fostering a dynamic ecosystem of growth and collaboration.

Actual or anticipated new products or processes with commercial application

Patent Name	Inventor	Co-inventor	Patent Number	Description
Real-time multispectral polarimetric imaging for noninvasive identification of nerves and other tissues	Wayne Knox	Haolin Liao, Gregory Heyworth, and Dr. David Mitten	63/387,089	This patent uses polarized light imaging to identify nerves, reducing accidental cuts and aiding surgical training with AR/VR applications.

Start-up Companies Formed
None

Description of each research sponsorship agreement, intellectual property ownership agreement, intellectual property license agreement or any other agreements entered into between the CoE and research partner
None

Description of any relationships with secondary schools and community colleges designed to foster student interest in scientific and technical careers
The Center of Excellence in Data Science strengthened connections with secondary schools by sponsoring the enrollment of three high school students in the Digging into Data Science summer program. Offered through the Goergen Institute for Data Science at the University of Rochester, this program provides high school students with the opportunity to explore the field of data science. The three sponsored students were identified by the University of Rochester as underrepresented or underprivileged, furthering efforts to promote equity and inclusion in STEM education.

Strategic plan
The Center of Excellence in Data Science (CoE), housed within the Goergen Institute for Data Science (GIDS) at the University of Rochester, serves as a hub for advancing research, education, economic impact, and community engagement in data science. Leveraging academic expertise from GIDS and other New York universities, the Center aligns its focus with industry needs and regional strengths. Collaboration with local and regional economic development entities helps identify emerging high-tech industry clusters, ensuring the Center's initiatives remain relevant and impactful.

The CoE engages with faculty, businesses, and students through mechanisms such as requests for proposals, research events, practicum projects, internships, and externally funded collaborative research. Application domains are shaped by institutional and statewide opportunities, with recent focus areas including health analytics, digital health, imaging, speech processing, optics, computer vision, life sciences, robotics, business analytics, and security.

Success is measured through quantitative metrics like economic impact and qualitative assessments of industry-academia partnerships and workforce development. Feedback from the University's Data Science Administrative Committee and the GIDS External Advisory Committee (EAC) ensures the Center's activities align with its mission. Annual evaluations by the EAC allow for strategic adjustments to maintain focus and maximize contributions to the data science ecosystem.

Governance Structure

The Center of Excellence in Data Science (CoE) is overseen by a director who also leads the Goergen Institute for Data Science (GIDS). GIDS serves as the academic hub for data science programs at the University of Rochester, and the Center operates within GIDS. Guidance and oversight for the CoE Director are provided by an internal Administrative Committee, which includes the University's Vice President for Research, the Dean of the School of Arts and Sciences, the Dean of the Hajim School of Engineering & Applied Sciences, and the Dean for Research in Arts, Sciences, and Engineering. Additionally, the Center benefits from advice and feedback from the GIDS External Advisory Committee, composed of distinguished leaders from organizations such as Bright House Networks, IBM, Origent Data Sciences, L3 Harris, Soleo Communications, Clark Atlanta University, Cornell University, Microsoft, Wegmans, University of Pittsburgh, Vnomics, QbDVision, Xerox, Evidation Health, and other prominent companies and institutions.

Currently, Mujdat Cetin serves as the Center's director, supported by Nick Koziol, Mike Kennerknecht, Cathy Adams, Brendan Mort, and Margaret Urzetta. University leadership is kept informed through monthly meetings of the Data Science Administrative Committee, where relevant updates are shared.