



JANUARY 1, 2024 - DECEMBER 31, 2024



ANNUAL REPORT 2024





MESSAGE FROM THE DIRECTORS

Fiscal year 2024 highlighted CRAFT's strong dedication to advancing fintech research, strengthening industry collaborations and championing sustainable and ethical innovation. Significant achievements were made across the three key focus areas: research, thought leadership and workforce development. Among these, we take particular pride in delivering value to our members through new patent applications and expanded commercialization efforts. As we reflect on the past year through this annual report, we are proud of our collective achievements despite a challenging environment. We would like to extend our gratitude to our industry partners for their invaluable contributions throughout the entire year. Key highlights include:

- Launched five new projects focusing on AI compliance, LLMs based financial analytics, quantum solutions and smart contracts.
- Welcomed new industry members, including BNY Mellon, Finliti and the Open Finance Foundation, and strengthened collaborations with academic institutions and international organizations such as the UK Fin+, the United Nations, and others.
- Established the CRAFT IP/Commercialization Task Force to streamline intellectual property management and licensing strategies.
- Hosted a workshop on Generative AI and organized the CIFEr 2024 Conference, an international conference on blockchain, AI and risk modeling.
- Engaged students and professionals through developing training programs, certifications and mentorship, fostering talent pipelines in fintech.
- Worked with NJ FAST - a fintech accelerator - by providing mentorship and leveraging advanced resources to drive innovation and economic growth in New Jersey's fintech sector.

At CRAFT, we strongly advocate a holistic approach to fintech innovation by integrating societal values into our initiatives. The strategic partnership between CRAFT and the CO-WY Climate Resilience Engine marks a significant advancement in leveraging financial technology to support climate resilience efforts. Additionally, our ongoing collaborations with the United Nations Association of El Salvador (UNA-SV) and the Organization for Poverty Alleviation and Development (OPAD) are focused on addressing financial literacy and sustainable finance challenges. Plans are underway to solidify CRAFT's involvement in key United Nations initiatives, including fintech education, workforce development and pilot youth programs for developing nations.

Despite the challenges and constraints, this year has been exceptionally productive, thanks to the unwavering support of our dedicated industry members and our enthusiastic academic members. As we move forward, we remain deeply committed to delivering even greater value to our stakeholders, adapting to the evolving landscape of the finance industry. With excitement and determination, we look ahead to an even more impactful and innovative 2025!

Sincerely,

Steve Yang
Director

Mohammed J. Zaki
Co-Director

George Calhoun
Director of
Corporate Alliance

Gregory Prastacos
Director of Strategy

Zachary Feinstein
Director of Research
and Development

Jesse Lisnow
Director of Operations



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“At CRAFT, we firmly believe in a holistic approach to addressing emerging technological challenges faced by the finance industry. Our joint effort between academia and financial industry leaders has proven fruitful in harvesting the power of technology in the new era of the dominance of artificial intelligence.”

Steve Yang
CRAFT Director, Associate Professor,
School of Business, Stevens Institute of Technology



CRAFT OVERVIEW

The Center for Research toward Advancing Financial Technologies (CRAFT) is the first National Science Foundation awarded I/UCRC (Industry-University Cooperative Research Center) in Fintech. CRAFT is a joint collaboration between Stevens Institute of Technology and Rensselaer Polytechnic Institute (RPI) established on July 25, 2021 and launched on October 28, 2021.

The CRAFT leadership team consists of Dr. Steve Yang (CRAFT Director), Dr. Mohammed Zaki (Co-Director and Site Director) and Dr. George Calhoun (Co-Director of Corporate Alliance). CRAFT recently announced the addition of two new members to the leadership team. They include former Stevens School of Business Dean Gregory Prastacos, who will be CRAFT's Co-Director of Strategy, and Dr. Zachary Feinstein, who will be CRAFT's Program Director of Research/Development and Certificate.

The Academic Leadership Team (ALT) of CRAFT consists of Dr. Steve Yang, Dr. Mohammed Zaki, Dr. George Calhoun, Dr. Kristen Bennett, Dr. Agostino Capponi, Dr. Maggie Chen, Dr. Darinka Dentcheva, Dr. Andrei Kirilenko, Dr. Jeffrey Nickerson and Dr. K.P. Subbalakshmi. The ALT acts as the academic governance arm of the Center. CRAFT has three main focuses - fintech research and innovation, workforce development and thought leadership. The Center focuses on research that helps its members create and assimilate fintech solutions effectively into their organizations. CRAFT also focuses on workforce development initiatives that advance industry partner knowledge and facilitate access to talent pipelines which are vital to the industry. The Center also prides itself on being a thought leader in the fintech sphere by creating leading-edge content, spearheading discussions with top stakeholders and an expanding influence through the Center's international partnerships. CRAFT's vision is to be an industry-university center devoted to research, workforce development and thought leadership in fintech with the aim of advancing the industry, and the various related disciplines of research, and more broadly, to make a beneficial impact on society.

CRAFT is dedicated to supporting new research that is collectively endorsed by our industry partners, academic leadership and experts in business, computer science, mathematics, finance, economics, business management, law and regulation, risk analytics and behavioral and social sciences. Working closely with the CRAFT Industry Advisory Board (IAB) members, the Center developed a formal process and research roadmap to facilitate interdisciplinary collaboration across the Center's two sites. The Center's extended research roadmap includes the following vertical areas - Machine Learning, Artificial Intelligence, Quantum Computing, Decentralized Finance, Generative Language Models, Climate Impact and Cybersecurity. The Center's multidisciplinary research projects aim to assimilate the following values:

CRAFT VALUES

- FAIRNESS AND ACCESSIBILITY, TO ESTABLISH TRUST AND CAPITALIZE ON THE OPPORTUNITIES WITH EMERGING TECHNOLOGIES
- ACCOUNTABILITY AND SOCIAL RESPONSIBILITY, WITH THE GOAL OF DEMOCRATIZING FINANCE
- SUSTAINABILITY, CLIMATE IMPACT AND GREEN FINANCE
- COOPERATION WITH FINANCIAL REGULATION, WHICH WILL GREATLY BENEFIT INTERDISCIPLINARY INVESTIGATION

CRAFT VERTICALS



Artificial
Intelligence



Natural
Language
Processing



Crypto
Assets



DeFi



Quantum
Finance



Green
Finance



Cybersecurity



SIGNIFICANT RESULTS



IN 2024, CRAFT:

- Funded five new IAB-recommended projects
- Continued with five research projects that were funded in 2023
- Funded a fifth internally-funded “ignition grant”
- Continued fine-tuning engagement channels between industry sponsors and project PIs
- Held two Center-wide Industry Advisory Board meetings
- Created an IP/Commercialization Task Force
- Partnered with CO-WY Climate Engines
- Expanded our partnership with the United Nations
- Had our second in-person meeting with Vanguard
- Continued to recruit new industry and academic partners
- Involved in the newly launched NJ FAST initiative

CRAFT has 20 current industry partners

They include 4Thought Tech, Altonomy, Balcony Technologies, Bank of America Corporate, Bank of America Securities Trading, BNY Mellon, Capgemini, Charles Schwab, CME, Finliti, Fintech Connector, Goldman Sachs, Kennedy’s IQ, IBM, Open Finance Foundation at Columbia University, Park Avenue Finance, SWIFT, United Nations, The Vanguard Group and Wells Fargo. The Center has also established a relationship with more than 70 faculty members between Stevens and RPI. With the advent of the newly formed academic affiliate partnerships, the Center is confident this number will grow to more than 100 members in 2025.

CRAFT and NJ FAST

NJ FAST, which is Plug and Play’s newly launched accelerator in partnership with Stevens Institute of Technology, Prudential Financial and the New Jersey Economic Development Authority, is dedicated to advancing innovation in fintech and insurtech. Located in New Jersey, NJ FAST serves as the state’s Strategic Innovation Center for Financial Services, leveraging Plug and Play’s global network to connect startups with corporate partners, universities and investors. NJ FAST will drive technological growth, strengthen the state’s innovation ecosystem and positions New Jersey as a national leader in financial and insurance technology.

In 2024, CRAFT saw the addition of three new industry members. New industry members included BNY Mellon, Canada-based fintech startup Finliti and Columbia University’s “Open Finance Foundation at Columbia University.”



“As the only NSF Center on fintech, we are paving the path for industry relevant fundamental research that has the potential to transform and provide leadership and workforce development in cutting edge technologies at the intersection of finance, AI and society.”

Mohammed Zaki

CRAFT Co-Director, Professor and Department Head for Computer Science,
Rensselaer Polytechnic Institute



SIGNIFICANT RESULTS



CRAFT saw the addition of three new industry members and partnered with the CO-WY Climate Resilience Engine New industry members included BNY Mellon, Canada-based fintech startup Finliti and Columbia University’s “Open Finance Foundation at Columbia University.” The Center also officially partnered with the CO-WY Climate Resilience Engine and launched a new collaboration in the field of Climate Impact Finance. The following are excerpts from the Stevens media release of the partnership:

The collaboration between the CO-WY Climate Resilience Engine and Stevens’ CRAFT is poised to revolutionize the fintech landscape by merging expertise in financial technologies with deep insights from science, engineering and climate resilience. By combining these disciplines, the partnership aims to address critical challenges such as monetizing climate change mitigation efforts and to foster innovation in green finance.

A key area of focus under this partnership is the development of a Greenhouse Gas Finance Certificate Program. This program will bridge the gap between finance and science/engineering disciplines, recognizing the imperative for collaboration in tackling climate-related financial issues and the challenges posed by the often externalized costs of climate change. With Stevens’ stronghold in the New York-New Jersey region and Innosphere Ventures’ presence in Colorado-Wyoming, the collaboration will bring together expertise from both traditional energy and renewable sectors to address climate challenges comprehensively. Developing the Colorado and Wyoming region’s fintech acumen is an important long-term impact expected from the CO-WY Engine. A certificate program, to be offered at Stevens, will be developed from the collaboration of the respective institutions’ expert faculty and research teams.



“This partnership represents a significant step forward in our collective mission to drive innovation at the intersection of technology, finance and sustainability. By combining our strengths with Stevens Institute of Technology’s CRAFT sector, we are poised to make meaningful strides in addressing pressing challenges such as climate change.”

Mike Freeman
CEO of Innosphere Ventures, CO-WY Climate Resilience Engine



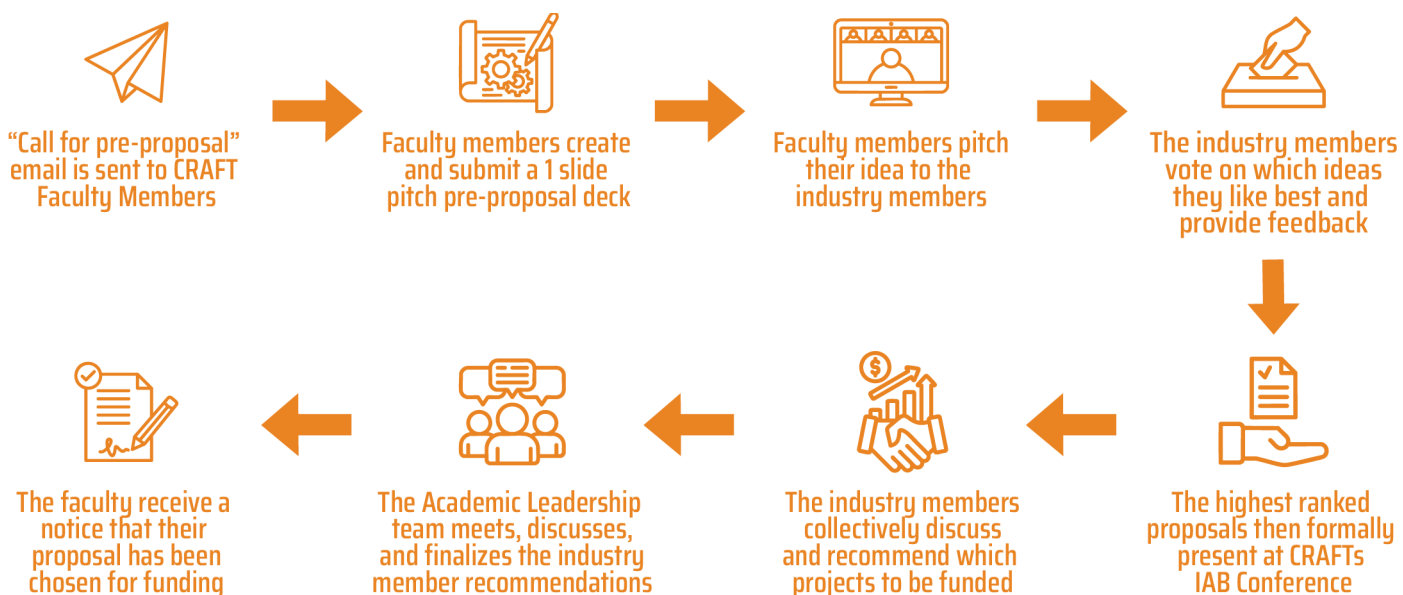
“Through our partnership with the CO-WY Climate Resilience Engine, we envision a future where fintech innovations become powerful tools for climate action. By integrating insights from science, engineering and finance, we are poised to drive innovation that not only addresses pressing climate challenges but also fosters sustainable economic growth.”

Ed Synakowski
Vice Provost for Research and Innovation at Stevens Institute of Technology



innosphere
ventures

The CRAFT Research Process



The CRAFT Research Process

Twice a year, a number of months before the CRAFT's bi-annual Industry Advisory Board meetings, 70 affiliated faculty members receive a "call for pre-proposal" solicitation from the center, calling for research project ideas to be submitted by a certain deadline. A "pre-proposal" is a one slide powerpoint which asks PIs to list their proposal title, team, funding request, research themes, proposal description, motivation, expected outcomes and industry benefits. After pre-proposals are collected, a virtual meeting is scheduled between all the pre-proposal faculty members and the industry members of CRAFT. Each faculty member who submitted a pre-proposal does a "Shark-Tank" style five-minute pitch to the industry members on their idea. After the meeting is over, the industry members have a period of voting and providing feedback on each pitch. After the voting period is over, the ALT reviews the results and decides which pre-proposals will move forward to the full proposal stage. Those selected to move forward submit a full-proposal, which includes finer details of the overall project and will get the opportunity to formally pitch their proposal to the industry members at the bi-annual Industry Advisory Board conferences. Each full proposal records a 10-minute video, which is shown to the industry members, and is given five minutes of Q&A time. After the full proposals are pitched, members have a private meeting amongst themselves where they discuss which projects they recommend to fund. They also identify who among them will become a project sponsor, which will allow the benefit of working closely with the PIs, providing data and a number of other IP related benefits. After receiving their findings, the ALT meets and discusses, finalizing the industry recommendations and reporting the conclusion back to the faculty members who made pitches. All research projects are then started each year on June 1 and usually run for a year, sometimes up to a year and half.

This year, the CRAFT IAB recommended four projects for research funding during the Spring 2024 IAB meeting. There was also an additional project from Fall of 2023 that was recommended to be funded. Following CRAFT bylaw procedures, the ALT decided to fund all five recommended projects. All five projects were selected for the \$100,000 full-funding level (1-year) [total \$500,000]. Furthermore, a fifth "ignition grant" was also funded using internal funding from academic partners. The Center followed the established budget and scope revision process for project teams prior to project kickoff.

All Full and Associate CRAFT industry partners have full access to CRAFT's research outcomes – including publications, intellectual property rights and deployable technologies – on a non-exclusive, royalty-free basis. IP terms and conditions are standardized according to the NSF's well-established template, which simplifies this often-tricky aspect of industry funding for academic research.



RESEARCH: 2024-25 Funded Projects



AI Compliance Officer

PI: Zachary Feinstein (Stevens Institute of Technology)

This project explores training a Large Language Model (LLM) on legal texts to automate the interpretation of financial regulations. With regulatory demands increasing, particularly post-Dodd-Frank, such a tool can aid compliance officers by offering actionable insights, reducing costs, and improving efficiency. The concept builds on the demonstrated ability of models like ChatGPT, which recently passed the Uniform Bar Exam, to handle complex legal texts. By complementing traditional compliance methods, the project aims to enhance regulatory adherence in financial institutions.



Analyzing Financial Information with XBRL-enhanced Foundation LLM

PI: Xiaoyang Liu (Rensselaer Polytechnic Institute)

This project integrates XBRL (extensible Business Reporting Language) semantics into a foundation Large Language Model (LLM) to improve financial data analysis. By capturing better semantics, the XBRL-enhanced LLM facilitates accurate data aggregation and supports informed decision-making. The initiative showcases CRAFT's commitment to advancing financial analytics by enhancing LLMs with XBRL-encoded knowledge. The result is a powerful, accessible tool that democratizes advanced financial insights for broader public use.



Smart Encoding and Automation of Over-The-Counter Derivatives Contracts

PI: Oshani Seneviratne (Rensselaer Polytechnic Institute)

This project addresses inefficiencies in Over-The-Counter (OTC) derivatives by creating an automated system for encoding, verifying, and auditing contracts. Utilizing neuro-symbolic AI, contracts are transformed into Financial products Markup Language (FpML) documents and Solidity smart contracts. This innovation reduces risks, enhances compliance, and improves efficiency. By bridging traditional platforms with blockchain's benefits, the system streamlines operations, fosters trust, and aligns with the broader market's regulatory and operational needs.



"CME Group is proud to be an active member of CRAFT. The foundational research by leading academics and financial professionals, especially in quantum computing for risk management and automated market makers (AMMs) for increased liquidity, is crucial for advancing financial markets and ensuring system stability"

Eric Leininger

Executive Director, Financial Research & Product Development
CME Group, and Vice Chair, CRAFT IAB



Large Transaction Models (LTMs) for FinTech

PI: Kristin Bennett (Rensselaer Polytechnic Institute)

This project develops Large Transaction Models (LTMs) using public financial datasets for tasks like fraud detection and predictive analytics. It combines decentralized finance and benchmark datasets to form a versatile testbed. By leveraging reinforcement learning (RL) with market data feedback, LTMs adapt dynamically, enhancing analytics efficiency. The framework supports diverse financial use cases, enabling users to analyze transaction patterns and derive actionable insights for strategic decision-making.



Semantically Enhanced Graph Neural Networks for Event-Driven Financial Impact Analysis

PI: Mohammed Zaki (Rensselaer Polytechnic Institute)

This project introduces a novel graph learning method using abstract meaning representation (AMR) to enhance document-level semantic embeddings. By employing graph neural networks (GNNs), this approach outperforms transformer models in tasks like trend prediction and risk correlation analysis, using less computational power. Targeting financial event impact evaluation, it demonstrates potential for broader applications with industry partners. The effort aligns with CRAFT's goals of innovation and commercialization opportunities in financial analytics.



Efficient Quantum PDE Solvers for Finance (Ignition Grant)

PI: Zhenyu Cui (Stevens Institute of Technology)

This project introduces a novel graph learning method using abstract meaning representation (AMR) to enhance document-level semantic embeddings. By employing graph neural networks (GNNs), this approach outperforms transformer models in tasks like trend prediction and risk correlation analysis, using less computational power. Targeting financial event impact evaluation, it demonstrates potential for broader applications with industry partners. The effort aligns with CRAFT's goals of innovation and commercialization opportunities in financial analytics.



"As the first CRAFT double member, Bank of America is excited to see the incredible work being done by the IUCRC CRAFT Center in the fintech space. Their innovative research and collaborations are driving advancements in financial technologies, and we are particularly impressed with their momentum as they enter their second NSF funding cycle. As the lead collaborator on the newly formed Commercialization task force, we are making great strides in expanding licensing, consulting, and sponsorship elements of the Centers IP. As CRAFT continues to foster fintech innovations, we look forward to a bright and successful future of partnership"

Graeme Muirhead

Managing Director, Bank of America

Throughout 2024, CRAFT was involved in many events and meetings that have further propelled the center's initiatives.



- **Presentations from CRAFT and academic leadership**
- **Keynote series titled “Past, Present, and Future of Fintech @ RPI - A Bicentennial Celebration”**
 - ◇ **“Four Innovations: An Engineer’s Journey through 40 years of Financial Management”**
Mr. John Hill ’77, Former Assistant Commissioner for Innovation and Transformation (retired), U.S. Department of the Treasury, Office of Fiscal Service
 - ◇ **“Reflections on RPI Experience and Impact”**
Fireside Chat between Dr. Kumar Bhaskaran, Mr. Steve Silberstein and Mr. Paul Lashmet
 - ◇ **“Defining the Future Agenda”**
Dr. Oshani Seneviratne, Computer Science, RPI and Dr. Xiaoyang Liu, Computer Science, RPI
- **NSF Presentation on the I/UCRC Model**
- **First round of project proposals - Theme: Computing and Technological Innovations**
 - ◇ **“Never say never - Exploration and exploitation in quantum optimization for finance”**
PI: Dr. Zhenyu Cui (Stevens)
 - ◇ **“Analyzing XBRL with AI ChatBot”**
PI: Dr. Xiaoyang Liu (RPI)
 - ◇ **“Enhancing Financial Systems Resilience: A Multi-dimensional Analysis and Strategy Framework”**
PI: Dr. Jose Ramirez-Marquez (Stevens)
 - ◇ **“Smart Encoding and Automation of Over-The-Counter Derivatives Contracts”**
PI: Dr. Oshani Seneviratne (RPI)
- **Keynote Titled “Insurtech Innovations and Opportunities”, Mr. Karim Derrick, Chief Products Officer, and Mr. Richard West, Global Head Client Innovation, Kennedys, Chair: Steve Yang**
- **Second round of project proposals - Theme: AI Innovations**
 - ◇ **“Large Transaction Models (LTMs) for FinTech”**
PI: Dr. Kristin Bennett (RPI)
 - ◇ **“AI Compliance Officer”**
PI: Dr. Zachary Feinstein (Stevens)
 - ◇ **“A Neurosymbolic Semantic Layer for Intentional Business Intelligence”**
PI: Dr. Thomas Ferguson (RPI)
 - ◇ **“Representational Harms in Foundational Models for Financial Services”**
PI: Dr. Feng Mai (Stevens)
- **Poster Session with all full proposals**
- **Keynote titled “Cloud Computing for Financial Services” Mr. Ravinder Khokhar, EVP & Global Head of Cloud for Financial Services and Capgemini, Chair: Aparna Gupta**
- **Panel Discussion titled “Addressing Deep Fake in Financial Services” Mr. Rajesh Iyer (Capgemini) and Mr. Richard West (Kennedys) with Moderator: Ms. Deborah Newberry, (Kennedys IQ)**



SPRING 2024 INDUSTRY ADVISORY BOARD MEETING | DAY 2

• Reports on Current Project Progress, Chair: Steve Yang

- ◇ “Extending, Simulating and Scaling Decentralized Exchanges Made by Automated Market Makers”
PI: Zachary Feinstein (Stevens)
- ◇ “Blockchain Interoperability for Business Organizations”
PI: Oshani Seneviratne (RPI)
- ◇ “Systemic Risk Implications of Central Bank Digital Currencies”
PI: Zachary Feinstein (Stevens)
- ◇ “Efficient, Private, and Explainable Federated Learning for Financial Crime Detection”
PI: Stacy Patterson (RPI)
- ◇ “Quantum Algorithms for Tail Risk in Loan Portfolios”
PI: Malik Magdon-Ismail (RPI)

- IP Management and Commercialization Workshop – with special invited guests
- CRAFT IAB and ALT Business Meeting
- Industry Members Discussion and Voting on Proposals – IAB Chair and Vice-Chair moderate
- NSF Closed Session with Industry
- IAB Chair and Vice-Chair report out to CRAFT ALT
- Next Steps, Action Items & Closing Remarks



“The scope of the CRAFT initiative saw a significant boost in 2024 with the launch of NJ FAST — The New Jersey Financial Accelerator at Stevens, a partnership between Stevens Institute of Technology, the State of New Jersey, Prudential Insurance and Plug and Play (the nation’s largest venture accelerator). NJFAST is designed to create a Fintech innovation hub in northern New Jersey, focusing on developing and promoting new ventures involved in bringing advanced financial technological solutions to the market. CRAFT will serve as a source of scientific and technical innovation and support for emerging companies going through the accelerator pipeline. NJ FAST will link with CRAFT to commercialize technological initiatives emerging from CRAFT research projects”.

George Calhoun

CRAFT Director of Corporate Alliance, Professor,
School of Business at Stevens Institute of Technology



During the two-day conference, there were 15 sessions and 55 presentations scheduled. Alongside the main conference track, this edition of CIFE featured an extended abstract track and a discussion track, which attracted 21 additional submissions. The Organizing Committee collaborated with the European Journal of Finance and the Journal of Futures Markets to establish two special issues entitled “Generative AI and LLM in financial risk modeling and applications” and “Cryptocurrency derivatives pricing, risk modeling, and regulatory impact.” Papers presented at the conference were welcome for submission to these two special issues.

The event was organized by IEEE, Stevens Institute of Technology and CRAFT and was sponsored by the Global Association of Risk Professionals (GARP). The conference included three keynote address by Agostino Capponi, Professor of Industrial Engineering and Operations Research and Director of the Center for Digital Finance and Technologies at Columbia University, Andrei Kirilenko, Professor of Finance and Director of the Cambridge Center for Finance, Technology & Regulation at the University of Cambridge and Mr. Shanker Ramamurthy Managing Partner Global Banking & Financial Markets, IBM. There was also a panel discussion which included Bart Frijns, Dean Faculty of Management Sciences at Open Universiteit and Editor of the Journal of Futures Markets.



CRAFT was involved with the management and hosting of the CIFE 2024 Conference.

The 2024 IEEE Computational Intelligence for Financial Engineering and Economics conference took place in-person in Hoboken, NJ, on October 22-23, 2024.

Parallel sessions included Large Language Models, Risks, Optimization, AML / Fraud, Natural Language Processing, Market Simulation, Reinforcement Learning / Financial Optimization, Time Series / Prediction, AI in Finance, Blockchain, Discussion Session 1, Reasoning, AI in Finance 2, Tables and Datasets and Discussion Session 2.





CRAFT's bi-annual Fall 2024 IAB conference took place on October 24-25, 2024 at the Stevens Institute of Technology.

- **Presentations from CRAFT and academic leadership**
- **Keynote address: “Money is Software”**
Andrei Kirilenko, Professor of Finance, Judge Business School and Founding Director of the Cambridge Centre for Finance, Technology and Regulation (CCFTR), University of Cambridge
- **Keynote address: “Plug and Play/NJFAST Overview”**
Tyler Lange and Justin Murray
- **Panel discussion: “CRAFT PI Experience”**
Steve Yang, CRAFT Director, Associate Professor, Stevens Institute of Technology (Moderator),
Kristin Bennett, Associate Director of the IDEA, Rensselaer Polytechnic Institute,
Oshani Seneviratne, Assistant Professor, Rensselaer Polytechnic Institute
Zachary Feinstein, Assistant Professor and Director of the Fintech Certificate Program, Stevens Institute of Technology
- **Keynote address: “Future-proofing with Innovation: The key to Resilience and Risk Management”**
John Bagni of BNY Mellon
- **IAB use-case presentations**
Wells Fargo, Kennedys IQ, Balcony, Park Avenue Finance, 4thought Technologies, and BNY Mellon
- **Panel discussion: “Climate Impact”**
Neil Mody, Partner, Kennedys, (Moderator)
Mike Freeman, CO-WY Engine CEO, PI,
Colby Fisher, Managing Member, Director of Research and Development, Hydronos Labs
Balbinder Singh Gill, Assistant Professor, Stevens Institute of Technology



“At CRAFT, our focus is on developing forward-thinking strategies that bridge innovation and actionable outcomes. By aligning the strengths of academic research, industry expertise, and emerging talent, we are creating the framework to effectively harness advancements in AI, blockchain, and quantum computing. Workforce development is crucial for industry professionals, and initiatives like our new fintech certificate exemplify our commitment to equipping the current and future workforce with the skills they need. Through targeted initiatives and collaborations, we are driving solutions that address industry challenges while laying the groundwork for a sustainable, inclusive, and technologically advanced financial system.”

Dr. Gregory Prastacos

CRAFT Director of Strategy, Professor and former Dean
School of Business at Stevens Institute of Technology



- **Administrative session with IAB members**
- **Introduction of two new members to the CRAFT leadership team**
Gregory Prastacos - Director of Strategy
Zachary Feinstein - Director of Research and Development
- **Six newly submitted research project proposal**
 - ◇ **“Testing Financial Foundation Models”**
PI: Ali Tajer
 - ◇ **“Privacy-Preserving Synthetic Data Generation for Financial Machine-Learning Tasks”**
PI: Oshani Seneviratne
 - ◇ **“A Generalized Multi-Purpose LLM-based AI Agents Framework for Financial Decision Making”**
PI: Steve Yang
 - ◇ **“Quantum Amplitude Estimation: Can Derivatives Valuation and Portfolio Management Benefit From It?”**
PI: Zhenyu Cui
 - ◇ **“A Framework for Cognitive Process Automation with Agentic Workflow”**
PI: Arion Cheong
 - ◇ **“A Neurosymbolic Semantic Layer for Compliance Checking”**
PI: Thomas Ferguson and Stefan Radev
- **Six current project reports**
 - ◇ **“Quantum Algorithms for Tail Risk in Loan Portfolios”**
PI: Malik Magdon-Ismail, PS Bank of America
 - ◇ **“Analyzing Financial Information with XBRL-enhanced Foundation LLM”**
PI: Xiaoyang Liu, PS Kennedys IQ, Park Avenue Finance, Wells Fargo
 - ◇ **“Smart Encoding and Automation of Over-The-Counter Derivatives Contracts”**
PI: Oshani Seneviratne, PS Bank of America, Capgemini
 - ◇ **“Large Transaction Models (LTMs) for FinTech”**
PI: Kristin Bennett, presented by Aaron Greene, PS Bank of America, IBM, SWIFT
 - ◇ **“Semantically Enhanced Graph Neural Networks for Event-Driven Financial Impact Analysis”**
PI: Mohammed Zaki, presented by Bolun (Namir) Xia, PS Park Avenue Finance, Wells Fargo
 - ◇ **“AI Compliance Officer”**
PI: Zachary Feinstein, PS IBM, Park Avenue Finance
 - ◇ **An IAB feedback report to the ALT**

Additionally, the Center connected with numerous universities to expand our academic network. With the advent of the newly formed affiliate academic membership initiative, the Center hopes to add numerous academic partners in 2025. Our meetings this year included universities such as the University of Connecticut, University of Florida, National Defense University and Florida State University. International universities include Imperial College, University of Manchester, University of Lima Peru, NEIMS University, The Sao Paulo School of Economics (FVG), University of Cambridge, Cardiff University and the University of Birmingham.



CRAFT IP TASK FORCE



Creating the CRAFT IP Task Force

At the Spring 2024 Industry Advisory Board meeting, there was an IP Management and Commercialization Workshop with special invited guests from Stevens and RPI tech transfer offices. This robust workshop generated an intensive conversation that birthed the newly formed CRAFT IP/Commercialization Task Force. The task force is chaired by Graeme Muirhead from Bank of America and vice chaired by Paul Lashmet of Park Avenue Finance. The task force has made great progress in identifying the specifics and procedures around the dissemination and licensing of center-generated IP, and has begun the process of recommending an implementation strategy across the Center. Topics discussed and deliberated are licensing, consulting and the obligations and benefits of “Industry Leads” on projects, formerly known as “Project Sponsors”.



INFRASTRUCTURE



CRAFT's main offices are currently at the Stevens Institute of Technology School of Business. Stevens generously allocated physical space for CRAFT operations, which includes nine offices, a conference room able to fit more than 30 people, an additional nine–12-person executive conference room and two cubicles. The number of affiliated faculty of the Center has grown from 28 during the planning phase to now more than 70 across business, science, technology and social science disciplines at both Stevens and RPI. With the University of Connecticut and the University of Florida slated to join CRAFT in 2025, the number of affiliated faculty will inevitably grow to more than 100



“The IP and Commercialization Task Force has made significant progress to streamline meaningful and effective collaboration between industry and academic members by drafting standard licensing and corporate sponsored research agreements and articulating the obligations and benefits for industry members that mentor R&D projects. As we prepare for Phase Two of the Center, we are also exploring innovative methods to demonstrate return on investment, which will help build a solid core membership and attract new participants. It is inspiring to see how we are injecting innovation into what could otherwise be dry topics and fostering active collaboration with peers across the industry.”

Paul Lashmet

Business Integration Architect,
Park Avenue Finance



ACCOMPLISHMENTS AND MILESTONES



- » **Since the first project funding cycle in June 2022, 17 funded CRAFT research products have produced 53 quarterly reports, 32 white papers, 29 report presentations, three invention disclosures one journal article and worked with 32 students.**

The Center is currently engaged with two domestic Universities (University of Connecticut and the University of Florida), four international universities (Imperial College [UK], University of Manchester [UK], Cardiff University [UK] and University of Birmingham [UK]) and four international partnerships (The United Nations Association of El Salvador and The Organization for Poverty Alleviation and Development (OPAD) at the United Nations, Kennedy IQ and UK Fin+).

- » **Between Stevens and RPI, CRAFT has engaged over 70 affiliated faculty members across multiple disciplinary areas.**

Areas such as quantitative finance/financial engineering, finance, business analytics, information systems, computer science, physics, mathematics, psychology, economics, systems and more. With the advent of the newly formed “affiliate academic membership” initiative, CRAFT aims to have this number go to more than 100 in 2025.

- » **CRAFTs fourth year of operations added three new members and brought the total number of industry partners to 20 members (14 Full or Associate, 6 Affiliate)**

This industry leaders representing many different segments of the financial services industry including banking, insurance, retail brokerage, financial exchange, asset management and others.



- » CRAFT officially secured two new members to the leadership team. They included former Stevens School of Business Dean Dr. Gregory Prastacos, who will be CRAFTs Director of Strategy, and Dr. Zachary Feinstein, who will act as CRAFTs Director of Research and Development + Certification.

- » CRAFT traveled back to Vanguard in August of 2024 to discuss further partnership opportunities after a very successful meeting in November 2023, which was a first-of-its-kind visit where four funded projects presented their progress and findings to Vanguard employees.

- » The third cycle of research project proposals attracted dozens of submissions from both university sites, resulting in approximately 14 proposals that were presented between the sixth and seventh IAB meetings of CRAFT held in March 2024 and October 2024. The IAB meetings included seven keynote presentations and 2 panel discussions.

- » CRAFT continued engagement and collaborative channels between IAB members and project PIs through Slack and bi-weekly/monthly Zoom meetings. These strategic channels are an opportunity not only for IAB members to be updated on project progress, but allow them to further guide, advise and steer projects as they unfold.

- » **CRAFT has been using the IAB semi-annual meetings to provide fintech training and development to industry participants, government staff and students at all levels.**

More than 50 industry professionals and 20 students participated in the open meetings for the spring and fall IAB meetings. For all the funded projects, there is at least one Ph.D. student involved in the research, along with some projects engaging many undergraduate students in the research experience. These students will be trained as experts in specific areas.

- » CRAFT maintains its official website at www.stevens.edu/craft. The website is constantly growing and adding sections and contains essential overview information about the mission and vision of the Center, includes an I/UCRC overview with FAQs, provides leadership information and all the affiliated faculty profiles, how to become a member, lists current academic and IAB members, provides current project summary information, news and events related to the center, fintech overviews and includes a portal for new research proposals.



- » The third cycle of project proposals in Spring 2024 followed the “pre-proposal” process which was initiated by the IAB members in Spring 2023. Submitting PIs now go through a pre-filtering process where they complete a “Shark Tank” style five-minute “lightning pitch” made in a “lightning round” to gather interest from the industry. In February, the 13 pre-proposal pitches were made to the IAB and eight of the 13 were chosen for further consideration at the Spring 2024 IAB meeting. The ALT confirmed this selection based on industry interest, academic merit and possibility of commercialization. They included “Never say never - Exploration and exploitation in quantum optimization for finance”, PI: Dr. Zhenyu Cui (Stevens), “Analyzing XBRL with AI ChatBot”, PI: Dr. Xiaoyang Liu (RPI), “Enhancing Financial Systems Resilience: A Multi-dimensional Analysis and Strategy Framework”, PI: Dr. Jose Ramirez-Marquez (Stevens), “Smart Encoding and Automation of Over-The-Counter Derivatives Contracts”, PI: Dr. Oshani Seneviratne (RPI), “Large Transaction Models (LTMs) for FinTech”, PI: Dr. Kristin Bennett (RPI), “AI Compliance Officer”, PI: Dr. Zachary Feinstein (Stevens), “A Neurosymbolic Semantic Layer for Intentional Business Intelligence”, PI: Dr. Thomas Ferguson (RPI), “Representational Harms in Foundational Models for Financial Services”, PI: Dr. Feng Mai (Stevens). In September 2024, an additional 12 pre-proposals were made to the IAB and 6 of the 13 were chosen for further consideration at the Fall 2024 IAB meeting. They included “Testing Financial Foundation Models” PI: Ali Tajer (RPI), “Privacy-Preserving Synthetic Data Generation for Financial Machine-Learning Tasks” PI: Oshani Seneviratne (RPI), “A Generalized Multi-Purpose LLM-based AI Agents Framework for Financial Decision Making” PI: Steve Yang (Stevens), “Quantum Amplitude Estimation: Can Derivatives Valuation and Portfolio Management Benefit From It?” PI: Zhenyu Cui (Stevens), “A Framework for Cognitive Process Automation with Agentic Workflow” PI: Arion Cheong (Stevens) and “A Neurosymbolic Semantic Layer for Compliance Checking” PI: Thomas Ferguson and Stefan Radev (RPI).

- » CRAFT is in current discussions with various stakeholders to implement a “CRAFT Talent Network” comprised of current academic member students to be accessed by industry partners, a “CRAFT HS Network” comprised of local high school students interested in fintech, a “CRAFT DEIA Network” comprised of economically disadvantaged and underrepresented local schools interested in financial training, and a “CRAFT Fintech Education Certification” which will act as a bootcamp in fintech for industry member employees and will result in certificate.



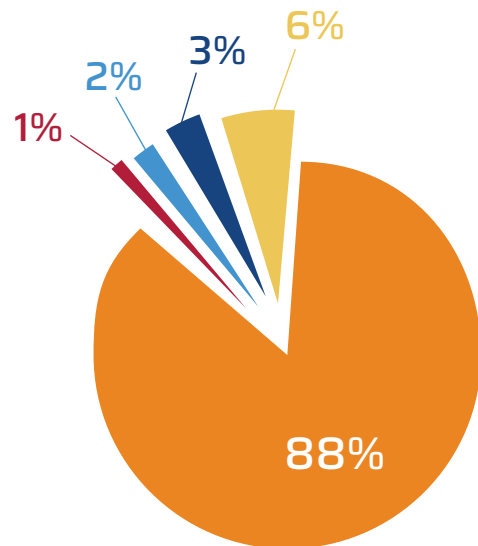


CRAFT BUDGET OVERVIEW

EXPENSES

- Salaries - \$174,842
- Meetings and Workshops - \$12,326
- Professional Services - \$6,230
- Travel - \$2,830
- Software Licenses - \$1,294
- Materials and Supplies - \$314
- Maintenance and Repairs - \$440
- Printing and Copy Services - \$264

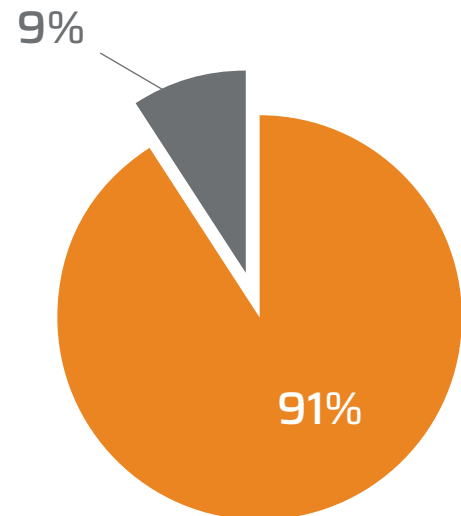
TOTAL EXPENSES: \$198,540



REVENUE

- Total Research Project Funding - \$500,000
- Balance Available - \$50,000

TOTAL REVENUE: \$550,000



“Fintech is a rapidly evolving field as new technologies develop and mature. CRAFT is investing in harnessing novel technologies in AI, blockchain, quantum computing and more to improve financial systems. With a broad view of financial applications from our industry partners, CRAFT is well situated to produce meaningful impact in research and thought leadership.”

Dr. Zachary Feinstein



Director of the Fintech Certificate Program, CRAFT Director of Research,
Assistant Professor, School of Business at Stevens Institute of Technology







CRAFT GROWTH OBJECTIVES

To accomplish the Center's long-term growth objectives, the CRAFT team has defined specific plans following these broad Center objectives.





A Conduct high-quality, high-impact research to meet shared needs of industry constituencies.

-  Base all research funding on industry need and the strong prospect for commercialization.
-  Work with venture investment firms to develop start-up incubation programs.




B Enhance workforce development and access to talent pipelines to drive industry and student engagement.

-  Continue to provide industry-inspired workshops, work with HR representatives from IAB members to drive actionable recruitment efforts, provide opportunities for active student engagement and showcasing.
-  Develop a fintech talent network across different universities and different disciplines.
-  Develop fintech certification programs jointly with the NGO Committee on Private Sector Development at the United Nations on sustainability, impact financing, etc.
-  Develop youth-focused immersion educational programs jointly with the UN and with partnership with high schools.

C Continue to actively recruit new partners in industry and academia.

-  Add new industry partners to the consortium to strengthen the research and talent needs while building additional partners in academia to increase the diversity of affiliated faculty and available research projects for funding.
-  The two specific sectors we are targeting during the next period are the insurance and the consulting industry.
-  Develop global academic partnership through UKFin+ and the UN Green Fintech subcommittee.
-  Encourage diversity, equity and inclusion (DEI) throughout all CRAFT activities.

D Assert thought leadership in fintech research and innovation.

-  Continue to use workshops, social media and other public forums to disseminate new knowledge in fintech and advocate social and economic impact.
-  Engage local and federal financial regulators such as the SEC, Federal Reserve, CFTC and Treasury to communicate challenging issues raised by Center members.
-  Develop global leadership in green fintech, impact financing through the UN partnership.



“In its fourth year of operation, CRAFT continues to deliver on its overall missions of research, workforce development and thought leadership. CRAFT is making strides in diversifying and broadening its outreach (e.g., NSF CO-WY Climate Resilience Engine) to drive transformational change and impact. The IBM and CRAFT partnership advances transformative technologies in financial services, especially in generative AI and quantum computing.”

Dr. Kumar Bhaskaran
Financial Services Technology & Innovation Leader
IBM and Chair, CRAFT IAB



January 2023 – The deadline for the requests for proposal of newly submitted research projects was the last day of January 2023.

February 2023 – The academic leadership team, along with the industry advisory board conducted review sessions on the newly submitted research proposals. Based on industry interest, proposals from October 2022, along with January 2023, 15 projects were chosen to present at the Spring 2023 IAB Meeting at RPI.

February 2023 – CRAFT organized a Workforce Development Workshop. The workshop consisted of two panel discussions - one led by industry partners from Bank of America, Charles Schwab, CME and Vanguard, the other by students from Stevens and RPI. Through this workshop, the Center gained valuable insights from industry/HR leaders on how CRAFT can best support workforce development, access to talent initiatives and best practices on hiring procedures. The first panel was a discussion with Industry/HR leaders on the “state of the industry.” This centered around topics such as current and changing in-demand skill sets in the finance market, what skills firms are looking for, how can CRAFT produce talent firms are interested in, recommendations for fintech courses, hiring challenges, talent development, inflation and costs, factors driving workforce compensation, student recommendations etc. Participants included Dax Hill, Senior Innovation Manager, Vanguard, Eric Leininger, Executive Director, Financial Research & Product Development, CME Group (moderator), and Krupakar Pasupuleti, Tech Executive, Cloud Development and Enablement, Bank of America. The second panel was a “fireside chat” between industry/HR leaders and four students from Stevens and RPI. Students led the discussion and asked questions based on career trajectory perspectives. This included items such as job fairs, the hiring process, desirable resume characters, best practices to secure a position, the interview process, how to stand out amongst competition, valuable courses or academic experience, extracurricular activities, advice on becoming a fintech innovator, etc. Students included Noah Porcelain, Stevens UG Student, Agathe Sadeghi, Stevens PhD Student. Cole Paquin, RPI MS Student, and Pierce Phillips, RPI MS Student. Industry participants included Dax Hill, Senior Innovation Manager, Vanguard, Eric Brubaker, Senior Manager R&D, and Charles Schwab. Eric Leininger, Executive Director, Financial Research & Product Development, CME Group, and Mike Purewal, Data Scientist, Bank of America. The workshop concluded with a presentation on the Hanlon Financial Systems Center laboratory, a staple of the finance program at Stevens, a presentation by the SSMIF (Stevens Student Managed Investment Fund) program at Stevens and a reception.



March 2023 – The third Industry Advisory Board Meeting was held at RPI. The meeting featured an introduction to CRAFT and the industry-university cooperative research center model Keynotes: “Fintech Venture Capital and Start-up Ecosystem” and “Fraud and Anomalies Detection in Financial Service”, a panel discussion on the commercialization of fintech innovations, an academic presentation by the University of Connecticut and 15 cutting-edge research project proposals. Day 2 of the meeting featured a successful administrative session with the IAB where the “pre-proposal lightning rounds” were discussed as a pre-filtering proposal step. The IAB voted to fund five projects which will begin on June 1, 2023. During the session, Bank of America suggested the next IAB meeting at their Bryant Park campus in New York City.

June 2023 - Four currently funded CRAFT projects began on June 1, 2023. They include:

- “Blockchain Interoperability for Business Organizations”
PI: Oshani Seneviratne (RPI)
- “Efficient, Private, and Explainable Federated Learning for Financial Crime Detection”
PI: Stacy Patterson (RPI)
- “Extending, Simulating and Scaling Decentralized Exchanges Made by Automated Market Makers”
PI: Zachary Feinstein (Stevens)
- “Systemic Risk Implications of Central Bank Digital Currencies”
PI: Zachary Feinstein (Stevens)



July 2023 - CRAFT implemented every-other-month “CRAFT Cadence Calls” between CRAFT leadership, ALT and IAB members. This acts as a Center update and a touch point for on-going discussion items.

September 2023 – CRAFT’s first funded “Ignition Grants” present their findings at the annual CRAFT Reception Event.

November 2023 – CRAFT held its fourth bi-annual Industry Advisory Board Meeting early in the month at Bank of America. This is the first time an IAB meeting was held at an Industry member location. This collaboration between RPI/Stevens/BoA proved to be greatly beneficial as many long-lasting relationships were solidified and the centralized location of Bank of America’s Bryant Park campus was very convenient for most attendees.

December 2023 – CRAFT visited the United Nations to attend the first ever “Interuniversity Conference on Youth and Education” (invite by ambassador Daniel Del Valle Blanco) with presenters from around the world and continues conversation on launching the UN-subcommittee on green finance initiatives.



January 2024 - The CRAFT Center acquires an entire wing of the Stevens School of Business to conduct operations.

January 2024 - 13 pre-proposals are submitted and lightning rounds are held.

February 2024 - CRAFT and CO-WY Climate Resilience Engine sign a MOU and enter into a collaborative partnership to combat climate change.

March 2024 - The Center creates a firewall proof online directory or repository that houses all center-generated materials that the IAB members can access at home or work.

March 2024 - Sixth IAB Meeting held at RPI Campus with 7 projects presented.

March-April 2024 - Two inventions are disclosed to technology transfer offices in a first of its kind initiative to possibly patent center generated ideas.

April 2024 - CRAFT adds "Industry Testimonials" to the website.



June 2024 - Five new research projects are started.

June 2024 – The new formed CRAFT IP/Commercialization Task Force begins its monthly meetings.

September 2024 – CRAFT hosts its annual September reception event at Stevens.

October 2024 – CRAFT manages the CIFEr 2024 Conference at Stevens.

October 2024 - CRAFT hosts the seventh Industry Advisory Board Meeting at Stevens

November 2024 - CRAFT creates the “affiliate academic member” membership option which expedites participation from other Universities, both international and domestic

December 2024 - CRAFT has formal meetings with United Nations Association of El Salvador (UNASV) and The Organization for Poverty Alleviation and Development (OPAD) at the United Nations to discuss and solidify the partnership and makes plans for a formal announcement at a February 2025 event at the UN. CRAFT will participate in the UNs “Knowledge Innovation Summit” poised for Spring 2026.

December 2024 - CRAFT continuously provides support and guidance for the Stevens/CRAFT Fintech Certification Program, in which CRAFT members will be the first to receive discounts on their enrollment in the program.

March 2025 - CRAFT’s eighth Industry Advisory Board Meeting will be held at RPI.