Research Seminar Series College-Wide Research Vision (CRV) Update

Rosemarie D. Wesson

Interim Associate Provost for Research

Thursday, December 9, 2021

College-wide Research Vision (CRV)

- **Seed funding competition**
- **CCNY community**
- **Harness paradigm shifting fundamental research**
- **Address challenging real-world problems**
- **Connecting diverse disciplines, techniques, and ways of thinking.**

CRV Objectives

- **Aims to remove academic silos**

- **Foster research that addresses the toughest questions facing humanity**

- **Practical implications for New York City, the nation and the world.**

CRV Goals

- **Bring together faculty from different disciplines**
- **Share knowledge**
- **Ask questions from multiple angles**
- **Collaborate on research**
- **Tear down academic barriers.**

CRV Timeline

- CRV Announcement – October 1, 2021
- College-wide CRV Town Hall – October 21, 2021
- **Deadline for submission of Concept papers – December 1, 2021**
- CRC Review of Concept Papers and potential teams – December 2021 - January 2022
- Coordination/Facilitation of potential CRV Teams – January – March 2022
- Presentation to CRC of the Select Concept Papers/teams – April 2022
- College Coordination – May 2022
- Final Selection of CRV Team – June 2022
- Commencement of the CRV Project – July 2022

The City College
of New York

Office of Research

FAQ #1 – WHO WON?

Answer: This will be a multi-stage discussion and selection process to determine a collaborative college-wide effort.

The process may include discussions among proposers whereby ideas / teams could merge into a single funded project.

CRV UPDATE

- **Sixteen Concept Papers received**
- **Eight Schools/Divisions represented**
- **Varying degrees of collaboration**
- **Topics:**
  - **Climate Change (5)**
  - **Energy (4)**
  - **Government/Politics (3)**
  - **Health (4)**

CRV Timeline

- CRV Announcement – October 1, 2021
- College-wide CRV Town Hall – October 21, 2021
- Deadline for submission of Concept papers – December 1, 2021
- **CRC Review of Concept Papers and potential teams – December 2021 - January 2022**
- Coordination/Facilitation of potential CRV Teams – January – March 2022
- Presentation to CRC of the Select Concept Papers/teams – April 2022
- College Coordination – May 2022
- Final Selection of CRV Team – June 2022
- Commencement of the CRV Project – July 2022

The City College
of New York

Office of Research

CLIMATE CHANGE-RELATED CONCEPT PAPERS (5)

Title: Climate Change, Urban Inequality and Housing Justice
CPS: Yana Kucheva (PI), Katherine Chen
GSOE: Prathap Ramamurthy

Title: The Sugar Maple Project: Integrating Science, Society and Stakeholders to Advance Climate Resilience
SCIENCE: Ana Carnaval (PI), Michael Hickerson, Kyle McDonald
CUNY: Andrew Reinmann, Hunter, ASRC
CPS: Jean Krasno
H&A: Emily Raboteau, Michelle Valadares, Rebecca Albee
EXTERNAL: Peter Gregg (Maple Sugar Producer)

Title: Convergence Research for an Inclusive City
ARCH: Zihao Zhang (PI), Cahterine Seavitt Nordenson
GSOE: Zhigang Zhu, Huy Vo, Mahdieh Allahviranloo

Title: Interdisciplinary Approach to Critical Environmental and Municipal Infrastructure Challenges: Application to Biosolids Management
GSOE: John Fillos(PI), Beth Wittig, Naresh Devineni, Jeff Morris, Marco Castaldi, Michael Bobker
ARCH: Hillary Brown
SCIENCE: Urs Jans
CPS: Mehdi Samimi

Title: GUTTED! A Decent Proposal for Environmental Justice
H&A: Araceli Tinajero (PI)

ENERGY-RELATED CONCEPT PAPERS (4)

Title: CRV: Community Energy Cells: An Interdisciplinary Approach to Climate Change, City Resiliency, and Energy Justice
<u>GSOE:</u> Ahmed Mohamed (PI), Jorge Gonzales, Michael Bobker, Mohamed Ali, Michael Grossberg, Alexander Couzis, Sanjoy Banerjee, Robert Messinger, Elizabeth Biddinger
<u>ARCH:</u> Shawn Rickenbacker
<u>CPS:</u> Punit Arora
<u>CWE:</u> Susanna Schaller

Title: A Paradigm Shift Inspired by Nature: New Design Principles for Solar-Energy Harvesting Architectures
<u>SCIENCE:</u> Dorthe Eisele (PI)
<u>ARCH:</u> Frank Melendez
<u>GSOE:</u> Jing Fan

Title: "Hygroscience" for Evaporation Energy Harvesting
<u>GSOE:</u> Xi Chen (PI), Jorge Gonzales, Raymond Tu, Charles Vorosmarty
<u>ARCH:</u> Ahu Aydogan
<u>CPS:</u> Daniel DiSalvo

Title: A Next Generation Modeling-Monitoring System to Study Offshore Wind Energy Problems
<u>GSOE:</u> Hansong Tang (PI), Vaisl Diyamandoglu, Naresh Devineni
<u>CUNY:</u> Alexander Tzanov
<u>EXTERNAL:</u> Branko Gilsic (Princeton), Marine Ecologist (TBD)

GOVERNMENT/POLITICS-RELATED CONCEPT PAPERS (3)

Title: Contested Histories: How to Negotiate Competing Historical Narratives Toward a Safer and More Inclusive Future
H&A: Mikhal Dekel (PI), Andrea Weiss
ARCH: Marta Gutman
CPS: Matthew Reilly

Title: Mitigating the Effects of War on Vulnerable Populations
CPS: Bruce Conin (PI), Adeyinka Akinsulure-Smith, Maritsa Poros, Lotti Silber, Ben Vilhauer,
SOM: Nancy Sohler
H&A: Anne Kornhauser
CWE: Danielle Zach

Title: Research Establishment for Game Advancement and Industry Networking (REGAIN)
GSOE: Akira Kawaguchi(PI), Pouyan Ghaemi, David Schmeltzer, Sergey Vitkalov, Teresa Bandosz, Adrian Rodriguez-Contreras
SCIENCE: Christian Wolf
CPS: Punit Arora
H&A: Mark Addison Smith

The City College
of New York

Office of Research

HEALTH-RELATED CONCEPT PAPERS(4)

Title: AI and Machine Learning Enabled Miniaturized Multimodal Medical Sensing
GSOE: Nicholas Madamopoulos (PI), Bingmei Fu, Sang-woo Seo, Jie Wei, Zhigang Zhu
SCIENCE: Karen Hubbard

Title: The "Beloved Community" Project
EDUCATION: Terri Watson (PI), Edwin Lamboy
GSOE: Bao Vuong
SCIENCE: Susan Perkins

Title: Tabletop Ultra-supercontinuum and Higher Harmonic Generation Source for UV and X-ray Microscopy (UXM) in Condensed Matter Physics, Chemistry, Biology and Medicine
SCIENCE: Robert Alfano (PI), Pouyan Ghaemi, David Schmeltzer, Sergey Vitkalov, Teresa Bandosz, Adrian Rodriguez-Contreras
GSOE: Roger Dorsinville
SOM: Sanna Goyert

Title: Artificial Intelligence for Health Equity and Diversity (AIHED)
SOM: Ashiwel Undieh(PI), Maria Lima, Noel Manyindo, Victoria Frye
GSOE: Jie Wei, Reza Khanbilvardi, Akira Kawaguchi, Zhigang Zhu, Jeff Garanich, Bingmei Fu,
SCIENCE: Karen Hubbard
CPS: Kevin Foster,
ARCH: Ahu Aydogan

The City College
of New York

Office of Research

Next Steps - CRV Timeline

- CRV Announcement – October 1, 2021
- College-wide CRV Town Hall – October 21, 2021
- Deadline for submission of Concept papers – December 1, 2021
- CRC Review of Concept Papers and potential teams – December 2021 - January 2022
- **Coordination/Facilitation of potential CRV Teams – January – March 2022**
- Presentation to CRC of the Select Concept Papers/teams – April 2022
- College Coordination – May 2022
- Final Selection of CRV Team – June 2022
- Commencement of the CRV Project – July 2022

The City College
of New York

Office of Research

CRV

- Provide forward-looking views and identify new opportunities at the forefront of research and innovation.

- Should not simply represent the PIs' ongoing or planned research activities.

- **Multi-stage discussion and selection process to determine a collaborative college-wide effort.**

- **May include discussions among proposers whereby ideas / teams could merge into a single funded project**

The City College
of New York

Office of Research

Next Steps

- **Concept Papers will be posted on Research Website**

- **Teams work with Team Science Facilitator (s)**

- **Currently coordinating with potential external Team Science facilitators**
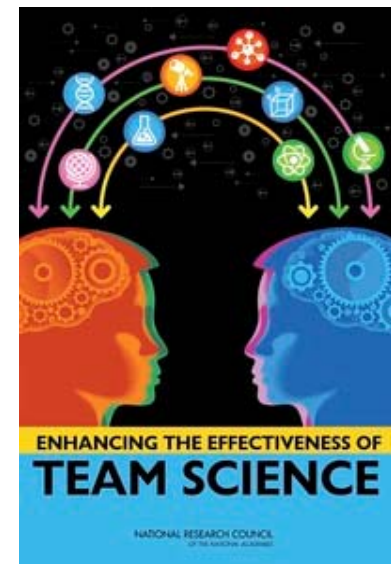
FAQ #2 - What is Team Science?

Team science is a collaborative effort to address a challenges that leverages the strengths and expertise of professionals trained in different fields

https://sc-ctsi.org/training-education/what-is-team-science

The City College of New York

Office of Research
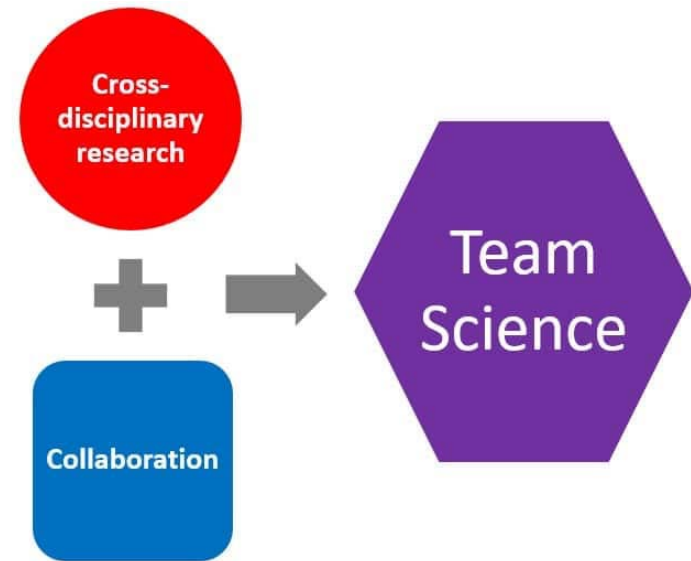
FAQ # 3 – Why Team Science?

The past half-century has witnessed a dramatic increase in the **scale and complexity** of research. The growing scale and complexity has been accompanied by a shift toward collaborative research, referred to as "team science." **Research is increasingly conducted by small teams and larger groups rather than individual investigators**, but the challenges of collaboration can slow these teams' progress in achieving their goals.

https://www.nationalacademies.org/our-work/the-science-of-team-science

The City College
of New York

Office of Research

FAQ #4 – Is an External Facilitator Necessary?

- **Brings Team Science expertise**
- **Pre-preparation essential**
- **Managing meeting dynamics may be difficult, especially when you know the people in the room.**
- **Brings an independent perspective to resolve alternative viewpoints**
- **Allows full engagement by participants**
- **Risk reduction (Goal – not waste participant time)**

FAQ # 5 – Why Should Teams Participate?

- **Encourages researchers across a broad range of disciplines to apply their individual knowledge to a problem.**
- **Each participant will approach the problem in a different way, offering their own perspective based on their own experience.**
- **Offers a way to be involved with a project that potentially has more significance/impact in comparison to day to day research.**
- **Opportunity to network and acquire new skills which could lead to additional funding.**

FAQ #6 – Are Teams Required To Participate?

- **Teams are not required to participate**

- **Final team will be selected at the conclusion of the facilitated workshops**

- **All participants benefit from team science approach**

The City College
of New York

Office of Research

FAQ #7 – How Long Will This Process Take?

- **Anticipate Workshops will begin in January and continue through April/May 2022**

- **Final Project Selection – June 2022**

- **Projects Begin – July 2022**

FAQ #8 – What Happens Next?

- **Researchers should review 16 submitted Concept Papers**

- **College Research Council (CRC) meets December 15, 2021**

- **CRC may request ONE PowerPoint slide**

- **CRC may request 5-7 minute video**

- **Additional Information forthcoming**

Concept Papers (Submitted by 12/1/2021)

Proposer	Department	Title	Whitepaper
Ahmed Mohamed	Electrical Engineering	CRV: Community Energy Cells: An Interdisciplinary Approach to Climate Change, City Resiliency, and Energy Justice	LINK
Akira Kawaguchi	Computer Science	Research Establishment for Game Advancement and Industry Networking (REGAIN)	LINK
Ana Carnaval	Biology	The Sugar Maple Project: Integrating Science, Society, and Stakeholders to Advance Climate Resilience	LINK
Araceli Tinajero	Spanish	Gutted! A Decent Proposal for Environmental Justice	LINK
Ashiwel Undieh	Medicine	Artificial Intelligence for Health Equity and Diversity (AIHED)	LINK
Bruce Cronin	Political Science	Mitigating the Effects of War on Vulnerable Populations	LINK
Dorthe Eisele	Chemistry	A PARADIGM SHIFT INSPIRED BY NATURE: New Design Principles for Solar-Energy Harvesting Architectures	LINK
Hansong Tang	Civil Engineering	A Next-generation Modeling-Monitoring System to Study Offshore Wind Energy Problems	LINK
John Fillos	Civil Engineering	Interdisciplinary approach to critical environmental and municipal infrastructure challenges: application to biosolids management	LINK
Michal Dekel	English	Contested Histories: How to Negotiate Competing Historical Narratives Toward a Safer and More Inclusive Future	LINK
Nicholas Madamopoulos	Electrical Engineering	AI and Machine Learning Enabled Miniaturized Multimodal Medical Sensing	LINK
Robert Alfano	Physics	Tabletop Ultra-supercontinuum and Higher Harmonic Generation Source for UV and Xray Microscopy (UXM) in Condensed Matter Physics, Chemistry, Biology, and Medicine	LINK
Terri N. Watson	Learning, Leadership and Culture	The "Beloved Community" Project	LINK
Xi Chen	Chemical Engineering	"Hygroscience" for Evaporation Energy Harvesting	LINK
Yana Kucheva	Sociology	Climate Change, Urban Inequality, and Housing Justice	LINK
Zihao Zhang	Architecture	Convergence Research for an Inclusive City	LINK

https://www.ccny.cuny.edu/research/college-wide-research-vision

The City College of New York

Office of Research

Next Steps - CRV Timeline

- CRV Announcement – October 1, 2021
- College-wide CRV Town Hall – October 21, 2021
- Deadline for submission of Concept papers – December 1, 2021
- CRC Review of Concept Papers and potential teams – December 2021 - January 2022
- Coordination/Facilitation of potential CRV Teams – January – March 2022
- Presentation to CRC of the Select Concept Papers/teams – April 2022
- College Coordination – May 2022
- Final Selection of CRV Team – June 2022
- Commencement of the CRV Project – July 2022

The City College
of New York
Office of Research

QUESTIONS?

The City College
of New York

Office of Research

BACK-UP SLIDES

CRV

- **Support researchers as they form inter-divisional teams tasked with investigating urgent issues, the results of which will have direct impact.**

- **Looking for solutions attainable in less than a decade.**

- **Projects must be rooted in collaboration to produce practical solutions to social, environmental, economic, cultural, political and humanitarian challenges.**

- **The collaborative team must commit to seek external funding to grow and sustain the effort during and after the initial three-year period of internal funding.**

CRV

- **Provide forward-looking views and identify new opportunities at the forefront of research and innovation.**

- **Should not simply represent the PIs' ongoing or planned research activities.**

- **Multi-stage discussion and selection process to determine a collaborative college-wide effort.**

- **May include discussions among proposers whereby ideas / teams could merge into a single funded project**

CRV Concept Papers

- **Topic suggestions will not be kept confidential.**
- **The College Research Council (CRC) will review submitted Concept Papers and invite up to five submitters to engage with the CRC in further discussions of their proposed topic.**

Additional Requirements

- **Commit to seek external funding to grow and sustain the effort during and after an initial three-year period of internal funding**

- **Report out by way of semi-annual presentations to the CRC and annual reports to the Office of Research**

CRV Funding

- **The Office of Research will provide seed funding of up to $200,000 annually for up to three years.**

- **The goal is to support one project beginning 07/01/2022**

CRV Budget

- **No capital equipment**
  - **Will be given higher priority in future GRTI funds for equipment**
  - **Encouraged to pursue external capital equipment grants**
- **Maximum 1 summer month of support for key faculty**
- **Highly recommended funding postdoc to achieve integration of research**
- **Graduate student support preferred, undergraduate support will be considered when justifiable**
- **Limited travel funds allowed**

CRV Timeline

- CRV Announcement – October 1, 2021
- **College-wide CRV Town Hall – October 21, 2021**
- Deadline for submission of Concept papers – December 1, 2021
- CRC Review of Concept Papers and potential teams – December 2021 - January 2022
- Coordination/Facilitation of potential CRV Teams – January – March 2022
- Presentation to CRC of the Select Concept Papers/teams – April 2022
- College Coordination – May 2022
- Final Selection of CRV Team – June 2022
- Commencement of the CRV Project – July 2022

The City College
of New York

Office of Research

CCNY College-wide Research Vision (CRV) Initiative Concept White Paper

[CRV PROJECT TITLE]

Project Team:
Principal Investigator: Dr. Jane Doe, Professor
Department: [Department] | [School/Division], The City College of New York
Other Key Personnel: Dr. John Smith (BME/GSOE); Dr. Katie Chen (Psychology/CPS)

Project Concept Description: (Maximum 2 pages)
Keywords: Global Warming, Weather, ...

Objective: Identify objectives in each of the areas to be supported by this initiative, and clearly identify how these objectives address an ultimate common goal. Note the key point for this initiative is to seek a holistic effort to address a common problem, not to support a collection of independent, piecemeal research efforts.

Approach: Identify approaches in each of the areas to be supported by this initiative, and clearly outline the benefits of the integration of these efforts.

Outcomes: What are the outcomes in each area and how are they connected to the common goal?

Expected Products: (Books, Journal Articles, and other significant multi-media products expected)
What are your expected products from this initiative in terms of quantity and quality? Identify tangible not abstract products. For example,

Merits: While merits can be discussed in each area independently, this section also needs to provide a convincing argument as to why achieving these independent merits would lead to the common merits of the entire initiative.

Impact: What are the expected impacts in each area and in the common humanity good.

Milestones:

Budget (Maximum Budget $200K):
Personnel Costs: (please list key positions and estimate budget required)
OTPS Costs: (major items, such as supplies, travel, etc. Subcontract and consultant costs are discouraged)

Note: There is no IDC, and no equipment costs are allowed. Necessary equipment will be considered as top priority from future GRTI allocations and/or other equipment grants.

CRV Review Criteria

- Does the proposed topic represent an opportunity for a significant leap or paradigm shift in a research area, or have the potential to create a new research area, generally and on our campus?

- What are the underpinning breakthroughs? Why is now the right time?

- Is there potential for making significant progress on a current national or societal need, or "grand challenge"?

- Does the topic require inter/multi-disciplinary expertise? Is the research scope beyond the capabilities of one school/division?

- How will the project be managed and what role will the non-lead personnel play in the research?

EXAMPLES

The City College
of New York

Office of Research

Closed-Loop Precision Farming

Goal: Establish closed-loop farming system that is duplicable, scalable and self-sustainable. This system would address the need in energy and water resources in farming.

- Impact on small/large farms and urban revitalization (Societal Impact)
- Political impact on food security and society resilience to climate change
- Renewable energy generation for self-sustainable operation
- AI-driven and computer vision algorithms to provide precise amount of water needed for optimized plant growth while conserving water
- Engineering design of modular system and equipment
- Agriculture study in optimizing plant growth and resource needs
- Business model and cost effectiveness assessment
- Business viability study and cost down modeling

Ocean Waste Removal System

Background - Ocean plastic waste is a major environmental challenge that affects fishing industry, but is also a clear and present danger to the important ecosystems from shoreline to distant offshore regions. There have been many large scale international efforts to develop autonomous ocean trash collection systems. However, transportation of these waste to shore for sorting, recycling or disposal can be an economical barrier that makes these collection efforts limited to nearshore regions. Fishing industry has developed vessels that can process the catch onboard to final products (ex. fillets) ready for market.

Ocean Waste Removal System

The system could design an offshore vessel system that could consist the following subsystems:

- Mining subsystem - collect the waste from the ocean

- Sorting subsystem - clean and sort using AI-driven high tech sorting system

- Pellet subsystem - heat useable materials into pellets, ready for industry on shore to use as raw material.

- Production subsystem – an optional plastic injection molding system or other press systems can be incorporated onboard to use the pellets onsite for final consumer products, such as planter boxes, crates, and other stackable products.

Ocean Waste Removal System

Vessel could come ashore and offload

- **Unusable plastic that could be burned as fuel at well-controlled facility**
- **Unusable trash for land fill facility**
- **Pellet materials for use by factories**
- **Final products per order and manufactured onboard.**

This project would then involves the following disciplines

- **Oceanography – study the ocean current and recirculation regions where large pool of plastic waste could gather**
- **Mechanical engineering – designing the Mining subsystem**
- **Computer science and industrial engineering for the sorting subsystem that involves AI, computer vision, and such.**
- **Economic or relevant business disciplines to develop efficient business model and optimize the workflow.**
- **Social science to study the impacts of plastic waste in ocean on fishing and tourist industry, and assess the impacts of such a large floating plastic processing vessel.**
- **Humanities and the Arts – humanitarian effort. Could involve artistic uses for the plastic waste.**