CRC Meeting 17
June 29, 2022
Present*: Professor Aguasaco, Director Baptiste-Sexton, Dean Couzis, Research Manager Duran, Assistant Professor Higney, Dean Lamboy, Dean Lima, Dean Miller, Vice President Mozeleski, Dean Perkins, Special Assistant Shih, CRC Chair Silber, CRC Chair Tinajero, Dean Wesson, Senior Director Wooten

**Due to the nature of this meeting, attendance of all CRC members may not have been recorded.*

Item 1: Approval of the May 11, 2022 minutes with one correction:

- Carlos Aguasaco is a full professor

Item 2: CRC Presentations (See Below)

Item 3: Next Steps for CRC Members

Each CRC member was provided with templates for each team. If a CRC member is a participant on any team, they have a conflict of interest and should not evaluate that team.

Time frame: CRC members should have templates submitted by July 31. If there is an agreement, results will be announced. If there are discrepancies, they may have to be ironed out.

There is a CRC meeting tentatively scheduled for **Wednesday, August 24, 2022**.

CRC Presentations:

Introduction: Dean Wesson introduced the College-Wide Research Vision Initiative Final Team Presentations. There are four presentations in this session and four at the end of July; the presentations are open to the CCNY community. The session was recorded, and the recording will be made available, along with slides, on the CCNY CRV website https://www.ccny.cuny.edu/research/college-wide-research-vision.

Team 1: Artificial Intelligence for Health Equity and Diversity (AIHED)

Team Members:

Faculty Name	Expertise Critical in Project (up to 2)
Ashiwel Undieh, Team Lead	Leadership; Medical and epigenomics data
Victoria Frye, Core A Lead	Social determinants of health; Electronic health records (EHR)
Jie Wei, Core B Lead	AI Software applications; Medical computing
N. Madamopoulos, Core C Lead	Hardware device development; Photonics sensors
Karen Hubbard, Core D Lead	Community linkages; Community participatory research
Ahu Aydogan	Environmental determinants of health (EDOH); Air quality and health
Akira Kawaguchi	AI Software applications; Augmented reality
Bingmei Fu	AI image processing; AI-assisted disease diagnosis
Bruce Kim	Microelectronics; Wearable sensors
Kevin Foster	Economic determinants of AI deployment; Cost-benefit analysis
Noel Manyindo	Social determinants of health; Community linkages
Reza Khanbilvardi	EDOH; Environmental surveillance data acquisition
Sang-Woo Seo	Hardware development; Physical sensors and actuators
Zhigang Zhu	Data engineering; Multimodal analytics

Guiding Question: How might individual and community health improve if wellness and healthcare delivery were infused with inclusive and equitable Artificial Intelligence (AI) technologies?

Summary: This project looks at the growth and integration of AI in the health sector, with a focus on diversity and its impact on data, AI algorithms, AI technology, and health and wellness outcomes for New Yorkers and beyond. Specifically a lack of data diversity and diversity among researchers could perpetuate the risk of creating and perpetuating harmful bias in AI. AIHED aims to position CCNY as a leader in equitable AI.

Methods: This project uses technical approaches for 4 core areas:

- Data sourcing, curation, and pipelining
- Algorithm development and adaptation to address equity considerations
- AI device development for inclusivity from design to prototyping
- Community outreach and participation

Future Funding Prospects and Self-Sustaining Plan: the team plans to submit funding applications to NYS, NIH, NSF, DOD, and DOE, and recently reached the interview stage for a $48 million NIH proposal. In addition, any products produced will earn patents and be developed or licensed out.

Questions:
Q: What is the state of the field (of AI)? Who are competitors? Why are we better positioned?
A: there are a lot of players in the field of AI and health, including academic institutions and corporations. What we bring is broad diversity of participants from different fields not just data science and AI; we can think more broadly in how to apply tech to wider range of issues, bringing equity and diversity as guiding principles.

Q: Is there enough funding for all team members? How is the budget split?

A: The team has agreed not to take summer salaries until more funding is gained.

Team 4: Water Resource Recovery
Team Members:

Team Lead: *John Fillos, Department of Civil Engineering*

Name	Department	Faculty Expertise (Assets)
Hillary Brown	Architecture	Sustainability, infrastructure planning
Marco J. Castaldi	Chemical Engineering	Thermal processing of organic waste
Jeff Morris	Chemical Engineering/Levich Institute	Rheology, complex fluids, mixture flow
Urs Jans	Chemistry	Chemical analysis of contaminants
Ann (Beth) Wittig	Civil Engineering	Air quality management
Naresh Devineni	Civil Engineering	Data science (environmental focus)
Krish Ramalingam	Civil Engineering	Water resource recovery engineering
Alex Rosenthal	Civil Engineering	Process modeling
Michael Bobker	CUNY Institute of Urban Systems	Energy Management
Mehdi Samimi	Economics & Business	Strategic Management

Guiding Question: Imagine if New York viewed waste as a valuable resource rather than a problem and used waste to bring sustainable benefits to a range of people. What would that look like?

Summary: New York generates 1.3 billion gallons of wastewater treated in 14 different wastewater plants. These plants focus on a treatment process to sustain water quality and support fishable swimmable waters; the facility is designed mainly to destroy contaminants rather than to recover them. This project explores the feasibility of moving away from wastewater treatment to a process of water resource recovery via biosolids, which involves recovering energy, nutrients, and other valuable components with market value from wastewater in a sustainable way. Class A exceptional quality biosolids are more acceptable and valuable to the public, and could be used in creating green spaces, coastal areas, etc., instead of going into landfills.

Methods:
- In addition to studying this process on the microscopic and macroscopic level to develop a process scale flow optimization, this project will involve strategic management from business, economic, and social perspectives.
- Specifically, this project will utilize these components: an advisory committee, proof of concept studies, biosolids regional workshop, and a funding strategy.

Questions:
Q: Can someone speak to regulations and how that will impact the research?
A: this is a brand-new area, and even the regulators will need to be educated, especially as technologies are developed.

Q: Are there dangerous materials in biosolids
A: City biosolids have relatively low pathogenic contaminants present, there are heavy metals, but not of concentration that prevent usage of biosolids. Contaminant levels in bio-solids treated

at Class A are comparable to any organic soil you buy in the store. The greater issue of concern is changing perception of using human waste.

Q: How will the team is work together?
A: Through proof-of-concept experiments, preliminary testing, basic data to be the basis of outside funding. Specifically in response to being asked about the heavier representation of science and engineering, a team member noted that a large component of the project is in addressing "not in my backyard" components and other public concerns.

Team 2: Mitigating the Effects of War on Vulnerable Populations

Team Members:

Team Member	Expertise
Bruce Cronin (principal investigator)	International law, civilian casualties
Adeyinka Akinsulure-Smith	Forced migration, psychological trauma
Kyle McDonald	Remote sensing to rebuild post-war societies
Dirk Moses	Genocide and crimes against humanity
Maritsa Poros	Migration, Displacement of populations
Irina Carlota Silber	Rebuilding postwar societies, Migration
Nancy Sohler	Healthcare for disadvantaged, trauma
Danielle Zach	Human rights, civil wars

Guiding Question: How can governments and international organizations better protect the security and mental health of civilians, refugees, displaced persons, and wounded soldiers during armed conflicts?

Summary: This project aims to address the problems created by over 40 ongoing interstate conflicts and civil wars and their indirect effects on the well-being and survival of the civilians, refugees, displaced persons, and wounded soldiers. Destruction makes it difficult for forced migrants to return home, especially where there is a lack of survivable conditions and infrastructure. Overall, there is a lack of coordination in response to these issues and across groups of people affected. This project has 4 main objectives: develop an integrated strategy to mitigate the effects of war on vulnerable populations; build a comprehensive approach to rebuilding towns and cities destroyed during armed conflicts; determine how best to treat civilians and former soldiers suffering from physical and psychological effects of war; and establish what legal agreements and government policies need to be updated, changed, or initiated.

Management Plan and Technical Approach:

- Create an International Center for Victims of Armed Conflict to conduct interdisciplinary research, policy analysis, and advocacy. Three key activities of the center include:
    - Podcast Series
    - Seminar Series
    - Policy Paper Series

Future Funding Prospects:

- As this is a new project, the team hopes to establish the center and produce deliverables before contacting human rights foundations for funding.

Questions:
Q: Is there a focus?
A: The center will facilitate better coordinate and integration amongst various practitioner groups with their own narrow focuses and priorities in responding to refugee crises.

Q: Can you share more details about the sensing work?
A: Kyle McDonald previously worked with the United Nations Development Program (UNDP) in Ukraine on water resources. After the conflict began, UNDP approached the team (which consisted of colleagues at NASA and CCNY's Jet Propulsion Lab) to apply technology towards mitigating the war effort. Using time series imaging radar from satellites, they were able to examine changes in structure based on changes in interferograms. Using this information, UNDP can target areas that need to be cleared of rubble to allow access for emergency vehicles and emergency response personnel. The technology also aids in addressing rebuilding long term infrastructure.

Q: How will the team work together? Is there overlap in the two sections (based on graphic).
A: The graphic doesn't show how the work is going to be done exactly. Setting up the center is important, and Dean Andy Rich, who has experience in running think tanks, will be a resource in establishing the center. Once established, it will hopefully become self-sustaining.

Team 3: Offshore Wind Farms for Clean and Renewable Energy – Towards a Systematic Framework to Evaluate their Environmental and Societal Impact

Team Members:

Faculty Name	Expertise critical in project
Hansong Tang (Team Lead, civil eng.)	Fluid mechanics and simulation
Vasil Diyamandoglu (civil eng.)	Water quality
Naresh Devineni (civil eng.)	Data science
Kyle McDonald (earth and atmospheric sciences)	Remote sensing
Akira Kawaguchi (computer sciences)	Gaming and networking
Alexandar Tzanov (CUNY high performance computing center)	Computing techniques
Grace Chang (Integral Consulting)	Ocean environmental modeling
Branko Glisic (Princeton Univ., eng.)	Structure health monitoring

Guiding Question: imagine if we had the knowledge to inform the planning and building of offshore wind (OSW) farms, what would that look like?

Summary: This project explores challenges facing the implementation of offshore wind energy (OSW) farms and projects. OSW is a green, renewable energy with 4x the generating capacity of an electric grid; there has been greater investment in OSW in recent years at all levels. Problems include where to allocate farms, how to design supporting foundations and power transmission cables, impacts on environmental and ecological systems, and farm vulnerabilities to ocean waves.

This group aims to develop a high fidelity, modeling-monitoring-data framework for the OSW impact on environments and vice versa and conduct a prototype study of an OSW farm, fundamental processes, scales, and magnitudes. If successful, this model system will be the first of its kind for OSW, help to promote green energies for communities, and enable co-exist4ence of OSW farms with communities and ecosystems.

Technical approach:
Theme 1: hydrodynamic and environmental processes
Theme 2: impacts between OSW farm and ocean
Theme 3: Data-driven modeling and computer integration

Team tasks:

1. Modeling ocean hydrodynamics
2. Satellite monitoring
3. Water quality
4. Infrastructure/power transmission cable
5. Environmental modeling
6. Data driven modeling
7. Computer integration

Future funding and self-sustaining plan:
The team has identified several targeted funding sources, including NSF, NYS Energy Research and Development Authority, National Offshore Wind Research and Development Consortium, and others. The team has also submitted proposals to the NSF, NOWDRC, and was selected to give an oral presentation at the State of Science Workshop on Wildlife and Offshore Wind Energy. The team will also conduct outreach to private industry developers for collaboration.

Questions:
Q: The presentation mentions collaborating with the Collin Powell School and the School of Education, have you set up those collaborations?
A: The team had a discussion in the first meeting, but nothing since.

Q: Given that this is a multi-scale and multi-disciplinary problem, will models be updated with data collected in real time?
A: As the project is new, the first step is framework creation and developing infrastructure to model and monitor data to use as a platform to move forward. The group hopes to build up the capability to process real time data.

Q: Are you also looking into the structural portion of it?

A: The team plans to collaborate with a structural person from Princeton on this portion.

Q: Will the effort include wind turbine simulation?
A: The team will focus on the ocean component first, the offshore wind part will use information from modeling results as input.

Conclusion: Thank you to the first four teams that presented. The next set will be teams 5-8 on **July 27, 2022 from 1-3 PM**. The CRC will try to make decisions by mid or end of August.