



# AI4PEP NEWSLETTER FIRST EDITION

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**3** GOOD HEALTH  
AND WELL-BEING



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EQUALITY



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# AI4PEP: ITS MANDATE, STRUCTURES, AND ASPIRATIONS ▶▶▶

Global South AI4PEP Network-Global South Artificial Intelligence for Pandemic and Epidemic Preparedness and Response Network was created in August 2022. This interdisciplinary Network draws on insights from artificial intelligence (AI), Clinical Public Health, One Health, data sciences, data management, disease modeling, Citizen Science, Community Engagement, participatory research, and race and climate justice to design practical tools and locally relevant interventions that address the disproportionate impact of pandemics and epidemics on our communities.

The IDRC funded (under the AI and Global Health Investment) Global South AI4PEP Network brings together an interdisciplinary team of clinical public health, artificial intelligence, data scientists, epidemiologists, physicists, mathematicians, software engineers, as well as disaster and emergency management, citizen science, and community engagement experts, from across disciplines and sectors, community health practitioners and program managers, policy and decision-makers from across levels of government, and other key stakeholders from Africa, Asia, Latin America, and the Caribbean, and the Middle East and North Africa. The network is entrusted with the mandate of working closely with governments,

public health agencies, civil society, and other actors to generate new knowledge and collaborations to inform practice and policies at subnational, national, regional, and global levels. Working closely with these diverse professionals and interdisciplinary researchers, AI4PEP strives to mobilize responsible AI to build equitable, resilient governance strategies & increase societal preparedness for future global pandemics and epidemics.

## Mandate

The network is entrusted with the mandate of working closely with governments, public health agencies, civil society, and other actors; i) to generate new knowledge and collaborations to inform practice and policies at subnational, national, regional, and global levels, ii) to deepen the understanding of how responsible AI solutions can improve public health preparedness and response. iii) to design and leverage reliable AI solutions towards equitable health, iv) to deepen the understanding of how responsible AI solutions can improve clinical public health and Global health preparedness & response to disease outbreaks in the Global South. v) to mobilize responsible AI to build equitable, resilient governance strategies & increase societal preparedness for future global pandemics and epidemics, vi) to foster an open and respectful collaborative forum for learning and knowledge-sharing to improve the quality of analytical support offered to global health and clinical public health programs in Low- and Middle-Income Countries (LMICs) and advancing general global health and clinical public health research.

Our work is grounded on Sustainable Development Goals (SDGs) 2 & 3; SDG3 (“Good Health and Well-being”) and SDG5 (“Gender Equality”). To advance these aspirations towards, we leverage Artificial Intelligence (AI) as a catalyst toward equitable health. Our mandate can be summarized into the following four themes:



- I. **Early Detection.**
- II. **Early Warning Systems.**
- III. **Early Response.**
- IV. **Mitigation, & Control of Emerging Epidemics**

These themes are rooted in our quest to gather timely and reliable data for public health decision-making, building strong, resilient, and equitable health systems, including vulnerable groups, and ameliorating access to health for the vulnerable poor.

### Approach

Since our work is centered around the health needs and challenges of the people in the Global South, we acknowledge that the history of colonialism and gendered oppression has enduring effects. It disproportionately impacts the health and quality of life of formerly colonized people and vulnerable groups, such as women, gender non-conforming people, people with disabilities, rural communities, and low-income households. Our theoretical framework centers around a **Gender, Equity, Inclusion, and Decolonization lens (GEID)**.

Research and experience have taught us that intersecting and compounded forms of injustices and inequities necessitate a feminist intersectional lens, decolonial methods, and the integration of diversity in research, and public policy processes. For us, decolonization is not a metaphor, but a political endeavor towards our wildest goal of equitable health. As part of our decolonial

framework, we advocate for community engagement, participatory research methods, community-centered health public policy, locally derived and relatable health data, and diversity and inclusivity.

### Constituency

The manifestations of our reality as a Global South-driven entity, our network is in the process of officially constituting its four nodes within its five target regions: Africa, Asia, Middle East & North Africa, and Latin America and the Caribbean.

These nodes will materialize our presence on the ground, advancing our mandate of one health, while also actively crafting their local interventions for local health gaps. While maintaining their relative autonomy, the knowledge-building processes in our various nodes will be unified by our shared values, cross-fertilization of skills, and collaboration. Lessons from the COVID-19 experience have amplified the need for national, regional, and global collaboration. Consummately, our collective efforts will culminate in resilient health systems and strong pandemic, epidemic, and disaster, and risk mitigation and preparedness in the future.

**Unique Regional Strategies**

Having launched our inaugural call for proposals in November 2022, our final adjudication process is underway. This process is meant to carefully identify potential partners and co-creators (research teams), that will form part of the local hubs across the regions. We are excited to share specific details in the next quarterly newsletter.

**Acknowledgments & Executive Mentions**

We would like to extend our deepest gratitude to our Board of Trustees for holding our hands and bracing us as we set off to chart new waters amid a global pandemic. They have continued to generously share their time, expertise, and constructive criticism with us. Their support is deeply appreciated and invaluable to us and our constituency.



# ORGANISATIONAL STRUCTURE



**Professor Ali Asgary**  
Strategic Working Committee



**Professor Sylvia Bawa**  
Strategic Working Committee



**Professor Alvine Belle**  
Digital Tools and Platform Co-Director



**Dr. Nicola Bragazzi**  
Chief Scientist



**Professor Amrita Daftary**  
Strategic Working Committee (Qualitative Approach)



**Professor Jianhong Wu**  
Policy and Advocacy Co-Director

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**Professor Nathaniel Osgood**  
Digital Tools and Platform Co-Director



**Professor Gertrude Mianda**  
Gender Equity Inclusion & Decolonization Director



**Professor Bruce Mellado**  
Policy and Advocacy Co-Director



## MEET OUR SECRETARIATE

1. Executive Director - Dr. Jude Kong
2. Chief Scientist - Dr. Nicola Bragazzi
3. Network Manager - Jean Jacques Rosseau
4. Communications and Community Engagement Officer - Liswa Luhlanga

Dr. Jude  
**Kong**



Executive Director

Dr. Nicola  
**Bragazzi**



Chief Scientist

Jean Jacques  
**Rosseau**



Network Manager

Executive Director  
**Liswa  
Luhlanga**



Communications and  
Community Engagement  
officer

## OUR DONORS AND GENEROUS HOST

*Our work is enabled by the courtesy and generous contributions of our donor; the International Development Centre (IDRC), and our host York University.*

# THE RATIONALE BEHIND THE AI4PEP VISION



**Executive Director: Dr Jude Kong**

Disease outbreaks are increasing both in terms of frequency and severity, in part due to accelerating human encroachment into natural landscapes (e.g., forests), urbanization, globalization, and climate change. Once initiated, their calamitous consequences can cascade across socioeconomic boundaries, disproportionately impacting vulnerable populations, while magnifying social inequities. The novel Coronavirus (COVID-19) pandemic is just the latest in a series of global disease outbreaks, including the H1N1 pandemic, the severe acute respiratory syndrome (SARS), and the West African Ebola epidemics that exhibited cascading compounding, and nonlinear effects within and across borders and sectors. Despite their differences, all these diseases were of animal origin. This is a characteristic of many emerging (or re-emerging) infectious diseases (ERIDs). Pathogenicity and transmission dynamics may be quite different in new host populations. Importantly, not all ERIDs are viral, some may originate from dormant bacteria that re-emerge due to factors such as climate change, whereas some persistent bacteria may become more deadly due to antimicrobial resistance.

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ERIDs may also be due to pathogens new to some areas and brought in by climate change or newly recognized as important, as is the case of several parasitic agents. Disease outbreaks, and especially COVID-19, have significantly put pressure and strain on weak health systems, with underlying inequities and disparities, stressing the need of building and develop more strengthened, resilient, and responsive infrastructures and facilities.

### **Understanding One Health**

The pandemic has significantly challenged the capacity and ability of healthcare workers to absorb unforeseen shocks and external events, to deliver high-quality healthcare provisions to all those who require them, and to preserve and maintain systems functioning and patient-centeredness. Health systems responded with a profound restructuring and reorganization of medical services to better protect healthcare personnel itself and patients. However, this restructuring was not enough, in many cases, to protect vulnerable, at-risk populations. This warrants an innovative health policy and systems research framing to strengthen health systems in the face of pandemics/epidemics and other shocks and make them more effective and quickly adaptative, as well as socially just, inclusive, equitable, and people-centered.

Traditional approaches that inform management and mitigation efforts for addressing the complex societal effects of disease outbreaks assume approximately linear relationships that link from a well-defined source to a single endpoint; heavily rely on historical data and observations; are merely reactive, rather than proactive; and focus on consequences and impacts within a system that is spatially and temporally self-contained. These approaches have proven to be inadequate for dealing with the challenges presented by the systemic nature of risk and vulnerability, namely, the “multifaceted interconnectedness of disease outbreaks, poorly understood breadth of population exposure, and profound nuance and detail of vulnerability.” These deficits are starkly illustrated by the COVID-19 pandemic, including the lack of an operationally defined, and testable theoretical and governance framework for systemic risk analysis, as well as inadequate operational practices for risk mitigation and response. Consequently, the global community has failed to identify and respond to secondary impacts that intensify as network hyper-risks across sectors and scales - local, regional, national, and international sufficiently and proactively.

### **Diversity, Inclusivity & Sensitivity Towards Vulnerable Groups**

In addition, existing management and governance structures for disease outbreaks policy often lack adequate mechanisms for considering the diverse needs of vulnerable or at-risk populations, including those living in informal settlements, in geographically isolated settings, socio-economically deprived or underserved, those who are homeless, racialized visible minorities, women, the elderly, persons with disabilities, Indigenous communities, informal workers,

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migrants and refugees, those without citizenship rights, sex workers, and the two-spirit, lesbian, gay, bisexual, transgender/transsexual, queer, intersex, asexual, polysexual/pansexual (2SLGBTQIAP+) community, among others. Learning and adaptation in the short-term response to an epidemic/pandemic can be enhanced by identifying the capacities and integrating the acute needs of the most vulnerable. Moreover, long-term transformation must incorporate new approaches to pandemic and epidemic prevention, preparedness, management, response, and recovery, to address the systemic nature of risks. Some studies have hypothesized six potential pathways explaining why outbreaks disproportionately affect minorities and vulnerable communities. These pathways include differential exposures and vulnerability to the pathogen with differential health and societal consequences of the disease. Of note, epidemic/pandemic control measures could have differential effectiveness and differential adverse consequence profiles, compared to the general population.



However, most of these pathways are poorly understood, warranting further studies. Moreover, disease outbreaks, and especially COVID-19 have underlined the need for timely, accurate, and reliable data, to better inform public health decision-making in an evidence-based fashion. As such, data science has played a key role in the response to the pandemic, driving measures and interventions to mitigate it. An incredible wealth of data from diverse, heterogeneous sources has been made available: from human mobility, to contact tracing, medical imaging, basic and translational sciences, including virology and infectious diseases, chemistry, pharmacology, and drug screening and discovery, as well as bioinformatics, scholarly literature, and different parts of the health system – including the formal health care system and other systems that form part of the intersectoral action needed to strengthen health systems (e.g. housing, transportation, education – and also across public and private sectors). However, quoting the prominent philosopher Immanuel Kant, data without concepts (models and frameworks) are blind, as well as concepts (models) without content (data) is empty.

### **Evolution towards Innovative Health Care**

Fundamentally new conceptualizations, adaptive models, and operational tools – that incorporate the systemic nature of risks in an objective, systematic and comprehensive manner, and focus on the most vulnerable – are required to transform existing epidemic/pandemic response approaches which have demonstrated many weaknesses, given the sustained threat of ERIDs; ideally a one health approach. One health implies an approach that recognizes the health of humans, domestic and wild animals, plants, and the wider environment are linked and interdependent. By definition, a one health approach requires a system science approach and an extensive toolbox, being characterized by a strong emphasis on the development and use of inter- and transdisciplinary

models to inform prevention, surveillance, and response at the human-animal-ecosystem interface. Since ERID challenges are global in scale, international communication, and shared strategies, building on the expertise of different kinds developed in varied contexts, are required to successfully address them. Our program represents a small step in that direction.

### **Contemporary Data Science & it's Unique Role in Healthcare**

AI techniques have developed rapidly over the last 10 years. New technologies and policies allowing the generation, collection, and storage of large data sets have enabled novel methods of analysis and implementation. Contemporary data science allows people to visualize information and make predictions on a scale that was previously not possible, while AI-based technologies can enable dynamic models to automatically process new information and provide forecasts based on the analyses of constantly evolving data sets. The advances in AI have expanded the potential scope of traditional epidemic and pandemic prevention, preparedness, and response mechanisms by making new data sources available to be integrated into multi-level analyses. Such changes provide opportunities to address gaps in existing surveillance systems, such as increasing their sensitivity for early detection of ERID and strengthening capabilities to enhance early detection, early warning systems, early response, and mitigation and control of developing epidemics/pandemics. For more than a decade, researchers have highlighted that these AI-based tools hold enormous potential for population and public health, as they can serve not only to contextualize and enrich one's understanding of public health issues but also as tools to assist public health policy and than being integrative. As such, there is an urgent need for next-generation 3P (process-, pattern-based, and participatory)



modeling that can capture outbreak principles and functions, incorporate statistical associations and correlations between variables of interest, from an “ecological” standpoint, enriching the previous purely mechanistic perspective, and can combine the expertise of the modelers with the true needs and expectations of local communities, making the model locally relevant, informed, and contextualized.

## ***Early Warning Systems as a Public Health Policy & Sustainable Development Issue***

*Prof. Ali Asgary - Disaster & Risk Management Expert & York University Professor at the Early Warning Systems that we held in collaboration with the Fields Institute in January 2023*



### **Early Warning Systems (EWS)**

A simple definition of an EWS Use of integrated and comprehensive communication systems that generate, process, and analyze information to help caution communities about health risks and hazardous climate-related eventualities. Effective EWS should comprise the following four characteristics: **surveillance and warning, risk analysis, dissemination and communication, and response capability.**

### **Why EWS?**

In recent times, and particularly amid COVID-19, Early Warning Systems have occupied a central stage in debates around global health, climate

change and the preponderance of ecological disasters. The United Nations Secretary-General has put the safety and protection of life at the center of the United Nations Development Agenda. For example, Sustainable Goals 3 (in respect of quality health and well-being) and 11 (disaster management) make this a high-level governance/ policy issue at national, regional, and global levels.

In his presentation at the Early Warning Systems (EWS) Conference at the Fields Institute, Prof. Ali Asgari contended that EWS were a public policy issue that required the buy-in and political commitment of policymakers across the globe. While EWS are often evaluated in terms of costs and benefits and contrasted against other government priorities, he recommended that EWS should be seen as worthy investments in the sense that they offer benefits that exceed the costs. For example, surveillance systems & comprehensive communication systems are key in strengthening preparedness, prevention, and risk mitigation including the minimization of casualties in cases of disasters, pandemics, and epidemics. Additionally, they protect property, which in turn insulates the economy from possible economic shocks.

It is, therefore, necessary for all stakeholders to be part of the policy debates about EWS and the protection of lives and property. This will help ensure that EWS is centered around the needs of the people, especially vulnerable groups, such as the vulnerable poor, women, children, and a rural folk.



# AI4PEP/ CIFAL-York Collaborative Bi-weekly Speaker Series on “AI for Global Health: Challenges and Lessons Learned

**Prof. Mpho Raborife**



We are grateful to our partners at CIFALYORK for a fruitful collaboration in rolling out our collaborative speaker series in the last quarter. Our thanks go to Dr. Ali Asgari, Francesco del Carpio, & our Support Volunteer, Dr. Blessing Ogboukiri for driving the program with unparalleled passion and success. We also wish to particularly thank the following guests from the Global South for their enormous intellectual contribution.

**Dr. Stephen Gabriel**



## Lessons Learned

The integration of Artificial Intelligence into health care has presented endless opportunities to revolutionize health care and improve the quality of life across the Global South. However, the following issues remain a major concern as they may potentially constrict the potential health benefits.

**Dr. Udanor Collins**



- AI Models need to be engineered within a people-centered framework to ensure that they have the trust and buy-in of the average user.
- The AI-Health space needs to be more inclusive, diverse, and participatory to benefit from multiple perspectives, including those of historically marginalized groups.

**Dr. Woldegebriel Assefa Woldegerima**



- AI Technologies must be more simplified, and accessible to the average population. This will help ensure that the people who require the services the most are not excluded because of their socio-economic status, or geographic locations.

**Dr. Ignatius Ezeani**



- AI Governance & public health policy-making processes need to be more participatory & open to diverse perspectives. Technology is not a mundane and neutral artifact. Instead, it is frequently mediated by power and structural bias e.g gender, race, class, sexuality. Modelers must develop a thorough consciousness, & further work towards the elimination of such prejudice.
- Concerns around privacy, ethical and transparent mobilization, and the use of AI technologies necessitate a responsible policy regulatory framework at national, regional, and global levels.
- AI Governance experts and representatives need to rise above the occasion and establish a legal architecture that is built on ethical values of respect for personal privacy, human autonomy, accountability & transparency.

This is an ongoing initiative, please refer to our website and feel free to register for upcoming episodes at: [yorku](http://yorku)

# AI4PEP's United Nations Diplomatic Engagement



The AI4PEP Team, led by its Executive Director joined the United Nations General Assembly 77 which was held in New York, USA on the 20th to 27th September 2022. The conference mainly deliberated on the United Nations Agenda 2030 which is mainly about fostering peace, human rights, and sustainable development. The main highlight of the conference is its ability to convene thought leaders from interdisciplinary backgrounds across the globe to deliberate on global challenges and offer the space for innovative, inclusive, and sustainable policy recommendations.



*From left: Our representatives Counsellor Jake Effoduh, ED: Dr. Jude Kong, the former Vice President of the IDRC, Dominique Charron, & Prof. Bruce Mellado (University of Witwatersrand in South Africa) at the UNGA77 Science Summit, September 2022.*



*The United Nations Tech Envoy, Amandeep Singh (the United Nations Tech Envoy), and AI4PEP's ED, Dr. Jude Kong.*

As a key stakeholder, and a pioneer of Sustainable Development Goals (SDGs) 3 (Health & Well Being) and 5 (Gender Equality), the AI4PEP Team had an opportunity to conduct two high-level panels at the UNGA77 Science Summit in a session entitled “Artificial Intelligence Research in Health: Tackling Global Challenges as One.”

Panelists agreed that too few countries are leading the digital health and AI for the health field, producing, and benefitting from most of the knowledge, with the rest of the world risking being left behind. The discussions pointed out the need for a collective, inclusive, neutral, and trusted platform to level the playing field and drive the conversation around human-rights-abiding AI solutions for health.

# CONGRATULATIONS MESSAGES



## **Congratulations to Prof. Jude Kong**

*A heartfelt congratulations to our Executive Director, Dr. Jude Kong who has been recently recognized for his remarkable hard work and commitment towards fostering research excellence and community building. His research focus on the mobilization of Artificial Intelligence (AI) to advance social courses, data science, mathematical modeling & advocacy for ethical and equitable governance in public health policy continues to highlight York University's research excellence, while also positively impacting the communities he serves.*

*Prof. Kong has emerged as a second-time winner of the York University Excellence in Research Award in Early Career Researcher (2021 & 2023). Recently (12th April 2023), President Rhonda Lenton honored him with the President's Emerging Research Leadership Award (PERLA) in Science, Technology, Engineering & Mathematics (STEM). Congratulations Dr. Kong!*



*Left is President Rhonda Lenton and fellow York Professors who were also recently decorated with the President's Research Excellence Award*

## **Congratulations to Dr. Jean Jacques Rosseau**

*The AI4PEP Team also extends its congratulations to its Programs Manager Jean-Jacques Rosseau on his recent appointment to the York University's Joint Task Force on the Future of Pedagogy. The function of the committee is to review York University's Teaching and Learning strategy to integrate in-person learning, digital learning, experiential learning, and work-integrated learning. Most importantly, and in line with AI4PEP's mandate, Dr. Rosseau's committee is also responsible for advancing decolonization, equity, diverse inclusion, and the United Nations' Sustainable Development Goals. Congratulations Dr. Rosseau!*





# RECENT PUBLICATIONS

## Read more...

- Nia, Z. M., Bragazzi, N. L., Wu, J., & Kong, J. D. (2023). Data in Brief, 48, 109118.
- Avusuglo, W. S., Han, Q., Woldegerima, W. A., Bragazzi, N., Asgary, A., Ahmadi, A., ... & Kong, J. D. (2023). Impact assessment.
- Movahedi Nia, Z., Bragazzi, N., Asgary, A., Orbinski, J., Wu, J., & Kong, J. (2023). Mpox Panic
- Bragazzi, N. L., Han, Q., Iyaniwura, S. A., Omame, A., Shausan, A., Wang, X., ... & Kong, J. D. (2023). Adaptive changes
- Puce, L., Okwen, P., Yuh, M. N., Akah, G., Pambe Miong, R. H., Kong, J., & Bragazzi, N. L. (2023). Well-being
- Kong, J. D., Akpudo, U. E., Effoduh, J. O., & Bragazzi, N. L. (2023, February). Leveraging Responsible

### **The Global Strategy Lab Launches a Brand-New Scoping Review on Systems Thinking & Complexity Science Methods**

- According to the WHO, Non-Communicable Diseases (NCDs) are responsible for 71% of all deaths globally, with most of these deaths occurring in low- and middle-income countries. The prevention and control of NCDs require a multi-sectoral approach that addresses the social, economic, and environmental determinants of health.
- Two Co-Investigators, Dr. Tarra Penny and Dr. Chloe Clifford recently published a study that

highlights the importance of using Thinking and Complexity Science Methods in the process for non-communicable diseases prevention. The authors found that incorporating systems thinking and complexity science (STCS) methods can help policymakers better understand the complex interactions between various factors that contribute to non-communicable diseases (NCDs), such as diabetes, cardiovascular disease, and cancer.

- The study identifies several systems thinking and complexity science methods that can be useful in the policy process, including causal loop diagrams, agent-based modeling, and network analysis. The researchers suggest that STCS methods have the potential to generate tailored and dynamic evidence, adding robustness to evidence-informed policymaking, but must be accessible to policy stakeholders and have strong stakeholder ownership to build consensus and change stakeholder perspectives.
- To learn more about the systematic review, read the study [read more...](#)

# GET IN TOUCH

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To learn more about the systematic review, read the study here...

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