

Haitian Diaspora Breaking Through New Scientific Frontiers to Influence Haiti's Future

Positioning Haiti and Haitian Scientists in Technology Foresight: *Interplanetary pandemics watch using AI-powered smartphones*

Background & Context

To be produced, following tonight's meeting by Dr. Lamy

Proposed Project

As part of our FUTURES PACK, this innovative project introduces AI-powered Smartphones, as mini medical laboratories, intended to support timely pandemic preparedness and response. Accordingly, the research team adopts a twin community health approach (combining conventional and traditional medicine), in order to :

- a. run very simple (low tech options) as well as sophisticated medical diagnostics (high-tech options) from the palm of a phone user's hand.
- b. perform real-time monitoring — detecting, alerting, continuous DNA-based sequencing — of exposure to targeted airborne pathogens in confined spaces.
- c. maintain every patient connected to his/her personal medical doctor anytime and anywhere, via said AI-powered smartphone.
- d. connect every smartphone user to a physical worldwide network of certified laboratories, licensed medical professionals (e.g., pharmacists, physicians, and advanced research facilities).
- e. Comply with State-by-State medical board requirements, to ensure the validity of all medical tests performed anywhere in the world, and beyond (e.g., going one step ahead, in the race to deliver digital "Transcare" technologies for applied telemedicine on orbit (TMO™).

In sum, this project's significance resides in its revolutionary approach to serve both medical professionals and end users in the Caribbean regions (regional perspective), notably Haiti (local perspective), as well as a worldwide community of users (macro perspective). The sensitivity of gender is accounted for: from the configuration of our research team to the universal nature of our gender-conscious application design.

United Nations' One Health initiative

In general, our project connects particularly to 3 pillars of the United Nations' One Health initiative.

1. Health of people is closely connected to the health of animals in a global village.
2. Hosting people, animals, plants in this intertwined environment require new measures to prepare for and fight against emergent/reemergent infectious diseases.
3. AI must play a role in solving this complex and ultra dynamic (e.g., everchanging) environment.

The Technical, Scientific Introduction

It is very challenging to embark in the design of any complex system intended to support early detection, warning, monitoring/control, and mitigation of emergent infectious airborne pathogens and diseases, using a heterogeneous network of nano sensors embedded in next generation, AI-powered smartphones. Our team's interstellar vision is set on morphing said intelligent devices into mini portable medical labs operating beyond earth's capillary boundaries: an interstellar "telemedical" apparatus for the active monitoring of emergent/ reemergent airborne pathogens and diseases, as world leaders turn their focus on space tourism and migration, in the hope to secure the survival of homo Sapiens beyond our telluric planet.

As a result, the proposed project covers the of knowledge pertaining to Biosensing technologies; Artificial Intelligence; Telemedicine; Pandemics; Airborne pathogens and diseases; Medicallab-on-chips; Space migration and tourism; Emergent diseases; Colloidal chemistry; BIOMEMS.

Our Primary Research Question:

How can one to detect, warn, monitor and mitigate the harmful effects of emergent contagious airborne pathogens on a global scale, using an interstellar cellular network of heterogeneous biomedical sensors?

Our Secondary Research Question:

How can the Haitian Diaspora use its resources (financial and technical) to make the case for the exercise of their newly consecrated rights to use using electronic machines to participate actively in Haitian public life (voting and run for office, according to applicable Haitian laws, notably law on electronic proof and signature, in annex)?

The Main Challenge:

Transforming AI-powered Smartphones into an interstellar network of mini-medical laboratories, available to everyone, anywhere and at any time, in the palm of the user's hand. Among secondary challenges, we must acknowledge reticence from medical practitioners to adopt new technologies as well as the heterogenic character of modus operandi followed by medical boards around the world. However, we are very confident in the ability our team to follow technical specifications according to relevant international standards (e.g., ISO 13485) for certification purposes.

Fortunately, our team includes two (2) practicing medical doctors who will also supervise ethical issues, as they relate to responsible AI practices promoted through the United Nations' One Health Care initiative, involving the public health, veterinary, public health and environmental sectors. The doctors will also lead our gender-conscious focus group.

In fact, the Code Red warning of the United Nation's Intergovernmental Panel on Climate Change is an unequivocal message that unless drastic changes are made to a range of human activities, escalating global temperature will exert a heavy toll on biodiversity, human and animal health, and geopolitics, in quite conceivably detrimental ways:

https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Full_Report.pdf

Data is also central to a tripartite collaboration set up by the World Health Organization (WHO),

the World Organization for Animal Health (OIE), and the Food and Agriculture Organization of the United Nations (FAO) to address concerns that arise from the human-animal-ecosystem interface. Each of these international organizations support countries in building capacity for indicator and event-based surveillance, with communication channels set up pursuant to the OIE's Terrestrial and Aquatic Animal Health Codes (Available online at: <https://www.oie.int/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/>).

Our Primary Objectif:

Avail an all-in-one system to enhance early detection, warning, and mitigating response to infectious diseases.

Our Vision:

Deepen the understanding of how responsible AI solutions can improve public health preparedness and response to global health issues and notable epidemics certainly to follow the disastrously Covid-19 nightmare.

PROJECT'S GENERAL OBJECTIVES

Avail a suite AI-powered tools to perform real-time monitoring — detecting, alerting, continuous DNA-based sequencing — of exposure to targeted airborne pathogens in a variety of settings, to support timely pandemic preparedness and response, thereby opening new opportunities to Haitian within the Diaspora to participate in building Haiti's future. We must acknowledge that technology is only a catalyst in building Haiti's next steps forward.

An autonomous system imbedding technologies with emergent techniques et methods to build a functional prototype of our team's patented innovation. Dalet Access Labs locating at heart of the Silicon Valley offers a robust laser-based infrastructure capable of attracting high tech giants such as SpaceX, Google, Alibaba, Samsung, Apple and Microsoft to collaborate and building a new generation of workers on Haitian soil: not even the sky is not able limit the interstellar potential of our project.

Avail digital devices as well as a robust laser-based backbone to ensure that electronic voting serve a catalyst to the full integration of members of the Haitian diaspora in their homeland's public life and economic development. Dalet Access Labs has been revealed as the most qualified partner in this specific endeavor.

RESEARCH SPECIFIC OBJECTIVES

1. **Conduct a survey involving twelve (12) major stakeholders**, to determine the acceptance level of the proposed countermeasures, as they relate to pandemic preparedness and response.
2. **Design an AI-powered Smartphone**, serving as mini medical laboratories, to support timely pandemic preparedness and response.
3. **File two new patent applications** arising from parent patent N° US 60/700,700,708.

4. **Build a fully functional prototype** in collaboration with public health organizations, university partners, and industry leaders on a global scale.

5. Develop and produce the device according to the market's response, industrial leaders' interest, and the latest technologies available during the manufacturing phase.

6. **Support three (3) doctoral theses between (2023-2028)** focusing on Artificial Intelligence applied to Telemedicine, in line with the United Nations' "One Health Initiative", in the global fight against emergent/reemergent diseases likely to trigger or complicate future pandemics. A non-exhaustive list of topics must include:

6.a. New engineering curriculum: *Introduction to Telemedicine for Engineers*

6.b. New curriculum in medical education: *"Introduction to AI Applied in Medicine"*

6.c. New game-based curriculum: *AI and Telemedicine for Kids*

6.d. Design and Development of a *Virtual Learning Environment for Telmed & AI (VleTaïa)*

7. **Establish an innovative business model** based on technology transfer and co-development, in a multisite setting.

In summary, we introduce a revolutionary to the design of conventional medical equipment, to assist medical practitioners as we incite, through a digital platform, traditional and conventional medical professionals as well as pharmacists to share and transfer their knowledge to the benefit of mankind. A priori human contributions will ensure that machines and humanoids dispense proper medicine. Furthermore, practitioners of traditional medicine will be conditioned to apply *measured* remedy to specific pathologies, while conventional medical practitioners and pharmacologists will learn about some of the rare virtues of medicinal plants, long buried in pharmacology notebooks. This is, indeed, a fertile ground for documenting and advancing knowledge in general in the field: a benefice to public health on a global scale, with a Haitian touch.

EXPECTED OUTCOMES

Expected Outcomes

Which of the following outcomes will your proposed research achieve? Select all that apply.

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- Upgrade existing methods and develop new techniques and tools for bettering clinical public health outcomes
- Devise comprehensive and complementary models to inform epidemic and pandemic prevention, preparedness, and response
- Map drivers and key national priorities to be considered for alignment and linkages
- Inform the development of new policies and approaches to stimulate innovation and technology adoption
- Bridge gaps between clinical public healthcare policy needs and solutions, and contribute to policy and disaster relief innovation
- Establish sustainable collaborations among local AI experts, government, civil society organizations, and community leaders
- Improve identification, collection, and cataloging of relevant data required for the research projects addressing epidemic and pandemic prevention, preparedness, and response
- Strengthen and enhance capacity and prepare the next generation of leaders in responsible AI in clinical public health policy through a unique training program in an interactive environment mentored by basic, applied, and policy researchers
- Build trust and knowledge of emerging and re-emerging models among key decision makers to enable rapid-repose in emergencies through close engagement with government, public health agencies, and other stakeholders
- Others (please specify)

Produce three Ph.D. theses

MANIFESTATION OF PUBLIC INTEREST: GOVERNMENT/CIVIL SOCIETY

There has been a manifest across the board interest in this project. It comes in the form of "letters of interest", public statements, as well as feedback from leading experts in the field: including High-Tech labs in the Silicon Valley (California). Prominent members of the Haitian diaspora, from Montreal, Canada to Geneva, Switzerland, New York, USA, Boston, USA, Miami, USA, Santo Domingo, Dominican Republic, Paris, France and Toronto, Canada, have landed their support in writing.

In addition, various government officials have also shown interest in the overall project proposal, notably the possibility to avail AI labs on the cloud to the entire region or allowing medical tests to be performed from anywhere and anytime, using a smartphone. "Marvelous!" exclaimed one official.

Cell phone manufacturers could bring production costs very low, using mass production and existing customer bases as leverage. Policy adoption will come from both technical and medical regulation bodies (such as FCC, IEEE, FDA, MSPP (Haiti)). We have already established contacts with several policymakers.

COMPETENCE ET CREDIBILITY

- Two of our team members have past work experience with both lower and higher

chambers of the Haitian Parliament. Discussions are ongoing. Lawmakers in the Dominican Republic have also shown a significant level of interest in this arena.

- Three state universities (One in France; One Canada; One in the United States) have committed to this project.
- Two private universities have committed to this project (One in Haiti; One the United States)
- Several Civil Society organizations are supporting this project (from North America to Europe and Latin America).
- The U.S. patent holder of the technology promoted here in the Lead Scientist of this project. The proposed innovation is backed by two doctoral theses and a U.S. patent.

Sections to be completed by next week:

LIST OF PARTNERS

LIST OF SCIENTISTS

COPY OF U.S. PATENTS

COPY OF NDA & MOU

BUDGET