DS-I Africa Consortium: Harnessing the power of partnerships for data science in Africa

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Abstract

The Harnessing Data Science for Health Discovery and Innovation in Africa (DS-I Africa) initiative is funded by the U.S. National Institutes of Health (NIH), is led by African investigators, and includes a Coordinating Center based at the University of Cape Town. DS-I Africa aims to leverage data science technologies to transform biomedical and behavioral research in Africa and develop solutions to the region's most pressing public health problems through a robust ecosystem including partners from the academic, government, and private sectors. Partnerships, especially across disciplines, sectors, and geographies, are a core aspect of the DS-I Africa's approach to data science and health research. The DS-I Africa Coordinating Center and the Partnerships and Outreach Working group actively support the facilitation of partnerships within the DS-I Africa consortium and more broadly outside the consortium. This is accomplished through active outreach and communications, internal and external discussions, and unique mechanisms such as the Networking Exchange events. The Networking Exchange brings interested individuals together in a virtual or in-person forum to learn from each other and to explore potential collaborations. Through these activities, several key lessons have emerged: 1) Diverse partnerships foster creativity and strengthen projects; 2) Creating opportunities for networking is preferable to matchmaking; and 3) Rapid changes in the data science field require constant scoping for opportunities. DS-I Africa is committed to supporting a culture of partnerships, collaboration, and networking across the data science community in Africa.

1 Introduction

1.1 Overview of DS-I Africa

The Harnessing Data Science for Health Discovery and Innovation in Africa (DS-I Africa) initiative is funded by the U.S. National Institutes of Health (NIH) through the NIH Common Fund and 12 NIH Institutes and Centers (https://commonfund.nih.gov/AfricaData). DS-I Africa is a consortium led by African investigators; the consortium's Coordinating Center is based at the University of Cape Town. The DS-I Africa initiative aims to leverage data science technologies to transform biomedical and behavioral research and develop solutions to Africa's most pressing public health problems through a robust ecosystem of new partners from the academic, government, and private sectors.

The DS-I Africa consortium is comprised of 19 projects, each of which is funded through an NIH award or grant, Most projects led by African researchers working in collaboration with global researchers outside Africa, many of whom are based in the USA. The projects form a unique continental network of researchers, data scientists, ethicists and engineers that bring together existing expertise to develop tools and applications that can be shared, adapted, and harmonized globally. Specifically, there is the Open Data Science Platform (ODSP) and Coordinating Center (CC), seven research hubs, seven research training programs and four ethical legal and social implication (ELSI) projects. The ODSP develops and maintains a data-sharing gateway for existing resources and new data generated by the DS-I Africa research hubs. The CC provides the organizational framework for the direction and management of the initiative's common activities. The research hubs are intended to be recognized centers of excellence in data science fields and are advancing population-relevant, affordable, acceptable, and scalable data science solutions to improve health in Africa. The research training programs train the next generation of African data scientists, provide support for faculty development, and implement new master's and PhD curricula in African institutions. The ELSI projects conduct research into key ELSI issues that present challenges in the field of data science in Africa such as data privacy and ownership, cross-border data sharing, intellectual property, and sensitivities concerning the use of geospatial information for research or public health surveillance.

DS-I Africa contributes to the development of expertise among African scientists and establishes networks of African investigators working synergistically towards ambitious health goals. The vision of DS-I Africa is to create and support a robust pan-continental network of data scientists and technologies that will be equipped to apply advanced data science skills to transform health, thus enhancing the impact of data science on health in Africa and spurring innovation through support of new African and global partnerships (**Figure 1**). We show in **Figure 2** several key facts about the DS-I Africa program.

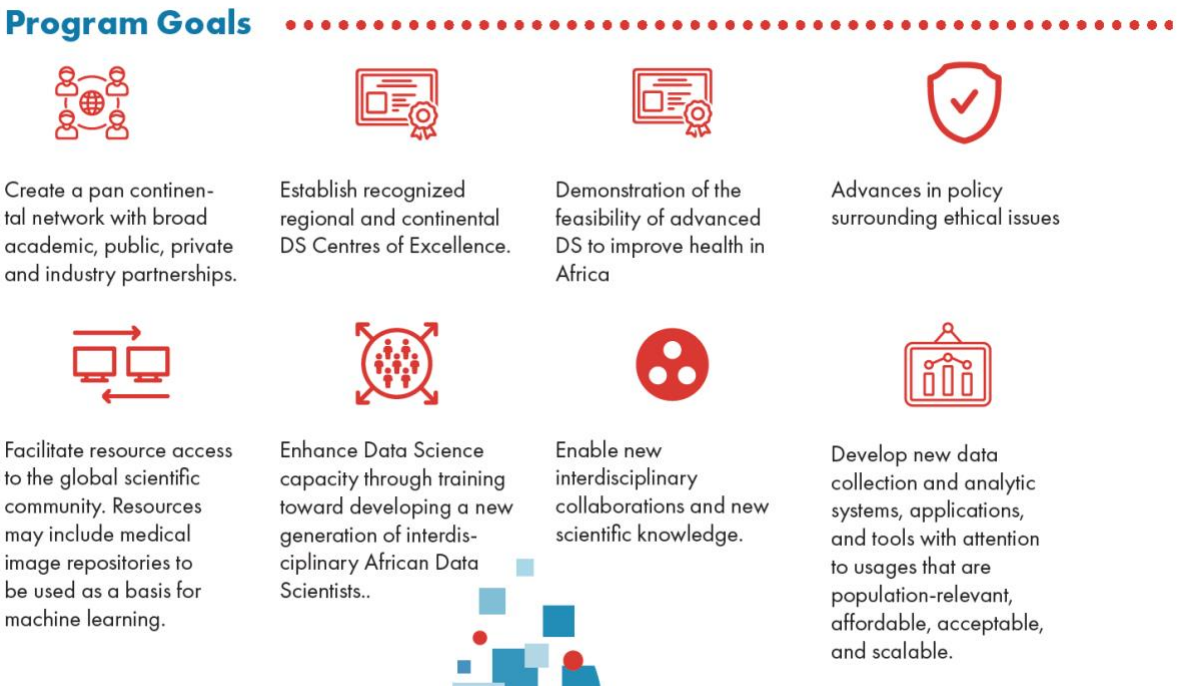

Figure 1: DS-I Africa program goals

Figure 2: An overview of the DS-I Africa program

1.2 Overview of DS-I Africa's focus on partnerships

The DS-I Africa program recognizes that to make progress on ambitious health goals, partnerships are required that bring scientists together across disciplines and engage with government, private sector, NGOs and local communities. Each DS-I Africa project involves multiple partners, including academic and non-academic organizations. Over time, the DS-I Africa consortium will expand as the projects within the consortium engage with new partners and connect with other data science activities across the continent. These partnerships are expected to strengthen data science networks and contribute to the sustainability of African data science programs.

1.3 Overview of the Partnerships and Outreach WG

DS-I Africa recognizes that there are many organizations across Africa beyond its current consortium. Accordingly, the DS-I Africa Partnerships and Outreach Working Group (P&O WG) was formed in 2022 to create networking opportunities with potential partners outside the consortium. The P&O WG also provides a forum for consortium members to informally meet potential collaborators, strengthen existing partnerships, and share strategies for effective collaboration. The CC works together with the P&O WG to contribute to the vision of DS-I Africa by fostering a network of data science organizations that includes start-ups, government actors, non-profits, and academic organizations working at the nexus of data science and health.

1.4 Partnerships within DS-I Africa

While each of the 19 projects is led by a principal investigator at an academic institution, each project involves multiple investigators, partners and collaborators. Moreover, each research hub includes at least one non-academic partner. Altogether, the DS-I Africa consortium comprises more than 350 individuals at 17 institutions, 70.6% of which are based in Africa. For example, we show in **Figure 3** an illustration of the partnerships involved in the seven training projects.

DS-I Africa projects also collaborate with each other across working groups related to training, data governance, data management, and the P&O WG described earlier. Furthermore, each ELSI project works in partnership with at least one research hub and other collaborations across the consortium have developed organically.

Figure 3: DS-I Africa's training programs with partner institutions

2 Outreach strategies

The CC leads outreach and communication activities on behalf of the initiative, in coordination with NIH and individual DS-I Africa projects. This involves monitoring the data science landscape in Africa, reviewing literature, meeting potential partner organizations, and maintaining an email listserv with about 1,000 individuals interested in data science and health in Africa. The CC organizes a variety of webinars with key organizations outside the consortium and regularly invites leading data science organizations to present their work to the DS-I Africa Steering Committee, which includes representatives from all DS-I Africa projects.

The Coordinating Center also tracks regional, continental, and global conferences and meetings of relevance to data science and health. These events are viewed as important opportunities to share research findings from DS-I Africa investigators, engage with different scientific communities, and learn from others working in the field. To date, DS-I Africa has participated in Data Science Africa 2023 in Rwanda and IndabaX 2023 in South Africa. Furthermore, the Coordinating Center invited a wide variety of organizations outside of the consortium to attend the DS-I Africa Consortium Meeting in November 2022 in South Africa. Outside organizations will be included in future Consortium Meetings as well.

The CC distributes information about funding opportunities, events, and other announcements from a wide variety of organizations. Organizations providing information include NIH, the Bill & Melinda Gates Foundation, the Wellcome Trust, and the Science for Africa Foundation. Information is disseminated across the DS-I Africa email listserv through a monthly DS-I Africa News Flash.

2.1 Networking Exchange

Recognizing that DS-I Africa can only reach a small portion of the rich and diverse data science and health landscape in Africa, the CC and NIH designed a mechanism to bring communities together and encourage collaboration. The Networking Exchange is an informal event that has now been held on three occasions – two virtual events and one in-person meeting – with plans for more events in the future. The virtual events took place on the Zoom platform, featuring short presentations and facilitated breakout rooms over three hours. The in-person event coincided with the DS-I Africa Consortium Meeting in November 2022 and was run alongside a trainee poster session. The concept of a Networking Exchange is to mimic a scientific poster session or science fair. However, instead of describing a research project, presenters talk about their organization with the goal of identifying potential partners. Each Networking Exchange includes unstructured time for discussions and Q&A, giving participants plenty of time to meet with different people, learn about their work, and explore collaborations.

The first virtual Networking Exchange was held in July 2022 and featured short presentations by the 19 DS-I Africa projects. Participants were able to learn about each project's activities, ask questions, and explore partnerships related to several new DS-I Africa funding opportunities which were open for application at the time. The interactive event included dedicated time for questions and interactive poll questions such as the Mentimeter polls described in **Figures 4** and **5**. More than 170 people attended and, based on a post-event survey, 89% of respondents thought the event was a good use of their time and 84% felt it was an effective way to learn about the DS-I Africa projects.

Figure 4: Interactive poll question from Virtual Networking Exchange, July 2022

Figure 5: Icebreaker question from Virtual Networking Exchange, May 2023

The second Networking Exchange was held in person as a part of the DS-I Africa Consortium Meeting at Cape Town, South Africa, in November 2022. Each DS-I Africa project presented a poster about their work alongside 17 research posters from early-career trainees affiliated with DS-I Africa projects. Additionally, 14 organizations outside the consortium participated with a poster or a booth – the latter provided a table for demonstrations of a technology or software application. Participating organizations included the Wellcome Trust, IBM Research, Instadeep, Roche Pharmaceuticals, UK BioBank, and the Makerere AI Lab. More than 200 individuals participated in the event which was very well received and considered a highlight of the consortium meeting by many attendees.

A third virtual Networking Exchange was held in May 2023. The event featured short presentations by organizations outside of academia and outside of the DS-I Africa consortium. More than 50 organizations expressed interest in the event and 32 organizations were included on the final agenda (https://dsi-africa.org/dsi-virtual-networking-exchange-agenda). These organizations included start-ups, global networks, consulting firms, multilateral organizations, and private sector companies. More than 500 individuals attended some portion of the three-hour event, which concluded with a panel featuring seven research funding agencies. Attendees were very diverse, coming from many different countries (as seen in **Figure 5**) and a wide variety of disciplines. Based on a post-event survey, 84% of respondents felt that the event was an effective way to learn about organizations working on data science and health in Africa. Survey respondents also shared that they appreciated the opportunity to hear from diverse organizations and identify potential collaborators in a format that allowed them to move around in breakout rooms. Several respondents also valued the opportunity to share knowledge and engage with research funding agencies. In response to, "Did you meet anyone that you would like to work with in the future?" 63% replied "Yes" and 31% replied "Maybe" (as seen in **Figure 6**). Based on these findings, the Networking Exchange achieved its goals of bringing diverse communities together in support of collaboration and networking.

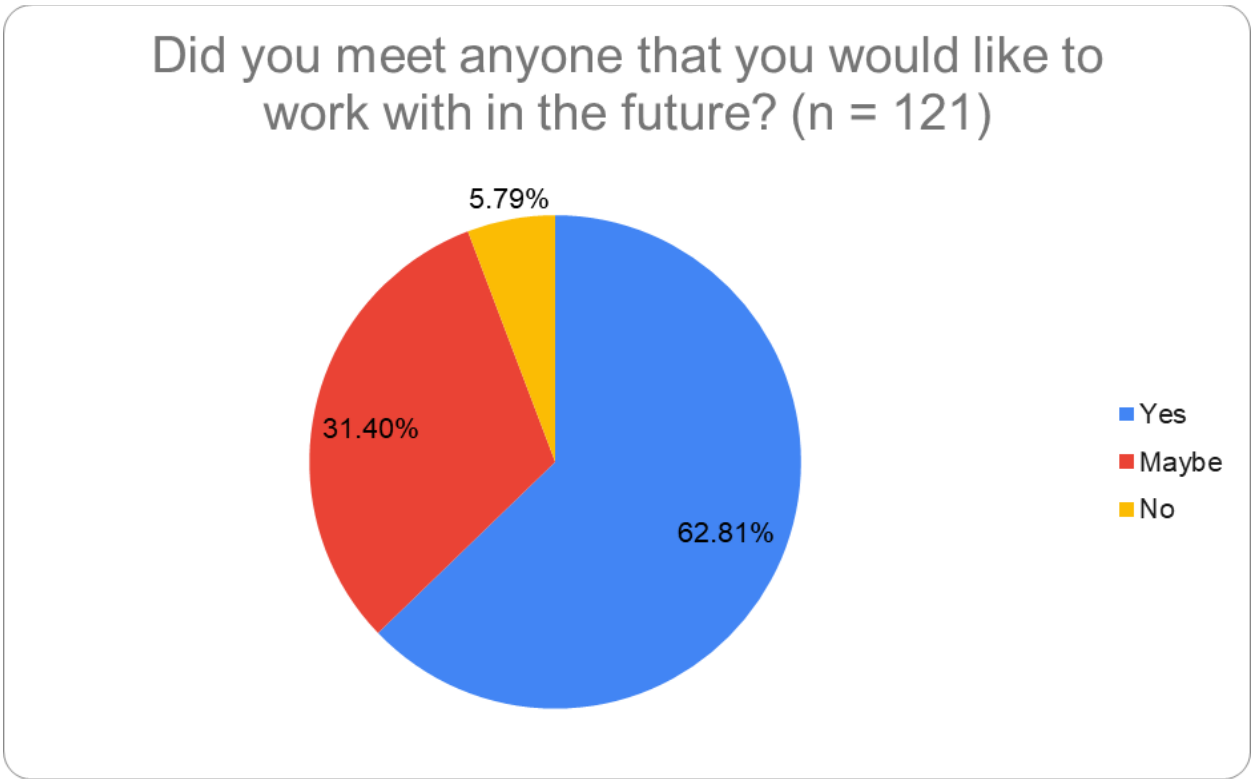

Figure 6: Evaluation question from the post-event survey, Virtual Networking Exchange, May 2023

3 Discussion

Before the launch of the DS-I Africa initiative, NIH conducted an extensive scoping exercise involving consultations, focus group discussions, literature review, and desktop research to identify gaps and opportunities for data science to impact health in Africa. This scoping revealed tremendous opportunities based on increases in the availability of data, advances in technology for analysis, and a diverse community of highly motivated scientists from across the continent. The potential for the field was further supported by the successes of previous initiatives, including the Human Heredity and Health in Africa (H3Africa) Initiative [1] and the Medical Education Partnership Initiative [2],.

However, a key gap was the lack of connectivity between the data science and health communities and expertise scattered across the continent. The importance of partnerships – especially across disciplines such as data science and health – was a common theme throughout consultations with African leaders in data science and health. These discussions also made clear the need to think broadly about partnerships, including policymakers, practitioners, and the private sector. The impact and utility of partnerships and investment in science were clearly demonstrated during the COVID-19 pandemic which allowed African scientists to harness their networks to contribute to the surveillance and finally to effective vaccine development [3].

Accordingly, a culture of partnerships and collaboration is integrated throughout DS-I Africa. The CC supports this culture through program-wide working groups, participation in key scientific conferences such as Deep Learning Indaba, and unique virtual and in-person opportunities for

networking that extend beyond the current consortium. Through these activities, several key lessons have emerged:

3.1 Diverse partnerships foster creativity and strengthen projects

The incredible potential of data science to improve health cannot be realized unless data scientists work closely and collaboratively with health experts [3, 4]. Complex health challenges require creative problem-solving, which is best achieved through diverse partnerships. DS-I Africa projects include partners working from different countries, disciplines, and sectors. As these projects advance, their partnerships continue to grow as they add different expertise and unique perspectives to their problem-solving approaches. The CC and the P&O WG serve this goal by continually creating opportunities for networking across silos and building bridges across disciplines and scientific communities.

3.2 Creating opportunities for networking is preferable to matchmaking

DS-I Africa's approach to partnerships is to support opportunities for investigators to meet and interact with a wide variety of organizations. The goal is to create networking opportunities and foster a culture of collaboration that allows project leads to identify the most appropriate partners to achieve their goals. This "hands-off" approach is preferable to pushing individuals to work with each other or recommending partners through matchmaking. Partnerships that develop organically among like-minded groups with shared goals result in teams that work well together and are more likely to achieve their shared objectives. Furthermore, partnerships can only be effective if they are equitable and are led by individuals and organizations who know the local context best.

3.3 Rapid changes in the field require constant scoping for opportunities

The field of data science is rapidly evolving as more and more data sets become available, infrastructure and capacity grows, and computational capacity increases. From the time that DS-I Africa began hosting Networking Exchanges, interest has increased much faster than expected (as seen in **Figure 7**), culminating in more than 500 attendees at the most recent event. Likewise, the number of publications, webinars, and conferences in the field is quickly growing. This requires the CC and P&O WG to constantly scope for new opportunities, activities, and potential partners. Data science is a fast-paced field and staying abreast of the latest developments is a necessity to harness this momentum.

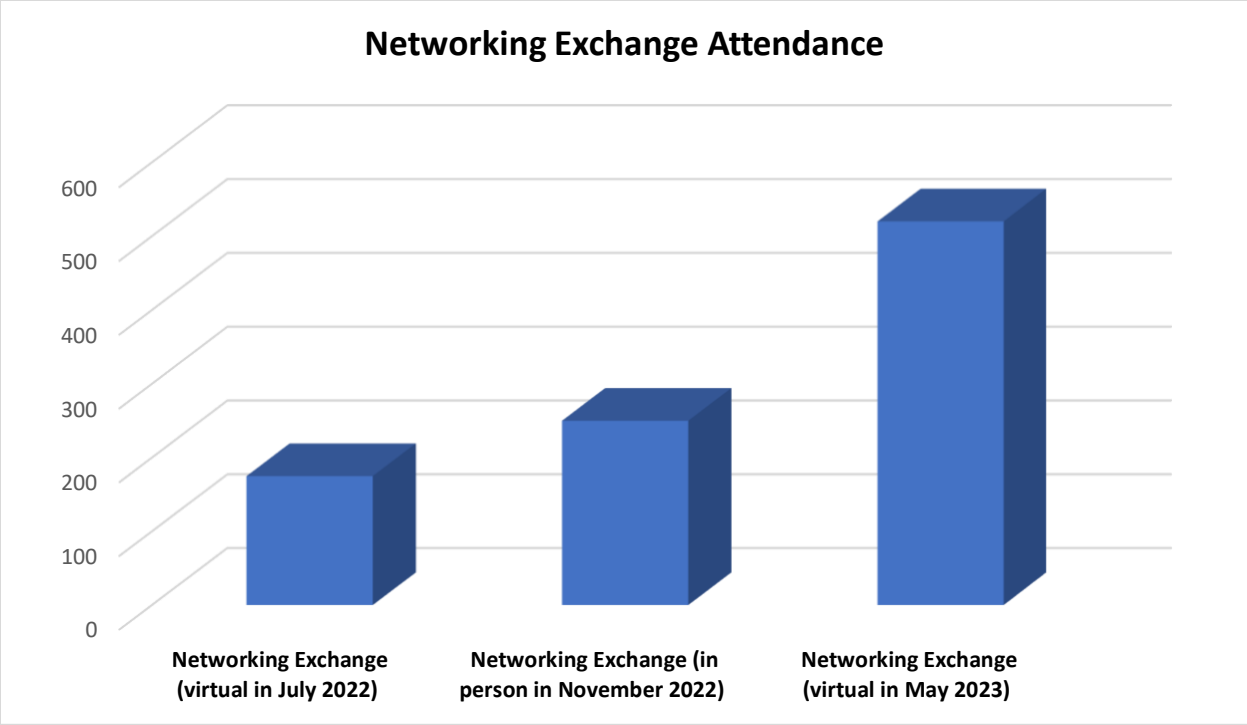

Figure 7: Attendance at DS-I Africa Networking Exchange

4 Conclusion

Partnerships and networks are critical to improving health in Africa through data science. Towards this goal, the DS-I Africa program has integrated a culture of partnership throughout its projects, actively engaged with other data science activities in Africa, and created opportunities for networking that extend beyond the current consortium. We will continue our outreach, work to break down silos, and explore new and creative ways of strengthening connectivity across the continent. Building equitable and transparent partnerships allows us to respond expediently to real-world problems.

We hope to learn more from organizations such as Deep Learning Indaba, improve the Networking Exchange model, and try new approaches to engage with partners. One such idea could be a data science festival event that brings researchers, practitioners, and policymakers from across Africa to share research, explore collaborations, and advance the field.

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Disclaimer

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