

MIT Industrial Liaison Program Faculty Knowledgebase Report

2020 MIT ILP Regional Webinar Series #3

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Battling the Pandemic with Data and Learning
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Leo Anthony Celi has practiced medicine in three continents, giving him broad perspectives in healthcare delivery. As clinical research director and principal research scientist at MIT [Laboratory of Computational Physiology](#) (LCP), he brings together clinicians and data scientists to support research using data routinely collected in the intensive care unit (ICU). His group built and maintains the Medical Information Mart for Intensive Care (MIMIC) database. This public-access database has been meticulously de-identified and is freely shared online with the research community. It is an unparalleled research resource; over 2000 investigators from more than 30 countries have free access to the clinical data under a data use agreement. In 2016, LCP partnered with Philips eICU Research Institute to host the eICU database with more than 2 million ICU patients admitted across the United States. The goal is to scale the database globally and build an international collaborative research community around health data analytics.

Leo founded and co-directs [Sana](#), a cross-disciplinary organization based at the Institute for Medical Engineering and Science at MIT, whose objective is to leverage information technology to improve health outcomes in low- and middle-income countries. At its core is an open-source mobile tele-health platform that allows for capture, transmission, and archiving of complex medical data (e.g. images, videos, physiologic signals such as ECG, EEG and oto-acoustic emission responses), in addition to patient demographic and clinical information. Sana is the inaugural recipient of both the mHealth (Mobile Health) Alliance Award from the United Nations Foundation and the Wireless Innovation Award from the Vodafone Foundation in 2010. The software has since been implemented around the globe including India, Kenya, Lebanon, Haiti, Mongolia, Uganda, Brazil, Ethiopia, Argentina, and South Africa.

He is one of the course directors for HST.936—global health informatics to improve quality of care, and HST.953—secondary analysis of electronic health records, both at MIT. He is an editor of the textbook for each course, both released under an open access license. The textbook [Secondary Analysis of Electronic Health Records](#) came out in October 2016 and was downloaded over 48,000 times in the first two months of publication. The course "[Global Health Informatics to Improve Quality of Care](#)" was launched under MITx in February 2017.

Leo was featured as a designer in the Smithsonian Museum National Design Triennial "Why Design Now?" held at the Cooper-Hewitt Museum in New York City in 2010 for his work in global health informatics. He was also selected as one of 12 external reviewers for the National Academy of Medicine 2014 report "Investing in Global Health Systems: Sustaining gains, transforming lives."

COVID-19 is a formidable global threat, impacting all aspects of society and exacerbating the existing inequities of our current social systems. As we battle the virus across multiple fronts, data are critical for understanding this disease and for coordinating an effective global response. Given the current digitization of so many aspects of life, we are amassing data that can be extrapolated and analyzed for the effective forecasting, prevention, and treatment of COVID-19. Learning from the data, responsibly and across disciplines, in combination with communication, education, treatment, and policy decisions, are our best ways forward to defeat this virus while laying the groundwork for collaborative data science in the face of future calamity.