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Big Data to individualize management of chronic diseases

Groundbreaking effort for health care to help doctors diagnose and treat chronic diseases more quickly and accurately<

Some chronic conditions, such as the autoimmune disease scleroderma, are especially difficult to treat because patients exhibit highly variable symptoms, complications and treatment responses. The process of finding an effective treatment for an individual can be frustrating for doctors, and painful and expensive for patients.

With support from the National Science Foundation (NSF), computer scientist and professor Suchi Saria, with Dr. Fredrick Wigley and an interdisciplinary team of experts at Johns Hopkins University, is leading a groundbreaking effort using Big Data to ease some of that pain for scleroderma patients. The team's research is in machine learning, a subfield of computer science and statistics that allows machines to learn from data. The team designs statistical algorithms that enable computers to analyze large volumes of medical records and identify subgroups of patients with similar patterns of disease progression.

In addition, the system learns the symptoms and treatments that are predictive of specific patterns of improvement or deterioration to help doctors pick the right set of treatments for an individual patient. Doctors can then map the course of treatment for new patients, based in part on what the computers reveal about what happened to other patients with similar symptoms.

Saria foresees data analysis similar to this helping clinicians treat other chronic diseases, such as lupus and rheumatoid arthritis.

Research in this episode was supported by NSF award [#1418590 \(/awardsearch/showAward?AWD_ID=1418590&HistoricalAwards=false\)](#), Smart and Connected Health (SCH)/Integrative Projects (INT): Collaborative Research: Modeling Disease Trajectories in Patients with Complex, Multiphenotypic Conditions.

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The ability to access, analyze and draw insights from massive amounts of data already drives innovation in areas ranging from medicine to manufacturing, leading to greater efficiency and a higher quality of life. To accelerate this emerging field, NSF announced awards in November 2015 to establish regional hubs for data science innovation. Find out more in this [news release \(/news/news_summ.jsp?cntn_id=136784\)](#).

Credit: Douglas Levere, University at Buffalo



Planners, architects and municipalities are actively pushing for energy efficiency in design, but the tools needed to predict the impacts of new buildings in advance are limited in their function and often are prohibitively expensive to access. PlanIT Impact, a company based in Kansas City, Missouri, is working to fix this problem and is in the process of helping to build smart connected communities able to serve citizens better. Find out more in this [discovery \(/discoveries/disc_summ.jsp?cntn_id=136209\)](#).

Credit: PlanIT Impact

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