



# Connected Healthcare: A Data Mining Driven Methodology for Modeling the Emergence of Diseases Based on Sensor Data

**Conrad S. Tucker**

The Pennsylvania State University  
[ctucker4@psu.edu](mailto:ctucker4@psu.edu)

“We're drowning in data but thirsting for knowledge”. A phrase often used to characterize the current state of the modern, digitally connected world. The challenge in today’s dynamic digital age is not the lack of large scale data, but rather, the ability to extract knowledge from this data in meaningful ways that support real world decision making efforts.

Particularly, the Healthcare industry is experiencing a tremendous paradigm shift as patient records move to the digital space. In addition, the digitization of clinical information also plays a major role in providing rich, quantifiable data for clinical research pertaining to disease prediction/modeling. Our research aims to develop dynamic, data-driven approaches to disease prediction and prevention that bring together patients, healthcare providers, data service providers and insurance companies. This is achieved by capturing health-related data from disparate sources (social media, multimodal sensors, etc.) and developing data mining/machine learning techniques in an effort to discover novel, previously unknown disease patterns that can serve as decision support systems for patients, healthcare providers, data service providers and insurance companies.

## Biography

Dr. Conrad Tucker holds a dual appointment as Assistant Professor in Engineering Design and Industrial Engineering at The Pennsylvania State University. He is also affiliate faculty in Computer Science and Engineering and holds the Hartz Family Career Development Professorship.

Dr. Tucker is the director of the Design Analysis Technology Advancement (D.A.T.A) Laboratory. His research interests are in formalizing the system design processes under the paradigm of data mining knowledge discovery, based on machine learning principles. This is achieved by developing a deep understanding of social network interactions and patterns, understanding geospatial data generated through micro blogs such as Twitter® and Facebook®, and developing efficient prediction and prevention algorithms for big data problems. Research applications include complex systems design, sustainable system design optimization in the areas of healthcare, consumer electronics, environment, and national security. Past research partnerships with industry and government organizations such as Intel and Sandia National Laboratories has helped Dr. Tucker to continue fostering a multidisciplinary approach to research

Dr. Tucker is part of the inaugural class of the Gates Millennium Scholars (GMS) program (funded by a \$1 billion grant from the Bill and Melinda Gates Foundation) and remains active in the program through national volunteer and mentoring efforts and local Penn State activities.