

**Title:** From Generative Neural Networks to Social Media Networks: Ascertaining the Veracity of Data in the Information Age

**Abstract:** Ascertainning the veracity of data in the information age is a challenge both for humans (e.g., communicating within social media networks) and machines (e.g., training data for artificial neural networks). A lack of data veracity has the potential to “fool” both machines, as well as humans into achieving different outcomes/output. From a machine learning perspective, “fooling” a machine has had a positive impact in the development of algorithms such as generative adversarial networks (GANs), and has resulted in the ability of machines to generate hyper-realistic data such as images, 3D geometries, and text. However, adverse effects can be observed in large-scale social media networks, where the veracity of data cannot be quickly ascertained. Misinformation that is spread via social media networks can result in echo-chambers, lone communities that facilitate selective content diffusion as a result of user polarization. Ironically, this misinformation can now be reliably generated using machine learning algorithms such as GANs. Our research focuses on developing methods to both generate high quality data, and safeguard against data exploitation. Several application domains are explored including product design and development, healthcare physiology state estimation, and STEM education.



**Bio:** Dr. Conrad Tucker is an Arthur Hamerschlag Career Development Professor of Mechanical Engineering and Machine Learning (Courtesy) at Carnegie Mellon University. His research focuses on the design and optimization of systems through the acquisition, integration and mining of large scale, disparate data.

Dr. Tucker has served as PI/Co-PI on federally/non-federally funded grants from the National Science Foundation (NSF), the Air Force Office of Scientific Research (AFOSR), the Defense Advanced Research Projects Agency (DARPA), the Army Research Laboratory (ARL), the Office of Naval Research (ONR) via the NSF Center for eDesign, and the Bill and Melinda Gates Foundation (BMGF). In February 2016, he was invited by National Academy of Engineering (NAE) President Dr. Dan Mote, to serve as a member of the Advisory Committee for the NAE Frontiers of Engineering Education (FOEE) Symposium. He received his Ph.D., M.S. (Industrial Engineering), and MBA degrees from the University of Illinois at Urbana-Champaign, and his B.S. in Mechanical Engineering from Rose-Hulman Institute of Technology.