Abstract:

Physics-based (as opposed to data-driven) models require many input parameters—physical, chemical and biological properties of foods. These models also generate tremendous amount of information (insight), such as temperature, moisture, pressure, microbiological growth, and texture development during food processing. Such information are extremely valuable to industry (product, process or equipment designers), extension (visualization of unsafe situations), and education (teaching and learning of critical concepts). All these are part of big data. We have a project in curing and developing three repositories: data and prediction equations for the vast array of physical properties of food materials, apps that can simulate food processes, and annotated videos of complex food processes. These will be crowdsourced, allowing everyone to contribute to and draw benefit from instant access, and insight from cross-comparison of materials and processes. The first and the second one also has research elements to develop frameworks for data and practical simulations.

Bio:

Ashim Datta is a Professor in the Department of Biological and Environmental Engineering and has been at Cornell University for the past 33 years. Ashim’s specialization is mathematical (computational) modeling of food processes like frying and microwave heating, with a goal to understand the processes better (more mechanistically and quantitatively). His research group also uses this understanding to optimize the process in the context of product, process and equipment design. He leads a collaborative NIFA project on digital food manufacturing also just completed a major nationwide project on use of digital simulations in education.

Background on the Cornell Initiative for Digital Agriculture:
An interdisciplinary group of Cornell University faculty began meeting in early 2017 to formulate an Initiative for Digital Agriculture, believing that Cornell is uniquely equipped to lead in this emerging arena that will benefit the public for generations. We define DA to mean the application of computational and information technologies coupled with nanotechnology, biology, systems engineering and economics to both the research and operational sides of agriculture and food production. With approximately 100 faculty from 5 Cornell colleges participating, we are collaborating with external stakeholders to shape and implement a research agenda for DA that will build a pipeline of discovery and innovations for the next 10+ years. Please contact Tim Vanini at tv37@cornell.edu with any questions.