Andrea Califano, Dr., is a pioneer in the field of systems biology and founding chair of the Department of Systems Biology at Columbia University Irving Medical Center. A physicist by training, Dr. Califano has taken innovative, systematic approaches to identify the molecular factors that lead to cancer progression and to the emergence of drug resistance at the single-cell level. Directing the conversation about cancer research away from focusing solely on gene mutations, Dr. Califano examines the complex and tumor-specific molecular interaction networks that determine cancer cell behavior. Using information theoretic approaches, analysis of these networks can precisely pinpoint master regulator proteins that are mechanistically responsible for supporting tumorigenesis and for implementing tumor cell homeostasis. Dr. Califano and his lab have shown that master regulators represent critical drivers and tumor dependencies, despite the fact that they are rarely mutated or differentially expressed, thus establishing them as a *bona fide* new class of therapeutic targets.

The Califano Systems Biology Lab combines computational and experimental methodologies to reconstruct the regulatory and signaling logic of human cells in genome-wide fashion. In addition, his lab has developed methods for the systematic discovery of small molecule compounds and combinations that can inactivate master regulator proteins in cancer, thus providing novel therapeutic hypotheses that can be validated pre-clinically and clinically. Indeed, several of his findings have been translated into clinical studies, including an innovative N-of-1 study at Columbia in which master regulators are identified and pharmacologically targeted on an individual patient basis in several aggressive malignancies, thus getting a step closer to deliver on the promise of a truly mechanistic implementation of precision medicine.

Dr. Califano's master regulator analyses have led to several discoveries that are being tested in the clinics, including the drug entinostat in a subset of metastatic neuroendocrine tumor patients, the use of combination therapy in HER2+ and inflammatory breast cancer, and additional phase 2 clinical trials in patients with recurrent pancreatic ductal carcinoma and metastatic prostate cancer. His research has been funded by the National Cancer Institute, Lustgarten Foundation, Falconwood Foundation, Hyundai Hope on Wheels, the NET Research Foundation, and the Prostate Cancer Foundation.

Dr. Califano is the Clyde and Helen Wu Professor of Chemical and Systems Biology in the Departments of Systems Biology, Biochemistry

& Molecular Biophysics and Biomedical Informatics and the founding chair of the Department of Systems Biology. He serves as director of the JP Sulzberger Columbia Genome Center and associate director for bioinformatics at Columbia's Herbert Irving Comprehensive Cancer Center. Dr. Califano is an elected fellow of the American Association for the Advancement of Science (AAAS, 2015), the International Society for Computational Biology (ISCB, 2017) and Institute of Electrical and Electronics Engineers (IEEE, 1997). In 2018, he was elected to the National Academy of Medicine.

Dr. Califano is active nationally and internationally, serving as scientific editor of several peer-reviewed journals and serving on scientific advisory boards, including the Frederick National Laboratory, Tempus Inc., the Koch Institute for Integrative Cancer Research at MIT and MD Anderson Division of Cancer Medicine, among others. In 2015, he cofounded biotech startup DarwinHealth, Inc. and currently serves as its chief scientific advisor. He also has served as chair or co-chair of many international conferences and meetings including, including the annual meeting of the American Association for Cancer Research (AACR); the RECOMB-ISCB Conference on Regulatory and Systems Genomics, with DREAM Challenges; Keystone Conferences; and several special conferences of the AACR on genomics and cancer systems biology.