Ideas to Impact

Rice University's perennial spot in the Leiden Ranking of scientific impact and our global leadership in nanotechnology, materials science, high performance computing, and policy analysis are not accidents. At Rice, ideas that begin with a simple "how?" or "what if?" transform into practical solutions to real challenges that have measurable impacts on our world.

In ourcnetury-plus history, Rice has – by design – become a prime mover in game-changing scientific research. With our institutional rejection of typical bureaucratic hurdles and red tape, Rice is nimble, responding quickly to emerging challenges. An agile, award-winning research community emphasizes cross-disciplinary collaboration and the willingness to question orthodoxy – the essential ingredient for developing novel new ideas and solutions to increasingly complex challenges.

Rice also understands that science and technology must serve human needs and accommodate prevailing social, economic, and political factors. We couple our science and technology innovations with insightful policy analysis to ensure that we implement ideas that are not simply the "best" technology, but that are also positive choices for our global community.

Bet Early, Bet Smart, Bet Big

One of the keys to Rice's leadership and scientific impact is our ability to recognize emerging challenges early, to envision the opportunities hidden in the prevailing paradigms. Here are just a few examples of how Rice sees – and seizes – opportunities that others may miss.

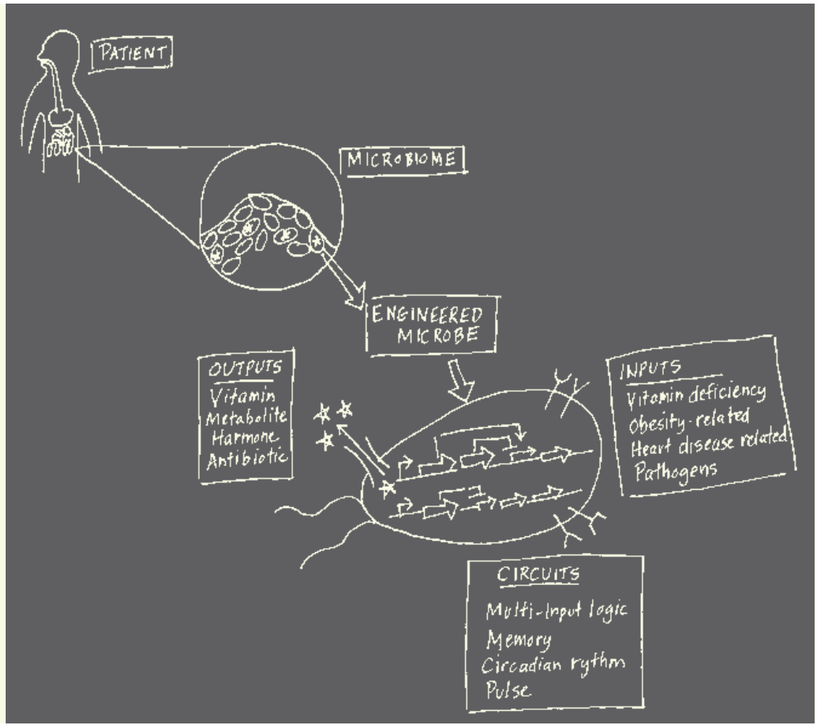
In 1985, researchers at Rice were part of a team that revealed the building block of nanotechnology – the "buckyball". This Nobel-winning discovery laid the foundation for the Smalley Institute for Nanoscale Science and Technology at Rice, the world's first nanotechnology center. From targeted medical treatments to the development of a highly conductive and super strong fiber that is hair-thin and bends like thread, the bet placed by early nano-researchers has paid off in a big way.

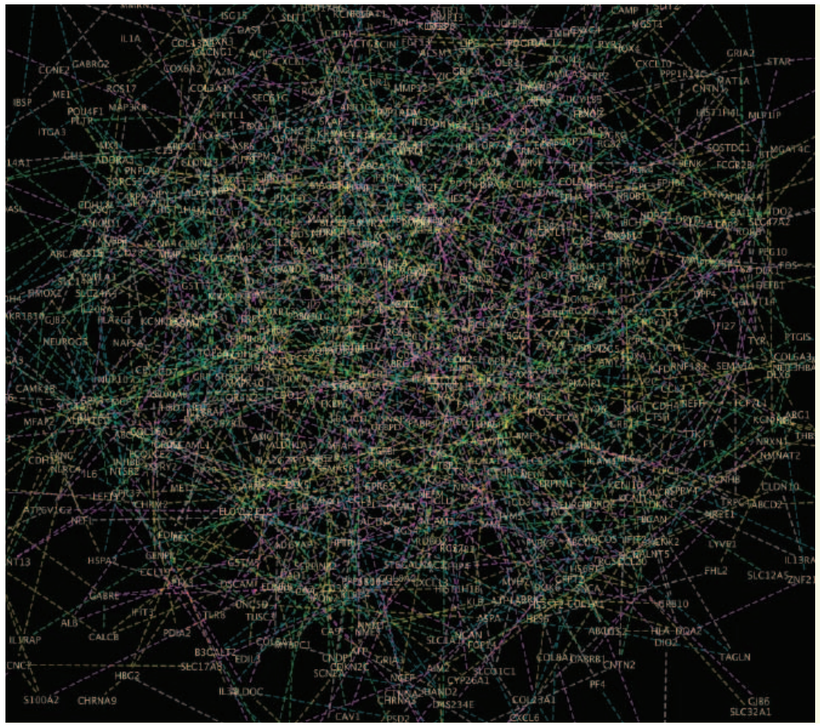
A little over 20 years ago, Rice recognized a growing need for data driven policy analysis that focuses on the intersection of technology, economics, and socio-political forces. Since its inception in 1993, the James A. Baker III Institute for Public Policy has become one of the premier nonpartisan public policy think tanks in the world, with expertise in energy, health, conflict resolution, science and technology, tax and expenditure policy, and Latin America and Asia studies.

In 1998, a team at Rice envisioned a research institution dedicated to applied interdisciplinary research to push the limits of high performance computing. Now the Kennedy Institute for Information Technology at Rice supports a broad spectrum of research that requires massive computing power.

In 2012, Rice again stepped into the breach to address the emerging imperative of developing greener energy technologies. Drawing on the multidisciplinary tradition at Rice, the new Energy and Environment Initiative (e2i) seeks to develop more efficient hydrocarbon exploration, extraction, and byproduct remediation methodologies to support a sustainable solution to growing demand.

Systems & Synthetic Biology combines disciplines to gain better understanding of the cause and progression of human diseases. Researchers hope to develop new biological systems with targeted functional properties, such as 'sentinel' organisms capable of maintaining a healthy human microbiome. An array of cell-based sensors detect microbiome imbalances, while synthetic gene circuits direct the sentinel organisms to secrete specific molecular outputs to adjust the microbiome back to a healthy state.





"Big data" is a collection of data too large and complex for traditional data processing applications. High-information biomedical technologies can measure and record millions of bio-markers (genes, point mutations, proteins, metabolites) in biological samples. Efficiently mining this "big-data" is the key to developing therapies for personalized medicine. This visualized network depicts genomic interactions in Glioblastoma tumor samples.