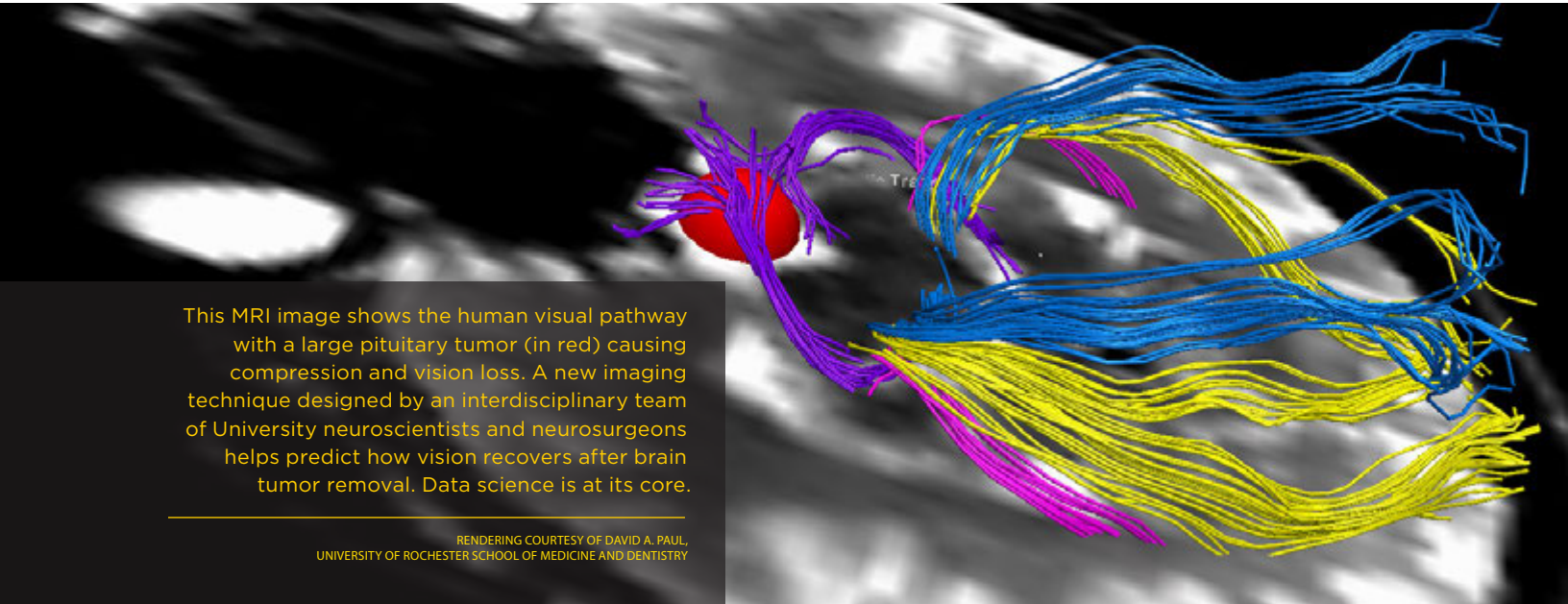


# GOERGEN INSTITUTE FOR DATA SCIENCE

## FOCUS AREA: HEALTH ANALYTICS



This MRI image shows the human visual pathway with a large pituitary tumor (in red) causing compression and vision loss. A new imaging technique designed by an interdisciplinary team of University neuroscientists and neurosurgeons helps predict how vision recovers after brain tumor removal. Data science is at its core.

RENDERING COURTESY OF DAVID A. PAUL,  
UNIVERSITY OF ROCHESTER SCHOOL OF MEDICINE AND DENTISTRY

► The biggest health care breakthroughs of this century may not come from the development of “magic bullet” drugs; instead, they may come from an increase in our ability to affect individual health outcomes based on treatments, genomics, lifestyle, and behavioral factors. The potential to truly impact individual and public health by using data science is huge, and it is why health analytics is a priority at the University of Rochester’s Goergen Institute for Data Science.

### The University at Work

Making health-related discoveries using analytics requires integrating large and complex data sets. Progress also relies on increased collaboration among experts in far-ranging fields such as medicine, computer science, electrical and computer engineering, psychology, neurology, nursing, psychiatry, and other disciplines. Here are just a few examples of current research.

#### iPhone App for Parkinson’s Patients

Codirectors of the Center for Human Experimental Therapeutics Ray Dorsey, MD, the David M. Levy Professor in Neurology, and Karl Kieburtz ’85M (MD), the Robert J. Joynt Professor in the Department of Neurology, along with Max Little, a mathematician and lecturer at Aston University in the United Kingdom, partnered with Sage Bionetworks to develop an iPhone tracking app called Parkinson mPower (Mobile Parkinson Observatory for

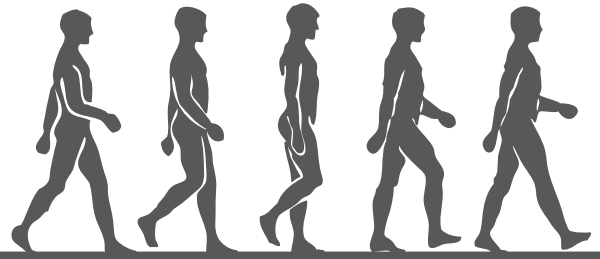
Worldwide, Evidence-based Research). The app, which is available now, allows patients with Parkinson’s disease to track their symptoms in real time and share information with researchers.

“To have a dedicated Parkinson’s app backed by research that will allow patients to engage with their care and receive feedback on their condition is amazing,” says Dorsey, whom the White House has named as a “Champion of Change” in the fight against Parkinson’s. “It is heartening to make the data in the aggregate available for research. Five years ago this would have been inconceivable.”

#### Global Public Health and Chronic Disease

Health analytics is at the core of much of the most progressive public health research and interventions happening globally. Timothy Dye, professor and associate chair for research in the Department of Obstetrics and Gynecology and director of biomedical informatics for the Clinical and Translational Science Institute, is harnessing this field’s potential to examine the impact of community-based interventions on chronic disease risk behaviors, such as smoking.

Dye also leads the School of Medicine and Dentistry’s efforts as the coordinating center for the Global and Territorial Health Research Network, which was recently established by the Centers for Disease Control and Prevention. This network develops and carries out public



Doctors across UR Medicine are now using the new National Institutes of Health-funded program **Patient Reported Outcomes Measurement Information System (PROMIS)** to gauge patient health. UR Medicine's orthopaedic department is the only one in the nation using PROMIS to quantify healing and patient outcomes and determine treatment strategies after reconstructive and gait movement surgery.

health research and interventions in the U.S. territories in the Pacific and Caribbean. "Our goal is not only to help these communities address their own chronic disease challenges but also to take the lessons that are learned there and apply them to public health problems closer to home," says Dye, who leads Rochester's role in the network.

**The Rochester Center for Health Informatics (RCHI):** RCHI researchers use health informatics, graph theory, and data analytics to distill massive amounts of health care data into findings that can improve health care and public health in the Rochester area. "Our goal is to help make this the healthiest community in the nation," says Martin Zand, MD, nephrology professor, RCHI director, and Center for Biodefense Immune Modeling codirector. "Being able to extract meaningful information from large-scale data sets is critical to our work."

### **High-Performance Computing and**

**Flu:** According to the World Health Organization, between 250,000 and 500,000 people worldwide die from the flu each year. David Topham, a University biologist and influenza researcher who has nearly 10 titles to his name, including director of the University's Health Sciences Center for Computational Innovation, has spent his career trying to figure out why. His main question has been "How does an influenza infection affect the immune system?" High-performance computing is at the core of his research, and so is the University's IBM Blue Gene/Q, one of the world's fastest supercomputers. Topham knows that having the right tools, methods, hardware, and software in place will lead to a better understanding of the immune system's response to influenza. This could result in the ability to design a vaccine to destroy multiple strains of influenza and, ultimately, protect people from this potentially deadly disease.

### **The Respiratory Pathogens Research Center (RPRC):**

The University has unique strengths in the study of respiratory disease

and is home to the only National Institutes of Health-funded RPRC. These strengths combined with the high-performance computing resources at the University will lead to new possibilities in respiratory disease research and clinical care.

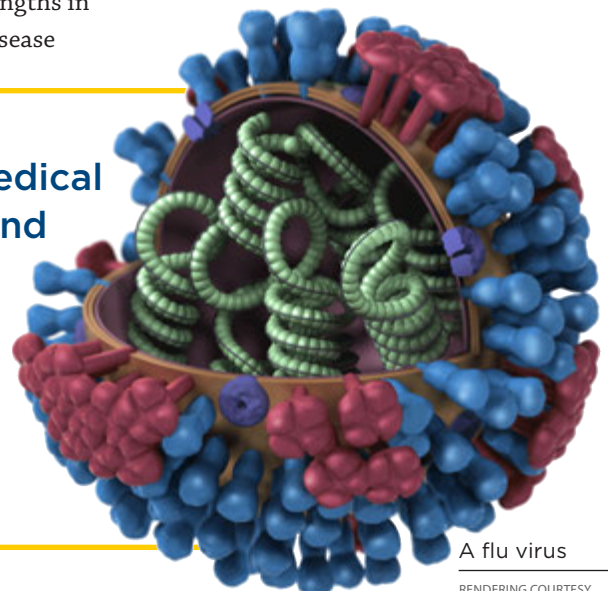
### **How You Can Help**

Endowment support for professorships, research, and graduate fellowships in health analytics can help change—and even save—lives. Your support fuels research in many areas, including suicide prevention, telemedicine, infectious disease tracking, and chronic disease care. It can also lead to new health care delivery approaches and more accurate predictions for cancer treatment outcomes. Please consider supporting the University's work in data science.

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**"Data science is creating new medical insights for us and changing how we care for people."**

—**Stephen Dewhurst**  
*Vice Dean for Research;*  
*Dean's Professor and Chair of*  
*Microbiology and Immunology*



A flu virus

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