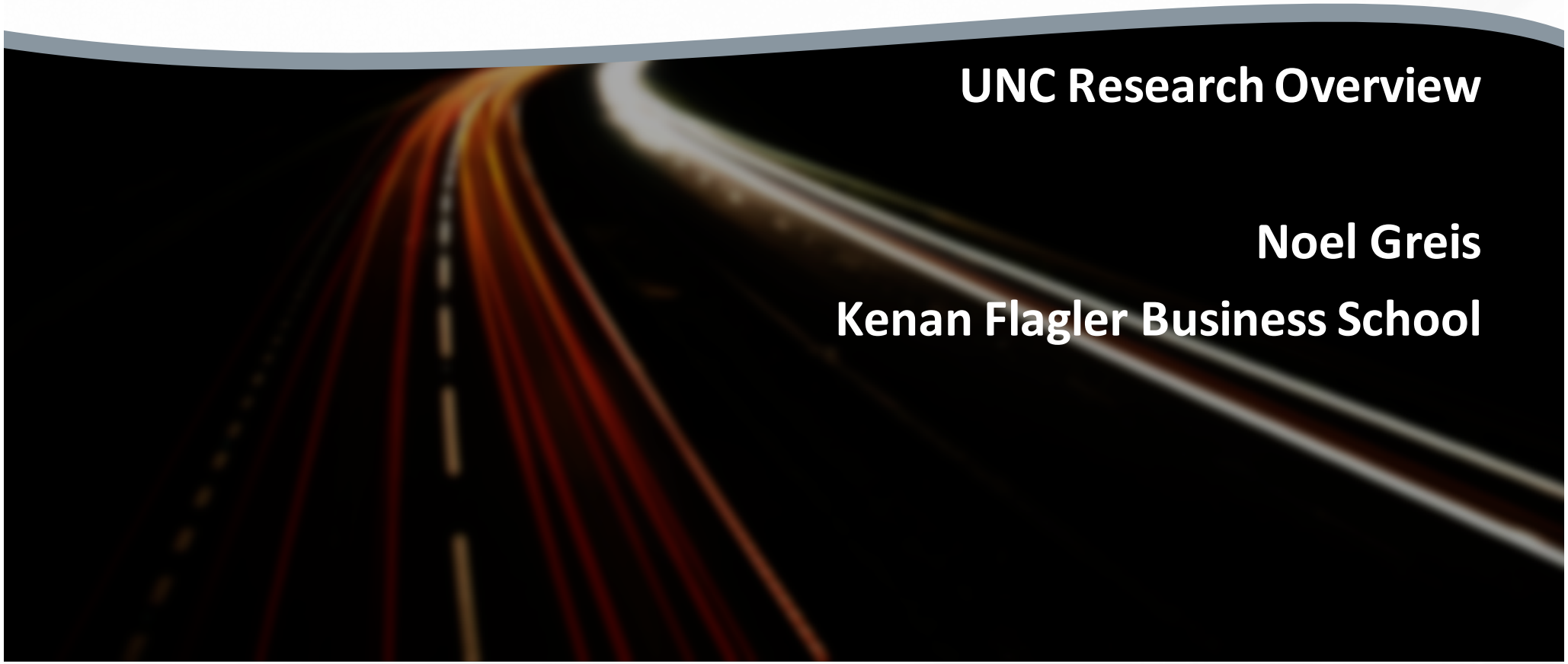
Information and Knowledge for Decision Making

An NSF I/UCRC Planning Grant Workshop



UNC Research Overview

Noel Greis

Kenan Flagler Business School

Center for Visual & Decision Informatics

renci

THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

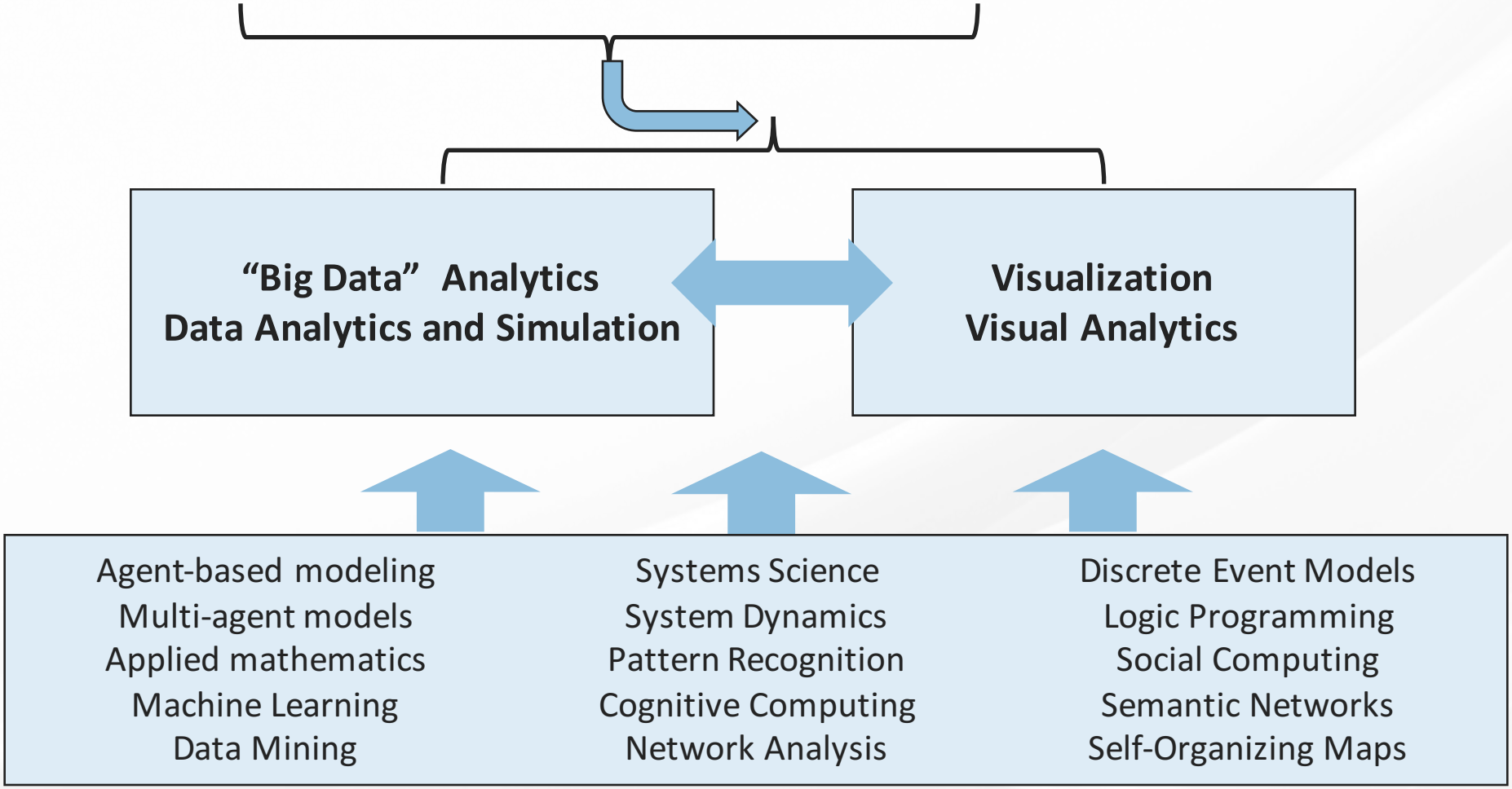
Overview of UNC Research Focus

UNC's research focus is the development of tools for the ***analysis and visualization*** of complex, multi-dimensional, and multi-scale data that transforms data to knowledge in support of ***data-driven decision-making*** in domains such as healthcare, business, finance, among others.

Harnessing the Power of Data and Analytics for Data-Driven Decision Making

UNC Supports the Fundamental Mission of CVDI

Data → Information → Knowledge → (Better) Decisions

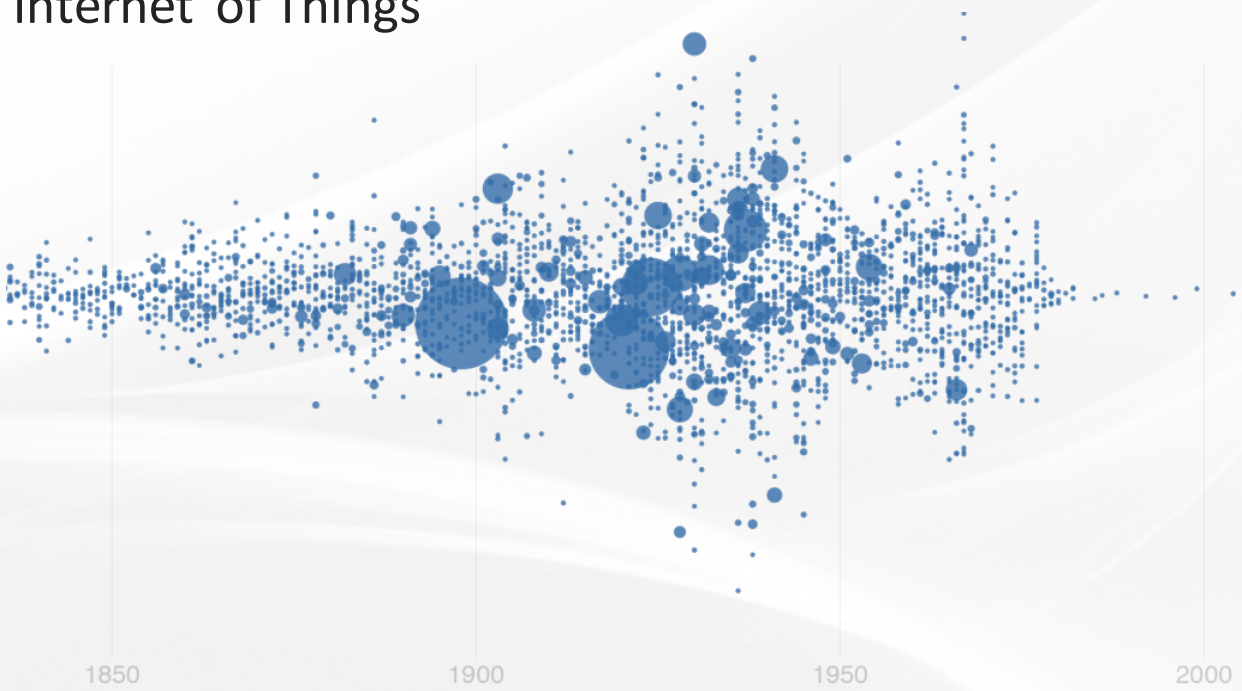


Get From Data To Decisions, Better And Faster!


UBER

Current Directions in Data Science Research

- "Datafication-Led" Innovation
- Analytics for "Rich" Media
- Predictive Analytics to Drive Efficiency
- Big Data in the Cloud
- Cognitive Computing
- Real-time Analytics and Internet of Things

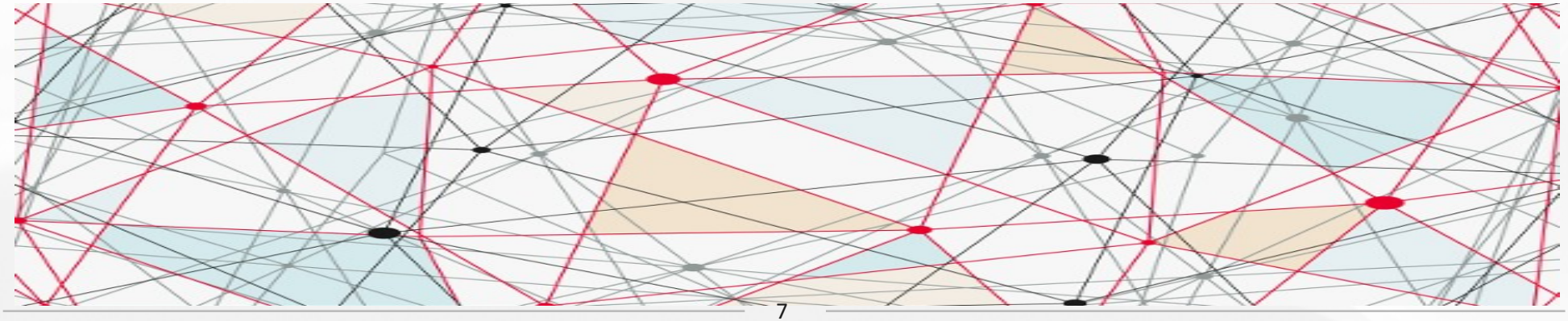


Areas of Need Expressed by Industry

- "Custom" data analytics
- Massive electronic data (c.f. EHR and EMR)
- Mobile analytics
- Data cleaning, duplicate detection and removal
- Large-scale data visualization
- Fraud detection (financial and "measures')
- Informatics and visual analytics for decision support
- Supply chain management

Low-Cost, Low-Risk Solutions for Dealing with…

- Large, Real-time Data
- Structured/Unstructured Data Mix
- Handling Missing/Poor Quality Data
- Sensor Data Streams
- Managing Metadata Repositories
- Digital Search and Retrieval
- Digital Preservation
- Etc.



Adoption of Data & Visual Analytics in Healthcare

"Health care has more slowly adopted data analytics than other industries."

Market penetration within health care is relatively low, at between 5 and 20 percent….

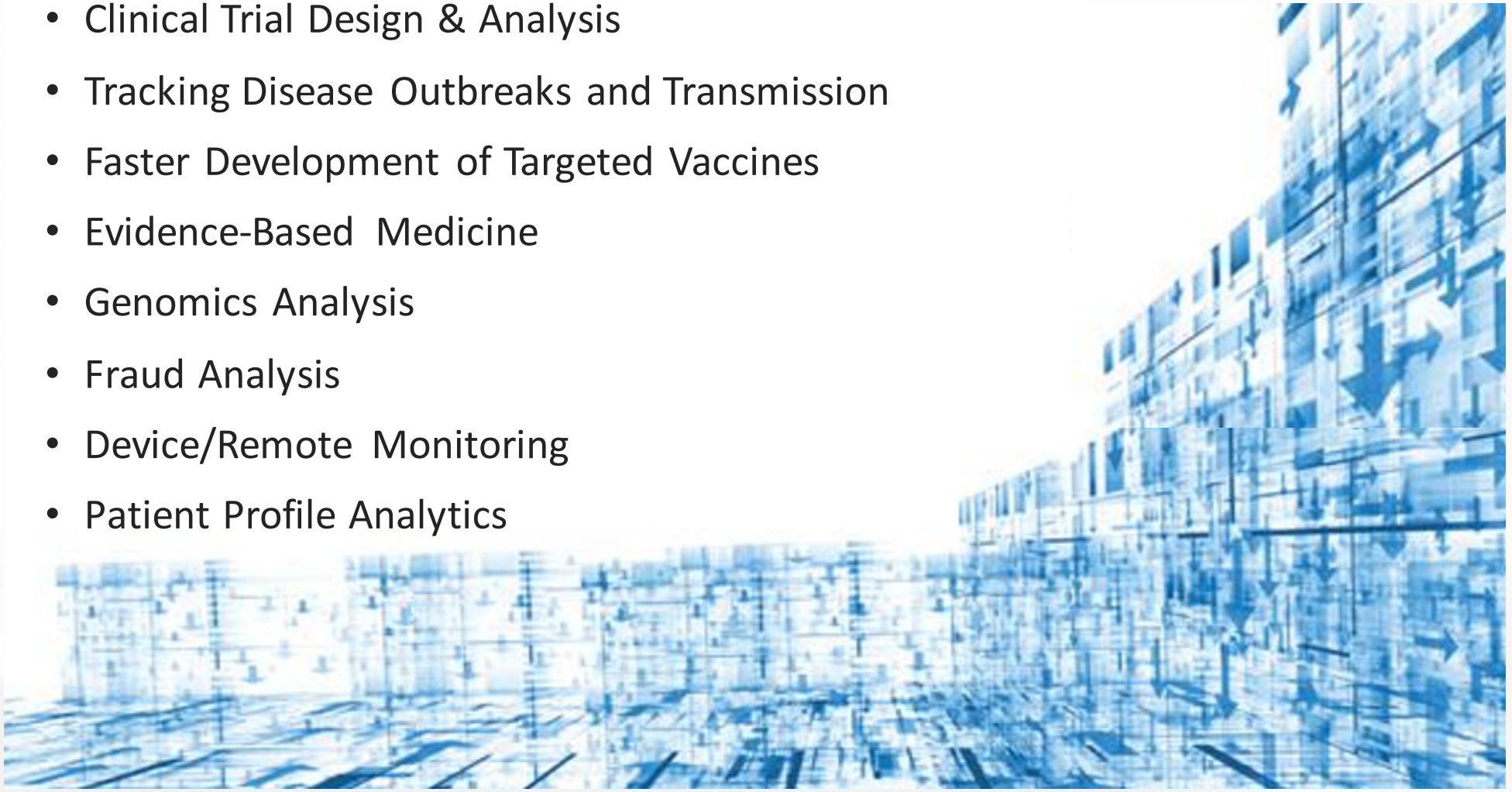
*(Gartner, 2013)**

……Data (in)security……..(Lack of) Data Integration……..(Lack of) Historical Investment…..(Difficulty of) Data Use….. (Limited) Staff Knowledge…. (Lack of) Industry Standards……..

*Hype Cycle for Healthcare Provider Applications, Analytics and Systems, Gartner, 2013

Data-Driven Decision-Making for Healthcare

- Efficient & Effective Clinical Operations
- Faster/Better Drug pipeline
- Clinical Trial Design & Analysis
- Tracking Disease Outbreaks and Transmission
- Faster Development of Targeted Vaccines
- Evidence-Based Medicine
- Genomics Analysis
- Fraud Analysis
- Device/Remote Monitoring
- Patient Profile Analytics



UNC Research Expertise in Data Science

FOCUS AREAS	APPLICATION AREAS	FACULTY
TECHNIQUES Agent-based modeling Knowledge networks Mathematical systems modeling Machine learning Multi-agent modeling Network analysis System dynamics Systems science **ADVANCED CYBER INFRASTRUCTURE** High-performance and high-throughput computing Secure research workspaces	Business Efficiency Healthcare Delivery Systems Life Sciences Research Epidemiology Organizational Modeling Supply Chain Management Human/Environment Interactions Population Dynamics Crowd Dynamics	**Noel Greis** *(Kenan-Flagler Business School)* **David Gotz** *(School of Information and Library Science)* **Javed Mostafa** *(School of Information and Library Science)* **Kelly Evenson** *(Gillings School of Global Public Health)* **Stephanie Haas** *(School of Information and Library Science)* **Kristen Hassmiller Lich** *(Gillings School of Global Public Health)* **Nilay Tanik Argon** (*Statistics and Operations Research*) **Kirk Wilhelmsen** (*School of Medicine - Genetics*) **Charles Schmitt** (*Renaissance Computing Institute*) Todd BenDor *(City and Regional Planning)* Nikhil Kaza *(City and Regional Planning)* Peter Mucha *(Mathematics)* Nancy Rodriguez-Bunn *(Mathematics)* Steve Walsh *(Geography, Galapagos Research Center)* Ming Lin *(Computer Science)* Dinesh Manocha *(Computer Science)*