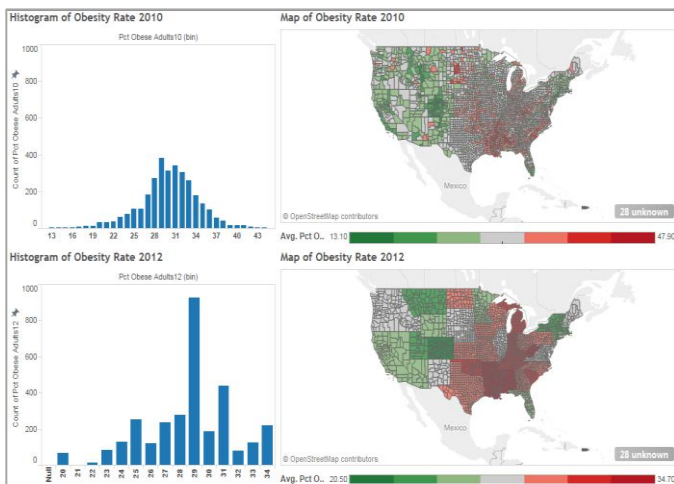


# OSU DEPARTMENT OF INTEGRATED SYSTEMS ENGINEERING

## DATA ANALYTICS, DATA-DRIVEN OPTIMIZATION AND VISUAL ANALYTICS

The Integrated Systems Engineering (ISE) Department has a research program integrating data analytics, data-driven optimization and visual analytics that leverages our world-class expertise in Operations Research and Cognitive Systems Engineering. This research focus is complemented by an M.S. concentration as well as an undergraduate track in data analytics and data-driven optimization. In addition, it complements the university-wide program in Translational Data Analytics (which includes a university wide undergraduate major in data analytics), as well as the College of Business undergraduate cluster on data analytics.

**Scope:** Our research on data-driven optimization and machine learning focuses on prescriptive analytics methods (e.g., convex optimization for high-dimensional data analysis, online adaptive learning). Advances in mathematical and computational modeling are complemented by our focus on how to effectively support human decision making and exploit human pattern recognition capabilities through visual analytics, building upon the broader framework provided by cognitive systems engineering and representation aiding.

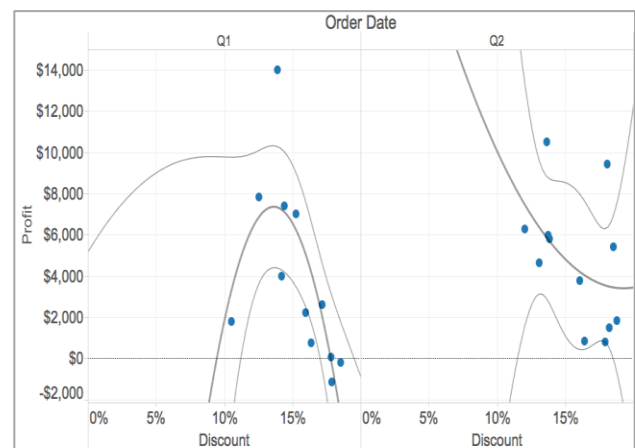


### Tools

- Cognitive task and work domain analyses
- Visualization through representation aiding
- Human / machine teaming
- Workflow process representation to accelerate expertise acquisition
- Large-scale convex optimization algorithms
- Semidefinite programming
- Markov Decision Processes
- Data-driven stochastic optimization

### Industry Focus Areas

- Cyber-security
- Power generation and distribution
- Brain image/genomics data analysis
- Production and scheduling
- Supply chain analysis
- Commercial aviation and aerospace
- Water resource management
- Healthcare



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