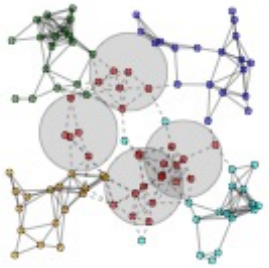
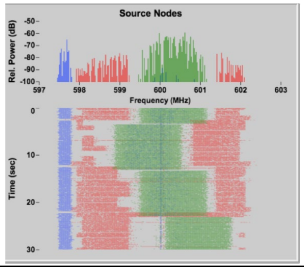
John Shea





Research Objectives and Key Challenges:

- How can networks and control systems better exchange and react to information about Quality of Service
- How to jointly adapt communication parameters and protocols with control algorithms for autonomous systems
- How to optimize network topologies and placement of agents, such as databases, computational resources, routers, jammers

Significance of Work:

- Assuring performance of autonomous systems in complex and denied environments
- Achieving higher capacity/better performance than conventional designs that treat communication network as fixed commodity

High-Level Technical Approach:

- Graph theory
- Physical- and link-layer design
- Stochastic modeling and reinforcement learning

Potential AFRL Collaboration Areas:

- Networked autonomous systems
- Communication in the presence of jamming/interference

Center Research Areas:

- Interface between networks and control
- Network topology optimization
- Optimization and machine learning for collaborative spectrum use

Recent Accomplishments:

- ✓ Developed optimal jamming placement algorithms to partition wireless networks
- ✓ Developed distributed privacy-preserving techniques for collaborative spectrum sensing
- ✓ Develop collaborative spectrum usage algorithms for coalitions operating in complex environments

Current Funding:

- NSF, DARPA

Short-Term Research Vision:

- Further development of techniques to make networks robust to interference and jamming
- Further development of algorithms for distributed, collaborative, privacy-preserving spectrum sensing and dynamic spectrum access

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