**RESEARCH IN THE MARYLAND OPTICS GROUP**

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**Free Space Optical Communications**
- Delayed diversity for fade resistance
- Pointing, Acquisition and Tracking
- Beacon-based Pointing with homographies
- Atmospheric turbulence measurements
- Direct observation of the Taylor microscale

**Free Space Optical Sensor Networking**
- Correlation functions measured

**Surface Plasmon Polaritons And Invisibility**
- Transformative optics: Make electromagnetic waves flow around an object as if it were not there
- Re-projection
- Mirrors

**Directional Wireless Networks and Mobility Control**
- Potential energy functions for network optimization
- Normal mode analysis to predict network breakdowns
- Topology control

**Network D-MAC Protocol**
- Network D-MAC Protocol to finish.
- Cluster head begins collecting data
- All motes are given time slots and the cluster head begins acquiring data

**Bioelectromagnetics**
- The Brain is not a Radio Receiver for Wireless Phone Signals: Human tissue does not demodulate a modulated radio-frequency carrier

**Enhanced Fluorescence from Quantum Dots**
- We have experimentally demonstrated the enhancement of fluorescence from quantum dots excited by interaction with surface plasmon polaritons on nanostructured metal surfaces

**Autonomous, Wireless-Networked HD Surveillance**
- OVERALL AIM: Improved traffic management, incident detection, security, improved highway utilization
- Automatic multiple vehicle tracking
- Automatic vehicle identification: model, color, license plate
- Per-lane speed measurements
- Origin-Destination tracking based on multiple cameras
- “Event” detection: crashes, traffic backups, erratic driving, pedestrians

**Remote Optical Vibrometry**
- Laser heterodyne detection of Doppler shift from remote target with I-Q demodulation in the RF domain. Sensitivity pm/VHz

**Applications**: Remote Sensing, Health Monitoring