Steganography in Empirical Sources Using Acquisition Oracle
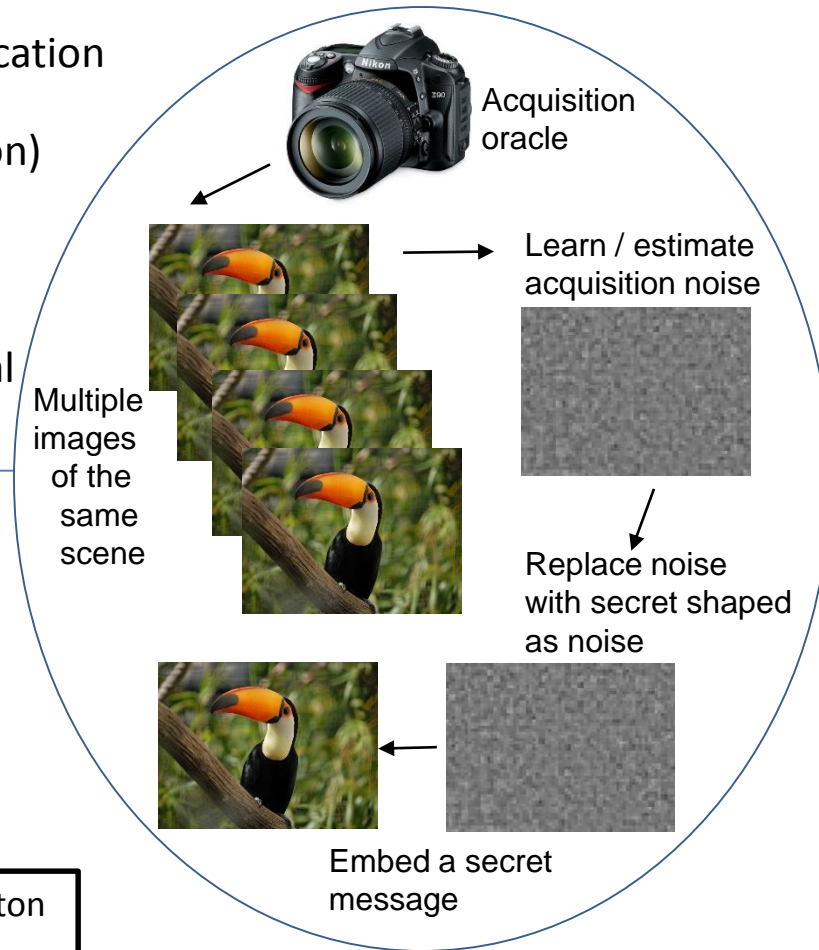
Challenge:

- Secure covert communication with digital imagery (alternative to encryption)
- Steganography = hiding message instead of encrypting
- Empirical source = digital media

Solution:

- Camera takes multiple exposures
- We learn acquisition noise naturally present in images
- Message masquerades as natural image noise

PI: Jessica Fridrich, Binghamton University, Binghamton, NY, fridrich@binghamton.edu

Acquisition oracle

Multiple images of the same scene

Learn / estimate acquisition noise

Replace noise with secret shaped as noise

Embed a secret message

Scientific Impact:

- Establishing fundamental limits of secure covert communication
- Replacing current heuristic with model-based approaches with quantifiable security
- Alleviating dichotomy between theory and practice that currently exists

Broader Impact:

- Twofold: 1) Secure covert data exchange in hostile environment, 2) Defense against such methods of deception
- Signal authentication, integrity verification, data dissemination
- Homeland security, law enforcement, forensic analysts, military will benefit
- Results incorporated in information-assurance classes