**Research Themes**

- Computational color and imaging
- Statistical learning for robust image classification
- Multimedia security and mining

**Color Lookup-Table Optimization**

- Lattice Topology
- Simplex Topology
- Use Simplex instead of Lattice

**CIELAB Errors Using Lattice**

- Jointly optimizes node locations and output values based on our constrained convex optimization framework

**CIELAB Errors Using Simplex**

**Sample Experimental Result**

<table>
<thead>
<tr>
<th>Method</th>
<th>Sunglasses (Recog. rate, %)</th>
<th>Scarves (Recog. rate, %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSGM</td>
<td>96.0</td>
<td>92.9</td>
</tr>
<tr>
<td>SRC</td>
<td>93.5</td>
<td>90.1</td>
</tr>
<tr>
<td>Eigen-Ns</td>
<td>47.2</td>
<td>29.6</td>
</tr>
<tr>
<td>Eigen-SVM</td>
<td>53.5</td>
<td>34.5</td>
</tr>
<tr>
<td>Fisher-Ns</td>
<td>57.9</td>
<td>41.7</td>
</tr>
<tr>
<td>Fisher-SVM</td>
<td>61.7</td>
<td>43.6</td>
</tr>
</tbody>
</table>

**Video Fingerprinting**

- (a) Original video.
- (b) Pirated video.
- (c) Application of video hashing in YouTube.

**Discriminative Sparsity for Robust Face Recognition**

Stage 1:
- $y_1 \in \mathbb{R}^m$

Stage 2:
- $y_2 \in \mathbb{R}^m$
- $y_3 \in \mathbb{R}^m$

**Research Sponsors (Last 5 yrs)**

- Federal
  - NSF S2ERC
- Industry
  - Xerox Corporation
  - YouTube
  - Nokia

**Areas of Impact**

- Homeland security
- Multimedia anti-piracy
- Consumer and medical imaging