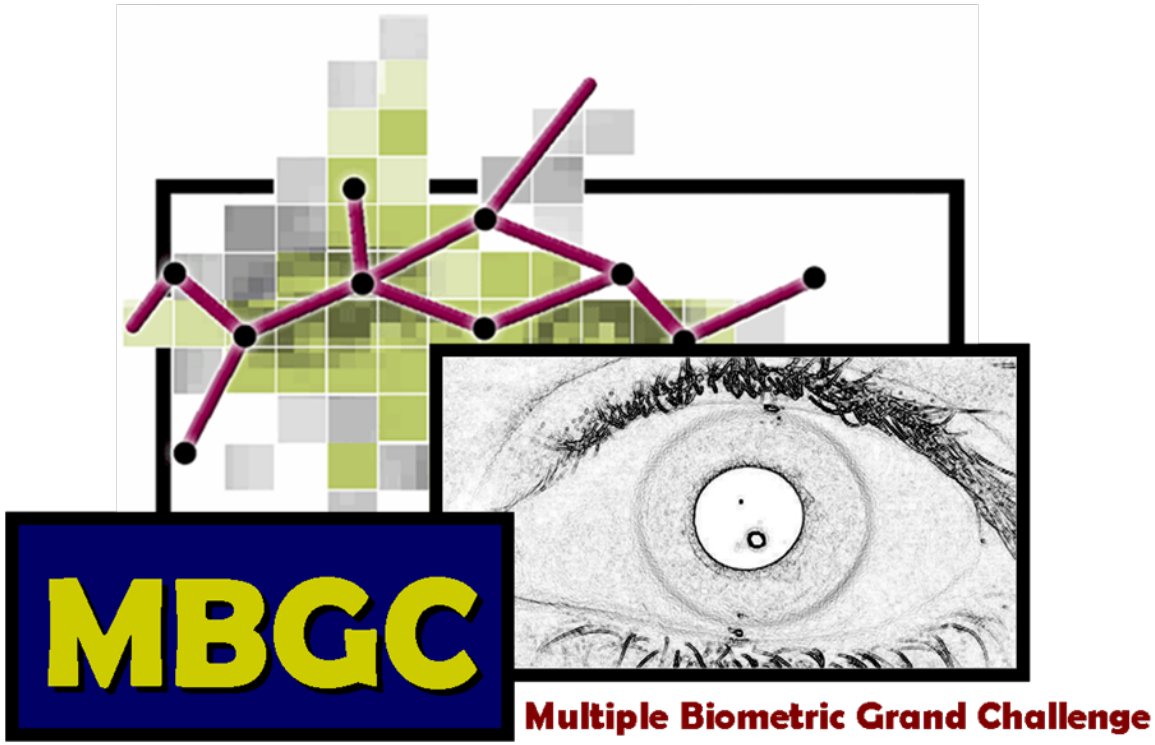



# Portal Challenge Problem
# Multiple Biometric Grand Challenge
# Preliminary Results of Version 2

04 December 2009

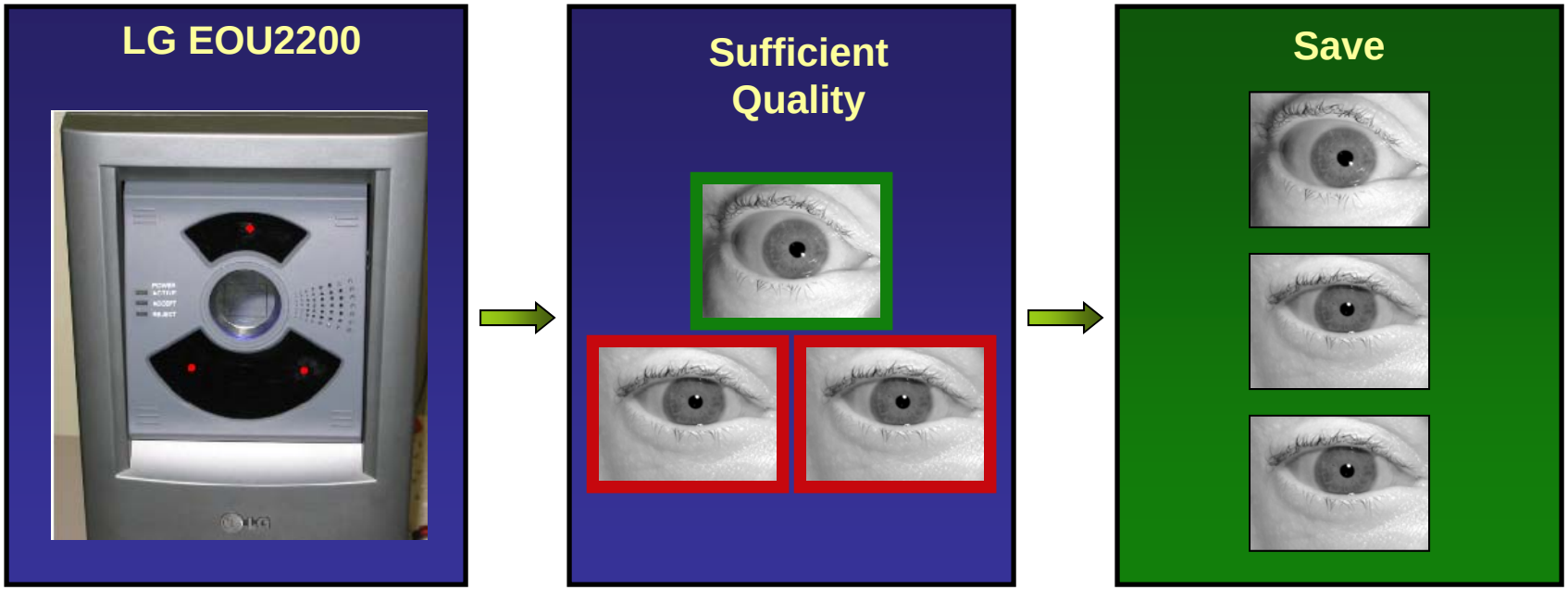
# Portal Challenge Goals

- Develop multi-modal algorithms
  - Iris, face, video
- Robust
  - Failure to acquire
  - Non-ideal biometric samples
- Portal technology
  - Stand off screening
  - Improving this class of applications

# Meet the Sensors….

# Meet the LG 2200

## MBGC Iris Acquisition System



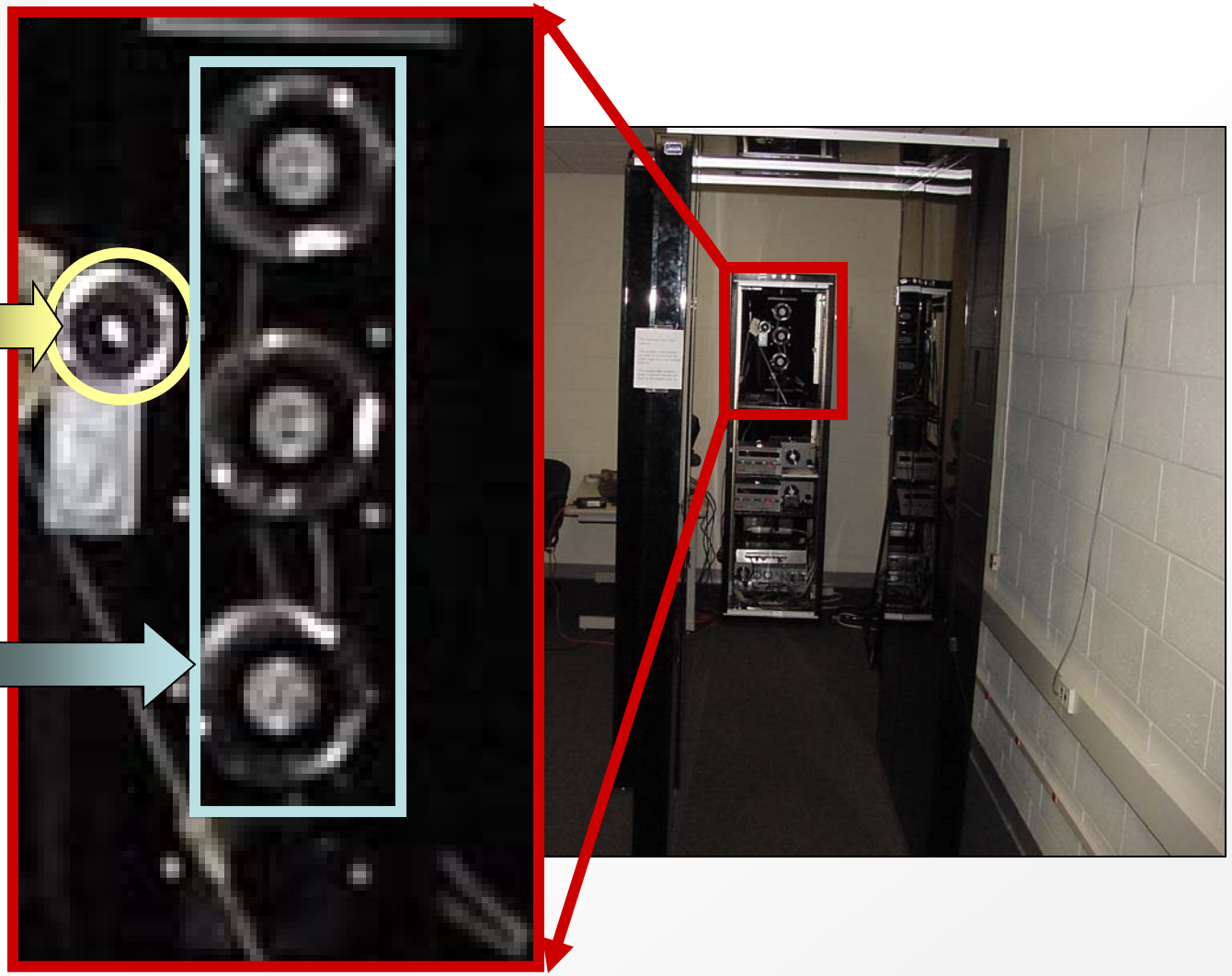

- Take 3 iris images
- One above quality threshold
- Save all three

# Meet the Portal

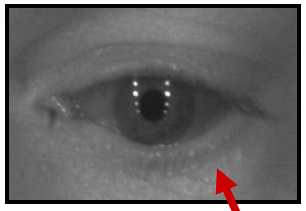
# Meet the Portal

High Definition (HD) Video Camera

Near Infrared (NIR) Video Cameras



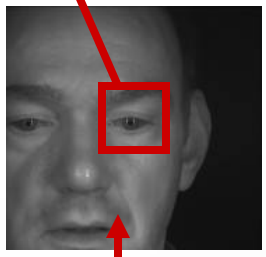
# Meet the Portal



120 pixels
across iris

2k

2k

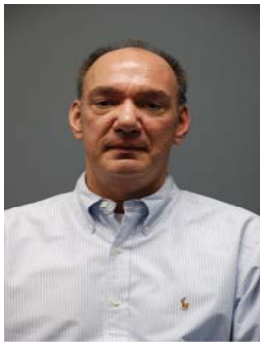


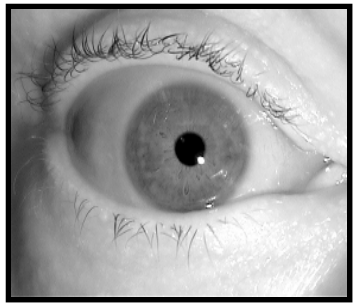
Near Infrared (NIR) Video Sequence

# Meet the Experiments….

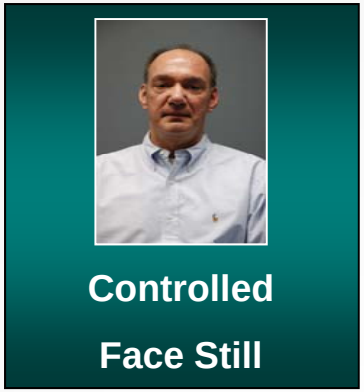
Target Data Samples

Query Data Samples

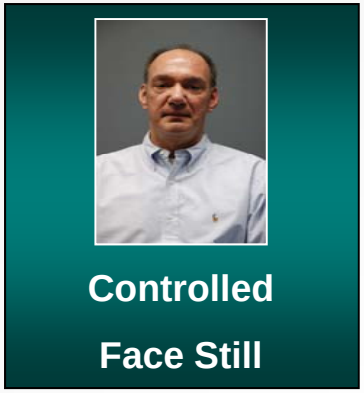




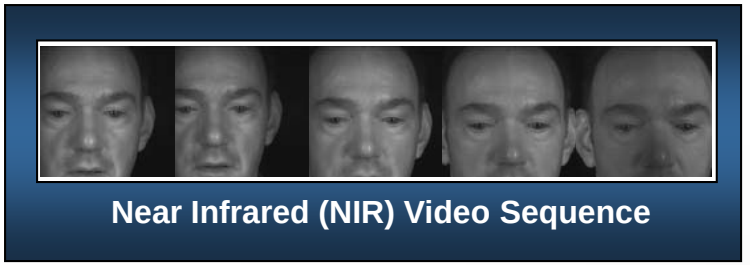
# Experiment:
## Still Face Images vs. HD Video

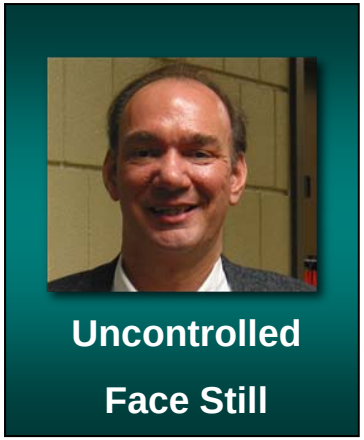


# Experiment:
## Still Face Images vs. NIR Video

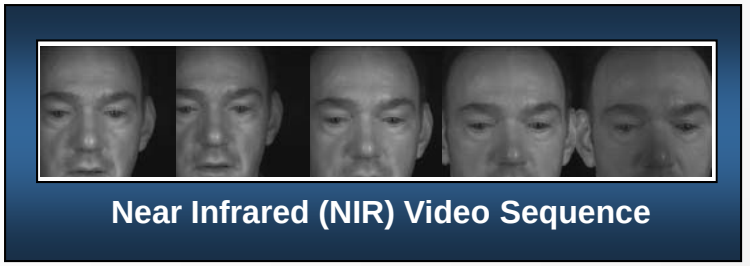






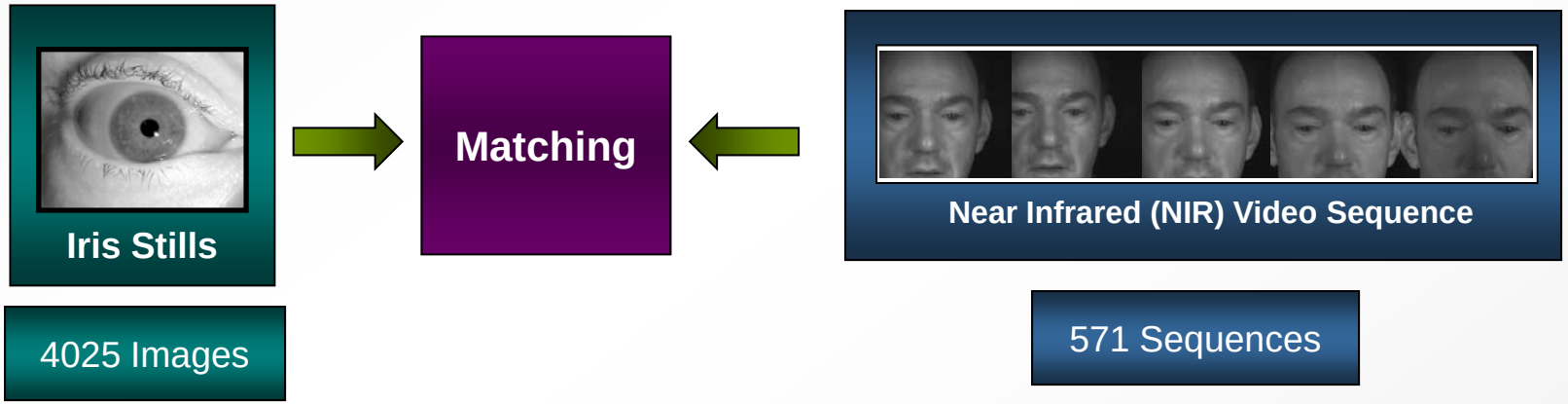







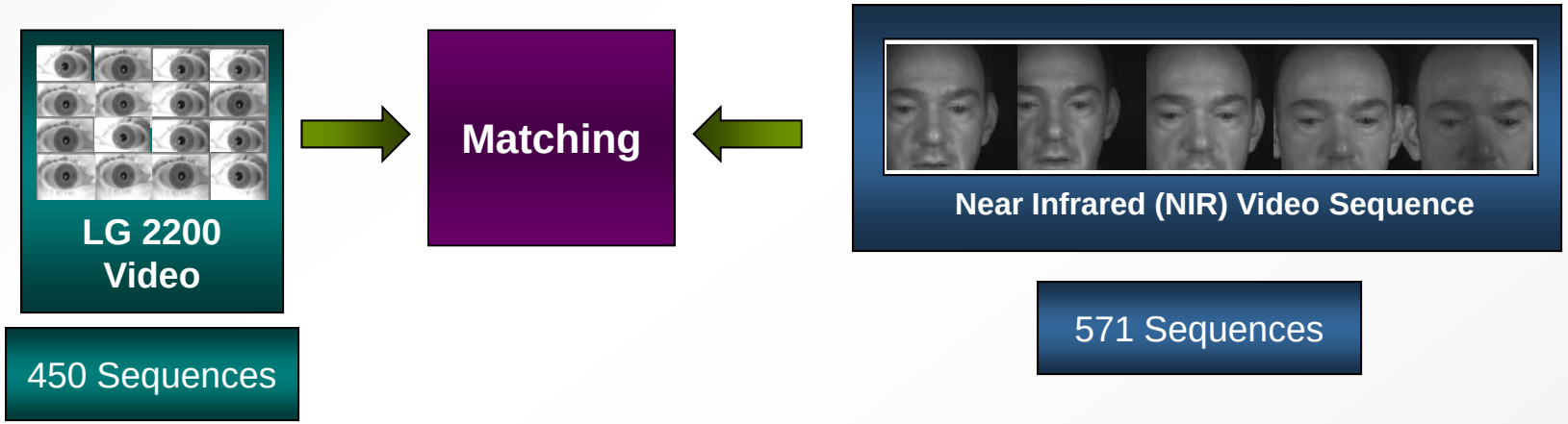

Target Query

# Experiment:
## Iris Stills vs. NIR Video




Target  Query

# Experiment:
## Iris Videos vs. NIR Portal Video




Target  Query

# Experiment:
## Controlled Face & Iris Still vs. HD & NIR Video

Iris Stills

Controlled Face Still

11,442 Images

Matching

Near Infrared (NIR) Video Sequence

High Definition (HD) Video

562 Sequences

Target

Query

# Experiment:
## Uncontrolled Face & Iris Still vs. HD & NIR Video

Iris Stills

Uncontrolled Face Still

14,115 Images

Matching

Near Infrared (NIR) Video Sequence

High Definition (HD) Video

562 Sequences

Target

Query

Face Still

## Face Stills vs. HD Video / NIR Video

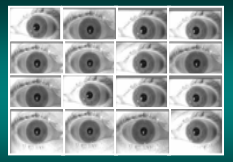
Near Infrared (NIR) Still

High Definition (HD) Video

Iris Still

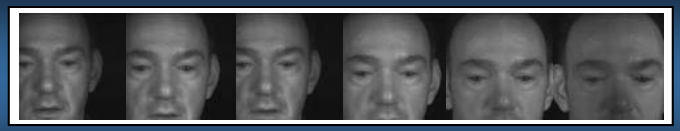
## Iris Stills vs. NIR Video

Near Infrared (NIR) Video Sequence



Iris Video

## Iris Video vs. NIR Video



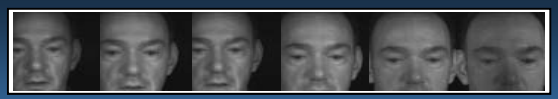
Near Infrared (NIR) Video Sequence

Face Still

Iris Still

## Fusion:

Still Face & Iris Stills vs. NIR & HD



Near Infrared (NIR) Still

High Definition (HD) Video

Target

Query

# List of participants

## Organizations

Clarkson, West Virginia, Tennessee Knoxville, CITeR

Cognitec

Dalian University of Technology

Lockheed Martin

Neurotechnology

Pittsburgh Pattern Recognition

Sagem Sécurité

University of Surrey

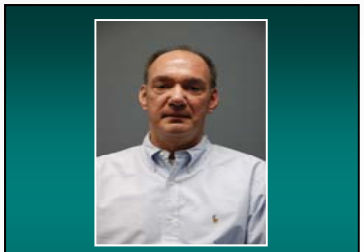
TELECOM SudParis

Toshiba Corporation

Vilnius University

# And now the results of the MBGC V2 Portal Challenge….

# Experiment:
## Still Face Images vs. HD Video



Controlled

Face Still

1426 Images

Matching

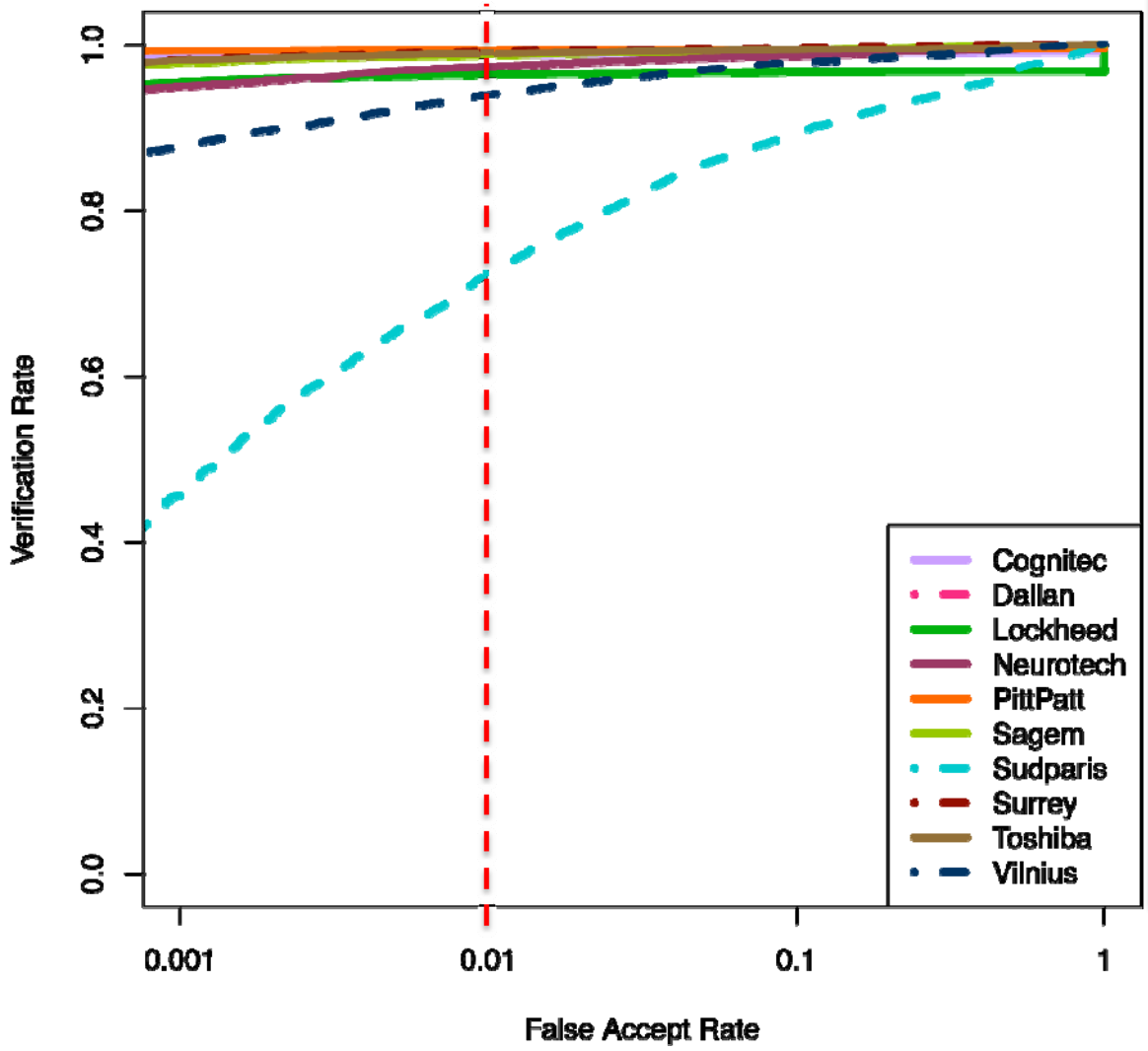
High Definition (HD) Video Sequence

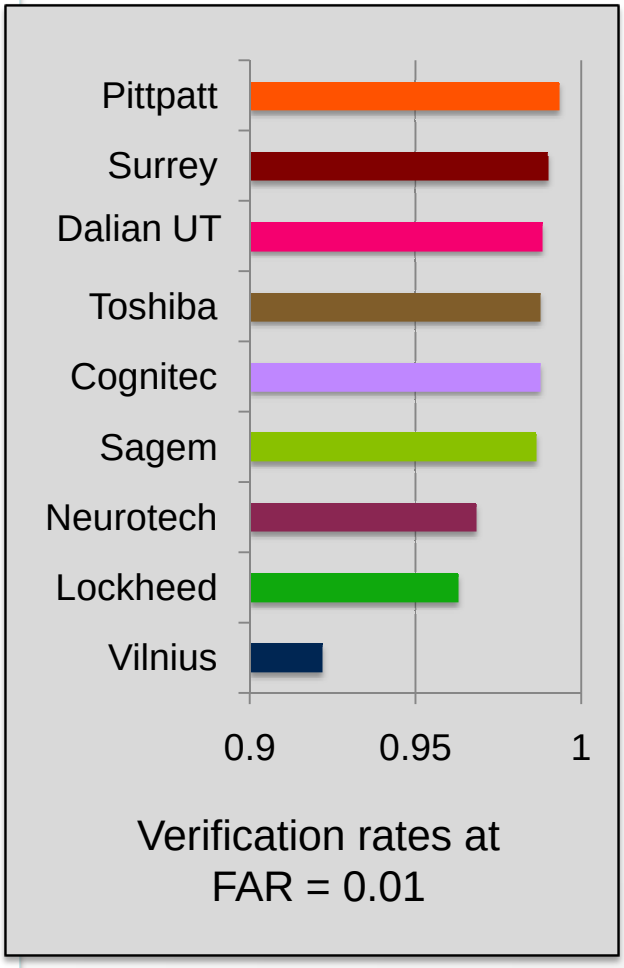
512 Sequences

Target

Query

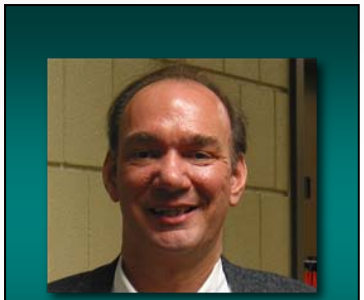
# Experiment – Controlled Face vs. HD




Results from an Open Book Challenge Problem, NOT an Independent Evaluation

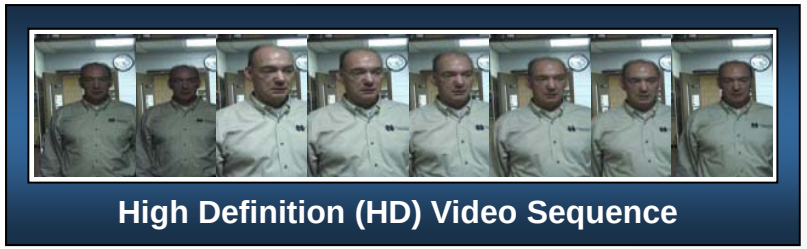
# Experiment:
## Still Face Images vs. HD Video



Uncontrolled Face Still

1785 Images

Matching



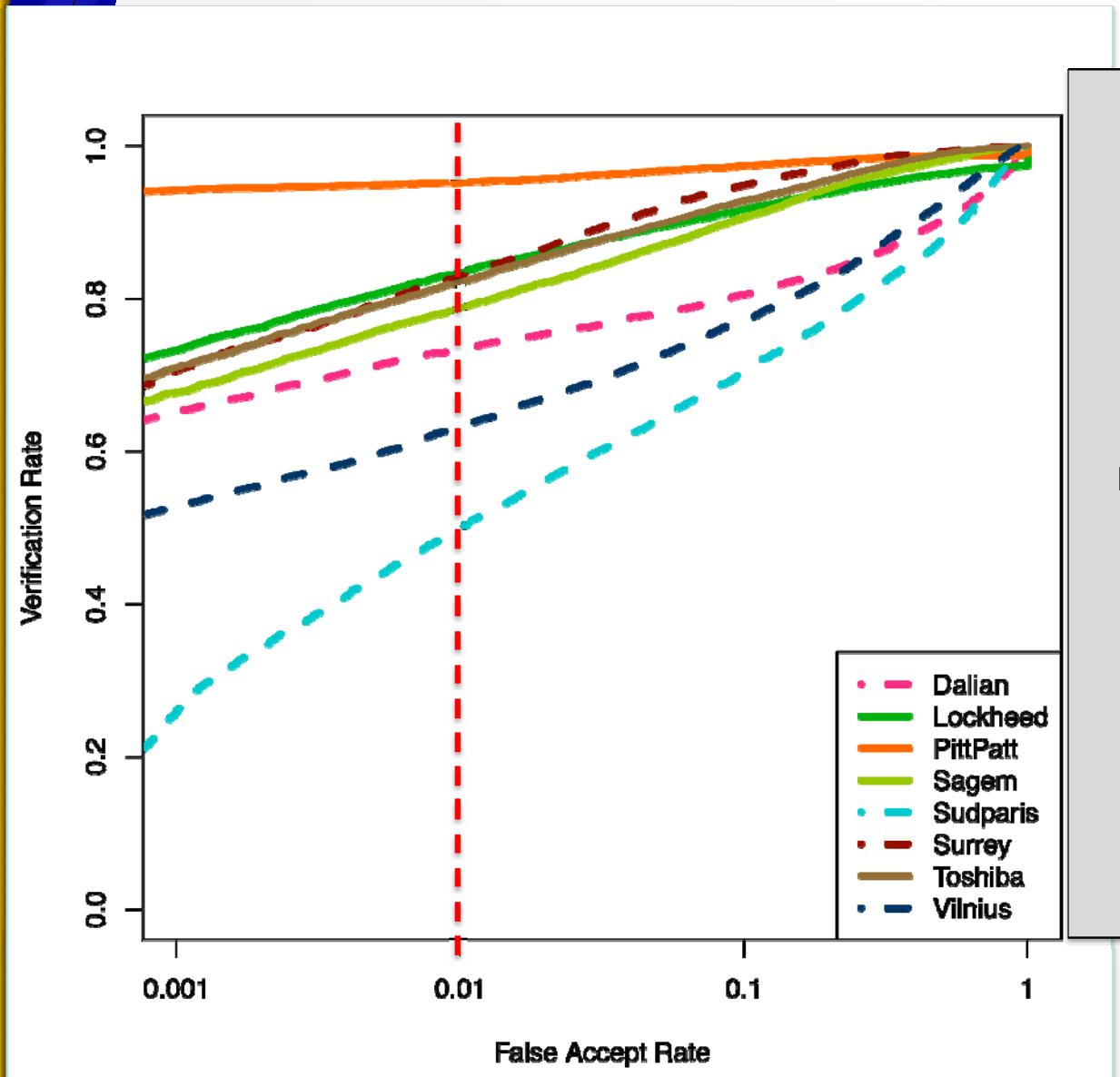
High Definition (HD) Video Sequence

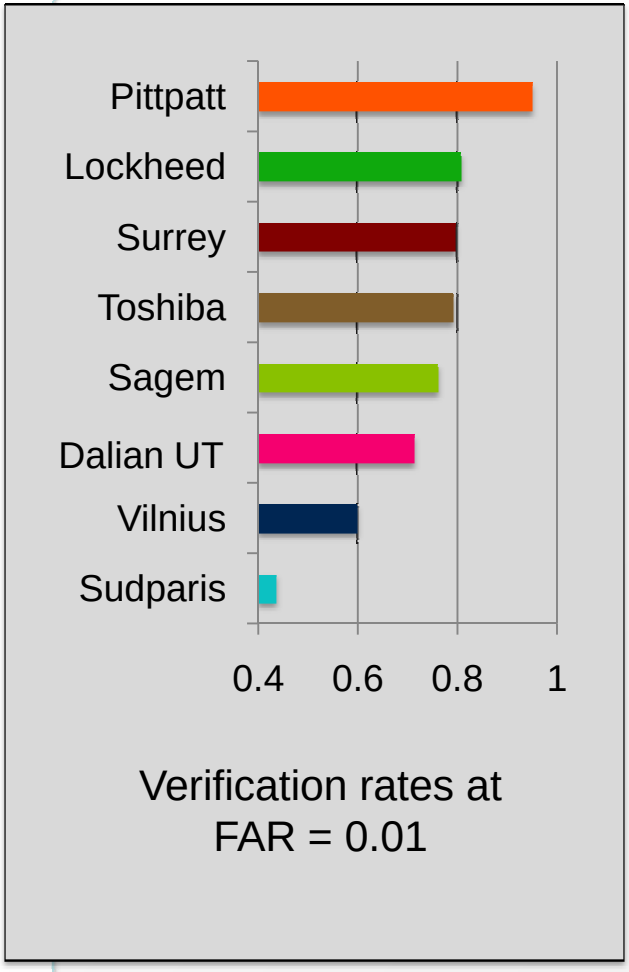
512 Sequences

Target

Query

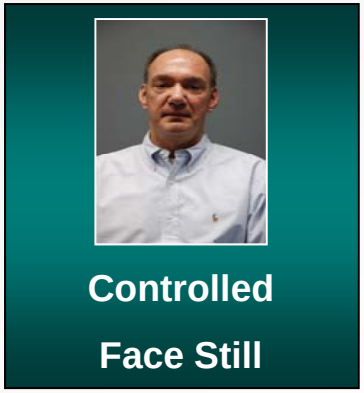
# Experiment – Uncontrolled Face vs. HD



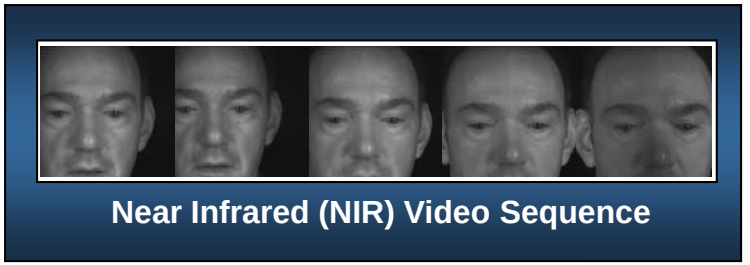



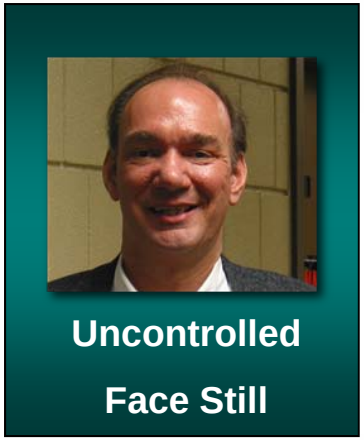

Results from an Open Book Challenge Problem, NOT an Independent Evaluation

# Experiment:
## Visible Light Images vs. NIR Video

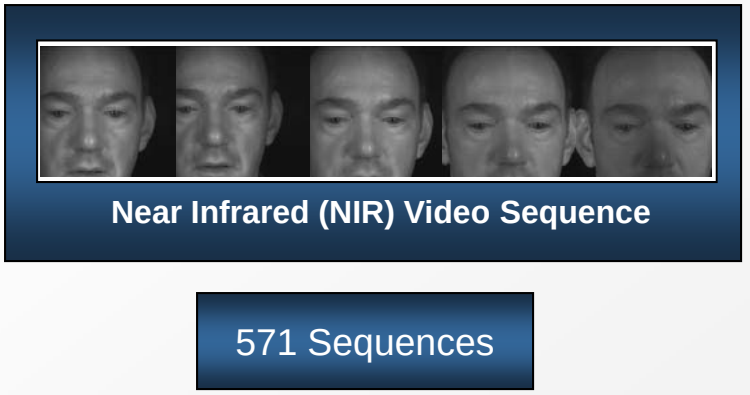






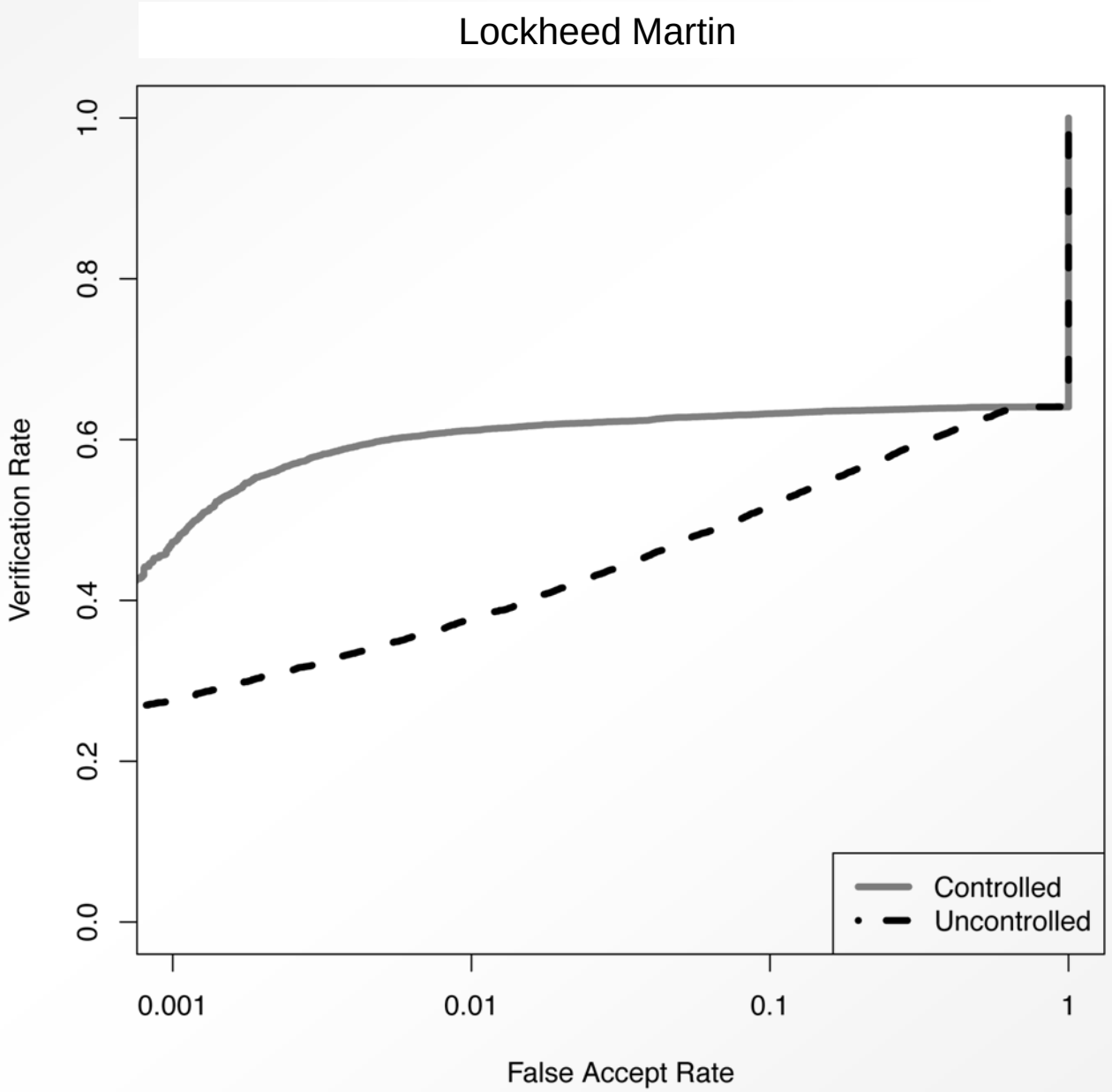







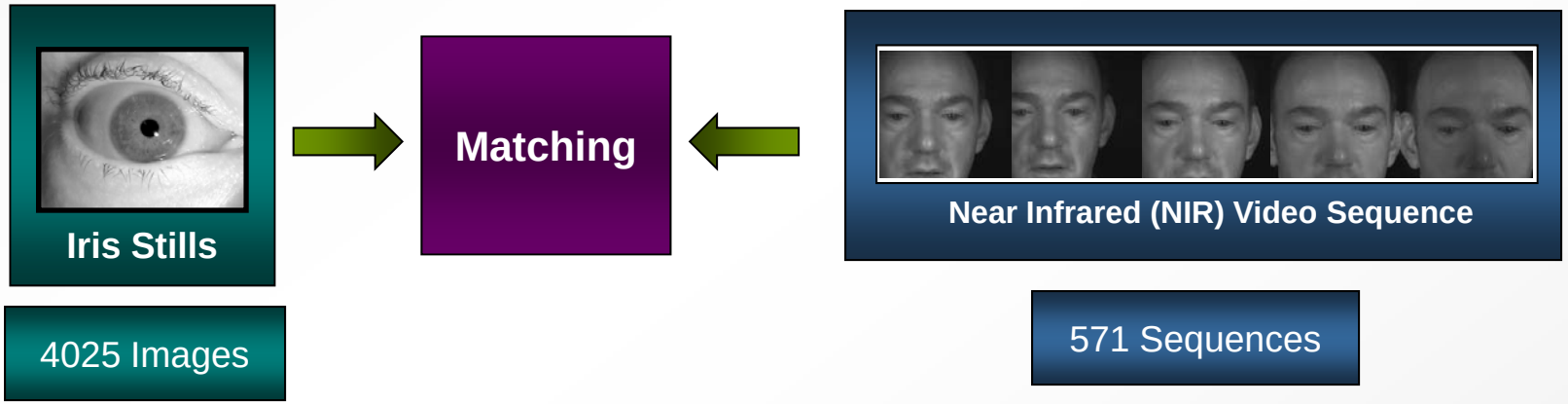

Target Query

# Experiment – Still Face vs. NIR




Results from an Open Book Challenge Problem, NOT an Independent Evaluation

# Experiment:
## Iris Stills vs. NIR Video



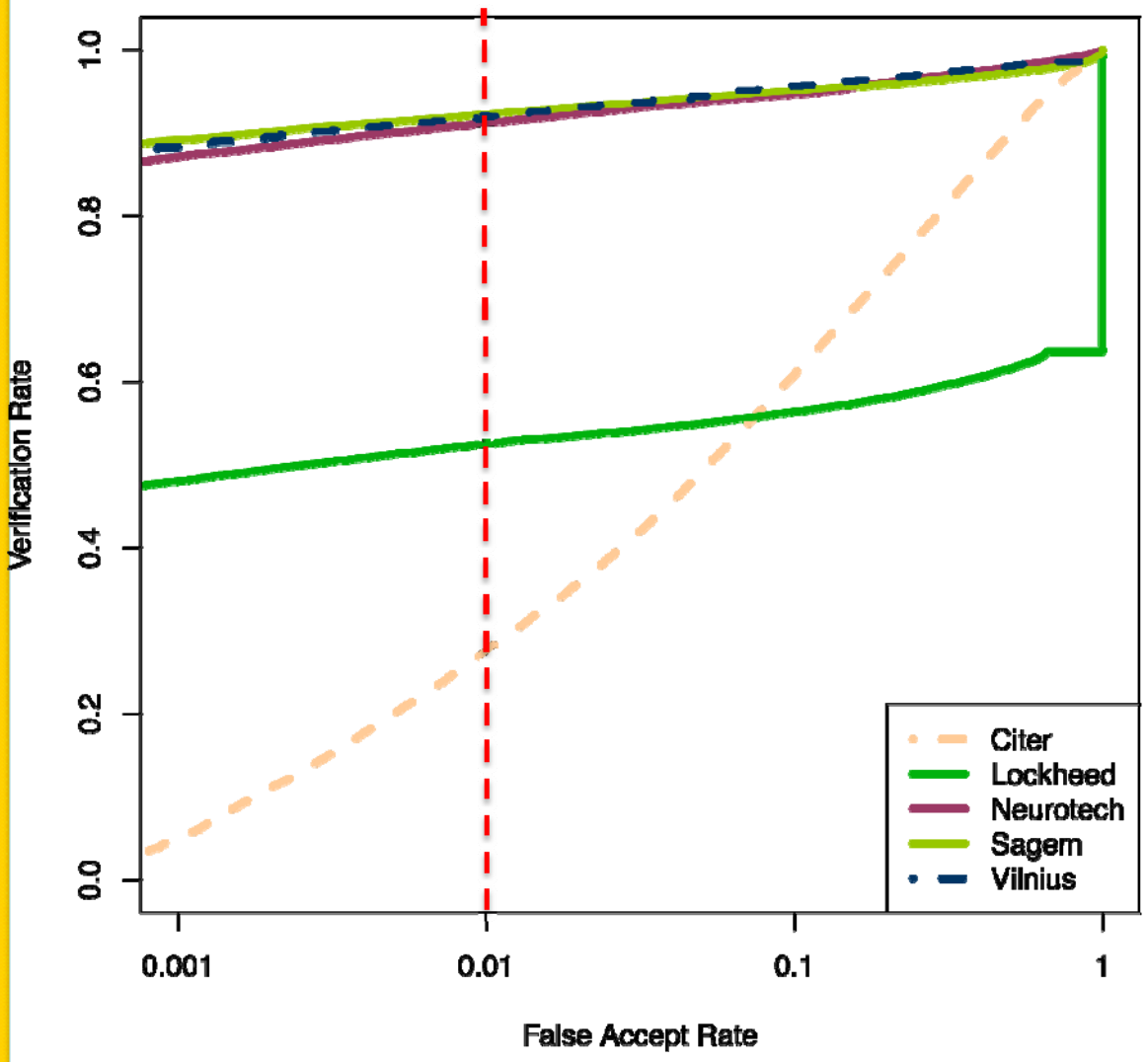

Target  Query

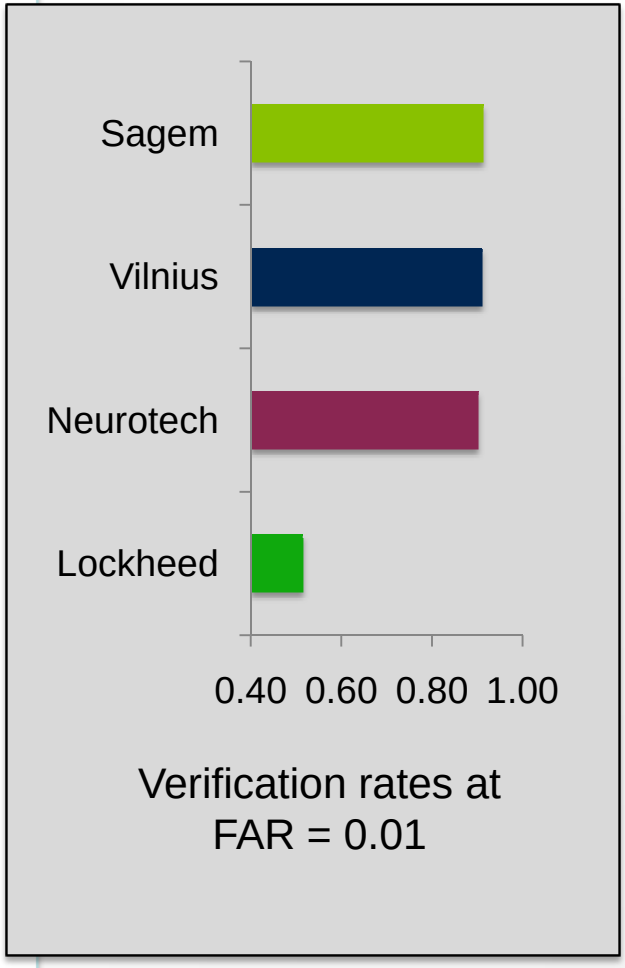
# Missing Irises in NIR

Example of Missing Right Iris

- Missing Irises
  - Left eye: 3
  - Right eye: 25
- Initial Analysis
  - Left eye only
- One goal is measuring fusion performance
  - Right eye later
  - Appropriate scoring

# Experiment – Iris Stills vs. NIR




Verification rates at FAR = 0.01

Results from an Open Book Challenge Problem, NOT an Independent Evaluation

# Experiment:
## Controlled Face & Iris Still vs. HD & NIR Video

Iris Stills

Controlled Face Still

11,442 Images

Matching

Near Infrared (NIR) Video Sequence

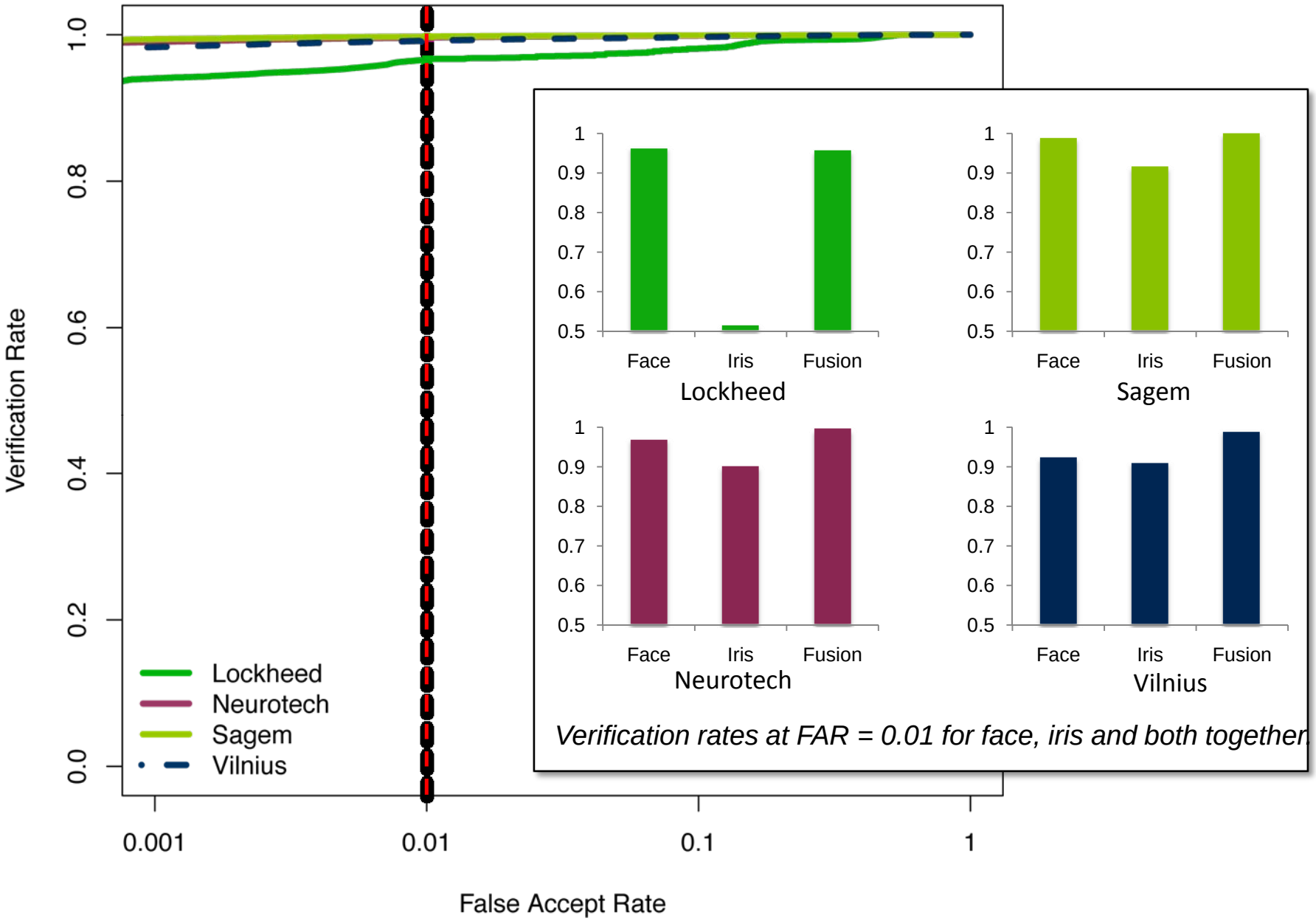
High Definition (HD) Video

562 Sequences

Target

Query

# Still Face Controlled – Left Iris Still vs HD – NIR Portal Video




Results from an Open Book Challenge Problem, NOT an Independent Evaluation

# Experiment:
## Uncontrolled Face & Iris Still vs. HD & NIR Video

Iris Stills

Uncontrolled Face Still

14,115 Images

Matching

Near Infrared (NIR) Video Sequence

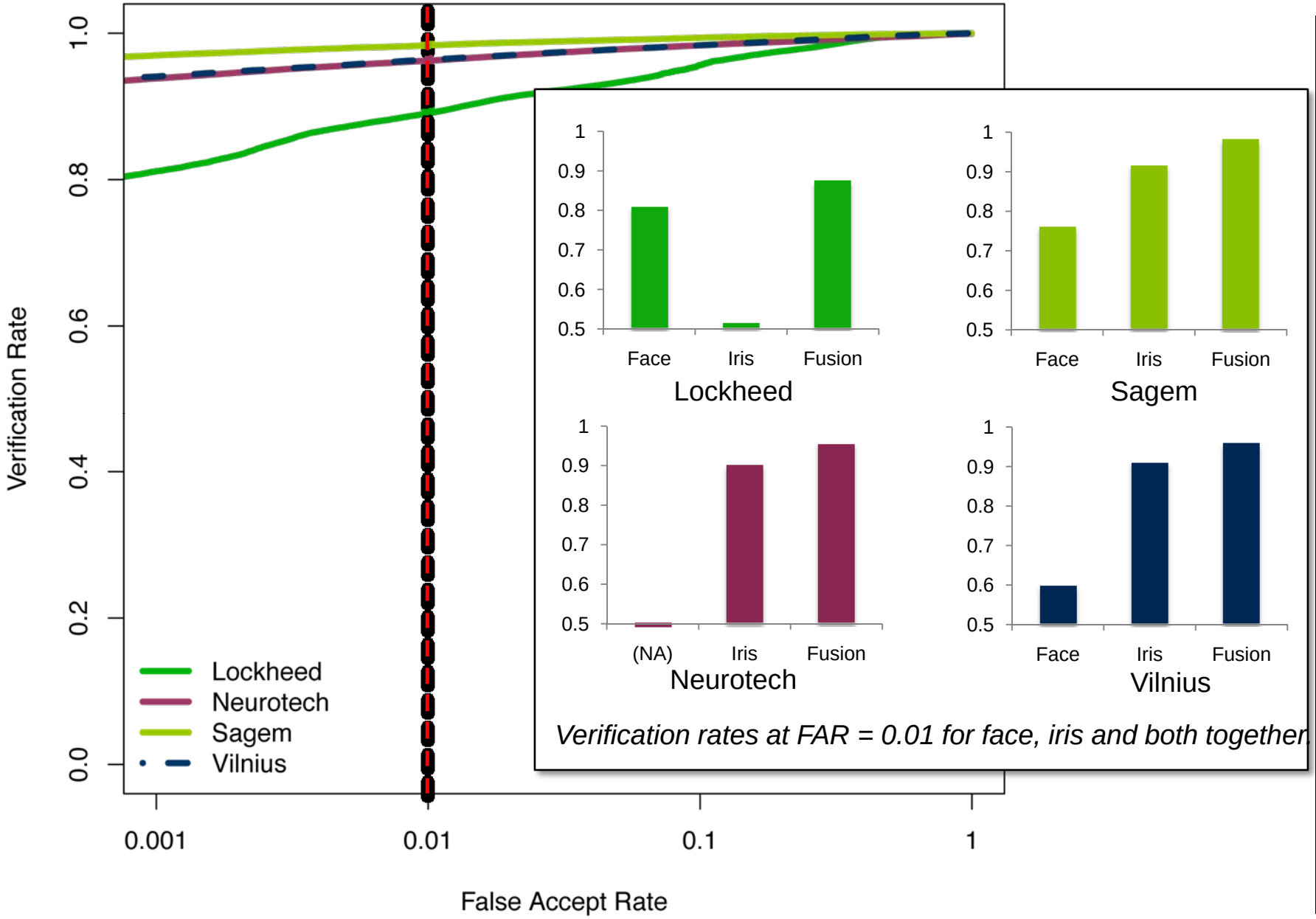
High Definition (HD) Video

562 Sequences

Target

Query

# Still Face UnControlled – Left Iris Still vs HD – NIR Portal Video




Results from an Open Book Challenge Problem, NOT an Independent Evaluation

# Summary

- Controlled Face
  - .99+ VR @ FAR=0.01 for multiple vendors.
- Uncontrolled Face
  - .95+ VR @ FAR=0.01 for Pittsburgh Pattern Recognition.
- Iris
  - .90+ VR @ FAR=0.01 for multiple participants.
- Cross-mode face is challenging.
- Fusion helps.
  - Especially for uncontrolled face.
  - .99+ VR@FAR=0.01 for Controlled Face: Single Iris
  - .95+ VR@FAR=0.01 for Uncontrolled Face: Single Iris