

# Biometric Consortium 2005 Conference

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**Topic:** Multi-biometric Fusion—From Research to Operations

**Abstract:** Multi-biometric fusion combines multiple biometric samples, or characteristics derived from samples, acquired by the same or different modalities or technologies. The goal is to identify or verify individuals more effectively than using a single matcher and/or sample. This presentation will describe the results of Mitretek-funded research that explored various approaches to score-based fusion using face and fingerprint data contained in the NIST BSSR1 data set. We found that the “best” linear decision boundary offers almost the same fusion accuracy as other, non-linear, fusion methods. Greater gains in performance were attained the less correlated the data being fused, even when fusing a so-called weaker biometric sample (face) with a stronger biometric sample (fingerprint). Also, data normalization by subject (probe) produced better performance (TAR vs. FAR) than normalization across the entire population of similarity scores.

The research methodology and analysis tools used can be applied to data representative of an application’s target population to design operational fusion methods. The presentation will describe how resultant multi-biometric accuracy measures and network queuing theory can be used to create an operational system performance model. Such a model can be used both to design and operate a system that meets performance requirements under typical and off-nominal operating conditions. For example, cost and performance trade-offs can be made, such as between having one or more (parallel) capture stations that each capture the same group of multiple biometric samples from each subject, versus having one or more series of capture stations where each station in the series captures a different biometric, and fewer subjects are processed by each subsequent station in the series.

The researchers on this project were Harold Korves, Brad Ulery, Dr. Denise Masi, and the presenter.

**Biography:** Larry Nadel is a Fellow in Mitretek’s Center for Information and Telecommunications Technologies. His experience includes evaluating and applying biometric identification technology for homeland security, criminal justice, and access control applications. He is currently leading Mitretek’s US-VISIT Biometrics and Standards Coordination and Support Program and is co-principal investigator on a Mitretek funded research project to assess and develop biometric fusion methods. He chairs Mitretek’s Biometric Identification Cluster Group, is a participant in INCITS-M1, and is a member of the National Academies “Whither Biometrics” study panel. Prior to his work in biometrics, Dr. Nadel worked on medical diagnostic and information systems at the NIH and the MITRE Corporation. He earned a B.S. degree in Electrical Engineering from Polytechnic University and M.Sc. and Ph.D. degrees in Electrical and Biomedical Engineering from the Ohio State University.