

# Identity Sciences Interdisciplinary Research

## Summary

While biometric identifiers can be used both as security measures and valuable pieces of evidence to investigators, significant challenges are faced when adversaries are able to modify biometric identifiers to thwart detection. New tools and techniques are needed to address these challenges with biometric systems. This research will provide tools and actionable recommendations to inform and improve DHS biometric operational capabilities, enabling analysts and investigators to overcome challenges posed by current biometric identification systems.

## Problem addressed

This research will support strategic efforts to analyze weaknesses and address challenges in biometric system performance in three specific areas: 1) detection of morph attacks, in which two face images pertaining to two identities are mixed into one morphed image, allowing multiple people to use the same identity document; 2) matching of latent fingerprints, to improve system performance in the analysis, matching, and identification of partial or low quality prints typically left at crime scenes; 3) detection of presentation attacks, in which a fake or altered biometric trait is presented to a biometric system in order to evade recognition.

## Approach

For each of these challenges, MSU researchers will review the state of the art, examine the performance of available biometric subsystems, and develop and evaluate techniques for addressing these challenges. Testing and evaluation for tools and techniques developed in the project will be conducted on the premises of the Maryland Test Facility (MdTF).

## Anticipated Impact for DHS

This research will examine and refine the performance of available biometric subsystems, provide input to DHS S&T on how the developed techniques can be incorporated into their workflow, and provide recommendations to DHS to integrate and operationalize similar capabilities.

## Research Products:

## Publications:

[Biometrics: Trust, But Verify](#)

[Deducing Health Cues from Biometric Data](#)

[Facial De-morphing: Extracting Component Faces from a Single Morph](#)

[Synthetic Latent Fingerprint Generator](#)