CHARACTERIZATION OF LWIR HYPERSPECTRAL IMAGERY FOR DEVELOPMENT OF BACKGROUND BAYESIAN PRIORS. *A. Schlamm, D. Messinger,* Center for Imaging Science, Digital Imaging and Remote Sensing Laboratory, *aas1510@cis.rit.edu, dwmpci@cis.rit.edu*

Pacific Northwest National Laboratories (PNNL) is developing methods to characterize the constituent species in gaseous plumes detected in industrial facilities from airborne imagery. Their identification methodology uses Bayesian Model Averaging requiring probabilistic "priors" describing the target and background image signatures. Bayesian prior estimation of the background, non-plume pixels is done using simple estimations at sensor radiance statistics, the ground leaving radiance, and atmospheric contributions from non-image synthetic data and the more complex, DIRSIG synthetic data. The effects of temperature, material type, and atmosphere on the non-image synthetic data priors are investigated through Principle Component Analysis (PCA) and statistical measures including covariance and mean. Similar processes were applied to DIRSIG generated data providing a more realistic scene of material distributions and temperatures.

Ariel Schlamm: Bio
Ariel graduated from the Imaging and Photographic Technology department in CIAS with high honors in May 2006. During her time at RIT, she has been the president of the Technical Photographic Student Association and SPIE (International Society of Optical Engineering) Student Chapter. She has also been a teaching assistant for a variety of courses in the department, including Introduction to Programming for Imaging, Digital Image Processing, and Material and Processes of Photography. In the summer of 2005, she participated in the Research Experience for Undergraduates (REU) in Optics at the University of Central Florida. Her research entitled "Effective Indices of High Contrast Nano- and Microstructures" involved the numerical modeling of the refractive indices of diffraction gratings using rigorous coupled-wave analysis for use in optical systems as a substitute for thin film coatings. She is continuing her education through graduate school at RIT at the Center for Imaging Science beginning fall 2006.