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**Leonila Lagunes\*** (leo.lagunes13@gmail.com) and **Charles H. Lee**  
(charleshlee@fullerton.edu). *Cancer Screening using Biomimetic Pattern Recognition with Hyper-Dimensional Structures.*

Cancer treatments have been shown to be more effective if the cancer is detected at an early stage. Current detection methods include imaging and tissue/blood-sample testing; these are expensive and invasive, thus scientists have been driven to develop alternatives to detect cancer. Biomimetic Pattern Recognition (BPR) is a technique that constructs a hyper-dimensional (HD) geometric body by mimicking a biological system and uses it for classification. BPR is derived from the Principle of Homology-Continuity, which assumes elements of the same class are biologically evolved and continuously connected. That is, between elements of the same class, there is a gradual connection. These connecting branches form HD surfaces. The resulting topological structure mimics a biological class. Recently, BPR has been successfully used in voice, facial, and iris recognition software. We developed new BPR algorithms and classification schemes to detect specific cancers using DNA microarray data. We investigated the performance of the proposed BPR methods based on bladder, colon, leukemia, liver, and prostate cancers. Results indicate that BPR has an increased recognition rate compared to previous techniques. BPR has shown to be a promising approach for cancer detection using DNA microarray data. (Received September 01, 2015)