BIOGRAPHICAL SKETCH

Born in: Glen Cove, New York
B.S. Biology, June 1978, Florida Atlantic University (FAU)
B.A.S. Computer Information Systems, August 1981, FAU
M.S. Computer Science, August 2006, FAU

QUALIFYING EXAMINATION & PUBLICATIONS

Time in Preparation: 2008-2011

Qualifying Examination Passed: Spring 2008

Selected Publications:

A. Kotlarchyk, T. Khoshgoftaar, M. Pavlovic, H. Zhuang, and A. S. Pandya; "Identification of microRNA biomarkers for cancer by combining multiple feature selection Techniques", *Journal of Computational Methods in Sciences and Engineering (JCMSE).* In Press.

M. Pavlovic, M. Cavallo, A. Kats, A. Kotlarchyk, H. Zhuang, and Y. Shoenfeld; "From Pauling's abzyme concept to the new era of hydrolytic anti-DNA autoantibodies: a link to rational vaccine design? - A review", *International Journal of Bioinformatics Research and Applications (IJBRA)*, 7(3):220-38, 2011.

A.J. Kotlarchyk, A.S. Pandya, and H. Zhuang; "Simulation and experimental studies on fuzzy vault fingerprint Cryptography", *International Journal of Knowledge-based and Intelligent Engineering Systems (KES)*, 12(5/6):305-317, 2008.

FAU

COLLEGE OF ENGINEERING & COMPUTER SCIENCE
Florida Atlantic University

THE FLORIDA ATLANTIC UNIVERSITY

COLLEGE OF ENGINEERING & COMPUTER SCIENCE

announces the

Ph.D. Dissertation Defense

of

ALEX JAY KOTLARCHYK

for the degree of

DOCTOR OF PHILOSOPHY (PH.D.)

OCTOBER 28, 2011 at 2:00 PM

In

EE 303C (DEAN'S CONFERENCE ROOM)

777 Glades Road

Boca Raton, FL

DEPARTMENT: **Computer & Electrical Engineering and Computer Science**

DISSERTATION TITLE: "**Identification of MicroRNA Biomarkers for Cancer by Combining Multiple Feature Selection Techniques**"

CHAIR OF THE CANDIDATE'S PH.D. COMMITTEE:
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ABSTRACT OF DISSERTATION

IDENTIFICATION OF MICRORNA BIOMARKERS FOR CANCER BY COMBINING MULTIPLE FEATURE SELECTION TECHNIQUES

MicroRNAs (miRNAs) may serve as diagnostic and predictive biomarkers for cancer. The aim of this study was to identify novel cancer biomarkers from miRNA datasets, in addition to those already known. Three published miRNA cancer datasets (liver, breast, and brain) were evaluated, and the performance of the entire feature set was compared to the performance of individual feature filters, an ensemble of those filters, and a support vector machine (SVM) wrapper. In addition to confirming many known biomarkers, the main contribution of this study is that seven miRNAs have been newly identified by our ensemble methodology as possible important biomarkers for hepatocellular carcinoma or breast cancer, pending wet lab confirmation. These biomarkers were identified from miRNA expression datasets by combining multiple feature selection techniques (i.e., creating an ensemble) or by the SVM-wrapper, and then classified by different learners. Generally speaking, creating a subset of features by selecting only the highest ranking features (miRNAs) improved upon results generated when using all the miRNAs, and the ensemble and SVM-wrapper approaches outperformed individual feature selection methods. Finally, an algorithm to determine the number of top-ranked features to include in the creation of feature subsets was developed. This algorithm takes into account the performance improvement gained by adding additional features compared to the cost of adding those features.