

CLAYTON D. SCOTT

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RESEARCH INTERESTS

Statistical machine learning: Developing efficient, theoretically sound algorithms for learning from training data, especially for pattern classification and anomaly detection. Emphasis on methods for controlling the false alarm rate.

Bioinformatics: Developing novel statistical and machine learning methodologies for emerging high-throughput technologies in genome and proteome analysis. Classification, differential expression, and regulatory networks from microarray data.

Wavelets and multiscale methods in signal and image processing.

Applications in biomedical imaging and data analysis, communication networks, and remote sensing.

EDUCATION

Rice University Ph.D. in Electrical Engineering, August 2004. “Dyadic Decision Trees,” directed by Robert D. Nowak. GPA 4.02/4.0.
M.S. in Electrical Engineering, May 2000. “A Hierarchical Wavelet-Based Framework For Pattern Analysis and Synthesis,” directed by Robert D. Nowak.

Harvard University A.B. in Mathematics, cum laude, May 1998. GPA 3.83/4.0 in major, 3.3/4.0 overall.

EXPERIENCE

Rice University Postdoctoral Associate and Instructor, Statistics dept., 2004–present
Teaching and research in machine learning and bioinformatics.

ChevronTexaco Consultant, 2004
Statistical signal processing for analysis and control of emulsion separators

Rice University Research Assistant, ECE dept., 1998–2004
Research in pattern recognition, shape matching, and statistical learning theory

Raytheon Intern, summer 2002
Research in image processing and pattern recognition with application to automatic target recognition

Eaton Corporation Consultant, summer 2001
Signal processing applications to vibrational monitoring of mechanical and automotive systems

TEACHING AT RICE UNIVERSITY

ELEC 531	Statistical Signal Processing, Fall 2003 and Fall 2004
STAT 310	Introduction to Probability and Statistics, Spring 2005
STAT 331	Applied Probability, Fall 2005
STAT 423	Probability in Bioinformatics and Genetics, Spring 2006
STAT 499	Mathematical Sciences VIGRE Undergraduate Seminar, Fall 2004 – Spring 2006
STAT 699	Mathematical Sciences VIGRE Graduate Seminar, Fall 2004 – Spring 2006

JOURNAL PUBLICATIONS

Available for download at www.stat.rice.edu/~cscott/pubs.html

D. Rossell, C. Scott, W. Choi, D. Cogdell, W. Zhang, and R. Guerra, “A comparison of 5FU and CPT-11 treated colon cancer cell lines using gene expression microarrays,” in preparation.

G. Blanchard, A. Binder, and C. Scott, “Comparison of generalization error bounds and complexity penalties using dyadic decision trees,” in preparation.

D. Rossell, C. Scott, and R. Guerra, “Partial density estimation for the analysis of differential expression data,” in preparation.

C. Scott, D. Cogdell, W. Zhang, and R. Guerra, “Protein profiling of 90 cancer cell lines with protein lysate microarrays,” in preparation.

M. Davenport, R. Baraniuk, and C. Scott, “Controlling false alarms with support vector machines,” to be submitted to *IEEE Transactions on Pattern Analysis and Machine Intelligence*.

C. Scott, “Regression level set estimation reduces to cost-sensitive classification,” submitted to *IEEE Transactions on Signal Processing*.

C. Scott, “Performance measures for Neyman-Pearson classification,” submitted to *IEEE Transactions on Information Theory*, Nov. 2005.

E. S. Neeley, C. Scott, D. Cogdell, W. Zhang, and R. Guerra, “Sources of Variation in Protein Lysate Microarrays” accepted for publication in *Bioinformatics*.

C. Scott and R. Nowak, “Learning minimum volume sets,” accepted for publication in *Journal of Machine Learning Research*.

C. Scott and R. Nowak, “Minimax-optimal classification with dyadic decision trees,” accepted for publication in *IEEE Transactions on Information Theory*.

C. Scott and R. Nowak, “Robust contour matching via the order preserving assignment problem,” accepted for publication in *IEEE Transactions on Image Processing*.

C. Scott, “Tree pruning with sub-additive penalties,” *IEEE Transactions on Signal Processing*, vol. 53, no. 12, pp. 4518-4525, Dec. 2005.

C. Scott and R. Nowak, “A Neyman-Pearson approach to statistical learning,” *IEEE Transactions on Information Theory*, vol. 51, no. 11, pp. 3806-3819, Nov. 2005.

C. Scott and R. Nowak, “TEMPLAR: A wavelet-based framework for pattern learning and analysis,” *IEEE Transactions on Signal Processing*, vol. 52, no. 8, pp. 2264-2274, Sept. 2004.

J. B. Conrey, E. Fransen, R. Klein, and C. Scott, “Mean values of Dedekind sums,” *Journal of Number Theory*, vol. 56, no. 2, pp. 214-226, 1996.

CONFERENCE PUBLICATIONS

G. Blanchard and C. Scott, “Transductive decision trees,” in preparation.

M. Davenport, R. Baraniuk, and C. Scott, "Controlling false alarms with support vector machines," accepted to *IEEE International Conference on Acoustics, Speech, and Signal Processing – ICASSP 2006*.

C. Scott and R. Nowak, "Learning minimum volume sets," to appear at *Neural Information Processing Systems 18 – NIPS 2005*, Vancouver, Dec. 2005.

C. Scott and R. Nowak, "On the adaptive properties of decision trees," *Neural Information Processing Systems 17 – NIPS 2004*, Vancouver, Dec. 2004.

C. Scott and R. Nowak, "Near-minimax optimal classification with dyadic classification trees," *Neural Information Processing Systems 16 – NIPS 2003*, Vancouver, Dec. 2003.

C. Scott and R. Nowak, "A multiresolution approach to pattern recognition," *IEEE Workshop on Statistical Signal Processing*, St. Louis, MO, Oct. 2003.

D. Waagen, M. Cassabaum, C. Scott, and H. Schmitt, "Exploring alternative wavelet basis selection techniques with application to high resolution radar classification," *6th International Conference on Information Fusion*, Queensland, Australia, July 2003.

C. Scott, R. Willett, and R. Nowak, "CORT: Classification or regression trees," *IEEE International Conference on Acoustics, Speech, and Signal Processing – ICASSP 2003*.

C. Scott and R. Nowak, "Dyadic classification trees via structural risk minimization," *Neural Information Processing Systems 15 – NIPS 2002*, Vancouver, Dec. 2002.

C. Scott and R. Nowak, "Template learning from atomic representations: A wavelet-based approach to pattern analysis," *IEEE Workshop on Statistical and Computational Theories of Vision* (published on the web), Vancouver, July 2001.

C. Scott and R. Nowak, "Pattern extraction and synthesis using a hierarchical wavelet-based framework," *IEEE International Conference on Image Processing – ICIP 2000*, Vancouver, Sept. 2000.

TECHNICAL ACTIVITIES

Reviewer for *IEEE Transactions on Information Theory*

Reviewer for *IEEE Transactions on Signal Processing*

Reviewer for *IEEE Transactions on Image Processing*

Member, IEEE

HONORS and AWARDS

Texas Instruments Distinguished Graduate Fellowship, 1998–2001

NSF VIGRE Postdoctoral Fellowship, 2004–present