

**37th Symposium on the Interface of
Computing Science and Statistics 2005
and the Annual Meeting of the
Classification Society of North America**

(Interface/CSNA 2005)

Abstracts

**St. Louis, Missouri, USA
8-12 June 2005**

ISBN: 978-1-62276-716-8

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2005) by the Interface Foundation of North America
All rights reserved.

Printed by Curran Associates, Inc. (2013)

For permission requests, please contact the Interface Foundation of North America
at the address below.

Interface Foundation of North America
PO Box 7460
Fairfax Station, VA 22039

Phone: (703) 993-1212
Fax: (703) 993-1700

interface@galaxy.gmu.edu

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

KEYNOTE ABSTRACTS

Mixtures at the Interface	1
<i>David Scott</i>	
The Practice of Cluster Analysis	1
<i>Jon Kettenring</i>	
Bayesian Perspectives on Combining Models	1
<i>Merlise Clyde</i>	
Bayesian Causal Inference from Observational Data	1
<i>Siddhartha Chib</i>	
Predictive Learning via Rule Ensembles	2
<i>Jerome Friedman</i>	
Extracting Biological Meaning from High-Dimensional Datasets	2
<i>John Quackenbush</i>	

CSNA/INTERFACE ABSTRACTS

COLLABORATION IN DATAMINING

The Role of Collaborations in the Sapphire Scientific Data Mining Project	7
<i>Chandrika Kamath</i>	
Data Mining Success = f (Definition, Collaboration, Value)	7
<i>Arnold Goodman</i>	
Strategies for Visual Data Mining	7
<i>Ed Wegman</i>	

MIXTURE MODELS

Topography of Multivariate Normal Mixtures	7
<i>Bruce G. Lindsay, Surajit Ray</i>	
Time-Dynamic Mode Tracking and the Mean-Shift Algorithm	8
<i>Hans-Georg Mueller, Ping-Shi Wu, Peter Hall</i>	

STATISTICS AND THE LAW

Racial Profiling and Selection Models	8
<i>Katherine Barnes</i>	
To Tell the Truth: On the Probative Value of Polygraph Search Evidence	9
<i>Stephen E. Fienberg</i>	
Statistical Models for Improving Biometric Authentication	9
<i>Sinjini Mitra, Stephen E. Fienberg, Anthony Brockwell, B. V. K. Vijaya Kumar, Marios Savvides</i>	

APPLICATIONS IN SCIENCES

Carbon Dioxide, Global Warming, and Michael Crichton's State of Fear	10
<i>Bert W. Rust</i>	
Spatially Constrained Clustering with GeoInformatics of Hotspot Detection and Early Warning	10
<i>G. P. Patil, Reza Modarres, Pushkar Patankar</i>	
Mining Massive Earth Science Data Sets for Large Scale Structure	10
<i>Amy Braverman</i>	
Efficient Processing of Massive Data in Comprehensive Two-Dimensional Gas Chromatography with Mass Spectrometry Detection (GC GC-MS)	11
<i>Nathaniel Beagley, Alan Willse, Jon H. Wahl</i>	

Robust Clustering of Positron Emission Tomography Data	11
<i>Prasanna K. Velamuru, Rosemary A. Renaut, Hongbin Guo, Kewei Chen</i>	

CLUSTERING

A Fast Clustering Algorithm with Application to Cosmology	12
<i>Woncheol Jang</i>	
Multiple Imputation for Cluster Analysis	13
<i>Michael D. Larsen</i>	
Selecting the Number of Components in Mixtures: A Risk-Based Approach	13
<i>Surajit Ray</i>	

MASS SPECTROMETRY BASED PROTEOMICS

Characterization of Environmental Stress Response in Mouse Lungs Via Mass Spectrometric Profiling	14
<i>Michael Wagner</i>	
Standardization and De-noising Algorithms for Mass Spectra to Classify Whole-Organism Bacterial Specimens	14
<i>Somnath Datta</i>	
Strategies for Mass Spectrometry Data Analysis in Cancer Proteomics	14
<i>Dayanand Naik</i>	

DETECTING GENE-GENE INTERACTIONS

The Restricted Partition Method Used to Screen for Genetic Interactions	15
<i>Robert Culverhouse, Brian Steinmeyer, William Shannon</i>	
Multifactor Dimensionality Reduction for Detecting Epistasis	15
<i>Marilyn Ritchie</i>	
Epistasis in a Case-Control Study with 100,000 SNPs	16
<i>Josephine Hoh</i>	

INFERENCE IN A CASE-CONTROL STUDY WITH 100,000 SNPS

Randomization Tests for Functional Data Based on Adaptive Truncation	16
<i>Jong Soo Lee, Dennis Cox</i>	
Ternary Separation and Hierarchies	16
<i>Robert C. Powers</i>	
On the Operating Characteristics of Some Non-parametric Methodologies for the Classification of Distributions by Tail Behavior	17
<i>Rick Ott</i>	
Minimum Energy Clustering	17
<i>Maria Rizzo</i>	
Higher-Order Density Estimation and Bump Hunting	17
<i>Michael C. Minnotte</i>	

HIGH-DIMENSIONAL BIOMEDICAL DATA

Class-Preserving Mapping of High-Dimensional Biomedical Data: Visualization, Classification, Clustering	18
<i>Ray Somorjai, Brion Dolenko</i>	
Generalized MDS for Data Visualization, Clustering, and Classification	18
<i>Jeffrey Solka, David Johannsen</i>	
Deriving Meaningful Structure from Spectral Embedding and Clustering	19
<i>Brandon Higgs, Jennifer Weller, Jeffrey Solka</i>	

MIXTURE MODELS

On a Flexible Information Criterion for Order Selection in Finite Mixture Models	19
<i>Richard Charnigo, Ramani S. Pilla</i>	
Applying Dirichlet Process Mixture Models to Compositional Data	20
<i>Marie Gantz</i>	
Functional Clustering of Temporal Microarray Data	20
<i>Ping Ma</i>	

DATABASES AND COMPUTERS

Automated Generation of Metadata	20
<i>Faleh Al-Shameri</i>	
A Database Design for Assessing Student Learning in an Online Course System	21
<i>Jun Tan, E. James Harner</i>	
Assessing Data Interoperability In Federated Distributed Databases	21
<i>Daniel N. Owunwanne</i>	
Developing Statistical COM Servers	22
<i>David R. Lemmon, Joseph L. Schafer</i>	
Clustering Heterogeneously Distributed Data	22
<i>Eduardo A. Socolovsky</i>	

APPLICATIONS IN MEDICINE

Improving the Sensitivity of Health Care Cost Predictions Using a Combination of Regression and Classification Procedures	23
<i>Ogi Asparouhov</i>	
Multilevel Classification of Quantitative Cytology Data Using Cumulative Log-Odds Method	24
<i>Jose-Miguel Yamal, Dennis Cox</i>	
Automatic Classification of fMRI Brain Images Using Smooth Asynchrony Maps	24
<i>Svetlana Shinkareva, Hernando Ombao, Bradley Sutton</i>	
Modeling Exposures for DNA Methylation Profiles	24
<i>Kimberly Siegmund</i>	
The Shrinkage Variance Hotelling T-Squared Test for Genomic Profiling Studies	25
<i>Grant Izmirlian, Jian-Lun Xu</i>	

BEST OF SIAM DATA MINING CONFERENCE

Dynamic Detection, Visualization and Classification of Defect Structures in Molecular Dynamics Simulations	27
<i>Srinivasan Parthasarathy, Sameep Mehta, Steve Barr, Alex Choy, Hui Yang, Raghu Machiraju, John Wilkins</i>	
Topic-Driven Clustering for Document Datasets	27
<i>Ying Zhao, George Karypis</i>	
Gaussian Processes for Active Data Mining of Spatial Aggregates	28
<i>Chris Bailey-Kellogg, Naren Ramakrishnan, Satish Tadepalli, Varun N. Pandey</i>	
Clustering with Model-Level Constraints	28
<i>David Gondek, Shivakumar Vaithyanathan, Ashutosh Garg</i>	

MODELING ALCOHOL ABUSE

Ecology of Alcohol and Alcoholism	29
<i>Ed Wegman, Yasmin Said</i>	
Modeling Alcohol Abuse and Consequences	29
<i>Yasmin Said, Ed Wegman</i>	
Drinking and Public Health: The Role for Simulations and Models	30
<i>William F. Wieczorek</i>	

TIME SERIES, NEURAL NETWORKS, HIERARCHICAL MODELS

Time Series Prediction Based on ARMA and GRNN Technology	30
<i>Weimin Li, Jianwei Liu, Jiabin Le, Xiangrong Wang</i>	
Discrimination of Locally Stationary Time Series	30
<i>Wolfgang Polonik, Gabriel Chandler</i>	
Bayesian Neural Networks and Variable Selection	31
<i>R. Adam Molnar</i>	
Hierarchical Bayesian Models for Frequent Terms in Text	31
<i>Edoardo M. Airoldi, William W. Cohen, Stephen E. Fienberg</i>	

MODEL AVERAGING AND ASSESSMENT

A Modest Improvement Towards Seeing the Trees in a Utopian Forest	32
<i>Grant Izmirlian</i>	
Applying Ensemble Learning to Model Quantitative Structure-Activity Relations of Pharmaceutical Molecules	33
<i>Christopher Tong, Vladimir Svetnik, Ting Wang, Andy Liaw</i>	
A Robust Meta-Classification Scheme for Cancer Detection	33
<i>Gabriela Alexe, Gyan Bhanot, Gustavo Stolovitzky, Lilian Chiang, Jorge Lepre, Ram Ramaswamy, Babu Vengataraghavan</i>	
Comparison of Estimators of Generalization Error	34
<i>Rory Martin, Kai Yu</i>	
On Evidence Weighted Mixture Classification	34
<i>Richard Everson, Trevor Bailey, Wojtek Krzanowski, Derek Partridge</i>	

BIOINFORMATICS

Statistical Learning Tools for Analyzing Metabolomic Datasets	35
<i>Xiaodong Lin</i>	
Learning Variable Covariances via Gradients	36
<i>Sayan Mukherjee, Ding-Xuan Zhou</i>	
A Stepwise Structural Equation Modeling Algorithm to Reconstruct Genetic Networks	36
<i>Grace Shieh, Ching-Yun Yu, Chung-Ming Chen, Juiling Huang</i>	

CLUSTER VALIDATION

Additive Tree Fitting of Individual Differences Through (Heuristic) Iterative Projection	36
<i>H.-F. Koehn</i>	
Multiobjective Programming Methods for Applied Cluster Analysis	37
<i>Michael Brusco</i>	
Stability Analysis in K-Means Clustering	37
<i>Douglas Steinley</i>	

SELECTED IASC PAPERS

Data Reduction Using L_p Criteria	38
<i>Jonathon Schuler, James E. Gentle</i>	
Empirical Bayes Thresholding in Gene Expression Analysis	38
<i>Michael G. Schimek, Wolfgang Schmidt</i>	
Fitting a Cox Survival Model on High Dimensional Data	38
<i>Hans C. Van Houwelingen</i>	
Differential Co-Expression: A New Concept in Analyzing Microarrays	39
<i>Dennis Kostka, Rainer Spang</i>	

MODEL-BASED/GRAPH-THEORETIC METHODS

Variable Selection for Model-Based Clustering	39
<i>Nema Dean, Adrian E. Raftery</i>	
Estimation and Selection of Normal Mixture Models Based on Spacings	40
<i>Yong Wang</i>	
Model-Based Clustering Toolbox for MATLAB	40
<i>Angel R. Martinez, Wendy L. Martinez</i>	
Discovering Backbone Structure in Graphs	40
<i>Juan Lin</i>	
Graph-Theoretic Scagnostics	40
<i>Leland Wilkinson, Anushka Anand</i>	

CLUSTERING AND CLASSIFYING TEXT

Estimating Probability Mass Functions from Very Sparse Data	41
<i>Sanjeev P. Khudanpur</i>	
Knowledge Acquisition from Text	42
<i>Dekang Lin</i>	
An Investigation of Text Mining Techniques for the Analysis of Abstracts	42
<i>David Marchette</i>	

MODEL-BASED CLUSTERING AND CLASSIFICATION

Model-Based Clustering of High-Dimensional Data	42
<i>Geoff McLachlan, Richard Bean</i>	
Quantitating Differences in Two Multivariate Distributions	43
<i>Guenther Walther</i>	
On Potts Model Clustering and Kernel K-Means	43
<i>Alejandro Murua</i>	

MICROARRAYS

Clustering Methods in Microarrays	44
<i>Lidia Rejto, Gabor Tusnady</i>	
Microarray Analysis: Is an Ordered Gene List Enough?	44
<i>Leonard B. Hearne, Eric Antoniou</i>	
Microarray Gene Selection Using Mantel Correlation with K-means	44
<i>Bill Shannon, Brian Steinmeyer</i>	
Genetic Algorithms for Feature Selection using Mantel Correlation Scoring	45
<i>John Grefenstette, Kevin Thompson, Brian Steinmeyer, William Shannon</i>	
Gene Selection Using Support Vector Machines with Nonconvex Penalty	45
<i>Cheolwoo Park, Hao Helen Zhang, Jeongyoun Ahn, Xiaodong Lin</i>	

APPLICATIONS

Using Classification of Professionals to Assess Vocational Guidance Counselors and Their Clients	46
<i>Olga Mitina, Vera Pchelina, Leonov Sergey</i>	
Visual Assessment of Simple Association Models	47
<i>Heike Hofmann</i>	
Discriminant Function Analysis in Forensic Authorship Attribution	47
<i>Carole E. Chaski</i>	
Employing Priors for Classifying High Risk Prison Inmates	47
<i>Jong-Ho Baek</i>	
Measuring Relationships Between Entities in Free Text	48
<i>Amanda M. White, Antonio San Lippo, Christian Posse, Ryan E. Hohimer</i>	

COMPARING CLASSIFICATION METHODS

Classifying the Classifiers	50
<i>Li Li, James E. Gentle</i>	
Comparing Neural Networks and Other Multi-Layer Classification Methods	50
<i>Jill McCracken, Jeremy Flantzer</i>	
Comparing Nonlinear Approaches for Classification	50
<i>Carlos Alzola, Yasmin Said</i>	
Comparing Ensemble Approaches for Classification	50
<i>James Shine</i>	

QUANTILE REGRESSION

Quantile Regression: Beyond the Average Man	51
<i>Roger Koenker</i>	
Quantile Volcano Plots for Identifying Significant Genes in Microarray Data	51
<i>Xia Li, Rob Culverhouse, Bill Shannon</i>	
Quantile Regression for Gene Expression Analysis in GeneChip Arrays	51
<i>Huixia Wang</i>	

SPECTRAL METHODS IN DATA ANALYSIS

From Text Data Mining to Gene Expression Mining and Back Again	52
<i>Jeff Solka, Brandon Higgs, Jeffinifer Weller</i>	
Dissimilarity Matrices and Spectral Projections	52
<i>Elizabeth Leeds, David J. Marchette</i>	
Co-clustering of Social Network Data	52
<i>John Rigsby, Je Rey Solka</i>	

MULTIDIMENSIONAL SCALING AND ET ALIA

Multidimensional Scaling Algorithms for Large Data Sets	53
<i>Michael W. Trosset, Patrick J. F. Groenen</i>	
Local Multidimensional Scaling for Nonlinear Dimension Reduction	53
<i>Lisha Chen, Andreas Buja</i>	
Maximal Data Piling in Discrimination	54
<i>Jeongyoun Ahn, J. S. Marron</i>	
Estimating the Sparse Directions in the Effective Dimension Reduction Space	54
<i>Zhihua Qiao, Jianhua Huang</i>	
Uncovering Curvature in Data	54
<i>Jesse Spencer-Smith</i>	

BEST OF THE JOURNAL OF CLASSIFICATION

Looking at Different Options Within the COSA Clustering Algorithm	55
<i>Jacqueline J. Meulman, Jerome H. Friedman</i>	
A Hierarchical Methodology for Class Detection Problems with Skewed Priors	56
<i>Christopher K. Eveland, Diego A. Socolinsky, Carey E. Priebe, David J. Marchette</i>	
Estimating the Cluster Tree of a Density	56
<i>Werner Stuetzle</i>	

NON-NUMERIC DATA ANALYSIS

Conditional Independence Modeling for Categorical Anomaly Detection	56
<i>Chad Scherrer, Nathaniel Beagley</i>	
Usage-Based Evolution of Visual Analysis Tools	57
<i>Elizabeth Hetzler, Stuart Rose, Dennis McQuerry, Pat Medvick</i>	

Scenario Analysis for Homeland Security	57
<i>Olga Anna Kuchar, George Chin Jr., Paul Whitney, Katherine Johnson, Mary Powers</i>	

DISCRIMINATION AND DATA MINING

Choosing Weights for Nearest-Neighbor Classification with Linear Programming	58
<i>Samuel E. Buttrey, W. Matthew Carlyle</i>	
Classification Via Interpoint Distance Profiles	58
<i>Jayson D. Wilbur</i>	
Polya Tree Priors for Classification Error Distributions	58
<i>Andrew Neath</i>	
SIP Load Test Automation based on Data Mining Algorithms	59
<i>Arta Doci</i>	

CLUSTERING METHODS AND APPLICATIONS

Imputation-Free Robust Clustering Using Soft Constraints	59
<i>Nan Lin</i>	
Applications of Parametric and Nonparametric Bayesian Predictive Clustering	59
<i>Fernando A. Quintana</i>	
Propensity Scoring and the LATE Distribution from Unsupervised Clustering	60
<i>Nicholas Lewin-Koh, Robert Obenchain</i>	
Profiling Price Dynamics in Online Auctions Using Curve Clustering	60
<i>Wolfgang Jank, Galit Shmueli</i>	
Clustering for Measurement Error in Expenditure Survey Data	60
<i>John Dixon</i>	

COMPUTATIONAL BIOLOGY

Spike and Slab Gene Selection for Multigroup Microarray Data	61
<i>J. Sunil Rao</i>	
Bayesian Infinite Mixture Model-Based Clustering of Functional Genomics Data	61
<i>Mario Medvedovic</i>	
Classification and Regression-Based Approaches to Protein Structure Prediction	61
<i>Jarek Meller, Rafal Adamczak, Michael Wagner, Aleksey Porollo</i>	

GRAPH-THEORETIC PATTERN RECOGNITION

Juggling: Ensembles of Class Cover Classifiers	62
<i>Jason DeVinney, David Marchette, Carey Priebe</i>	
Geometry of Learning: from Graphs to Continuous Spaces	62
<i>Mikhail Belkin</i>	
Local Intrinsic Dimension Estimation with kNNGs	62
<i>Alfred Hero, Jose Costa</i>	

ALGORITHMS

Parallel Computation of the kth Nearest Neighbor Estimate of the Entropy of Molecules Using Circular Distances	63
<i>E. James Harner, Jun Tan, Shengqiao Li</i>	
Characterizing the Solution Path of Multicategory Support Vector Machines	63
<i>Zhenhuan Cui, Yoonkyung Lee</i>	
Accelerating Linearly-Convergent Algorithms	63
<i>Tim Hesterberg</i>	
Alternative Visualization of Andrews' Curves	64
<i>Wendy L. Martinez, Angel R. Martinez</i>	

Optimal Linear Combination of Longitudinal Markers for Disease Classification	64
<i>Ming Ji</i>	

APPLICATIONS IN BIOLOGY

Multivariate Regression Tree: Classification of Bird Assemblages Based on Their Habitat Characteristics	64
<i>Marie-Helene Ouellette, Jean-Luc Desgranges, Pierre Legendre, Daniel Borcard</i>	
Global Classification of (Plant) Proteins across Multiple Species	65
<i>Naomi S. Altman, Kerr Wall, Jim Leebens-Mack, Victor Albert</i>	
Phyloinformatics of Genes in Complete Chloroplast Genomes	65
<i>Beatrice Kilel</i>	
Visualizing Primate Evolution: Reification of a Statistical Model	66
<i>F. James Rohlf, Nina Amenta, Eric Delson, David F. Wiley, Will Harcourt-Smith, Steve Frost, Alfred L. Rosenberger, Dan A. Alcantara, Lissa Tallman</i>	

ENVIRONMENTAL APPLICATIONS

Statistical Modeling and Evaluation of Microbial Source Tracking Data from rep-PCR DNA Fingerprints	68
<i>Luis Tenorio, Junko Munakata-Marr, John Albert</i>	
Simulation-Based Detection of Water-Borne Bacterial Contamination	68
<i>Brian West</i>	
Scaling by Reference Conditions for Ecological Assessment	68
<i>Samantha Bates Prins, Eric P. Smith</i>	

MODEL BUILDING: MIXTURES & BIOINFORMATICS

Analysis of Semiparametric Mixture Models, with Application to QTL Analysis	69
<i>Jason Fine</i>	
A Mixture Model Approach to Multiple Hypothesis Testing	69
<i>Geoff McLachlan, Geo McLachlan, Liat Ben-Tovim Jones</i>	
Searching High-Dimensional Spaces for Parsimonious Mixture Models	70
<i>R. Pilla, Catherine Loader</i>	

TREES AND NEURAL NETWORKS

Gaussian Process Trees	70
<i>Robert B. Gramacy, Herbert K. H. Lee</i>	
Making Use of Small Samples for Classification	71
<i>Russell Steele, Matthew Taddy, Inti Zlobec, Nilima Nigam</i>	
Default Bayesian Neural Network Classification	71
<i>Herbie Lee</i>	

DATA MINING

Learning Classifiers Under a Limited Budget for Acquiring Training Data	71
<i>Balaji Krishnapuram</i>	
Nonparametric Statistics and Data Mining	72
<i>Tamraparni Dasu</i>	
Mining Temporal Patterns	73
<i>Feng Liang</i>	

DEVELOPMENTS IN BIOINFORMATICS

Selecting an Appropriate Clustering Algorithm for Analyzing Microarray Data	73
<i>Susmita Datta</i>	

Estimating Network Topology and Latent Factors in A Gene Network Based on Independent Component Analysis	74
<i>Wei-Fuh Wang, Chung-Ming Chen</i>	
Statistical Methods to Construct Transcriptional Regulatory Networks Using Gene Expression and DNA Sequence Data	74
<i>Biao Xing, Mark van der Laan</i>	

AUTHOR IDENTIFICATION

Lexical Predictors of Personality Type	75
<i>Shlomo Argamon</i>	
Multiple Methods and the Federalist Papers	75
<i>Ross Sowell, Diana Michalek</i>	
Author Identification on the Large Scale	76
<i>Alex Genkin, D. Lewis, D. Madigan, D. Fradkin</i>	
Author Index	