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6. AUTHORS
Lawrence Carin

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5e. TASK NUMBER

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C/O Office of Research Support
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Durham, NC 27705 -4677

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14. ABSTRACT
A workshop was help on the science of compressive sensing. The agenda for the meeting was as follows.

Monday, July 27, 2015
09:15 - 09:30 Welcome
09:30 - 11:30 Invited Talks I
Stan Osher - How sparsity and L1 optimization impacts "continuous" applied mathematics, physics and engineering

15. SUBJECT TERMS
compressive sensing

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Report Title

Final Report: Workshop: Sensing and Analysis of High-Dimensional Data

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A workshop was help on the science of compressive sensing. The agenda for the meeting was as follows.

Monday, July 27, 2015
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Phil Schniter - Iteratively reweighted L1 approaches to sparse composite regularization
Volkan Cevher - A universal primal-dual convex optimization framework
Yuxin Chen - Solving random quadratic systems of equations is nearly as easy as solving linear systems
11:30 - 12:30 Whiteboards I
12:30 - 13:30 Lunch
13:30 - 15:30 Invited Talks II
Jared Tanner - Parallel-L0, a fully parallel algorithm for combinatorial compressed sensing
Babak Hassibi - LASSO with nonlinear measurements
Joel Tropp - Applied random matrix theory
Yonina Eldar - Sub-Nyquist sampling without sparsity
15:30 - 17:00 Posters I

Tuesday, July 28, 2015
09:00 - 10:30 Invited Talks III
Cynthia Rudin - Sparse if-then rule models
David Wipf - Non-Convex, Bayesian-inspired algorithms for sparse and low-rank estimation
John Paisley - Scalable Bayesian nonparametric dictionary learning
10:30 - 11:00 Coffee Break
11:00 - 12:00 Invited Talks IV
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Ken Bollen - The Latent Variable - Autoregressive Latent Trajectory (LV-ALT) model: a general framework for longitudinal data analysis
12:00 - 13:00 Whiteboards II
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13:30 - 15:30 Invited Talks V
Patrick Wolfe - Network analysis and nonparametric statistics
Pradeep Ravikumar - Elementary estimators for “big-p” statistical models
Marc Suchard - High-dimensional biological sequences through simple models and posterior diagnostics
James Scott - False discovery rate smoothing
15:30 - 17:00 Posters II
19:00 - 22:00 Workshop banquet

Wednesday, July 29, 2015
09:00 - 10:30 Invited Talks VI
Andrea Montanari - Semidefinite programming relaxations for graph estimation
Alfred Hero - Correlation mining from massive data: high dimensional sampling regimes
Marina Meila - Modeling ordered data by counting inversions
10:30 - 11:00 Coffee Break
11:00 - 12:00 Invited Talks VII
Tony Jebara - Graphical modeling with the Bethe approximation
Surya Ganguli - A theory of neural dimensionality, dynamics, and measurement

The workshop website is: http://sahd.pratt.duke.edu/index.html

Enter List of papers submitted or published that acknowledge ARO support from the start of the project to the date of this printing. List the papers, including journal references, in the following categories:

(a) Papers published in peer-reviewed journals (N/A for none)

Received Paper

TOTAL:

Number of Papers published in peer-reviewed journals:

(b) Papers published in non-peer-reviewed journals (N/A for none)

Received Paper

TOTAL:

Number of Papers published in non peer-reviewed journals:

(c) Presentations

Number of Presentations: 0.00

Non Peer-Reviewed Conference Proceeding publications (other than abstracts):

Received Paper

TOTAL:

Number of Non Peer-Reviewed Conference Proceeding publications (other than abstracts):

Peer-Reviewed Conference Proceeding publications (other than abstracts):

Received Paper

TOTAL:

Number of Peer-Reviewed Conference Proceeding publications (other than abstracts):

(d) Manuscripts

Received Paper

TOTAL:

Number of Manuscripts:

Books

Received Book

TOTAL:

Received	Book Chapter

TOTAL:

Patents Submitted

Patents Awarded

Awards

Graduate Students

NAME	PERCENT_SUPPORTED
FTE Equivalent:	
Total Number:	

Names of Post Doctorates

NAME	PERCENT_SUPPORTED
FTE Equivalent:	
Total Number:	

Names of Faculty Supported

NAME	PERCENT_SUPPORTED	National Academy Member
Lawrence Carin	0.00	
FTE Equivalent:	**0.00**	
Total Number:	**1**	

Names of Under Graduate students supported

NAME	PERCENT_SUPPORTED
FTE Equivalent:	
Total Number:	

Student Metrics

This section only applies to graduating undergraduates supported by this agreement in this reporting period

The number of undergraduates funded by this agreement who graduated during this period: 0.00

The number of undergraduates funded by this agreement who graduated during this period with a degree in science, mathematics, engineering, or technology fields:..... 0.00

The number of undergraduates funded by your agreement who graduated during this period and will continue to pursue a graduate or Ph.D. degree in science, mathematics, engineering, or technology fields:..... 0.00

Number of graduating undergraduates who achieved a 3.5 GPA to 4.0 (4.0 max scale):..... 0.00

Number of graduating undergraduates funded by a DoD funded Center of Excellence grant for Education, Research and Engineering:..... 0.00

The number of undergraduates funded by your agreement who graduated during this period and intend to work for the Department of Defense 0.00

The number of undergraduates funded by your agreement who graduated during this period and will receive scholarships or fellowships for further studies in science, mathematics, engineering or technology fields:..... 0.00

Names of Personnel receiving masters degrees

NAME

Total Number:

Names of personnel receiving PHDs

NAME

Total Number:

Names of other research staff

NAME PERCENT_SUPPORTED

FTE Equivalent:
Total Number:

Sub Contractors (DD882)

Inventions (DD882)

Scientific Progress

A very successful workshop was held, with 25 speakers, over 50 poster presenters, and about 150 attendees.

Technology Transfer

There was no explicit technology transfer, as this was a workshop.

Final Report

Duke Workshop on High-Dimensional Data Sensing and Analysis
Workshop Dates: July 27-29, 2015

Principal Investigator:

Lawrence Carin, Duke University

Abstract

A workshop on applied statistics and machine learning was held, with the following agenda.

Monday, July 27
09:15 - 09:30 Welcome
09:30 - 11:30 Invited Talks I

- Stan Osher - *How sparsity and L1 optimization impacts "continuous" applied mathematics, physics and engineering*
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- Volkan Cevher - *A universal primal-dual convex optimization framework*
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- John Paisley - *Scalable Bayesian nonparametric dictionary learning*

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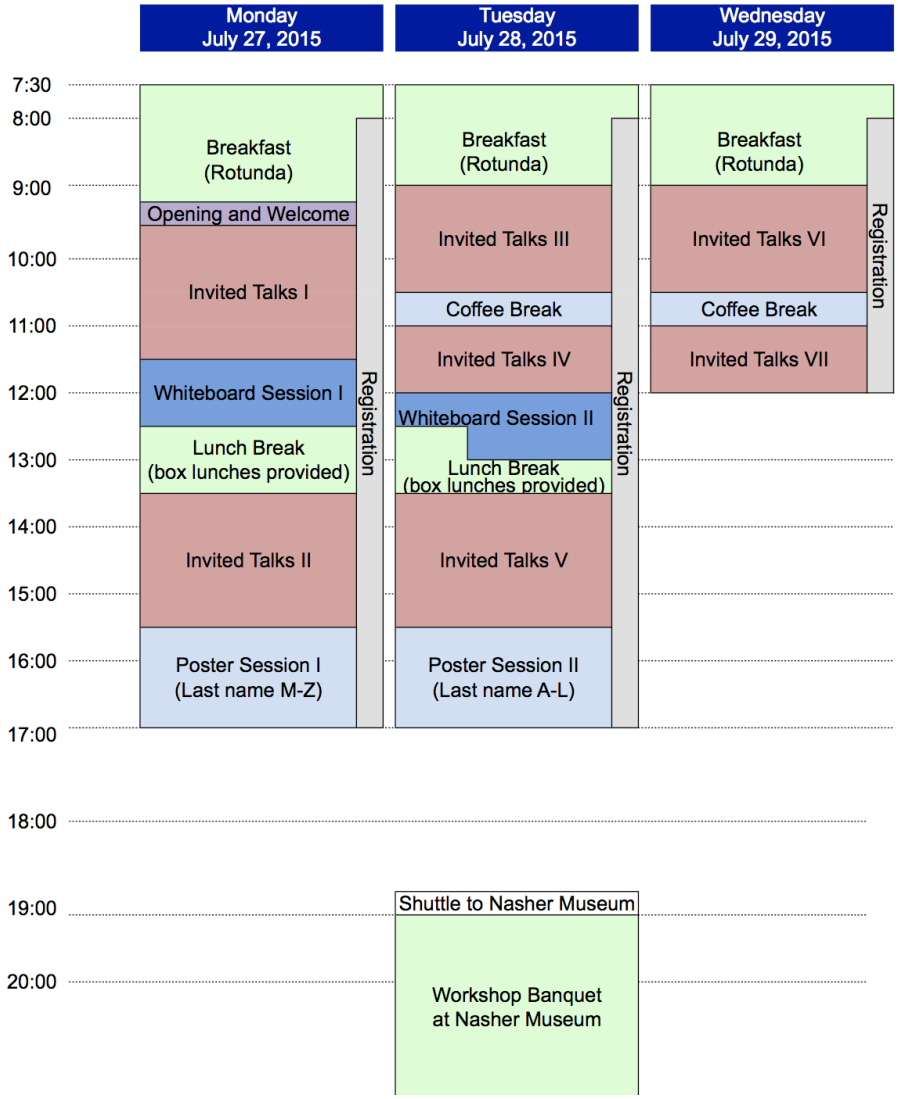
- Alfred Hero - *Correlation mining from massive data: high dimensional sampling regimes*
- Marina Meila - *Modeling ordered data by counting inversions*

10:30 - 11:00 Coffee Break
11:00 - 12:00 Invited Talks VII

- Tony Jebara - *Graphical modeling with the Bethe approximation*
- Surya Ganguli - *A theory of neural dimensionality, dynamics, and measurement*



Whiteboard Session I (Monday, July 27 from 11:30 am - 12:30 pm)

- Pallavi Basu - *Model Selection in High-Dimensional Misspecified Models*
- Miles Lopes - *Compressed Sensing without Sparsity Assumptions*
- Henry Pfister - *Connections Between Coding and Compressed Sensing*
- Farhad Pourkamali-Anaraki - *Efficient PCA for large high-dimensional datasets via Randomized Sketching*
- Galen Reeves - *Scalable Approximations of Marginal Posteriors in Variable Selection*
- Rebecca Willett - *Learning Single Index Models in High Dimensions*

Whiteboard Session II (Tuesday, July 28 from 12:00 - 1:00 pm)

- Ingrid Daubechies - *ConceFT: Concentration in Frequency and Time*
- Kai Fan - *Hierarchical Graph-Coupled HMMs for Heterogeneous Personalized Health Data*
- Raja Giryes - *Theoretical Limits in Sparsity and Deep Learning*
- Sayan Mukherjee - *Learning mixtures of subspaces*
- Manolis Tsakiris - *Abstract Algebraic Subspace Clustering*
- Sergey Voronin - *Randomized blocked algorithms for efficiently computing rank-revealing factorizations of matrices*

Poster Session I (Monday, July 27 from 3:30 - 5:00 pm)
Last name M - Z

- Yanting Ma - *Universal Denoising in Approximate Message Passing*
- Sorin Mitran - *Information geometry and model reduction*
- Ikenna Odinaka - *Spectrally Grouped Edge-Preserving Reconstruction*
- Qiang Qiu - *Random Forests Can Hash*
- Qing Qu - *Complete Dictionary Learning Over the Sphere*
- Akshay Rangamani - *Learning Program Attributes in Control Flow Graphs*
- Owen Rehrauer - *Fluorescence Modeling for OB-CD Raman Spectroscopy*
- Abhra Sarkar - *Bayesian Nonparametric Higher Order Markov Chains*
- Anand Sarwate - *The performance of differentially private PCA*
- Shahin Sefati - *Linear Systems with Sparse Inputs*
- Anish Simhal - *Computational statistics for CLARITY volumes*
- Catherine Stamoulis - *Signal processing approaches for genomic data*
- Charles Talbot - *Reduced Stochastic Models of Permeable Medium Flow*
- Mariano Tepper - *Compressed NMF is Fast and Accurate*
- Manolis Tsakiris - *Abstract Algebraic Subspace Clustering*
- Kyle Ulrich - *Gaussian Process Kernels for Cross-Spectrum Analysis*

- Sergey Voronin - *An efficient algorithm for computing a CUR factorization*
- Tong Wang - *Bayesian Or's of And's for Interpretable Classification*
- Yizhe Zhang - *Spatial dependent deep factor model*

Poster Session II (Tuesday, July 28 from 3:30 - 5:00 pm)
Last name A - L

- Amit Ashok - *Analysis & Simulation Framework: X-ray Threat Detection*
- Martin Azizyan - *Extreme Compressive Sampling for Covariance Estim.*
- Dror Baron - *Image Reconstruction in Radio Astronomy*
- Evan Byrne - *Sparse Multinomial Logistic Regression via AMP*
- Dan Coroian - *Learning a Personalized CDSS From EHR Data*
- Jyotishka Datta - *Bayesian Cluster Detection for Rare Variants*
- Mauricio Delbracio - *Burst Deblurring*
- Lee Dicker - *Efficient variance estimation for high-dimensional linear models*
- Yan Feng - *Model reduction of stochastic biomechanical system*
- Raja Giryes - *Deep Neural Networks with Random Gaussian Weights: A Universal Classification Strategy?*
- Joel Greenberg - *Coding and compression in snapshot XRD imaging*
- Shermin Hamzehei - *Compressive Parameter Estimation via AMP*
- Jordan Hashemi - *Pose-invariant cross-modality facial expression*
- Alfred Hero - *On the sample complexity of correlation mining*
- Xin Jiang - *Minimax Rates for Photon Limited Image Reconstruction*
- Mojtaba Kadkhodaie - *Locating Rare and Weak Material Anomalies by Convex Demixing of Propagating Wavefield Data*
- Yan Kaganovsky - *Variational Automatic Relevance Determination*
- Yuehaw Khoo - *NMR structural calculation via semidefinite programming*
- Jinyoung Kim - *Robust Prediction of DBS targeting structures*
- Santhosh Kumar - *Reed-Muller Codes Achieve Capacity on erasure Channels*
- Yuanxin Li - *Stable Super-Resolution of Mixture Models*

- Mengke Lian - *Belief-Propagation Reconstruction for Compressed Sensing: Quantization vs. Gaussian Approximation*
- Luoluo Liu - *Partial Face Recognition*
- Miles Lopes - *Compressed Sensing without Sparsity Assumptions*
- John Lu - *Optical imaging for forensics*
- Yue Lu - *Randomized Kaczmarz Algorithm and its Cousins: Exact MSE Analysis and Asymptotically Sharp Bounds*

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