

44th Symposium on the Interface of Computing Science and Statistics 2013

(Interface 2013)

**Orange, California, USA
4-6 April 2013**

Editors:

Hesham El-Askary

Ed Wegman

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

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

interface@galaxy.gmu.edu

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Thursday April 4th 2013: Sandhu Conference Center

7:30 am – 1:30 pm
8:30 am – 10:00 am

Registration
Technical Sessions

- **Astroinformatics: Learning from Data in the Astronomical Sciences 1**

Chair: Kirk Borne, George Mason University

1. *Citizen Science and Astroinformatics - Data Science at the Frontiers of Astronomy....1*
Kirk Borne, George Mason University
2. *Automatic Pattern Recognition and Citizen Science....10*
John Wallin, Middle Tennessee State University
3. *Filtergraph: An Innovative Online Portal for Rapid and Intuitive Visualization of Massive Multi-Dimensional Datasets....33*
Dan Burger, Vanderbilt University

- **Data Science and Climate 1**

Chair: Amy Braverman, JPL

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Matthias Katzfuss, University of Heidelberg
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Amy Braverman, Jet Propulsion Laboratory
3. *Informing climate retrieval development using data mining....96*
Lukas Mandrake, Jet Propulsion Laboratory

10:00 am – 11:30 pm

Technical Sessions

- **Learning from Data**

Chair: James Gentle, George Mason University

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Kirk Borne, George Mason University
2. *Leveraging as a Paradigm for Statistically-Informed Large-Scale Computation....132*
Michael Mahoney, Stanford
3. *Machine Learning Explorations of Citizen Science Data....145*
Arun Vedachalam, George Mason University

- **From Large Earth Science Datasets to Compelling Scientific Results**

Chair: Charles Ichoku, NASA GSFC

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Pawan K. Bhartia and Joanna Joiner, NASA GSFC

2. *Assessment of aerosol intercontinental transport with big data from EOS satellites....167*
Hongbin Yu, NASA GSFC
3. *Implications of Satellite Swath Width on Aerosol Optical Thickness Statistics...176*
Peter Colarco, NASA GSFC
4. *Improving our Understanding of Land-Use Change and Fire in Southeast Asia by Using Advanced Mathematical Techniques, Models, and Multiple Remotely Sensed Measurements in Tandem....187*
Jason Blake Cohen, National University of Singapore

11:30 pm – 1:15 pm **Lunch Break and Poster Session**
(Provided: Beckman Center 404)

1:15 pm – 1:45 pm Official Opening, Introductions and Welcoming Notes

- *Introductions* Hesham El-Askary, Interface 2013 Chair, Chapman University
- *Welcoming Remarks* James Doti, President Chapman University
- *Welcoming Remarks* Janeen Hill, Dean Schmid College of Science and Technology
- *Welcoming Remarks* Menas Kafatos, Director Center of Excellence in Earth Systems Modeling & Observations, on behalf of Chancellor, Chapman University

1:45 pm – 2:45 pm Panel Discussion by Experian: *The Future of Digital Wallets....202*
Moderator: **Mark Kapczynski, VP, Strategy, Experian Consumer Services**

1. *Panelist 1*: Dan Elvester, Director, Business Development, Experian Decision Analytics
2. *Panelist 2*: JP Voisinet, Strategy Associate, Experian Consumer Services
3. *Panelist 3*: Wences Casares, CEO, Lemon Wallet
4. *Panelist 4*: Andy Johnson, SVP Data, Experian Marketing Services
5. *Panelist 5*: Eric Haller, SVP, Data Lab, Experian

2:45 pm – 3:20 pm Keynote Speaker 1 “*Data Theory*”: **Edward Wegman, George Mason University**

Title: *Big Data: Technology and Analysis....204*

3:20 pm – 3:30 pm Q&A

3:30 pm – 3:55 pm **Afternoon Break**

4:00 pm – 4:50 pm Keynote Speaker 2 “*Earth Systems Science Data*”: **Jack Kaye, NASA**

	Title: <i>Earth System Science: Data Challenges Created by Observations and Models, and their use for Science and Applications....227</i>
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	Title: <i>Changing Role of Big Data in Healthcare....258</i>
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(Beckman Center 404)

6:00 pm – 8:00 pm **Networking and Opening Reception**

Friday April 5th 2013:

Sandhu Conference Center

(Data Theory and Earth Science Sessions)

Argyros Forum

(Health Care Sessions)

7:30 am – 8:00 am **Registration**

8:00 am – 9:30 am **Technical Sessions**

- **Astroinformatics: Learning from Data in the Astronomical Sciences 2**

Chair: Kirk Borne, George Mason University

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George Djorgovski, California Institute of Technology
2. *Finding Rare Astronomical Objects Using Efficient Bayesian Networks....293*
Ashish Mahabal, California Institute of Technology
3. *Data Triage of Astronomical Transients and Variables: A Machine Learning Approach....308*
Umaa Rebbapragada, Jet Propulsion Laboratory
4. *Observations-driven PCA Models for seasonal Changes on Jupiter and Saturn....324*
Padma Yanamandra-Fisher, Space Science Institute

- **Data Science and Climate 2**

Chair: Amy Braverman, JPL

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Mark Nakamura, University of California, Los Angeles
2. *Understanding Climate Change - A Data Driven Approach....349*
Vipin Kumar, University of Minnesota
3. *A Software Architecture for the Systematic Analysis of Climate Science Data....376*
Dan Crichton, Jet Propulsion Laboratory

- **Healthcare Process Reform**

Chair: Arnold Goodman, Collaborative Data Solutions

1. *Process Analysis of Healthcare to Better Manage Stakeholder Goals, Funding, Engineering, Delivery, Culture, Big Data and Accountability....N/A*
Arnold Goodman, Collaborative Data Solutions
2. *Benchmarking Healthcare Provider Performance: Some Statistical Considerations....N/A*
Susan Paddock, RAND Corporation
3. *Make More Accurate Genomic Conclusions from Sequence Findings by Reducing a Basic Uncertainty in Associating Genes with Diseases....N/A*
Arnold Goodman, Collaborative Data Solutions

9:30 am – 11:00 am

Technical Sessions

- **JCGS Highlights at the Interface Auditorium**

Chair: Richard Levine, JCGS Editor, San Diego State University

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Eric Chi, University of California, Los Angeles
2. *Tapered Covariance: Bayesian Estimation and Asymptotics....412*
Benjamin Shaby, University of California, Berkeley
3. *A Discussion of Graphical Inference....N/A*
Heike Hofmann, Iowa State University

- **Analysis of Big Data for Atmospheric Aerosol Research**

Chair: Olga Kalashnikova, Jet Propulsion Laboratory

Co-Chair: Michael Garay, Jet Propulsion Laboratory

1. *Scientific Discovery and Anomaly Detection in Large Aerosol Data Sets....433*
Kiri Wagstaff, Jet Propulsion Laboratory
2. *Giovanni-4: the next generation of an online tool for satellite data visualization, exploration and inter-comparison....444*
Christopher Lynnes, NASA/GSFC
3. *Spatial Statistical Data Fusion for Remote Sensing Applications....460*
Hai Nguyen, Jet Propulsion Laboratory

- **Healthcare Futures**

Chair: Mark Kapczynski, VP, Strategy, Experian Consumer Services

1. *Panelist 1*: Dan Johnson, President, Experian Healthcare
2. *Panelist 2*: Anatoly Kvitnitsky, Strategy Associate, Experian Consumer Services
3. *Panelist 3*: John Benson, CEO Verisys
4. *Panelist 4*: Katie Vahle, CEO, CoPatient
5. *Panelist 5*: Greg Jackson, Chief Data Officer, EverydayHealth

11:00 am – 11:30 pm

Morning Break

11:30 pm – 1:00 pm

Technical Sessions

- **Educating Data Scientists**

Chair: Hadley Wickham, Rice University

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William Cleveland, Purdue University
2. *Teaching Statistics in the Data Deluge....482*
Rob Gould, University of California, Los Angeles
3. *Designing the Data Science Curriculum....N/A*
Jeff Hammerbacher, Cloudera

- **Statistical Learning in Earth Systems Science**

Convener: David A. Van Dyk, Imperial College London

Chair: Richard Levine, JCGS Editor, San Diego State University

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Daniel Jeske, University of California, Riverside
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Yaming Yu, University of California, Irvine
3. *A Nonlinear Model for Predicting Plankton Dynamics....537*
Barbara Bailey, San Diego State University

- **Application of Big Data and Analytics to the Healthcare Setting (Panel Discussion)**

Chair: Janeen Hill, Chapman University

1. *Panelist 1*: Paea LePendou, Stanford Center for Biomedical Informatics Research (BMIR)
2. *Panelist 2*: Lorraine Fernandes, Information Management, IBM
3. *Panelist 3*: Graham Nixon, Chief Health Informatics Officer, Veteran Affairs San Diego Healthcare System
4. *Panelist 4*: Charles Boicey, Informatics Solutions Architect, UC Irvine Health

1:00 pm – 2:30 pm

Lunch Break and Poster session

(Provided: Beckman Center 404)

2:30 pm – 4:00 pm

Technical Sessions

- **Cloud Computing and Big Data**

Chair: Michael Fahy, Chapman University

1. *R²: R and SAS collaboration in the cloud....N/A*
James Harner, West Virginia University
2. *Cloud-Enabled Processing & Exploitation of Remotely Sensed Data....N/A*
Michael Limcaco, Amazon Web Services
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Gayn B. Winters, Technical Program Manager, Technology Consultants

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Chair: Robert Allen, University of California, Riverside

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Robert Allen, University of California, Riverside
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Charlie Zender, University of California, Irvine
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Joel Norris, Scripps Institution of Oceanography, University of California, San Diego
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Toshihisa Matsui, NASA GSFC

- **Big Data Challenges in Bioinformatics and Medical Informatics**

Organizer: Nadim Alkharouf, Towson University

Chair: Ian Misner, Towson University

1. *Big Data Challenges in the Sequencing of plant pathogen Genomes....N/A*
Ian Misner, Towson University
2. *Speeding-Up Codon Analysis on the Cloud with Local MapReduce Aggregation....N/A*
Atanas Radenski & Louis Ehwerhemuepha, Chapman University
3. *Translational Bioinformatics and Quantitative Biology in Cancer Research: From Big Data Molecular Analysis of Human Disease to Personalized Medicine....N/A*
Gennady Verkhivker, Chapman University

(Beckman Center 404)

4:15 pm – 5:15 pm Panel Discussion by NEXUS IS: *Applied Analytics in the Enterprise....N/A*

Moderator: Kevin Griffith, NEXUS IS

1. *Panelist 1:* Colin McNamara, Chief Cloud Architect
2. *Panelist 2:* Paul Caracciolo, Chief Healthcare Officer

5:15 pm – 7:00 pm (NEXUS IS Sponsored Reception)

Saturday April 6th 2013: Sandhu Conference Center

7:30 am – 8:00 am

Registration

8:00 am – 9:30 am

Technical Sessions

- **Random Solutions to Big Problems**

Co-Chairs: Eric C. Chi, University of California, Los Angeles and Miles Lopes, University of California, Berkeley

1. *Implementing Randomized Matrix Algorithms in Parallel and Distributed Environments....N/A*
Michael Mahoney, Stanford
2. *A More Powerful Two-Sample Test in High Dimensions using Random Projection....N/A*
Miles Lopes, University of California, Berkeley
3. *Perturb-and-MAP Random Fields: The Interplay Between Random Sampling and Optimization....N/A*
George Papandreou, University of California, Los Angeles

- **From Large Earth Science Datasets to Compelling Scientific Results**

Chair: Mian Chin, NASA GSFC

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Daven Henze, University of Colorado
2. *Satellite and Model Data to Support Air Quality Management....634*
Tracey Holloway, University of Wisconsin, Madison
3. *Trends in Extreme United States Temperatures....648*
Jaechoul Lee, Boise State University

9:30 am – 11:00 am

Technical Sessions

- **Visualization of Big Data**

Chair: Juergen Symanzik, Utah State University

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Simon Urbanek, AT&T Research Labs
2. *Divide and Recombine (D&R) for Comprehensive Visualization of Large Complex Data at Their Finest Granularity....N/A*
William Cleveland, Purdue University
3. *Visualization of "Big Data" in Molecular and Genomic Sciences....N/A*
Nicholas Lewin-Koh, Genentech

- **From Large Earth Science Datasets to Compelling Scientific Results**

Chair: Hesham El-Askary, Chapman University

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11:00 pm – 11:30 pm

Morning Break

11:30 pm – 1:00 pm

Technical Sessions

- **Data Science Methods**

Chair: Edward Wegman, George Mason University

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Kyle Caudle, South Dakota School of Mines and Technology
2. *Depth Functions and Multidimensional Medians on Proximity Graphs....N/A*
Mengta Dan Yang, George Washington University
3. *Near k -Regular Graphs and Hamiltonian Cycles....N/A*
Yang Xu, George Mason University

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Chair: Menas Kafatos, Chapman University

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2. *Use of variable resolution gridding in the Ocean-Land-Atmosphere Model (OLAM) for optimal utilization of resources on large and small computers....697*
Robert Walko, University of Miami
3. *Computational Aspects of Regional Climate and Weather Forecasting Applications....N/A*
Craig Tremback, President ATMET, LLC
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Tarek El-Ghazawi, The George Washington University