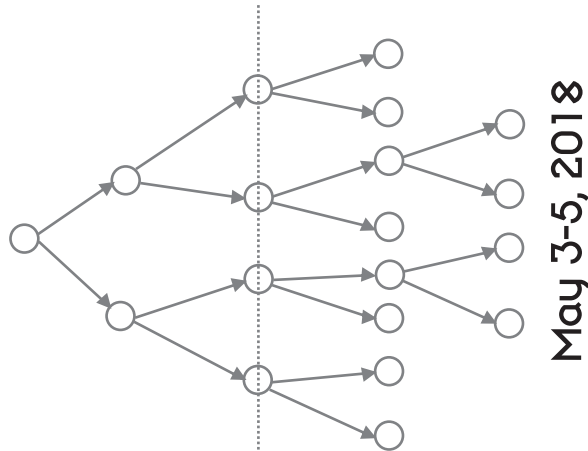


Final Program and Abstracts

2018 SIAM International Conference on DATA MINING



San Diego Marriott Mission Valley
San Diego, California, USA

Sponsored by the SIAM Activity Group on Data Mining and Analytics

The purpose of the SIAM Activity Group on Data Mining and Analytics (SIAG/DMA) is to advance the mathematics of data mining, to highlight the importance and benefits of the application of data mining, and to identify and explore the connections between data mining and other applied sciences. The activity group organizes the yearly SIAM International Conference on Data Mining (SDM), organizes minisymposia at the SIAM Annual Meeting, and maintains a membership directory and electronic mailing list.

This conference is held in cooperation with the American Statistical Association.



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Conference Themes**Methods and Algorithms**

- Classification
- Clustering
- Frequent Pattern Mining
- Probabilistic & Statistical Methods
- Graphical Models
- Spatial & Temporal Mining
- Data Stream Mining
- Anomaly & Outlier Detection
- Feature Extraction, Selection and Dimension Reduction
- Mining with Constraints
- Data Cleaning & Preprocessing
- Computational Learning Theory
- Multi-Task Learning
- Online Algorithms
- Big Data, Scalable & High-Performance Computing Techniques
- Mining with Data Clouds
- Mining Graphs
- Mining Semi Structured Data
- Mining Image Data
- Mining on Emerging Architectures
- Text & Web Mining
- Optimization Methods
- Other Novel Methods

Applications

- Astronomy & Astrophysics
- High Energy Physics
- Recommender Systems
- Climate / Ecological / Environmental Science
- Risk Management
- Supply Chain Management
- Customer Relationship Management
- Finance
- Genomics & Bioinformatics
- Drug Discovery
- Healthcare Management
- Automation & Process Control
- Logistics Management
- Intrusion & Fraud detection
- Bio-surveillance
- Sensor Network Applications
- Social Network Analysis
- Intelligence Analysis
- Other Novel Applications & Case Studies

Human Factors and Social Issues

- Ethics of Data Mining
- Intellectual Ownership
- Privacy Models
- Privacy Preserving Data Mining & Data Publishing
- Risk Analysis
- User Interfaces
- Interestingness & Relevance
- Data & Result Visualization
- Other Human Factors and Social Issues

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The SIAM registration desk is located in the Rio Vista Ballroom Foyer. It is open during the following hours:

Wednesday, May 2

5:00 PM – 7:00 PM

Thursday, May 3

7:00 AM – 7:30 PM

Friday, May 4

7:30 AM – 4:00 PM

Saturday, May 5

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SIAM will also provide a limited number of email stations for attendees during registration hours.

Registration Fee Includes

- Admission to all technical sessions
- Admission to all tutorial sessions
- Admission to all workshops
- Business Meeting (open to SIAG/DMA members)
- Coffee breaks daily
- Continental Breakfast daily
- Room set-ups and audio/visual equipment
- Welcome Reception and Poster Session
- Doctoral Forum and Poster Session
- USB of conference proceedings, workshop, and tutorial notes

Job Postings

Please check with the SIAM registration desk regarding the availability of job postings or visit <http://jobs.siam.org>.

Important Notice to Poster Presenters

The poster sessions are scheduled for Thursday, May 3, 7:00 PM – 9:00 PM and Friday, May 4, 7:00 PM – 9:00 PM. Presenters are requested to put up their posters no later than 7:00 PM, the official start time of both sessions. Papers presented on Thursday and Saturday will have their poster slots during the Welcome Reception and Poster Session on Thursday, May 3. Papers presented on Friday will have their poster slots during the Doctoral Forum and Poster Session on Friday, May 4. Boards and push pins will be available to Thursday's presenters at 7:00 AM on Thursday, May 3 and at 9:00 AM on Friday, May 4 for Friday's presenters.

SIAM Books and Journals

Display copies of books and complimentary copies of journals are available on site. SIAM books are available at a discounted price during the conference. Titles on display forms are available with instructions on how to place a book order.

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Get-togethers

- Welcome Reception and Poster Session



Thursday, May 3
7:00 PM – 9:00 PM

- Business Meeting (open to SIAG/DMA members)

Friday, May 4
7:00 PM – 9:00 PM

Complimentary beer and wine will be served.



Statement on Inclusiveness

As a professional society, SIAM is committed to providing an inclusive climate that encourages the open expression and exchange of ideas, that is free from all forms of discrimination, harassment, and retaliation, and that is welcoming and comfortable to all members and to those who participate in its activities. In pursuit of that commitment, SIAM is dedicated to the philosophy of equality of opportunity and treatment for all participants regardless of gender, gender identity or expression, sexual orientation, race, color, national or ethnic origin, religion or religious belief, age, marital status, disabilities, veteran status, field of expertise, or any other reason not related to scientific merit. This philosophy extends from SIAM conferences, to its publications, and to its governing structures and bodies. We expect all members of SIAM and participants in SIAM activities to work towards this commitment.

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Audio and video recording of presentations at SIAM meetings is prohibited without the written permission of the presenter and SIAM.

Social Media

SIAM is promoting the use of social media, such as Facebook and Twitter, in order to enhance scientific discussion at its meetings and enable attendees to connect with each other prior to, during and after conferences. If you are tweeting about a conference, please use the designated hashtag to enable other attendees to keep up with the Twitter conversation and to allow better archiving of our conference discussions. The hashtag for this meeting is #SIAMSDM18.

SIAM's Twitter handle is
@TheSIAMNews.

Changes to the Printed Program

The printed program and abstracts were current at the time of printing, however, please review the online program schedule (<http://meetings.siam.org/program.cfm?CONFCODE=DT18>) for the most up-to-date information.

Invited Plenary Speakers

**** All Invited Plenary Presentations will take place in Salon A-D****

Thursday, May 3

8:15 AM - 9:30 AM

IP1 Title Not Available at Time of Publication

Bernhard Schölkopf, *Max Planck Institute for Intelligent Systems, Germany
and Amazon, Germany*

1:15 PM - 2:30 PM

IP2 Learning to Rank Results Optimally in Search and Recommendation

Charles Elkan, *University of California, San Diego USA*

Friday, May 4

8:15 AM - 9:30 AM

IP3 Towards a Structure/Function simulation of a Cancer Cell

Trey G. Ideker, *University of California, San Diego USA*

Saturday, May 5

8:00 AM - 9:15 AM

IP4 From Robots to Biomolecules: Computing Meets the Physical World

Lydia Kavraki, *Rice University, USA*

Tutorials

**** All Tutorials will take place in Sierra 5-6 ****

Thursday, May 3

10:00 AM - 12:00 PM

TS1: Tutorial Session: A Critical Review of Online Social Data:
Biases, Methodological: Pitfalls, and Ethical Boundaries

2:45 PM - 4:45 PM

TS2: Tutorial Session: Data Mining Critical Infrastructure Systems - Models and Tools

5:00 PM - 7:00 PM

TS3: Tutorial Session: Knowledge Discovery from Temporal Social Networks

Friday, May 4

10:00 AM - 12:00 PM

TS4: Tutorial Session: Problems with Partially Observed (Incomplete) Networks:
Biases, Skewed Results, and Solutions

1:15 PM - 3:15 PM

TS5: Tutorial Session: The Canonical Polyadic Tensor: Decomposition
and Variants for Mining Multi-Dimensional Data

3:30 PM - 5:10 PM

TS5: Tutorial Session, continued: The Canonical Polyadic Tensor:
Decomposition and Variants for Mining Multi-Dimensional Data

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Workshops

Saturday, May 5 Workshops

9:30 AM – 5:45 PM

Workshop 1: Big Traffic Data Analytics

Sierra 6

Workshop 2: Artificial Intelligence in Insurance

Sierra 5

Workshop 3: Machine Learning Methods for Recommender Systems

Salon A-C

Workshop 4: Cost-Sensitive Learning

Balboa 1-2

Workshop 5: Data Mining for Geophysics and Geology

Cabrillo Salon 1

Workshop 6: Data Mining for Medicine and Healthcare

Cabrillo Salon 2

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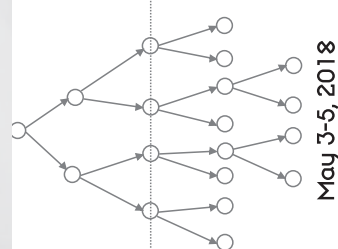
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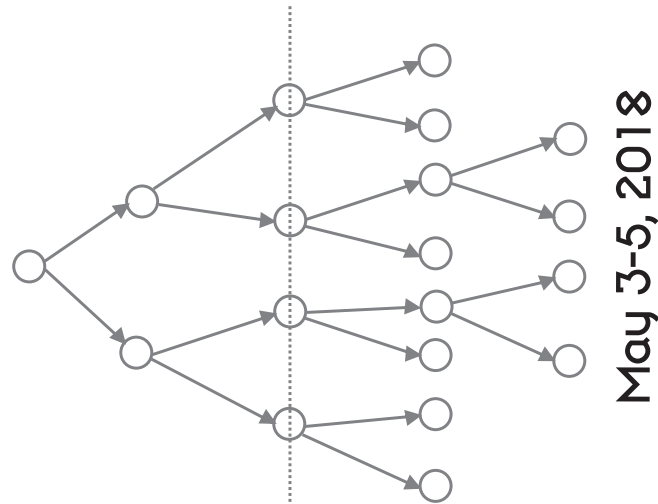
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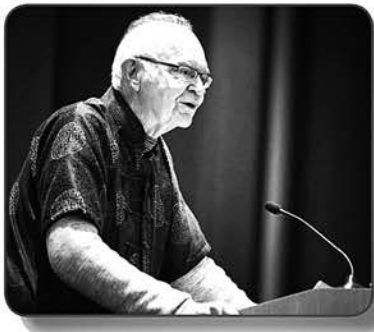
2018 SIAM International Conference on DATA MINING



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Wednesday, May 2

Registration

5:00 PM-7:00 PM

Room: Rio Vista Ballroom Foyer

Thursday, May 3

Registration

7:00 AM-7:30 PM

Room: Rio Vista Ballroom Foyer

Continental Breakfast

7:30 AM-8:00 AM

Room: Salon E-H



Announcements

8:00 AM-8:15 AM

Room: Salon A-D

Thursday, May 3

IP1

Title To Be Announced

8:15 AM-9:30 AM

Room: Salon A-D

Chair: Dino Pedreschi, Universita' di Pisa, Italy

Abstract Not Available At Time Of Publication

Bernhard Schölkopf

Max Planck Institute for Intelligent Systems, Germany and Amazon, Germany

Coffee Break

9:30 AM-10:00 AM

Room: Salon E-H



Thursday, May 3

TS1

Tutorial Session: A Critical Review of Online Social Data: Biases, Methodological: Pitfalls, and Ethical Boundaries

10:00 AM-12:00 PM

Room: Sierra 5-6

Chair: Yan Liu, University of Southern California, USA

To set the context for the issues we review, we first discuss why (purposes and applications), and how (prototypical data processing and analysis pipeline) social data is used, and provide examples of typical limitations, tradeoffs or mistakes.

Alexandra Olteanu
BM Research, USA

Emre Kiciman
Microsoft Research, USA

Carlos Castillo
Universitat Pompeu Fabra, Spain

Thursday, May 3

CP1

Clustering

10:00 AM-12:00 PM

Room: Salon A-C

Chair: Fosca Giannotti, Institute of Information Science and Technologies (ISTI), Italy

10:00-10:15 Many-to-Many Correspondences Between Partitions: Introducing a Cut-Based Approach

Roland Glantz, Karlsruhe Institute of Technology, Germany; Henning Meyerhenke, University of Cologne, Germany

10:20-10:35 Graph Sketching-Based Space-Efficient Data Clustering

Anne Morvan, CEA and Université Paris-Dauphine, France; Krzysztof Choromanski, Google, Inc., USA; Cédric Gouy-Pailler, CEA, France; Jamal Atif, Université Paris Dauphine, France

10:40-10:55 Image Constrained Blockmodelling: A Constraint Programming Approach

Mohadeseh Ganji, University of Melbourne, Australia; Jeffrey Chan, RMIT University, Australia; Peter J Stuckey, James Bailey, Christopher Leckie, and Kotagiri Ramamohanarao, University of Melbourne, Australia; Ian Davidson, University of California, Davis, USA

11:00-11:15 NLRR++: Scalable Subspace Clustering Via Non-Convex Block Coordinate Descent

Jun Wang, Harbin Institute of Technology, China; Cho-Jui Hsieh, University of California, Davis, USA; Daming Shi, Harbin Institute of Technology, China

11:20-11:35 Unsupervised Neural Categorization for Scientific Publications

Keqian Li, Hanwen Zha, Yu Su, and Xifeng Yan, University of California, Santa Barbara, USA

11:40-11:55 Mixtures of Block Models for Brain Networks

Zilong Bai, University of California, Davis, USA; Peter Walker, Naval Medical Research Center, USA; Ian Davidson, University of California, Davis, USA

Thursday, May 3

CP2

Sequence Data

10:00 AM-12:00 PM

Room: Salon D

Chair: - Jessie Li, Pennsylvania State University, USA

10:00-10:15 Causal Inference on Event Sequences

Kailash Budhathoki and Jilles Vreeken, Max Planck Institute for Informatics, Germany

10:20-10:35 Outlier Detection over Distributed Trajectory Streams

Jiali Mao, Pengda Sun, Cheqing Jin, and Aoying Zhou, East China Normal University, China

10:40-10:55 Jump: A Fast Deterministic Algorithm to Find the Closest Pair of Subsequences

Xingyu Cai, Shanglin Zhou, and Sanguthevar Rajasekaran, University of Connecticut, USA

11:00-11:15 Streaming Tensor Factorization for Infinite Data Sources

Shaden Smith and Kejun Huang, University of Minnesota, USA; Nicholas Sidiropoulos, University of Virginia, USA; George Karypis, University of Minnesota and Army HPC Research Center, USA

11:20-11:35 Mining Top-K Quantile-Based Cohesive Sequential Patterns

Len Feremans, Boris Cule, and Bart Goethals, University of Antwerp, Belgium

11:40-11:55 Staple: Spatio-Temporal Precursor Learning for Event Forecasting

Yue Ning, Virginia Tech, USA

Lunch Break

12:00 PM-1:15 PM

Attendees on their own

Thursday, May 3

IP2**Learning to Rank Results Optimally in Search and Recommendation**

1:15 PM - 2:30 PM

Room: Salon A-D

Chair: Martin Ester, Simon Fraser University, Canada

Consider the scenario where an algorithm is given a context, and then it must select a slate of results to display. For example, the context may be a search query, an advertising slot, or an opportunity to show recommendations. We want to compare many alternative ranking functions that select results in different ways. However, online A/B testing with traffic from actual users is expensive. This research provides a method to use traffic that was exposed to a past ranking function to obtain an estimate of the utility of a hypothetical new ranking function. The method is a purely offline computation, and relies on just one assumption that is quite reasonable. We show further how to design a ranking function that is the best possible, given the same assumption. Learning an optimal function for a search engine to apply to rank results given a query is a special case. Experimental results on data logged by a real-world e-commerce web site are positive.

Charles Elkan

University of California, San Diego, USA

Coffee Break

2:30 PM-2:45 PM



Room: Salon E-H

Thursday, May 3

TS2**Tutorial Session: Data Mining Critical Infrastructure Systems - Models and Tools**

2:45 PM-4:45 PM

Room: Sierra 5-6

Chair: Yan Liu, University of Southern California, USA

Critical Infrastructure Systems such as transportation, water and power grid systems are vital to our national security, economy, and public safety. These different infrastructures are also interdependent on each other in such a complicated way that failures in one may lead to failures in the others. Recent events, like Hurricanes Harvey and Irma, show how the interdependencies among different CI networks lead to catastrophic failures among the whole system. Hence, analyzing these CI networks becomes a very important problem. Can we understand how different CISs are related to each? Moreover, given a natural disaster like a hurricane or an earthquake, can we analyze and predict their impact on the CISs? How can we help policy makers in such situations?

Different types of approaches (empirical, agent based, system-dynamics based, etc.) have been proposed. In this tutorial, we will cover recent and state-of-the-art research on interesting CIS problems both generally and in specific popular systems (power and transportation). We will also cover tools that support decision making during events. The tutorial will be in 2 hours, with a 5 min break. This tutorial has not been presented before in other venues.

Liangzhe Chen
Virginia Tech, USAAditya Prakash
Virginia Tech, USA

Thursday, May 3

CP3**Networks 1**

2:45 PM-4:45 PM

Room: Salon A-C

Chair: Shobeir Fakhraei, University of Southern California, USA

2:45-3:00 Near-Optimal Mapping of Network States Using Probes

Bijaya Adhikari, Pavan Rangudu, B. Aditya Prakash, and Anil Vullikanti, Virginia Tech, USA

3:05-3:20 Network Inference from Contrastive Groups Using Discriminative Structural Regularization

Ruihua Cheng and Zhi Wei, New Jersey Institute of Technology, USA; Kai Zhang, Temple University, USA

3:25-3:40 Group Centrality Maximization Via Network Design

Sourav Medya, Arlei Silva, and Ambuj Singh, University of California, Santa Barbara, USA; Prithwish Basu, Raytheon Systems, USA; Ananthram Swami, Army Research Laboratory, USA

3:45-4:00 Robust Road Map Inference Through Network Alignment of Trajectories

Sanjay Chawla, University of Sydney, Australia; Sofiane Abbar, Rade Stanojevic, Saravanan Thirumuruganathan, Fethi Filali, and Ahid Aleimat, Qatar Computing Research Institute, Qatar

4:05-4:20 AspEm: Embedding Learning by Aspects in Heterogeneous Information Networks

Yu Shi, University of Illinois, Urbana-Champaign, USA; Huan Gui, Facebook, USA; Qi Zhu, University of Illinois, Urbana-Champaign, USA; Lance Kaplan, U.S. Army Research Laboratory, USA; Jiawei Han, University of Illinois at Urbana-Champaign, USA

4:25-4:40 Semi-Supervised Embedding in Attributed Networks with Outliers

Jiongqian Liang, Peter Jacobs, Jiankai Sun, and Srinivasan Parthasarathy, Ohio State University, USA

Thursday, May 3

CP4

Social Media

2:45 PM-4:45 PM

Room:Salon D

Chair: Hongwei Liang, Simon Fraser University, Canada

2:45-3:00 Online Truth Discovery on Time Series Data

Liuyi Yao and Lu Su, State University of New York, Buffalo, USA; Qi Li, University of Illinois, Urbana-Champaign, USA; Yaliang Li, Baidu Research Big Data Lab, China; Fenglong Ma, Jing Gao, and Aidong Zhang, State University of New York, Buffalo, USA

3:05-3:20 Modeling the Interaction Coupling of Multi-View Spatiotemporal Contexts for Destination Prediction

Kunpeng Liu and Pengyang Wang, Missouri University of Science and Technology, USA; Jiawei Zhang, Florida State University, USA; Guannan Liu, Beihang University, China; Yanjie Fu and Sajal Das, Missouri University of Science and Technology, USA

3:25-3:40 Who Will Attend This Event Together? Event Attendance Prediction Via Deep Lstm Networks

Xian Wu, Yuxiao Dong, and Baoxu SHI, University of Notre Dame, USA; Ananthram Swami, Army Research Laboratory, USA; Nitesh Chawla, University of Notre Dame, USA

3:45-4:00 You Are How You Move: Linking Multiple User Identities From Massive Mobility Traces

Huandong Wang and Yong Li, Tsinghua University, P. R. China; Gang Wang, Virginia Tech, USA; Depeng Jin, Tsinghua University, P. R. China

4:05-4:20 Click Versus Share: A Feature-Driven Study of Micro-Video Popularity and Virality in Social Media

Jingtao Ding, Yanghao Li, Yong Li, and Depeng Jin, Tsinghua University, P. R. China

4:25-4:40 A Probabilistic Hough Transform for Opportunistic Crowd-Sensing of Moving Traffic Obstacles

Michiaki Tatsubori, IBM Research - Tokyo, Japan; Aisha Walcott-Bryant and Reginald Bryant, IBM Research, Kenya; John Wamburu, University of Massachusetts, Amherst, USA

Thursday, May 3

Organizational Break

4:45 PM-5:00 PM

TS3

Tutorial Session: Knowledge Discovery from Temporal Social Networks

5:00 PM-7:00 PM

Room:Sierra 5-6

Chair: Yan Liu, University of Southern California, USA

Data is structured in the form of networks. And now? How to analyze them? Extracting knowledge of network data is not a simple task and requires the use of appropriate tools and techniques, especially in scenarios that take into account the volume and evolving aspects of the network. There is a vast literature on how to collect, process, and model social media data in the form of networks, as well as key metrics of centrality. However, there is still much to be discussed in relation to the analysis of the underlying network. In this tutorial we consider that data has already been collected and is already structured as a network. The goal is to discuss techniques to analyze network data, especially considering time perspective. First, concepts related to problem definition, temporal networks and metrics for network analysis will be presented. Next, in a more practical aspect will be shown techniques of visualization and processing of temporal networks. In the end, applications with real data will be discussed, illustrating how network data knowledge extraction works from start to finish.

Fabiola Pereira

Federal University of Uberlandia, Brazil

Joao Gama

University of Porto, Portugal

Thursday, May 3

CP5

Time Series Data 1

5:00 PM-6:40 PM

Room:Salon A-C

Chair: - Abdullah Mueen, University of New Mexico, USA

5:00-5:15 Interpretable Categorization of Heterogeneous Time Series Data

Ritchie Lee, Carnegie Mellon University, USA; Mykel Kochenderfer, Stanford University, USA; Ole Mengshoel, Carnegie Mellon University, USA; Joshua Silbermann, Johns Hopkins University, USA

5:20-5:35 Efficient Search of the Best Warping Window for Dynamic Time Warping

Chang Wei Tan and Matthieu Herrmann, Monash University, Australia; Germain Forestier, University of Haute Alsace, France; Geoff Webb and Francois Petitjean, Monash University, Australia

5:40-5:55 Accelerating Time Series Searching with Large Uniform Scaling

Yilin Shen and Yanping Chen, Samsung Research America, USA; Eamonn Keogh, University of California, Riverside, USA; Hongxia Jin, Samsung Research America, USA

6:00-6:15 Evolving Separating References for Time Series Classification

Xiaosheng Li and Jessica Lin, George Mason University, USA

6:20-6:35 Classifying Multivariate Time Series by Learning Sequence-Level Discriminative Patterns

Guruprasad Nayak, University of Minnesota, USA; Varun Mithal, LinkedIn, USA; Xiaowei Jia and Vipin Kumar, University of Minnesota, USA

Thursday, May 3

CP6

Health Informatics

5:00 PM-6:40 PM

Room:Salon D

Chair: Dino Pedreschi, University of Pisa, Italy

5:00-5:15 Health-Atm: A Deep Architecture for Multifaceted Patient Health Record Representation and Risk Prediction

Tengfei Ma and Cao Xiao, IBM Research, USA; Fei Wang, Cornell University, USA

5:20-5:35 Uncorrelated Patient Similarity Learning

Mengdi Huai, Chenglin Miao, and Qiuling Suo, State University of New York, Buffalo, USA; Yaliang Li, Baidu Research Big Data Lab, China; Jing Gao and Aidong Zhang, State University of New York, Buffalo, USA

5:40-5:55 Eeg-Based Motion Intention Recognition Via Multi-Task Rnns

Weitong Chen, University of Queensland, Australia; Sen Wang, Griffith University, Brisbane, Australia; Xiang Zhang and Lina Yao, University of New South Wales, Australia; Lin Yue, Northeast Normal University, People's Republic of China; Buyue Qian, Xi'an Jiaotong University, P.R. China; Xue Li, University of Queensland, Australia

6:00-6:15 Multi-Task Learning Based Survival Analysis for Predicting Alzheimer's Disease Progression with Multi-Source Block-Wise Missing Data

Yan Li, University of Michigan, USA; Tao Yang, Arizona State University, USA; Jiayu Zhou, Michigan State University, USA; Jieping Ye, University of Michigan, Ann Arbor, USA

6:20-6:35 Deep Attention Model for Triage of Emergency Department Patients

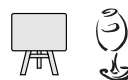
Djordje Gligorijevic, Jelena Stojanovic, Wayne Satz, Ivan Stojkovic, Kraftin Schreyer, Daniel Del Portal, and Zoran Obradovic, Temple University, USA

Thursday, May 3

Welcome Reception and Poster Session Part I

7:00 PM-9:00 PM

Room:Rio Vista Pavilion



Papers presented on Thursday and Saturday will have their poster slots during this session.

Friday, May 4

Registration

7:30 AM-4:00 PM

Room:Rio Vista Ballroom Foyer

Continental Breakfast

7:30 AM-8:00 AM

Room:Salon E-H



Announcements

8:00 AM-8:15 AM

Room:Salon A-D

Friday, May 4

IP3**Towards a Structure/
Function Simulation of a
Cancer Cell**

8:15 AM - 9:30 AM

*Chair: Tanya Y. Berger-Wolf, University of
Illinois, Chicago, USA*

Recently we and other laboratories have launched the Cancer Cell Map Initiative (ccmi.org) and have been building momentum. The goal of the CCMI is to produce a complete map of the gene and protein wiring diagram of a cancer cell. We and others believe this map, currently missing, will be a critical component of any future system to decode a patient's cancer genome. I will describe efforts along several lines: 1. Coalition building. We have made notable progress in building a coalition of institutions to generate the data, as well as to develop the computational methodology required to build and use the maps. 2. Development of technology for mapping gene-gene interactions rapidly using the CRISPR system. 3. Causal network maps connecting DNA mutations (somatic and germline, coding and noncoding) to the cancer events they induce downstream. 4. Development of software and database technology to visualize and store cancer cell maps. 5. A machine learning system for integrating the above data to create multi-scale models of cancer cells. In a recent paper by Ma et al., we have shown how a hierarchical map of cell structure can be embedded with a deep neural network, so that the model is able to accurately simulate the effect of mutations in genotype on the cellular phenotype.

Trey G. Ideker*University of California, San Diego, USA***Coffee Break**

9:30 AM-10:00 AM

*Room:Salon E-H*

Friday, May 4

TS4**Tutorial Session: Problems
with Partially Observed
(Incomplete) Networks:
Biases, Skewed Results, and
Solutions**

10:00 AM-12:00 PM

*Room:Sierra 5-6**Chair: Yan Liu, University of Southern
California, USA*

Networked representations of physical and social phenomena are ubiquitous. Examples include social and information networks, technological and communication networks, co-purchasing networks, etc. These networks are often incomplete because the phenomena are partially observed. Working with incomplete networks can skew analyses. Acquiring the full data is often unrealistic (e.g., obtaining the Twitter Firehose is not viable), but one may be able to collect data selectively to enrich the incomplete network. With a limited query budget, which parts of a partially observed network should be examined to give the best (i.e., most complete) view of the entire network? Suppose that one has obtained a sample of a Twitter retweet network from a Web site. The sample was collected for some other purpose (unknown to us), and so may not contain the most useful structural information for one's purposes. How should one best supplement this sampled data? This tutorial addresses the above questions. In particular, it will focus on multi-armed bandit and reinforcement learning solutions.

Tina Eliassi-Rad*Northeastern University, USA***Sucheta Soundarajan***Syracuse University, USA***Sahely Bhadra***Indian Institute of Information Technology,
India*

Friday, May 4

CP7**Graphs**

10:00 AM-12:00 PM

*Room:Salon A-C**Chair: B. Aditya Prakash, Virginia Tech, USA***10:00-10:15 Learning Graph
Representation Via Frequent
Subgraphs***Dang Nguyen, Wei Luo, Tu Nguyen, Svetha
Venkatesh, and Dinh Phung, Deakin
University, Australia***10:20-10:35 On2Vec: Embedding-
Based Relation Prediction for Ontology
Population***Muhao Chen, University of California, Los
Angeles, USA***10:40-10:55 On Spectral Graph
Embedding: A Non-Backtracking
Perspective and Graph Approximation***Fei Jiang, Peking University, China; Lifang
He, South China University of Technology,
China; Yi Zheng, Peking University, China;
Enqiang Zhu, Guangzhou University,
China; Jin Xu, Peking University, China;
Philip Yu, University of Illinois, Chicago,
USA***11:00-11:15 A Family of Tractable
Graph Distances***Stratis Ioannidis, Northeastern University,
USA; Jose Bento, Boston College, USA***11:20-11:35 Fast Flow-Based Random
Walk with Restart in a Multi-Query
Setting***Yujun Yan, Mark Heimann, Di Jin, and Danai
Koutra, University of Michigan, USA***11:40-11:55 Ensemble-Spotting:
Ranking Urban Vibrancy Via Poi
Embedding with Multi-View Spatial
Graphs***Pengyang Wang, Missouri University of
Science and Technology, USA; Jiawei
Zhang, Florida State University, USA;
Guannan Liu, Beihang University, China;
Yanjie Fu, Missouri University of Science
and Technology, USA; Charu C. Aggarwal,
IBM T.J. Watson Research Center, USA*

Friday, May 4

CP8

Matrix Factorization and Topic Models

10:00 AM-12:00 PM

Room:Salon D

Chair: Lifang He, Cornell University, USA

10:00-10:15 Latitude: A Model for Mixed Linear-Tropical Matrix Factorization

Sanjar Karaev, Max-Planck Institute for Informatics, Germany; James Hook, University of Bath, United Kingdom; Pauli Miettinen, Max Planck Institute for Informatics, Germany

10:20-10:35 Topic Modeling Based on Keywords and Context

Johannes Schneider, Universitaet Liechtenstein, Switzerland

10:40-10:55 Discovering Hidden Topical Hubs and Authorities in Online Social Networks

Roy Ka-Wei Lee, Singapore Management University, Singapore; Tuan-Anh Hoang, Leibniz University Hannover, Germany; Ee-Peng Lim, Singapore Management University, Singapore

11:00-11:15 SamBaTen: Sampling-Based Batch Incremental Tensor Decomposition

Ekta Gujral, Ravdeep Pasricha, and Evangelos Papalexakis, University of California, Riverside, USA

11:20-11:35 ParaSketch: Parallel Tensor Factorization Via Sketching

Bo Yang and Ahmed Zamzam, University of Minnesota, USA; Nicholas Sidiropoulos, University of Virginia, USA

11:40-11:55 The Trustworthy Pal: Controlling the False Discovery Rate in Boolean Matrix Factorization

Sibylle Hess, Nico Piatkowski, and Katharina Morik, TU Dortmund, Germany

Lunch Break

12:00 PM-1:15 PM

Attendees on their own

Friday, May 4

TS5

Tutorial Session: The Canonical Polyadic Tensor: Decomposition and Variants for Mining Multi-Dimensional Data

1:15 PM-3:15 PM

Room:Sierra 5-6

Chair: Yan Liu, University of Southern California, USA

Multi-dimensional or multi-way datasets are becoming increasingly common in science and engineering applications. Data structures that live in three or more dimensions often exhibit informative hidden structures that can be discovered and understood through tensor decompositions. The purpose of this tutorial is to dive deep into the canonical polyadic tensor decomposition (also known as CANDECOMP, PARAFAC, or just CP), giving attendees the mathematical and algorithmic tools to understand existing methods and have a strong foundation for developing their own tools. The tutorial begin with the basics and build up to very recent developments. It is appropriate for anyone at the graduate school level or higher, with a basic understanding of numerical methods. A unique feature of our proposed tutorial will be hands-on exercises using the Tensor Toolbox for MATLAB to apply tensor decompositions to real-world open source datasets. Through these exercises, we hope to give attendees a glimpse into the application of these methods and the open problems that still exist (like choosing the rank of the tensor decomposition). We expect that most attendees will already have access to MATLAB through their universities, but we also intend to work with Mathworks to get temporary licenses for participants. We will work with one dataset that is nearly 2 GB, so we will invite participants to download the datasets ahead of time.

Tamara G. Kolda

Sandia National Laboratories, USA

Daniel M. Dunlavy

Sandia National Laboratories, USA

continued in next column

Friday, May 4

CP9**Novel Learning Methods 1**

1:15 PM-3:15 PM

Room:Salon A-C

Chair: Martin Ester, Simon Fraser University, Canada

1:15-1:30 Exploiting Structure for Fast Kernel Learning

Trefor W. Evans and Prasanth B. Nair, University of Toronto, Canada

1:35-1:50 Global Nonlinear Metric Learning by Gluing Local Linear Metrics

Yaxin Peng, Lingfang Hu, and Shihui Ying, Shanghai University, China; Chaomin Shen, East China Normal University, China

1:55-2:10 Co-Regularized Monotone Retargeting for Semi-Supervised Letor

Shalmali Joshi, Rajiv Khanna, and Joydeep Ghosh, University of Texas at Austin, USA

2:15-2:30 Markov Chain Monitoring

Harshal Chaudhari, Boston University, USA; Michael Mathioudakis, University of Helsinki, Finland; Evimaria Terzi, Boston University, USA

2:35-2:50 Multi-view Weak-label Learning Based on Matrix Completion

Qiaoyu Tan and Guoxian Yu, Southwest University, China; Carlotta Domeniconi, George Mason University, USA; Jun Wang and Zili Zhang, Southwest University, China

2:55-3:10 Efficient and Effective Accelerated Hierarchical Higher-Order Logistic Regression for Large Data Quantities

Nayyar Zaidi, Francois Petitjean, and Geoffrey Webb, Monash University, Australia

Friday, May 4

CP10**Classification**

1:15 PM-3:15 PM

Room:Salon D

Chair: Takashi Washio, Osaka University, Japan

1:15-1:30 Discriminative Prototype Set Learning for Nearest Neighbor Classification

Shin Ando, Tokyo University of Science, Japan

1:35-1:50 ALE: Additive Latent Effect Models for Grade Prediction

Zhiyun Ren, George Mason University, USA; Xia Ning, Indiana University - Purdue University Indianapolis, USA; Huzefa Rangwala, George Mason University, USA

1:55-2:10 A Salient Ensemble of Trees Using Cascaded Linear Classifiers with Feature-Cost Constraints

Chien-Wen Huang, Chung-Kuang Chou, and Ming-Syan Chen, National Taiwan University, Taiwan

2:15-2:30 An Lstm Approach to Patent Classification Based on Fixed Hierarchy Vectors

Matthias Schubert, Ludwig-Maximilians-Universität München, Germany; Marawan Shalaby, Technical University of Munich, Germany; Jan Stutzki, Ludwig Maximilian University of Munich, Germany; Stephan Günnemann, Technical University of Munich, Germany

2:35-2:50 Limited-Memory Common-Directions Method for Distributed L1-Regularized Linear Classification

Wei-Lin Chiang and Yu-Sheng Li, National Taiwan University, Taiwan; Ching-Pei Lee, University of Wisconsin, Madison, USA; Chih-Jen Lin, National Taiwan University, Taiwan

2:55-3:10 A Practitioners' Guide to Transfer Learning for Text Classification Using Convolutional Neural Networks

Tushar Semwal, Indian Institute of Technology Guwahati, India; Gaurav Mathur and Promod Yenigalla, Samsung R&D Institute India, Bangalore; Shivashankar Nair, Indian Institute of Technology, Guwahati, India

Coffee Break

3:15 PM-3:30 PM

Room:Salon E-H



Friday, May 4

TS5**Tutorial Session, continued: The Canonical Polyadic Tensor: Decomposition and Variants for Mining Multi-Dimensional Data**

1:15 PM-3:15 PM

Room:Sierra 5-6

Chair: Yan Liu, University of Southern California, USA

Multi-dimensional or multi-way datasets are becoming increasingly common in science and engineering applications. Data structures that live in three or more dimensions often exhibit informative hidden structures that can be discovered and understood through tensor decompositions. The purpose of this tutorial is to dive deep into the canonical polyadic tensor decomposition (also known as CANDECOMP, PARAFAC, or just CP), giving attendees the mathematical and algorithmic tools to understand existing methods and have a strong foundation for developing their own tools. The tutorial begin with the basics and build up to very recent developments. It is appropriate for anyone at the graduate school level or higher, with a basic understanding of numerical methods. A unique feature of our proposed tutorial will be hands-on exercises using the Tensor Toolbox for MATLAB to apply tensor decompositions to real-world open source datasets. Through these exercises, we hope to give attendees a glimpse into the application of these methods and the open problems that still exist (like choosing the rank of the tensor decomposition). We expect that most attendees will already have access to MATLAB through their universities, but we also intend to work with Mathworks to get temporary licenses for participants. We will work with one dataset that is nearly 2 GB, so we will invite participants to download the datasets ahead of time.

continued on next page

Tamara G. Kolda
Sandia National Laboratories, USA

Daniel M. Dunlavy
Sandia National Laboratories, USA

Friday, May 4

CP11

Time Series Data 2

3:30 PM-5:10 PM

Room: Salon A-C

Chair: Joao Gama, University of Porto, Portugal

3:30-3:45 Sparse Decomposition for Time Series Forecasting and Anomaly Detection

Sunay Choudhary, Adobe Systems, USA;
Gaurush Hiranandani, UIUC, USA; Shiv Saini, Adobe Systems, USA

3:50-4:05 StreamCast: Fast and Online Mining of Power Grid Time Sequences

Bryan Hooi, Hyun Ah Song, Amritanshu Pandey, Marko Jereminov, Larry Pileggi, and Christos Faloutsos, Carnegie Mellon University, USA

4:10-4:25 Exact Mean Computation in Dynamic Time Warping Spaces

Markus Brill, Technische Universitaet Berlin, Germany; Till Fluschnik, Vincent Froese, Brijnesh Jain, Rolf Niedermeier, and David Schultz, TU Berlin, Germany

4:30-4:45 Framework for Inferring Leadership Dynamics of Complex Movement from Time Series

Chainarong Amornbunchornvej and Tanya Y. Berger-Wolf, University of Illinois, Chicago, USA

4:50-5:05 Brain EEG Time Series Selection: A Novel Graph-Based Approach for Classification

Chenglong Dai, Nanjing University of Aeronautics and Astronautics, China; Jia Wu, Macquarie University, Sydney, Australia; Dechang Pi and Lin Cui, Nanjing University of Aeronautics and Astronautics, China

Friday, May 4

CP12

Applied Data Science

3:30 PM-5:10 PM

Room: Salon D

Chair: - Jiayu Zhou, Michigan State University, USA

3:30-3:45 A Rare and Critical Condition Search Technique and its Application to Telescope Stray Light Analysis

Keiichi Kisamori, National Institute of Advanced Industrial Science and Technology, Japan; Takashi Washio, Osaka University, Japan; Yoshio Kameda, National Institute of Advanced Industrial Science and Technology, Japan; Ryohei Fujimaki, NEC Global, Japan

3:50-4:05 Revenue Maximization on the Multi-Grade Product

Ya-Wen Teng, National Taiwan University, Taiwan; Chih-Hua Tai, National Taipei University of Technology, Taiwan; Philip Yu, University of Illinois, Chicago, USA; Ming-Syan Chen, National Taiwan University, Taiwan

4:10-4:25 Avoidance Region Discovery: A Summary of Results

Emre Eftelioglu, Shashi Shekhar, and Xun Tang, University of Minnesota, USA

4:30-4:45 Learning Convolutional Text Representations for Visual Question Answering

Zhengyang Wang and Shuiwang Ji, Washington State University, USA

4:50-5:05 Black-Box Expectation Propagation for Bayesian Models

Ximing Li, ; Changchun Li, Jinjin Chi, Jihong Ouyang, and Wenting Wang, Jilin University, China

Organizational Break

5:10 PM-5:15 PM

Friday, May 4

**Panel: Broadening
Participation in Data
Science**

5:15 PM-6:30 PM

Room:Salon D

**Award Ceremony and
SIAG/DMA
Business Meeting**

6:30 PM-7:00 PM

Room:Salon D

*Complimentary beer and wine will be
served*

**Doctoral Forum and
Poster Session Part II**

7:00 PM-9:00 PM

Room:Rio Vista Pavilion

*Papers presented on Friday will have their
poster slots during the Doctoral Forum
Session.*



Saturday, May 5

Registration

7:30 AM-4:00 PM

Room:Rio Vista Ballroom Foyer

Continental Breakfast

7:30 AM-8:00 AM

Room:Salon E-H



IP4

**From Robots to
Biomolecules: Computing
Meets the Physical World**

8:00 AM - 9:15 AM

Room: Salon A-D

*Chair: Dimitrios Gunopulos, University
of Athens, Greece*

The development of fast and reliable motion planning algorithms has deeply influenced many domains in robotics, such as industrial automation and autonomous exploration, but has also contributed novel methodologies to distant domains such as computational structural biology. This talk will present recent work on the computation of low-level plans from high-level specifications. High-level specifications declare what the robot must do, rather than how this task is to be done. The talk will also discuss robotics-inspired methods for computing the flexibility of proteins and for molecular docking with the ultimate goal of deciphering molecular function and aiding the discovery of new therapeutics.

Lydia Kavradi
Rice University, USA

Coffee Break

9:15 AM-9:30 AM

Room:Salon E-H



Saturday, May 5

CP13

Personalization

9:30 AM-11:30 PM

Room:Salon D

*Chair:Beidou Wang, Simon Fraser
University, Canada*

**9:30-9:45 Learning to Interact with
Users: A Collaborative-Bandit
Approach**

*Konstantina Christakopoulou and Arindam
Banerjee, University of Minnesota, USA*

**9:50-10:05 Robust Cost-Sensitive
Learning for Recommendation with
Implicit Feedback**

*Peng Yang, King Abdullah University
of Science & Technology (KAUST),
Saudi Arabia; Peilin Zhao, South China
University of Technology, China; Yong
Liu, NTUC Link, Singapore; Xin Gao,
King Abdullah University of Science &
Technology (KAUST), Saudi Arabia*

**10:10-10:25 Modeling Item-Specific
Effects for Video Click**

*Fei Tan, Kuang Du, Zhi Wei, and Haoran Liu,
New Jersey Institute of Technology, USA;
Chenguang Qin and Ran Zhu, PPLive, Inc,
China*

**10:30-10:45 One-Class
Recommendation with Asymmetric
Textual Feedback**

*Mengting Wan and Julian McAuley,
University of California, San Diego, USA*

**10:50-11:05 Online It Ticket
Automation Recommendation Using
Hierarchical Multi-Armed Bandit
Algorithms**

*Qing Wang, Tao Li, and S.S. Iyengar, Florida
International University, USA; Larisa
Shwartz, IBM T.J. Watson Research
Center, USA; Genady Grabarnik, St. John's
University, USA*

**11:10-11:25 Investigating Deep
Reinforcement Learning Techniques in
Personalized Dialogue Generation**

*Min Yang, Chinese Academy of Sciences,
China; Qiang Qu, Shenzhen Institute of
Advanced Technology, China; Kai Lei,
Peking University, China; Jia Zhu, South
China Normal University, China; Zhou
Zhao, Zhejiang University, China; Xiaojun
Chen and Joshua Zhexue Huang, Shenzhen
University, China*

Saturday, May 5

Workshop 1: Big Traffic Data Analytics

9:30 AM-5:45 PM

Room:Sierra-6

Workshop 2: Artificial Intelligence in Insurance

9:30 AM-5:45 PM

Room:Sierra 5

Workshop 3: Machine Learning Methods for Recommender Systems

9:30 AM-5:45 PM

Room:Salon A-C

Workshop 4: Cost-Sensitive Learning

9:30 AM-5:45 PM

Room:Balboa 1-2

Workshop 5: Data Mining for Geophysics and Geology

9:30 AM-5:45 PM

Room:Cabrillo Salon 1

Workshop 6: Data Mining for Medicine and Healthcare

9:30 AM-5:45 PM

Room:Cabrillo Salon 2

Lunch Break

12:15 PM-1:30 PM

Attendees on their own

Saturday, May 5

CP14

Networks 2

1:30 PM-3:30 PM

Room:Salon D

Chair: Danai Koutra, University of Michigan, USA

1:30-1:45 Reconstructing a Cascade from Temporal Observations

Han Xiao, Polina Rozenshtein, Nikolaj Tatti, and Aristides Gionis, Aalto University, Finland

1:50-2:05 Modeling Co-Evolution Across Multiple Networks

Wenchao Yu, University of California, Los Angeles, USA; Charu C. Aggarwal, IBM T.J. Watson Research Center, USA; Wei Wang, University of California, Los Angeles, USA

2:10-2:25 Multi-Layered Network Embedding

Jundong Li, Chen Chen, Hanghang Tong, and Huan Liu, Arizona State University, USA

2:30-2:45 Maximizing the Effect of Information Adoption: A General Framework

Tianyuan Jin, Tong Xu, Hui Zhong, Enhong Chen, Zhefeng Wang, and Qi Liu, University of Science and Technology of China, China

2:50-3:05 SMACD: Semi-Supervised Multi-Aspect Community Detection

Ekta Gujral and Evangelos Papalexakis, University of California, Riverside, USA

3:10-3:25 Toward Relational Learning with Misinformation

Liang Wu and Jundong Li, Arizona State University, USA; Fred Morstatter, University of Southern California, USA; Huan Liu, Arizona State University, USA

Coffee Break

3:30 PM-3:45 PM



Room:Salon E-H

Saturday, May 5

CP15

Novel Learning Methods 2

3:45 PM-5:25 PM

Room: Salon D

Chair: Jiliang Tang, Michigan State University, USA

3:45-4:00 Personalized Ranking on Poisson Factorization

Li-Yen Kuo, Chung-Kuang Chou, and Ming-Syan Chen, National Taiwan University, Taiwan

4:05-4:20 Strongly Hierarchical Factorization Machines and Anova Kernel Regression

Ruocheng Guo, Hamidreza Alvari, and Paulo Shakarian, Arizona State University, USA

4:25-4:40 A Novel Genetic Algorithm for Feature Selection in Hierarchical Feature Spaces

Pablo Silva, Universidade Federal Fluminense, Brazil; Alexandre Plastino, Fluminense Federal University, Brazil; Alex A. Freitas, University of Kent, United Kingdom

4:45-5:00 Making Kernel Density Estimation Robust Towards Missing Values in Highly Incomplete Multivariate Data Without Imputation

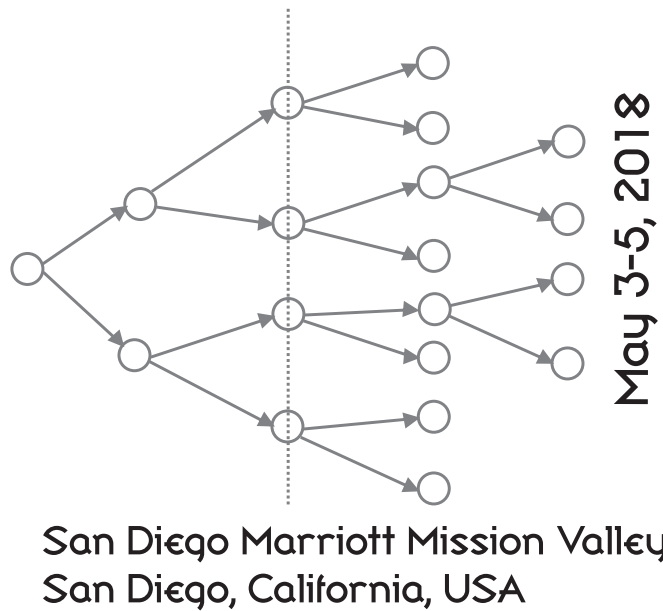
Richard Leibrandt and Stephan Gunneman, Technische Universität München, Germany

5:05-5:20 Dense Neighborhood Pattern Sampling in Numerical Data

Arnaud Giacometti and Arnaud Soulet, Universite François Rabelais, France

Abstracts

2018 SIAM International Conference on DATA MINING

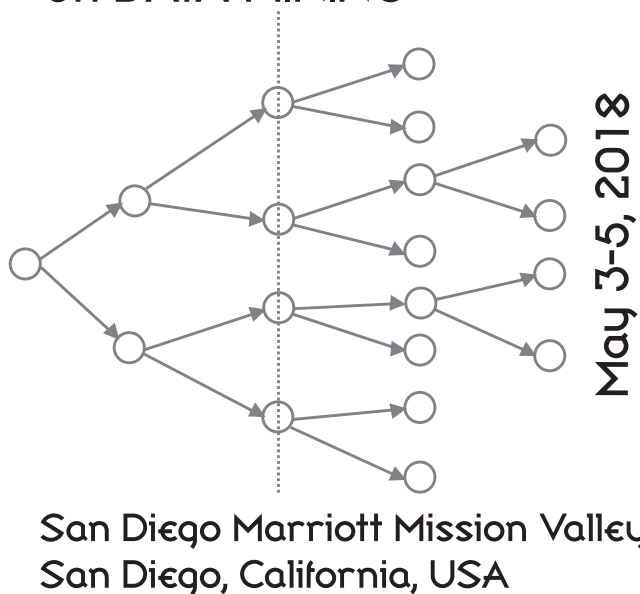


Abstracts are printed as submitted by the authors.

Notes

Organizer and Speaker Index

2018 SIAM International Conference on DATA MINING



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Notes

SDM18 Budget

Conference Budget

SIAM International Conference on Data Mining

May 3-5, 2018

San Diego, California

Expected Paid Attendance 260

Revenue

Registration Income			\$129,555
	Total		\$129,555

Expenses

Printing	\$1,200
Organizing Committee	2,700
Invited Speakers	7,480
Food and Beverage	34,000
AV Equipment and Telecommunication	17,100
Advertising	6,900
Proceedings	6,000
Conference Labor (including benefits)	49,906
Other (supplies, staff travel, freight, misc.)	7,550
Administrative	12,598
Accounting/Distribution & Shipping	8,240
Information Systems	13,939
Customer Service	5,376
Marketing	8,797
Office Space (Building)	5,716
Other SIAM Services	7,033
	Total
	\$194,535

Net Conference Expense (\$64,980)

Support Provided by SIAM			\$64,980
			\$0

Estimated Support for Travel Awards not included above:

Early Career and Students	16	\$12,100
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San Diego Marriott Mission Valley

Hotel Floor Plan

