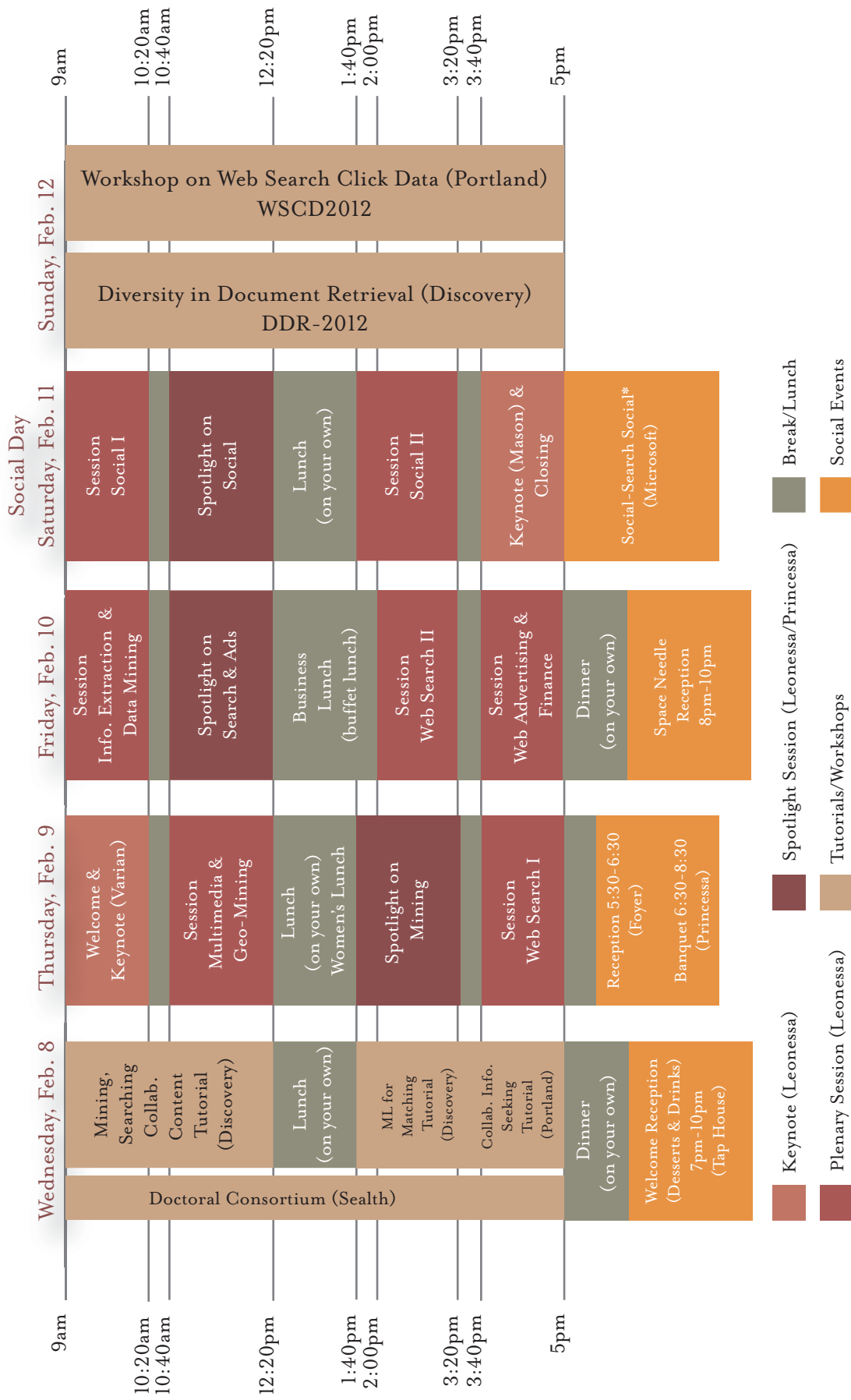




Fifth ACM International Conference on  
Web Search and Data Mining



Seattle, Washington  
February 8-12, 2012



Keynote (Leonesa)  
 Plenary Session (Leonesa)  
 Spotlight Session (Leonesa/Princessa)  
 Tutorials/Workshops  
 Break/Lunch  
 Social Events

\*pre-registration required

# Welcome



Eytan Adar  
University of Michigan

On behalf of the Organizing Committee, we would like to extend a warm welcome to the Fifth ACM International Conference on Web Search and Data Mining (WSDM 2012), in Seattle, Washington, USA, held February 8–12, 2012. WSDM is the premier annual international ACM conference for presenting the very best research innovations and other significant work covering areas in search and data mining on the Web and the Social Web, with an emphasis on practical but principled novel models of search, retrieval and data mining, algorithm design and analysis, economics implications, and in-depth experimental analysis of accuracy and performance. The goal of WSDM 2012 is to provide a forum for researchers, practitioners, and professionals to identify challenging issues in these areas, to share the latest ideas and results, to shape research directions, and to inspire future breakthroughs.



Jaime Teevan  
Microsoft Research

A shared experience for all attendees is a valuable part of what makes WSDM what it is. WSDM 2012 features variable length paper presentations and interactive discussion for all papers during an evening poster session. Of 362 submissions from 38 countries, 30 papers will be presented in traditional, full length plenary sessions, and 45 will be presented via shorter spotlight presentations with extended time immediately following for interactive discussion (an acceptance rate of 20.7%).

It is the strong WSDM program that makes the conference a success. We would like to thank all the members of the Organizing Committee for their dedication and hard work in ensuring an excellent technical program. In particular, we would like to thank our 25 Senior PC members, the 175 PC members, and other reviewers for their great efforts in providing WSDM 2012 with an excellent technical program. We also thank the authors of submitted papers for their contributions, and the delegates for their participation.



Eugene Agichtein  
Emory University

Our most sincere thanks goes to the following Organizing Committee members for their dedication and support in making WSDM 2012 a great success: Krysta Svore, Misha Bilenko, Jeff Huang, Diane Kelly, Paul Bennett, Brian Davison, Susan Dumais, Alice Oh, Smriti Bhagat, and Andrew Tomkins. We are deeply grateful to our two distinguished speakers, Hal Varian and Hilary Mason for their insightful keynote talks that highlight state of the art research work in web search and mining.



Yoelle Maarek  
Yahoo! Research

We would also like to thank the sponsors of WSDM 2012: Microsoft Research, eBay, Yahoo! Labs, Google, Amazon, Adobe, Surf Canyon, Yandex, SIGIR, SIGKDD, SIGMOD, SIGWEB, and the ACM. Our special thanks go to Microsoft Research for sponsoring the Best Paper and Best Student Paper Awards. In addition, Bing is providing travel support for a number of students in attendance this year, and Microsoft Research is hosting a Women's Lunch on the first day of the main program. Additionally, we thank Google for their support of the Doctoral Consortium. The generous sponsorship and support of these organizations contribute immensely to the success of the conference.

Once again, we welcome you to WSDM 2012, and wish you a stimulating, productive, and fruitful experience in Seattle!

Eytan Adar & Jaime Teevan, General Chairs  
Eugene Agichtein & Yoelle Maarek, Program Chairs



## Nowcasting the Macroeconomy with Search Engine Data

Hal Varian, Google Inc.

It is now possible to acquire real time information on economic variables of interest from various commercial sources. I illustrate how one can use Google Trends data to measure the state of the macroeconomy in various sectors, and discuss some of the ramifications for research and policy.

Hal R. Varian is the Chief Economist at Google. He started in May 2002 as a consultant and has been involved in many aspects of the company, including auction design, econometric analysis, finance, corporate strategy and public policy.

## The Secret Life of Social Links

Hilary Mason, bitly

The social web is a messy place! At bitly, we see hundreds of millions of shares and clicks per day—clicks that contain all sorts of wonderful content from lolcats to spacecraft launches. I'll discuss our philosophy, tools, and techniques for looking at the data, and new research opportunities that weren't possible before.

Hilary Mason is the Chief Scientist at bitly, where she finds sense in vast data sets. Her work involves both pure research and development of product-focused features. She's also a co-founder of HackNY ([hackny.org](http://hackny.org)), a non-profit organization that connects talented student hackers from around the world with startups in NYC.

## Doctoral Consortium & Tutorials (Wednesday, February 8)

Doctoral Consortium (Sealth Room, 6th floor, 9am — 5pm)

Sponsored by Google

Students: Luca Chiarandini (Universitat Pompeu Fabra), Kushal Dave (IIIT - Hyderabad), Brian Thompson (Rutgers University), Elizeu Santos-Neto (University of British Columbia)  
(Additional student authors by invitation for lunch/afternoon session)

Morning Tutorial (9am — 12:20pm)

Mining, Search and Exploiting Collaboratively Generated Content on the Web (Discovery Room)  
Eugene Agichtein (Emory University), Evgeniy Gabrilovich (Yahoo! Research)

Afternoon Tutorials (1:40pm — 5pm)

Machine Learning for Query-Document Matching in Search (Discovery Room)  
Hang Li (Microsoft Research Asia), Jun Xu (Microsoft Research Asia)

Collaborative Information Seeking: Understanding Users, Systems and Content (Portland Room)  
Chirag Shah (Rutgers University)

Welcome Reception (Tap House Grill, 7pm — 10pm)

All sessions in Leonessa (Posters in Foyer)

9:00 am — 9:20 am

Welcome

9:20 am — 10:20 am

Keynote: Hal Varian, Nowcasting the Macroeconomy with Search Engine Data

10:20 am — 10:40 am

Morning Break

10:40 am — 12:20 pm

Multimedia and Geo Mining (chair: James Shanahan)

Spatially-aware Indexing for Image Object Retrieval

Roelof Van Zwol and Lluís Garcia Pueyo

Auralist: Introducing Serendipity into Music Recommendation

Yuan Cao Zhang, Diarmuid Ó Séaghdha, Daniele Quercia and Tamas Jambor

Efficient Misbehaving User Detection in Online Video Chat Services

Hanqiang Cheng, Yu-Li Liang, Xinyu Xing, Xue Liu, Richard Han, Qin Lv and Shivakant Mishra

Beyond Co-occurrence: Discovering and Visualizing Tag Relationships from Geo-spatial and Temporal Similarities

Haipeng Zhang, Mohammed Korayem, Erkang You and David Crandall



Object Matching in Tweets with Spatial Models

Nilesh Dalvi, Ravi Kumar and Bo Pang

12:20 pm — 1:40 pm

Lunch (on your own) or Women's Lunch (sponsored by Microsoft Research)

1:40 pm — 3:20 pm

Spotlight on Mining (Chair: Eugene Agichtein)

Beyond 100 Million Entities: Large-scale Blocking-based Resolution for Heterogeneous Data

George Papadakis, Ekaterini Ioannou, Claudia Niederée, Themis Palpanas and Wolfgang Nejdl

Mining Contrastive Opinions on Political Texts using the Cross-perspective Topic Model

Yi Fang, Luo Si, Naveen Somasundaram and Zhengtao Yu

Coupled Temporal Scoping of Relational Facts

Partha Talukdar, Derry Wijaya and Tom Mitchell

Overcoming Browser Cookie Churn with Clustering

Anirban Dasgupta, Maxim Gurevich, Liang Zhang, Belle Tseng and Achint O. Thomas

mTrust: Discerning Multi-Faceted Trust in a Connected World

Jiliang Tang, Huiji Gao and Huan Liu

Of Hammers and Nails: An Empirical Comparison of Three Paradigms for Processing Large Graphs

Marc Najork, Dennis Fetterly, Alan Halverson, Krishnaram Kenthapadi and Sreenivas Gollapudi

Pairwise Cross-Domain Factor Model for Heterogeneous Transfer Ranking

Bo Long, Yi Chang, Anlei Dong and Jianzhang He



Best paper candidate

continued...

# Thursday, February 9 (cont.)

All sessions in Leonessa (Posters in Foyer)

1:40 pm — 3:20 pm (cont.)

Spotlight on Mining



Scalable Inference in Latent Variable Models

Amr Ahmed, Mohamed Aly, Joseph Gonzalez, Shravan Narayanamurthy and Alexander Smola

Learning Recommender Systems with Adaptive Regularization

Steffen Rendle

Collaborative Ranking

Suhrid Balakrishnan and Sumit Chopra

From Chatter to Headlines: Harnessing the Real-Time Web for Personalized News Recommendation

Gianmarco De Francisci Morales, Aristides Gionis and Claudio Lucchese

ETF: Extended Tensor Factorization Model for Personalizing Prediction of Review Helpfulness

Samaneh Moghaddam, Mohsen Jamali and Martin Ester

Multi-Relational Bayesian Probabilistic Ranking leveraging Social Network Data

Artus Krohn-Grimberghe, Lucas Drummond, Christoph Freudenthaler and Lars Schmidt-Thieme

Comment Spam Detection by Sequence Mining

Ravi Kant, Srinivasan H. Sengamedu and Krishnan S. Kumar

Mining Slang and Urban Opinion Words and Phrases from cQA Services: An Optimization Approach

Hadi Amiri and Tat-Seng Chua

What's in a Hashtag? Content based Prediction of the Spread of Ideas in Microblogging Communities

Oren Tsur and Ari Rappoport

3:20 pm — 3:40 pm

Afternoon Break

3:40 pm — 5:00 pm

Web Search I (chair: Ziv Bar-Yossef)

No Search Result Left Behind: Branching Behavior with Browser Tabs

Jeff Huang, Thomas Lin and Ryan W. White

Characterizing Web Content, User Interests, and Search Behavior by Reading Level and Topic

Jin Young Kim, Kevyn Collins-Thompson, Paul Bennett and Susan T. Dumais

Topical Clustering of Search Results

Ugo Scaiella, Paolo Ferragina, Andrea Marino and Massimiliano Ciaramita

To Each His Own: Personalized Content Selection based on Text Comprehensibility

Chenhao Tan, Evgeniy Gabrilovich and Bo Pang

5:30 pm — 6:30 pm

Poster Reception (Foyer)

6:30 pm — 8:30 pm

Banquet, and awards  presentations (Princessa)



Best paper candidate

# Friday, February 10

All sessions in Leonessa (Posters in Princessa)

9:00 am – 10:20 am

Web Information Extraction and Data Mining (chair: ChengXiang Zhai)

WebSets: Extracting Sets of Entities from the Web Using Unsupervised Information Extraction  
Bhavana Dalvi, William W. Cohen and Jamie Callan

Selecting Actions for Resource-bounded Information Extraction Using Reinforcement Learning  
Pallika H. Kanani and Andrew McCallum

Online Selection of Diverse Results  
Debmalya Panigrahi, Atish Das Sarma, Gagan Aggarwal and Andrew Tomkins

Overlapping Clusters for Distributed Computation  
Reid Andersen, David F. Gleich and Vahab Mirrokni

10:20 pm – 10:40 pm

Morning Break

10:40 am – 12:20 pm

Spotlight on Search and Ads (Chair: Yoelle Maarek)

Sponsored Search Auctions with Conflict Constraints  
Panagiotis Papadimitriou and Hector Garcia-Molina

Post-Click Conversion Modeling and Analysis for Non-Guaranteed Delivery Display Advertising  
Rómer Rosales, Haibin Cheng and Eren Manavoglu

Incorporating Revisiting Behaviors into Click Models  
Danqing Xu, Yiqun Liu, Min Zhang, Shaoping Ma and Liyun Ru

A Noise-aware Click Model for Web Search  
Weizhu Chen, Dong Wang, Yuchen Zhang, Zheng Chen, Adish Singla and Qiang Yang

Personalized Click Model through Collaborative Filtering  
Si Shen, Botao Hu, Weizhu Chen and Qiang Yang

Fair and Balanced: Learning to present news stories  
Amr Ahmed, Choon Hui Teo, S. V. N. Vishwanathan and Alex Smola

Extracting Search-Focused Key N-Grams for Relevance Ranking in Web Search  
Chen Wang, Keping Bi, Yunhua Hu, Hang Li and Guihong Cao

Query Suggestion by Constructing Term-Transition Graphs  
Yang Song, Dengyong Zhou and Li-Wei He

Language Models for Keyword Search over Data Graphs  
Yosi Mass and Yehoshua Sagiv

Large-Scale Analysis of Individual and Task Differences in Search Result Page Examination Strategies  
Georg Buscher, Ryen W. White, Susan T. Dumais and Jeff Huang

Sequence Clustering and Labeling for Unsupervised Query Intent Discovery  
Jackie Chi Kit Cheung and Xiao Li

continued...

# Friday, February 10 (cont.)

All sessions in Leonessa (Posters in Princessa)

10:40 am — 12:20 pm (cont.)

IR System Evaluation using Nugget-based Test Collections

Virgil Pavlu, Shahzad Rajput, Peter B. Golbus and Javed A. Aslam

Tapping into Knowledge Base for Concept Feedback: Leveraging ConceptNet to Improve Search Results for Difficult Queries

Alexander Kotov and ChengXiang Zhai

Domain Bias in Web Search

Samuel Jeong, Nina Mishra, Eldar Sadikov and Li Zhang

Optimized Top-K Processing with Global Page Scores on Block-Max Indexes

Dongdong Shan, Shuai Ding, Jing He, Hongfei Yan and Xiaoming Li

12:20 pm — 2:00 pm

Business Lunch - Buffet lunch provided

2:00 pm — 3:20 pm

Web Search II (chair: Hang Li)

Probabilistic Models for Personalizing Web Search

David Sontag, Kevyn Collins-Thompson, Paul N. Bennett, Ryen W. White, Susan Dumais and Bodo Billerbeck



Effective Query Formulation with Multiple Information Sources

Michael Bendersky, Donald Metzler and W. Bruce Croft

Learning to Rank with Multi-Aspect Relevance for Vertical Search

Changsung Kang, Xuanhui Wang, Yi Chang and Belle Tseng

Beyond Ten Blue Links: Enabling User Click Modeling in Federated Web Search

Danqi Chen, Weizhu Chen, Haixun Wang, Zheng Chen and Qiang Yang

3:20 pm — 3:40 pm

Afternoon Break

3:40 pm — 5:00 pm

Web Advertising and Finance (chair: Vanja Josifovski)

Finding the Right Consumer: Optimizing for Conversion in Display Advertising Campaigns

Yandong Liu, Sandeep Pandey, Deepak Agarwal and Vanja Josifovski

Fast Top-k Retrieval for Model Based Recommendation

Deepak Agarwal and Maxim Gurevich

Relational Click Prediction for Sponsored Search

Chenyan Xiong, Taifeng Wang, Wenkui Ding, Yidong Shen and Tiejian Liu

"I Loan Because...": Understanding Motivations for Pro-Social Lending

Yang Liu, Roy Chen, Yan Chen, Qiaozhu Mei and Suzy Salib

8 pm — 10 pm

Space Needle Reception, Drinks & Dessert (Monorail tickets provided)



Best paper candidate



# Saturday, February 11 (Social Day)

All sessions in Leonessa (Posters in Princessa)

9:00 am – 10:20 am

Social I (Chair: Andrew Tomkins)

Correlating Financial Time Series with Micro-Blogging Data

Eduardo J. Ruiz, Vagelis Hristidis, Carlos Castillo, Aristides Gionis and Alejandro Jaimes

Harmony and Dissonance: Organizing the People's Voices on Political Controversies

Rawia Awadallah, Maya Ramanath and Gerhard Weikum

Identifying Content for Planned Events Across Social Media Sites

Hila Becker, Dan Iter, Mor Naaman and Luis Gravano

Daily Deals: Prediction, Social Diffusion, and Reputational Ramifications

John W. Byers, Michael Mitzenmacher and Georgios Zervas

10:20 pm – 10:40 pm

Morning Break

10:40 am – 12:20 pm

Spotlight on Social (Chair: Alice Oh)

On Clustering Heterogeneous Social Media Objects with Outlier Links

Guo-Jun Qi, Charu C. Aggarwal and Thomas S. Huang

Adding Semantics to Microblog Posts

Edgar Meij, Wouter Weerkamp and Maarten De Rijke

Exploring Social Influence via Posterior Effect of Word-of-Mouth Recommendations

Junming Huang, Xue-Qi Cheng, Hua-Wei Shen, Tao Zhou and Xiaolong Jin

Find Me Opinion Sources in Blogosphere: Opinionated Blog Feed Retrieval

Xueke Xu, Songbo Tan, Yue Liu, Xueqi Cheng, Zheng Lin and Jiafeng Guo

Understanding Cyclic Trends in Social Choices

Anish Das Sarma, Sreenivas Gollapudi, Rina Panigrahy and Li Zhang

Maximizing Product Adoption in Social Networks

Smriti Bhagat, Amit Goyal and Laks V. S. Lakshmanan

Answers, not Links

Ingmar Weber, Antti Ukkonen and Aris Gionis

A Straw Shows Which Way the Wind Blows: Potential Popularity Ranking from Early Votes

Peifeng Yin, Ping Luo, Min Wang and Wang-Chien Lee

A Large-Scale Sentiment Analysis for Yahoo! Answers

Onur Kucuktunc, B. Barla Cambazoglu, Ingmar Weber and Hakan Ferhatosmanoglu

Tips, Dones and ToDos: Uncovering User Profiles in Foursquare

Marisa Vasconcelos, Saulo Ricci, Jussara Almeida, Fabrício Benevenuto and Virgilio Almeida

continued...

# Saturday, February 11 (Social Day, cont.)

All sessions in Leonessa (Posters in Princessa)

10:40 am — 12:20 pm (cont.)

When Will It Happen? Relationship Prediction in Heterogeneous Information Networks

Yizhou Sun, Jiawei Han, Charu C. Aggarwal and Nitesh V. Chawla

The Life and Death of Online Groups: Predicting Group Growth and Longevity

Sanjay Kairam, Dan J. Wang and Jure Leskovec

Evaluating Search in Personal Social Media Collections

Chia-Jung Lee, W. Bruce Croft, and Jin Young Kim

Learning Evolving and Emerging Topics in Social Media: A Dynamic NMF approach with Temporal Regularization

Ankan Saha and Vikas Sindhwani

12:20 pm — 1:40 pm

Lunch (on your own)

1:40 pm — 3:20 pm

Social II (Chair: Meredith Ringel Morris)

Effects of User Similarity in Social Media

Ashton Anderson, Dan Huttenlocher, Jon Kleinberg and Jure Leskovec

How User Behavior is Related to Social Affinity

Rina Panigrahy, Marc Najork and Yinglian Xie



Finding Your Friends and Following Them to Where You Are

Adam Sadilek, Henry Kautz and Jeffrey P. Bigham



How to Win Friends and Influence People, Truthfully: Influence Maximization Mechanisms for Social Networks

Yaron Singer

Inferring Social Ties across Heterogenous Networks

Jie Tang, Tiancheng Lou and Jon Kleinberg

3:20 pm — 3:40 pm

Afternoon Break

3:40 pm — 4:40 pm

Keynote: Hillary Mason, The Secret Life of Social Links

4:40 pm — 5:00 pm

Closing

5:00 pm — 8:00 pm

Microsoft Social Search Social

Buses department to Microsoft Campus, Pre-registration necessary



Best paper candidate

# Workshops (Sunday, February 12)

## Diversity in Document Retrieval (DDR-2012)

Discovery Room, 9am — 5pm,

<http://www.dcs.gla.ac.uk/workshops/ddr2012/>

When an ambiguous query is received, a sensible approach is for the information retrieval (IR) system to diversify the results retrieved for this query, in the hope that at least one of the interpretations of the query intent will satisfy the user. Diversity is an increasingly important topic, of interest to both academic researchers (such as participants in the TREC Web and Blog track diversity tasks), as well as to search engines professionals. In this workshop, we solicit submissions both on approaches and models for diversity, the evaluation of diverse search results, and on applications and presentation of diverse search results.

Craig Macdonald, University of Glasgow

Jun Wang, University College London

Charles Clarke, University of Waterloo

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Ben Carterette, University of Delaware

Ben He, Chinese Academy of Science

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Tetsuya Sakai, Microsoft Research Asia

Rodrygo Santos, University of Glasgow

Ryen White, Microsoft Research

## Workshop on Web Search Click Data 2012 (WSCD2012)

Portland Room, 9am — 5pm,

<http://research.microsoft.com/en-us/um/people/nickcr/wscd2012/>

WSCD2012 is the second workshop on Web Search Click Data, following WSCD2009. It is a forum for new research relating to Web search usage logs and for discussing desirable properties of publicly released search log datasets.

Pavel Serdyukov, Yandex

Nick Craswell, Microsoft

Georges Dupret, Yahoo!

Additional challenge organizers: Alexey Gorodilov and Eugene Kharitonov, Yandex

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Oren Kurland (Technion, Israel Institute of Technology, Israel)  
Kevin Lang (Yahoo! Research, USA)  
Silvio Lattanzi (Google, USA)  
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Lihong Li (Yahoo! Research, USA)  
Ping Li (Cornell University, USA)  
Edo Liberty (Yahoo! Labs, Israel)  
Tie-Yan Liu (Microsoft Research Asia, China)  
Bing Liu (University of Illinois at Chicago, USA)  
Wei-Ying Ma (Microsoft Research Asia, China)  
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Mark Manasse (Microsoft Research, USA)  
Amelie Marian (Rutgers University, USA)  
Winter Mason (Stevens Institute of Technology, USA)  
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Massimo Melucci (University of Padua, Italy)  
Donald Metzler (University of Southern California, USA)  
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Alistair Moffat (University of Melbourne, Australia)  
Vanessa Murdock (Yahoo! Research Barcelona, Spain)  
Uri Nadav (Yahoo! Research, USA)  
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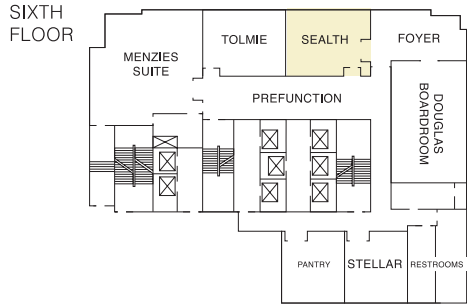
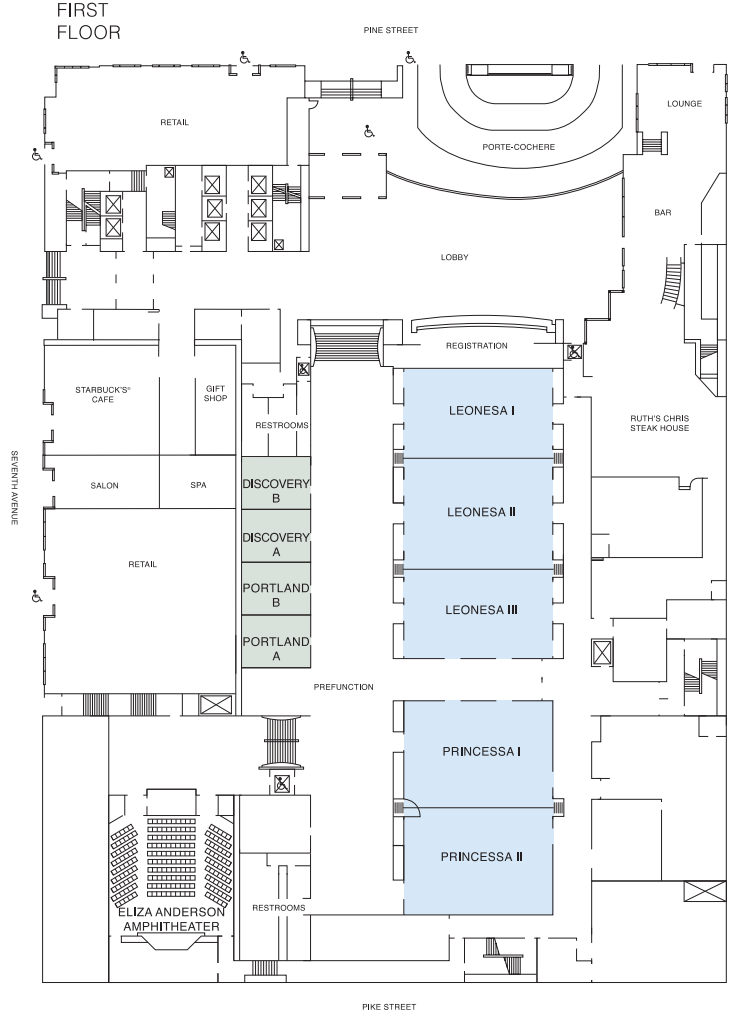
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