

Curriculum Vitae for Pang-Ning Tan

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EDUCATION

- **Ph.D.** in Computer Science, University of Minnesota, Twin Cities (2002).
- **M.S.** in Physics, University of Minnesota, Twin Cities (1996).
- **B.S.** in Physics, University Technology of Malaysia (1992).

EMPLOYMENT

- **Professor**, Michigan State University, 2017 – present.
- **Associate Professor**, Michigan State University, 2009 –2017.
- **Assistant Professor**, Michigan State University, 2003 –2009.
- **Research Associate**, University of Minnesota, Twin Cities, 2002 –2003.

HONORS AND AWARDS

- Best Paper Award, IEEE International Conference on Big Data, 2016.
- Winner of the SPHERE Challenge: Activity Recognition with Multimodal Sensor Data, 26th European Conference on Machine Learning (ECML-PKDD), 2016.
- Joint project entitled "Promoting Inclusive, Ethical, and Successful STEM Teams" by K. Cheruvilil, P. Soranno, K. Elliott, G. Montgomery, and P.N. Tan, was selected as winner of the 2015 Excellence Award in Interdisciplinary Scholarship by the MSU Chapter of the Honor Society of Phi Kappa Phi.
- Best Application Paper Runner Up, 2013 SIAM International Conference on Data Mining, 2013
- Withrow Distinguish Faculty Award, Michigan State University, 2010.
- Best contributed paper in Application Development, Western Users of SAS Conference, 2001.

PUBLICATIONS

Summary: Google scholar: H-index = 50, i10-index = 114, number of citations > 25000, including 22 papers with more than 100 citations (as of December, 2019).

Books and Edited Books

1. **Pang-Ning Tan**, Michael Steinbach, Vipin Kumar, "Introduction to Data Mining," Addison Wesley, Boston, MA, ISBN 978-0321321367 (2005).
2. **Pang-Ning Tan**, Sanjay Chawla, Chin Kuan Ho, and James Bailey, "Advances in Knowledge Discovery and Data Mining - 16th Pacific-Asia Conference, PAKDD 2012", Part I. Lecture Notes in Computer Science 7301, Springer, ISBN 978-3-642-30216-9 (2012).
3. **Pang-Ning Tan**, Sanjay Chawla, Chin Kuan Ho, and James Bailey, "Advances in Knowledge Discovery and Data Mining - 16th Pacific-Asia Conference, PAKDD 2012", Part II. Lecture Notes in Computer Science 7302, Springer, ISBN 978-3-642-30219-0 (2012).
4. Mohammed Javeed Zaki, Zoran Obradovic, **Pang-Ning Tan**, Arindam Banerjee, Chandrika Kamath, Srinivasan Parthasarathy (Eds.): Proceedings of the 2014 SIAM International

Conference on Data Mining, Philadelphia, Pennsylvania, USA, April 24-26, 2014. SIAM 2014, ISBN 978-1-61197-344-0

5. **Pang-Ning Tan**, Michael Steinbach, Anuj Karpatne, and Vipin Kumar, “Introduction to Data Mining,” 2nd Edition, Addison Wesley, Boston, MA, ISBN 978-0133128901 (2018).

Refereed Journal Publications

6. Jianpeng Xu, Jiayu Zhou, **Pang-Ning Tan**, Xi Liu, and Lifeng Luo. Spatio-temporal Multi-task Learning via Tensor Decomposition. Accepted for IEEE Transactions on Knowledge and Data Engineering (2020).
7. Tyler Wagner, Noah Lottig, Meredith Bartley, Ephraim Hanks, Erin Schliep, Nathan Wikle, Katelyn King, Ian McCullough, Joseph Stachelek, Kendra Cheruvilil, Christopher Filstrup, Jean Francois Lapierre, Boyang Liu, Patricia A. Soranno, **Pang-Ning Tan**, Qi Wang, Katherine Webster, and Jiayu Zhou. “Increasing accuracy of lake nutrient predictions in thousands of lakes by leveraging water clarity data”. Accepted for Limnology and Oceanography Letters (2020).
8. Sandi W. Smith, Saleem Alhabash, Duygu Kanver, **Pang-Ning Tan**, and Greg Viken. “Celebration Drinking around the Clock.” *Health Communication*, doi: 10.1080/10410236.2019.1625007 (2019).
9. Sarah Collins, Shuai Yuan, **Pang-Ning Tan**, Sam Oliver, Jean-Francois Lapierre, Kendra Cheruvilil, Emi Fergus, Nicholas Skaff, Joe Stachelek, Ty Wagner, and Patricia Soranno. “Winter Precipitation and Summer Temperature Predict Lake Water Quality at Macroscales.” *Water Resources Research*, 55:4, 2708-2721 (2019).
10. Jean-François Lapierre, Sarah Collins, David Seekell, Kendra Cheruvilil, **Pang-Ning Tan**, Nicholas Skaff, Zofia Taranu, Emi Fergus, and Patricia Soranno. “Similarity in spatial structure constrains ecosystem relationships: Building a macroscale understanding of lakes.” *Global Ecology and Biogeography*, 27:10, 1251-1263 (2018).
11. Saleem Alhabash, Courtland Vandam, **Pang-Ning Tan**, Sandy Smith, Greg Viken, Duygu Kanver, Liang Tian, and Luiz Figueira. “140 Characters of intoxication: Exploring the prevalence of alcohol-related tweets and predicting their vitality.” *Sage Open* (2018).
12. Jingbo Meng, Wei Peng, **Pang-Ning Tan**, Wuyu Liu, Ying Cheng, and Arram Bae. “Diffusion size and structural virality: The effects of message and network features on spreading health information on twitter”, *Computers in Human Behavior*, 89: 111-120 (2018).
13. Samantha K Oliver, C. Emi Fergus, Nicholas K. Staff, Tyler Wagner, **Pang-Ning Tan**, Kendra Spence Cheruvilil, and Patricia A. Soranno. “Strategies for effective collaborative manuscript development in interdisciplinary science teams”, *Ecosphere*, 9(4), e02206 (2018).
14. Noah R Lottig, **Pang-Ning Tan**, Tyler Wagner, Kendra Spence Cheruvilil, Patricia A Soranno, Emily H Stanley, Caren E Scott, Craig A Stow, and Shuai Yuan. “Macroscale patterns of synchrony identify complex relationships among spatial and temporal ecosystem drivers”. *Ecosphere*, 8(12), e02024 (2017).
15. Patricia A Soranno, Linda C Bacon, Michael Beauchene, Karen E Bednar, Edward G Bissell, Claire K Boudreau, Marvin G Boyer, Mary T Bremigan, Stephen R Carpenter, Jamie W Carr, Kendra S Cheruvilil, Samuel T Christel, Matt Claucherty, Sarah M Collins. Joseph D Conroy, John A Downing, Jed Dukett, C Emi Fergus, Christopher T Filstrup, Clara Funk, Maria J Gonzalez, Linda T Green, Corinna Gries, John D Halfman, Stephen K Hamilton, Paul C Hanson, Emily N Henry, Elizabeth M Herron, Celeste Hockings, James R Jackson, Kari Jacobson-Hedin, Lorraine L Janus, William W Jones, John R Jones, Caroline M Keson, Katelyn B S King, Scott A Kishbaugh, Jean-Francois Lapierre, Barbara Lathrop, Jo A Latimore, Yuehlin Lee, Noah R Lottig, Jason A Lynch, Leslie J Matthews, William H McDowell, Karen E B Moore, Brian P Neff, Sarah J Nelson, Samantha K Oliver, Michael L Pace, Donald C Pierson, Autumn C Poisson, Amina I Pollard, David M Post, Paul O Reyes, Donald O Rosenberry, Karen M Roy, Lars G Rudstam, Orlando Sarnelle, Nancy J Schuldt, Caren E Scott, Nicholas K Skaff, Nicole J Smith,

- Nick R Spinelli, Joseph J Stachelek, Emily H Stanley, John L Stoddard, Scott B Stopyak, Craig A Stow, Jason M Tallant, **Pang-Ning Tan**, Anthony P Thorpe, Michael J Vanni, Tyler Wagner, Gretchen Watkins, Kathleen C Weathers, Katherine E Webster, Jeffrey D White, Marcy K Wilmes, and Shuai Yuan. "LAGOS-NE: A multi-scaled geospatial and temporal database of lake ecological context and water quality for thousands of U.S. lakes". *Gigascience*, 6(12): 1-22 (2017).
16. Kendra Spence Cheruvilil, Shuai Yuan, Katherine E. Webster, **Pang-Ning Tan**, Jean-Francois Lapierre, Sarah M. Collins, C. Emi Fergus, Caren E. Scott, Emily N. Henry, Patricia A. Soranno, Christopher T. Filstrup, and Tyler Wagner. "Creating multi-themed ecological regions for macroscale ecology: Testing a flexible, repeatable, and accessible clustering method". *Ecology and Evolution*, 7(9):3046-3058 (2017).
 17. Jianpeng Xu, **Pang-Ning Tan**, Jiayu Zhou, and Lifeng Luo. "Online Multi-task Learning Framework for Ensemble Forecasting". *IEEE Transactions on Knowledge and Data Engineering* 29(6): 1268-1280 (2017).
 18. Patricia A Soranno, Edward G Bissell, Kendra S Cheruvilil, Samuel T Christel, Sarah M Collins, C Emi Fergus, Christopher T Filstrup, Jean-Francois Lapierre, Noah R Lottig, Samantha K Oliver, Caren E Scott, Nicole J Smith, Scott Stopyak, Shuai Yuan, Mary Tate Bremigan, John A Downing, Corinna Gries, Emily N Henry, Nick K Skaff, Emily H Stanley, Craig A Stow, **Pang-Ning Tan**, Tyler Wagner, Katherine E Webster. "Building a multi-scaled geospatial temporal ecology database from disparate data sources: fostering open science and data reuse." *GigaScience*, 4(1): 1-15 (2015).
 19. Zubin Abraham, **Pang-Ning Tan**, Perdinan, Julie Winkler, Shiyuan Zhong, Malgorzata Liszewska, "Contour Regression: A Distribution Regularized Regression Framework for Climate Modeling," *Statistical Analysis and Data Mining*, 7(4): 272-281 (2014). *Selected as one of three best papers from the journal in 2014 to be presented in the session "Best of SADM" at the 45th Interface Symposium on Computing Science and Statistics (Interface 2015).*
 20. P.A. Soranno, K. Spence Cheruvilil, E.G. Bissell, M. Tate Bremigan, J.A. Downing, C.E. Fergus, C.T. Filstrup, E. Norton Henry, N.R. Lottig, E.H. Stanley, C.A. Stow, **P.-N. Tan**, T. Wagner, K.E. Webster, Cross-scale interactions: Quantifying multi-scaled cause-effect relationships in macrosystems, *Frontiers in Ecology and the Environment*, 12:1, 65-73 (2014).
 21. Prakash Mandayam-Comar, **Pang-Ning Tan**, and Anil K. Jain, "Simultaneous Classification and Community Detection on Heterogeneous Network Data," *Data Mining and Knowledge Discovery*, 25(3), pp. 420-449 (2012)
 22. Prakash Mandayam-Comar, **Pang-Ning Tan**, and Anil K. Jain, "A Framework for Joint Community Detection Across Multiple Related Networks," *Neurocomputing*, 76(1), pp 93-104, (2012)
 23. Samah Fodeh, William F Punch, and **Pang-Ning Tan**, "On Ontology-Driven Document Clustering Using Core Semantic Features," *Knowledge and Information Systems*, 28(2), 395-421 (2011)
 24. Julie Winkler, Galina Guentchev, Perdinan, **Pang-Ning Tan**, Sharon Zhong, Malgorzata Liszewska, Zubin Abraham, Tadeusz Niedzwiedz, and Zbigniew Ustrnul, "Climate scenario development and applications for local/regional climate change impact assessments: An overview for the non-climate scientist. Part I: Scenario development using downscaling methods," *Geography Compass*, 5(6): 275-300 (2011)
 25. Julie Winkler, Galina Guentchev, Malgorzata Liszewska, Perdinan, and **Pang-Ning Tan**, "Climate scenario development and applications for local/regional climate change impact assessments: An overview for the non-climate scientist. Part II: Considerations when using climate change scenarios," *Geography Compass*, 5(6): 301-328 (2011)
 26. Haibin Cheng, **Pang-Ning Tan**, and Rong Jin, "Localized Support Vector Machine," *IEEE Transactions on Knowledge and Data Engineering*, 22(4): 537-549, April (2010).

27. Jerry Scripps and **Pang-Ning Tan**, “Constrained Overlapping Clusters: Minimizing the Negative Effects of Bridge-Nodes,” *Statistical Analysis and Data Mining*, 3(1): 20 - 37 (2010).
28. Julie A. Winkler, Suzanne Thornsby, Marco Artavio, Frank Chmielewski, Dieter Kirschke, Sangjun Lee, Malgorzata Liszewska, Scott Loveridge, **Pang-Ning Tan**, Sharon Zhong, Jeffrey A. Andresen, J. Roy Black, Robert Kurlus, Denys Nizalov, Nicole Olynk, Zbigniew Ustrnul, Costanza Zavalloni, Jeanne M. Bisanz, Géza Bujdosó, Lesley Fusina, Yvonne Henniges, Peter Hilsendegen, Katarzyna Lar, Lukasz Malarzewski, Thordis Moeller, Roman Murmylo, Tadeusz Niedzwiedz, Olena Nizalova, Haryono Prawiranata, Nikki Rothwell, Jenni van Ravensay, Harald von Witzke, and Mollie Woods, “Multi-Regional Climate Change Assessments for International Market Systems with Long-Term Investments: A Conceptual Framework,” *Climatic Change journal*, 103:3, pp. 445-470 (2010).
29. Kapila Moonesinghe and **Pang-Ning Tan**, “Outlier Detection using Random Walk,” *International Journal on Artificial Intelligence Tools*, 17(1), pp. 19-36, February (2008).
30. Hui Xiong, Shashi Shekhar, **Pang-Ning Tan**, and Vipin Kumar, “TAPER: A Two-Step Approach for All-Strong-Pairs Correlation Query in Large Databases,” *IEEE Transactions on Knowledge and Data Engineering*, 18(4), pp. 493-508, April (2006).
31. Hui Xiong, **Pang-Ning Tan**, and Vipin Kumar, “Hyperclique Pattern Discovery,” *Data Mining and Knowledge Discovery*, 13(2), pp. 219-242, September (2006).
32. Bo Wang, Sohraab Soltanis, Jonathan Shapiro, and **Pang-Ning Tan**, “Local Detection of Selfish Routing Behavior in Ad Hoc Networks,” *Journal of Interconnection Networks*, 7(1), pp. 133-146, March (2006).
33. Christopher Potter, Steve Klooster, **Pang-Ning Tan**, Michael Steinbach, Vipin Kumar, and Vanessa Genovese, “Variability in terrestrial carbon sinks over two decades: Part III - South America, Africa, and Asia,” *Earth Interactions*, 9(29), pp. 1-15 (2005).
34. Christopher Potter, Steve Klooster, **Pang-Ning Tan**, Michael Steinbach, Vipin Kumar and Vanessa Genovese, 2005, “Variability in terrestrial carbon sinks over two decades: Part 2 - Eurasia,” *Global and Planetary Change*, 49, 177-186.
35. Christopher Potter, **Pang-Ning Tan**, Vipin Kumar, Christopher Kucharik, Steve Klooster, Vanessa Genovese, Warren Cohen, and Sean Healey, “Recent History of Large-Scale Ecosystem Disturbances in North America Derived from the AVHRR Satellite Record,” *Ecosystems*, 8(7), pp. 808 – 824 (2005).
36. **Pang-Ning Tan**, Vipin Kumar, and Jaideep Srivastava, “Selecting the Right Objective Measure for Association Analysis,” *Information Systems*, 29(4), pp. 293-313 (2004).
37. Christopher Potter, Steve Klooster, Michael Steinbach, **Pang-Ning Tan**, Vipin Kumar, Shashi Shekhar, and CJR Carvalho, “Understanding Global Teleconnections of Climate to Regional Model Estimates of Amazon Ecosystem Carbon Fluxes,” *Global Change Biology*, 10, pp. 693-703 (2004).
38. Christopher Potter, Steve Klooster, **Pang-Ning Tan**, Michael Steinbach, Vipin Kumar, and Vanessa Genovese, “Variability in terrestrial carbon sinks over two decades: Part I - North America,” *Earth Interactions*, 7(12), pp. 1-14 (2003).
39. Christopher Potter, Steve Klooster, Ranga Myneni, Vanessa Genovese, **Pang-Ning Tan**, and Vipin Kumar, “Continental scale comparisons of terrestrial carbon sinks estimated from satellite data and ecosystem modeling 1982-98,” *Global and Planetary Change*, 39, pp. 201-213 (2003).
40. Christopher Potter, Steve Klooster, Michael Steinbach, **Pang-Ning Tan**, Vipin Kumar, Shashi Shekhar, Ranga Myneni, and Ramakrishna Nemani, “Global Teleconnections of Ocean Climate to Terrestrial Carbon Flux,” *Journal of Geophysical Research*, 108 (D17), pp. 1-27 (2003).
41. Christopher Potter, **Pang-Ning Tan**, Michael Steinbach, Steve Klooster, Vipin Kumar, Ranga Myneni, and Vanessa Genovese, “Major Disturbance Events in Terrestrial Ecosystems Detected using Global Satellite Data Sets,” *Global Change Biology*, 9(7), pp. 1005-1021 (2003).
42. **Pang-Ning Tan** and Vipin Kumar, “Discovery of Web Robot Sessions based on their Navigational Patterns,” *Data Mining and Knowledge Discovery*, 6(1), pp. 9-35 (2002).

Refereed Conference Proceedings

43. Tyler Wilson, **Pang-Ning Tan**, and Lifeng Luo. “Convolutional Methods for Predictive Modeling of Geospatial Data”, To appear in Proceedings of SIAM International Conference on Data Mining (SDM-2020), Cincinnati, OH (2020).
44. Ding Wang, Boyang Liu, **Pang-Ning Tan**, and Lifeng Luo, “OMuLeT: Online Multi-Lead Time Location Prediction for Hurricane Trajectory Forecasting”, To appear in Proceedings of 34th AAAI Conference on Artificial Intelligence (AAAI-2020), New York, NY (2020).
45. Farzan Masrour, **Pang-Ning Tan**, and Abdol-Hossein Esfahanian, “Bursting the Filter Bubble: Fairness-Aware Network Link Prediction”, To appear in Proceedings of 34th AAAI Conference on Artificial Intelligence (AAAI-2020), New York, NY (2020).
46. Xi Liu, Tyler Wilson, **Pang-Ning Tan**, and Lifeng Luo, “Hierarchical LSTM Framework for Long-Term Sea Surface Temperature Forecasting”. In Proceedings of 6th IEEE International Conference on Data Science and Advanced Analytics (DSAA 2019), Washington, DC (2019).
47. Courtland VanDam, Farzan Masrour, **Pang-Ning Tan**, and Tyler Wilson. “You have been CAUTE! Early Detection of Compromised Accounts on Social Media”. In Proceedings of IEEE/ACM International Conference on Social Networks Analysis and Mining (ASONAM 2019), Vancouver, Canada (2019).
48. Farzan Masrour, **Pang-Ning Tan**, and Abdol-Hossein Esfahanian. “OPTANE: An OPTimal Transport Algorithm for NETwork Alignment”. In Proceedings of IEEE/ACM International Conference on Social Networks Analysis and Mining (ASONAM 2019), Vancouver, Canada (2019).
49. Boyang Liu, **Pang-Ning Tan**, and Jiayu Zhou. “Augmented Multi-Task Learning by Optimal Transport”. In *Proceedings of the SIAM International Conference on Data Mining (SDM 2019)*, Calgary, Canada (2019).
50. Qi Wang, Claire Boudreau, Qixing Luo, **Pang-Ning Tan**, and Jiayu Zhou. “Deep Multi-view Information Bottleneck”. In *Proceedings of the SIAM International Conference on Data Mining (SDM 2019)*, Calgary, Canada (2019).
51. Tyler Wilson, **Pang-Ning Tan**, and Lifeng Luo. “A Low Rank Weighted Graph Convolutional Approach to Weather Prediction”. In *Proceedings of IEEE International Conference on Data Mining (ICDM 2018)*, Singapore (2018).
52. Xi Liu, **Pang-Ning Tan**, Zubin Abraham, Lifeng Luo, and Pouyan Hatami. “Distribution Preserving Multi-Task Regression for Spatio-Temporal Data”. In *Proceedings of IEEE International Conference on Data Mining (ICDM 2018)*, Singapore (2018).
53. Qi Wang, **Pang-Ning Tan**, and Jiayu Zhou. “Imputing Structured Missing Values in Spatial Data with Clustered Adversarial Matrix Factorization”. In *Proceedings of IEEE International Conference on Data Mining (ICDM 2018)*, Singapore (2018).
54. Courtland VanDam, **Pang-Ning Tan**, Jiliang Tang, and Hamid Karimi. “CADET: A Multi-View Learning Framework for Compromised Account Detection on Twitter”. In *Proceedings of IEEE/ACM International Conference on Social Networks Analysis and Mining (ASONAM 2018)*, Barcelona, Spain (2018).
55. Farzan Masrour, **Pang-Ning Tan**, Abdol-Hossein Esfahanian, and Courtland VanDam. “Attributed Network Representation Learning Approaches for Link Prediction”. In *Proceedings of IEEE/ACM International Conference on Social Networks Analysis and Mining (ASONAM 2018)*, Barcelona, Spain (2018).
56. Boyang Liu, **Pang-Ning Tan**, and Jiayu Zhou. “Enhancing Predictive Modeling of Nested Spatial Data through Group-Level Feature Disaggregation”. In *Proceedings of the 24th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD 2018)*, London, England (2018).
57. Jianpeng Xu, Xi Liu, Tyler Wilson, **Pang-Ning Tan**, Pouyan Hatami, and Lifeng Luo. “MUSCAT: Multi-Scale Spatio-Temporal Learning with Application to Climate Modeling”. In

- Proceedings of the 27th International Joint Conference on Artificial Intelligence (IJCAI 2018)*, Stockholm, Sweden (2018).
58. Xi Liu, **Pang-Ning Tan**, and Lei Liu. "STARS: Soft Multi-Task Learning for Activity Recognition from Multi-Modal Sensor Data". In *Proceedings of the 22nd Pacific Asian Conference on Knowledge Discovery and Data Mining (PAKDD-2018)*, Melbourne, Australia (2018).
 59. Shuai Yuan, Jiayu Zhou, **Pang-Ning Tan**, Emi Fergus, Tyler Wagner, and Patricia Soranno. "Multi-Level Multi-Task Learning for Modeling Cross-Scale Interactions in Nested Geospatial Data". In *Proceedings of the IEEE International Conference on Data Mining (ICDM-2017)*, New Orleans, LA (2017).
 60. Courtland Vandam, Jiliang Tang, and **Pang-Ning Tan**. "Understanding Compromised Accounts on Twitter". In *Proceedings of the IEEE/WIC/ACM International Conference on Web Intelligence (WI-2017)*, Leipzig, Germany (2017).
 61. Xi Liu, **Pang-Ning Tan**, Lei Liu, and Steve Simske. "Automated Classification of EEG Signals for Predicting Students' Cognitive State during Learning". In *Proceedings of the IEEE/WIC/ACM International Conference on Web Intelligence (WI-2017)*, Leipzig, Germany (2017).
 62. Shuai Yuan, **Pang-Ning Tan**, Kendra Cheruvelil, Nick Staff, Emi Fergus and Patricia Soranno. "Learning Hash-Based Features for Incomplete Continuous-Valued Data" In *Proceedings of SIAM International Conference on Data Mining (SDM-2017)*, San Antonio, TX (2017).
 63. Jianpeng Xu, Jiayu Zhou, **Pang-Ning Tan**, Xi Liu and Lifeng Luo. WISDOM: Weighted Incremental Spatio-Temporal Multi-Task Learning via Tensor Decomposition. In *Proceedings of IEEE International Conference on Big Data*, Washington, DC (2016). **Won the Best Paper award**
 64. Courtland VanDam and **Pang-Ning Tan**. "Hashtag Hijacking from Twitter Data." In *Proceedings of ACM Web Science Conference (WebSci'2016)*, Hanover, Germany (2016).
 65. Ding Wang, Prakash MandayamComar, and **Pang-Ning Tan**. "Crowdsourcing of Network Data." In *Proceedings of IEEE International Joint Conference on Neural Networks (IJCNN-2016)*, Vancouver, Canada (2016).
 66. Jianpeng Xu, **Pang-Ning Tan**, Lifeng Luo, and Jiayu Zhou. "GSpartan: a GeoSpatio-Temporal Multi-task Learning Framework for Multi-location prediction." In *Proceedings of SIAM International Conference on Data Mining (SDM-2016)*, Miami, FL (2016).
 67. Jianpeng Xu, Jiayu Zhou, **Pang-Ning Tan**, and Kaixiang Lin. "Synergies that Matter: Efficient Interaction Selection via Sparse Factorization Machine", In *Proceedings of SIAM International Conference on Data Mining (SDM-2016)*, Miami, FL (2016).
 68. Xi Liu, Han Hee Song, Mario Baldi, and **Pang-Ning Tan**. "Macro-scale Mobile App Market Analysis using Customized Hierarchical Categorization", In *Proceedings of IEEE International Conference on Computer Communications (INFOCOM-2016)*, San Francisco, CA (2016). **Best presented paper for Big Data technical session**
 69. Shuai Yuan, **Pang-Ning Tan**, Kendra Cheruvelil, Sarah Collins, and Patricia Soranno. "Constrained Spectral Clustering for Regionalization: Exploring the Trade-off between Spatial Contiguity and Landscape Homogeneity". In *Proceedings of the 2015 IEEE Int'l Conf on Data Science and Advanced Analytics, Special Session on Environmental and Geo-spatial Data Analytics*, Paris, France (2015).
 70. Lei Liu, **Pang-Ning Tan**, and Xi Liu, "MF-Tree: Matrix Factorization Tree for Large Multi-Class Learning", In *Proceedings of the 24th ACM International Conference on Information and Knowledge Management (CIKM-2015)*, Melbourne, Australia (2015).
 71. Jianpeng Xu, Jiayu Zhou, and **Pang-Ning Tan**, "FORMULA: Factorized Multi-task Learning for task discovery in personalized medical models." In *Proceedings of SIAM International Conference on Data Mining (SDM-2105)*, Vancouver, Canada (2015).
 72. Jianpeng Xu, **Pang-Ning Tan**, and Lifeng Luo, "ORION: Online Regularized multi-task regressiON and its application to ensemble forecasting." In *Proceedings of the IEEE International Conference on Data Mining (ICDM-2014)*, Shenzhen, China, December 14-17 (2014).

73. Lei Liu, Sabyasachi Saha, Ruben Torres, Jianpeng Xu, **Pang-Ning Tan**, Antonio Nucci, and Marco Mellia, "Detecting Malicious Clients in ISP Network Using HTTP Connectivity Graph and Flow Information". In Proceedings of the IEEE/ACM International Conference on Social Networks Analysis and Mining (ASONAM 2014), Beijing, China, August 17-20 (2014).
74. Zubin Abraham, **Pang-Ning Tan**, Perdinan, Julie Winkler, Shiyuan Zhong, Malgorzata Liszewska, "Position-Preserving Multi-Output Prediction," Proceedings of the European Conference on Machine Learning (ECML-2013), Prague, Czech Republic, September 23-27 (2013).
75. Prakash Mandayam Comar, Lei Liu, Sabyasachi Saha, **Pang-Ning Tan**, and Antonio Nucci, "Missing or Inapplicable: Treatment of incomplete continuous-valued features in supervised learning," Proceedings of the SIAM International Conference on Data Mining (SDM-2013), Austin, Texas, May 2 – May 4 (2013).
76. Zubin Abraham, **Pang-Ning Tan**, Perdinan, Julie Winkler, Shiyuan Zhong, Malgorzata Liszewska, "Distribution Regularized Regression Framework for Climate Modeling," Proceedings of the SIAM International Conference on Data Mining (SDM-2013), Austin, Texas, May 2 – May 4 (2013). *Awarded best application paper runners-up.*
77. Prakash Mandayam Comar, Lei Liu, Sabyasachi Saha, **Pang-Ning Tan**, and Antonio Nucci, "Combining Supervised and Unsupervised Learning for Zero-Day Malware Detection," Proceedings of 32nd IEEE International Conference on Computer Communications (INFOCOM-2013), Turin, Italy, April 14-19 (2013).
78. Prakash Mandayam Comar, Lei Liu, Sabyasachi Saha, **Pang-Ning Tan**, and Antonio Nucci, "Weighted Linear Kernel with Tree Transformed Features For Malware Detection," Proceedings of the 21st ACM International Conference on Information and Knowledge Management (CIKM-2012), Maui, Hawaii, October 29 – November 2 (2012).
79. Lei Liu, Prakash Mandayam Comar, Sabyasachi Saha, **Pang-Ning Tan**, and Antonio Nucci, "Recursive NMF: Efficient Label Tree Learning for Large Multi-Class Problems," Proceedings of the 21st International Conference on Pattern Recognition (ICPR-2012), Tsukuba, Japan, November 11 – November 16 (2012).
80. Prakash Mandayam Comar, **Pang-Ning Tan**, and Anil Jain, "LinkBoost: A Novel Cost-Sensitive Boosting Framework for Community-Level Network Link Prediction," *Proceedings of the IEEE International Conference on Data Mining (ICDM-2011)*, Vancouver, Canada, December 11 – 14 (2011).
81. Zubin Abraham, Fan Xin, and **Pang-Ning Tan**, "Smoothed Quantile Regression for Statistical Downscaling of Extreme Events in Climate Modeling," *Proceedings of NASA Conference on Intelligent Data Understanding (CIDU 2011)*, Mountain View, California, October 19-21 (2011).
82. Feilong Chen, Supranamaya Ranjan, and **Pang-Ning Tan**, "Detecting bots via Incremental LS-SVM Learning with Dynamic Feature Adaptation," *Proceedings of ACM SIGKDD International Conference on Data Mining*, San Diego, California, August 21-24 (2011).
83. **Pang-Ning Tan**, Feilong Chen, and Pang-Ning Tan, "Information Assurance: Detection of Web Spam Attacks in Social Media," Proceedings of the 27th Army Science Conference, Orlando, Florida, November 29 – December 2 (2010)
84. Prakash Mandayam, **Pang-Ning Tan**, and Anil Jain, "Multi-task Learning on Multiple related networks," *Proceedings of the 19th ACM International Conference on Information and Knowledge Management (CIKM-2010)*, Toronto, Canada, October 26 – 30 (2010).
85. Prakash Mandayam, **Pang-Ning Tan**, and Anil Jain, "Identifying Cohesive Subgroups and their Correspondences in Multiple Related Networks," *Proceedings of the IEEE/WIC/ACM International Conference on Web Intelligence (WI-2010)*, Toronto, Canada, August 31 – September 3 (2010).
86. Liu Lei and **Pang-Ning Tan**, "A Framework for Co-Classification of Articles and Users in Wikipedia," *Proceedings of the IEEE/WIC/ACM International Conference on Web Intelligence (WI-2010)*, Toronto, Canada, August 31 – September 3 (2010).

87. Ronald Nussbaum, Abdol-Hossein Esfahanian, and **Pang-Ning Tan**, "Clustering Social Networks Using Distance-preserving Subgraphs," *Proceedings of the 2010 International Conference on Advances in Social Networks Analysis and Mining (ASONAM'10)*, Odense, Denmark, August 9-11 (2010)
88. Zubin Abraham and **Pang-Ning Tan**, "An Integrated Framework for Simultaneous Classification and Regression of Time Series Data," *Proceedings of SIAM International Conference on Data Mining (SDM-2010)*, Columbus, Ohio, April 29 – May 1 (2010).
89. Feilong Chen, **Pang-Ning Tan**, and Anil Jain, "A Co-classification Framework for Detecting Web Spam and Spammers in Social Media Web Sites," *Proceedings of ACM Conference on Information and Knowledge Management (CIKM-2009)*, Hong Kong, China, November 2-6 (2009).
90. Jerry Scripps, **Pang-Ning Tan**, and Abdol-Hossein Esfahanian. "Measuring the Effects of Preprocessing Decisions and Network Forces in Dynamic Network Analysis," *Proceedings of ACM SIGKDD International Conference on Data Mining (KDD-2009)*, Paris, France, June 28-July 1 (2009).
91. Haibin Cheng, **Pang-Ning Tan**, Christopher Potter, and Steve Klooster, "Detection and Characterization of Anomalies in Multivariate Time Series," *Proceedings of the SIAM International Conference on Data Mining (SDM-09)*, Sparks, Nevada, April 30 – May 2 (2009).
92. Jerry Scripps, **Pang-Ning Tan**, and Abdol-Hossein Esfahanian. "A Matrix Alignment Approach for Collective Classification," *Proceedings of the 2009 International Conference on Advances in Social Networks Analysis and Mining (ASONAM'09)*, Athens, Greece, July 20-22 (2009)
93. Ronald Nussbaum, Abdol-Hossein Esfahanian, and **Pang-Ning Tan**. "History-based Email Prioritization," *Proceedings of the 2009 International Conference on Advances in Social Networks Analysis and Mining (ASONAM'09)*, Athens, Greece, July 20-22 (2009)
94. Samah Fodeh, William F. Punch, and **Pang-Ning Tan**, "Combining Statistics and Semantics via Ensemble Model for Document Clustering," *Proceedings of 24th Annual ACM Symposium on Applied Computing (Special Track on Data Mining)*, Honolulu, Hawaii, March 8-12 (2009).
95. Jerry Scripps, **Pang-Ning Tan**, Feilong Chen, and Abdol-Hossein Esfahanian, "A Matrix Alignment Approach for Link Prediction," *Proceedings of the 19th International Conference on Pattern Recognition (ICPR-08)*, Tampa, Florida, December 8-11 (2008). **Nominated for IBM best student paper award**
96. Feilong Chen, Jerry Scripps, and **Pang-Ning Tan**, "Link Mining for a Social Bookmarking Web Site," *Proceedings of the IEEE/WIC/ACM International Conference on Web Intelligence (WI-2008)*, Sydney, Australia, December 9-12 (2008).
97. Haibin Cheng, **Pang-Ning Tan**, Christopher Potter, and Steve Klooster, "Data Mining for Visual Exploration and Detection of Ecosystem Disturbances," *Proceedings of the 16th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems (ACM GIS)*, Irvine, CA, November 5-7 (2008).
98. Haibin Cheng and **Pang-Ning Tan**, "Semi-supervised Learning with Data Calibration for Long-Term Time Series Forecasting," *Proceedings of ACM SIGKDD International Conference on Data Mining (KDD-2008)*, Las Vegas, NV, August 24-27 (2008).
99. Haibin Cheng, Ruofei Zhang, Yefei Peng, Jianchang Mao and **Pang-Ning Tan**. "Maximum Margin Active Learning for Sequence Labeling with Different Length," *Proceedings of 8th Industrial Conference on Data Mining*, Leipzig, Germany, July 16-18 (2008).
100. Jerry Scripps, **Pang-Ning Tan**, and Abdol-Hossein Esfahanian, "Exploring the Link Structure and Community-based Node Roles in Networked Data," *Proceedings of IEEE International Conference on Data Mining (ICDM-2007)*, Omaha, NE, October 28-31 (2007).
101. Haibin Cheng, **Pang-Ning Tan**, Jon Sticklen, and William F. Punch, "Recommendation via Query Centered Random Walk on K-partite Graph," *Proceedings of IEEE International Conference on Data Mining (ICDM-2007)*, Omaha, NE, October 28-31 (2007).

102. Hamed Valizadegan and **Pang-Ning Tan**, “Kernel-based Detection of Mislabeled Examples,” *Proceedings of SIAM International Conference on Data Mining (SDM-2007)*, Minneapolis, MN, April 26-28 (2007).
103. Haibin Cheng, **Pang-Ning Tan**, and Rong Jin, “Localized Support Vector Machine and Its Efficient Algorithm,” *Proceedings of SIAM International Conference on Data Mining (SDM-2007)*, Minneapolis, MN, April 26-28 (2007).
104. Samah Fodeh and **Pang-Ning Tan**, “Incorporating Background Knowledge for Subjective Rule Evaluation,” *Proceedings of IEEE International Conference on Tools with Artificial Intelligence (ICTAI-2007)*, Patras, Greece, October 29-31 (2007).
105. Kapila Moonesinghe, Hamed Valizadegan, Samah Fodeh, and **Pang-Ning Tan**. “A Probabilistic Substructure-Based Approach for Graph Classification,” *Proceedings of IEEE International Conference on Tools with Artificial Intelligence (ICTAI-2007)*, Patras, Greece, October 29-31 (2007).
106. Hamed Valizadegan and **Pang-Ning Tan**, “A Prototype-driven Framework for Change Detection in Data Stream Classification,” *Proceedings of IEEE Symposium on Computational Intelligence and Data Mining (CIDM 2007)*, Hawaii, April 1-5 (2007).
107. Kapila Moonesinghe, Samah Fodeh, and **Pang-Ning Tan**, “Frequent Closed Itemset Mining using Prefix Graphs with an Efficient Flow-Based Pruning Strategy,” *Proceedings of IEEE International Conference on Data Mining (ICDM-2006)*, Hong Kong, December 18-22 (2006).
108. Jing Gao and **Pang-Ning Tan**, “Converting Output Scores from Outlier Detection Algorithms into Probability Estimates,” *Proceedings of IEEE International Conference on Data Mining (ICDM-2006)*, Hong Kong, December 18-22 (2006).
109. Jerry Scripps and **Pang-Ning Tan**, “Clustering in the Presence of Bridge-Nodes,” *Proceedings of SIAM International Conference on Data Mining (SDM-2006)*, Bethesda, MD, April 20-22 (2006). **One of four papers nominated for best paper award**
110. Jing Gao, **Pang-Ning Tan**, and Haibin Cheng, “Semi-supervised Clustering with Partial Background Information,” *Proceedings of SIAM International Conference on Data Mining (SDM-2006)*, Bethesda, MD, April 20-22 (2006).
111. Jing Gao, Haibin Cheng, and **Pang-Ning Tan**, “A Novel Framework for Incorporating Labeled Examples into Anomaly Detection,” *Proceedings of SIAM International Conference on Data Mining (SDM-2006)*, Bethesda, MD, April 20-22 (2006).
112. Haibin Cheng, **Pang-Ning Tan**, Jing Gao, and Jerry Scripps, “Multi-step Ahead Time Series Prediction,” *Proceedings of the 10th Pacific Asia Conference on Knowledge Discovery and Data Mining (PAKDD-2006)*, Singapore, April 9-12 (2006). **One of six papers nominated for best paper award**
113. Brian Connelly, Christopher Bowron, Li Xiao, **Pang-Ning Tan**, and Chen Wang, “Adaptively Routing P2P Queries using Association Analysis,” *Proceedings of International Conference on Parallel Processing (ICPP-2006)*, Columbus, OH, August 14-18 (2006).
114. Kapila Moonesinghe and **Pang-Ning Tan**, “Outlier Detection using Random Walk,” *Proceedings of IEEE International Conference on Tools with Artificial Intelligence (ICTAI-2006)*, Washington, D.C., November 13-15 (2006).
115. Jing Gao, Haibin Cheng, and **Pang-Ning Tan**, “Semi-supervised Outlier Detection,” *Proceedings of the ACM Symposium on Applied Computing (Special Track on Data Mining)*, Dijon, France, April 23-27 (2006).
116. Jing Gao, Jianzhong Li, Zhaogong Zhang, and **Pang-Ning Tan**, “An Incremental Data Stream Clustering Algorithm Based on Dense Units Detection,” *Proceedings of the 9th Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD-2005)*, Hanoi, Vietnam, May 18-20 (2005).
117. Michael Steinbach, **Pang-Ning Tan**, and Vipin Kumar, “Support Envelopes: A Technique for Exploring the Structure of Association Patterns,” *Proceedings of the ACM SIGKDD International*

- Conference on Knowledge Discovery and Data Mining (KDD-2004)*, Seattle, WA, August 22-25 (2004).
118. Hui Xiong, Shashi Shekhar, **Pang-Ning Tan**, and Vipin Kumar, "Exploiting a Support-based Upper Bound of Pearson's Correlation Coefficient for Efficiently Identifying Strongly Correlated Pairs," *Proceedings of the ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD-2004)*, Seattle, WA, August 22-25 (2004).
 119. **Pang-Ning Tan** and Rong Jin, "Ordering Patterns by Combining Opinions from Multiple Sources," *Proceedings of the ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD-2004)*, Seattle, WA, August 22-25 (2004).
 120. Michael Steinbach, **Pang-Ning Tan**, Hui Xiong, Vipin Kumar, "Extending the Notion of Support," *Proceedings of the ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD-2004)*, Seattle, WA, August 22-25 (2004).
 121. Aysel Ozgur, **Pang-Ning Tan**, and Vipin Kumar, "RBA: An Integrated Framework for Regression based on Association Rules," *Proceedings of SIAM International Conference on Data Mining (SDM-2004)*, Lake Buena Vista, FL, April 22-24 (2004).
 122. Hui Xiong, Michael Steinbach, **Pang-Ning Tan**, and Vipin Kumar, "HICAP: Hierarchical Clustering with Pattern Preservation," *Proceedings of SIAM International Conference on Data Mining (SDM-2004)*, Lake Buena Vista, FL, April 22-24 (2004).
 123. Behrouz Minaei-Bidgoli, **Pang-Ning Tan**, and William F. Punch, "Mining Interesting Contrast Rules for a Web-based Educational System," *Proceedings of the 2004 International Conference on Machine Learning and Applications (ICMLA'04)*, Louisville, KY, December 16-18 (2004).
 124. Hui Xiong, **Pang-Ning Tan**, and Vipin Kumar, "Mining Strong Affinity Association Patterns in Data Sets with Skewed Support Distribution," *Proceedings of the IEEE International Conference on Data Mining (ICDM-2003)*, Melbourne, FL, November 19-22 (2003).
 125. Michael Steinbach, **Pang-Ning Tan**, Vipin Kumar, Steve Klooster, and Christopher Potter, "Discovery of Climate Indices using Clustering," *Proceedings of the ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD-2003)*, Washington DC, August 24-27 (2003).
 126. Levent Ertoz, Aleksandar Lazarevic, Eric Eilertson, **Pang-Ning Tan**, Paul Dokas, Vipin Kumar, and Jaideep Srivastava, "Protecting Against Cyber Threats in Networked Information Systems," *Proceedings of SPIE Annual Symposium on AeroSense, Battlespace Digitization and Network Centric Systems III*, Orlando, FL, April 23 (2003).
 127. **Pang-Ning Tan**, Vipin Kumar, and Jaideep Srivastava, "Selecting the Right Interestingness Measure for Association Patterns," *Proceedings of the ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD-2002)*, Edmonton, Canada, July 23-26 (2002).
One of four papers nominated for best paper award
 128. Aleksandar Lazarevic, Paul Dokas, Levent Ertoz, Vipin Kumar, Jaideep Srivastava, and **Pang-Ning Tan**, "Cyber Threat Analysis - A Key Enabling Technology for the Objective Force (A Case Study in Network Intrusion Detection)," *Proceedings of 23rd Army Science Conference*, Orlando, December 2-5 (2002).
 129. **Pang-Ning Tan**, Hannah Blau, Steve Harp, and Robert Goldman, "Textual Data Mining of Service Center Call Records," *Proceedings of the ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD-2000)*, Boston, MA, August 20-23 (2000).
 130. **Pang-Ning Tan**, Vipin Kumar, and Jaideep Srivastava, "Indirect Association: Mining Higher Order Dependencies in Data," *Proceedings of the 4th European Conference on Principles and Practice of Knowledge Discovery in Databases (PKDD-2000)*, Lyon, France, September 13-16 (2000).

Other Publications

131. Tyler Wilson, Xi Liu, **Pang-Ning Tan**, Pouyan Hatami, and Lifeng Luo. Deep Graph Convolution for Weather Prediction. American Geographical Union Fall Meeting, Washington, DC (2018).
132. Pouyan Hatami, Lifeng Luo, Lisi Pei, Xi Liu, Tyler Wilson, and **Pang-Ning Tan**, Predicting US Drought Monitor Categories with Multiple Land Surface Models and Machine Learning. American Geographical Union Fall Meeting, Washington, DC (2018).
133. Xi Liu, **Pang-Ning Tan**, Tyler Wilson, Pouyan Hatami, and Lifeng Luo. A Deep Learning Architecture for Long-Range Forecasting of Sea Surface Temperature. American Geographical Union Fall Meeting, Washington, DC (2018).
134. Duygu Kanver, Saleem Alhabash, Liang Tian, Sandy Smith, **Pang-Ning Tan**, Courtland VanDam and Greg Viken. "Celebration drinking with close friends and acquaintances: SMS surveys on St. Patrick's Day". D.C. Health Communication Conference (DCHC), Fairfax, VA, April 27-29 (2017).
135. Duygu Kanver, Greg Viken, Saleem Alhabash, Sandy Smith, **Pang-Ning Tan**, Courtland and Liang Tian. "Is it about the celebration or who you think is drinking? Predicting celebration drinking with a revised look at perceived social norms in the age of social media." Health Communication Division of the annual meeting of the International Communication Association, San Diego, CA, May 25-29 (2017).
136. Xi Liu, Lei Liu, and **Pang-Ning Tan**. "Location-based Hierarchical Approach for Activity Recognition with Multi-modal Sensor Data." ECML/PKDD 2016 Discovery Challenge, Riva del Garda, Italy (2016).
137. Lifeng Luo, **Pang-Ning Tan**, and Dan Barrie. "Toward more skillful prediction." *National Integrated Drought Information System Newsletter*, Volume 5, Issue 1 (2015).
138. **Pang-Ning Tan**, Zubin Abraham, Ferdinan, Julie Winkler, Shiyuan Zhong, Malgorzata Liszewska, "A Hybrid Framework to Bias Correct and Empirically Downscale Daily Temperature and Precipitation from Regional Climate Models," American Geographical Union Fall Meeting (2013).
139. Zubin Abraham and Pang-Ning Tan. "A Semi-supervised Framework for Simultaneous Classification and Regression of Zero-Inflated Time Series Data with Application to Precipitation Prediction." *Proceedings of ICDM workshop on Spatial and Spatiotemporal Data Mining*, 644-649 (2009).
140. Jerry Scripps, **Pang-Ning Tan**, and Abdol-Hossein Esfahanian, "Node Roles and Community Structure in Networks," *Proceedings of WebKDD*, San Jose, CA, August 12-15 (2007).
141. Samah Fodeh and **Pang-Ning Tan**, "Incorporating Background Knowledge from the World Wide Web Using the Minimum Discriminative Information Principle," *Proceedings of KDD 2007 Workshop on Mining Multiple Information Sources*, San Jose, CA, August 12-15 (2007).
142. **Pang-Ning Tan**, "Knowledge Discovery from Sensor Data," Barbara Goode (editor), *Sensors Magazine (Cover story)*, March (2006).
143. Jing Gao, **Pang-Ning Tan**, and Haibin Cheng, "Semi-supervised Clustering with Partial Background Information," *Proceedings of 1st Int'l Workshop on Mining Complex Data (MCD'05)*, Houston, Texas, November 27 (2005).
144. Haibin Cheng, **Pang-Ning Tan**, Jing Gao, and Jerry Scripps, "An Empirical Study on Multistep-ahead Time Series Prediction," *Proceedings of ICDM 2005 Workshop on Temporal Data Mining: Algorithms, Theory, and Applications (TDM 2005)*, Houston, Texas, November 27 (2005).
145. H.D.K Moonesinghe, **Pang-Ning Tan**, Moon-Jung Chung, and Ming Wu, "Parallel Mining of Sequential Patterns Using an Efficient Task Partitioning Approach," *Proceedings of 8th Int'l Workshop on High Performance and Distributed Mining (HPDM'05)*, Newport Beach, CA, April 23 (2005).

146. Bo Wang, Sohraab Soltanis, Jonathan K Shapiro, **Pang-Ning Tan**, "Local Detection of Self Routing Behavior in Ad Hoc Networks," *Proceedings of Workshop on Heterogeneous Wireless Ad Hoc and Sensor Networks*, Las Vegas, Nevada, December 9 (2005).
147. Ali Shojaie and **Pang-Ning Tan**, "Outlier Detection based on Projection-Based Ordering," *Proceedings of the Sixth Int'l Conf on Data Mining, Text Mining and their Business Applications*, Skiathos, Greece, May 25-27 (2005).
148. Aleksandar Lazarevic, Paul Dokas, Levent Ertöz, Vipin Kumar, Jaideep Srivastava, and **Pang-Ning Tan**, "Cyber Threat Analysis - A Key Enabling Technology for the Objective Force (A Case Study in Network Intrusion Detection)," *Proceedings of 23rd Army Science Conference*, Orlando, December 2-5 (2002).
149. Michael Steinbach, **Pang-Ning Tan**, Vipin Kumar, Christopher Potter, and Steven Klooster, "Temporal Data Mining for the Discovery of Ocean Climate Indices," *Proceedings of KDD 2002 Workshop on Temporal Data Mining*, Edmonton, Canada, July 23 (2002).
150. Michael Steinbach, **Pang-Ning Tan**, Vipin Kumar, Christopher Potter, and Steven Klooster, "Data Mining for the Discovery of Ocean Climate Indices," *Proceedings of SDM 2002 Workshop on Mining Scientific Datasets*, Arlington, VA, April 13 (2002).
151. **Pang-Ning Tan** and Vipin Kumar, "Mining Association Patterns in Web Usage Data," *Proceedings of the International Conference on Advances in Infrastructure for e-Business, e-Education, e-Science, and e-Medicine on the Internet*, L'Aquila, Italy, Jan 21-27 (2002).
152. **Pang-Ning Tan**, Vipin Kumar, and Harumi Kuno, "Using SAS for Mining Indirect Associations in Data," *Proceedings of the Western Users of SAS Software Conference*, San Francisco, CA, September 5-7 (2001). **Awarded Best contributed paper in Application Development**
153. **Pang-Ning Tan** and Vipin Kumar, "Mining Indirect Associations in Web Data," *Proceedings of WebKDD 2001: Mining Log Data Across All Customer Touch Points*, San Francisco, CA, August 26 (2001).
154. **Pang-Ning Tan**, Michael Steinbach, Vipin Kumar, Christopher Potter, Steven Klooster, and Alicia Torregrosa, "Finding Spatio-Temporal Patterns in Earth Science Data," *Proceedings of KDD 2001 Workshop on Temporal Data Mining*, San Francisco, CA, August 26 (2001).
155. Michael Steinbach, **Pang-Ning Tan**, Vipin Kumar, Christopher Potter, Steven Klooster, and Alicia Torregrosa, "Clustering Earth Science Data: Goals, Issues and Results," *Proceedings of KDD 2001 Workshop on Mining Scientific Datasets*, San Francisco, CA, August (2001).
156. Vipin Kumar, Michael Steinbach, **Pang-Ning Tan**, Steven Klooster, Christopher Potter, and Alicia Torregrosa. "Mining Scientific Data: Discovery of Patterns in Global Climate Systems", *Proceedings of the Joint Statistical Meetings*, Atlanta, GA (2001).
157. **Pang-Ning Tan** and Vipin Kumar, "Modeling of Web Robot Navigational Patterns," *Proceedings of WebKDD 2000: Web Mining for E-Commerce*, Boston, MA, August 20 (2000).
158. **Pang-Ning Tan** and Vipin Kumar, "Interestingness Measures for Association Patterns: A Perspective," *Proceedings of KDD'2000 Workshop on Postprocessing in Machine Learning and Data Mining*, Boston, MA, August 20 (2000).
159. Robert Cooley, **Pang-Ning Tan**, and Jaideep Srivastava, "WebSIFT: The Web Site Information Filter System," *Proceedings of the Web Usage Analysis and User Profiling Workshop*, San Diego, CA, August 15 (1999).

Book Chapters

160. Ronald Nussbaum, Abdol-Hossein Esfahanian, and **Pang-Ning Tan**. Clustering Social Networks Using Distance-Preserving Subgraphs. Tansel Özyer, Jon G. Rokne, Gerhard Wagner, Arno H. P. Reuser (editors). *The Influence of Technology on Social Network Analysis and Mining*, Lecture Notes in Social Networks, Vol. 6, pp. 331-349 (2013).

161. Jerry Scripps, Ronald Nussbaum, **Pang-Ning Tan**, and Abdol-Hossein Esfahanian, “Link-based Network Mining,” Matthias Dehmer (editor), *Structural Analysis of Networks*, Birkhäuser Publishing (2010).
162. **Pang-Ning Tan**, “Neural Networks,” Ling Liu and M. Tamer Ozsü (editors), *Encyclopedia of Database Systems*, Springer (2009).
163. **Pang-Ning Tan**, “Receiver Operating Characteristics (ROC) curve,” Ling Liu and M. Tamer Ozsü (editors), *Encyclopedia of Database Systems*, Springer (2009).
164. Michael Steinbach and **Pang-Ning Tan**, “kNN: k-Nearest Neighbor Classification,” Xindong Wu and Vipin Kumar (editors), *The Top Ten Algorithms in Data Mining*, Chapman & Hall/CRC (2009).
165. Shyam Boriah, Vipin Kumar, Michael Steinbach, **Pang-Ning Tan**, Christopher Potter, and Steve Klooster, “Detecting Ecosystem Disturbances and Land Cover Change using Data Mining,” Hillol Kargupta, Jiawei Han, Philip Yu, Rajeev Motwani, and Vipin Kumar (editors), *Next Generation of Data Mining*, CRC Press (2008).
166. Hui Xiong, Michael Steinbach, **Pang-Ning Tan**, and Vipin Kumar, “Pattern Preserving Clustering,” John Wang (editor), *Encyclopedia of Data Warehousing and Mining*, IGI Global (2008).
167. Michael Steinbach, Pusheng Zhang, Vipin Kumar, Shashi Shekhar, **Pang-Ning Tan**, Steve Klooster, and Christopher Potter, “Discovery of Patterns in the Earth Science Data using Data Mining,” Jozef Zurada and Mehmed Kantardzic (editors), *New Generation of Data Mining Applications*, John Wiley & Sons (2005).
168. Vipin Kumar, Pang-Ning Tan, and Michael Steinbach, “Data Mining”. Dinesh P. Mehta and Sartaj Sahni (editors), *Handbook of Data Structures and Applications*, Chapman and Hall/CRC (2004).
169. **Pang-Ning Tan** and Vipin Kumar, “Discovery of Web Robot Sessions based on their Navigational Patterns,” Ning Zhong and Jiming Liu (editors), *Intelligent Technologies for Information Analysis*, Springer (2004).
170. Levent Ertoz, Eric Eilertson, Aleksandar Lazarevic, **Pang-Ning Tan**, Vipin Kumar, Jaideep Srivastava, and Paul Dokas, “MINDS - Minnesota Intrusion Detection System,” Hillol Kargupta, Anupam Joshi, Krishnamoorthy Sivakumar, and Yelena Yesha (editors), *Data Mining: Next Generation Challenges and Future Directions*, AAAI Press (2004).
171. **Pang-Ning Tan** and Vipin Kumar, “Discovery of Indirect Associations from Web Usage Data,” Ning Zhong, Jiming Liu, and Yiyu Yao (editors), *Web Intelligence*, Springer (2003).
172. Vipin Kumar, Mahesh Joshi, Eui-Hong (Sam) Han, **Pang-Ning Tan**, and Michael Steinbach, “High-Performance Data Mining,” Jose M. L. M. Palma, Jack Dongarra, Vicente Hernandez, and A. Augusto de Sousa (editors), *High Performance Computing for Computational Science*, Springer (2002).
173. Robert Cooley, **Pang-Ning Tan**, and Jaideep Srivastava, “Discovery of Interesting Usage Patterns from Web Data,” Myra Spiliopoulou and Brij Masand (editors), *Advances in Web Usage Analysis and User Profiling*, Springer (2000).

Invited Presentations

174. **Pang-Ning Tan**. “Multi-task Learning for Spatio-Temporal Data”, Keynote presentation at the 13th International Workshop on Spatial and Spatiotemporal Data Mining (SSTDM-18), Singapore, Nov 17 (2018).
175. **Pang-Ning Tan**. “Multi-task Learning for Spatio-Temporal Data”, MSU Machine Learning Seminar, Oct 22 (2018).
176. **Pang-Ning Tan**. “Multi-task Multi-relational Network Mining”, Cisco FAST Seminar Series, June 28 (2015).

177. **Pang-Ning Tan.** “Cluster Analysis of Secchi Time Series using Dynamic Time Warping”, Archibold Biological Station, Lake Placid, FL, January 1 (2014).
178. **Pang-Ning Tan.** “Data Mining for Limnology Research”, Trout Lake, WI, January 22 (2013).
179. **Pang-Ning Tan.** “Threat Identification by Analyzing Temporal Connectivity Graphs”, Narus Corp, March 19 (2013).
180. **Pang-Ning Tan.** “Application of Regional Climate Model Simulations in Agricultural Assessment: Evaluation of Bias and Bias Correction Methods”, 32nd International Geographical Conference, Cologne, Germany, August 28 (2012).
181. **Pang-Ning Tan.** Invited panel on “Data Mining in Complex Real World Problems”, Pacific-Asia Conference on Knowledge Discovery and Data Mining, Kuala Lumpur, May 29 (2012).
182. **Pang-Ning Tan.** “Multi-task and Multi-relational Network Learning,” Wayne State University, Nov 8 (2011).
183. **Pang-Ning Tan.** “Pattern Discovery and Predictive Modeling of Earth Science Data,” Universitas Indonesia, July 22 (2009).
184. **Pang-Ning Tan.** “Exploiting Link Structure in Mining Network Data.” Singapore Management University, July 20 (2009).
185. **Pang-Ning Tan.** “Data Mining for Analysis and Modeling of Eco-climatic Data,” George Mason University, June 11 (2008).
186. **Pang-Ning Tan.** “Analysis and Modeling of Eco-climatic Data,” Virginia Tech University, June 10 (2008).
187. **Pang-Ning Tan.** “Mining Data Intensive Applications for Intelligent Transportation Systems,” Michigan State University, June 13 (2007).
188. **Pang-Ning Tan.** “Data Mining,” NSF workshop on Agents of Change: A Multidisciplinary Protocol for Assessing Climate Impacts, Vulnerability and Adaptation, East Lansing, January 22 (2007)
189. **Pang-Ning Tan.** “Clustering in the Presence of Bridge-Nodes,” INTERFACE 2006 Symposium on the interface of Statistics, Computing Science, and Applications, Pasadena, May 26 (2006).
190. **Pang-Ning Tan.** “Knowledge Discovery in Health Care,” GE Healthcare Integrated IT Solutions, East Lansing, July 6 (2006).
191. **Pang-Ning Tan.** “Prototype-Driven Classification of Data Streams,” Western Michigan University, Oct 28 (2005)
192. **Pang-Ning Tan.** “Data Mining for Electronic Medical Records,” Health Informatics Seminar at College of Human Medicine, East Lansing, May 13 (2005).
193. **Pang-Ning Tan.** “Data Mining for Diagnostics and Prognostics Applications,” Eaton Corporation Diagnostic and Prognostic Design Burst, Minneapolis, April 7 (2004).
194. **Pang-Ning Tan** and Anil K. Jain. “Data Mining,” Tutorial presentation at Eaton Corporation, Milwaukee, March 15 (2004).
195. Vipin Kumar, **Pang-Ning Tan**, and Michael Steinbach. “Data Mining,” Tutorial presentation at ARL - Aberdeen Proving Ground, May 15 (2003).
196. **Pang-Ning Tan**, “MINDS – Minnesota Intrusion Detection System,” Seventh Annual E-Commerce Conference, Minneapolis, May 1 (2003).
197. **Pang-Ning Tan**, “Discovery of Indirect Associations and Its Applications,” Western Users of SAS Conference, San Diego, CA, September 4 (2002).

Press Releases

1. WILX 10 news, “Sparrow, MSU team up to create healthy eating app”, <http://www.wilx.com/content/news/Sparrow-MSU-team-up-to-create-healthy-eating-app-384097061.html>, June 23 (2016).
2. MSU/Sparrow Press Release, “Sparrow and MSU researchers work on new app to help heart Patients stay healthy”, <http://www.sparrow.org/News/Article.aspx?id=1560&sid=1&nid=1298&showBack=true&PageIndex=0&Categories=1>, June 7 (2016).
3. NSF Press Release 11-160, “NSF Grants Foster Understanding of Biological Systems on Regional to Continental Scales”, August 5 (2011)
4. MSU Press Release, “MSU-led study to examine effect of climate change on global industries,” <http://news.msu.edu/story/6957/>, October 12 (2009)
5. NSF Press Release 09-197, “NSF Awards Grants for Studies of Coupled Natural and Human Systems,” http://www.nsf.gov/news/news_summ.jsp?cntn_id=115757, October 14 (2009)
6. NASA Press Release 04-395, “NASA Scientists Link Greenhouse Gases to Insects and Trees,” http://www.nasa.gov/home/hqnews/2004/dec/HQ_04395_bugs_gas.html, December 13 (2004)
7. NASA Press Release 03-51AR, “NASA Data Mining Reveals a New History of Natural Disasters,” http://www.nasa.gov/centers/ames/news/releases/2003/03_51AR.html, July 8 (2003)

RESEARCH FUNDING

1. NSF-Amazon. FAI: Fairness-Aware Algorithms for Network Analysis. \$636,000. P.N. Tan and A-H Esfahanian. 1/1/2020 – 12/31/2022.
2. Bosch Research and Technology Center. Heterogeneous Data Mining. \$50,000. P.N. Tan. 10/1/2016 – 8/31/2017.
3. NSF. MSF-FRA: A macrosystems ecology framework for continental-scale prediction and understanding of lakes. P.A. Soranno, K.S. Cheruvellil, P.N. Tan, and J. Zhou. \$2,392,743. 10/15/2016 – 9/14/2021.
4. NSF. III: Small: Robust Algorithms for Multi-Task Learning of Spatio-Temporal Data. P.N. Tan and L. Luo. \$499,891. 8/1/2016 – 7/31/2020.
5. Cisco Inc. Topology-Aware Device Configuration Compliance, Risk Assessment and Optimal Network Updates . \$45,000. P.N. Tan. 1/1/2016 – 12 /31/2016.
6. MSU Trifecta Pilot Grant Award. Celebration Drinking and Social Media. \$10,000. S.E Alhabash, P.N. Tan, S. Smith. 11/1/2015 – 10/31/2016.
7. Bosch Research and Technology Center. Heterogeneous Data Mining. \$50,000. P.N. Tan. 9/1/2015 – 8/31/2016.
8. Sparrow/MSU Center for Innovation and Research. Mobile tool to Aid Health Behavior Choices. \$50,000. P.N. Tan, J. Huh, B. Given, and P. Entler. 6/1/2015 – 5/31/2016.
9. Hewlett Packard Laboratories. Biometric Data Mining. P.N. Tan. \$10,000. 6/1/2015 – 5/31/2016.
10. MSU Trifecta Pilot Grant Award. Leveraging Message Features and Network Structures to Harness the Power of Social Media in Preventive Health Information Propagation. J. Meng, W. Peng, P.N. Tan. \$10,000. 4/1/2015-3/31/2016.
11. MSU S3 (Science Studies @ State) Collaborative Grant Award. Conceptions of good science in a data-rich world. K. Cheruvellil, P. Soranno, K. Elliott, G. Montgomery, P.N. Tan. \$10,000. 1/1/2015 – 12/31/2015.
12. NASA. Developing a statistical-physical integrated approach for downscaling hydrologic information from GCM. L. Luo, M. Pan, and P.N. Tan. \$512,085. 6/21/2013 – 3/19/2017.

13. NOAA. Exploring best practice procedures for optimal use of climate forecast for regional hydrological applications. L. Luo and P.N. Tan. \$309,238. 8/1/2012 – 7/31/2016.
14. Narus Corp. Data mining on network traffic analysis. P.N. Tan. \$35,000. 9/13/2013-5/31/2014.
15. NIH. Neural mechanisms of attentional priority for visual features and objects. T. Liu, D. Zhu, P.N. Tan. \$1,832,299. 7/1/2012 – 6/30/2017.
16. Narus Corp. Data mining on network traffic analysis. P.N. Tan. \$70,000. 1/1/2012-12/31/2012.
17. NSF. Collaborative Research: The effects of cross-scale interactions on ecosystem state across space and time. P. Soranno, K. Cheruvilil, P.N. Tan. \$1,260,314. 5/15/2011 –5/14/2016.
18. Narus Corp. Data mining on network traffic analysis. P.N. Tan. \$70,000. 1/1/2011-12/31/2011.
19. CDC. Serious Social Media for Health: incorporation of new data sources to identify temporal and spatial clusters of foodborne illness. T. Bernardo, J. Funk, P.N. Tan. \$24,000. 10/1/2011 – 9/30/2012.
20. PSI. Assessing Land Cover Change in Global Forest Cover using Data Mining. V. Kumar, P.N. Tan. \$70,000 (subcontract from U of Minnesota), 2/1/2010 – 1/31/2011.
21. Narus Corp. Data mining on network traffic analysis. P.N. Tan. \$25,000. 1/1/2010-12/31/2010.
22. ONR. Kernel Learning for Fusing Uncertain Information from Multiple Heterogenous Sources. A.K. Jain, R. Jin, P.N. Tan. \$909,377. 3/16/2009 – 9/30/2014.
23. ARO. Information Assurance: Detection & Response to Web Spam Attacks. P.N. Tan, A.K. Jain. \$50,000. 10/1/2009 – 6/30/2010.
24. NSF. CNH: Towards an Integrated Framework for Climate Change Impact Assessments for International market Systems with Long-Term Investments. J. Winkler, S. Thornsbury, P.-N. Tan, J. Andresen, J.R. Black, S. Loveridge, S. Zhong, J. Zhao, N. Rothwell, and A. Iezioni. \$1,499,763. 10/1/2009-9/30/2014.
25. NASA. Algorithms for Forest Cover Change Detection using MODIS Data. V. Kumar, P.N. Tan. \$25,000 (subcontract from U of Minnesota). 7/1/2009 – 6/30/2010.
26. NSF. III-CXT: Collaborative Research: Spatio-Temporal Data Mining For Global Scale Eco-Climatic Data. P.N. Tan. \$188,000. 7/1/2007 – 6/30/2010.
27. MSU. A Web-based Assistant for Matching RFPs to Teams of Researchers. P.N. Tan, J. Sticklen. \$55,000. 1/1/2008 – 6/30/2009.
28. NSF. AOC: A Multidisciplinary Protocol for Assessing Climate Impacts, Vulnerability and Adaptation. J. Winkler, S. Thornsbury, P.-N. Tan, J. Andresen, J.R. Black, S. Loveridge, S. Zhong, N. Rothwell. \$124,736. 8/15/2006 – 2/29/2008.
29. MSU. The Only Constant Is Change: Mining Evolving Data Sets. P.N. Tan. \$50,000. 12/15/2003 – 6/15/2005.

THESIS SUPERVISION

Current Graduate Students

- Farzan Masrouf (PhD – co-advise with Abdol Esfahanian), Ding Wang (PhD), Tyler Wilson (PhD), Boyang Liu (PhD – co-advice with Jiayu Zhou).

Graduated PhD and MS Students

- Xi Liu (PhD, 2019), “Robust Multi-Task Learning Algorithms for Predictive Modeling of Spatial and Temporal Data”, First employment: Pinterest.
- Courtland VanDam (PhD, 2019), “Learning Algorithms for Detecting Disinformation on Social Media”, First employment: MIT Lincoln Labs.
- Shuai Yuan (PhD, 2017), “Novel Learning Algorithms for Mining Geospatial Data”, First employment: Quora.
- Jianpeng Xu (PhD, 2017), “Multi-Task Learning and Its Application to Geospatio-Temporal Data”, First employment: Ebay.
- Liu Lei (PhD, 2015), “Hierarchical Learning for Large Multi-class Classification in Network Data”, First employment: Hewlett Packard Research Laboratory.
- Zubin Abraham (PhD, 2013), “Multi-Objective Regression with Application to the Climate Domain”. First employment: Bosch Research.
- Prakash Mandayam (PhD, 2012), “Exploiting Multiple Data Sources for Network Mining”. Currently at Amazon Inc.
- Courtland Vandam (MS, 2012), “A Probabilistic Topic Modeling Approach for Event Detection in Social Media”.
- Samah Fodeh (PhD, 2010), “Incorporating Background Knowledge in Document Clustering”. Currently Assistant Professor at University of Massachusetts Medical School.
- Jerry Scripps (PhD, 2009), “Exploiting the Link Structure in Mining Network Data”. Currently Assistant Professor at Grand Valley University.
- Haibin Cheng (PhD, 2008), “Spatio-Temporal Data Mining with Applications to Earth Science Domain”. Currently at Facebook Inc.
- Kapila Moonesinghe (PhD, 2007), “Graph-based Methods for Pattern Mining”. First employment: Assistant Professor at University of Toledo.
- Samah Fodeh (MS, 2006), “Mining Interesting Rules by Combining Knowledge Discovery from Data with Literature-based Discovery”.
- Ronald Nussbaum (MS, 2008, co-advise with Dr Abdol-Hossein Esfahanian), “Graph-based Email Prioritization”.

PROFESSIONAL ACTIVITIES

- **Conference Organizing Committee**
 - Program Co-Chair, Workshop on Health Data Science: Creation, Presentation, Analysis and Interpretation, IEEE International Conference on Health Informatics (ICHI 2016).
 - Media and Publicity Co-chair, ACM SIGKDD International Conference on Data Mining (KDD-2015)
 - Program Co-chair, SIAM International Conference on Data Mining (SDM 2014)
 - Program Co-chair, Pacific Asia Conference on Knowledge Discovery and Data Mining (PAKDD 2012)
 - Publication Chair, SIAM International Conference on Data Mining (SDM 2009).
 - Co-organized the Conference on Climate Change in the Great Lakes Region (2008).
 - Publicity Chair, SIAM International Conference on Data Mining (SDM 2008).
 - Vice Chair, IEEE/WIC/ACM International Conference on Web Intelligence (WI 2007).
 - Tutorial Chair, SIAM International Conference on Data Mining (SDM 2007).
- **Associate Editor**
 - Web Intelligence (2015 – present)
 - IEEE Intelligent Informatics Bulletin (2007-present).
- **Program Committee Member**
 - IEEE Joint Conference on Artificial Intelligence (Area chair, IJCAI 2019)

- ACM SIGKDD International Conference on Data Mining (KDD 2020, KDD 2018, KDD 2016, KDD 2013, KDD 2012, KDD 2011, KDD 2010, KDD 2009, KDD 2008, KDD 2007).
 - IEEE International Conference on Data Mining (ICDM 2020, ICDM 2018, ICDM 2016, ICDM 2015, ICDM 2013, ICDM 2012, ICDM 2011, ICDM 2010, ICDM 2009, ICDM 2007, ICDM 2006, ICDM 2005, ICDM 2004, ICDM 2003, ICDM 2002).
 - SIAM International Conference on Data Mining (SDM 2017, SDM 2016, SDM 2015, SDM 2012, SDM 2011, SDM 2010, SDM 2009, SDM 2008, SDM 2007, SDM 2006).
 - IEEE International Conference on Pattern Recognition (ICPR 2010, ICPR 2008).
 - European Conference on Machine Learning / Principles and Practice of Knowledge Discovery in Databases (ECML/PKDD 2011, ECML/PKDD 2010, ECML/PKDD 2008, ECML/PKDD 2006).
 - Pacific-Asia Conference on Knowledge Discovery & Data Mining (PAKDD-2011, PAKDD-2010, PAKDD-2009, PAKDD-2008, PAKDD-2007, PAKDD-2003).
 - IEEE/WIC/ACM International Conference on Web Intelligence (WI 2010, WI 2009, WI 2008, WI 2007, WI 2006, WI 2005, WI 2004, WI 2003).
 - ACM Conference on Information and Knowledge Management (CIKM 2018, CIKM 2017, CIKM 2016, CIKM 2015, CIKM 2011, CIKM 2010).
- **Panelist**
 - National Science Foundation (NSF), 2005, 2007, 2009.
 - Hong Kong Research Grant Council (RGC), 2009 – 2017.
 - Japan Society for the Promotion of Science (JSPS), 2010.
- **Committee Memberships at Michigan State University**
 - CSE Graduate Study and Research Committee (2006 –2008, 2011 - 2014).
 - CSE Curriculum Committee (2008 –2011, 2019).
 - CSE Computing Environment Committee (2003 –2005, 2015 - 2018).
 - CSE Colloquium committee (2005).
 - CSE Poster workshop organizer (2005).
 - CSE Advisory committee (2015).
 - CSE faculty search committee (2014, 2015).
 - CSE chair search committee (2016/2017).
 - CSE/CMSE deep learning search committee (2017, 2018).
 - BAE/CEE search committee (2019).
 - Review panel for Strategic Partnership Grant (2016).
 - Faculty senate (2019/2020).
 - University Council (2019/2020).