SEE-KIONG NG, Ph.D.

Professor of Practice, Department of Computer Science, School of Computing
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***Profile*: Multi-lingual, multi-cultural, well-published, cross-disciplinary computer scientist, technology executive, and professor specializing in data analytics and artificial intelligence applied to smart cities and bioinformatics; balanced experience in industry, academia and research institutes; start-up and corporate industry experience; international exposure in the US, UK, and Asia (Singapore, India, South Korea, China and Japan); practical skills in both conducting individual research and managing inter-disciplinary research teams; post-graduate lectureship and student supervision**

Education

- **Ph.D. in Computer Science** and **M.S. in Computer Science.**
  Carnegie Mellon University, School of Computer Science. 1990–1991, 1993–1998.

- **M.S.E. in Computer and Information Science (Artificial Intelligence)**
  University of Pennsylvania, Department of Computer and Information Science. 1989–1990.

- **B.S. in Applied Mathematics (Computer Science Track)** with university honor
  Carnegie Mellon University, Mellon College of Science. 1986–1989.

Professional Experience

- **Professor of Practice**. School of Computing, NUS, Singapore. 2016-present.
  Conducts applied research in data science and artificial intelligence that enables computational discovery of useful knowledge from data that lead to effective informed decision making and planning for challenging real-world problems. Joint-appointment with Institute of Data Science.

- **Director, Translational Research**. Institute of Data Science, NUS, Singapore. 2016-present (concurrent appointment).
  Oversees engagements with various external stakeholders to promote translation of the data science research at the institute to solve challenging data-driven problems that are relevant to the government and industry.

- **Director, Strategic Alliances.** Institute for Infocomm Research, Singapore. 2013-2016.
  Part of the institute's senior management team to assist the Executive Director in directing the activities and growth of the organization. Responsible for overseeing I^2R's Research and Commercialization Hub that comprises of joint labs with strategic industry partners and

technology adopters including MNCs, LLEs, and public agencies to establish long term partnerships for value capture of the institute's R&D efforts.

- **Programme Director.** Urban Systems Initiative, A*STAR, Singapore. 2012-2015.
  As the SERC (Science and Engineering Research Council) Programme Director to oversee and integrate research programmes involving multiple research institutes on smart cities under the A*STAR Urban Systems Initiative. The Initiative seeks to develop key technological capabilities for Smart Nation through active partnerships with public agencies and private sector players, leveraging on infocomm advances in big data, complexity science, and artificial intelligence to enable innovative urban solutions for smart cities.

- **Principal Scientist; Department Head; Department Advisor.** Institute for Infocomm Research, A*STAR, Singapore. 2000-2016.

  Principal Scientist (2010-2016); Senior Scientist (2000-2010). Conducts research in applied data mining, machine learning, and artificial intelligence, with a focus on mining complex data (networks, links) and also unstructured data (free text). Early research in text mining and bioinformatics has resulted in a successful overseas bioinformatics joint-venture (see *Concurrent Appointments* below). Since founding the Data Analytics Department in I^2R, have groomed an award-winning data mining team for a wide range of real-world application domains beyond bioinformatics. Published more than 100 papers in leading peer-reviewed journals and conferences across multiple disciplines. Promoted to Principal Scientist II, the highest rank for research scientists in A*STAR, in 2014.

  Department Heads (2005-2016, multiple departments).
  - *Founding Department Head, Data Analytics Department (DAD, 2005-2012):* Founded the Data Analytics Department in 2005 and grew the department from l5 members to more than 50 by 2012. Transformed the department from a niche bioinformatics group into an award-winning data mining team in Singapore with the largest number of data scientists. Expanded into new research domains for data analytics such as social network mining, privacy-preserving data analytics, and semantic web. Successfully attracted industry collaborations from multiple verticals, ranging from advanced manufacturing to financial services, and spun out two successful start-up companies (Knorex and 9 Degrees Freedom) from the department. Also served as a member of the institute's Core Management Team in 2007-2009.
  - *Founding Department Head, Urban Systems Department (URBAN, 2012 - 2016):* Founded the Urban Systems Department in 2012, focusing on developing a real-world data analytics platform (A*DAX) for R&D innovations to harness the power of big data in the city into new urban solutions for the city from urban mobility to city planning. In less than 3 years, grew the department from scratch to a team of about 20, with the A*DAX platform successfully testbedded in Singapore's first Smart City Testbed in Jurong Lake District through collaborating with a local system integrator.
  - *Sense and Sense-abilities Department (S&S, 2015-2016):* Took over the department in 2015, re-profiled into a 20-plus team with a balanced mix of research and development capabilities. Expanded the scope of the department to focus on developing intelligent sensing systems for smart applications ranging from environment sensing to industry 4.0. Groomed a deputy department head to take over the department in a year.

Department Advisor (2012-2015)

- Served as the Department Advisor for Data Analytics Department (DAD) and successfully groomed a new department head in 2011 who has continued to bring DAD to the next level with award-winning research and multiple successful industry collaborations.

Lab Head (2001-2004). Managed a data mining team with a focus on bioinformatics in the Knowledge Discovery Department. Also served as Deputy Department Manager between 2003-2004.

- **Associate Professor**. Singapore University of Technology and Design, Singapore. 2011-2015.
  As one of the pioneering faculty members of Singapore's fourth university, under the Information Systems Technology and Design pillar. (Joint appointment with A*STAR).

- **Principal Scientist.** DNA Sciences (formerly Kiva Genetics), Mountain View, California, United States. 1999-2000.
  Responsible for developing proprietary genomic data analysis algorithms for SNP genotyping, and involved in the implementation of a fully-integrated production laboratory information management system (LIMS) for ultra-high throughput genotyping with novel miniaturized microcapillary technologies.

- **Senior Investigator**. SmithKline Beecham Pharmaceuticals R&D, Harlow, United Kingdom. 1998-1999.
  Responsible for developing and supporting in-house bioinformatics software solutions to address the practical computational needs of biologists and geneticists in large-scale pharmacogenomics projects, focusing on microsatellite genotyping.

- **Post-Doctoral Scientist**. Laboratory of Bioinformatics, Keio University, Japan. 1998.
  Performed research on the estimation of kinetic parameters for complex biochemical pathways using machine learning approaches for *in silico* cellular simulation using E-CELL.

- **Software Consultant**. Cybergenetics Inc., Pittsburgh, United States. 1996-1998.
  Solely responsible for the conversion of *FAST-MAP*, an academic bioinformatics software written for my Ph.D. thesis, into *TrueAllele*™, a commercial version licensed internationally. Supported worldwide customers such as DECODE Genetics (Iceland), SmithKline Beecham (UK), and National Institute of Health (USA).

- **Research Engineer**. Systems & Computer Organization, Singapore. 1991-1992.
  Involved in team research, design, and implementation of a system for computer-aided text summarization for the Ministry of Defense in Singapore.

Awards

- Minister for National Development's R&D Awards 2017 (Distinguished Award), for innovation in developing a city-level integrated analytics platform to enable a more effective and efficient data-driven planning process across the whole of government, 29 June 2017.

- MTI (Ministry of Trade and Industry Singapore) Borderless Award, as project member of the Green Growth Working Group (G3) to advance national efforts in green growth initiatives and narrative, 17th June 2014.
- A*STAR (Agency for Science, Technology and Research Singapore) Borderless Award, as team leader of the Urban Systems Initiative, 9th April 2014.
- MTI (Ministry of Trade and Industry Singapore) Innovation Award, in recognition of the winning project on Strategic Technology Translation in Business Analytics, 3 May 2013
- Winner of PAKDD 2012 Data Mining Competition Open Category, Problem 1: Predicting potential churners and ex-customers who are likely to come back (2012)
- Best Paper Runner-Up Award, 16th International Conference on Database Systems for Advanced Applications (DASFAA) (2011)
- Best Poster Award, 12th Annual International Conference on Research in Computational Molecular Biology (RECOMB) (2008)
- Best Paper Award, 16th International Conference on Genome Informatics (GIW) (2005)
- Winner of the First Golden Point Award (Chinese Short Story category) by National Arts Council (1992)
- Recipient of the National Computer Board (NCB) Undergraduate Overseas Scholarship (1986-9)

Competitive Research Grants

- "Learning to Detect Anomalies in Cyber Physical Systems with Generative Adversarial Networks on Networked Sensor Time Series Data", CRDCG2017-S05, Singapore Cybersecurity Consortium (2017-2018). Principal Investigator.
- "Urban Systems Programme Office", SERC Grant 1224710058, Science and Engineering Research Council, Agency for Science, Technology and Research, Singapore (2012-2015). Programme Director.
- "A*STAR – IDA Business Analytics Center (BAC)", Commercialization of Technology (COT) Grant No: ETPL/10-S10COT-0020, Exploit Technologies, Singapore (2011). Principal Investigator.
- "Hippocratic Data Stream Cloud for Secure, Privacy-Preserving Data Analytics Services", SERC Grant No: 102 158 0037, Science and Engineering Research Council, Agency for Science, Technology and Research, Singapore (2010). Principal Investigator.
- "Enabling Medical Research with Differential Privacy", SERC Grant 102 158 0074, Science and Engineering Research Council, Agency for Science, Technology and Research, Singapore (2010). Co-Investigator.
- "Advanced techniques for Handling Imbalanced and Unlabelled Data for Classification", SERC Grant No: 102 155 0091, SERC Aerospace Programme, Science and Engineering Research Council, Agency for Science, Technology and Research, Singapore (2010). Co-Investigator.
- "ISyNCC – Intelligent System for Neuro Critical Care", SERC Grant No: 092 148 0067, Science and Engineering Research Council, Agency for Science, Technology and Research, Singapore (2009). Co-Investigator.
- "A Personalized and Adaptive Literature Curation System for the Biomedical Sciences", BMRC Grant No: 041/1/31/19/377, Biomedical Research Council, Agency for Science, Technology and Research, Singapore (2005). Co-Investigator.
- "Smart Laboratory Initiative: The Virtual Lab Dashboard", *Embedded and Hybrid Systems Programme (Main Phase)*, Project No. 022-106-0047, Science and Engineering Research

Council, Agency for Science, Technology and Research, Singapore (2003). Principal Investigator.

- "Smart Laboratory Initiative", *Embedded and Hybrid Systems Pilot Projects*, Project No. 012-106-0059, Science and Engineering Research Council (SERC), National Science and Technology Board (2001). Principal Investigator.

Publications

Journal Papers (43)

- B. Zhang, W. Li, X.-L. Li, and S.-K. Ng (2018) "Intelligent fault diagnosis under varying working conditions based on domain adaptive convolutional neural networks", in *IEEE Access*, 10.1109/ACCESS.2018.2878491, October 2018.

- A. T. Luu, H. S. Cheung, and S.-K. Ng (2016) "Utilizing Temporal Information for Taxonomy Construction", in *Transactions of the Association for Computational Linguistics (TACL)*, Vol 4, p. 551-564, December 2016.

- Y. Hu, T. Hase, H. P. Li, S. Prabhakar, H. Kitano, S.-K. Ng, S. Ghosh, L. Wee (2016) "A Machine Learning Approach for the Identification of Key Markers involved in Brain Development from Single-cell Transcriptomic Data", in *BMC Genomics*, Vol 17 (Suppl 13), December 2016.

- G. Liu, H. Zhang, M. Feng, L. Wong, and S.-K. Ng (2015) "Supporting Exploratory Hypothesis Testing and Analysis", in the *ACM Transactions on Knowledge Discovery from Data (TKDD)*, Volume 9 Issue 4, Article No 31, June 2015.

- H. Han, X.-L. Li, S.-K. Ng, and J. Zhou (2013) "Multi-Resolution-Test for Consistent Phenotype Discrimination and Biomarker Discovery in Translational Bioinformatics", in the *Journal of Bioinformatics and Computational Biology*, doi: 10.1142/S0219720013430105.

- H. Cao, X.-L. Li, Y.-K. Woon, and S.-K. Ng (2013) "Integrated Oversampling for Imbalanced Time Series Classification", in the *IEEE Transactions on Knowledge and Data Engineering (TKDE)*, vol 25 (12), pages 2809-2822.

- Daniel L.-K. Wong, X.-L. Li, M. Wu, J. Zheng, and S.-K. Ng (2013) "PLW: Probabilistic Local Walks for Detecting Protein Complexes from Protein Interaction Networks", in *BMC Genomics (InCoB2013 Conference Supplements)*, vol 14 (suppl 5):S15.

- P. Yang, X.-L. Li, J.-P. Mei, C.-K. Kwoh, and S.-K. Ng (2012) "Positive-Unlabeled Learning for Disease Gene Identification", in *Bioinformatics*, vol 28(20), pages 2640-2647.

- S. Awad, N. Panchy, S.-K. Ng, and J. Chen (2012) "Inferring the Regulatory Interaction Models of Transcription Factors in Transcriptional Regulatory Networks", in the *Journal of Bioinformatics and Computational Biology*, Vol. 10:5.

- M. Wu, X. Li, C.-K. Kowh, S.-K. Ng and L. Wong (2012) "Discovery of Protein Complexes with Core-Attachment Structures from TAP Data", in *Journal of Computational Biology*, Vol 19:9, pages 1027-1042.

- E. Y. Cheu, C. Quek and S.-K. Ng (2012) "ARPOP: An Appetitive Reward-based Pseudo-Outer-Product Neural Fuzzy Inference System Inspired from The Operant Conditioning of Feeding Behavior in Aplysia", in *IEEE Transactions on Neural Networks*, Vol 23:2, pages 317-329.

- H. Willy, S.-K. Ng and W.-K. Sung (2011) "D-SLIMMER: Domain-SLiM Interaction Motifs Miner for Sequence Based Protein-Protein Interaction Data", in *Journal of Proteome Research*, Vol 10:12, pages 5285-5295.

- P. Yang , X. Li, M. Wu, C.-K. Kwoh, S.-K. Ng (2011) "Inferring Gene-Phenotype Associations via Global Protein Complex Network Propagation", in *PLoS ONE,* 6(7): e21502.

- S. Teddy and S.-K. Ng (2011) "Forecasting ATM Cash Demands using a Local Learning Model of Cerebellar Associative Memory Network, in *International Journal of Forecasting*, vol 27, pages 706-776.

- M. Wu, H. N. Chua, X. Li, C.-K. Kwoh, and S.-K. Ng (2010) "Integrating Diverse Biological and Computational Sources for Reliable Protein-Protein Interactions", in *BMC Bioinformatics*, 11 (Suppl 7):S8.

- H. Willy, F. Song, Z. Aung, S.-K. Ng, and W.-K. Sung (2010) "SLiM on DIet: Finding Short Linear Motifs on Domain Interaction Interfaces in PDB", in *Bioinformatics*, vol 26, no. 8, pages 1036-1042.

- X. Li, M. Wu, C.-K. Kwoh, and S.-K. Ng (2010) "Computational approaches for detecting protein complexes from protein interaction networks: a survey", in *BMC Genomics,* 11(Suppl 1):S3.

- F. Eisenhaber, C.-K. Kwoh, S.-K. Ng, W.-K. Sung, and L. Wong (2009) "Brief Overview of Bioinformatics Activities in Singapore", in *PLoS Computational Biology*, 5(9): e1000508.

- D. Low, V. Kuralmani, S.-K. Ng, K. K. Lee, I. Ng, and B. T. Ang (2009) "Prediction of Outcome Utilizing Both Physiological and Biochemical Parameters in Severe Head Injury", in *Journal of Neurotrauma*, Vol 26:1177-1182.

- M. Wu, X. Li, C.-K. Kwoh, and S.-K. Ng (2009) "A Core-Attachment based Method to Detect Protein Complexes in PPI Networks", in *BMC Bioinformatics,* Vol 10:169.

- H.N. Chua, W. Hugo, G. Liu, X. Li, L. Wong, and S.-K. Ng (2009) "A probabilistic graph-theoretic approach to integrate multiple predictions for the protein-protein subnetwork prediction challenge", in *Annals of the New York Academy of Sciences*, Vol 1158:224-33.

- S. Tang, Z. Zhang, G. Kavitha, E.-K. Tan, and S.-K. Ng (2009) "MDPD: an integrated genetic information resource for Parkinson's disease", in *Nucleic Acids Research*, Vol

37(Database issue):D858-62.

- X. Li, J.-X. Li, B. Veeravalli, and S.-K. Ng (2008) “Inferring Transcription Factor Interactions Using a Novel HV-SVM Classifier”, in *International Journal of Computational Biology and Drug Design*, Vol 1, No 1, pp. 59-73.

- Z. Aung, S.-H. Tan, S.-K. Ng and K. L. Tan (2008) "Uncovering the Structural Basis of Protein Interactions with Efficient Clustering of 3-D Interaction Interfaces", in *Journal for Bioinformatics and Computational Biology*, Vol 6, No 3, pp. 415–433.

- Vincent Y.F. Tan and S.-K. Ng (2008) “Privacy-Preserving Sharing of Horizontally-Distributed Private Data for Constructing Accurate Classifiers” in *Privacy, Security, and Trust in KDD*, F. Bonchi et al. (Eds.), LNCS 4890, pp. 116–137.

- S.-H. Tan, H. Willy, W.-K. Sung and S.-K. Ng (2006) "A Correlated Motif Approach for Finding Short Linear Motifs from Protein-Protein Interaction Data", *BMC Bioinformatics* vol 7:502.

- X. Li, Y.C. Tan, and S.-K. Ng (2006) “Systematic gene function prediction from gene expression data by using a fuzzy nearest-cluster method", *BMC Bioinformatics* vol 7 (Suppl 4): S23.

- J. Jansson, S.-K. Ng, W.-K. Sung, H. Willy (2006) “A Faster and More Space-Efficient Algorithm for Infering Arc-Annotations of RNA Sequences through Alignment”, *Algorithmica* vol 46, no 2, pages 223-245.

- S.-K. Ng, S.-H. Tan (2006) “Challenges in Biological Literature Mining for Online Discovery of Molecular Interaction Pathways”, in *International Journal of Computer Applications in Technology (IJCAT)*, vol 27, No 4, pages 259-269.

- X.-L. Li, S.-H. Tan, and S.-K. Ng (2006) "Improving Domain-Based Protein Interaction Prediction Using Biologically-Significant Negative Dataset", *International Journal of Data Mining and Bioinformatics (IJDMB)* vol 1, no. 2, pages 138-149.

- J. Chen, W. Hsu, M.L. Lee, and S.-K. Ng (2006) “Increasing Confidence of Protein Interactomes using Network Topological Metrics”, *Bioinformatics* vol 22, no 16, pages 1998-2004.

- J.J. Kim, Z. Zhang, J.C. Park, and S.-K. Ng (2006) “BioContrasts: Extracting and Exploiting Protein-Protein Contrastive Relations from Biomedical Literature”, *Bioinformatics* vol 22, no 5, pages 597-605.

- J. Chen, W. Hsu, M.L. Lee, and S.-K. Ng (2005) "Discovering Reliable Protein Interactions from High-Throughput Experimental Data using Network Topology", *Artificial Intelligence in Medicine (AIM)*, vol 35, pages 37-47.

- S.-H. Tan, Z. Zhang, S.-K. Ng (2004) “ADVICE: Automated Detection and Validation of Interaction by Co-Evolution”, *Nucleic Acids Research*, vol 32, W69-W72.

- Z. Zhang, S.-K. Ng (2004) “InterWeaver: Interaction Reports for Discovering Potential Protein Interaction Partners with Online Evidence”, *Nucleic Acids Research*, vol 32, W73-W74.

- S.-K. Ng, L. Wong (2004) “Accomplishments and Challenges in Bioinformatics”, *IEEE IT Professional*, vol 6, no. 1, pages 44-50.

- S.-K. Ng, S.-H. Tan (2004) “Discovering Protein-Protein Interactions”, *Journal for Bioinformatics and Computational Biology*, vol 1, no. 4, pages 711-741.

- S.-K. Ng, Z. Zhuo, S.-H. Tan, (2003) “Integrative Approach for Computationally Inferring Protein Domain Interactions”, *Bioinformatics,* vol 19, no. 8, pages 923-929.

- S.-K. Ng, Z. Zhuo, S.-H. Tan, K. Lin, (2003) “InterDom: a database of putative interacting protein domains for validating predicted protein interactions and complexes”, *Nucleic Acids Research,* vol 31, no. 1, pages 251-254.

- A. Caprara, G. Lancia, S.-K. Ng, (2001). "Sorting Permutations by Reversals through Branch-and-Price", *INFORMS Journal on Computing* vol 13, pages 224-244.

- A. Caprara, G. Lancia, S.-K. Ng, (1999). "A Column-Generation Based Branch-and-Bound Algorithm for Sorting by Reversals", in M. Farach-Colton, F.S. Roberts, M. Vingron, M. Waterman (eds.) *Mathematical Support for Molecular Biology*, DIMACS Series in Discrete Mathematics and Theoretical Computer Science 47, AMS Press, pages 213-226.

- S.-K. Ng, Mukhopadhyay, N., Rayman, J., Ghosh, S., and Perlin, M, (1996). “Fully Automated Microsatellite Genotyping: Computer Software and Analysis Results”, *American Journal of Human Genetics*, 59(4):A229.

- M. Perlin, G. Lancia and S.-K. Ng, (1995). “Toward Fully Automated Genotyping: Genotyping Microsatellite Markers by Deconvolution”, *American Journal of Human Genetics*, 57(5), pages 1199-1210.

Conference Papers (74)

- D. Li, D. Chen, J. Goh, and S.-K. Ng. (2018) "Anomaly Detection with Generative Adversarial Networks for Multivariate Time Series", in the *7th International Workshop on Big Data, Streams and Heterogeneous Source Mining* (in conjunction with KDD18), London, Uniter Kingdom, 20 August, 2018.

- D. Chen, R. Yang, L. Shi, Y. K. Tham, T. H. Lim, H. W. Kuan, and S.-K. Ng. (2018) "Traveller Segmentation using Smart Card Data with Deep Learning on Noisy Labels", in the *7th International Workshop on Urban Computing* (in conjunction with KDD18), London, United Kingdom, 20 August, 2018.

- A. T. Luu, Y. Tay, S. C. Hui, and S.-K. Ng (2016). “Learning Term Embeddings for Taxonomic Relation Identification Using Dynamic Weighting Neural Network”, in Proceedings of the *Conference on Empirical Methods in Natural Language Processing (EMNLP),* pp. 403-413, Austin, Texas, USA, 2-4 November, 2016.

- L. Yu, W. Wu, G. Li, W. S. Ng, S.-K. Ng, X. Li, Z. Huang, A. Anunan, H. M. Watt (2015). "iVizTRANS: Interactive Visual Learning for Home and Work Place Detection from Massive Public Transportation Data", in Proceedings of the *IEEE Visual Analytics Science and Technology (VAST)*, Chicago, Illinois, USA, 25-30 October, 2015.

- A. T. Luu, J.-J. Kim, and S.-K. Ng (2015). "Incorporating Trustiness and Collective Synonym/Contrastive Evidence into Taxonomy Construction", in Proceedings of the *Conference on Empirical Methods in Natural Language Processing (EMNLP)*, pp. 1013–1022, Lisbon, Portugal, 17-21 September, 2015.

- S.-K. Ng, W.S. Ng, and Paul M. C. Lim (2014) "A*DAX: Data Analytics Platform for Smart Cities", *Smart City Expo World Congress*, Barcelona, Spain, 18-20 November, 2014.

- A. T. Luu, J.-J. Kim, and S.-K. Ng (2014) "Taxonomy Construction Using Syntactic Contextual Evidence", in Proceedings of the *Conference on Empirical Methods on Natural Language Processing (EMNLP)*, pp. 810-819, Doha, Qatar, 25-29 October, 2014.

- L. Yu, Joanne C. P. Yee, W. S. Ng, Paul M. C. Lim, and S.-K. Ng (2014) "SINGAPORE-IN-MOTION: More Data Lead to Better Understanding", *21st ITS World Congress*, Detroit, USA, 7-11 September 2014.

- Paul M. C. Lim, S.-K. Ng, W. S. Ng, H. Wu and Alan M. H. Quek (2014) "A*DAX for Transport Data Management, Sharing and Analytics", *21st ITS World Congress*, Detroit, USA, 7-11 September 2014.

- N. Amudha, G. G. Chua, Eric S. K. Foo, S. T. Goh, S. Guo, Paul M. C. Lim, M. T. Mak, M. C. M. Munshi, S.-K. Ng, W. S. Ng, H. Wu (2014) "A*DAX: A Platform for Cross-domain Data Linking, Sharing and Analytics", in Proceedings of the *19th International Conference on Database Systems for Advanced Applications (DASFAA),* Bali, Indonesia, 21-24 April 2014.

- K. Rajasekharan, A. P. Mathur, and S.-K. Ng (2013) "Effective Crowdsourcing for Software Feature Ideation in Online Co-Creation Forums", in Proceedings of the *25th International Conference on Software Engineering and Knowledge Engineering (SEKE)*, Boston, USA, 27-29 June 2013.

- W.S. Ng, S.-K. Ng, W. Wu (2012) "PlugCloud – Scaling by Plugging a Personal Cloud Infrastructure", in Proceedings of the *IEEE International Workshop on Scalable Computing for Big Data Analytics (SC-BDA)*, Singapore, December 17-19, 2012.

- G. Liu, A. Suchitra, H. Zhang, M. Feng, S.-K. Ng, and L. Wong (2012) "AssocExplorer: An Association Rule Visualization System for Exploratory Data Analysis", in Proceedings of the *18th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 2012)*, pp. 1536-1539 (Demonstration Track), Beijing, China, August 12-16, 2012.

- E. Y. Cheu, K. Sim, S.-K. Ng and H. C. Quek (2012) "Fuzzy Associative Learning of Feature Dependency for Time Series Forecasting", in Proceedings of the *International Joint*

Conference on Neural Networks (IJCNN 2012), pp 1-7, Brisbane, Australia, June 10-15, 2012.

- M. N. Nguyen, X.-L. Li and S.-K. Ng (2012) "Ensemble Based Positive Unlabeled Learning for Time Series Classification", in Proceedings of the *17th International Conference on Database Systems for Advance Applications (DASFAA 2012)*, pp 243-257, Busan, Korea, April 15-18, 2012.

- H. Cao, X.-L. Li, Y.-K. Woon and S.-K. Ng (2011) "SPO: Structure Preserving Oversampling for Imbalanced Time Series Classification", in Proceedings of the *IEEE International Conference on Data Mining (ICDM 2011)*, pp 1008-1013, Vancouver, Canada, December 11-14, 2011.

- Y. Fang, M. Ashrafi and S.-K. Ng (2011) "Privacy beyond Single Sensitive Attribute", in Proceedings of the *22nd International Conference on Database and Expert Systems Applications (DEXA '11)*, pp187-201, Toulouse, France, August 29-September 2, 2011.

- W. Wei, C. Gao, X.-L. Li, S.-K. Ng and G. Li (2011) "Integrating Community Question and Answer Archives", in Proceedings of the *25th AAAI Conference on Artificial Intelligence (AAAI-11)*, pp1255-1260, San Francisco, USA, August 7-11, 2011.

- M.N. Nguyen, X.-L. Li, and S.-K. Ng (2011) "Positive Unlabeled Learning for Time Series Classification", in Proceedings of the *22nd International Joint Conference on Artificial Intelligence (IJCAI 2011)*, pp1421-1426, Barcelona, Spain, July 16-22, 2011.

- E. Y. Cheu, H. C. Quek and S.-K. Ng (2011) "Evolving Ensemble of Fuzzy Models", in Proceedings of the *20th IEEE International Conference on Fuzzy Systems (FUZZ-IEEE 2011)*, pp2668 – 2675, Taipei, Taiwan, June 27-30, 2011.

- X.-L. Li, A. Tan, P.S. Yu, and S.-K. Ng (2011) "ECODE: Event-Based Community Detection from Social Networks", in Proceedings of the *16th International Conference on Database Systems for Advance Applications (DASFAA 2011)*, pp22-37, Hong Kong, April 22-25, 2011. ***Best Paper Runner-Up Award for DASFAA 2011.***

- G. Liu, M. Feng, Y. Wang, L. Wong, S.-K. Ng, T. L. Mah, E. Lee (2011) "Toward Exploratory Hypothesis Testing and Analysis", in Proceedings of the *IEEE International Conference on Data Engineering (ICDE 2011)*, pp745-756, Hannover, Germany, April 11-16, 2011.

- X.L. Li, B. Liu and S.-K. Ng (2010) "Negative Training Data Can Be Harmful to Text Classification", in Proceedings of the *Conference on Empirical Methods in Natural Language Processing (EMNLP 2010)*, pp218-228, Massachusetts, USA, October 9-11, 2010.

- E. Y. Cheu, H. C. Quek and S.-K. Ng (2010) "Time Series Forecasting With Appetitive Reward-based Pseudo-Outer-Product Fuzzy Neural Network", in Proceedings of the *IEEE International Joint Conference on Neural Networks (IJCNN 2010)*, pp4015-4022, Barcelona, Spain, July 18-23, 2010.

- X. L. Li, L. Zhang, B. Liu and S.-K. Ng (2010) "Distributional Similarity vs. PU Learning for Entity Set Expansion", in Proceedings of the *48th Annual Meeting of the Association for Computational Linguistics (ACL 2010)*, pp359-364, Uppsala, Sweden, July 11–16, 2010.

- Z. Aung and S.-K. Ng (2010) "An Indexing Scheme for Fast and Accurate Chemical Fingerprint Database Searching", in Proceedings of the *22nd International Conference on Scientific and Statistical Database Management (SSDBM 2010)*, pp288-305, Heidelberg, Germany, June 30 – July 2, 2010.

- C. Sheng, W. Hsu, M. L. Lee, J. C. Tong, and S.-K. Ng (2010) "Mining Mutation Chains in Biological Sequences", in Proceedings of the *26th IEEE International Conference on Data Engineering (ICDE 2010)*, pp473-484, Long Beach, California, USA, March 1-6, 2010.

- K. Sim, V. Gopalkrishnan, H. N. Chua, and S.-K. Ng (2009) "MACs: Multi-Attribute Co-Clusters with High Correlation Information", in Proceedings of the *European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML/PKDD 2009),* pp398-413, Bled, Slovenia, September 7-11, 2009.

- S. D. Teddy and S.-K. Ng (2009) "KCMAC-TSK: A Fuzzy Cerebellar Model with Localized TSK Learning for Non-Linear System Identification", in Proceedings of the *18th IEEE International Conference on Fuzzy Systems (FUZZ-IEEE 2009)*, pp1633-1638, Jeju Island, Korea, August 20-24, 2009.

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- V. Bajic, V. Brusic, J. Li, S.-K. Ng, L. Wong (2003) "From Informatics to Bioinformatics", in *Proceedings of the 1st Asia Pacific Bioinformatics Conference*, pages 3-14 (invited keynote, primary author L. Wong).

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International Committees

- Committee on *A Global Review of Data-to-Decisions Technologies: Integrating Humans, Machines and Networks*, Board of Global Science and Technology, National Academy of Sciences, USA (2012-2014)

National Committees

- Member, IT & Digital Advisory Panel (ITDAP), National Gallery Singapore (2016-present)
- Academic and Industry Group, Enabling ICT and Platforms Workgroup for National Innovation Challenge (NIC) on *Land and Liveability* (2013-2016)
- Member, Mid-term Review Panel, Singapore-ETH Centre – Future Cities Laboratory (FCL) (2013)
- Expert panel member, National Research Foundation Technology Foresight on *Urban Solutions* (2013)
- Member of the Science and Engineering Research Council (SERC) Public Sector Funding Technical Review Panel (PSF-TRP) (2013-present)

- Co-chairperson of Technical Review Panel for A*STAR's Science and Engineering Research Council (SERC) Thematic Programmes under Infocomm, Media and Computing Cluster (2014-2016)
- Technical Reviewer for the Land and Liveability National Innovation Challenge (L2 NIC) R&D Proposals (2014-2017)

Invited Talks

- "Harnessing Unstructured Medical Data", invited talk, Inaugural Symposium on Artificial Intelligence in Medicine, organized by SingHealth and NUS, 4 April 2018.
- "Learning to Live in a Data-Driven World", invited talk, Workshop on Digital Transformation in Urban Society organized by the Lee Kuan Yew Centre for Innovative Cities, Singapore University of Technology and Design (SUTD) and Sol Price School of Public Policy, University of Southern California (USC), Singapore, 16-17 March 2018.
- "Navigating the Age of Big Data and Artificial Intelligence", invited talk, DSTA Academy Technology Talks, Defence Science and Technology Agency (DSTA), Singapore, 18 May 2017.
- "The Science of Data + X", invited talk, A*STAR Scientific Symposium, Singapore, 2 August 2016.
- "Making Cities Smarter with Big Data", invited talk, First Urban Cities and Local Governments (UCLG) Executive Bureau Forum, Kazan, Russia, 26-28 May 2016.
- "Harnessing Big Data to Make Cities Smart", **invited keynote**, AI Forum 2016, Hualian, ROC, 29-30 April 2016.
- "Addressing the New Challenges of the Rapidly Urbanizing World with Big Data", invited talk, 2nd Asia-Pacific Conference on Complex Systems Design & Management, Singapore, 24-26 February 2016.
- "Harnessing Big Data and Data Analytics to Improve the Lives of Citizens in Smart Cities", invited talk, TM Forum Smart City InFocus 2015, Yinchuan, People's Republic of China, 11-13 September 2015.
- "Smart Cities and Big Data: Opportunities and Challenges", **invited keynote**, 13th International Conference on Smart Homes and Health Telematics "Inclusive Smart Cities and e-Health" (ICOST 2015), Geneva, Switzerland, 10-12 June 2015.
- "Unravelling Big Data for Smart Cities", invited talk, International Smart Cities Initiative (SCI2015) Workshop, held in conjunction with Information and Communication Technology Research Forum (ICTRF), Abu Dhabi, UAE, 18 May 2015.
- "Smart Cities and Big Data: Opportunities and Challenges", invited talk, Information and Communication Technology Research Forum (ICTRF), Abu Dhabi, UAE, 17 May 2015.
- "Transforming Singapore into a Smart Nation", invited talk, International Forum on Smart National Territory Development Strategies 2015, Taipei, ROC, 11-13 May 2015.
- "Data Analytics for Smart Future Cities", invited talk, Ovum's 4th Annual Urban IoT / Smart to Future Cities 2015, London, United Kingdom, 28-29 April 2015.
- "Realizing Data Economy for Smart Nation", invited talk, the first Roundtable of Thought Leaders on Innovation in Cities, the Lee Kuan Yew Centre for Innovative Cities, Singapore, 19-20 January 2015.
- "Addressing the New Challenges of the Rapidly Urbanizing World through Technology and Innovations", Future Cities Asia, invited talk, Future Cities Asia, Hong Kong, 14-16 October 2014.
- "Addressing the New Challenges of the Rapidly Urbanizing World through Technology and Innovations", Opening Address (day 2), Safe Cities Asia, Singapore, 27-30 May 2014.

- "Be Actionable-Ready: From Big Data to Smart Data", invited talk, NCS TechConnect, Singapore, 23 May 2014.
- "Big Data in the City: A Game-Changer for Building Better Cities", invited talk, First EMTech Singapore, 20-21 January 2014.
- "From Bright Lights, Big Cities to Smart Cities, Big Data", invited talk, First DEXTRA Workshop, 1 August 2013.
- "Smart Cities, Big Data – Urban Systems Initiative", invited talk, Urban Sustanability R&D Congress, Singapore, 27-28 June 2013.
- "Advanced Interdisciplinary Research towards Innovation – From understanding the biology of human body to unraveling the biology of human cities", invited talk, 1st e-ASIA JRP Symposium, Singapore, 04 December 2012.
- "Unravelling Big Data: Empowering Your Business with Analytics", invited panelist, Singtel's *i.luminate* Business Innovations Forum, Singapore, 06 Nov 2012.
- "Making better decisions improves productivity – analytics is the key", invited panelist, 18th IT Best Practices (ITBP) Seminar, Singapore, 30th October 2012.
- "Urban Systems Analytics: The Way We (will) Live", invited talk, 19th Infocomm Media Horizons, Fusionopolis Singapore, 15-16 August 2012.
- "Urban Systems Initiatives: Urban Solutions for Tomorrow's Smart Cities Today", invited talk, Smart City Workshop 2012 Singapore, Hitachi Asia R&D, 3 August 2012.
- "Unleash the Power of Information: From Open Science to Open Governments", invited talk, Web Science and Open Data Workshop, A*STAR and University of Southampton, 12 March 2012.
- "Mining for Knowledge: From Biological to Medical Data", invited talk, International Symposium on Infocomm & Media Technology in Bio-Medical & Healthcare Applications (3T-in-3A), Chiba University, Japan, 21 February 2012.
- "Data Mining for Supply Chain Analytics", invited talk, Infocomm Professional Development Forum, Infocomm Development Authority (IDA) and Singapore Computer Society, 7 July 2011.
- "Unravelling Protein-Protein Interaction Networks", invited talk and panelist, BioComplexity Symposium: System Biology Approach to Systems Drug Discovery and Systems Medicine, National University of Singapore, 14 February 2011.
- "The Alchemy of Data: Using Data Mining and Semantics to turn raw data into gold", invited talk and panelist, Whole-of-Government Data Management Forum, Ministry of Finance and the Infocomm Development Authority, 7 January 2011.
- "Intelligent Geospatial Data Mining", invited talk, Geospatial Information and Technology Exchange Forum (GITEX), Singapore Land Authority, 30 April 2010.
- "Medical Applications of Data Mining", invited talk, Chiba University, Japan, 30 March 2010.
- "Searching for Rising Stars in Researchers' Collaboration Networks", invited talk, Seoul National University, Korea, 13 November 2009.
- "Searching for Rising Stars in Bibliography Networks", invited research presentation for the Workshop on Mining User-Generated Content, Singapore Management University, 8 August 2009.
- "Unraveling the Building Blocks of Protein-Protein Interaction Networks", invited seminar, Institute for Chemical Research, Kyoto University, Japan, 20 April 2009.
- "Deciphering Protein-Protein Interactions – Experimentally and Computationally", invited guest lecture, School of Biological Sciences, Nanyang Technological University, 10 September 2008.

- "Network Data Mining", invited lecture for *A Short Course on Introduction to Data Mining* organized by the Pattern Recognition and Machine Intelligence Association (PREMIA), National University of Singapore, 28 June 2008.
- "Data Mining for Real", invited guest lecture, School of Computer Science, National University of Singapore, 4 April 2008.
- "Computing Protein-Protein Interactions", invited guest lecture, School of Biological Sciences, Nanyang Technological University, 29 August, 2007.
- "Mining the Protein-Protein Interaction Networks", invited speaker for the *Bioinformatics for Biologists* seminar series, Office of Life Sciences, National University of Singapore, 30 January, 2007.
- "Fishing for Knowledge in Real-World Networks", invited speaker for the *Knowledge Management Workshop*, Exploit Technologies, Singapore, 10 January, 2007.
- "Unraveling the Common Denominators in Protein Interaction Networks", invited **keynote** for the International Symposium on Computational Biology and Bioinformatics, India, 15-17 December 2006.
- "Uncovering the Biological Building Blocks of Protein Interaction Networks", invited plenary speaker for the 8th National Symposium on Biology, Malaysia, 5-7 December 2006.
- "Dissecting Protein Interaction Networks with Meso-scale Network Motifs", invited speaker for the *Fifth Korea-Singapore Workshop on Bioinformatics and NLP*, KAIST, Korea, 17 Nov 2006.
- "Pictures of the Future: Services", invited speaker at Siemens Corporate Technology, Munich, Germany, 8 November 2006.
- "Unraveling Multi-Domain Dependencies in Protein-Protein Interactions", invited **keynote** for the First International Conferences on Computational Systems Biology, Shanghai, 20-23 July 2006.
- "Extracting and Exploiting Protein-Protein Contrasts from Biomedical Literature", invited speaker for the *CHIME Text Processing Seminar*, School of Computing, National University of Singapore, 1 Mar 2006.
- "BioContrasts: Protein-Protein Contrasts from Biomedical Literature", invited speaker for the *First International Symposium on Languages in Biology and Medicine*, KAIST, Korea, 26 Nov 2005.
- "Computational Purification of Protein Interactomes Using Network Topological Metrics", invited speaker for the *BIOINFO2005 AASBi Conference*, Busan, Korea, 23 September 2005.
- "Detecting False Positives and False Negatives in Protein Interactome using Network Topology", invited speaker for the *NTU BIRC Workshop on Computational Analysis of Proteomics Data*, NTU, Singapore, 16 June 2005.
- "Smart Bio-Laboratories of the Future", invited paper for *ISCAS 2005: Life Science Systems*, Kobe, Japan, 26 May 2005.
- "Detecting False Positives and False Negatives in Protein Interactome using Network Topology", invited speaker for *IMS Workshop on Data Analysis and Data Mining in Proteomics*, NUS, Singapore, 12 May 2005.
- "A Better Tomorrow with Bioinformatics", invited speaker for *ACJC Symposium*, ACJC, Singapore, 15 Mar 2005.
- "Enabling On-the-Go Equipment Access in a Smart Bio-Laboratory", invited speaker for *Digital Convergence Conference*, Singapore, 27 Sep 2004.
- "Literature Mining for Interaction Pathway Discovery", invited proposal presentation for *TREC Genomics Pre-Track Presentation*, JDCL-2002, Portland, USA, 18 Jul 2002.
- "Literature Mining for Interaction Pathway Discovery", invited speaker for *IMS Workshop on Post-genome Knowledge Discovery*, NUS, Singapore, 30 May 2002.

- "Pathweaver: System, Studies, Results, Collaboration", *Invited Workshop on NLP and Ontology in Biology*, Tokyo, Japan, 20 Feb 2002.
- "Laboratories of the Future: Accelerating Life Sciences Research with Leading-edge IT", invited speaker at the National Library, Singapore, 16 Oct 2001.
- "Decoding the Book of Life: Sequences, Genotypes, A, C, G, and T", invited speaker at the National Library, Singapore, 20 Mar 2001.