

J. SHANE CULPEPPER

Director, [Centre for Information Discovery and Data Analytics](#)
Vice-Chancellor's Principal Research Fellow & Associate Professor
RMIT University, School of Science (CSIT)
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EDUCATION Ph.D., Computer Science, August 2008;
"Efficient Data Representations for Information Retrieval"
Adviser: Professor Alistair Moffat
University of Melbourne, Melbourne, VIC, Australia

CURRENT POSITION *Associate Professor & Vice Chancellor's
Principal Research Fellow, CS & IT* **RMIT University
Melbourne, Australia
2008 – Present**

I am a researcher in the area of Information Retrieval where I am the Director of the Centre for Information Discovery and Data Analytics (CIDDA) at RMIT University. My current work focuses on how to design efficient algorithms and data structures for a wide variety of data processing problems. My research focuses on developing new models to help reason about complex data representations, and discovering algorithms and data structures of both theoretical and practical interest that are capable of efficiently supporting modern data processing tasks. In particular, I am interested in developing new approaches to effectively and efficiently search massive data collections, and understanding how to measure the quality of the answers found. Research interests include efficient and scalable algorithm design, machine learning in search, and system evaluation. Many computational domains that are heavily reliant on the processing of massive data sets, such as information retrieval, question answering, dialog search, conversational AI, machine learning, data mining, data science, bioinformatics, and streaming data benefit from this line of research.

TEACHING EXPERIENCE 2010-2013 - Lecturer & Course Coordinator: Algorithms & Analysis (COSC 1285/2123)
<http://www.rmit.edu.au/courses/039989>

2012-2013 - Lecturer & Course Coordinator: Operating Systems Principles (COSC 1112/1114)
<http://www.rmit.edu.au/courses/004111>

2011 - Lecturer & Course Coordinator: Unix Essentials (COSC 2412/2425)
<http://www.rmit.edu.au/courses/004302>

2009 - Lecturer & Course Coordinator: Search Technology (COSC 2306)
<http://www.rmit.edu.au/courses/036673>

PROFESSIONAL ACTIVITIES **Conference Organization**

General Co-Chair WSDM 2019
Program Co-Chair CIKM 2017. ADCS 2013, 2014
Program Co-Chair SIGIR Doctoral Consortium 2014, 2015
Program Co-Chair CIKM Workshops 2015
Senior Program Committee CIKM 2015, 2016. WSDM 2019

Journal Editor

Information Retrieval Journal (IRJ)
Foundations and Trends in Information Retrieval (FNTIR)

Workshop Organization

SWIRL III, 2018
SIGIR-OSIR, 2012
SPIRE Workshop on Compression, Text, and Algorithms, 2008

Program Committees

SIGIR 2018, 2017, 2016, 2015, 2014, 2013, 2012
CIKM 2016, 2015, 2014, 2013, 2012, 2009
ACL 2018
WSDM 2017, 2016
WWW 2016
ADCS 2017, 2016, 2015, 2014, 2013, 2012, 2011
AIRS 2013, 2012, 2011, 2009
LDS-IR 2015, 2013
RIGOR 2015, ADC 2011, IJCAI 2011, CPM 2011, SPIRE 2018, 2015, 2008

Other Committees and Panels

Strategic Workshop on Information Retrieval in Lorne, SWIRL 2013.
Dagstuhl Seminar on “Reproducibility of Data-Oriented Experiments in e-Science” (Jan 2016).

Journal Reviewing

ACM Transactions of Information Systems, ACM Transactions on Intelligent Systems and Technology, ACM Transactions on Computer Systems, ACM Transactions on Database Systems, ACM Transactions on Storage, ACM Transactions on the Web, IEEE Transactions on Computers, Algorithmica, Information Processing and Management, Software Practice and Experience.

Grant Reviewing

ARC Discovery Projects, 2011 - present.
European Research Council (ERC) 2015, 2017

UNIVERSITY ACTIVITIES

Centre Director, Centre for Information Discovery, 2018
ERA 08 FOR Advisor, 2017-2018
ITS Committee Chair, 2012-2013
ISAR Discipline Coordinator, 2010
Staff Committee Chair, 2011
Teaching Committee, 2010
Staff Committee, 2009-2011

GRANTS

RMIT Vice-Chancellor’s Senior Research Fellowship : J. S. Culpepper 2017-2020 (\$598,676).
2017H1 Mozilla Research Grant : J. S. Culpepper: ”Efficient and Effective Multi-Stage Retrieval in Rust.” 2017 (\$50,000 USD).
ARC Discovery Grant DP170102231: T. Sellis, J. S. Culpepper, C. L. A. Clarke, and J. Lin: ”Trajectory Data Processing - Spatial Computing meets Information Retrieval.” 2017-2019 (\$416,000).

ARC Discovery Early Career Research Award DE140100275: J. S. Culpepper: “Beyond keyword search for ranked document retrieval.” 2014–2016 (\$392,979) + (\$150,000 RMIT Support).

ARC Discovery Grant DP140101587: J. S. Culpepper, T. Sellis, N. Mamoulis, and C. S. Jensen: “Efficient and effective ad-hoc retrieval using structured and unstructured geospatial information.” 2014–2016 (\$422,000) + (\$75,000 RMIT Support).

ARC Discovery Grant DP110101743: A. Moffat, A. Wirth, J. S. Culpepper, and A. Turpin: “Efficient and effective algorithms for searching strings in secondary storage.” 2011–2013 (\$360,000).

RMIT Seed Grant: J. S. Culpepper: “Novel ranking algorithms for unrestricted text indexing.” 2010 (\$20,000).

RMIT PaCE Grant: J. S. Culpepper: “Algorithms and Analysis Course Renewal.” 2009 (\$5,000).

AWARDS

Best Paper: ADCS Conference, December 2007, 2012, 2015, 2016.

Supervised Best M.S. Minor Thesis: M. S. Petri: “Ranking in full-text indices.” 2009.

Outstanding Teaching Award: University of Melbourne, 2007.

NICTA Phd Scholarship: University of Melbourne, 2005-2008.

EDITED COLLECTIONS

E.-P. Lim, M. Winslett, M. Sanderson, A. W.-C. Fu, J. Sun, J. S. Culpepper, E. Lo, J. C. Ho, D. Donato, R. Agrawal, Y. Zheng, C. Castillo, A. Sun, V. S. Tseng, and C. Li, editors. *Proceedings of the 26th ACM on Conference on Information and Knowledge Management (CIKM 2017)*, November 2017.

J. S. Culpepper, L. A. Park, and G. Zuccon, editors. *Proceedings of the 19th Australasian Document Computing Symposium (ADCS 2014)*, November 2014.

J. S. Culpepper, G. Zuccon, and L. Sitbon editors. *Proceedings of the 18th Australasian Document Computing Symposium (ADCS 2013)*, December 2013.

A. Trotman, C. L. A. Clarke, I. Ounis, J. S. Culpepper, M.-A. Cartright, and S. Geva, editors. *Proceedings of the SIGIR Workshop on Open Source Information Retrieval (OSIR 2012)*, August 2012.

JOURNAL PUBLICATIONS

J. S. Culpepper, F. Diaz, and M. D. Smucker. “Research Frontiers in Information Retrieval: Report from the Third Strategic Workshop on Information Retrieval in Lorne (SWIRL 2018).” *SIGIR Forum*, 52(1): pp 34-90, 2018.

F. M. Choudhury, J. S. Culpepper, Z. Bao, and T. Sellis. “Batch Processing of Top-k Spatial-Textual Queries.” *ACM Transactions on Spatial Algorithms and Systems (TSAS)*, 3(4):pp 1-40, 2018.

F. M. Choudhury, J. S. Culpepper, Z. Bao, and T. Sellis. “Finding the optimal location and keywords in obstructed and unobstructed space.” *VLDB Journal*, 27(40): pp 445-470, 2018.

S. Wang, Z. Bao, J. S. Culpepper, T. Sellis, and G. Cong. “Reverse k Nearest Neighbor Search over Trajectories.” *IEEE Transactions on Knowledge and Data Engineering*, 30(4): pp 757-771, 2018.

J. Li, T. Sellis, J. S. Culpepper, Z. He, C. Liu, and J. Wang. “Geo-Social Influence Spanning Maximization.” *IEEE Transactions on Knowledge and Data Engineering*, 29(8): pp 1653-1666, 2017.

Y. Kim, J. Callan, J. S. Culpepper, and A. Moffat. “Efficient Distributed Selective Search.” *Information Retrieval Journal*, 20(3): pp 221-252, 2017.

C. L. A. Clarke, J. S. Culpepper, and A. Moffat. “Assessing Efficiency-Effectiveness Tradeoffs in Multi-Stage Retrieval Systems Without Using Relevance Judgments.” *Information Retrieval Journal*, 19(4):pp 351–377, 2016.

X. Lu, A. Moffat, and J. S. Culpepper. “The effect of pooling and evaluation depth on IR metrics.” *Information Retrieval Journal*, 19(4):pp 416–445, 2016.

F. M. Choudhury, J. S. Culpepper, T. K. Sellis, and X. Cao. “Maximizing Bichromatic Reverse Spatial and Textual k Nearest Neighbor Queries.” *PVLDB*, 9(6):pp 456–467, 2016.

J. Li, C. Liu, J. X. Yu, Y. Chen, T. K. Sellis, and J. S. Culpepper. “Personalized Influential Topic Search via Social Network Summarization.” *IEEE Transactions on Knowledge and Data Engineering*, 28(7):pp 1820–1834, 2016.

G. K. Jayasinghe, W. Webber, M. Sanderson, L. S. Dharmasena, and J. S. Culpepper. “Statistical comparisons of non-deterministic IR systems using two dimensional variance.” *Information Processing & Management (IPM)*, 51(5):pp 677–694, Sep 2015.

S. Gog, A. Moffat, J. S. Culpepper, A. Turpin, and A. Wirth. “Large-scale pattern search using reduced-space on-disk suffix arrays.” *IEEE Transactions on Knowledge and Data Engineering*, 26(8): pages 1918–1931, Aug 2014.

S. Huston, J. S. Culpepper, and W. B. Croft. “Indexing Word-Sequences for Ranked Retrieval.” *ACM Transactions on Information Systems*, 32(1): pages 3-1–3-26, Jan 2014.

G. K. Jayasinghe, J. S. Culpepper, and P. Bertok. “Efficient and Effective realtime prediction of drive-by download attacks.” *Journal of Network and Computer Applications*, 38: pages 135–149, Feb 2014.

J. S. Culpepper, M. Petri, and S. J. Puglisi. “Revisiting bounded context block-sorting transformations.” *Software Practice and Experience*, 42(8):pages 1037–1054, Aug 2012.

J. S. Culpepper and A. Moffat. “Efficient set intersection for inverted indexing.” *ACM Transactions on Information Systems*, 29(1): pages 1.1–1.25, Dec 2010.

E. V. Sadanandan, S. K. Pillai, M. V. Laksmikantham, A. D. Billimoria, J. S. Culpepper, and M. P. Cava. “Efficient syntheses of the marine alkaloids Makaluvamine D and Discorhabdin C: The 4, 6, 7-trimethoxyindole approach.” *Journal of Organic Chemistry*, 60(6): pages 1800–1805, 1995.

REFEREED
CONFERENCE
PROCEEDINGS

T. Dammesie, J. S. Culpepper, J. Kim, and F. Scholer. “Presentation Ordering Effects On Assessor Agreement.” *Proceedings of the 27th International Conference on Information and Knowledge Management (CIKM 2018)*, To appear.

R. Benham, J. S. Culpepper, L. Gallagher, X. Lu, and J. Mackenzie. “Towards Efficient and Effective Query Variant Generation.” *Proceedings of the 1st International Design of Experimental Search & Information Retrieval Systems (DESIRES 2018)*, CEUR 2167, pp 62–67, 2018.

J. S. Culpepper. “Single Query Optimisation is the Root of All Evil.” *Proceedings of the 1st International Design of Experimental Search & Information Retrieval Systems (DESIRES 2018)* CEUR 2167, pp 100, 2018.

J. S. Culpepper. “Balancing Efficiency and Effectiveness Trade-offs in Large Scale Multi-Stage Search Engines.” *Proceedings of the 1st International Design of Experimental Search & Information Retrieval Systems (DESIRES 2018)* CEUR 2167, pp 8, 2018.

H. Zamani, W. B. Croft, and J. S. Culpepper. "Neural Query Performance Prediction using Weak Supervision from Multiple Signals." *Proceedings of the 41st International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR 2018)*, pp 105-114, 2018.

H. R. Mohammad, K. Xu, J. Callan, and J. S. Culpepper. "Dynamic Shard Cutoff Prediction for Selective Search." *Proceedings of the 41st International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR 2018)*, pp 85-94, 2018.

S. Wang, Z. Bao, J. S. Culpepper, Z. Xie, Q. Liu and X. Qin. "Torch: A Search Engine for Trajectory Data." *Proceedings of the 41st International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR 2018)*, pp 535-544, 2018.

O. Kurland and J. S. Culpepper. "Tutorial / Fusion in Information Retrieval." *Proceedings of the 41st International ACM SIGIR Conference on Research and Development in Information Retrieval (SIGIR 2018)*, pp 1383-1386, 2018.

S. Huang, Z. Bao, J. S. Culpepper, P. Zhang, and B. Zhang. "A linear-time algorithm for finding induced planar subgraphs." *Proceedings of the 17th International Symposium on Experimental Algorithms (SEA 2018)*, LIPIcs Volume 103, pp 23:1-25:15, 2018.

H. Luo, F. M. Choudhury, Z. Bao, J. S. Culpepper, and B. Zhang. "MaxBRkNN Queries for Streaming Geo-Data." *Proceedings of the 23rd International Conference on Database Systems for Advanced Applications (DASFAA 2018)*, LNCS 10827, pp 647-664, 2018.

J. Mackenzie, C. Macdonald, F. Scholer, J. S. Culpepper. "On the Cost of Negation for Dynamic Pruning." *Proceedings of the 40th European Conference on Information Retrieval (ECIR 2018)*, LNCS 10772, pp 544-549, 2018.

J. Mackenzie, J. S. Culpepper, R. Blanco, M. Crane, C. L. A. Clarke, and J. Lin. "Query Driven Algorithm Selection in Early Stage Retrieval." *Proceedings of the 11th International Conference on Web Search and Data Mining (WSDM 2018)*, pp 396-404, 2018.

R. Benham and J. S. Culpepper. "Risk-Reward Trade-offs in Rank Fusion." *Proceedings of the 22nd Annual Australasian Document Computing Symposium (ADCS 2017)*, Dec 2017, pp 1.1-1.8.

J. Mackenzie, F. Scholer, and J. S. Culpepper. "Early Termination Heuristics for Score-at-a-Time Index Traversal." *Proceedings of the 22nd Annual Australasian Document Computing Symposium (ADCS 2017)*, Dec 2017, 8.1-8.8.

X. Lu, A. Moffat, and J. S. Culpepper. "Can Deep Effectiveness Metrics Be Evaluated Using Shallow Judgment Pools?" *Proceeding of the 40th Annual International Conference on Research and Development in Information Retrieval (SIGIR 2017)*, Aug 2017, pp 35-44.

R.-C. Chen, L. Gallagher, R. Blanco, and J. S. Culpepper. "Efficient Cost-Aware Cascade Ranking in Multi-Stage Retrieval." *Proceeding of the 40th Annual International Conference on Research and Development in Information Retrieval (SIGIR 2017)*, Aug 2017, pp 445-454.

T. T. Damessie, T. P. Nghiem, F. Scholer, and J. S. Culpepper. "Gauging the Quality of Relevance Assessments using Inter-Rater Agreement." *Proceeding of the 40th Annual International Conference on Research and Development in Information Retrieval (SIGIR 2017)*, Aug 2017, pp 1089-1092.

F. M. Choudhury, Z. Bao, J. S. Culpepper, and T. Sellis. "Monitoring the Top-m Rank Aggregation of Spatial Objects in Streaming Queries." *Proceedings of the 33rd IEEE International Conference on Data Engineering (ICDE 2017)*, Apr 2017, pp 585-596

- S. Wang, Z. Bao, J. S. Culpepper, T. Sellis, M. Sanderson, and X. Qin. "Answering Top-k Exemplar Trajectory Queries." *Proceedings of the 33rd IEEE International Conference on Data Engineering (ICDE 2017)*, Apr 2017, pp 597-608.
- M. Crane, J. S. Culpepper, J. Lin, J. Mackenzie, and A. Trotman. "A Comparison of Document-at-a-Time and Score-at-a-Time Evaluation." *Proceedings of the 10th International Conference on Web Search and Data Mining (WSDM 2017)*, pp 201-210, Feb 2017.
- J. S. Culpepper, C. L. A. Clarke, and J. Lin. "Dynamic Cutoff Prediction in Multi-Stage Retrieval Systems." *Proceedings of the 21st Annual Australasian Document Computing Symposium (ADCS 2016)*, pp 17-24, Dec 2016. *** Winner of the best paper award ***
- T. T. Damessie, F. Scholer, and J. S. Culpepper. "The Influence of Topic Difficulty, Relevance Level, and Document Ordering on Relevance Judging." *Proceedings of the 21st Annual Australasian Document Computing Symposium (ADCS 2016)*, pp 41-48, Dec 2016.
- S. Wang, Z. Bao, J. S. Culpepper, T. Sellis, M. Sanderson and M.-E. Yadamjav. "Interactive Trip Planning Using Activity Trajectories." *Proceedings of the 21st Annual Australasian Document Computing Symposium (ADCS 2016)*, pp 77-80, Dec 2016.
- X. Lu, A. Moffat, and J. S. Culpepper. "Modeling Relevance as a Function of Retrieval Rank." *Proceeding of the Twelfth Asia Information Retrieval Societies Conference (AIRS 2016)*, pp 3-15, LNCS 9994, Nov 2016.
- X. Lu, A. Moffat, and J. S. Culpepper. "Efficient and Effective Higher Order Proximity Modeling." *Proceeding of the 2nd Annual International Conference on the Theory of Information Retrieval (ICTIR 2016)*, pp 21-30, Sept 2016.
- T. T. Damessie, F. Scholer, K. Jarvelin, and J. S. Culpepper. "The Effect of Document Order and Topic Difficulty on Assessor Agreement." *Proceeding of the 2nd Annual International Conference on the Theory of Information Retrieval (ICTIR 2016)*, pp 73-76, Sept 2016.
- T. P. Nghiem, C. Ma, J. S. Culpepper, and T. Sellis. "Spatial Textual Top-k Search in Mobile Peer-to-Peer Networks." *Proceeding of the 27th Australasian Database Conference (ADC 2016)*, pp 69-81, Sept 2016.
- Y. Kim, J. Callan, J. S. Culpepper and A. Moffat. "Load-Balancing in Distributed Selective Search." In *Proceedings of the 39th Annual International Conference on Research and Development in Information Retrieval (SIGIR 2016)*, pp 905-908, 2016.
- Y. Kim, J. Callan, J. S. Culpepper, and A. Moffat. "Does Selective Search Benefit from WAND Optimization?" In *Proceedings of the 38th European Conference on Information Retrieval (ECIR 2016)*, pp 145-148, 2016.
- J. Mackenzie, F. M. Choudhury, and J. S. Culpepper. "Efficient location-aware web search." In *Proceedings of the 20th Annual Australasian Document Computing Symposium (ADCS 2015)*, Article 4, December 2015. *** Winner of the best paper award ***
- M. Yasukawa, J. S. Culpepper, and F. Scholer. "Data fusion for Japanese term and character n -gram search." In *Proceedings of the 20th Annual Australasian Document Computing Symposium (ADCS 2015)*, Article 10, December 2015. *** Winner of the best paper award ***
- X. Lu, A. Moffat, and J. S. Culpepper. "On the Cost of Extracting Proximity Features for Term-Dependency Models." In *Proceedings of the 24th ACM International Conference on Information and Knowledge Management (CIKM 2015)*, pages 293-302, November 2015.
- X. Lu, A. Moffat, and J. S. Culpepper. "Experiments into the Consistency of Effectiveness Metrics." In *Proceedings of the SIGIR 2015 Workshop on Reproducibility, Inexplicability, and Generalizability of Results (RIGOR 2015)*, August 2015.

- F. M. Choudhury, J. S. Culpepper, and T. Sellis. “Batch processing of top- k spatial-textual queries.” In *Proceedings of the Second International ACM SIGMOD Workshop on Managing and Mining Enriched Geo-Spatial Data (GEORICH 2015)*, pages 7–12, June 2015.
- X. Lu and A. Moffat and J. S. Culpepper. “How effective are proximity scores in term dependency models?” In *Proceedings of the 19th Annual Australasian Document Computing Symposium (ADCS 2014)*, pages 89–92, November 2014.
- G. K. Jayasinghe, W. Webber, M. Sanderson, and J. S. Culpepper. “Improving test collection pools with machine learning.” In *Proceedings of the 19th Annual Australasian Document Computing Symposium (ADCS 2014)*, pages 2–9 November 2014.
- G. K. Jayasinghe, W. Webber, M. Sanderson, and J. S. Culpepper. “Extending test collection pools without manual runs.” In *Proceedings of the 37th Annual International Conference on Research and Development in Information Retrieval (SIGIR 2014)*, pages 915–918, July 2014.
- G. K. Jayasinghe, W. Webber, M. Sanderson, L. S. Dharmasena, and J. S. Culpepper. “Evaluating non-deterministic retrieval systems.” In *Proceedings of the 37th Annual International Conference on Research and Development in Information Retrieval (SIGIR 2014)*, pages 911–914, July 2014.
- J. S. Culpepper, S. Mizzaro, M. Sanderson, and F. Scholer. “TREC: Topic engineRing ExerCise.” In *Proceedings of the 37th Annual International Conference on Research and Development in Information Retrieval (SIGIR 2014)*, pages 1147–1150, July 2014.
- M. Petri, A. Moffat and J. S. Culpepper. “Score-safe term dependency processing with hybrid indexes.” In *Proceedings of the 37th Annual International Conference on Research and Development in Information Retrieval (SIGIR 2014)*, pages 899–902, July 2014.
- M. Petri, J. S. Culpepper, and A. Moffat. “Exploring the Magic of WAND.” In *Proceedings of the 18th Annual Australasian Document Computing Symposium (ADCS 2013)*, pages 58–65, December 2013.
- M. Petri and J. S. Culpepper. “Efficient indexing algorithms for approximate pattern matching in text.” In *Proceedings of the 17th Annual Australasian Document Computing Symposium (ADCS 2012)*, pages 9–16, December 2012. *** Winner of the best paper award ***
- S. Huston, J. S. Culpepper, and W. B. Croft. “Sketch-based indexing of n -words.” In *Proceedings of the 21st Annual International Conference on Information and Knowledge Management (CIKM 2012)*, pages 1864–1868, October 2012.
- M. Yasukawa, J. S. Culpepper, and F. Scholer. “Phonetic matching in Japanese.” In *Proceedings of the SIGIR Workshop on Open Source Information Retrieval (OSIR 2012)*, pages 68–71, August 2012.
- J. S. Culpepper, M. Petri, and F. Scholer. “Efficient in-memory top- k document retrieval.” In *Proceedings of the 35th Annual International Conference on Research and Development in Information Retrieval (SIGIR 2012)*, pages 225–234, August 2012.
- J. S. Culpepper and M. Yasukawa and F. Scholer. “Language independent ranked retrieval with NeWT.” In *Proceedings of the 16th Australasian Document Computing Symposium (ADCS 2011)*, pages 18–25, Dec 2011.
- M. Petri and G. Navarro and S. J. Puglisi and J. S. Culpepper. “Backwards search in context bound text transformations.” In *Proceedings of the First International Conference on Data Compression, Communications and Processing (CCP 2011)*, IEEE Press, pages 82–91, Jun 2011.

J. S. Culpepper and G. Navarro and S. Puglisi and A. Turpin. “Top-k ranked document search in general text databases.” In *Proceedings of the 18th Annual European Symposium on Algorithms (ESA 2010) Part II*, Sep 2010, pages 194–205, LNCS Volume 6347.

A. Turpin, F. Scholer, K. Jarvelin, M. Wu, and J. S. Culpepper. “Including summaries in system evaluation.” In *Proceedings of the 32nd Annual International Conference on Research and Development in Information Retrieval (SIGIR 2009)*, Boston, MA, USA, Jul 2009, pages 508–515.

A. Arakal, J. S. Culpepper, J. Jeffers, A. Turpin, S. Boztas, K. J. Horadam, and A. McKendrick. “Entropy of the retinal template.” In *Proceedings of the 3rd IAPR/IEEE International Conference on Biometrics (ICB 2009)*, Jun 2009, pages 1250–1259, LNCS Volume 5558.

A. Moffat and J. S. Culpepper. “Hybrid bitvector index compression.” In *Proceedings of the 12th Australasian Document Computing Symposium (ADCS 2007)*, Melbourne, Australia, December 2007, pages 25–37. *** Winner of the best paper award ***

J. S. Culpepper and A. Moffat. “Compact set representation for information retrieval.” In *Proceedings of the 14th International Symposium on String Processing and Information Retrieval (SPIRE 2007)*, Santiago, Chile, Oct 2007, pages 124–135, LNCS Volume 4726.

J. S. Culpepper and A. Moffat. “Phrase-based pattern matching in compressed text.” In *Proceedings of the 13th International Symposium on String Processing and Information Retrieval (SPIRE 2006)*, Glasgow, Scotland, Oct 2006, pages 337–345, LNCS Volume 4209.

J. S. Culpepper and A. Moffat. “Enhanced byte codes with restricted prefix properties.” In *Proceedings of the 12th International Symposium on String Processing and Information Retrieval (SPIRE 2005)*, Buenos Aires, Argentina, Nov 2005, pages 1–12, LNCS Volume 3772.

Advising & Mentoring

Ph.D. Graduates

Xiaolu Lu, 2018. Thesis Title: “Efficient and effective retrieval using higher-order proximity models.”

Farhana Choudhury, 2017. Thesis Title: “Efficient query processing on spatial and textual data: beyond individual queries.”

Gaya Jayasinghe, 2014. Thesis Title: “Evaluation with Uncertainty.”

Matthias Petri, 2013. Thesis Title: “Scalable succinct indexing for large text collections.”

Postdoctoral Advisor

Berkant Barla Cambazoglu (2018), Jessie Ngyuen (2016), Jianxin Li (2015).

Ph.D. Advisor (current)

Binsheng Liu, Rodger Benham, Shixun Huang, Hui Luo, Luke Gallagher, Sheng Wang, Joel Mackenzie, Bhagya Wickramasinghe, Tadele Tedla Damessie

M.S. Minor Thesis Supervisor

Matthias Petri (2010)

Honours Thesis Supervisor

Robert Tirtasantana (2018), Rodger Benham (2017), Luke Gallagher (2016), Joel MacKenzie (2015)

PREVIOUS
INDUSTRY
EXPERIENCE

Senior R&D Engineer

N2 Broadband, Inc.
Atlanta, GA, USA
2002 – 2004

End to end prototyping and demo development for new product evaluation. Worked with one of the companies founding architects to develop project plans, level of effort estimates, and product requirement documents to help the business unit determine time to market and develop engineering cost estimates. Did the C++ and Java coding for the initial prototypes and helped the business unit develop demo scripts which would highlight new product functionality. Also worked with the software development team on code refactoring and CORBA infrastructure. Development projects included a TCP/IP streaming video on demand server with an ASI based broadcasting content catcher used for scheduling and playing movie previews, a UDP to TCP/IP session proxy, a scalable, high-availability framework to support automatic fail-over and load balancing in clustering environments, and a video media conversion framework. Supporting APIs included: ACE, TAO, Orbacus, JacORB, Xerces, and STLPort.

Team Leader

Channelogics, Inc.
Atlanta, GA, USA
2001 – 2002

Served as team leader for the entire Cablelogics product line which was composed of eight software engineers. Cablelogics is a distributed enterprise cable application that monitors all broadband connections and controls bandwidth allocation using custom prediction and control algorithms. The servers consisted of CORBA services written in C++ using SNMP and XML for hardware communication and ran on Linux and Solaris platforms. It also included a Java client for report generation, monitoring, service requisition, and fine grained control. Helped design and implement CORBA interfaces to provide third party application access to Oracle and MySQL data. Helped create a XML over CORBA framework for configuration and status communications. Made release decisions based on requirements from product management, mentored young developers, and helped define technical direction. Introduced new processes to keep the development team productive. Did extensive code cleanups to ensure all the daemons were thread safe, performance enhancements, and added platform abstractions to improve code portability. Automated all build and testing processes to allow simple “one-step” development and regression. Supporting APIs included: ACE, TAO, UCD-SNMP, and Gnome-XML.

Team Leader

Eazel, Inc.
Mountain View, CA, USA
2000 – 2001

Served as team leader for the client services group which was composed of four engineers. Helped architect and implement the services framework which included an SSL proxy, XML parsing engines, and many UI feature enhancements. Also helped with daily bug fixes and enhancements of Nautilus, a file manager for the Gnome desktop on Linux. All of this work was released under the GPL license and is readily available in the Gnome CVS repository located at <http://www.gnome.org>. Supporting APIs included: Glib, GTK, Gnome-Libs, Bonobo, ORBit, OpenSSL, and many other libraries part of Gnome and the Linux OS.

Senior Software Engineer

Netscape Communications Corp.
Mountain View, CA, USA
1998 – 2000

Made daily fixes and enhancements to all components in the Mozilla code base to stabilize and improve the quality of UNIX core and ports. Ported the Cartman security and other internal commercial libraries to HP-UX and AIX. Setup the HP-UX tinderboxes and created a shared toolset to standardize the HP-UX Mozilla build environment. Added the Xremote feature enhancement to the Mozilla UNIX core. This included a generic remote interface using xpCOM and xpIDL, the Xlib backend in C, and a C++ implementation wrapper to connect all the interfaces and GTK widgets. Helped the core team nightly to fix tree blocker and regression bugs on UNIX. All of this work was released under the GPL license and is readily available in the Mozilla CVS repository located at <http://www.mozilla.org>.