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DEPARTMENT OF COMPUTER SCIENCE  
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**RESEARCH INTERESTS** Randomized algorithms, data structures, distributed computing, lower bounds, applications to networks.

### **EDUCATION**

- Ph.D., 1988, Computer Science, University of California, Berkeley. Thesis: “Lower Bounds on the Complexity of Graph Properties,” supervised by Richard Karp.
- J.D., 1983, Boalt Hall School of Law, University of California, Berkeley.
- A.B., 1977, Mathematics, Princeton University, Princeton, NJ.

### **PROFESSIONAL EXPERIENCE**

- *2003-present*: Professor, Department of Computer Science, University of Victoria
- *2006-7*: Visiting Researcher, Microsoft Research Silicon Valley Center, Mountain View, CA.
- *2001-02*: Senior member of the technical staff, Systems Research Center, HP Labs, formerly, Compaq, Palo Alto, CA.
- *6/97-03* : Associate Professor, Department of Computer Science, University of Victoria.
- *1/99-6/99* : Visiting Scholar, Computer Science Department, U.C. Berkeley and ICSI.
- *1/99-6/99* : Visiting Professor, Computer Science Department, Hebrew University
- *7/98-9/98* : Visiting Associate Professor, DIKU, University of Copenhagen
- *7/92-97* : Assistant Professor, Department of Computer Science, University of Victoria.
- *9/90-6/92*: Research Scientist, NECI, Princeton, NJ.
- *1/89-8/90*: Postdoctoral Fellow, University of Toronto, Department of Computer Science.
- *2/90* : Visiting Scientist, University of Bonn, W. Germany.
- *9/88-12/88* : Postdoctoral Fellow, Princeton University, Department of Computer Science.

### **PROFESSIONAL MEMBERSHIPS**

- California State Bar
- ACM

## MAJOR RESEARCH GRANTS

- Pacific Institute of Mathematical Science (PIMS) Collaborative Research Group (CRG) Algorithmic Theory of Networks: 2012-2015  
Principal Investigators: Petra Berinbrink, Funda Ergun, and Valerie King Total amount: \$160,000
- Natural Sciences and Engineering Research Council (NSERC) of Canada Discovery Grant  
Amount per year: \$29,000. Years of tenure: 2011-2015.  
Title: "Network Algorithms"
- Natural Sciences and Engineering Research Council (NSERC) of Canada Research Grant.  
Amount per year: \$48,000. Years of tenure: 2006-2010.  
Title: "Algorithms and Data Structures for Networks"
- Natural Sciences and Engineering Research Council (NSERC) of Canada Research Grant.  
Amount per year: \$49,000. Years of tenure: 2001-2005.  
Title: "Dynamic Data Structures."
- Nortel Networks  
Principal investigators: Eric Manning and Ali Shoja.  
Amount: \$58,000. Year received: 1999-2000  
"A Predictor and an Optimizer for the Network Organizer."
- Natural Sciences and Engineering Research Council (NSERC) of Canada Research Grant.  
Amount per year (currently): \$43,800. Years of tenure: 1997-2001.  
Title: "Randomization and Dynamic Data Structures."
- Natural Sciences and Engineering Research Council (NSERC) of Canada Research Grant.  
Amount per year: \$22,000. Years of tenure: 1992-1997.  
Title: "Randomized and Deterministic Data Structures."
- Natural Sciences and Engineering Research Council (NSERC) of Canada Equipment Grant.  
Principal investigator: Mike Fellows.  
Amount: \$20,742. Year received: 1997.  
Title: "Implementation of Bounded Width Algorithmics for Applications in Biology."

## PUBLICATIONS

**Awards:** Best Paper Awards: SODA (2013), PODC (2010), SOCIALCOM(2009); Best Poster Award: WWW (2008).

### Papers in Refereed Journals

1. Kazem Jahanbakhsh, Valerie King, Gholamali C. Shoja: Predicting missing contacts in mobile social networks. *Pervasive and Mobile Computing* 8(5): 698-716 (2012)

2. Valerie King, Jared Saia: Breaking the  $O(n^2)$  bit barrier: Scalable byzantine agreement with an adaptive adversary. *Journal of the ACM* 58(4): 18 (2011)
3. Louis Lei Yu, Valerie King: The evolution of friendships in Chinese online social networks. *IJSCCPS* 1(2): 180-205 (2011)
4. Valerie King, Cynthia A. Phillips, Jared Saia, Maxwell Young: Sleeping on the Job: Energy-Efficient and Robust Broadcast for Radio Networks. *Algorithmica* 61(3): 518-554 (2011).
5. B. M. Kapron, D. Kempe, V. King, J. Saia, V. Sanwalani: Fast Asynchronous Byzantine Agreement and Leader Election with Full Information. (Special issue of SODA 2008 papers) *ACM Transactions on Algorithms* 6(4) (2010).
6. D. Holtby, B. M. Kapron, V. King: Lower bound for Scalable Byzantine Agreement. *Distributed Computing* 21(4): 239-248 (2008)
7. Valerie King, Scott Lewis, and Jared Saia, "Simple and Efficient Algorithms for Choosing a Random Peer," *Algorithmica* 49 (2) pp. 147-169 (2007).
8. Valerie King and Garry Sagert, "A Fully Dynamic Algorithm for Maintaining the Transitive Closure", *Journal of Comput. Systems Science* 65(1) (2002) pp. 150-167.
9. Moniker Henzinger and Valerie King, "Maintaining minimum spanning forests in dynamic graphs" *SIAM J. of Computing*, vol. 31, no.2, pp. 364-374 (2001).
10. Monika Henzinger and Valerie King, "Randomized Dynamic Algorithms with Polylogarithmic Time per Operation," *Journal of the ACM*, Vol. 46 No. 4 (1999) pp.502-516.
11. M. Henzinger, V. King and T. Warnow "Constructing a Tree from Homeomorphic Subtrees with Applications to Computational Biology," *Algorithmica*, vol. 24, no.1 (1999) pp.1-13.
12. V. King, C. K. Poon, V. Ramachandran, and S. Sinha "An Optimal EREW algorithm for minimum spanning tree verification", *Information Processing Letters*, 62(3) (1997) pp.153-159.
13. Valerie King, "A Simpler Linear Time Algorithm for Minimum Spanning Tree Verification." *Algorithmica*, 18 (1997) pp.263-270.
14. F. Fich, R. Impagliazzo, B. Kapron, V. King, and M. Kutylowski "Limits on the power of parallel random access machines with weak forms of write conflict resolution" *Journal of Computer and System Sciences* 53 (1996) pp.104-111.
15. V. King, S. Rao and R. Tarjan, "A Faster Deterministic Maximum Flow Algorithm," *Journal of Algorithms*, vol. 17. no. 3 (1994) pp.447-474.
16. Claire. Kenyon and Valerie King, "On Boolean Decision Trees with Noisy Nodes," *Random Structures and Algorithms*, vol.5 no.3 (1994), pp. 453-464.
17. Wayne Goddard, Claire Kenyon, Valerie King, and Leonard Schulman "Optimal Randomized Algorithms for Local Sorting and Set-Maxima," *SIAM Journal of Computing*, 22(2) (1993), pp. 272-285.
18. Valerie King, "A Lower Bound for the Recognition of Digraph Properties," *Combinatorica*, 10(1) (1990) pp.53-59.

19. Valerie King, ‘An  $\Omega(n^{5/4})$  Lower Bound on the Randomized Complexity of Graph Properties,’ in *Combinatorica*, 11(1) (1991), pp.23-32.

#### **Papers in Refereed Conferences**

20. Zahed Rahmati, Valerie King and Sue Whitesides: Kinetic Data Structures for All Nearest Neighbors and Closest Pair in the Plane. To appear in SoCG 2013.
21. Valerie King and Jared Saia: Byzantine Agreement in Expected Polynomial Time. To appear in STOC 2013.
22. Bruce Kapron, Valerie King, Ben Mountjoy: Dynamic Graph Connectivity in Polylogarithmic Worst Case Time. SODA 2013 *Best Paper Award*
23. Zahed Rahmati, Sue Whitesides, Valerie King: Kinetic and Stationary Point-Set Embeddability for Plane Graphs. Graph Drawing 2012: 279-290
24. Seth Gilbert, Jared Saia, Valerie King, Maxwell Young: Resource-competitive analysis: a new perspective on attack-resistant distributed computing. FOMC 2012: 1
25. Varsha Dani, Valerie King, Mahnush Movahedi, Jared Saia: Brief announcement: breaking the  $O(nm)$  bit barrier, secure multiparty computation with a static adversary. PODC 2012: 227-228
26. Valerie King, Jared Saia, Maxwell Young: Conflict on a communication channel. ACM Principles of Distributed Computing. (PODC) 2011: 277-286.
27. K. Jahanbakhsh, V. King, A. Shoja: Predicting missing contacts in mobile social networks. 12th IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WOWMOM ) 2011:1-9.
28. Kazem Jahanbakhsh, Valerie King, Gholamali C. Shoja: Empirical Comparison of Information Spreading Algorithms in the Presence of 1-Whiskers. SocialCom/PASSAT 2011: 489-492
29. V. King, S. Lonergan, J. Saia, Amitabh Trehan: Quorums: Achieving Load Balanced Byzantine Agreement: Int’l Conf. on Distributed Computing and Networking (ICDCN ) 2011: 203-214.
30. L. Yu, V. King, The Evolution of Friendships in Chinese Online Social Networks: IEEE international Conference on Social Computing (SocialCom/PASSAT), 2010
31. V. King and J. Saia: Breaking the  $O(n^2)$  Bit Barrier: Scalable Byzantine Agreement with an Adaptive Adversary. ACM Principles of Distributed Computing (PODC) 2010: 420-429 *Best Paper Award*.
32. B. Wu, V. King and J. Saia: Attack-Resistant Frequency Counting. IEEE International Parallel and Distributed Processing Symposium (IPDPS) 2010: 1-10.
33. O. Oluwasanmi, V. King and J. Saia. An Empirical Study of a Scalable Byzantine Agreement Algorithm. Heterogeneity in Computing Workshop (HWC 2010): 1-10.
34. K. Jahanbakhsh, A. Shoja, and V. King. Social-Greedy: A Socially-Based Greedy Routing Algorithm for Delay Tolerant Networks (poster)(MobiOpp) 2010.

35. V. King, L. Yu, Y. Zhuang: Guanxi in the Chinese Web. IEEE international Conference on Social Computing (SocialCom) (4) 2009: 9-17 *Best Paper Award*.
36. V. King, J. Saia: From Almost Everywhere to Everywhere: Byzantine Agreement with  $\tilde{\gamma}(n^{3/2})$  Bits. International Symposium on Distributed Computing (DISC) 2009: 464-478.
37. Valerie King, Cynthia Phillips, Jared Saia, Maxwell Young, "Sleeping on the Job: Energy Efficient Broadcast for Radio Networks," to appear in *ACM Principles of Distributed Computing (PODC)* (2008).
38. Valerie King, Louis Lei Yu, Yan Zhuang, "Guanxi in the Chinese Web - a Study of Mutual Linking. Best Poster Award. *International World Wide Web Conference (WWW)* (2008) pp. 1161-1162 *Best Poster Award*.
39. Bruce M. Kapron, David Kempe, Valerie King, Jared Saia, Vishal Sanwalani, "Fast Asynchronous Byzantine Agreement and Leader Election with Full Information. *ACM SIAM Symp. on Discrete Algorithms (SODA)* (2008). pp. 1038-1047.
40. V. King, J. Saia, V. Sanwalani, E. Vee "Towards Secure and Scalable Computation in Peer-to-Peer Networks," *IEEE Foundations of Computer Science (FOCS)* (2006) pp.87-98.
41. D. Holtby, B. Kapron, V. King, "Lower Bounds for Scalable Byzantine Agreement" with D. Holtby and B. Kapron, *ACM Principles of Distributed Computing (PODC)* (2006) pp.285-291.
42. Valerie King, Jared Saia, Vishal Sanwalani, Erik Vee. "Scalable Leader Election, *ACM SIAM Symp. on Discrete Algorithms (SODA)* (2006) pp.990-999.
43. Chong Liu, Kui Wu, Valerie King, "Very low cost sensor localization for hostile environments," IEEE Int. Conf. on Communications (ICC) ( 2005).
44. Chong Liu, Kui Wu, Valerie King: Randomized Coverage-Preserving Scheduling Schemes for Wireless Sensor Networks. *NETWORKING* (2005) pp.956-967.
45. Sarah Carruthers, Valerie King. "Connectivity of Wireless Sensor Networks with Constant Density. *ADHOC-NOW* (2004) pp. 149-157.
46. Dennis Dreef, Sanaz Ahari, Kui Wu, Valerie King. "Utilizing the Uncertainty of Intrusion Detection to Strengthen Security for Ad Hoc Networks," *ADHOC-NOW* (2004) pp. 82-95.
47. Valerie King, Jared Saia. Choosing a random peer. *ACM SIGACT-SIGOPS Symp. on Principles of Distributed Computing (PODC)* (2004) pp. 125-130.
48. Valerie King, Li Zhang, and Yunhang Zhou, "On the Complexity of Distance-based Tree Reconstruction Methods," *ACM-IEEE SODA '03*.
49. Valerie King and Mikkel Thorup, "Space-saving Trick for Maintaining Shortest Paths and Transitive Closure," *Proceedings of the 7th Annual International Conference COCOON in LNCS 2108* (August, 2001) pp. 268-277.
50. Valerie King, Orna Kupferman, Moshe Y. Vardi. "On the Complexity of Parity Word Automata" *Foundations of Software Sci. and Computation Structures (FoSSaCS)* (2001) pp. 276-286.

51. Valerie King, "Fully Dynamic Algorithms for Maintaining All-Pairs Shortest Paths and Transitive Closure in Digraphs." *40th Symposium on Foundations of Computer Science (FOCS)* (October, 1999).
52. Valerie King and Garry Sagert, "A Fully Dynamic Algorithm for Maintaining the Transitive Closure", *31st ACM Annual Symposium on Theory of Computing (STOC)* (May 1999).
53. Monika Henzinger and Valerie King, "Maintaining a minimum spanning tree in a dynamic graph" *24th International Colloquium of Automata, Languages and Programming (ICALP)* (July 1997).
54. Monika Henzinger, Valerie King, and Tandy Warnow, "Constructing a Tree from Homeomorphic Subtrees with Applications to Computational Biology," with *7th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)* (January, 1996).
55. Monika Henzinger and Valerie King, "Fully Dynamic Biconnectivity and Transitive Closure," *36th Symposium on Foundations of Computer Science (FOCS)* (October, 1995), pp. 664-72.
56. Valerie King "A Simpler Linear Time Algorithm for Minimum Spanning Tree Verification." *Fourth Workshop on Algorithms and Data Structures (WADS)* (August 1995).
57. Monika Henzinger and Valerie King "Randomized Dynamic Algorithms with Polylogarithmic Time per Operation " *27th ACM Annual Symposium on Theory of Computing (STOC)* (May 1995).
58. F. Fich, R. Impagliazzo, B. Kapron, V. King, and M. Kutylowski. "Limits on the power of parallel random access machines with weak forms of write conflict resolution" *10th Symposium on Theoretical Aspects of Computer Science (STACS)* (February 1993).
59. V. King, S. Rao and R. Tarjan, "A Faster Deterministic Maximum Flow Algorithm," *Third Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)* (January 1992) pp.157-64.
60. C. Kenyon and V. King "On Boolean Decision Trees with Noisy Nodes," *Israel Symposium on Theory of Computing and Systems*, (May 1992), pp.24-31.
61. Wayne Goddard, Valerie King, and Leonard Schulman, "Optimal Randomized Algorithms for Local Sorting and Set-Maxima" *22nd ACM Annual Symposium on Theory of Computing (STOC)* (May 1990) pp.45-53.
62. C. Kenyon-Mathieu and V. King, "Verifying Partial Orders," *Proceedings of the 21st ACM Annual Symposium on Theory of Computing (STOC)* (May 1989) pp. 367-74.
63. Valerie King, "Lower Bounds on the Complexity of Graph Properties," *20st ACM Annual Symposium on Theory of Computing (STOC)* (May 1988), pp. 468-74.

**Book chapters and unrefereed articles**

64. V. King, J.Saia: Scalable Byzantine Agreement. *ACM SIGACT News*: 41(3): 89-107 (2010)
65. "Dynamic graph connectivity," in *Encyclopedia of Algorithms*, ed. Ming Kao, Springer (2008).
66. "Dynamic Transitive Closure," in *Encyclopedia of Algorithms*, ed. Ming Kao, Springer (2008).

**STUDENTS and POSTDOCs who have completed their studies**

- Peter Yan, M.Sc. 1997. Thesis title: “Coloring Random k-Colorable Graphs.”
- Torrey Hoffman, M.Sc. 1998. Thesis title: A Cache Scheduling Problem.
- Garry Sagert, M.Sc. 2000. Thesis Title: Dynamic Transitive Closure Algorithms.
- Lou Ibarra, Ph.D. 2001: Thesis title: Dynamic Chordal and Interval Graph Algorithms.
- Peter Hollemans, M.Sc., 2003. Thesis title: Minimal Energy Broadcasting Networks
- Dan Holtby, MSc. 2006. Thesis title: Lower bounds for Scalable Byzantine Agreement.
- Vishal Sanwalani (post-doc) 2006. Research Topic: Byzantine Agreement.
- Gordon Brown, Ph.D. 2008. Thesis title: An Analysis of Salmonid RNA Sequences and Implications for Salmonid Evolution.”
- Yan Zhuang, MSc. 2009 Thesis Topic: Efficient Modeling of the WWW
- Warren Sheckenfelder, MSc. 2009. Thesis Topic: Machine Learning.
- Louis Yu, Ph.D. 2010. Thesis Topic: Guanxi and the Chinese Web
- Amitabh Trehan, postdoctoral fellow. 2010.
- Kazem Jahanbakhsh, Ph.D. 2012. Thesis Title: Contact Prediction, Routing and Fast Information Spreading in Social Networks

**Current graduate students:**

- Ben Mountjoy, MS. Thesis Topic: Dynamic graph algorithms.
- Zahed Rahmati, Ph.D. Thesis Topic: Kinetic algorithms.

**External examiner for:**

- O. Oluwasanmi, MSc., University of New Mexico (2011).
- Liam Roditty, Ph.D. candidate, University of Tel Aviv (2006).
- Camil Demestrescu, Ph.D. candidate at University of Rome, “La Sapienza” (2000) ;
- Stephen Alstrup, Ph.D. University of Copenhagen (DIKU) (1999);

**OTHER TECHNICAL CONTRIBUTIONS**

I served the technical committees for the following conferences:

- 2013 STOC
- 2013 ICALP
- 2012 ACM Symposium on Principles of Distributed Computing (PODC)
- 2012 International Colloquium on Automata, Languages and Programming (ICALP)

- 2011 Canadian Discrete and Algorithmic Mathematics Conference (CanaDAM)
- 2010 ACM-SIAM Symposium on Discrete Algorithms (SODA) 2010
- Scandanavian Workshop on Algorithmic Theory (SWAT)
- 2010 Latin American Theoretical Informatics Symp. (LATIN)
- 2008 IEEE Foundations of Computing (FOCS)
- 2007 13th Annual International Computing and Combinatorics Conference (COCOON )
- 2007 39h ACM Annual Symposium on Theory of Computing (STOC)
- 2005 Workshop on Algorithms and Data Structures (WADS)
- 2004 Latin American Theoretical Informatics Symp. (LATIN)
- 2002 ACM-SIAM Symposium on Discrete Algorithms (SODA).
- 1999 RANDOM.
- 1999 ACM-SIAM Symposium on Discrete Algorithms (SODA).
- 1998 Scandanavian Workshop on Algorithmic Theory (SWAT).
- 1997 29th ACM Annual Symposium on Theory of Computing (STOC).
- 1993 ACM-SIAM Symposium on Discrete Algorithms (SODA).

Organizer or co-organizer of the following workshops:

- 2013, 2011, 2009 Algorithms and Data Structure Workshop ADS in Bertinoro
- 2009 BIRS Workshop on Lower Bounds in Distributed Computing.
- 2008: Workshop in Honor of Bob Tarjan's 60th Birthday Birthday in Princeton, NJ.
- 2004 ALADDIN workshop on dynamic algorithms and applications
- 2001 CAIMS (Canadian industrial and applied mathematics) workshop on computational biology
- 2000 PIMS (Pacific institute of mathematical sciences) workshop on dynamic graphs

Other professional activities:

- 2012-3: Member of Elections BC Panel on Internet Voting
- 2008: Local Arrangements Co-chair of the ACM STOC in Victoria, Canada.
- 2007-: Member of the College of Reviewers for Canada Research Chairs Program.
- 2000, 2007, 2010, 2012: Reviewer for the Israel Science Foundation
- 2000: Reviewer for the Danish National Council (Science Research Project Grant Assessment
- 2001-4: Member of the NSERC Discovery Grant Panel



- 1998: Member of the NSF Theory Panel

#### **RECENT INVITED TALKS**

- Dynamic Graph Algorithms for Maintaining Connectivity, Women in Theory, Princeton (2012).
- “Open problems in Byzantine agreement, ” BIRS workshop on probabilistic vs. deterministic techniques for shared memory computation. (2012)
- “ Conflict on a communication channel.” Workshop on Algorithms and Data Structures, Bertinoro (2011).
- ”A Simple Streaming Problem with Applications to Power Consumption in Sensor Nets,” Workshop on Algorithms and Data Structures, Bertinoro (2007).
- ”Distributed Computing With Malicious Processors w/o Crypto or Private Channels”, at Google, Mountain View and HP Labs, Palo Alto (2007)
- ”Zombies, ETs and Other Encounters with Dynamic Graph Algorithms, ” invited plenary talk, 1st Canadian Discrete and Applied Mathematics Conference (CanaDAM ) 2007.

#### **COMMUNITY/UNIVERSITY-WIDE ACTIVITIES:**

- Head of the Alan Turing Celebration Committee at University of Victoria (2012)
- President of the Jewish Community Centre of Victoria (2006–2010).
- Member of the Board of the Academic Women’s Caucus of the University of Victoria (2007–2010)