

MING LI

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Contact Information

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Education

Harvard University, Postdoctoral fellow, supervisor: Les Valiant, 9/1986 – 8/1987
Cornell University, M.S. 1983, Ph.D. 1985 Computer Science. Advisor: Juris Hartmanis. 1981 – 1985
Wayne State University, M.S., Computer Science. Advisor: W. Grosky, 4/1980 – 12/1980
GPA of all above: 4.0/4.0

Employment

University Professor, School of Computer Science, University of Waterloo, 2009 – present
Canada Research Chair, Tier I, School of Computer Science, University of Waterloo, 2002 – present
Professor (tenured), School of Computer Science, University of Waterloo, 7/1994 – present
Professor (tenured), Computer Science Department, University of California at Santa Barbara, 2000-2002 (On leave from UW)
Associate Professor, Computer Science Department, University of Waterloo, 7/1989 – 7/1994
Assistant Professor, Computer Science Department, York University, 1/1988 – 7/1989
Visiting Assistant Professor, Aiken Computational Lab, Harvard University, 9/1987 – 1/1988
Assistant Professor, Dept. Computer Science and Information, Ohio State University, 4/1985 – 9/1986

Research Interests

Deep learning, conversation robots, Kolmogorov complexity and its applications, analysis of algorithms, computational complexity, natural language processing, bioinformatics,

Honours & Awards

Killam Prize, 2010. (\$100,000). One award each year in Engineering, Natural Science, Health Science, Humanity, and Literature.
Outstanding Contribution Award, IEEE Granular Computing, San Jose, August, 2010
University Professor, University of Waterloo, June 2009.
Premier's Discovery Award (Innovation Leadership), 2009
Fellow, Royal Society of Canada, 2006
Fellow, ACM, 2006
Fellow, IEEE, 2006
IEEE GrC Conference, Pioneer Award, May, 2006
Canada Research Chair in Bioinformatics, Tier I, Nov. 2002 (renewed 2009)
Killam Research Fellowship, Canada Council for the Arts, 2001

E.W.R. Steacie Memorial Fellowship, NSERC, 1996

Award of Merit, 1997. The Federation of Chinese Canadian Professionals (FCCP)

Best paper awards: *COLING'2010*, Beijing, August 2010; *CSB'2007*, San Diego, August 2007; *2007 Genome Informatics Workshop*, Singapore, Dec. 2007 *1999 Genome Informatics Workshop*, Tokyo, Japan, Dec. 1999

Selected Keynote/Distinguished Lectures

1. Keynote Speech: Contextual sensitive chatting. Artificial Intelligence Summit, Beijing Asia Grand Hotel, Beijing, China, March 28, 2017.
2. Keynote Speech: De novo and antibody sequencing. Fudan University Medical School, Proteomics Workshop, March 27, 2017.
3. Keynote Speech: Chatting robots by deep learning. Global Artificial Intelligence and Robotics Summit, Chinese Computer Federation, Shenzhen, China, August 12-13, 2016.
4. Keynote Speech: Chatting robots by deep learning. 7th Workshop on data mining and intelligent computing. Hefei, China, August 9-10, 2016.
5. Keynote Speech: Chatting robots by deep learning. The 3rd workshop on big data and computational intelligence. Beijing, July 29-July 31, 2016.
6. Keynote Speech: 13th *CCL'2014*, Wuhan, China, Oct 18-19, 2014. Approximating Semantics.
7. Keynote Speech: 10th Conf on Algorithmic Aspects of Information and Management. Vancouver, July 8-11, 2014.
8. Invited tutorial: Unconventional Computation & Natural Computation, (Tutorial) London, Ontario. July 14-18, 2014
9. Keynote Speech: ISBRA 2014, Zhang Jia Jie, China. June 28-30, 2014
10. Public Tianyi Lecture, Ningbo City, China, Oct. 21, 2013 "Latent Search".
11. University of New Brunswick Annual Lecture in Computer Science: April 11-12, 2013.
12. Special Faculty Wide Colloquium: Information distance from a question to an answer. April 18th, 2012.
13. Keynote Speech: Sharcnet Research Day, May 23, 2012. Guelph University, Ontario, Canada.
14. Keynote Lecture: IEEE International Conference on Bioinformatics and Biomedicine (BIBM 2012), Philadelphia, US, Oct. 4-7, 2012.
15. Keynote Speech: ICDM'2011 Workshop on Biological data mining and its applications in healthcare. Vancouver, Dec. 11, 2011.
16. Keynote Lecture: Solomonoff 85th Memorial Conference, Melbourne, Australia. Nov. 30–Dec. 2, 2011.
17. Invited Lecture: Information distance. The Fourteenth International Conference on Discovery Science (DS 2011), Oct. 5-7, 2011, Espoo, Finland.
18. Keynote Lecture: "Kolmogorov complexity and its applications in computer science". Laurier Centennial Conference: Applied Mathematics, Modeling and Computational Science Conference. July 25-29, 2011.
19. Invited Lecture: *International Bioinformatics Workshop'2011*, Xi'an, China, July 11-13, 2011.

20. Keynote Lecture: The 4th Annual Meeting of the Asian Association for Algorithms and Computation (AAAC 2011), April 16-17, 2011, Hsinchu, Taiwan.
21. Keynote Lecture: The 4th Annual Int'l Conf. on Combinatorial Optimization and Applications. Dec. 18-20, 2010, Hawaii.
22. Keynote Speech: ACM International Workshop on Data and Text Mining in Bioinformatics Oct. 29-30, 2010, Toronto.
23. Keynote Speech: IEEE Int'l Conf. on Granular Comput. August 14-16, 2010, San Jose.
24. Keynote Speech: 5th Canadian Student Conf. on Biomedical Comput. and Engineering, May 20-22, 2010, Waterloo, Ontario.
25. Keynote Lecture: 12th Descriptive Complexity of Formal Systems August 8-10, 2010. Saskatoon, Saskatchewan.
26. Keynote Lecture: 1st International Conference on Bioinformatics and Computational Biology. New Orleans. April 8-10, 2009.
27. Distinguished Lecture: Can NMR Protein Structure Determination be Automated? Computer Science Department, University of Alberta. March 16, 2009.
28. Keynote Lecture: *14th Int'l Conf. DNA Computing (DNA14)*, Prague, June 2-6, 2008.
29. Keynote Lecture: *19th Int'l Conf on Genome Informatics (GIW2008)*. Brisbane, Australia, Dec. 1-3, 2008.
30. Distinguished lecture: Computer Science Department, University of Maryland at Baltimore County. Feb. 5, 2008.
31. Distinguished lecture: Computer Science Department, University of Texas, Dallas, Sept 14, 2007.
32. Keynote speaker: The 13th Annual International Computing and Combinatorics Conference (COCOON'07), July 16-19 2007, Banff, Alberta.
33. Invited Speaker: *11th Int'l Conf. Develop. Language Theory (DLT)*, Turku, July, 3-6, 2007.
34. Keynote speaker: Ohio Collaborative Conference on Bioinformatics, Miami University, Oxford Ohio, July 9-11, 2007.
35. Keynote speaker: *ISBRA'2007*. Atlanta, May 7-10, 2007.
36. Distinguished Speaker: *Modern homology search*, Distinguished Lecture Series, Simon Fraser University, Oct. 26, 2006.
37. Keynote Speaker: *Fast homology search*. 31st Int'l Symp. on Math. Found. Comput. Sci. (MFCS'2006), Slovakia, Aug. 28–Sept. 1, 2006.
38. Distinguished Speaker: *Workshop on Bioinformatics*, July 12-15, 2006. Singapore.
39. Invited Speaker, 2006 RECOMB Satellite Workshop on Regulatory Genomics: Complexity of motif ranking, Singapore, July 17-18, 2006.
40. Keynote Speaker: *The information distance and applications*. The 11th International Conference on Implementation and Application of Automata (CIAA'06), Taipei, Taiwan, August 21-23, 2006.
41. Keynote Speaker: *Information distance*. IEEE Int'l Conf. on Granular Computing, Atlanta, May 10-12, 2006.

42. Invited Speaker: *Super seeds in bioinformatics and finance*. Symposium on Combinatorial Pattern Matching (CPM'05) Jeju island, Korea, June 19-22, 2005.
43. Invited Plenary Speaker: *Theory of spaced seeds*. International Symposium on Recent Trends in Theoretical Computer Science. Feb. 28 – Mar. 3, 2005, Kyoto, Japan.
44. Keynote Speaker: *Genome to annotation*. SIG meeting in structural bioinformatics, Jan. 17, 2005, Singapore.
45. Distinguished Speaker: *PatternHunter – fast and sensitive homology search*. Queens University, School of Computing Distinguished Seminar Series, <http://www.cs.queensu.ca/seminars/dss/schedule.html>, Nov. 12, 2004.
46. Invited Plenary Speaker: *Kolmogorov complexity and its applications*. The 3rd International Congress of Chinese Mathematicians (ICCM), <http://www.ims.cuhk.edu.hk/conference/iccm2004/>, Hong Kong, December 17-22, 2004.
47. Keynote Speaker: *Fast and sensitive homology search*. 4th IEEE International Conference on Data Mining (ICDM), <http://icdm04.cs.uni-dortmund.de/>, Brighton, UK, Nov. 2-4, 2004. Invited Talk: *A theory of parameter-free data mining*. Workshop on Foundations of Data Mining, Brighton, UK, Nov. 1, 2004.
48. Keynote speaker: *Fun and elegant ideas in bioinformatics*. The 3rd annual Toronto Undergraduate Biotechnology Symposium, March 26, 2004.
49. Keynote Speaker: *Fast and sensitive homology search*. 2003 Bioinformatics In Taiwan (BIT2003) Symposium, Taiwan, Sept 5-7, 2003. <http://ymbc.ym.edu.tw/bit/3e.html>.
50. Invited Public Lecture: *Chain letters and evolutionary histories*. Tsinghua University, Beijing, China, Oct. 2003.
51. Invited Plenary Lecture: *Bioinformatics Tools and Software*. Canada-Japan Science Symposium, Canadian Embassy in Japan. Jan. 2003. Japan.
52. Keynote Speaker: *Building tools to mine molecular sequence data*. 2002 Australian Joint Artificial Intelligence Conference, Canberra, Australia, Dec. 2-6, 2002. <http://www.cs.adfa.edu.au/abbass/AI02/>
53. Invited Lecture: *Fast and sensitive homology search*. Theoretical Computer Science Symposium 100 Anniversary of Nihon University, Tokyo, Japan, 2002.
54. Invited Plenary Speaker: *PatternHunter: Any genome anywhere*. Second Annual "The Computational Challenges in the Post Genomic Age", Durham, NC. March 11-13, 2002.
55. Keynote Speaker: *Bioinformatics: new challenges to computer science*. Beijing Bioinformatics Conference. Nov. 27, 2000, Beijing, China.
56. Keynote Speaker: *Whole genome phylogeny*, Case Western Reserve-Netgenics-Athersys mini-symposium on computational genetics, Cleveland, Oct. 20, 2000.
57. Keynote Speaker/Panelist: *Bioinformatics challenges to computer science*. Bioinformatics Workshop, Wayne State University, Detroit, Oct. 26, 2000.
58. Keynote Speaker: *Bioinformatics: new challenges to computer science*. Bioinformatics Workshop, Dec. 2000. National Chung Zheng University, Taiwan.
59. Invited Plenary Speaker: *The incompressibility argument*. International Conference on Theoretical Computer Science (in honor of Manuel Blum's 60th Birthday). April 20-24, 1998, Hong Kong.

60. Keynote Speaker: *Average-case analysis using Kolmogorov complexity* CATS'98 – Computing: The Australasian Theory Symp. Feb. 2-3, 1998, Perth, Australia.
61. Keynote Speaker: *Average-case analysis via incompressibility method*, 11th Symp. Fundamentals of Computation Theory (FCT'97), Krakow, Poland, Sept. 1-3, 1997.
62. Distinguished Speaker: *Kolmogorov complexity and its applications*, Center for System Science and School of Computing Science Distinguished Speaker Series, Simon Fraser University, Nov. 21, 1996.
63. Public Lecture: *A tour through the world of Kolmogorov complexity*, City University of Hong Kong. Nov. 13, 1996.
64. Invited Plenary Lecture: *Inferring a DNA sequence from erroneous copies*, 6th Annual International Workshop on Algorithmic Learning Theory, Fukuoka, Japan, Oct. 18-20, 1995.
65. Invited Lecture: *Kolmogorov complexity and its applications*, ALCOM Summer School on Complexity, Barcelona, Sept. 5-9, 1994.
66. Invited Plenary Lecture: *DNA sequencing and learning*, DIMACS “Combinatorial methods for DNA mapping and sequencing” workshop, Oct. 6-9, 1994.
67. Keynote Lecture: *PAC-learning theory and its applications*, Canadian Workshop on Machine Learning, Banff, Calgary, May, 1994.
68. Keynote Lecture: *Theories of learning*, 3rd International Conference for Young Computer Scientists, Beijing, July, 1993.
69. Keynote Lecture: *Thermodynamics of computing and information distance*, 1993 Midwest theory conference, Notre Dame, Indiana, April 3, 1993.
70. Keynote Lecture: *Information distance*, 1993 Carleton Annual Theory Symposium, Ottawa, Oct. 16, 1993.
71. Keynote Lecture: *A tour through the world of Kolmogorov complexity*, 19th International Colloquium on Automata, Languages, and Programming (ICALP'92), Vienna, July 13-17, 1992.

Patents filed

M. Li, B. Ma and J. Tromp, A method for fast and sensitive homology search. US patent, issue by USPTO, March, 2017. (Filed Sept. 2002. Application number 10/236339 and publication number 20030120429.)

M. Li, Y. Tang, D. Wang System, method, and computer program for correcting speech recognition information. US patent, provisional patent filed in Oct. 2011.

M. Li, Y. Tang, D. Wang System, method and computer program for correcting machine translation information. US patent, provisional patent filed in 2012. US Patent Application No. 13/749333. Formally approved, Dec. 30th 2015. Issued under US Patent No 9256597 (Jan 27, 2016)

M. Li, Y. Yang, D. Wang System and method for universal translating from natural language questions to structured queries. US patent, provisional patent filed in 2012 (Lawyer Ref: 55772714-2US) (US Patent Application No. 13/776,084) Issued by USPTO on Nov. 10, 2015, Patent No. 9,183,511.

Selected Trainees. (Total: 17 Ph.D's and 18 PDFs.)

- J. Tromp, postdoc, Sponsored by NSERC International Postdoc Fellowship. 1993-1995. Renaissance Technologies.
- Karsten Verbeurgt. Ph.D. 1998

- B. Ma, Ph.D., 1999, and postdoc, 1999-2000. Professor at University of Waterloo.
- Kevin Lanctot, Ph.D. 2000.
- Haoyong Zhang, M.Math. 1999. Microsoft.
- L. Zhang, postdoc, 1995. Professor at National University of Singapore.
- B. DasGupta, postdoc, 1995-1996. Faculty member at University of Illinois Chicago.
- Q. Gao, postdoc, 1987-1988. Professor at Academia Sinica, China.
- C.Z. Liang, M.Math. 2001. Professor at Institute of Genetics, Academia Sinica, China.
- J. Badger, postdoc, 1998-2000. Research scientist at TIGR.
- G. Lin, postdoc, computational biology. Professor at University of Alberta.
- X. Chen, postdoc. 2000-2002. Faculty member at the Nanyang Institute of Technology.
- Dongbo Bu, postdoc, 2006-2009. Professor at Academia Sinica.
- Paul Kearney. Hired using my Steacie Fellowship replacement fund as a definite term assistant professor. Chief Scientific Officer, Integrated Diagnostics.
- J. Xu, Ph.D. 2003. Faculty member at Toyota Institute of Technology Chicago.
- T. Vinar, Ph.D. 2005. Faculty member Comenius University.
- B. Brejova, Ph.D. 2005. Faculty member at Comenius University.
- Jing Zhang. Ph.D. 2008. Google China.
- Zefeng Zhang, Ph.D. 2008. Bioinformatics Solutions Inc.
- Hao Lin, Ph.D. 2008. Bioinformatics Solutions Inc.
- S.C. Li, Ph.D. 2010. Faculty member at City University of HK.
- X. Gao. Ph.D. 2011. Faculty member at KAUST.
- B. Alipanahi. Ph.D. 2012. Postdoc, University of Toronto.
- Yang Tang, Research Associate, 2011-2013. Twitter.
- Sayd Bashir. Ph.D. 2011. Google.
- Christina Boucher. Ph.D. 2012. Faculty member at University of Colorado.
- Dan Holtby. Ph.D. 2013, Postdoc, University of Waterloo.
- Xuefeng Cui, Ph.D. 2014.
- Guangyu Feng, Ph.D. 2015 expected.
- Anqi Cui: PDF
- Tran Ngoc Hieu: PDF
- Xin Chen: Visiting Assistant Professor.

Research Grants

1. NSERC Discovery Grant, \$74,000/year, 2011-2016.
2. CFI-CRC Chair bioinformatics lab equipment grant: \$300,000, 2009. CRC Chair fund, \$200,000/year, 2009-2016
3. NSERC Collaborative Grant. \$53076 / year for 3 years, 2008
4. Premier's Discovery Award. total \$250,000, 2009-2012.
5. NSERC IDRC Chair. \$1,000,000 for 5 years, 2009-2014. \$250,000 of this 1 million dollars will be spent at University of Waterloo over 5 years. Support source: NSREC.
6. NSERC Operating/Discovery Grant, \$74,000/year, 2006-2011.
7. PI, CITO Champions of Innovation Program. "New generation bioinformatics software". \$200,000, 2003-2005.
8. CFI-CRC Chair bioinformatics lab equipment grant: \$300,000, 2003. CRC Chair fund, \$200,000/year, 2002-2009
9. NSERC Operating/Discovery Grant, \$68,000/year, 2001-2006.
10. Co-PI, Carbon Sequestration in *Synechococcus*: From Molecular Machines to Hierarchical Modeling. \$220,000 USD, 2002-2005. The whole grant is 19.1 million over 3 years, led by Sandia National Lab, under DOE's Genome to Life (GTL) initiative.
11. PI, NSF, BDI, 0213903, Scalable homology search tools. \$410,000 USD, 2002-2005.
12. PI, NSF, Theory of computation, CCR-0208595, Kolmogorov complexity and its applications. \$201,430 USD, 2002-2005.
13. PI, LSI & Rigel Pharmaceuticals, PathwayFinder. \$100,000 USD. (2002).
14. PI. NSF, ITR/ACS, 0124597: Supplement grant to ACI00-85801. \$17,500 USD, 2001.
15. PI, NSF, ITR/ACS ACI00-85801: Computational techniques of applied bioinformatics. \$312,500 USD, 2000-2004. (This is part of a larger project together with M. Clegg and T. Jiang, total \$785k.)
16. Project leader, CITO grant: "Computational tools for molecular biology" \$240,000, 1998-2000.
17. NSERC Operating Grant OGP0046506, \$51,000/year, 1996-1999, \$58,905/year, 1999-2001.
18. NSERC Steacie supplement grant (\$92,000, 1997-1999).
19. CGAT Grant: "Efficient Algorithms for Multiple Sequence Alignment, Evolutionary Trees, and Restriction Mapping" (\$300,000, 1994-1997). (with T. Jiang, *et al.*) CGAT—Canadian Genome Analysis and Technology project.
20. ITRC Grant (Ian Munro, Jeff Shallit, *et al*, \$20,000/year, 1993 – 1998).
21. NSERC Operating Grant OGP0046506 (\$37,000/year, 1993-1996).
22. NSERC International Scientific Exchange Award (\$5400, 1992).
23. NSERC International Scientific Exchange Award (\$5400, 1990).
24. NSERC Operating Grant OGP0046506, \$35,428/year, 1990-1993.
25. NSERC Equipment Grant, \$19,000, 1989.

26. NSERC Operating Grant OGP0036747, \$22,890/year, 1988-1990.
27. PI, NSF Grant DCR-8606366 \$80,000 USD, 1986-1988, with Yaacov Yesha.
28. PI: Ohio State University, Seed Grant \$16,000 USD, 1986, with Yaacov Yesha.

PROFESSIONAL SERVICE AND OUTREACH

Editorial Boards

- (co-) Editor-in-Chief. *Journal of Bioinformatics and Computational Biology*, 2002 – 2016,
- Associate Editor-in-Chief, *Journal of Computer Science and Technology*, 2003 – present.
- *Journal of Computer and System Sciences*, 1992 – 2015.
- *SIAM Journal on Computing*, 2002 – 2008.
- *Information and Computation*, 1997 – 2006.
- *Journal of Combinatorial Optimization*, 1995 – 2014.
- *International Journal of Foundation of Computer Science*, 1999 – 2003.
- Editor: Science Press (China), Discrete Mathematics and Theoretical Computer Science Series.
- Editor: Higher Education Press (China): Frontiers of Modern Sciences Series.
- Special Issue co-editor (with Les Valiant): *Machine Learning*, 14:1(1994), special issue for COLT'91.
- Special Issue editor: *Journal of Computer and System Sciences*, 50:3(1995), for COLT'92.
- Special Issue co-editor (with Bill Gasarch): *Journal of Computer and System Sciences*, for COLT'94.
- Special Issue co-editor (with Paul Vitányi): *Journal of Computer and System Sciences*, special issue for 2nd European Computational Learning Theory Conference (EuroCOLT'95).
- Special Issue co-editor (with Dingzhu Du): *Theoretical Computer Science*, special issue for COCOON'95, Vol. 181 No. 2 (30 July, 1997)
- Special Issue co-editor (with Tao Jiang): *International J. Foundation of Computer Science*, special issue on "Computational Biology", 1995.
- Special Issue editor: *Theoretical Computer Science* for ALT'97.
- Special Issue co-editor (with R. Karp, P. Pevzner, R. Shamir): *Journal of Computer and System Sciences*, Bioinformatics Special Issues, 2002, 2003, 2004.

Other Professional Services

- Conference Chair, Asia Pacific Bioinformatics Conference. Singapore, Jan. 17-21, 2005. CCL'2015 (Chinese Computational Linguistics Conference), Guangzhou. Nov. 2015.
- Recent service on conference program committees: WABI'2016, RECOMB'2014, CiE'2012, IDCM'2009, APBC'2009, FOCS'2009, GIW'2009, WADS'2009, WABI'2009, RECOMB'2008, GIW'2007, WABI'2007, CPM'2007, KDD'2007, SODA'2007, CSB'2006, ISMB'2006, CPM'2006, Spain. CPM'2004, Istanbul, Turkey. 2nd IEEE Computer Society Bioinformatics Conference CSB2003, Aug. 11-14, 2003. FCT'03, Malmo, Sweden, August 12-15, 2003. ISAAC 2002, Vancouver, Nov. 21-23, 2002. ACM Symp. Theory of Computation (STOC'01), Greece, 2001; 40th IEEE Symp. Foundation of Computer Science, (FOCS'99), NY, 1999; FST&TCS'99, India, Dec. 13-15, 1999; LATIN'2000, Punta del Este, Uruguay, April 10-14, 2000; ICYCS'99. Nanjing, China, Oct. 20-23, 1999; CATS'99. Auckland, New Zealand, Jan., 1999; ISAAC'98. South Korea, December 14-16, 1998;

- Conference program committee chair for: *8th Algorithmic Learning Theory Conference (ALT'97)*, Sendai, Japan, Oct. 6-8, 1997; *International Computing and Combinatorics Conference, (COCOON'95)*, Xi'an, China, Aug. 24-26 1995.
- Refereeing: I have refereed hundreds of papers and proposals for many journals including *SIAM J. Comput.*, *Theor. Comput. Sci.*, *IEEE Trans. Inform. Theory*, *Inform. Computation*, *Journal of Computer and System Sciences*, *Inform. Process. Lett.*, *Math. Syst. Theory*, *Journal of the ACM*, *Bioinformatics*, *Journal of Bioinformatics and Computational Biology*, *AI Journal*, *Machine Learning*, and agencies including *NSERC*, *CGAT (Canadian genome project)*, *NIH*, *NSF*, *Hong Kong Research council*, *City University of Hong Kong*, *Hong Kong University*, *Australian National University*
- External examiner of Bioinformatics program, Nanyang Technical University of Singapore. 2002–present.
- Created the Waterloo's undergraduate (co-op) Bioinformatics program joint between Computer Science Department and Biology Department, accepting 50 students each year, since 2001.
- Advisory committee: Computer Science Department, Wayne State University, 2003-2006.
- Scientific Advisory Committee: Designing Oil Seeds for Tomorrow's Market (Genome Canada / Genome Alberta, 14 million project): 2008–2010.
- Advisory Board: Book series: Theory and Applications of Computability, Springer. 2009-present.

Media Coverage

- Scientific Chinese: Cover page, No. 11, 2016.
- CCTV, 10 minute interview on Chatting Robots. Broadcast Feb. 27, 2017.
- CCTV 4. Together with Legend CEO Yang Yuanqing 2005
- Radio Canada International Interview for IDRC, at: <http://www.rciviva.ca/rci/ch/dossiers/80504.shtml>
- Waterloo Region Record, Friday, April 16, 2010, Front page story
- *Globe and Mail*, April 13, 2010 (coverage of Killam prize), 2006 (coverage of Royal Society of Canada), 2013 (University of Waterloo)
- News coverages (for Steacie, Killam awards) in the Chinese news papers including Tsingdao Daily, World Daily, People's Daily, Suzhou Daily
- K-W FM 98.3 Radio Chinese 1/2 hour interview.

PUBLICATIONS

Books

1. M. Li and P. Vitányi, *An introduction to Kolmogorov complexity and its applications*, Springer-Verlag, 1st Edition 1993 (xx+546 pp). 2nd Edition 1997 (xx+637 pp). 3rd Edition 2008 (xx+792 pp).
2. M. Li and H.A. Li, *A course on Java programming*. Science Press, 1997 (In Chinese, 252 pp).
3. M. Li and P. Vitányi, *Descriptive complexity*. Science Press, 1999 (In Chinese, 220 pp).
4. M. Li. *Lower Bounds in Computational Complexity*. Ph.D. thesis. Cornell Univeristy, 1985.

Papers in Popular Magazines

5. C.H. Bennett, M. Li and B. Ma, Chain letters and evolutionary histories. *Scientific American*, 288:6(June 2003) (feature article), 76-81.

6. Dana MacKenzie, On a roll, *New Scientist*, Nov. 6, 1999, 44-47. (Article devoted to our work on Kolmogorov complexity and Heilbronn triangles.) Also translated in to French appeared in *Courrier International* (12/23/99).
7. Wolfgang Blum, Die ZEIT, April 13, 2000 (#16), p. 40: "Geometrisch Eingekreist". (Article devoted to our work on Kolmogorov complexity)
8. Interview article on our PatternHunter system. Steve Melon: Exploring the new frontier: Java technology powers the "Post-Genomic" era. <http://java.sun.com/features/2001/09/genome.html>. It appeared as the cover story of java.sun.com website which has 2 million viewers per day.
9. W. Kirchherr, M. Li, and P. Vitányi, The miraculous universal distribution. *The Mathematical Intelligencer*, 19:4(fall 1997), 7-15.

Papers in Refereed Journals

10. N.H, Tran, X. Zhang, L. Xin, B. Shan, M. Li. De novo peptide sequencing by deep learning. Under review at *Nature – Communications* 2017.
11. N.H. Tran, M.Z. Rahman, L. He, L. Xin, B. Shan, M. Li. Complete de novo assembly of monoclonal antibody sequences. *Nature, Scientific Reports* 6 (Published on line: August 26, 2016), doi:10.1038/srep31730.
12. J. Wooley, M. Li, L. Wong, JBCB, the first decade. *Journal of Bioinformatics and Computational Biology* 12:03(2014).
13. X. Zhang, Z. Luo, M. Li Merge-weighted dynamic timing warping for speech recognition. *J Comput. Sci. Tech.* 29:6 (2014), 1072-1082.
14. B. DasGupta, X. He, M. Li, J. Tromp, L. Zhang. Nearest neighbor interchange and related distances. *Encyclopedia of Algorithms*, 2014. Springer.
15. X. Cui, S.C. Li, L. He, M. Li, Fingerprinting protein structures effectively and efficiently. *Bioinformatics*, 30:7(2014) 949-955.
X.F. Cui, S.C. Li, D.B. Bu, M. Li, Towards reliable automatic protein structure alignment. *Nucleic Acids Research*, 37:12(2013), 1-7.
16. Y. Tang, D. Wang, J. Bai, X. Zhu, M. Li, Information distance between what I said and what it heard. *Communications of the ACM*. 56:7 (July, 2013), 70-77.
17. D. Holtby, S.C. Li and M. Li. LoopWeaver - Loop Modeling by the Weighted Scaling of Verified Proteins *J. Computat. Biol.*, 20:3(2013), 212-223.
18. X.F. Cui, S.C. Li, D.B. Bu, B. Alipanahi, M. Li. Protein structure idealization: How accurately is it possible to model protein structures with dihedral angles? *Alg. of Molecular Biology*, 8:5(2013)
19. B. Alipanahi, N. Krislock, H. Wolkowicz, A. Ghodsi, L. Donaldson and M. Li. Determining protein structures from NOESY distance constraints by semidefinite programming. *J. Computat. Biol.*, 20:4(2013) 296-310.
20. D. Bu, S.C. Li, M. Li, Clustering 100,000 protein structure decoys in minutes. *IEEE/ACM Trans. Comput. Biol. Bioinf.* 9:3(2012), 765-773.
21. F. Bu, X. Zhu, M. Li. A New Multiword Expression Metric and Its Applications *J. Comput. Sci. Tech.*, 26:1(2011), 3-13.

22. S.C. Li, D. Bu, M. Li Residues with similar hexagon neighborhoods share similar side-chain conformations. *ACM/IEEE Trans. Comput. Biology Bioinfo.* 9:1(2011), 240-248
23. Richard Jang, X. Gao, M. Li, Towards fully automated structure-based NMR assignment of ¹⁵N-labeled proteins from automatically picked peaks. *J. Comput. Biol.*, 18:3(2011), 374-363. Special Issue for *RECOMB 2010*.
24. S.C. Li, D. Bu, J. Xu, and M. Li. Finding nearly optimal GDT scores. *J. Comput. Biol.*, 18:5(2011), 693-704.
25. M. Li, Can we determine a protein structure quickly? *J. Comput. Sci. Tech.* 25:1(2010) 95-106.
26. J.W. Zou, X. Deng, M. Li, Detecting market trends by ignoring it, some days. *J. Universal Computer Science.* 2010.
27. Y. Zhao, B. Alipanahi, S.C. Li, M. Li, Protein secondary structure prediction using NMR chemical shift data. *JBCB* 8:5(2010).
28. B. Alipanahi, X. Gao, E. Karakoc, F. Balbach, S.C. Li, G. Feng, L. Donaldson, M. Li. Error tolerant NMR backbone resonance assignment for automated structure generation. *J. Bioinform & Computat. Biol.*, 1(2011), 1V26.
29. X. Gao, J. Xu, S.C. Li, and M. Li. Predicting local quality of a sequence-structure alignment, *J. Bioinform & Computat. Biol.*, 7:5(2009) 789-810.
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264. M. Li, Simulating 2 pushdown stores by 1 tape in $O(n^{1.5})$ time. *Proc. 26th IEEE Symp. Found. Computer Science (FOCS'85)*. Portland, pp. 56-64, 1985.
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A Summary of Some Representative Publications

1. M. Li and P. Vitányi, *An introduction to Kolmogorov complexity and its applications*, Springer-Verlag, 1st Edition 1993 (xx+546 pp). 2nd Edition 1997. 3rd Edition 1998.

This research monograph is considered the standard reference in the field. It has been used to teach graduate research courses in many top universities. Parts of our writings have been translated into various languages including Russian, Japanese, and Chinese. At <http://citeseer.nj.nec.com/source.html>, this book is ranked as one of the most cited publications in computer science (31st most cited computer science source document). 5 star rating by all readers at amazon.com.

2. B. Ma, J. Tromp, M. Li, PatternHunter: faster and more sensitive homology search, *Bioinformatics*, 18:3(2002), 440-445. M. Li, B. Ma, D. Kisman and J. Tromp. PatternHunter II: highly sensitive and fast homology search. *J. Bioinformatics and Computational Biology*, 2:3(2004), 417-440.

The optimized spaced seeds, invented here, have changed the way we do homology search. This new method is widely recognized as a major innovation in bioinformatics and is adopted by all major homology search engines, including BLAST (<http://www.ncbi.nlm.nih.gov/Web/Newsltr/FallWinter02/blastlab.html>, news release). Today, our spaced seeds are serving thousands of homology search queries daily by the scientists all over the world via NCBI BLAST and PatternHunter. Dozens of research groups in the world are following our leads working on various aspects of the spaced seeds. PatternHunter has been used in hundreds of research institutions and industry. In particular, it is used by the Mouse Genome Sequence Consortium to compare the mouse genome and the human genome, taking 20 CPU-days instead of 20 CPU-years otherwise by BLAST at the time.

3. C.H. Bennett, P. Gács, M. Li, P. Vitányi, and W. Zurek, Information Distance. *IEEE Trans. Inform. Theory*, 44:4(July 1998), 1407-1423. M. Li, J. Badger, X. Chen, S. Kwong, P. Kearney, H. Zhang, An information-based sequence distance and its application to whole mitochondrial genome phylogeny, *Bioinformatics*, 17:2(2001), 149-154. M. Li, X. Chen, X. Li, B. Ma, P.M.B. Vitányi, The similarity metric, *IEEE Trans. Information Theory*, 50:12(2004), 3250-3264. T. Yang, D. Wang, J. Bai, X. Zhu, M. Li, Information distance between what I said and what it heard. *Communications of the ACM*. 56:7(July, 2013) 70-77.

The first three papers have opened a new research area of "information distance". The information distance derived from the first physical principles in the first paper is now widely accepted as the standard concept to measure "ultimate distance" between any two information carrying entities. The last two papers, have opened the door of using such tools in real applications from measuring distance between two genomes to measuring distance between a query and an answer on the internet. Hundreds of applications have followed. In a SIGKDD04 paper (pp. 206-215), Keogh, Lonardi and Ratanamahatana have demonstrated that our methodology was better than all 51 methods for time series clustering they have found in SIGKDD, SIGMOD, ICDM, ICDE, SSDB, VLDB, PKDD, PAKDD conferences. The last paper puts the theory to real life applications of natural language processing, with a working system.

4. M. Li, Simulating 2 pushdown stores by 1 tape in $O(n^{1.5})$ time. *Journal of Computer and System Sciences* (Special Issue for FOCS'85), 37:1 (1988), 101-116.

This paper solved several open questions in complexity theory and formal language theory, open for over 10 years. It showed, surprisingly, that one nondeterministic tape can simulate 2 pushdown stores in less than n^2 time, using a planar graph separator theorem.

5. M. Li, Towards a DNA sequencing theory (learning a string). *Proc. 31st IEEE Symp. Found. Computer Science* (FOCS'90), 1990, pp. 125-134. A. Blum, T. Jiang, M. Li, J. Tromp, and M. Yannakakis, Linear approximation of shortest superstrings. *Journal of the ACM*, 41:4(1994), 630-647 (also in STOC'91).

These two papers have solved a major question in computer science open for 10 years on linear approximation of shortest common superstrings. This problem also arises in shotgun DNA sequence assembly and our solution has provided theoretical foundations for shotgun DNA sequencing. Our algorithm and proof have been described in all pioneering computational biology textbooks including [Michael Waterman. *Introduction to Computational Biology: maps, sequences and genomes*, Chapman & Hall, 1995]. This has also started a new research trend. The techniques invented here have been used in dozens of follow-up papers.

6. J. Xu and M. Li, Assessing RAPTOR's new linear programming approach for fold recognition in CAFASP3. *PROTEINS: Structure, Function, and Genetics*, 53(S6):579-584. Oct. 2003

We have introduced a new method to do protein threading using linear programming. Our software RAPTOR was voted by peers as the most interesting new method for 2002's CASP5 competition at www.forcas.org. It is ranked number 1 among the individual automatic protein 3D structure prediction

programs in CASP5/CAFASP3 competition for fold recognition. RAPTOR is directly contributing to drug development at Merck, Boehringer-Ingelheim, and Genentech.

7. M. Li, B. Ma, and L. Wang, Finding similar regions in many sequences. *Proc. 31st ACM Symp. Theory of Computing (STOC'99)*, 1999.

This paper solves several open questions on consensus problems. For example, it improves a $\frac{4}{3}$ approximation algorithm Hamming center problem to a polynomial approximation scheme (PTAS): find string s which is Hamming distance d away from a set of given strings. It also gives a PTAS for the well-known star-alignment problem when only constant number of gaps on each sequence is allowed.

8. M. Kearns, M. Li, and L. Valiant, Learning Boolean formulas. *Journal of the ACM*, 41:6(1994), 1298-1328 (also in STOC'87). M. Kearns and M. Li, Learning in the presence of malicious errors. *SIAM J. Comput.*, 22:4(1993), 807-837 (also in STOC'88).

These two papers are pioneering papers in computational learning theory and have made major impact to the field. Many later papers have investigated and improved problems and results in these papers.

9. T. Jiang and M. Li, k one-way heads cannot do string-matching. *Journal of Computer and System Sciences*, 53:3(Dec. 1996), 513-524 (also in STOC'93).

This paper settles a 13 year old well-known conjecture of Galil and Seiferas: one cannot use 1-way pointers to do string matching.

10. M. Chrobak and M. Li, $k + 1$ heads are better than k for PDA's. *Journal of Computer and System Sciences (Special issue for FOCS'86)*, 37:2(1988), 144-155.

This paper settles a 20 year open question first raised by Harrison and Ibarra: there is a language accepted by a $k + 1$ head PDA but not acceptable by a k head PDA.

11. T. Jiang, M. Li, P. Vitányi, Average-case complexity of Shellsort, *J. ACM*, 47:5(2000), 905–911.

The average-case analysis of Shellsort has been a major open question of 40 years since the beginning of computer science. Using our “incompressibility method”, we gave a simple analysis of an $\Omega(pm^{1+\frac{1}{p}})$ average-case lower bound for p -pass Shellsort, for every p .