

Kishori Mohan Konwar

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CURRENT POSITION	Research Associate Computer Science and Artificial Intelligence Laboratory, Massachusetts Institute of Technology, Cambridge, MA	Starting from March/April 2015
	Tula Foundation Post-Doctoral Fellow (Dec 2010-Current) University of British Columbia	
RESEARCH INTEREST	<ul style="list-style-type: none">• Distributed and Parallel Computing (Theory and Practice)• High Performance computing, GPU Computing• High Performance Computing applied to Bioinformatics	
EDUCATION	University of Connecticut, Storrs, CT PhD in Computer Science Research/Thesis: Distributed Algorithms	2008
	<u>MS in Statistics</u> Research: Maximum Likelihood Estimation in Alternating Renewal Processes	
	Indian Statistical Institute, Calcutta, India <u>MS in Computer Science</u> , First class with Distinction Research/Thesis: Machine Learning and Fuzzy Systems	2000
	Indian Institute of Technology, Kanpur, India <u>MSc in Physics</u>	1998
PAST INDUSTRY EXPERIENCE	<ul style="list-style-type: none">• Developer for grid computing infrastructure (with 15,000+ nodes) for large scale simulation and data processing, Goldman Sachs & Co, New York City 2007-2010	
SOFTWARE DEVELOPED	<ul style="list-style-type: none">• MetaPathways MetaPathways (http://hallam.microbiology.ubc.ca/MetaPathways/) is a modular software pipeline for integrated analysis of environmental metagenomic samples. The software performs a series of popular analyses for taxonomic profiling and functional potential with limited data handling, allowing researchers to spend their time analyzing their data instead of performing complicated data transformations. It can also process large volume of data using multiple grids and stand-alone servers using a master-worker model with mechanism for fault-tolerance.• LuitPad LuitPad (http://www.luitpad.com) is a stand-alone, fully Unicode compliant software designed for rapid typing of Assamese words and characters. There are two main typing options; one which is based on approximate sound of words and the other based on the sound of characters, both of which are efficient and user-friendly, even for a first-time user. Assamese is spoken throughout North-Eastern parts of India by approximately 30 million people.• DNA-BAR: Distinguisher Selection for Robust DNA Barcoding DNA-BAR is a software package for selecting DNA probes that can be used in genomic-based identification of microorganisms. Given the genomic sequences of the microorganisms, DNA-BAR finds a near-minimum number of distinguishes. DNA-BAR can be used online through the web interface provided at http://dna.engr.uconn.edu/?page_id=23. The open source C code, released under the GNU General Public License, is also available at the above address.	

• **G-POT: Multiplex-PCR Primer Set Selection**

G-POT is a software package for selecting a minimum set of primers needed to amplify a set of loci through Multiplex Polymerase Chain Reaction. The tool is based on the "potential function" greedy algorithm developed by the authors. G-POT can be downloaded from http://dna.engr.uconn.edu/?page_id=74. The C code is released under the GNU General Public License.

**PEER -
REVIEWED
PUBLICATIONS**

Distributed and Parallel Computing:

- [1] K.M. Konwar, D.R. Kowalski and A.A. Shvartsman, "The Join Problem in Dynamic Network Algorithms", *Proceedings of the International Conference Dependable Systems Networks*, pp 315-324 (2004).
- [2] K.M. Konwar, P.M. Musial, N.C. Nicolaou and A.A. Shvartsman, "Implementing Indirect Atomic Data through Indirect Learning in Dynamic Networks", *Network Computing Applications 2007 (NCA 07)*
- [3] K.M. Konwar, D.R. Kowalski and A.A. Shvartsman, "Node Discovery in Networks", *Proceedings of the 9th International Conference On Principles Of Distributed Systems*, pages 154–165, 2005.
- [4] Kishori M. Konwar, Dariusz R. Kowalski, Alexander A. Shvartsman: Node discovery in networks. *J. Parallel Distrib. Comput.* 69(4): 337-348 (2009)
- [5] Kishori M. Konwar, Peter M. Musial, Alexander A. Shvartsman: Spontaneous, Self-Sampling Quorum Systems for Ad Hoc Networks. *ISPDC 2008*: 367-374
- [6] K.M. Konwar and A.A. Shvartsman, "Resource Discovery in Networks under Bandwidth Limitations", *ISPDC 2006*, pages 42-49.
- [7] K.M. Konwar, S. Rajasekaran, A. A. Shvartsman, "Robust Network Supercomputing with Malicious Processes", *DISC 2006*: pages. 474-488.
- [8] K.M. Konwar, D.R. Kowalski and A.A. Shvartsman, "Node Discovery in Networks", *Proceedings of the 9th International Conference On Principles Of Distributed Systems*, pages 154–165, 2005.
- [9] Seda Davtyan, Kishori M. Konwar, Alexander A. Shvartsman: Robust network supercomputing without centralized control. *PODC 2011*: 293-294
- [10] Seda Davtyan, Kishori M. Konwar, Alexander A. Shvartsman: Robust network supercomputing without centralized control. *Principles of Distributed Systems (OPODIS) 2011*.
- [11] Seda Davtyan, Kishori M. Konwar, Alexander A. Shvartsman: Brief announcement: decentralized network supercomputing in the presence of malicious and crash-prone workers. *Proceedings PODC 2012*: 231-232.
- [12] Seda Davtyan, Kishori M. Konwar, Alexander Russell, Alexander A. Shvartsman: Dealing with Undependable Workers in Decentralized Network Supercomputing. *Proceedings ICDCN 2013*: 27-41.
- [13] Seda Davtyan, Kishori Konwar and Alexander Shvartsman, "Estimating Reliability of Workers for Cooperative Distributed Computing", *Proceedings ISPDC 2013*.
- [14] Seda Davtyan, Kishori Konwar and Alexander Shvartsman, "Self-Stabilizing Resource Discovery Algorithm", *Proceedings of the 9th International Conference on Principles of Distributed Systems (OPODIS)*, pp 129-144, 2013.
- [14] Seda Davtyan, Kishori Konwar and Alexander Shvartsman, "Brief announcement: Self-Stabilizing Resource Discovery Algorithm", *Proceedings of the Principles of Distributed Computing (PODC)*, pp 116-118, 2013.

[15] Inna Rytsareva, Ananth Kalyanaraman, Kishori M Konwar and Steven J. Hallam, "Scalable heuristics for clustering biological graphs", Proceedings of ICCABS pp. 1-6, 2013.

[16] Seda Davtyan, Kishori Konwar and Alexander Shvartsman, "Dependable Decentralized Cooperation with the Help of Reliability Estimation", Proceedings of the 16th International Symposium on Stabilization, Safety, and Security of Distributed Systems (SSS 2014) pp 283-298.

[17] K.M.Konwar, S. Rajasekaran, A. A. Shvartsman, "Robust Network Supercomputing with Unreliable Processes", *Journal of Parallel and Distributed Computing* Oct 2014. (accepted)

[18] Seda Davtyan, Kishori M. Konwar, Alexander Russell, Alexander A. Shvartsman: Dealing with Undependable Workers in Decentralized Network Supercomputing, *Theoretical Computer Science*, 2014 (accepted)

Bioinformatics:

[1] K.M. Konwar, I.I. Mandoiu, A.C. Russell and A.A. Shvartsman, "Approximation algorithms for minimum PCR primer set selection with amplification length and uniqueness constraints", *ACM Computing Research Repository*, cs.DS/0406053 (2004).

[2] K.M. Konwar, I.I. Mandoiu, A.C. Russell and A.A. Shvartsman, "Improved Algorithms for Multiplex PCR Primer Set Selection with Amplification Length Constraints", *Proc. 3rd Asia-Pacific Bioinformatics Conference (APBC)*, pp. 41-50 (2005).

[3] B. DasGupta, K.M. Konwar, I.I. Mandoiu and A.A. Shvartsman, "Highly scalable algorithms for robust string barcoding", *Proc. 5th International Conference on Computational Science, part II*, pp 1020-1028 (2005).

[4] B. DasGupta, K.M. Konwar, I.I. Mandoiu and A.A. Shvartsman, "Highly scalable algorithms for robust string barcoding", *International Journal of Bioinformatics Research and Applications* 1, pp. 145-161 (2005).

[5] B. DasGupta, K.M. Konwar, I.I. Mandoiu and A.A. Shvartsman, "DNA-BAR: Distinguisher Selection for DNA Barcoding", *Bioinformatics*, 21(16), pp. 3424-3426 (2005).

[6] K.M. Konwar, I.I. Mandoiu, A.C. Russell and A.A. Shvartsman, "Improved Algorithms for Multiplex PCR Primer Set Selection with Amplification Length Constraints", *Bioinformatics Algorithms: Techniques and Applications*, Wiley, pp. 241-258, 2008.

[7] Jody J. Wright, Kishori M. Konwar and Steven J. Hallam, "Microbial ecology of expanding oxygen minimum zones", *Nature Reviews Microbiology* 10, 381-394 (June 2012).

[8] Kaston Leung, Hans Zahn, Timothy Leaver, Kishori M. Konwar, Niels W. Hanson, Antoine P. Pagé, Chien-Chi Log, Patrick S. Chain, Steven J. Hallam and Carl L. Hansen, "A programmable droplet-based microfluidic device applied to multiparameter analysis of single microbes and microbial communities", *Nat Acad Sci (PNAS)*, 109:18505-18510.

[9] E. Allers E, J.J.Wright, K.M.Konwar, C.G.Howes, E.Beneze, S.J.Hallam and M.B. Sullivan, "Diversity and population structure of Marine Group A bacteria in the Northeast subarctic Pacific Ocean", *ISME Journal* (2012).

[10] Kishori M. Konwar, Niels W. Hanson, Antoine P. Pagé, Steven J. Hallam: MetaPathways: a modular pipeline for constructing pathway/genome databases from environmental sequence information. *BMC Bioinformatics* 14: 202 (2013).

[11] W Evan Durno, Niels W Hanson, Kishori M Konwar and Steven J Hallam, "Expanding the boundaries of local similarity analysis, *BMC Genomics*, 2013, 14(Suppl 1):S3.

[12] N. W. Hanson, K.M. Konwar, S.-J. Wu and S.J. Hallam. Metapathways v2.0 : A master-worker model for environmental pathway/genome database construction on grids and clouds. In IEEE Conf. on Computational Intelligence in Bioinformatics and Computational Biology (CIBCB), Hawaii, 2014.

[13] Jody J Wright, Keith Mewis, Niels W Hanson, Kishori M Konwar, Kendra R Maas and Steven J Hallam, Genomic properties of Marine Group A bacteria indicate a role in the marine sulfur cycle, The ISME Journal (2014) 8, pp 455–468.

[14] Niels W Hanson, Kishori M Konwar, Alyse K Hawley, Tomer Altman, Peter D Karp and Steven J Hallam, Metabolic pathways for the whole community, BMC Genomics (accepted)

Statistical & Computational:

[1] S. Mitra, K.M. Konwar and S.K. Pal, “Fuzzy decision tree, linguistic rules and fuzzy knowledge-based network: generation and evaluation“. *IEEE Transactions on Systems, Man, and Cybernetics, Part C* 32(4): 328-339 (2002).

[2] Chunming Li, Chenyang Xu, Kishori M. Konwar, Martin D. Fox: Fast Distance Preserving Level Set Evolution for Medical Image Segmentation. ICARCV 2006: 1-7

[3] E.A. Alvarez, F. J. Ciocchini and K.M. Konwar, “A Stationary Markov Chain Model for Labor Dynamics”, *Journal of Data Science* 7(2008), 27-42

[4] Kishori M. Konwar, Lester Lipsky, Marwan S. Sleiman: Moments of Memory Access Time for Systems With Hierarchical Memories. *Computers and Their Applications* 2006: 103-109.

[5] Marwan S. Sleiman, Lester Lipsky, Kishori M. Konwar: Performance modeling of hierarchical memories. *CAINE* 2006: 54-59

[6] Kishori M. Konwar, Lester Lipsky, Marwan S. Sleiman, Analysis of Moments of Memory Access Time for Systems With Hierarchical Memories, *Journal of Computer Science and Electrical Engineering* (invited paper).

[7] Navanath Saharia and Kishori M Konwar, “LuitPad: A fully Unicode compatible Assamese writing”, *Proceedings of the Second Workshop on Advances in Text Input Methods (WTIM 2)*, 2012.

[8] Navanath Saharia, Kishori M. Konwar, Utpal Sharma, Jugal K. Kalita: An Improved Stemming Approach Using HMM for a Highly Inflectional Language. *Proceedings of CICLing (1)* 2013: 164-173.

REVIEW EXPERIENCE

[0] Parallel Computing

[1] PLOS One

[2] *Transactions on Computers* (Elsevier)

[3] *Journal of Parallel and Distributed Computing* (Elsevier)

[4] *Neurocomputing* (Elsevier)

[5] *Principles of Distributed Computing* (PODC 2014)

[6] *Information Sciences* (Elsevier)

[7] *Distributed Computing* (Elsevier)

[8] *Transactions on Parallel and Distributed Systems* (Elsevier)

[9] *Fuzzy Sets and Systems* (Elsevier)

[10] *IEEE Conference on Computational Intelligence in Bioinformatics and Computational Biology* (2014)

[11] *Principles of Distributed Computing* (PODC 2014)

[12] *AJSCA Journal*

[13] *Information Systems* (Elsevier)

[14] *Data Mining and Knowledge Discovery*

AWARDS

Taylor L. Booth Scholarship (for PhD in Computer Science), University of Connecticut.

Public Service Award from the Secretary of the State of Connecticut for work on the accuracy (statistical

and quantitative methods) and integrity of state's voting equipment.