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ACADEMIC & PROFESSIONAL POSITIONS

- 2007 – **Research Fellow, National Heart, Lung, and Blood Institute (NHLBI)**
National Institutes of Health (NIH), Bethesda, MD
- 2007 – 2007 **Research Fellow, National Center for Biotechnology Information (NCBI/NLM)**
National Institutes of Health (NIH), Bethesda, MD
- 2005 – 2007 **Research Associate, National Center for Biotechnology Information (NCBI/NLM)**
National Institutes of Health (NIH), Bethesda, MD
- 2004 – 2005 **Visiting Fellow, National Center for Biotechnology Information (NCBI/NLM)**
National Institutes of Health (NIH), Bethesda, MD
- 2003 – 2004 **Guest Lecturer, University of Texas at Dallas**
Department of Computer Science, Richardson, TX
- 2001 – 2004 **Research/Teaching Assistant, University of Texas at Dallas**
Department of Computer Science, Richardson, TX
- 2000 – 2001 **Software Engineer, Westwave Communications**
Richardson, TX
- 1998 – 1999 **Database Engineer, P'Four Software and Marketing Services**
Chennai, India

EDUCATION

- Ph.D.** Computer Science, University of Texas at Dallas, Richardson, TX, Aug 2001 – Aug 2004
- M.S.** Computer Science, University of Texas at Dallas, Richardson, TX, Jan 2000 – Dec 2000
- B.E.** Computer Science and Engineering, University of Madras, Chennai, India, Sep 1994 – Apr 1998

AWARDS, FELLOWSHIPS AND GRANTS

- 2007 – Research Fellowship, National Institutes of Health, National Heart, Lung, and Blood Institute
- 2007 Research Fellowship, National Institutes of Health, National Library of Medicine
- 2004 – 2007 Visiting Fellowship, National Institutes of Health, National Library of Medicine
- 2005 Travel Fellowship, International Society for Computational Biology (ISMB 2005)
- 2004 Travel Scholarship, European Association of Theoretical Computer Science (ICALP 2004)
- 2001 – 2004 Texas Public Educational Grant
- 2001 – 2004 University of Texas at Dallas Doctoral Scholarship
- 2003 Nominated for the Best Paper Award, PDCS
- 2003 IBM Student Travel Award (SODA 2003)
- 2003 DIMACS Travel Grant
- 2002 University of Texas at Dallas Engineering and Computer Science Special Fellowship

PROFESSIONAL SERVICES

Conference Vice Chair

- The IEEE International Conference on Bioinformatics and Biomedicine (BIBM), Philadelphia, CA, Nov 7-9, 2008.

Conference Technical Program Committee Member

- 15th Annual International Conference on Intelligent Systems for Molecular Biology (ISMB) & 6th European Conference on Computational Biology (ECCB), Vienna, Austria, Jul 21-25, 2007.
- The IEEE International Conference on Bioinformatics and Biomedicine (BIBM), Silicon Valley, CA, Nov 2-4, 2007.

Conference Session chair

- 7th INFORMS Telecommunications Conference, 2004.
- 3rd IEEE International Conference on Networking, 2004.
- 15th IASTED International Conference on Parallel and Distributed Computing and Systems, 2003.

Peer-Reviewer

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| Grants | National Institutes of Health (NIH), National Science Foundation (NSF), The Biotechnology and Biological Sciences Research Council (BBSRC) – UK |
| Journals | Nature Methods, Genome Research, Genome Biology, Trends in Genetics, Nucleic Acids Research, Proteins, Bioinformatics, BMC Bioinformatics, BMC Genomics, IEEE/ACM Transactions on Computational Biology and Bioinformatics, IEEE Transactions on NanoBioscience, Pattern Recognition Letters, Discrete and Computational Geometry, Networks, Journal of Graph Algorithms and Applications |
| Conference Proceedings | Pacific Symposium on Biocomputing (PSB) 2008, 15th Annual International Conference on Intelligent Systems for Molecular Biology (ISMB) & 6th European Conference on Computational Biology (ECCB) 2007, IEEE International Conference on Bioinformatics and Biomedicine (BIBM) 2007, Pacific Symposium on Biocomputing (PSB) 2007, 14th Annual International Conference on Intelligent Systems on Molecular Biology (ISMB) 2006, Pacific Symposium on Biocomputing (PSB) 2006, International Workshop on Bioinformatics Research and Applications (IWBRA) 2006, International Workshop on Approximation Algorithms for Combinatorial Optimization Problems (APPROX) 2006, IEEE INFOCOM 2004, International Conference on Communications (ICC) 2004, Annual Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS) 2003, Globecom 2003. |
| Member | International Society for Computational Biology (ISCB), Association for Computing Machinery (ACM) |

INVITED TALKS & PRESENTATIONS

- Jan 2008 **Rutgers University**, Camden, NJ - Regulatory proteins within a hierarchical framework have distinct dynamic properties.
- Aug 2007 **Department of Defense Biotechnology HPC Software Applications Institute (BHSI)**, Fort Detrick, Frederick, MD - Inferring protein and domain interactions using sequence co-evolution and combinatorial optimization approaches.

- May 2007 **National Institutes of Health** (NIH/NLM/NCBI), Bethesda, MD - Inferring molecular interactions using sequence co-evolution and co-inheritance: biases, strengths and weaknesses
- Apr 2007 **George Mason University**, Fairfax, VA – Co-evolution (correlated mutations) as an indicator of protein and domain interactions.
- Mar 2007 **Philips Research**, Briarcliff Manor, NY– Co-evolution as an indicator of protein and domain interactions.
- Feb 2007 **University of Connecticut**, Storrs, CT – Co-evolution as an indicator of protein and domain interactions.
- Dec 2006 **RECOMB Satellite Conferences on Systems Biology and Computational Proteomics**, San Diego, CA – Co-evolutionary analysis of domains in interacting proteins reveals insights into domain-domain interactions mediating protein-protein interactions.
- Oct 2006 **9th Annual Computational Genomics Conference**, Baltimore, MD – Co-evolutionary analysis of domains in interacting proteins reveals insights into domain-domain interactions mediating protein-protein interactions.
- Oct 2006 **National Institutes of Health Research Festival**, Bethesda, MD – Co-evolutionary analysis of domains in interacting proteins reveals insights into domain-domain interactions mediating protein-protein interactions.
- Sep 2005 **National Institutes of Health** (NIH/NLM/NCBI), Bethesda, MD - A new phylogenetic approach to delineate orthologous groups .
- Jun 2005 **International Conference on Intelligent Systems for Molecular Biology (ISMB)**, Detroit, MI –Predicting protein-protein interaction by searching evolutionary tree automorphism space.
- May 2005 **9th Annual International Conference on Research in Computational Molecular Biology**, Cambridge, MA – An Evolution-Based Clustering Method to Separate Orthologous Genes from Out-Paralogs.
- May 2005 **DIMACS Workshop on Biomolecular Networks: Topological Properties and Evolution**, Rutgers University, New Brunswick, NJ – An Evolution-Based Clustering Method to Separate Orthologous Genes from Out-Paralogs.
- Dec 2004 **University of Maryland**, College Park, MD – The effects of evolutionary tree topology on predicting protein interaction specificity.
- Dec 2004 **Georgetown University**, Washington D.C – The effects of evolutionary tree topology on predicting protein interaction specificity.
- Nov 2004 **7th Annual Conference on Computational Genomics**, Reston, VA – Protein Folding in Hydrophobic-Hydrophilic Model: How Good is Theory in Practice?
- Apr 2004 **National Institutes of Health (NIH)**, Bethesda, MD – Protein folding in the Hydrophobic-Hydrophilic Model.
- Mar 2004 **State University of New York (SUNY)**, Oneonta, NY – The traveling repairmen problem.
- Mar 2004 **Hobart and William Smith Colleges**, Geneva, NY – The traveling repairmen problem.
- Mar 2004 **Fayetteville State University**, Fayetteville, NC – The traveling repairmen problem.
- Mar 2004 **7th INFORMS Telecommunications Conference**, Boca Raton, FL – Survivable Network design: the capacitated minimum spanning network problem.
- Nov 2003 **International Conference on Parallel and Distributed Computing and Systems**, Marina del Rey, CA – Design of local access networks.
- May 2003 **DIMACS Workshop on Geometric Optimization**, Rutgers University, New Brunswick, NJ – Leave no stones unturned: improved approximation algorithms for degree-bounded minimum spanning trees.

- Apr 2003 **University of Maryland**, College Park, MD – Approximation algorithms for capacitated minimum spanning tree problem and its variants in network design.
- Jan 2003 **14th ACM-SIAM Symposium on Discrete Algorithms**, Baltimore, MD – A 5/4-approximation algorithm for minimum 2-edge-connectivity.

RESEARCH INTERESTS


My research interests are in the broad areas of Bioinformatics and Computational Biology. Specific areas of interest include protein-protein and domain-domain interactions, gene regulatory networks, epigenetic regulatory mechanisms, and epigenomics.

PUBLICATIONS (* indicates corresponding author, ¹ indicates joint first author)

Book Chapter

1. **R Jothi** and T Przytycka, Computational Approaches to Predict Protein-Protein and Domain-Domain Interactions, Bioinformatics Algorithms: Techniques and Applications, (Eds: Alexander Zelikovsky and Ion Mandoiu), Wiley, John & Sons, Feb (2008).

Articles in Peer-Reviewed Journals

2. TM Przytycka, **R Jothi**, L Aravind, and DJ Lipman, Comprehensive Analysis of Uniformity of Selective Pressure in Orthologous Proteins. Submitted to BMC Evolutionary Biology, to appear. (2008)
3. **R Jothi*** and B Raghavachari, Improved Approximation Algorithms for Single-Sink Buy-at-Bulk Network Design Problem. Submitted to Journal of Discrete Algorithms, to appear. (2008)
4. **R Jothi*** and B Raghavachari, Degree-Bounded Minimum Spanning Trees, Discrete Applied Mathematics, to appear. (2008)
5. B Raghavachari, A Tasneem, T Przytycka, and **R Jothi***, DOMINE: A Database of Protein Domain Interactions, Nucleic Acids Research, 36:D656-D661 (2008).
6. **R Jothi***, T Przytycka, and L Aravind, Discovering Functional Linkages and Uncharacterized Cellular Pathways Using Phylogenetic Profile Comparisons: A Comprehensive Assessment, BMC Bioinformatics, 8:173 (2007).
 - Biomed Central **Highly accessed** distinction
7. MG Kann, **R Jothi**, PF Cherukuri, and T Przytycka, Predicting Protein Domain Interactions from Co-evolution of Conserved Regions, Proteins, 67(4):811-820 (2007).
8. **R Jothi*** and B Raghavachari, Approximating the k-Traveling Repairmen Problem with Repair times, Journal of Discrete Algorithms, 5(2): 293-303 (2007).
9. K Guimares, **R Jothi**, E Zotenko, and T Przytycka, Predicting Domain-Domain Interactions Using a Parsimony Approach, Genome Biology, 7: R104 (2006).
 - Biomed Central **Highly accessed** distinction
10. **R Jothi***, PF Cherukuri, A Tasneem, and T Przytycka, Relative Co-evolution of Domains in Interacting Proteins Reveals Insights into Domain-Domain Interactions Mediating Protein-Protein Interactions, Journal of Molecular Biology, 362(4):861-875 (2006).
 - Recommended by  F1000 BIOLOGY
 - Ranked 12th on the ScienceDirect “Top25 Hottest Articles” for the period Jul-Sep 2006.

11. E Zotenko, K Guimares, **R Jothi**, and T Przytycka, Decomposition of Overlapping Protein Complexes: A Graph Theoretical Method for Analyzing Static and Dynamic Protein Associations, Algorithms for Molecular Biology, 1: 7 (2006).
12. **R Jothi***, E Zotenko, A Tasneem, and T Przytycka, COCO-CL: Hierarchical Clustering of Homology Relations Based on Evolutionary Correlations, Bioinformatics, 22(7), 779-788 (2006).
13. **R Jothi*** and B Raghavachari, Approximation Algorithms for the Capacitated Minimum Spanning Tree Problem and its Variants in Network Design, ACM Transactions on Algorithms, 1(2), 265-282 (2005).
14. **R Jothi**, MG Kann, and T Przytycka, Predicting Protein-Protein Interaction by Searching Evolutionary Tree Automorphism Space, Bioinformatics, 21 Suppl 1, i240-i250 (2005). *Acceptance rate: 13%*
15. C Gong, K Sarac, O Daescu, B Raghavachari, and **R Jothi**, Load Balanced Agent Activation for Value Added Network Services,” Computer Communications, 29(11), 1905-1916 (2005).
16. V Vokkarane, J Wang, **R Jothi**, X Qi, B Raghavachari and J Jue, Dual-Homing Protection in IP-over-WDM Networks, IEEE/OSA Journal of Lightwave Technology, Vol. 23 (10), 3111-24 (2005).
17. **R Jothi*** and B Raghavachari, Survivable Network Design: The Capacitated Minimum Spanning Network Problem, Information Processing Letters, 91(4), 183-190 (2004).
 - *Ranked 5th on the ScienceDirect “Top25 Hottest Articles” for the period Jul-Sep 2004.*

Articles Submitted or In Preparation (* indicates corresponding author, ¹ indicates joint first author)

18. **R Jothi**^{1*}, S. Balaji¹, A Wuster, J Grochow, J Gsponer, TM. Przytycka, L. Aravind, and MM. Babu*, Regulatory Proteins within a Hierarchical Framework Have Distinct Dynamic Properties.
19. **R Jothi**, S Cuddapah, A Barski, K Cui, and K Zhao, Genome-Wide Identification of in Vivo Protein-DNA Binding Sites From ChIP-Seq data.
20. A Barski¹, S Cuddapah¹, **R Jothi**¹, K Cui, TY Roh, DE Schones, Z Wang, G Wei, and K Zhao, mRNA and miRNA Genes Are Poised for Activation.
21. S Cuddapah¹, **R Jothi**¹, A Smith, DE Schones, TY Roh, K Cui, A Barski, MQ Zhang, and K Zhao, The Insulator Binding Protein Ctf Demarcates Active And Repressive Chromatin Domains.

Articles in Peer-Reviewed Conference Proceedings

22. E Zotenko, K Guimares, **R Jothi**, and TM Przytycka*, Decomposition of Overlapping Protein Complexes: A Graph Theoretical Method for Analyzing Static and Dynamic Protein Associations, Proceedings Annual RECOMB Satellite Workshop on Systems Biology and Regulatory Genomics , LNCS 4023, 23-28 (2005)
23. **R Jothi**, MG Kann, and TM Przytycka*, Predicting Protein-Protein Interaction by Searching Evolutionary Tree Automorphism Space, in Proceedings International Conference on Intelligent Systems on Molecular Biology, Suppl 1, i240-i250 (2005). *Acceptance rate: 13%*
24. **R Jothi*** and B Raghavachari, Degree-Bounded Minimum Spanning Trees, in Proceedings 16th Canadian Conference on Computational Geometry (CCCG), 192-195 (2004).
25. **R Jothi*** and B Raghavachari, Approximation Algorithms for the Capacitated Minimum Spanning Tree Problem and its Variants in Network Design, in Proceedings 31st International Colloquium on Automata, Languages and Programming (ICALP), Springer-Verlag LNCS 3142, 805-818 (2004). *Acceptance rate: 25%*

26. **R Jothi*** and B Raghavachari, Improved Approximation Algorithms for the Single-Sink Buy-at-Bulk Network Design Problems, in Proceedings 9th Scandinavian Workshop on Algorithm Theory (SWAT), Springer-Verlag LNCS 3111, 336-348 (2004). *Acceptance rate: 33%*
27. V Vokkarane, J Wang, **R Jothi**, X Qi, B Raghavachari and J Jue, Dynamic Dual-Homing Protection in WDM Mesh Networks, in Proceedings IEEE International Conference on Communications (ICC), Vol. 3, 1644-1648 (2004). *Acceptance rate: 29%*
28. **R Jothi*** and B Raghavachari, Minimum Latency Tours and the k-Traveling Repairmen Problem, in Proceedings Latin American Theoretical Informatics (LATIN), Springer-Verlag LNCS 2976, 423-433 (2004). *Acceptance rate: 33%*
29. O Daescu, **R Jothi**, B Raghavachari and K Sarac*, Optimal Placement of NAK-Suppressing Agents for Reliable Multicast: A Partial Deployment Case, in Proceedings 19th ACM Symposium on Applied Computing (SAC), 334-338, (2004). *Acceptance rate: 36%*
30. C Gong, O Daescu, **R Jothi**, B Raghavachari and K Sarac*, Load-Balancing for Reliable Multicast, in Proceedings 3rd IASTED International Conference on Communications, Internet, and Information Technology (CIIT), 86-91 (2004).
31. **R Jothi*** and B Raghavachari, Survivable Network Design: The Capacitated Minimum Spanning Network Problem, in Proceedings 7th INFORMS Telecommunications Conference, 50-52, 2004 (2004).
32. **R Jothi*** and V Vokkarane, Threshold-Based Differentiated Intermediate-Node Initiated (TDINI) Signaling for Optical Burst-Switched Networks, in Proceedings 7th INFORMS Telecommunications Conference (2004).
33. **R Jothi***, A Note on Altinkemer-Gavish's Algorithm for the Design of Tree Networks, in Proceedings 7th INFORMS Telecommunications Conference, 78-80 (2004).
34. K Deen, **R Jothi*** and B Raghavachari, Multi-Homing Protection in WDM Mesh Networks, in Proceedings 7th INFORMS Telecommunications Conference (2004).
35. **R Jothi*** and B Raghavachari, Revisiting Esau-Williams' Algorithm: On the Design of Local Access Networks, in Proceedings 7th INFORMS Telecommunications Conference, 104-107 (2004).
36. **R Jothi*** and B Raghavachari, Dynamic Capacitated Minimum Spanning Trees, in Proceedings 3rd IEEE International Conference on Networking (ICN), ISBN 0-86341-326-9 (2004).
37. **R Jothi*** and B Raghavachari, Placement of Proxy Servers to Support Server-Based Reliable Multicast, in Proceedings 3rd IEEE International Conference on Networking (ICN), ISBN 0-86341-326-9 (2004).
38. **R Jothi*** and B Raghavachari, Design of Local Access Networks, in Proceedings 15th IASTED International Conference on Parallel and Distributed Computing and Systems, 883-888. (2004).
39. **R Jothi***, B Raghavachari and S Varadarajan, A 5/4-Approximation Algorithm for Minimum 2-Edge-Connectivity, in Proceedings 14th ACM-SIAM Symposium on Discrete Algorithms (SODA), 725-734 (2003). *Acceptance rate: 27%*