

# SOHA HASSOUN

## Curriculum Vitae

Department of Computer Science  
Tufts University  
Medford, MA 02155

(617) 627-5177  
soha@cs.tufts.edu  
<http://www.cs.tufts.edu/~soha>

---

### Research Interests

**Bio Design Automation:** pathway synthesis, modularity analysis, and predictive modeling of biochemical networks

**Electronic Design Automation:** Tools and methods to enhance existing designs with new technologies including FinFETs, 3-D die integration

### Education

**University of Washington, Seattle, WA**

Ph.D., Computer Science and Engineering, 1997

**MIT, Cambridge, MA**

S.M., Electrical Engineering and Computer Science, 1988

**South Dakota State University, Brookings, SD**

B.S., Electrical Engineering, 1986

### Professional Experience

**Department of Computer Science, Tufts University**

Chair, September 2013- August 2016

Professor, September 2015 - Present

Associate Department Chair, September 2012-August 2013

Associate Professor, May 2004 – August 2015

Assistant Professor, January 1998 –May 2004

**Department of Electrical and Computer Engineering, Tufts University**

Adjunct Professor, September 2015 - Present

Adjunct Associate Professor, September 2002- August 2015

**Department of Chemical and Biological Engineering, Tufts University**

Adjunct Professor, September 2015

Adjunct Associate Professor, September 2014- August 2015

**Consultant**, Carbon Design Systems, Acton, MA January 2007-October 2008

**Visiting Researcher**, IBM Austin Research Labs, Austin, TX, January 2002-July 2002

**Consultant**, IKOS Systems (Now Mentor Graphics), Sept 1999-June 2001

**Research Assistant**, University of Washington, September, December 1997

Department of Computer Science and Engineering

**Senior Design Engineer**, Digital Equipment Corporation, August 1988-August 1991

Microprocessor Design Group

**Research and Teaching Assistant**, Massachusetts Institute of Technology, Cambridge, MA

Department of Electrical Engineering and Computer Science, September 1986 - May 1988

## Refereed Journal Articles

1. J. Marcus, S. Hassoun, N. Nair "Computational Prediction of Functional Abortive RNA in *E. coli*", *Genomics* (2017)
2. N. Hassanpour, E. Ullah, M. Yousofshahi, N. Nair, and S. Hassoun, "[Selection Finder \(SelFi\): A Computational Metabolic Engineering Tool to Enable Directed Evolution of Enzymes](#)", *Metabolic Engineering Communications* 4(2017):37-47
3. D. M. Dinh, B. Ramadas, D. Kattula; R. Sarkar, P. Braustein, A. Tai, C. A. Wanke, S. Hassoun, A. V. Kane, E. N. Naumova, G. Kang, H. D. Ward, "[Longitudinal Analysis Of The Intestinal Microbiota In Persistently Stunted Young Children In South India](#)", *PloS one* 11.5(2016):e0155405
4. E. Ullah, S. Aeron, and S. Hassoun, "[gEFM: An Algorithm for Computing Elementary Flux Modes Using Graph Traversal](#)", *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, 2016 Jan 1;13(1):122-34.
5. M. Yousofshahi, S. Manteiga, C. Wu, K. Lee and S. Hassoun, "[PROXIMAL: A Method for Prediction of Xenobiotic Metabolism](#)", *BMC Systems Biology*, 2015, 9:94, doi:10.1186/s12918-015-0241-4
6. E. Ullah, M. Walker, K. Lee, and S. Hassoun, "[PreProPath Algorithm: An Uncertainty-Aware Algorithm for Identifying Predictable Profitable Pathways in Biochemical Networks](#)", *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, 2015, vol.PP, no.99, pp.1,1 doi: 10.1109/TCBB.2015.2394470
7. B. Gaynor and S. Hassoun, "[Simulation Methodology and Evaluation of Through-Silicon Via \(TSV\)-FinFET Noise Coupling in 3-D Integrated Circuit](#)", *IEEE Transactions on Very Large Scale Integration (VLSI) Systems* 23.8 (2015): 1499-1507.
8. G. Sridharan, E. Ullah, S. Hassoun, and K. Lee, "[Discovery of Substrate Cycles in Large Scale Metabolic Networks Using Hierarchical Modularity](#)", *BMC Systems Biology* 9, no. 1 (2015): 5. doi:10.1186/s12918-015-0146-2
9. B. Gaynor and S. Hassoun, "[Fin Shape Impact on FinFET Leakage With Application to Multithreshold and Ultralow-Leakage FinFET Design](#)", *IEEE Transactions on Electron Devices*, 2014, PP:99, doi:10.1109/TED.2014.2331190
10. B. Gaynor and S. Hassoun, "[Parasitic Back-Gate Effect in 3-D Fully Depleted Silicon on Insulator Integrated Circuits](#)", *IEEE Transactions on Components, Packaging and Manufacturing Technology*, vol.4, no.1, pp.100--108, January 2014 doi: 10.1109/TCPMT.2013.2272401
11. M. Yousofshahi, E. Ullah, R. Stern and S. Hassoun, "[MC<sup>3</sup>: A Steady-State Model and Constraint Consistency Checker for Biochemical Networks](#)", *BMC Systems Biology*, 2013, 7:129 doi:10.1186/1752-0509-7-129
12. M. Yousofshahi, M. Orshansky, K. Lee, and S. Hassoun "[Probabilistic strain optimization under constraint uncertainty](#)", *BMC Systems Biology*, 2013, 7:29 doi:10.1186/1752-0509-7-29
13. N. Khan, S. Alam, and S. Hassoun, "[GND Plugs: A Superior Technology to Mitigate TSV-Induced Substrate Noise](#)", *IEEE Transactions on Components, Packaging and Manufacturing Technology*, vol.3, no.5, pp.849--857, May 2013 doi: 10.1109/TCPMT.2013.2241178
14. G. Sridharan, M. Yi, S. Hassoun, and Kyongbum Lee, "[Metabolic Flux-Based Modularity using Shortest Retroactive Distances](#)", *BMC Systems Biology*, 2012, 6:155 doi:10.1186/1752-0509-6-155
15. G. Sridharan, S. Hassoun, and K. Lee, "[Identification of Biochemical Network Modules based on Shortest Retroactive Distances](#)", *PLoS Computational Biology*, 2011, doi: 10.1371/journal.pcbi.1002262
16. N. Khan, S. Alam, and S. Hassoun, "[Power Delivery Design For 3-D ICs Using Different](#)

- [Through-Silicon Via \(TSV\) Technologies](#)", *IEEE Transactions on Very Large Scale Integration (VLSI) Systems*, vol. 19, no. 4, pp. 647-658, April, 2011, doi: 10.1109/TVLSI.2009.2038165
17. M. Yousofshahi, K. Lee, and S. Hassoun, "[Probabilistic Pathway Construction](#)", *Metabolic Engineering*, July 2011, 13 (4), pp. 435-444, doi:10.1016/j.ymben.2011.01.006
  18. B. Swahn and S. Hassoun, "[Electro-Thermal Analysis of Multi-Fin Devices](#)", *IEEE Transactions on Very Large Scale Integration (VLSI)*, vol. 16, no. 7, pp. 816--829, July 2008, doi: 10.1109/TVLSI.2008.2000455
  19. S. Hassoun, M. Kudlugi, C. Selvidge, and D. Pryor, "[A Transaction-Based Unified Architecture for Simulation and Emulation](#)", *IEEE Transactions on Very Large Scale Integration (VLSI) Systems*, vol. 13, no. 2, pp.278--287, February 2005, doi: 10.1109/TVLSI.2004.840763
  20. S. Hassoun and C. Alpert, "[Optimal Path Routing in Single- and Multiple-Clock Domain Systems](#)", *IEEE Transaction on Computer-Aided Design*, vol. 22, no. 11, pp. 1580-1588, October 2003, doi: 10.1109/TCAD.2003.818378
  21. S. Hassoun, C., Cromer, and E. Calvillo-Gamez, "[Static Timing Analysis For Level-Clocked Circuits In The Presence Of Crosstalk](#)", *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, vol. 22, no. 9, pp.1270--1277, September 2003, doi: 10.1109/TCAD.2003.816209
  22. D. Dobberpuhl, R. Witek, R. Allmon, R. Anglin, D. Bertucci, S. Britton, L. Chao, R. Conrad, D. Dever, B. Gieseke, S. Hassoun, G. Hoepfner, K. Kuchler, M. Ladd, B. Leary, L. Madden, E. McLellan, D. Meyer, J. Montanaro, D. Priore, V. Rajagopalan, S. Samudrala, S. Santhanam. "A 200 MHz 64-b Dual-Issue CMOS Microprocessor", ["A 200-Mhz 64-B Dual-Issue CMOS Microprocessor"](#), *IEEE Journal of Solid-State Circuits*, November 1992, Vol. 27, No. 11. Also appears in *Digital Technical Journal*, Vol. 4, No. 4, 1992

## Books and Book Chapters

23. B. Gaynor, N. Khan, and S. Hassoun (2016), "TSV-to-Device Noise Analysis and Mitigation Techniques", In A. Todri-Sanial and T. C. Seng (Eds.), "Physical Design for 3D Integrated Circuits", CRC Press Publisher.
24. N. Khan, S. Hassoun, "Designing TSVs for 3D Integrated Circuits", 1<sup>st</sup> edition, SpringerBriefs in Electrical and Computer Engineering, 2012.
25. S. Hassoun and T. Sasao, Editors, "Logic Synthesis and Verification", Kluwer Academic Publishers, 2002.
26. S. Hassoun and T. Villa (2002), "Optimization of Synchronous Circuits", In Hassoun and Sasao (Eds.), "Logic Synthesis and Verification", Kluwer Academic Publishers, pp. 225-253, 2002.

## Patents

27. B. Gaynor and S. Hassoun, "Integrated Circuit with Multi-Threshold Bulk FinFETs", provisional filed in March 2014
28. N. Khan, S. Hassoun, and S. Alam, "Method to Mitigate Through-Silicon Via-Induced Substrate Noise", PCT/US2012/029003, September 20, 2012
29. S. Hassoun and B. Swahn, "Circuit Having Hardware Threading", U.S. Patent 7797647, September 14, 2010

30. C. Selvidge, K. Crouch, M. Kudluga, and S. Hassoun, "Non-Synchronized Multiplex Data Transport across Synchronous Systems", U.S. patent 6,961,691, November 1, 2005
31. C. Alpert and S. Hassoun, "Optimal Buffered Routing Path Constructions for Single and Multiple Clock Domain Systems", U.S. Patent 6,915,361, July 5, 2005
32. S. Hassoun and D. Sanders, "Method and Apparatus for Parity Generation", U.S. Patent 5557622, September 17, 1996

### **Refereed Publications with Length Greater Than 5 Pages In Top-Tier Conferences With Acceptance Rates 20%-30%**

33. E. Ullah, C. Hopkins, S. Aeron, and S. Hassoun, "Decomposing Biochemical Networks Into Elementary Flux Modes Using Graph Traversal", *Proceedings of the International Conference on Bioinformatics, Computational Biology and Biomedical Informatics (ACM-BCB)*, Washington, DC, September 2013.
34. N. Khan, and S. Hassoun, "[The Feasibility of Carbon Nanotubes for Power Delivery in 3-D Integrated Circuits](#)", *Asia-Pacific Design Automation Conference (ASP-DAC)*, Sydney, Australia, January 2012.
35. S. Hassoun, "[Genetic/Bio Design Automation for \(Re-\)engineering Biological Systems](#)", *Design and Test in Europe (DATE)*, Munich, Germany, March 2012.
36. E. Ullah, K. Lee, and S. Hassoun, "[An Algorithm For Identifying Dominant-Edge Metabolic Pathways](#)", *IEEE/ACM International Conference on Computer-Aided Design (ICCAD)*, San Jose, CA, November 2009
37. B. Swahn and S. Hassoun, "[Gate Sizing - FinFETs vs 32nm Bulk MOSFETs](#)", *IEEE/ACM Design Automation Conference (DAC)*, San Francisco, CA, July 2006
38. B. Swahn and S. Hassoun, "[Hardware Scheduling for Dynamic Adaptability Using External Profiling and Hardware Threading](#)", *IEEE/ACM International Conference on Computer-Aided Design (ICCAD)*, San Jose, CA, November 2003
39. S. Hassoun, C. Alpert, and M. Thiagarajan, "[Optimal Buffered Routing Path Constructions For Single And Multiple Clock Domain Systems](#)", *IEEE/ACM International Conference on Computer Aided Design (ICCAD)*, San Jose, CA, November 2002
40. S. Hassoun, C., Cromer, and E. Calvillo-Gamez, "[Verifying Clock Schedules in the Presence of Cross Talk](#)", *Design, Automation and Test in Europe Conference (DATE)*, Paris, France, March 2002.
41. M. Kudluga, S. Hassoun, C. Selvidge, and D. Pryor, "[A Transaction-Based Unified Simulation/Emulation Architecture For Functional Verification](#)", *IEEE/ACM Design Automation Conference (DAC)*, Las Vegas, NV, June 2001
42. S. Hassoun, "[Critical Path Analysis Using A Dynamically Bounded Delay Model](#)", *IEEE/ACM Design Automation Conference (DAC)*, Los Angeles, CA, June 2000
43. S. Hassoun, and C. McCreary, "[Regularity Extraction Via Clan-Based Structural Circuit Decomposition](#)", *IEEE/ACM International Conference on Computer-Aided Design (ICCAD)*, pp. 414-419, November 1999
44. S. Hassoun and C. Ebeling, "[Using Precomputation In Architecture And Logic Resynthesis](#)", *International Conference on Computer-Aided Design (ICCAD)*, San Jose, CA, November 1998
45. S. Hassoun and C. Ebeling, "[Architectural Retiming - Pipelining Latency-Constrained](#)

- [Circuits](#)", *IEEE/ACM Design Automation Conference (DAC)*, Las Vegas, NV, June 1996
46. R. Allmon, B. Benschneider, M. Callander, L. Chao, D. Dever, J. Farrell, N. Fitzgerald, J. Grodstein, Soha Hassoun, L. Hudepohl, D. Kravitz, J. Lundberg, R. Marcello, S. Marino, J. Pickholtz, R. Preston, M. Richesson, S. Samudrala, and D. Sanders, "[System, Process, And Design Implications Of A Reduced Supply Voltage Microprocessor](#)", *IEEE International Solid-State Circuits Conference (ISSCC)*, San Francisco, CA, February 1990
  47. W. Dally, L. Chao, A. Chien, S. Hassoun, W. Horwat, J. Kaplan, P. Song, B. Totty, and S. Wills, "[Architecture Of A Message-Driven Processor](#)", *International Symposium on Computer Architecture (ISCA)*, Pittsburgh, PA, June 1987 (A re-write of this article appears in the Best of ISCA 2000)

### **Refereed Proceedings of Other Conferences, including Specialized Conferences**

48. N. Khan, S. Alam, and S. Hassoun, "[Mitigating TSV-induced Substrate Noise in 3-D ICs using GND Plugs](#)", *International Symposium on Quality Electronic Design (ISQED)*, Santa Clara, CA, March 2011
49. N. Khan, S. Reda, and S. Hassoun, "[Early Estimation Of TSV Area For Power Delivery In 3-D Integrated Circuits](#)", *IEEE International Conference on 3D System Integration (3DIC)*, Munich, Germany, November 2010
50. N. Khan, S. Alam, and S. Hassoun, "[System-Level Comparison Of Power Delivery Design For 2D And 3D ICs](#)", *IEEE International Conference on 3D System Integration (3DIC)*, San Francisco, CA, September 2009
51. N. Khan, S. Alam, and S. Hassoun, "[Through-Silicon Via \(TSV\)-Induced Noise Characterization And Noise Mitigation Using Coaxial TSVs](#)", *IEEE International Conference on 3D System Integration (3DIC)*, San Francisco, CA, September 2009
52. B. Swahn and S. Hassoun, "[METS - A Metric For Electro-Thermal Sensitivity, And Its Application To FinFETs](#)", *International Symposium on Quality Electronic Design (ISQED)*, Santa Clara, March 2006
53. S. Hassoun, "[Optimal Use Of 2-Phase Transparent Latches In Buffered Maze Routing](#)", *International Symposium on Circuits and Systems (ISCAS)*, Bangkok Thailand, May 2003
54. S. Hassoun, "[Fine Grain Incremental Rescheduling Via Architectural Retiming](#)", *International Symposium on System Synthesis (ISSS)*, Hsinchu, Taiwan, December, 1998
55. E. Ullah, K. Lee, and S. Hassoun, "An Algorithm for Identifying Dominant-Edge Metabolic Pathways", *International Workshop on Logic and Synthesis*, Berkeley, CA, July 2009
56. J. Rieffel, H. Zhou, F. Saunders, S. Hassoun, B. Trimmer, S. Nadimpalli, and J. Rife, "Evolving Soft Robotic Locomotion in PhysX", *Workshop on Computational Intelligence on Consumer Games and Graphics Hardware*, Montréal, Québec, Canada, July 2009
57. F. Aloul, S. Hassoun, K. Sakallah, and D. Blaauw, "[Robust SAT-Based Search Algorithm For Leakage Power Reduction](#)", *International Workshop on Power and Timing Modeling, Optimization and Simulation (PATMOS)*, Spain, 2002.
58. K. Bolding, S.-C. Cheung, S.-E. Choi, C. Ebeling, S. Hassoun, T. Ngo, and R. Wille, "The Chaos Router Chip: Design and Implementation of an Adaptive Router", *International Conference on Very Large Scale Integration (VLSI)*, Grenoble, France, 7, September 1994

### **Invited Refereed Articles**

59. D. Densmore and S. Hassoun, "[Design Automation for Synthetic Biological Systems](#)", *IEEE Design & Test of Computers*, Volume:29 , Issue: 3, May/June 2012.

### **Lightly Refereed Workshops and Symposia (Article Length 4-8 pages)**

60. S. Hassoun and C. Ebeling, "Experiments in the Iterative Application of Resynthesis and Retiming", *International Workshop on Timing Issues in the Specification and Synthesis of Digital Systems (TAU)*, Seattle, WA, December 1997
61. S. Hassoun and C. Ebeling, "Sequential Circuit Optimization Using Precomputation", *International Workshop on Logic Synthesis*, Granlibakken, CA, May 1997
62. S. Hassoun and C. Ebeling, "Architectural Retiming: An Overview", *International Workshop on Timing Issues in the Specification and Synthesis of Digital Systems (TAU)*, Seattle, WA, November 1995
63. S. Hassoun and G. Borriello, "Improving Finite State Assignment for Two-Level Programmable Logic Devices", *International Workshop on Logic Synthesis (IWLS)*, Granlibakken, CA, May 1993.

### **Lightly Refereed Short Abstracts (Article Length Two or Fewer Pages)**

64. S. Hassoun, N. Alden, K. Lee, K. V. Porokhin, J. Colebrook-Soucie, E. Cokova, "A Widget-Based Data-Analytic Metabolomics Pipeline", *Metabolic Engineering Conference*, Japan, June 2016
65. S. Amin, V. Endalur Gopinarayanan, N. Nair, S. Hassoun, "Enhancing Pathway Synthesis Using Genetic Information", *Computational Aspects of Biological Information*, Cambridge, MA, November, 2016
66. N. Hassanpour, N. Alden, K. Lee, S. Hassoun, "Using Putative Metabolic Biotransformations to Annotate Mass Spectral Data", *Computational Aspects of Biological Information*, Cambridge, MA, November, 2016
67. S. Amin, V. Endalur Gopinarayanan, N. Nair, S. Hassoun, "Enhancing Pathway Synthesis Using Genetic Information", *American Institute of Chemical Engineers (AIChE) Annual Meeting*, San Francisco, CA, October 2016
68. J. Marcus, B. Nascimento, S. Hassoun, N. Nair, "Discovery and Design of Novel Regulatory Noncoding RNA in Bacteria", *American Chemical Society Meeting*, San Diego, CA, March 2016
69. N. Hassanpour, E. Ullah, M. Yousofshahi, S. Hassoun, N. Nair, "SelFi: Selection Finder for the directed evolution of enzymes", *American Chemical Society Meeting*, San Diego, CA, March 2016
70. J. Marcus, S. Hassoun, and N. Nair, "Mining for Novel Regulatory Noncoding RNA in Bacteria", *Synthetic Biology, Engineering, Evolution and Design (SEED)*, Boston, June 2015
71. S. Amr Amin, M. Yousofshahi, and S. Hassoun, "Considering Dynamic Constraints During Strain Optimization", *Synthetic Biology, Engineering, Evolution and Design (SEED)*, Boston, June 2015
72. N. Hassanpour, E. Ullah, M. Yousofshahi, N. Nair, and S. Hassoun, "Enabling Selection in Directed Evolution of Enzymes via Cellular Engineering", *Synthetic Biology, Engineering, Evolution and Design (SEED)*, Boston, June 2015
73. N. Hassanpour, B. Gaynor, M. Yousofshahi, N. Nair, and S. Hassoun, "Automated Selection

- Finder (ASF) For Directed Evolution”, International Workshop on Bio Design Automation, Boston, MA, June 2014
74. E. Ullah, S. Aeron, and S. Hassoun, “Using the Method of Types to Improve Adjacency Testing for Elementary Flux Mode Computation”, International Workshop on Bio Design Automation, Boston, MA, June 2014
  75. S. Amr Amin, M. Yousofshahi, and S. Hassoun, “Optimizing Product Yield Through Identifying Gene Expression Fold Changes”, International Workshop on Bio Design Automation, Boston, MA, June 2014
  76. N. Hassanpour, B. Gaynor, M. Yousofshahi, N. Nair, and S. Hassoun, “Automated Selection Finder (ASF) for Dominant Positive Enzyme Phenotypes”, *Boston Bacterial Meeting*, Boston, MA, June 2014
  77. G. Sridharan, E. Ullah, S. Hassoun, and K. Lee, “Using Hierarchical Modularity to Identify Substrate Cycles in Metabolic Networks”, *American Institute of Chemical Engineers (AIChE) Annual Meeting*, San Francisco, CA, October 2013
  78. M. Yousofshahi, K. Lee, and S. Hassoun, “Characterizing and Predicting Xenobiotic Transformations Through Human and Bacterial CYPs”, *American Institute of Chemical Engineers (AIChE) Annual Meeting*, San Francisco, CA, October 2013
  79. E. Ullah, C. Hopkins, S. Aeron, and S. Hassoun, “Computing Elementary Flux Modes Using a Graph-Based Approach”, *American Institute of Chemical Engineers (AIChE) Annual Meeting*, San Francisco, CA, October 2013
  80. C. Hopkins and S. Hassoun, “Abstraction of Kinetic Models (AKM) Using Function and Parameter Co-Estimation Exploration”, *American Institute of Chemical Engineers (AIChE) Annual Meeting*, San Francisco, CA, October 2013
  81. C. Hopkins and S. Hassoun, “Deriving Reduced Kinetic Models for Biological Modules”, *The First Workshop on Modeling of Biological Systems (MoBS'13)*, Austin, TX, June 2013
  82. E. Ullah, M. Yousofshahi, R. Stern, and S. Hassoun, “MC<sup>3</sup>: A Tool for Model and Constraint Consistency Checking of Stoichiometric Biochemical Network Models”, *American Institute of Chemical Engineers (AIChE) Annual Meeting*, Pittsburgh, PA, October 2012
  83. M. Yousofshahi, M. Orshansky, K. Lee, and S. Hassoun, “Chance-constraint Optimization for Gene Modifications”, *International Workshop On Bio Design Automation*, San Francisco, CA, June 2012
  84. M. Yousofshahi, M. Orshansky, K. Lee, and S. Hassoun, “Robust Selection of Gene Modifications”, *American Institute of Chemical Engineers (AIChE) Annual Meeting*, Minneapolis, MN, October 2011
  85. G. Sridharan, S. Hassoun, and K. Lee, “SHREDing a Biochemical Network Into Hierarchical Modules”, *American Institute of Chemical Engineers (AIChE) Annual Meeting*, Minneapolis, MN, October 2011
  86. G. Sridharan, D. Weaver, S. Hassoun, and K. Lee, “ShReD: A Novel Metric for Determining Reciprocal Interactions Between Biochemical Network Components”, *American Institute of Chemical Engineers (AIChE) Annual Meeting*, Salt Lake City, UT, November 2010
  87. M. Yousofshahi, K. Lee, and S. Hassoun, “Pathway Identification for Strain Engineering”, *International Workshop on Bio Design Automation*, Anaheim, CA, June 2010
  88. E. Ullah, K. Lee, and S. Hassoun, “Predictably Profitable Paths in Metabolic Networks”, *International Workshop on Bio Design Automation*, Anaheim, CA, June 2010

89. E. Ullah, K. Lee, and S. Hassoun, "A Weighted Graph Algorithm for Identifying Dominant Metabolic Pathways", *American Institute of Chemical Engineers (AIChE) Annual Meeting*, Nashville, TN, 2009
90. E. Ullah, K. Lee, and S. Hassoun, "DOMINANT-EDGE PATHWAY: A Weighted Graph Algorithm for Identifying Dominant Metabolic Pathways", *International Workshop on Bio Design Automation*, San Francisco, CA, July 2009

## Other

91. S. Hassoun and G. Janssen, "[First CADathlon Programming Contest Held at 2002 ICCAD](#)", *IEEE Design and Test of Computers*, pp. 104-107, May-June, 2003
92. S. Hassoun and S. Bana, "[Practices For Recruiting And Retaining Graduate Women Students In Computer Science And Engineering](#)", *International Conference on Microelectronic Systems Education*, 2001
93. S. Hassoun, "A Memory Design for the Message-Driven Processor", MIT VLSI Memo No. 88-564, August, 1988

## Grants for Design Automation for Metabolic Engineering Related Research

1. NIH R03, \$147,569 (Hassoun's portion: \$73,784), Co-PI with Kyongbum Lee (Tufts), "A Machine-Learning Based Software Widget for Resolving Metabolite Identities", 9/15/2016-8/31/2017
2. Tufts Institute for Innovation, \$88,662, Co-PI with Jimmy Crott (PI), Kyongbum Lee, Anne Kane, Qiaobing Xu, Lakshmanan Iyer, Paula-Dene Nesbeth, "Suppression of obesity-induced inflammation and colorectal cancer through the administration of adenosine and Parabacteroides distasonis", 5/2015-5/2016
3. NSF, \$300,000, Principal Investigator: Soha Hassoun, "SHF: Small: Design Tools and their Experimental Validation for Synthetic Biological Systems", 08/2014-07/2017
4. Tufts Collaborates Program, \$20,000, Co-PI with Nikil Nair (Tufts), "Predicting and Validating Host-Pathway Compatibility for Synthetic Biology Applications", 07/2014-06/2015
5. NSF, \$300,000 (Hassoun's portion: \$131,295), Co-PI with Kyongbum Lee (Tufts) and Arul Jayaraman (Texas A&M), "Collaborative Research: Identification of Immunomodulatory Microbiota Metabolites", 06/2014-06/2016
6. NIH R21, \$190,981 (Hassoun's portion: \$40,482), Co-PI with Kyongbum Lee (Tufts) and Arul Jayaraman (Texas A&M), "Computational Metabolomics of Gut Microbiota Metabolites", 04/2014-04/2016
7. NSF, \$874,000, Principal Investigator: Soha Hassoun, "Multi-Resolution Partitioning and Kinetic Function Estimation for Dynamic Biochemical Network Model Development", 09/2008-05/2013

## Grants for Electronic Design Automation Related Research

8. PTC, \$50,000, Principal Investigator: Soha Hassoun, in support of advancing research and education of the Internet of Things at Tufts, 05/2016-08/2016
9. DARPA, subcontract through JPL, \$75,000, Principal Investigator: Soha Hassoun, "Analysis and Mitigation of TSV-induced Substrate Noise in 3D Integrated Circuits", 04/2011-04/2012
10. Altera Corp., \$25,000, Principal Investigator: Soha Hassoun, in support of FinFET research at Tufts, 03/2005



11. NSF, \$ 165,578, Principal Investigator: Soha Hassoun, "Tools for Double-Gate FETs", 08/2004-07/2006
12. NSF-REU, \$12,500, Principal Investigator: Soha Hassoun, "REU Supplement", 06/2003-05/2004
13. NSF-CAREER, \$310,000, Principal Investigator: Soha Hassoun, "Tools for Designing and Integrating Configurable Components", 02/2001-01/2006
14. DAC Design Automation Scholarship, \$24,000, Principal Investigator: Soha Hassoun, "Verification for Deep Submicron Designs", 06/2000-05/2001
15. NSF-POWRE, \$75,000, Principal Investigator: Soha Hassoun, "Functional and Physical Co-Analysis in Timing Verification", 09/1999-02/2001
16. DAC Design Automation Scholarship, \$24,000, Principal Investigator: Soha Hassoun, "Microarchitectural Optimizations and Synthesis", 06/1998-05/1999

### Grants for Course Development and Other

17. Mathworks, \$40,000, Principal Investigator: Soha Hassoun, in support of developing ES93: Computational Modeling and Design, 05/2014
18. NSF, \$12,000, Co-PI with Sanjukta Bhanja (PI), Irene Calizo, Valencia Koomson, and Ian Harris, "Workshop on Fostering Diversity in the Design Automation for Emerging Computing Community", 05/2014
19. Tufts School of Engineering, \$14,776, Principal Investigator: Soha Hassoun, "Curriculum Innovation Project Introduction to Computational Design", 06/2012-12/2012
20. Tufts Innovates Program, \$31,265, Principal Investigator: Soha Hassoun, "Engaging Students and Faculty in GPU (Graphics Processing Units) Programming for Scientific Applications at Tufts", 07/2012-05/2013
21. CRA-W, \$15,500, Principal Investigator: Soha Hassoun, "Modeling Neuro-Mechanical Control in Soft-Tissue Organism", 08/08-07/09
22. NSF, \$385,000, Co-PI with Tufts faculty D. Souvaine, L. Baise, C. Cao, and M. Kilmer, "Tufts CSEMS-Scholars Program", 01/2002-01/2006

### Supervised Ph.D. Thesis

1. Seyed Ramtin Hosseini (Computer Science) – TBD, expected May 2022
2. X. Li (Computer Science) – Co-advised with James Van Deventer) – *Tools to Advance Antibody Design*, expected May 2021
3. B. Heydarshahi (Computer Science) – (Co-advised with Mark Hempstead) – *Design Space Exploration for Mobile Applications*, expected May 2020
4. S. Amin Amr (Computer Science) – (Co-advised with Nikil Nair) – *Design Tools for Synthetic Biological Systems*, expected May 2018
5. N. Hassanpour (Computer Science) – (Co-advised with Nikil Nair) – *Computational Tools for Directed Evolution of Enzymes*, expected May 2018
6. M. Yousofshahi (Computer Science) - (Co-advised with Kyongbum Lee) - *Computational Methods for Pathway Synthesis and Strain Optimization*, December 2014, Think Surgical
7. Ehsan Ullah (Computer Science) - (Co-advised with Kyongbum Lee) - *Pathway Analysis of Metabolic Networks Using Graph Theoretical Approaches*, August 2014, Postdoctoral Research Fellow at Qatar Computing Research Institute
8. Brad Gaynor (Electrical and Computer Engineering) - *Simulation of FinFET Electrical Performance Dependence on Fin Shape and TSV and Back-Gate Noise Coupling in 3-D Integrated Circuits*, May 2014, Founder and CTO at Lexumo

9. Gautham Sridharan (Chemical and Biological Engineering) (Co-advised with Kyongbum Lee) - *Modularity Analysis of Metabolic Networks Based on Shortest Retroactive Distances (ShReD)*, May 2013, Bioinformatics Scientist at Alnylam Pharmaceuticals
10. Nauman Khan (Computer Science), *Noise Analysis and Power Grids for 3D ICs*, August 2011, Intel.
11. Brian Swahn (Electrical and Computer Engineering), *CAD for FinFETs*, August 2006, Analog Devices.

### Supervised BS Honors Thesis

- Jeremy Markus (co-advised with Nik Nair), Computational Prediction of Functional Abortive RNA in *E. coli*, 2016
- Calvin Hopkins, Abstraction of Kinetic Models (AKM) Using Function-Parameter Co-Estimation, 2012

### Technical Presentations

1. TUTORIAL: “Data-Driven Analysis of Untargeted Metabolomics Datasets”, ACM Conference on Bioinformatics, Computational Biology and Biomedical Informatics (ACM BCB), Seattle, WA, October, 2016
2. “Using Machine Learning to Interpret Untargeted Metabolomics in the Context of Biological Samples”, AI for Synthetic Biology at the International Joint Conference on Artificial Intelligence, New York City, NY, July, 2016
3. “Computational Modeling and Design For Engineering (and Beyond)”, Jumbo Days, Tufts, Medford, MA, April, 2016
4. “A Computational Perspective: Can We (Re-)Engineer Biology?”, Parent’s weekend, Tufts, Medford, MA, October, 2015
5. “Why Engineering Biology is \*Slightly\* More Challenging than Designing Electronics” given at:
  - Department of Computer Science, Boston University, Boston, MA, May 2014
  - Department of Chemical and Biological Engineering, Tufts, Medford, MA, April 2014
  - IEEE VLSI Test Symposium, Berkeley, CA, May 2013
6. “Abstraction of Kinetic Models (AKM) Using Function and Parameter Co-Estimation Exploration”, *American Institute of Chemical Engineers (AIChE) Annual Meeting*, San Francisco, CA, October 2013
7. TUTORIAL: “GPU Programming for Bioinformatics Applications”, ACM Conference on Bioinformatics, Computational Biology and Biomedical Informatics (ACM BCB), Bethesda, Washington DC, September 2013
8. “Gene Modification Identification under Flux Capacity Uncertainty”, IEEE/ACM Design Automation Conference (DAC), Austin, TX, June 2013
9. “Computational Modeling & Design”, given at:
  - Soft materials robotics IGERT boot camp, Medford, MA, August 2013
  - Tufts Engineering Open House, Medford, MA, March 2012
  - Roxbury Community College, Roxbury Crossing, MA, April 2012
10. “The Feasibility of Carbon Nanotubes for Power Delivery in 3-D Integrated Circuits”, Asia-Pacific Design Automation Conference (ASP-DAC), Sydney, Australia, January 2012

11. "TSV-Induced Noise in 3-D Stacked ICs", given at:
  - MIT Lincoln Lab, Lexington, MA, October 2011
  - Intel, Hudson, MA, April 2011
12. "Robust Selection of Gene Modifications", *American Institute of Chemical Engineers (AIChE) Annual Meeting*, Minneapolis, MN, October, 2011
13. "FinFETs: Thermal Modeling, Analysis, and Circuit Design", given at:
  - CRA-W Distinguished Lecture Series, University of Virginia, VA, October 2007
  - Distinguished Lecture Series, Northeastern University, Boston, MA, October 2007
  - University of Toronto, Toronto, Canada, January 2006
  - Altera Corp., Toronto, Canada, January 2006
  - University of Michigan, Ann Arbor, February 2006
  - IBM Research Labs, Austin, TX, October 2006
14. "Optimal Route Construction", given at:
  - University of Massachusetts, Amherst, MA, October, 2003
  - Harvard University, Cambridge, MA, November 2003
  - Tufts CS seminar, Medford, MA, October 2003
  - Cadence Berkeley Labs, Berkeley, CA, August, 2003
  - Intel, Hillsboro, OR, August, 2003
15. "Let's Re-sort the Phone Book and Other Topics in Computer Science", first year student orientation at Tufts, Medford, MA, September, 2003
16. "Architectural Retiming", given at:
  - MIT Lincoln Lab, Lexington, MA, March 1997
  - Tufts University, Department of Electrical and Computer Engineering, Medford, MA, April 1997
  - Synopsys, Mountain View, CA, March 1998
  - Intel, Hillsboro, OR, February 1998

### **Mentoring/Outreach Presentations**

- *Invited Speaker*, "Networking", CRA-W Graduate Cohort Workshop, 2017
- *Invited Speaker*, "Publishing your Research", CRA-W Graduate Cohort Workshop, 2017
- *Invited Speaker*, "Women in STEM" panel, Tufts, 2016
- *Invited Speaker*, "Building your Professional Network", *Grace Hopper Celebration for Women in Computing*, 2016
- *Invited Speaker*, "Balancing Graduate School and Personal Life", CRA-W Graduate Cohort Workshop, 2016
- *Invited Speaker*, "NSF CAREER Award Panel Discussion", Tufts, 2016
- *Invited Speaker*, "Mentors and Advisors", CRA-W Graduate Cohort Workshop, 2011
- *Invited Speaker*, "Transitioning to Graduate School", CRA-W Graduate Cohort Workshop, 2009
- *Invited Speaker*, "Fundamentals of Writing Winning Proposals", Young Faculty Workshop at DAC, San Francisco, 2009
- *Invited Speaker*, "Traveling through a Technical Meeting", CRA-W Graduate Cohort Workshop, 2006
- *Invited Panelist*, "Working the 80/20 Rule for Success -- Focusing in on What Matters", Annual Workshop for Women in Design Automation, DAC 2006
- *Invited Panelist*, "Future Leaders and Ideal Hires", a panel at the International Conference on Microelectronic Systems Education, June 2001
- *Invited Speaker*, "Department and Grassroots: Improving Graduate School Environment for Female Students", CRA Snowbird Conference, July 1998

## Professional Service

### Most Impactful Service Summary, 2016

PhD Forum at DAC (Founded: 1997, Overseer: 1997-2002, 19<sup>th</sup> year, 100+ annual submissions, 300-500 attendees), Design Automation Summer School (Founded 2001, overseer in 2001, 2005, and 2007, 6<sup>th</sup> iteration, 40+ annual students), CADathlon (Founded 2003, Overseer 2003-2007, 16<sup>th</sup> year, 15+ annual teams), Designer/User Track at DAC (8<sup>th</sup> year, 15+ presentations, 300+ annual attendees), Work in Progress session at DAC (Founded: 2012, 4<sup>th</sup> year, 80+ presentations, 400+ annual attendees), Workshop on Bio Design Automation (8<sup>th</sup> year, 75+ annual attendees)

### Departmental Committees and Special Activities

- *Chair*, Department of Computer Science, 09/2013-08/2016
- *Co-Founder and Contact Person*, Tufts Young CS Alum group, 08/2013-08/2016
- *Associate Chair*, Department of Computer Science, 09/2012-05/2013
- *Member*, search committee for Bridge Professorship in Cognitive Science, 2014-2015
- *Graduate Program Director*, 2005-2006, and member of the graduate committee 2001-2007
- *Faculty search committee*, 2003-2004, 2004-2005, 2008-2009
- *Undergraduate Committee Chair*, 2008-2009
- *Organizer*, CS department seminars, Fall 2013; EECS department seminars, Fall 2000, Spring 2001, Fall 2001
- *Member*, Computer Engineering Curriculum Committee, EECS department, 1999-2001

### College and University Committee Appointments

- *Steering Committee Member*, MA in Digital Tools for Pre-Modern Studies Program at Tufts, 2015-2016
- *Chair*, Research Day on Data Science, May 2014
- *Member*, Council on Diversity at Tufts, 09/2012-12/2013
- *Fellow*, Tisch College of Citizenship and Public Service, 2010-2011
- *Member*, Faculty Research Award Committee, 09/2009-05/2013
- *Fellow*, Tufts Center for the Enhancement of Learning and Teaching (CELT), 2009-2010
- *Member*, Campus Planning and Development Committee (CPDC), 09/2001- 05/2005
- *Member*, Equal Educational Opportunity Committee (EEOC), 09/2001- 05/2004
- *Attendee*, Critical Thinking Faculty Workshop at Tufts, May, 5/1999
- *Attendee*, Faculty Workshop on Teaching Diverse Student Populations, 5/1998

### Inter-university Appointments

Ph.D. Thesis referee for Valentina Ciriani, “Three-level Logic Synthesis”, University of Pisa, Italy, Fall, 2002.

### Professional Executive Leadership Roles

- *Board Member*, Computer Research Association Council on Women (CRA-W), 2016-
- *Chair*, Design Automation Conference (DAC), the premier conference in Design Automation with an annual budget of over \$2.5M and over 100 volunteers, 2014
- *Vice Chair*, Design Automation Conference (DAC), 2013
- *Member*, Executive Committee, Design Automation Conference (DAC), 2011-2015
- *General Chair*, the International Conference on Computer-Aided Design (ICCAD), 2006
- *Vice Chair*, the International Conference on Computer-Aided Design (ICCAD), 2005
- *Member*, Executive Committee, the International Conference on Computer-Aided Design (ICCAD), 2001-2007
- *Chair*, The International Workshop on Logic and Synthesis, 2002
- *Co-Founder*, the International Workshop on Biology Design Automation (IWBDA), 2009
- *Steering committee member*, the International Workshop on Biology Design Automation (IWBDA), 2009-2012

### **Professional Technical Leadership Roles**

- *Organizer, "Workshop on Microbiomics, Metagenomics, and Metabolomics"*, with Curtis Huttenhower, Department of Biostatistics, School of Public Health, Harvard University, at ACM Conference on Bioinformatics, Computational Biology and Biomedical Informatics, (ACM BCB), 2017
- *Technical Program Co-Chair*, Design Automation Conference (DAC), 2012-2011
- *Design Community Chair*, Design Automation Conference (DAC), 2010-2009
- *Technical Program Chair*, the International Conference on Computer-Aided Design (ICCAD), the second largest conference in EDA at the time, 2004
- *Technical Program Co-Chair*, the International Conference on Computer-Aided Design (ICCAD), 2003
- *Subcommittee Chair on Synthesis*, Design Automation Conference (DAC), 2003-2005
- *Technical Program Chair*, The International Workshop on Logic and Synthesis, 2001
- *Publicity Chair*, the International Workshop on Biology Design Automation (IWBD), 2010

### **Program Committees**

- ACM Conference on Bioinformatics, Computational Biology and Biomedical Informatics (ACM BCB), 2013, 2017-
- The International Conference on Computer-Aided Design (ICCAD), 2011-2013, 2017- (serving as chair for the Bio-Systems and Bio-electronics track)
- The International Workshop on Biology Design Automation, 2009-
- Design Automation Conference (DAC), 2002-2005
- The International Workshop on Timing Issues in the Specification and Synthesis of Digital Systems (TAU), 2002-2006
- The International Workshop on Logic and Synthesis (IWLS), 2001-2005

### **Editorship Roles**

- *Associate Editor*, PeerJ CS, 2015-
- *Associate Editor*, IEEE Design and Test Magazine (D&T), 2002- 2011, 2013-2014
- *Member*, selection committee for the EIC for the ACM Transactions on Design Automation of Electronic Systems (TODAES), Fall 2013
- *Associate Editor*, IEEE Transactions on Computer-Aided Design (TCAD), January 2002- January 2006

### **Guest Editorials**

- *Guest Editor*, with Yervant Zorian (Synopsys), for IEEE Design and Test Magazine special section on the 50<sup>th</sup> Design Automation Conference, May-June 2014
- *Guest Editor*, with Douglas Densmore (Boston University), for IEEE Design and Test Magazine special section on Bio Design Automation, May-June 2012
- *Guest Editor*, with Leon Stok (IBM Watson) and Steve Nowick (Columbia), for IEEE Transactions on Computer-Aided Design special issue on Logic Synthesis, May 2003
- *Guest Editor*, with Sani Nassif (IBM Austin Research Labs) for IEEE Design and Test Magazine special issue on Power Grid Design and Analysis, May-June 2003
- *Guest Editor*, with Yong-Bin Kim (Northeastern) and Fabrizio Lombardi (Northeastern), for IEEE Design and Test Magazine special issue on Clockless Design, November-December 2003

### **Professional Society Leadership Roles**

- *Vice President of Technical Activities*, IEEE CEDA (Council on Design Automation), 2007-2008
- *Advisory Board member*, ACM's Special Interest on Design Automation (SIGDA), 1999-2004
- *Director of Educational Activities*, ACM/SIGDA, 2001-2004

- *Member*, the CACM (Communication of the ACM) Task Force, A group of dynamic individuals charged by then President of ACM, David Patterson, to remap the key flag publication, 2004

#### **Reviewing and Best Paper Selection Committees**

- *Section Member*, NIH's Small Business: Computational, Modeling, and Biodata Management, 2012, 2015, 2016, 2017
- *Panelist*, NSF Panels in 2014, 2012, 2011, 2010, 2009, 2008, 2007, 2004, 2003, 2002; MICRO program, 2004, 200
- *Reviewer*, IEEE Transactions on Computer-Aided Design, ACM Transaction on Design Automation of Electronic Systems, IEEE Transaction on VLSI, IEEE Transaction on Electron Devices, IEEE Transactions on Components, Packaging and Manufacturing Technology, ACM Journal on Emerging Technologies in Computing Systems, IEEE Transactions on Electron Devices, Bioinformatics, PLOS ONE, ACS Synthetic Biology
- *Member*, Best paper selection committee, ICCAD 2003
- *Chair*, Best paper selection committee, ICCAD 2004
- *Member*, Best paper selection committee, DAC 2010
- *Chair*, Best paper committee, DAC 2011

#### **Diversity/Outreach Service**

- *Co-organizer*, 2016 Young Faculty Workshop at DAC, Austin, June 2016
- *Member*, Grace Hopper Celebration for Women Scholarship Application Committee, 2014
- *Co-organizer*, CRAW/CDC Discipline Specific Workshop on Diversity in Design Automation, San Francisco, May 2014, with funding from CRA-W, NSF, ACM/SIGDA, and IEEE CEDA
- *Co-organizer*, 2012 Young Faculty Workshop at DAC, San Francisco, June 2012

#### **Society Memberships**

- IEEE, senior member
- ACM, senior member
- AIChE, member
- Society of Biological Engineers, member

#### **Civic Activities**

*Member*, Defense Science Study Group, Institute for Defense Analysis, Nominated by Tufts Dean of Engineering and appointed by DARPA, 2009-2011

## **Teaching**

### **Systems Biology**

- Computational Methods of Systems Biology, COMP 150-SB

### **Circuits, VLSI and Architecture**

- Introduction to VLSI, EE/COMP 103
- Advanced VLSI Design, EE 104
- Computer Architecture, COMP 40
- Computer Organization, EE 126
- Advanced Computer Architecture, COMP 150-ACA
- Analog Electronics, EE 11
- Computer-Aided Design (Novel technologies), COMP 150-CAD
- Computer-Aided Design (Algorithms), COMP 150-CAD
- Introduction to the Internet of Things (IoT), COMP 150-IOT, COMP 50-IOT

### **Introductory CS Courses**

- Data Structures, COMP 15

- Exploring Computer Science, an introductory course, COMP 10
- Introduction to Computational Design, ES93

#### **Advanced CS Courses**

- Algorithms, COMP 160
- Stochastic Search and Genetic Algorithms, COMP 150-GA
- GPU Programming for Scientific Applications COMP 150-GPU

#### **Honors & Awards**

- Marie Pistilli Award for Women in Engineering Achievement Award, 2016
- Winner, Tufts Ideas Competition hosted by the Gordon Institute, "TRAG: At-home diagnostics system and app for tracking the gut microbiota", 2015
- IEEE CEDA (Council on Electronic Design Automation) Distinguished Service Award for chairing the Design Automation Conference, June 2015
- Hassoun was recognized by the Electronic Design Automation Consortium (the trade association for EDA, [www.edac.org](http://www.edac.org)) for her role as DAC General Chair as one of 33 luminaries in the field of design automation. Hassoun is one of three women who were recognized at an event in San Jose, CA, at the Computer History Museum, October 2013
- Design Automation Conference Innovation Award, "For Creating the Designer Track", DAC, June 2013
- Design Automation Conference Innovation Award, "For Creating the Work-in-Progress Session", DAC, June 2013
- Design Automation Conference Service Award, "For Creating the Design Automation Summer School", DAC, June 2013
- Design Automation Conference Service Award, "For Creating the PhD Forum at DAC", DAC, June 2013
- ACM Student Research Award, Third Place at the Design Automation Conference, 2011, N. Khan, "Method to Mitigate Through-Silicon Via-Induced Substrate Noise"
- Member, Defense Science Study Group, Institute for Defense Analysis, Nominated by Tufts Dean of Engineering and appointed by DARPA, 2009-2011
- IEEE Senior member, 2007
- ACM/SIGDA Distinguished Service Award, June 2007, "For outstanding contributions to the creation of the SIGDA Ph.D. Forum at DAC on the occasion of its 10th edition."
- Tufts University Mellon Fellowship, Spring 2003, selected among Tufts faculty to receive a one semester leave
- ACM/SIGDA Technical Leadership Award, June 2002, "For contributions to the SIGDA Ph.D. Forum at DAC"
- ACM/SIGDA Service Award, June 2000, "For developing the SIGDA Ph.D. Forum"
- NSF CAREER award, 2001-2006
- Women and Minorities Fellowship, CSE Department, University of Washington, 1995-1996 Fellowship, Digital Equipment Corporation, 1991-1992
- Tau Beta Pi Fellow, 1986-1987