

Tuan M. Hoang-Trong
25 COUNTY CENTER RD., APT A-3
White Plains
NY, 10607

Phone: 703-473-1395
tmhoangt@us.ibm.com
hoangtrongminhtuan@gmail.com
<http://tinyurl.com/tmhoangt>

Education

- **Ph.D., Bioinformatics & Computational Biology** 2008 - 2014
George Mason University - Krasnow Institute of Advanced Studies - Fairfax, VA
 - Advisor: Prof. M. Saleet Jafri (Chair, Dept. Molecular Neuroscience)
 - Thesis: Computational studies of Ca²⁺-entrained arrhythmias in cardiac cells using GPGPU
- **M.Eng., Electrical and Computer Engineering** 2006-2008
Chonnam National University - Gwangju, South Korea
 - Advisor: Assoc. Prof. Yonggwon Won (Director, Artificial Neural Network Lab)
 - Thesis: The study of Image Analysis Methods for Two-dimensional Gel Electrophoresis
- **B.Eng., Computer Science** 2000-2005
HoChiMinh City University of Technology - Viet Nam
 - Advisor: Dr. Quan V. Ho
 - Thesis: Building a Domain-Target Crawling Tool

Work Experience

- IBM T.J. Watson** : (NewYork, NY, USA) Feb, 2017 -now
Research Staff Member: Computational Neuroscience and Multiscale Brain Modeling Group
Manager: James Kozloski
- IBM T.J. Watson** : (NewYork, NY, USA) Aug, 2015 - Jan-2017
Postdoctoral Researcher: Multiscale Computational Modeling Group
Research Advisors: Jeremy Rice/James Kozloski
Project: Neural tissue simulation and brain modeling for identification of Huntington's Disease neural mechanisms and treatments
- Tietronix Software Inc.** (Houston, TX, USA) Oct, 2014 - Aug, 2015
Principal Software Engineer (Life Science Group)
Assignment (R&D): Involved in proposal writing (SBIR, STTR), Hadoop-based system with GPU computing for biomedical research, cloud computing and data analytics for NASA's OpenData initiative.

IBM T.J. Watson : (NewYork, NY, USA)

Summer 2013

Summer Intern: Functional Genomics & System Biology Group

Research Advisors: Jeremy Rice/Gustavo Stolovitzky

Wrote parallel code to generate M-cell islands in a whole-heart configuration. This is part of the Cardioid Heart Modelling Project, a massively parallel computing software that runs on IBM BlueGene/Q.

GMU - Research Assistant: (Fairfax, VA, USA)

Sept,2008-Sept,2014

Developed compartmental stochastic cardiac cell model

Developed 3D temporospatial cardiac cell model

Developed multi-cellular stochastic cardiac cell model

GMU - Teaching Assistant

BINF 739 - CUDA-enabled Scientific Programming

Spring 2012

Math 114 - Calculus

Fall 2009

BIO-IT Foundry Center in Gwangju - Research Assistant: South Korea

Mar,2006-Mar,2008

Developed protein spot matching algorithm (ProteomeBase software package)

Two-dimensional gel electrophoresis images

Artificial Neural Networks

FTS Ltd. company - Software Developer: Viet Nam

2005-2006

Developed various software components for Japanese clients (C/C++)

Research Experience

- Solid understanding of Hodgkin-Huxley axon model, Integrate-and-Fire model, cable model, and calcium dynamics
- Calcium signaling in cardiac cells, multi-scale whole-cell modelling and multi-cellular modelling using stochastic methods
- Machine Learning: Artificial Neural Network
- High performance computing (MPI/OpenMP), GPGPU computing (CUDA programming) and Code Optimization
- Cloud Computing, Big Data Analytics with Hadoop + GPGPU
- 2-D Gel-Electrophoresis: Protein-Spot matching + Image Processing

Skills

Programming Languages: Fortran, C/C++, Python, IDL, R, MatLab (Octave), Shell Scripting (Bash, Unix tools), Perl, C# (.NET Framework).

Cloud computing : Ubuntu/MAAS, Python programming on Google App Engine (GAE) using webapp2 Web Framework and RESTful APIs.

Big Data : Hadoop-based system with GPGPU computing

Operating Systems: UNIX (HP-UX), Linux (Ubuntu), Windows

Editors: Emacs, Vim, L^AT_EX, OpenOffice, MS Office Suite, Texmac

Programming Libraries: Boost, VTK, HDF, Silo (LLNL)

Visualization Toolkits: gnuplot, xmgrace, IDL, CUDA-GPU, VisIt (LANL)

Debuggers: cuda-gdb, GNU gdb

Database/File-format: SQL(MySQL), MS Excel, HDF5, Silo format

Network Admin: Manage a small cluster (16-workstations) with network file system and network information system, configure Infiniband HPC with GPU.

Graduate Coursework

- Molecular Cell Biology
- Advanced Neural Networks
- Advanced Data Mining
- Digital Image Processing
- Pattern Classification
- Computer Vision
- Numerical methods for Bioinformatics
- Biological Sequence Analysis

Training

Virtual School of Computational Science and Engineering - proven algorithmic techniques for many-core processors (CUDA)	Summer 2011
Cold Spring Harbor Laboratory - Summer course in Computational Cell Biology	Summer 2010
Virginia Commonwealth University training in Modeling the Heart in 3D	Fall 2009
VCU training in Biological and Biomedical signals	Spring 2009

Awards & Honors

Dissertation Completion Fellowship (GMU)	Spring 2014
Honorable Mention (Oral Presentation) - Student Research Day (GMU)	Spring 2013
Academic Excellence Award (School of System Biology - GMU)	2012
NVIDIA Graduate Fellowship Finalist (Using GPU for research)	2011
Best Oral Presentation - Student Research Day (GMU)	Fall 2010
Department Fellowship in recognition of good academic performance	2010
Travel Grant to NHI-NHLBI training course, VA	2009
Travel Grant to AMIA summit on Translational Biology, CA	2009
Research Assistantship at GMU	2008-now
Graduate Commonwealth Outstanding Student Award	2008-2010
Brain Korea '21 Scholarships, South Korea	2007-2008
Research Assistantship at Intelligent Computing@Network Lab, South Korea	2006-2008
Full Scholarship for Master's Program, South Korea	2006-2008

Professional Membership & Other Activities

Organizing Committee: Listening to the Heart and Brain: Current Challenges in Multiscale Modeling Symposium	
Frontiers in Applied and Computational Mathematics [link]	NJIT FACM17
Editorial Consultant - Interventional Cardiology Grand Rounds	Sep.,2015 - now
Reviewer - 3rd International Conference on Biomedical Engineering and Biotechnology (ICBEB2014)	
President of Bioinformatics Graduate Student Organization - GMU	2010-2012
Student Member of Biophysical Society (BPS)	2010-2012
Vice President of Bioinformatics Graduate Student Organization - GMU	2009-2010
Student Member of IEEE	2007-2009

Patents

1. Tuan M. Hoang-Trong, George Blair Williams, M. Saleet Jafri, “*Methods and Systems for Utilizing Markov-chain Monte-carlo simulations*” (US 9,009,095)

Publications (book chapters)

1. Thach Nguyen, Timothy Yee, Tuan M. Hoang-Trong, Loan Pham, & John Reilly, “*Futuristic Applications to Today’s management of Cardiovascular Problems*” - Evidence-Based Cardiology Practice: A 21st century approach (2009)
2. Thach Nguyen, Tuan M. Hoang-Trong, Timothy Yee, Cindy Grines, Dayi Hu, & John Reilly, “*Practicing Cardiology of the 21st Century*” - Evidence-Based Cardiology Practice: A 21st century approach (2009)

Publications (journals)

1. Tuan M. Hoang-Trong, Sarah E. Motley, John Wagner, Robert R. Kerr and James Kozloski. “*Explicit multi-compartment models of dendritic spines in the Neural Tissue Simulator modify action potential back-propagation*” (2017) (IBM Journal of Research & Development, vol.61, issue 2/3). [link]
2. Tuan M. Hoang-Trong, A. Ullah, and M. S. Jafri. “*Calcium Sparks in the Heart: Dynamics and Regulation*” (2015) (Research and Reports in Biology, (6)). [link]
3. Niall Macquaide, Tuan M. Hoang-Trong, Jun-ichi Hotta, Wouter Sempels, Ilse Lenaerts, Patricia Holemans, Johan Hofkens, M. Saleet Jafri, Rik Willems, Karin R. Sipido. “*Ryanodine Receptor cluster fragmentation and redistribution in persistent atrial fibrillation enhance calcium release*” (2015) (Cardiovascular Res., 108 (3), 387-398). [link]
4. Limbu S, T. M. Hoang-Trong, B. L. Prosser, W. J. Lederer, and M. S. Jafri. “*Modeling Local X-ROS and Calcium Signaling in Heart*” (2015). Biophys. J. (109 (10), 2037-2050).

5. Eva Wagner, Marcel Lauterbach, Tobias Kohl, George S. B. Williams, Julia H. Steinbrecher, Jan-Hendrik Streich, Brigitte Korff, Hoang-Trong M. Tuan, Brian Hagen, Stefan Luther, Gerd Hasenfuss, Volker Westphal, Ulrich Parlitz, M. Saleet Jafri, Stefan W. Hell, W. Jonathan Lederer, Stephan E. Lehnart: “*STED live cell imaging shows early remodeling of T-tubule nanowires following myocardial infarction in mice*” (Circ. Res., 2012)[link]
6. George Blair Williams, Aristide C. Chikando, Tuan M. Hoang-Trong, Eric A. Sobie, W.J. Lederer, M.Saleet Jafri, “*Dynamics of Calcium sparks and Calcium leaks in the heart*” (Biophysical J., Vol.101, 1287-1296)
7. Hieu T.Huynh & Minh-Tuan T.Hoang & Nguyen H.Vo & Won Y. “*An Improvement of Outlier Detection in Linear Regression based on Area-Descent*”, WSEAS Transactions on Computers Research (Issue 2, Vol. 1, December 2006), pg. 174-180.
8. Nguyen H.Vo & Hieu T.Huynh & Minh-Tuan T.Hoang & Kim J.J & Won Y. “*Extension of General Mapping Convergence Framework using Extreme Learning Machine in Single Class Classification*”, WSEAS Transactions on Computers Research (Issue 2, Vol. 1, December 2006), pg.102-107.

Publications (conferences)

1. Tuan M. Hoang-Trong, George S.B. Williams, Aristide C. Chikando, Eric A. Sobie, W.J. Lederer, M. Saleet Jafri, “*Stochastic Simulation of Cardiac Calcium Dynamics and Waves*” (33rd IEEE-EMBC Conference, Boston, Aug. 2011) [link]
2. Tuan M. Hoang-Trong, George S.B Williams, Gregory D. Smith, Saleet Jafri, “*Using GPU in studying cellular molecular events of cardiac arrhythmias*” (GPU Technology Conference’10, Sept. 21-24, San Jose, CA, USA)
3. Minh-Tuan T.Hoang & Yonggwon Won, “*A Marker-free Watershed Approach for 2DGE Protein Spot Segmentations*”, International Symposium on Information Technology Convergence, Proceeding IEEE CS (ISITC’07, Nov. 23-24, Jeonju, Korea) (Acceptance rate: 29.7%) [link]
4. Hieu T. Huynh, Nguyen H. Vo, Minh-Tuan T. Hoang & Yonggwon Won, “*Outlier Treatment for SLFNs in Classification*”, 5th International Conference on Computational Science and Its Applications, Proceeding IEEE Computer Society (ICCSA’2007, Aug. 26-29, Kuala Lumpur, Malaysia), pg. 104-109 (Acceptance rate: 15%)
5. Minh-Tuan, T.Hoang & Won, Y. & Yang, H. “*Cognitive States Detection in fMRI using incremental PCA*”, The 5th International Conference on Computational Science and Its Applications, Proceeding IEEE Computer Society (ICCSA’2007, Aug. 26-29, Kuala Lumpur, Malaysia), pg.335-341 (Acceptance rate: 15%) [link]
6. Hieu, T.H. & Nguyen, H.V., Minh-Tuan, T. Hoang & Won, Y. “*Performance Enhancement of RBF Networks in Classification by Reducing Effect of Outliers in the Training Phase*”, Modelling Decisions for Artificial Intelligence (MDAI’2007, Aug. 16-18, Kitakyushu, Japan), LNAI, Springer-Verlag, pg.341-350.
7. Minh-Tuan, T.Hoang & Hieu, T.H & Nguyen, H.V & Won, Y. “*A Robust Online Sequential Extreme Learning Machines*”, Proceeding of the 4th Int. Symp. on Neural Networks (ISNN’2007, June 3-07, Nanjing, China), LNCS 4491, Springer-Verlag, pg.1077-1086 (Accept rate: 20.3%) [link].

8. Minh-Tuan, T.Hoang & Hieu, T.H & Nguyen, H.V & Kim, J.J & Won, Y. “*Two-step Iterative Registration for 2D-Gel Electrophoresis Images*”, Proceeding of the 5th IEEE Int. Conf. on Research, Innovation, and Vision for the Future (RIVF’2007, March 07-09, Ha Noi, Viet Nam), pg.274-280 (Acceptance rate: 29%)[link]
9. Hieu, T.H & Minh-Tuan, T.Hoang & Nguyen, H.V & Kim, J.J & Won, Y. “*Outlier Detection with Two-Stage Area-Descent Method for Linear Regression*”, Proceeding of the 6th WSEAS Int. Conf. on Applied Computer Science (ACS’06, December 16- 18, Tenerife, Spain)[link]
10. Nguyen, H.V & Minh-Tuan, T.Hoang & Hieu, T.H & Kim, J.J & Won, Y. “*Iterative Extreme Learning Machine for Single Class Classifier using General Mapping Convergence framework*”, Proceeding of the 6th WSEAS Int. Conf. on Applied Computer Science (ACS’06, December 16-18, Tenerife, Spain)
11. Quan, H. V. & Dung, N.V. & Minh-Tuan, T.Hoang, “*A Domain - Specific Crawling Tool for the Internet*”, Proceeding of the 2005 International School on Computational Sciences and Engineering: Theory and Applications (COSCI’2005, March 2-4, Ho Chi Minh City, Viet Nam).

Abstract/Poster

1. Tuan M. Hoang-Trong, M. Saleet Jafri, W.J. Lederer, “*Cardiac alternans occurs through the synergy of Voltage- and Calcium-dependent mechanisms* (Biophysical Society Meeting 2015)
2. Sarita Limbu, Tuan M. Hoang-Trong, W.J. Lederer, M. Saleet Jafri, “*Mechanism of Stretch-Activated Reactive Oxygen Modulation of Excitation-Contraction Coupling: Computational Studies*” (Biophysical Society Meeting 2015)
3. Aman Ullah, Tuan M. Hoang-Trong, George S.B. Williams,W.J. Lederer, M. Saleet Jafri, “*Spontaneous Calcium Release Can Initiate a Calcium-Entrained Arrhythmia* ” (Biophysical Society Meeting 2014)
4. E. Wagner, T. Kohl, H.T.M. Tuan, V. Westphal, U. Parlitz, S. Luther, S.W. Hell, M.S. Jafri, W.J. Lederer, S.E. Lehnart “*Superresolution analysis identifies proliferative changes of excitable membranes (T-tubules) during cardiac remodeling leading to orphaning of Ca²⁺ release sites and prolonged action potentials* [BEST BASIC SCIENCE ABSTRACT ’2013]
http://europace.oxfordjournals.org/content/15/suppl_2/ii223.full
5. Tuan M. Hoang-Trong, George S. Williams, Stephan E. Lehnart, W. Jonathan Lederer, M. Saleet Jafri, “*Stochastic Simulation Assessing the Functional Changes Occurring during Heart Failure*, BPS’12
6. Tuan M. Hoang-Trong, George S. Williams, M. Saleet Jafri, “*GPU-enabled 3D temporospatial whole-cell model of ventricular myocyte in studying calcium- entrained arrhythmias*” (GTC’12)
7. Tuan M. Hoang-Trong, George S.B. Williams,W.J. Lederer, M. Saleet Jafri, “*GPU-enabled stochastic spatiotemporal model of rat ventricular myocyte calcium dynamics*” (Biophysical Society Meeting 2011 - BPS’11)
8. Tuan M. Hoang-Trong, George S. Williams, Gregory D. Smith, M. Saleet Jafri, “*Unveiling cellular and molecular events of cardiac arrhythmias using CUDA-capable GPU*” (GPU Technology Conference 2010 - GTC’10)

* = equal contribution