

Tuan M. Hoang-Trong

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Education

- **Ph.D., Bioinformatics & Computational Biology** Fall 2008 - now
George Mason University - College of Sciences - Fairfax, VA
 - Advisor: Prof. Saleet Jafri
 - Thesis: Computational studies of Ca^{2+} -entrained arrhythmias in cardiac cells
- **M.Eng., Electrical and Computer Engineering** 2006-2008
Chonnam National University - Gwangju, South Korea
 - Advisor: Assoc.Prof. Yonggwon Won
 - 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

Research Interest

- Current
 - High performance computing, GPGPU computing (CUDA programming)
 - Calcium signaling in cardiac cells, multi-scale whole-cell modelling and multi-cellular modelling
- Former
 - Machine Learning: Artificial Neural Network
 - 2-D Gel-Electrophoresis: Protein-Spot matching + Image Processing

Graduate Coursework

- Pattern Classification
- Advanced Neural Networks
- Advanced Data Mining
- Digital Image Processing
- Computer Vision
- Numerical methods
- 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
Outstanding Student Award (American Bristish Tobacco Company, Viet Nam)	Fall 2004

Work Experience

IBM T.J. Watson - Summer Intern: Functional Genomics & System Biology Research Advisors: Jeremy Rice/Gustavo Stolovitzky Wrote parallel code to generate M-cell islands in a whole-heart configuration. This is a part of the Cardioid Heart Modelling Project, a massively parallel computing software that run on IBM BlueGene/Q.	Summer -2013
GMU - Research Assistant: NIH grant "Calcium Entrained Arrhythmias" Developed compartmental stochastic cardiac cell model using Fortran/CUDA language Developed 3D temporospatial cardiac cell model Developed multi-cellular stochastic cardiac cell model	2010-now
GMU - Teaching Assistant BINF 739 - CUDA-enabled Scientific Programming Math 114 - Calculus	Spring 2012 Fall 2009

BIO-IT Foundry Center in Gwangju - Research Assistant: South Korea 2006-2008
Developed protein spot matching algorithm (ProteomeBase software package)

FTS Ltd. comparny - Software Developer: Viet Nam 2005-2006
Developed various software components for Japanese clients (C/C++)

Skills

Programming Languages: C/C++, Fortran, IDL, R, MatLab

Operating Systems: Linux (Ubuntu), Windows

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

Toolkit/Library: gnuplot, xmgrace, IDL, CUDA (C, Fortran), VisIt (LANL)

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

Networks: administration (NIS), Infiniband HPC with GPU

Professional Membership & Other Activities

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, Saleet Jafri, “*Methods and Systems for Utilizing Markov-chain Monte-carlo simulations*” (2011 - patent pending)

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. “A GPU-Enabled Ultrafast Monte Carlo Simulation Algorithm Applied to the Molecular Events of Calcium Signaling in the Heart” (on preparation)
2. Niall Macquaide, Hoang-Trong Minh Tuan, Jun-ichi Hotta, Wouter Sempels, Ilse Lenaerts, Patricia Holemans, Johan Hofkens, M. Saleet Jafri, Rik Willems, Karin R. Sipido, “*Functional consequences of RyR cluster fragmentation and redistribution in persistent atrial fibrillation*” (2013) (under submission)
3. 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]
4. 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)
5. 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.
6. 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, 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)
2. 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)
3. 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)
4. 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
5. 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*”
6. 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* ”