
CURRICULUM VITAE

NAME: Nguyen, Thanh M., PhD

POSITION TITLE: Postdoc Fellow

INSTITUTION: Informatics Institute, the University of Alabama at Birmingham, Birmingham, Alabama

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A. Education

2010-2012 BS of Computer Science, Indiana University Purdue University Indianapolis (IUPUI),
Indiana.
2013-2018 PhD of Computer Science, Indiana University Purdue University Indianapolis (IUPUI),
Indiana.

B. Positions and Honors

Positions and Employment

2010-2012 Math Tutor, IUPUI Mathematics Assistant Center, Indiana.
2013-2017 Research Assistant, Dept. of Computer and Information Science, IUPUI, Indiana.
2017-2018 Visiting Scientist, Informatics Institutes, University of Alabama at Birmingham (UAB), AL.
2018- Postdoc Fellow, Informatics Institutes, University of Alabama at Birmingham (UAB), AL.

Other Experience, Services and Professional Memberships

2012-2014 Volunteer student, Indiana Center of System Biology and Personalized Medicine, IUPUI.
2014-2016 Visiting Scientist (Summer Internship), Wenzhou Medical University, Zhejiang, China.
2015-2016 Consultant, MedeoLinx LLC, Nanjing, China.
2018-2018 Consultant, Wenzhou Yuekang Information Technology Ltd, Zhejiang, China.

Honors

2007 Vietnam 4th rank honor for excellent student in History (top 150 of the nation).
2008 Hanoi 4th rank honor for excellent student in Chemistry (top 100 of the province).
2009 Vietnamese governmental scholarship for undergraduate studying oversea.
2010-2012 IUPUI School of Science Scholar's List Recipients.
2013 IUPUI Dept. of Computer Science Gersting Award.

Participation in Research Awards

2013-2014 Health-Terrain: Visualizing Large Scale Health Data. Department of Defense Award #
W81XWH-13-1-0020. PI: Fang, Shiaofer, Ph.D., Indiana University.
2014-2017 Fast Reinforcement Learning Using Multiple Models and State Decomposition. National
Science Foundation Award # ECCS-1407925. PI: Snehasis Mukhopadhyay, Ph.D,
Indiana University.

Professional services

2019 Scientific reviewer at IEEE International Conference on Biomedical and Health
Informatics.
2019 Scientific committee and Machine Learning – Biomedicine session chair at MidSouth

2019
2019

Conference on Computational Biology
Database co-instructor, Informatics Institute, University of Alabama at Birmingham.
Postdoc trainee, National Heart, Lung, and Blood Institute - Progenitor Cell Translational Consortium, Jay Zhang (University of Alabama at Birmingham) hub.

C. Contribution to Science

1. My publications during the PhD program at IUPUI focus on fast reinforcement learning in multi-agent learning system.
 - a. Nguyen, T. and Mukhopadhyay, S., Identification and Optimal Control of Large-scale System Using Selective Decentralization, in IEEE International Conference on Systems, Man and Cybernetics. 2016: Budapest.
 - b. Nguyen, T. and Mukhopadhyay, S., Selectively Decentralized Q-Learning, in IEEE International Conference on Systems, Man, and Cybernetics. 2017: Bannf, Canada.
 - c. Nguyen, T. and Mukhopadhyay, S., Multidisciplinary Optimization in Decentralized Reinforcement Learning, in 16th IEEE International Conference On Machine Learning And Applications (ICMLA). 2017: Cancun, Mexico.
 - d. Nguyen, T. and Mukhopadhyay, S., Selective decentralization to improve reinforcement learning in unknown linear noisy systems. in Intelligent and Evolutionary Systems (IES), 2017 21st Asia Pacific Symposium on. 2017. IEEE.
 - e. Nguyen, T. and Mukhopadhyay, S., Two-phase selective decentralization to improve reinforcement learning systems with MDP. *AI Communications*, 31 (4), pp. 319-337, 2018.
 - f. Nguyen, T., Mukhopadhyay, S. and Babbar-Sebens, M. Why the 'Selfish' MDO Agents Could Solve the Decentralized Reinforcement Learning Problems. *AI Communications*, accepted for future publication.
2. In addition, my other publications focus on bio-health informatics.
 - a. Chen, J., Pandey, R. and **Nguyen, T.M.**, HAPPI-2: a Comprehensive and High-quality Map of Human Annotated and Predicted Protein Interactions. *BMC Genomics*, 18(1), 2017.
 - b. Huang, H., **Nguyen, T.**, Ibrahim, S., Shantharam, S., Yue, Z., & Chen, J. Y I., DMAP: a connectivity map database to enable identification of novel drug repositioning candidates. *BMC Bioinformatics*, 2015. 16 Suppl 13: p. S4.
 - c. Yue, Z., Kshirsagar, M.M., **Nguyen, T.**, Suphavailai, C., Neylon, M.T., Zhu, L., Ratliff, T. and Chen, J.Y., PAGER: constructing PAGs and new PAG-PAG relationships for network biology. *Bioinformatics*, 2015. 31(12): p. i250-7.
 - d. Fang, S., Palakal, M., Xia, Y., Bloomquist, S., **Nguyen, T.M.**, Krishnan, A., Jiang, S., Li, W., Keiper, J., and Grannis, S., Health---Terrain: A Visual Analytics System for Health Data. Report to U.S. Army Medical Research and Materiel Command, Award # W81XWH-13-1-0020, 2015, approved for Public Release;.
 - e. **Nguyen, T.**, Zhang, T. Fox, G, Zeng, S., Cao, N., Pan, C., and Chen, J.Y., I. Linking Clinotypes to Phenotypes and Genotypes from Laboratory Test Results in Comprehensive Physical Exams. Submitted to *BMC Bioinformatics*, *MCBIOS 2019 Proceeding Supplemental*.
 - f. Keiper, J., Fang, S., Xia, Y., Palakal, M. Grannis, S.R., **Nguyen, T.M.**, Bloomquist, S., Krishnan, A. and Li, W., A Public Health Data Visualization System Demonstration, *AMIA 2014*, Demo paper, Washington DC. Nov. 2014.
 - g. Xia, Y., Fang, S., Palakal, M., Gamache, R., **Nguyen, T.**, Bloomquist, S., Keiper, J., and Grannis, S., Data Exploration of a Notifiable Condition Detector System. In *Proc. 2013 Workshop on Visual Analytics in Healthcare*. Poster Presentation, Washington DC, Oct. 2013, pp 66-67.
 - h. Palakal, M., Fang, S., Xia, Y., Grannis, S., Gamache, R., **Nguyen, T.**, Bloomquist, S., and Keiper, J., Detecting Comorbidity of Chlamydia from Clinical Reports. In *Proc. 2013 Workshop on Visual Analytics in Healthcare*. Poster Presentation, Washington DC. Oct. 2013, pp 75-76.
 - i. Muhammad, S.A., Raza, W., **Nguyen, T.**, Bai, B., Wu, X. and Chen, J., Cellular Signaling Pathways in Insulin Resistance-Systems Biology Analyses of Microarray Dataset Reveals New Drug Target Gene Signatures of Type 2 Diabetes Mellitus. *Frontiers in physiology*, 2017. 8: p. 13.
 - j. Muhammad, S. A., Guo, J., **Nguyen, T. M.**, Wu, X., Bai, B., Yang, X. F., & Chen, J. Y., Simulation Study of cDNA Dataset to Investigate Possible Association of Differentially Expressed Genes of Human THP1-Monocytic Cells in Cancer Progression Affected by Bacterial Shiga Toxins. *Frontiers*

in Microbiology, 2018. 9, p.380

- k. Yue, Z., Neylon, M.T., **Nguyen, T.**, Ratliff, T. and Chen, J.Y. "Super Gene Set" Causal Relationship Discovery from Functional Genomics Data. IEEE/ACM Transactions on Computational Biology and Bioinformatics, 15(6), 2018.
- l. **Nguyen, T.**, Muhammad, S.A., Ibrahim, S., Ma L., Guo, J. and Bai, B., DeCoST: A New Approach in Drug Repurposing from Control System Theory, Frontiers in Pharmacology, 2018. 9: p. 583.
- m. **Nguyen, T.**, et al., An integrated machine learning and network analysis to discover marker clinical measurement in lung cancer, in Genomic Medicine. 2015: Ho Chi Minh City.
- n. Cao, N., Zeng, S., Shen, F., Pan, C., Chen, C., **Nguyen, T.** and Chen, J., Predictive and Preventive Models for Diabetes Prevention using Clinical Information in Electronic Health Record, in IEEE International Conference on Bioinformatics and Biomedicine. 2015: Washington DC. pp. 867-874
- o. Chen, J.Y., Yue, Z., Neylon, M.T., **Nguyen, T.**, Bulsara, N., Arora, I. and Ratliff, T. Towards constructing "Super Gene Sets" regulatory networks. in IEEE International Conference on Bioinformatics and Biomedicine (BIBM), 2016. IEEE.
- p. Yue, Z., **Nguyen, T.**, Zhang, E., Zhang, J., Chen, J.Y, WIPER: Weighted in-Path Edge Ranking for biomolecular association networks. Accepted in Quantitative Biology.
- q. Guo J, **Nguyen T**, Zhang T, Chang F, Chen J, Wang Z, Cao L, Cai L, Ma L, Li Y, Fu Z, Pan C, Chen JY. How mHealth Providers Meet the Emerging Demands of Consumers in China: A Survey from Patient-Users. Journal of Medical Internet Research, Preprints. 05/05/2019:14610. DOI: 10.2196/preprints.14610

3. I have the following (pending) patents in China (approved for publication, on further investigation for patent granted). They are completed during my summer internship and consultants in China between 2014 and 2018. These patents are retrievable via the China Global Patent Examination Information Inquiry (<http://cpquery.sipo.gov.cn/>)

- a. No. 2017108247383. Inventors: Thanh Minh Nguyen (阮明成), 陈越. Title: Patent of Mining and Analyzing Electronic Medical Record (临床检测项目的数据处理方法、装置及电子设备). Submitted by: Yue Kang Information Technology LLC, Wenzhou City, Zhejiang Province, China (温州悦康信息技术有限公司).
- b. No. 2017108245072. Inventors: Thanh Minh Nguyen (阮明成), 陈越. Title: New Method to Predict Diseases (常见疾病风险预测方法及系统). Submitted by: Yue Kang Information Technology LLC, Wenzhou City, Zhejiang Province, China (温州悦康信息技术有限公司).

4. Other presentations

- a. **Nguyen, T.**, Zhang, T., Zhang, E., Zhang, J., Pan, C., and Chen, J. Identify Hypertension Risk from Health Exam Results. AHA Hypertension Scientific Session, New Orleans, LA 2019. doi/10.1161/hyp.74.suppl_1.P108
- b. Zhang, E., Nguyen, T., Dang, S., **Nguyen, T.**, Zhu, W. and Zhang, J. Identification and pharmaceutical targeting of putative gene networks critical for closure of the cardiomyocyte proliferative window in large mammals: a blueprint. MidSouth Conference on Computational Biology and Bioinformatics. Birmingham, AL, Mar 2019
- c. **Nguyen, T.** Zhang, E. Zhang, J, and Chen, J. Upregulation of immune-responsive genes in the highly-recovered heart after injury and potential contribution to heart regeneration. 4th International Conference of Innovations in Cancer Research and Regenerative Medicine, Ho Chi Minh City, Vietnam.
- d. Chen, J. and **Nguyen, T.** Improve the Glioblastoma Multiform Patient Survival Prediction Using Visual Analytic. 4th International Conference of Innovations in Cancer Research and Regenerative Medicine, Ho Chi Minh City, Vietnam.

5. Software

- a. "Chronic Disease Prediction APP - Predict your future with precision, from now on". Role: developer. Owned by Yue Kang Information Technology Ltd, Zhejiang, China. Period of contribution: June-July 2018

C. Skills

- Technical skills: very proficient in many subjects in:
 - + Computer Science: artificial intelligence, data mining, algorithm development, database system, programming.
 - + Mathematics: system modeling and control, statistics, optimization, linear algebra.
 - + Bioinformatics and system biology
- Fast learning speed.
- Board knowledge in multiple scientific and non-scientific areas.
- Leadership in both academic and industry environment.
- Mentoring, one-to-one training, motivating.

D. Personal Statement

I am a postdoc at the Informatics Institute, the University of Alabama at Birmingham (UAB). My expertise includes developing theories in Artificial Intelligence (AI), applying AI - visual analytics in BioHealth Informatics and building Bioinformatics databases. At Purdue University, I built the 'Selective Decentralization', which was a collection of methods, theoretical analysis and simulations for multiple AI agents to coordinate in solving large-scaled Adaptive Control / Reinforcement Learning problems. I further extended Multidisciplinary Design Optimization (MDO), which was originally a class of engineering techniques for automatic vehicle and aircraft control, to be applied in AI problems. Applying AI techniques in Computational Biology, I built DeCoST (<https://www.frontiersin.org/articles/10.3389/fphar.2018.00583/full>), an AI-based simulation technique to predict cancer-specific drug efficacy. I contributed to the construction of bioinformatics databases: HAPPI (v.2.0) (<http://discovery.informatics.uab.edu/HAPPI/aboutUs.php>), DMAP (<https://discovery.informatics.uab.edu/cmmaps>) and PAGER (v.1.0) (<http://discovery.informatics.uab.edu/PAGER/>) as the data analyst. In Health Informatics, I served as the data analyst and database engineer (trainee) in HealthTerrain, which was a visual analytic system for large scale medical records. In addition, I developed the Clinotype Prediction and Association-finding (CPA) framework, which linked disease-phenotypes, genotypes and clinical lab test results to help identify high-risk cohorts. At UAB, I continue applying AI to solve Biomedicine challenges, including predicting Glioblastoma patient survival outcomes and identifying master regulators for neonatal pig heart development. In addition, I am improving the pipeline for GeneTerrain data generation and developing a new version for the PAGER database.

On the other hand, I practice data analytic as a left-hand job in my free time. I have very strong experience analyzing from the very big data (for example, genomic sequencing > 5TB) to the very small data (for example, accounting spreadsheet < 50 KB). I primarily use Matlab for the analysis as I have a full Matlab license. In addition, I am skillful in R and other programming languages, including Java and Python/Jupyter Notebook. I prefer executing machine learning in my analysis, such as deep neural network, support vector machine, random forest, and reinforcement learning. On top of these, I am proficient in executing other statistical methods.

I have strong interest in applying machine learning and data mining algorithms to solve the challenging bioinformatics and health informatics problems, especially in system biology and drug repurposing. Starting as a PhD student researching fast reinforcement learning, I gradually learn bioinformatics and health informatics and be very familiar with the omics and medical report data. By integrating of machine learning, data mining and knowledge in bio-health informatics, I am fascinated to build computational models to simulate system biology, discover potential new therapeutic strategies for cancers, predict patients' personal risk factor from the medical record data and improve the patients' health by suggesting beneficial exercise, food and drink. I am also active in building omics databases, which support my primary research interests.

In addition, I am active in training junior researchers both inside and outside the country, both in the academic and the industrial environment. During my PhD program, I frequently visited China as the visiting scholar in summer internships at Wenzhou Medical University. In my duty, I recruited and managed young students. I taught them the first lessons in research, improved their technical and communicative skills. Overcoming the language and personality barrier, together I and these Chinese students developed new techniques in bio-health informatics, applied for Chinese patents, published 2 research paper, and built health data analytic mobile application. Among these students, two achieved Master degrees directly under my guidance, other two students became healthcare professionals. At UAB, my responsibility involves training masters students in Dr.

Jake Chen's lab in bioinformatics research. In addition, I was the co-instructor in the Biomedical database course, in which Dr. Jake Chen was the primary instructor.