Nathaniel Hudson

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ABOUT ME

I am a computer scientist, currently serving as a Postdoctoral Scholar at Globus Labs out of the University of Chicago's Department of Computer Science. My research focuses on designing solutions for AI at the network edge for smart city applications.

PROFESSIONAL EMPLOYMENT

2022– *Postdoctoral Scholar*, Department of Computer Science, University of Chicago; Chicago, Illinois, USA

2017–'22 *Graduate Assistant*, Department of Computer Science, University of Kentucky; Lexington, Kentucky, USA

2014–'17 *Academic Tutor*, Learning Assistance Programs, Northern Kentucky University; Highland Heights, Kentucky, USA

2013 *Software Engineering Specialist I*, Center for Applied Informatics, Northern Kentucky University; Highland Heights, Kentucky, USA

EDUCATION

Ph.D. Computer Science, University of Kentucky, 2022
Advisor: Dr. Hana Khamfroush
Dissertation: "Smart Decision-Making via Edge Intelligence for Smart Cities"

M.S. Computer Science, University of Kentucky, 2021

B.S. Computer Science, Northern Kentucky University, 2017
3.601/4.0 GPA (*Cum Laude*), Mathematics Minor, Honors Distinction

RESEARCH AREAS

Edge Computing, Resource Management, Service Placement, Internet-of-Things

Federated learning, Deep Learning, Machine Learning

Network Science, Complex/Interdependent Networks, Online Social Networks, Diffusion Processes

EXPERIENCE

Computer Languages

Python

Java

C/C++

LaTeX

Frameworks

PyTorch

TensorFlow 2.0+ (or Keras)

SciKit-Learn

NumPy/SciPy

Pandas

NetworkX

PEER-REVIEWED PUBLICATIONS

Journal Articles

2020 N. Hudson and H. Khamfroush, "Behavioral information diffusion for opinion maximization in online social networks," *IEEE Transactions on Network Science and Engineering*, 2020

2019 H. Khamfroush, N. Hudson, S. Iloo, and M. R. Naeini, "Influence spread in two-layer interdependent networks: designed single-layer or random two-layer initial spreaders?," *Applied Network Science*, vol. 4, no. 1, pp. 1–21, 2019

Conference Proceedings

2022 N. Hudson, P. Oza, H. Khamfroush, and T. Chantem, "Smart edge-enabled traffic light control: Improving reward-communication trade-offs with federated reinforcement learning," in *2022 IEEE International Conference on Smart Computing (SMARTCOMP)*, pp. 40–47, IEEE, 2022

2022 M. Hosseinzadeh, N. Hudson, S. Heshmati, and H. Khamfroush, "Communication-loss trade-off in federated learning: A distributed client selection algorithm," in *2022 IEEE Consumer Communications & Networking Conference (CCNC) Workshop SONATAI*, IEEE, 2022

2021 M. Hosseinzadeh, N. Hudson, X. Zhao, H. Khamfroush, and D. E. Lucani, "Joint compression and offloading decisions for deep learning services in 3-tier edge systems," in *2021 IEEE International Symposium on Dynamic Spectrum Access Networks (DySPAN)*, IEEE, 2021. (Invited, equal contribution as first author)

2021 N. Hudson, M. J. Hossain, M. Hosseinzadeh, H. Khamfroush, M. Rahnamay-Naeini, and N. Ghani, "A framework for edge intelligent smart distribution grids via federated learning," in *2021 30th International Conference on Computer Communications and Networks (ICCCN)*, IEEE, 2021. (Invited)

2021 N. Hudson, H. Khamfroush, and D. E. Lucani, "QoS-aware placement of deep learning services on the edge with multiple service implementations," in *2021 30th International Conference on Computer Communications and Networks (ICCCN) 1st International Workshop on Big Data & Machine Learning for Networking (BDMLN)*, IEEE, 2021

2020 X. Zhao, M. Hosseinzadeh, N. Hudson, H. Khamfroush, and D. E. Lucani, "Improving the accuracy-latency trade-off of edge-cloud computation offloading for deep learning services," in *2020 IEEE Globecom Workshops (GC Wkshps)*, pp. 1–6, IEEE, 2020

2020 N. Hudson, H. Khamfroush, B. Harrison, and A. Craig, "Smart advertisement for maximal clicks in online social networks without user data," in *2020 IEEE International Conference on Smart Computing (SMARTCOMP)*, pp. 172–179, IEEE, 2020

2020 E. Hufbauer, N. Hudson, and H. Khamfroush, "A proximity-based generative model for online social network topologies," in *2020 International Conference on Computing, Networking and Communications (ICNC)*, pp. 648–653, IEEE, 2020

2019 N. Hudson, M. Turner, A. Nkansah, and H. Khamfroush, "On the effectiveness of standard centrality metrics for interdependent networks," in *2019 International Conference on Computing, Networking and Communications (ICNC)*, pp. 842–846, IEEE Computer Society, 2019

GRANTS AND AWARDS

Awards and Honors

2022 *2022 Diverse: Issues In Higher Education Rising Graduate Scholar*, one of the 10 selected for this honor of that year.

2021 *Outstanding Student Paper Award* ("Behavioral information diffusion for opinion maximization in online social networks"), Department of Computer Science, University of Kentucky.

2021 *Service Award*, Graduate Student Association for Computer Science, Department of Computer Science, University of Kentucky.

2019 *Runner-Up Best Poster Award* ("Content-Award Click-Through Prediction on Online Social Networks Using Learning Techniques"), Commonwealth Computational Summit 2019, University of Kentucky.

Grants and Fellowships

2021 University of Kentucky Graduate Student Congress Conference Travel Award ($500)

2021 NSF IEEE INFOCOM 2021 Student Travel Grant ($225.00)

2020 NSF IEEE SMARTCOMP 2020 Student Travel Grant

2019 WINE 2019 Conference Student Travel Grant

2019 University of Kentucky Computer Science Departmental Travel Grant ($\times 2$)

TEACHING

University of Kentucky (Teaching Assistant)

Graphics and Multimedia (CS 335)

Discrete Mathematics (CS 275)

Introduction to Computer Networking (CS 371)

Systems Programming (CS 270)

Northern Kentucky University (Academic Tutor)

Pre-Calculus

Elementary Programming

Object-Oriented Programming I (w/Lab)

Object-Oriented Programming II

Data Structures and Algorithms (*also served as teaching assistant*)

Discrete Mathematics

Theory of Computation

SERVICE

Technical Program Committees

2022 IEEE International Conference on Sensing, Communication, and Networking (SECON)

Academic Journal Peer Review

Elsevier Pervasive and Mobile Computing

IEEE Transactions on Computers

IEEE Transactions on Network Science & Engineering

Physica A: Statistical Mechanics and Its Applications

PLOS One

Conference Proceedings Peer Review

IEEE Global Communications Conference (GLOBECOM)

IEEE International Conference on Communications (ICC)

IEEE International Conference on Computer Communications and Networks (ICCCN)

IEEE/ACM International Symposium on Quality of Service (IWQoS)

IEEE International Conference on Smart Computing (SMARTCOMP)

IEEE Conference on Wireless On-Demand Network Systems and Services (WONS)

Campus (University of Kentucky)

2021–'22 President, Graduate Student Association for Computer Science

2020–'21 Secretary, Graduate Student Association for Computer Science

Campus (Northern Kentucky University)

2016 Honors College Peer Mentor

2014–'16 Student Panelist for GEM high school scholars

2014–'15 LGBTQ Student Ambassador

2014 Student Representative, Data Science Faculty Search Committee

Community

2014–'20 Ignite Academy Computer Science Academy Judge and Volunteer; Kenton County Schools, Kentucky, USA.

Conference Participation

2021 Volunteer Judge for the 41st IEEE International Conference on Distributed Computing Systems (ICDCS)

MEMBERSHIPS

Institute of Electrical and Electronics Engineers (IEEE)

Updated July 2022