Curriculum Vitae September 15, 2021

Biographical Sketch

Dr. Wallace is a professor of Computational Sciences and currently serves as Chair of Biomedical Data Science Department, teaching and supporting Computer and Data Science as well as Biomedical Data Science degrees. In total, he brings over 25 years of experience in academics, industry, and research, with over 50 scientific and technical publications in various conferences, journals, technical reports, and book chapters. Dr. Wallace is the principal author of "**Data Mining & Deep Learning using R, Python, and Julia Lecture Notes: Theory and Practice**" now in editorial review; the textbook includes several deep learning methods for DNA sequence analysis, such as neural network examples using *TensorFlow*, *OpenCV*, and wavelet image processing using *OpenMP* and *OpenCL*.

Current areas of research interest include high-dimensional hidden variable stochastic models for multivariate random matrices, topology mappings of mutivariable mutual information, energy based machines and models, wavelet theory, tensor decomposition, computer vision; Hartree-Fock computation for atoms and molecules, *quantum computing* theory; and, novel AI neural network and information theoretic methods for theoretical biology, such as mutation models and DCA predictions from sequences with applications to proteomics and X-ray diffraction.

Academic Background

Ph.D., Tennessee State University, Nashville, TN, GPA 3.9/4.0.
concentration: theoretical computer and data science with subspace mathematics applied to medical imaging and DNA sequence machine learning and analysis

Doctoral study and research - Physics and Astronomy Department, Vanderbilt University, Nashville, TN.
concentration: computational *in-silico* mathematical modeling of quantum mechanics; biological physics; and atomic modeling using Hartree Fock

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MSEE, Tennessee Technological University, Cookeville, TN, GPA 3.7/4.0.
concentration: physical phenomenon with *in-silico* models for laser physics for fusion diagnostics

BSEE, Tennessee Technological University, Cookeville, TN.
concentration: communications and signal processing

Academic Appointments & Teaching Experience

2021-present **Chair of Biomedical Data Sciences, Professor**.
Professor of Computational Sciences in School of Applied Computational Sciences; Chair of Computational Sciences supporting Ph.D. program in Biomedical Data Science, M.S. Biomedical Science, M.S. Data Science.

2017-2021 **Chair of Computational Sciences, Associate Professor**.
Associate Professor of Computational Sciences, Computing, and Technology, in the College of Computing and Technology; Chair of Computational Sciences supporting Data Science, Computational Biology, and Data Analytic degrees.

2016 **Chair of Data Sciences, Associate Professor**.
Associate Professor in College of Computing and Technology; Chair of Data Sciences supporting Data Science and Computational Biology degrees

2015-2016 **Associate Professor**.
Associate Professor in College of Computing and Technology, supporting Data Science majors, degrees, curriculum, and teaching

Notable Research Domain

2015-2021 **Computational algorithms and novel AI methods for bioinformatics, image-tensor decomposition, computational, and theoretical biology**, local University, Nashville, TN, Computational and theoretical biology, physics, computer science, and mathematics; information theoretic analytic methods via advanced algorithms in Python, Julia, and R et al.; machine learning for health sciences using advanced multivariate statistics. Recent topics include neural network modeling and hidden variable analysis of RNA and DNA sequences; applications using convolutional neural networks (CNN), reinforcement learning neural networks (RLNN).

Recent Courses Taught

2021 Artificial Intelligence & Neural Networks; topics included hidden variable stochastic Markovian chains; Boltzman machine models; and reinforcement learning competitions

2016-2021 Mathematical Structures for Computer Science (Rosen's Discrete Mathematics for computer science, data science, computational biology et al.)

2015-2020 Data Mining and Analysis, NLP clustering analysis using online search, using R, Tableau, Python, linear algebra and multivariate inferential statistics for clustering and association predictions, structured and unstructured data, and spectral clustering theory and practice with image processing neural networks; Graduate and under-graduate .

2021 Database Systems for Computer Science

2021 Ethics in Artificial Intelligence & Data Science

2020 Mobile and Distributed Computing Systems; Wireless Communications

2020 Mobile Application Software Development: Android Pie

2018-2021 Modern Software Applications in Data Science: R, Tableau, Julia, Python, and more.

2019 Cybersecurity Competition: SECCDC student competitions

2018-2021 Introduction to Data Science: Basic methods of statistical inference, trending, prediction, clustering, association, and more using R.

2015-2017 Principles of Data Science, Multiple Regression analysis using SQL and Python;Graduate and under-graduate .

2017 Special Topics on Big Data applications and research

2016 Modern Software Applications in Data Science: R, Tableau, Julia, Python, and more.

2017 Parallel Processing and High Performance Computing: OpenMP and Open-MPI programming lectures and assignments, International Online University of Zimbabwe Spring 2017

Recent Journals and Conferences

[1] Wallace, T. et al. (2021), Development of a Software Tool for Identifying Protein Sequence Interdependencies from Multiple Sequence Alignments, Experimental Biology, ASBMB Conference Protein Structure and Biophysics, 2021 April.

[2] Wallace, T. et al. (2021), "PSICalc: Protein sequence interdependency clustering and visualization from multiple sequence alignments" Journal paper in progress.

[3] Wallace, T. (2020). Journal paper in progress "Theory and Proof of Eigenvalue Distributions for Random Genetic Mutation Sequences in Identical and Independently Distributed Multivariate Binary Tree", supported in part by Provost Faculty Summer Research Grant 2017.

[4] Wallace, T. (2018, June). "Recent Progress on Distributions of Random Mutation Sequences" CSC 2018: Health Sciences, "Discovery in the Sciences: Research Updates in Basic and Biomedical Sciences" , Nashville, Tennessee.

[5] Wallace, T. (2017, June). Investigation of Binary Tree Model for Random Mutation Sequences. CSC 2017: Application of Computer Science and Mathematics to Biological Systems, Nashville, Tennessee.

[6] Wallace, T. (2016, June). Leveraging Data Science for Benevolence in the New Millennium. CSC 2016 Justice: Meaning and Practice, Nashville, Tennessee.

[7] Wallace, T. (2015). Application of Subspace Clustering in DNA Sequence Analysis. Journal of Computational Biology., doi: 10.1089/cmb.2015.0084. (peer-reviewed)

[8] Wallace, T. et al. (2014). Kaczmarz Iterative Projection and Nonuniform Sampling with Complexity Estimates. Journal of Medical Engineering., doi: http://dx.doi.org/10.1155/2014/908984. (peer-reviewed)

[9] Wallace, T. (2014). Development of Subspace Techniques for Kaczmarz Reconstruction and Genetic Sequence Clustering, T. Wallace, 2014/2016 publication date, Dissertation

[10] Wallace, T. (2013). Investigation of Subspace Algorithms for Protein Sequence Analysis, 9th Georgia Tech and Emory University International Conference, Genome Biology and Bioinformatics, T. Wallace and A. Sekmen, 2013

[11] Wallace, T. (2013). Acceleration of Kaczmarz Using Orthogonal Subspace Projections, Biomedical Sciences and Engineering Conference (BSEC) T. Wallace and A. Sekmen, 2013, IEEE Vol 1, 4, 21-23, (peer-reviewed)

Recent Presentations and Invited Talks

Fall 2019 Wallace, Computational Physics Career Pathways with Example on Time Dependent Schrodinger Equation Simulations of Electron Tunneling in Finite Potential Well using Fourier Time Numerical Solutions to Partial Differential Equations, presentation and talk by invitation to local university physics department

Fall 2019 Wallace, et al., Science Degrees in the College of Computing and Technology, Nashville, TN.

Spring 2019 Wallace, et al., Technology Degrees in the College of Computing and Technology, Nashville, TN.

2017 Wallace, et al., Future of Technology Degrees, National Guard, Nashville, TN.

2017 Wallace and et al., Future of Technology Degrees, Robotics class, Franklin, Tennessee.

2017 Wallace, T., Binary Tree Model for Random Mutation Sequences. Provost Insight Presentation, Application of Computer Science and Mathematics to Biological Systems, Nashville, Tennessee.

2017 Wallace, T., Research Topics in Emerging Technology, The Nashville Tech Summit, Nashville, Tennessee.

2016 Visiting STEM day faculty talk, local University, Nashville, TN, 2016

May 2015 Bayesian Inference in Data Sciences for Research Methods Class, May 2015, Nashville, TN

Student Research Seminar on Subspace Clustering in Data Sciences, May 2015, Tennessee State University, Nashville, TN

2015 Annual Workshop on Data Sciences, Subspace Clustering and High-Dimensional Data Analysis, Subspace Clustering of Orthologous Genomic Sequences, April 2015, Tennessee State University

2014 Subspace Clustering of Orthologous Genomic Sequences, September 2014, R&D Seminar, Tennessee State University

2014 Computed Tomography Complexity Using Orthogonal Subspace Projections, , December 2014, local State University

Community and Professional Service Appointments

2020-2021 Academic Curriculum Team Committee

2018-2021 Council for University Center for Data Analytics and Informatics Board Member

2015-2016 Faculty mentor and adviser for Upsilon Pi Epsilon Honor Society

2015-2019 Faculty mentor, adviser, chair or committee, for Student Scholars Symposium, multiple students

2015-2019 Presidential Scholars faculty representative

2015-2019 Provost Scholars faculty representative

2006-present American Cancer Society supporter

2016-2019 International Student Scholarship Fund supporter

Professional Societies

ACM Association for Computing Machinery

SIGKDD	Special Interest Group on Knowledge Data and Discovery
IEEE	Institute of Electrical and Electronics Engineers
APS	American Physical Society

Honors and Awards

2020	Nominated Outstanding Teacher in College for University
2017	Awarded Provost summer research grant for winning proposal on method and models for multivariate statistical prediction in high-dimensional spaces with mathematical proofs, College of Computing and Technology
2016-17	Researcher of the Year Award 2016-17, College of Computing and Technology
2013-14	Outstanding graduate student award for Academic Excellence, College of Engineering, Tennessee State University
	NASA recognized author of intellectual property embodied in software for in silico atomic and molecular electromagnetic in-homogeneous radiative transfer code

Professional Development

2015-2021	Engagement training ERP System management
2015-2021	Engagement virtual classroom enhanced learning methods and technology strategies
2015-2021	Engagements in many areas of leadership, teaching, etc., approximately 5 units per year.
2021	Engagements use of blackboard for content delivery in remote teaching

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