

DAVID O NAHMIA, PH.D.

 [HTTP://WWW.DNAHMIA.COM](http://www.dnahmias.com)

@ [DNAHMIA1@GMAIL.COM](mailto:dnahmias1@gmail.com)

RESEARCH INTERESTS

As a data scientist with an engineering background, my goal is to extract knowledge and construct narratives from complex data-sets to drive informed decision-making.

My current research interests are broadly in data science, machine learning, and statistical signal processing with biomedical applications, particularly for medical device alarm algorithms and computational neuroscience.

I am also interested in applying these technical skills to other interesting domains with challenging problems.

EDUCATION

University of Maryland

PH.D. ELECTRICAL AND COMPUTER ENGINEERING

College Park, MD

Conferred: May 2020

M.S. ELECTRICAL AND COMPUTER ENGINEERING

Conferred: Dec. 2018

- Ph.D. Dissertation: *Advances in Quantitative Characterizations of Electrophysiological Neural Activity.*

Directed by: Dr. Kimberly L. Kontson (FDA) & Prof. Jonathan Z. Simon (UMD)

- Coursework: Statistical Pattern Recognition; Neural Modeling; Advanced Numerical Optimization; Image Understanding; Harmonic Analysis; Selected Topics in Analysis: Wavelets, Time-Frequency Analysis, and Frames; Advanced Digital Signal Processing; Random Processes in Communication and Control; Information Theory; Optimal Control; Embedded Systems; Intellectual Property Seminar; Microelectronics Seminar.

Audited: Neural Basis of Human Movement; Estimation and Detection Theory; Unsupervised Learning; Mathematical Methods in Machine Learning; Computational Linguistics I.

Swarthmore College

Swarthmore, PA

B.S. ENGINEERING (EMPHASES: ELECTRICAL ENGINEERING AND ROBOTICS)

Conferred: June 2014

B.A. MATHEMATICS (EMPHASIS: STATISTICS)

Conferred: June 2014

- Engineering Design Thesis: *Electromyography Analysis and Recognition for Human Device Interface.*
 - Mathematics Thesis: *Development and Applications of Wavelets in Signal Processing.*
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WORK & RESEARCH EXPERIENCE

FDA (U.S. Food and Drug Administration)

White Oak, MD

RESEARCH ELECTRICAL ENGINEER

09/'19 – Present

- Staff researcher and medical device consultant in the Advanced Patient Monitoring and Controls (APMC) group in the Division of Biomedical Physics (DBP) under the Office of Science and Engineering Laboratories (OSEL) in the Center for Devices and Radiological Health (CDRH).
- Conduct research to advance regulatory science through better understanding and analysis of intelligent medical device alarm algorithms for patient monitoring applications through quantitative metrics and database testing.
- Consult and provide regulatory and technical recommendations on medical device submissions in the patient monitoring, digital health, and software as a medical device (SaMD) space.

reNu Data, LLC

Gaithersburg, MD

DATA SCIENCE CONSULTING, FOUNDER & OWNER

01/'19 – Present

- Data science, machine learning, and statistical consulting firm focusing on local technology companies.
- Client domains have included: biotechnology, finance, and education.
- Aid clients with large amounts of data but without in-house technical expertise to analyze and interpret public and proprietary data.
- Outcomes of consulting contracts have led to improved product performance, new product features, and directed future product development.

Global Enrichment Inc.

Rockville, MD

INFORMATION TECHNOLOGY (I.T.) CONSULTANT

09/'15 – Present

- I.T. consultant and substitute instructor for after school program that focuses on French immersion programming and enrichment.
- Manage and support the school's technology infrastructure including computer hardware, software, networking, virtualization, mobile/tablet computing, cloud resources, and virtual instruction.

FDA (U.S. Food and Drug Administration)

White Oak, MD

ORISE (OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION) FELLOW

09/'16 – 08/'19

- Research fellow in the Human-Device Interaction (HDI) group in the Division of Biomedical Physics (DBP) under the Office of Science and Engineering Laboratories (OSEL) within the Center for Devices and Radiological Health (CDRH).
- Conduct research and analyses on clinical trials data from electroencephalography (EEG) through machine learning and statistical signal processing.
- Research projects have included: novel methods of evaluating inter- and intra-subject consistency as well as epoch-time dependence of quantitative EEG features, novel deep learning and feature-based classifications of patient characteristics using solely EEG, EEG connectivity analyses of neural activity in healthy and clinical populations, and novel methods of physiological signal quality assessment.

University of Maryland-College Park: School of Public Health **College Park, MD**

G.A. (GRADUATE ASSISTANT) 09/'15 – 08/'16

- Manage and support the School of Public Health's technology infrastructure.
- Support and troubleshoot computer hardware, software, servers, networking, virtualization, mobile/tablet computing, cloud resources, database, and enterprise systems.

Epic Systems Corporation **Madison, WI**

SERVER SYSTEMS ENGINEER 08/'14 – 08/'15

- Unix database administrator and Caché system manager.
- Manage Epic's database system, via InterSystem's Caché database, both through development and implementation of database server systems for new Epic customers and support of existing implementations of Epic software at various health organizations.
- Implemented and managed infrastructure of a new deployment of Epic at regional hospital while advising on purchases and interfaces from server to application, network and other peripheral systems.

NIST (National Institute of Standards and Technology) **Gaithersburg, MD**

SURF (SUMMER UNDERGRADUATE RESEARCH FELLOWSHIP) RECIPIENT 05/'13 – 08/'13

- Done in the Intelligent Systems Division of the Engineering Lab (E.L.) at NIST. Managed a full independent project on AGV (Autonomously Guided Vehicle) obstacle detection and avoidance.
- Designed and constructed mechanical system to move obstacles with programmable displacement and velocity. Furthered AGV's sensing ability and testing procedures for industry standards.

Swarthmore College: I.T.S. (Information Technology Services) **Swarthmore, PA**

SEED (SUMMER EDUCATIONAL E-PROJECT DEVELOPMENT) INTERN 05/'12 – 08/'12

- Software engineering position that demanded learning new languages and software packages as each project was developed in a collaborative environment.
- Developed websites for psychology experiments using JavaScript and libraries such as jQuery and Raphaël along with Google analytics. Created assignments and solutions that became the foundation of WeBWorK assignments for introductory math courses at Swarthmore.

Swarthmore College: Engineering Department **Swarthmore, PA**

T.A. (TEACHING ASSISTANT) 01/'12 – 06/'14

- Led problem sessions for students to assist with weekly homeworks, tutored students one-on-one as needed, guided review sessions for exams and grade homework assignments.
- Electrical Circuit Analysis (Fall 2012, Fall 2013)
- Linear Systems Analysis (Spring 2013)

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- Experimentation for Engineering Design (Spring 2013, Spring 2014)
- Control Theory and Design (Spring 2014)

Swarthmore College: Psychology Department

Swarthmore, PA

RESEARCHER

09/'11 – 06/'14

- Independently designed and conducted eye-tracking experiments that determined bilinguals represent novel, code-switched, sentence structures in the brain as valid abstract sentence structures.
- Presented at the CUNY Conference on Human Sentence Processing March 2012 as the only undergraduate presenting. Presented at the Association for Psychological Science (APS) convention May 2013. Currently analyzing further results and intend to co-publish findings.

SKILLS, CERTIFICATES, AWARDS AND EXTRAS

Computer Skills

- Programming Languages: Python, C, M/MUMPS, HTML/CSS, JavaScript, MATLAB, Mathematica, R.
- Software Packages: Data science tools in Python (Including but not limited to: NumPy, SciPy, Pandas, SciKit-Learn, PyTorch, TensorFlow, Keras, OpenCV), Caché, L^AT_EX, LabVIEW, TI's CCS & RTOS, GPU programming via CUDA, Microsoft Office Suite (Word, Excel, PowerPoint, OneNote), Adobe (Photoshop, Illustrator), EXBuilder, EyeLink II, Audacity, VirtualDJ.
- Operating Systems: Windows OS, Windows Server, OS X, RHEL, AIX (IBM), HP-UX & other Unix platforms.
- ARM Processors: TI's BeagleBone Black, Raspberry Pi & Arduino; Use of I2C and SPI for GPIOs from A/D converters and other sensors.

Languages (non-programming)

- Fluent in English, French & Moroccan Arabic.
- Proficient in Modern Standard Arabic & Hebrew.
- Beginner in Spanish.

Selected Certificates

- Ham Radio License, Call Sign: KB3JHA.
- Reviewer Certification Program (RCP) completed at U.S. FDA\CDRH.
- Linux Professional Institute 101 Exam, score 700/800 (500/800 needed).
- Red Hat Enterprise Linux (RHEL) 6 trained.
- Caché System Manager certified by Epic.
- Dentsply Complete Denture certificate.
- NYSCA certified for Volleyball.
- Machine shop trained by NIST.

Selected Awards

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- Recipient of the 2018 Graduate Student Service Award from the Department of Electrical and Computer Engineering at UMD.
- Recipient of a ORISE (Oak Ridge Institute for Science and Education) graduate research fellowship to conduct research at the FDA beginning fall 2016 through summer 2019 for ECE PhD program at UMD.
- Recipient of a Joshua Lippincott Fellowship in 2015, for graduate program at the University of Maryland-College Park.
- Recipient of The Albert Vollmecke Engineering Award for 2014, awarded upon graduation.
- Certificate of Merit from State of Maryland, 2010.
- College Board AP Scholar, 2010.

Selected Memberships

- Student member of Institute of Electrical and Electronics Engineers (IEEE) and the Engineering in Medicine and Biology Society (EMBS), since 2018.
- Nominated and elected as an associate member of Sigma Xi, Scientific Research Honors Society, since 2012.

Selected Extracurriculars

- President of Electrical and Computer Engineering Graduate Student Association at University of Maryland.
- President of Swarthmore Society of Engineers.
- Volleyball, captain of collegiate team at Swarthmore College and member of club team at University of Maryland.
- Music development via software and DJ-ing events.
- Wood-working and carving.

SELECTED PUBLICATIONS AND TALKS

- [1] **Nahmias, D.** (2020) *Advances in Quantitative Characterizations of Electrophysiological Neural Activity*. Ph.D. Dissertation. University of Maryland.
<https://doi.org/10.13016/j2li-dyvw>
- [2] **Nahmias, D.** & Kontson, K. *Quantifying Signal Quality from Unimodal and Multimodal Sources: Application to EEG with ocular and motion artifacts*. Submitted for publication, May 2020.
- [3] **Nahmias, D.** & Kontson, K. *Easy Perturbation EEG Algorithm for Spectral Importance (easyPEASI): A simple method to identify important spectral features of EEG in deep learning models*. 26th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD '20). Virtual Event, USA.
Invited for oral presentation in applied data science track (one of 44/756 accepted).
<https://doi.org/10.1145/3394486.3403289>
- [4] **Nahmias, D.**, Civillico, E. & Kontson, K. *Deep Learning and Feature Based Medication Classifications from EEG in a Large Clinical Data Set*. Nature Scientific Reports.

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In Press. Available online August 26, 2020.

- [5] **Nahmias, D.**, Kontson, K., Soltysik, D. & Civillico, E. (2019) *Consistency of Quantitative Electroencephalography Features in a Large Clinical Data Set*. Journal of Neural Engineering. 16(6).
<https://doi.org/10.1088/1741-2552/ab4af3>
- [6] **Nahmias, D.** & Kontson, K. (March 2019) *EEG Spectral Connectivity Analysis in a Large Clinical Population*. 9th International IEEE EMBS Conference on Neural Engineering (NER '19). San Francisco, CA.
<https://doi.org/10.1109/NER.2019.8716884>
- [7] **Nahmias, D.**, Kontson, K. & Civillico, E. (November 2017) *Learning EEG: Identification of novel electroencephalogram classifications and variability of baseline features in a large clinical dataset*. International Symposium on Wearable and Rehabilitation Robotics (WeRob2017). Houston, TX.
<https://doi.org/10.1109/WEROB.2017.8383856>
- [8] **Nahmias, D.** (2014) *Electromyography Analysis and Recognition for Human Device Interface*. Engineering design senior thesis.
<http://hdl.handle.net/10066/14256>.
- [9] **Nahmias, D.** (2014) *Development and Applications of Wavelets in Signal Processing*. Mathematics senior paper. [See site for report](#).
- [10] **Nahmias, D.** (April 2015) *SRT51: Disaster Recovery Panel*. Led Systems Round-Table (SRT), part of eXpert Group Meeting (XGM), presentation at Epic. Verona, WI.
- [11] **Nahmias, D.** (May 2014) *Electromyography Analysis and Recognition for Human Device Interface*. 2014 Swarthmore Agora Talks. Swarthmore, PA.
- [12] **Nahmias, D.**, Thothathiri, M. & Grodner, D. (November 2013) *Online processing of multilingual (code-switched) sentences*. Poster presentation at Sigma Xi Student Research Poster Session. Swarthmore, PA.
- [13] **Nahmias, D.** (August 2013) *Design and construction of Computer Controlled Test Piece/Mannequin Mover (CCTPMM) for autonomous vehicles*. NIST SURF research talk and presentation. Gaithersburg, MD. Grant №70NANB13H067.
- [14] Thothathiri, M., **Nahmias, D.** & Grodner, D. (May 2013) *Online processing of multilingual (code-switched) sentences*. Poster presentation at Association for Psychological Science (APS) Conference. Washington, D.C..
- [15] **Nahmias, D.**, Thothathiri, M. & Grodner, D. (November 2012) *Priming during real-time comprehension of code-switched utterances*. Poster presentation at Sigma Xi Student Research Poster Session. Swarthmore, PA.

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- [16] Thothathiri, M., Grodner, D., **Nahmias D.** & Puentes, M. (March 2012) *Priming during real-time comprehension of code-switched utterances*. Poster presentation at CUNY Conference on Human Sentence Processing. New York, NY.