

Brandon Oubre, PhD

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Research Interests

Mobile health and health informatics, with a focus on digital, quantitative behavioral assessment of neurologic disease signs.

Professional Experience

Harvard Medical School, Massachusetts General Hospital

Research Fellow in Neurology

Boston, Massachusetts

Sept. 2022 – Present

Biogen Digital Health

Research Intern: Movement Data Analyst

Cambridge, Massachusetts

June 2021 – Aug. 2021

UMass Amherst Manning College of Information and Computer Sciences

PhD Student (Advised by Prof. Sunghoon Ivan Lee)

Amherst, Massachusetts

Sept. 2017 – Aug. 2022

CenturyLink

Software Developer II

Monroe, Louisiana

June 2015 – Aug. 2017

NASA Johnson Space Center

Software Engineering Intern

Houston, Texas

May 2014 – July 2014

NASA Ames Research Center

Software Engineering Intern

Mountain View, California

June 2013 – Aug. 2013

Education

University of Massachusetts Amherst

PhD Computer Science **Outstanding Dissertation Award**

Amherst, Massachusetts

September 2022

University of Massachusetts Amherst

MS Computer Science

Amherst, Massachusetts

May 2020

Louisiana State University

BS Computer Science and BS Mathematics

Baton Rouge, Louisiana

May 2015

Honors and Awards

- 2022 **Outstanding Dissertation Award**, Manning College of Information and Computer Sciences
- 2022 **Featured Article**, IEEE Transactions on Biomedical Engineering
- 2022 **Dissertation Writing Fellowship**, Manning College of Information and Computer Sciences
- 2020 **Featured Article**, IEEE Transactions on Neural Systems and Rehabilitation Engineering
- 2019 **NSF GRFP Honorable Mention**, NSF Graduate Research Fellowship Program
- 2019 **NSF Student Registration Award**, IEEE BHI/BSN '19
- 2017 **Graduate School Fellowship**, Manning College of Information and Computer Sciences
- 2017 **James Kurose Scholar**, Manning College of Information and Computer Sciences
- 2015 **Outstanding Thesis Award**, Louisiana State University Honors College
- 2015 **University Medalist**, Louisiana State University
- 2014 **Barry M. Goldwater Scholar**, Barry Goldwater Scholarship and Excellence in Education Foundation
- 2014 **Official State Commendation**, Louisiana Senate Resolution SR39
- 2013 **Clayton Engineering Excellence Award**, Louisiana State University College of Engineering
- 2011 **LA-STEM Research Scholarship**, Louisiana State University Office of Strategic Initiatives

Academic Service

- 2023 **Associate Editor**, IEEE Int. Engineering in Medicine and Biology Conference (EMBC)
- 2023 **Publicity Chair**, IEEE-EMBS Int. Conf. Wearable Implantable Body Sensor Netw. (BSN)
- 2023 **Peer Review**, IEEE TNSRE, JNER, Sensors, Frontiers Bioeng. Biotechnol.

Publications

Journal Publications

- [J1] N. M. Eklund, **B. Oubre**, A. C. Luddy, F. Yang, S. Patel, J. D. Schmahmann, C. D. Stephen, and A. S. Gupta, “The influence of self-reported depression on motor and non-motor components of patient-reported outcome measures in cerebellar ataxias,” *The Cerebellum*, [In Preparation].
- [J2] A. Nunes, S. Patel, **B. Oubre**, et al., “Neurobooth: A digital behavioral assessment platform to catalyze the use of artificial intelligence in neurology,” [In Preparation].
- [J3] K. Vattis, **B. Oubre**, A. C. Luddy, J. S. Ouillon, N. M. Eklund, C. D. Stephen, J. D. Schmahmann, A. S. Nunes, and A. S. Gupta, “Sensitive quantification of cerebellar speech abnormalities using deep learning models,” *IEEE Access*, [Minor Revisions].
- [J4] J.-F. Daneault, **B. Oubre**, J. G. V. Miranda, and S. I. Lee, “Understanding voluntary human movement variability through data-driven segmentation and clustering,” *Frontiers Human Neurosci.*, [Accepted].
- [J5] **B. Oubre** and S. I. Lee, “Detection and assessment of point-to-point movements during functional activities using deep learning and kinematic analyses of the stroke-affected wrist,” *IEEE J. Biomed. Health Inform.*, [Accepted].
- [J6] J. Lee, **B. Oubre**, J.-F. Daneault, S. I. Lee, and A. S. Gupta, “Estimation of ataxia severity in children with ataxia-telangiectasia using ankle-worn sensors,” *J. Neurology*, Jul. 2023.
- [J7] Y. Liu, **B. Oubre**, C. Duval, S. I. Lee, and J.-F. Daneault, “A kinematic data-driven approach to differentiate involuntary choreic movements in individuals with neurological conditions,” *IEEE Trans. Biomed. Eng.*, vol. 69, no. 12, pp. 3784–3791, Dec. 2022.
- [J8] J. Lee, **B. Oubre**, J.-F. Daneault, C. D. Stephen, J. D. Schmahmann, A. S. Gupta, and S. I. Lee, “Analysis of gait sub-movements to estimate ataxia severity using ankle inertial data,” *IEEE Trans. Biomed. Eng.*, vol. 69, no. 7, pp. 2314–2323, Jul. 2022.
- [J9] **B. Oubre**, S. Lane, S. Holmes, K. Boyer, and S. I. Lee, “Estimating ground reaction force and center of pressure using low-cost wearable devices,” *IEEE Trans. Biomed. Eng.*, vol. 69, no. 4, pp. 1461–1468, Apr. 2022, [Featured Article].
- [J10] **B. Oubre**, J.-F. Daneault, K. Whritenour, N. C. Khan, C. D. Stephen, J. D. Schmahmann, S. I. Lee, and A. S. Gupta, “Decomposition of reaching movements enables detection and measurement of ataxia,” *Cerebellum*, vol. 20, no. 6, pp. 811–822, Dec. 2021.
- [J11] **B. Oubre**, J.-F. Daneault, K. Boyer, J. H. Kim, M. Jasim, P. Bonato, and S. I. Lee, “A simple low-cost wearable sensor for long-term ambulatory monitoring of knee joint kinematics,” *IEEE Trans. Biomed. Eng.*, vol. 67, no. 12, pp. 3483–3490, Dec. 2020.
- [J12] **B. Oubre**, J.-F. Daneault, H.-T. Jung, K. Whritenour, J. G. V. Miranda, J. Park, T. Ryu, Y. Kim, and S. I. Lee, “Estimating upper-limb impairment level in stroke survivors using wearable inertial sensors and a minimally-burdensome motor task,” *IEEE Trans. Neural Syst. Rehabil. Eng.*, vol. 28, no. 3, pp. 601–611, Mar. 2020, [Featured Article].
- [J13] P. Khaloo, **B. Oubre**, J. Yang, T. Rahman, and S. I. Lee, “Nose: A novel odor sensing engine for ambient monitoring of the frying cooking method in kitchen environments,” *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol.*, vol. 3, no. 2, 49:1–49:25, Jun. 2019, ISSN: 2474-9567.

Conference Proceedings

- [C1] **B. Oubre** and S. I. Lee, “Estimating post-stroke upper-limb impairment from four activities of daily living using a single wrist-worn inertial sensor,” in *IEEE EMBS Int. Conf. Biomed. Health Inform.*, IEEE, Sep. 2022.
- [C2] **B. Oubre**, J.-F. Daneault, H.-T. Jung, J. Park, T. Ryu, Y. Kim, and S. I. Lee, “Estimating quality of reaching movement using a wrist-worn inertial sensor,” in *42nd Annu. Int. Conf. IEEE Eng. Medicine Biol. Soc.*, IEEE, Jul. 2020.

Abstracts, Talks, and Posters

- [A1] **B. Oubre**, “Digital and quantitative behavioral phenotyping in neurologic disease,” *ML4Health Seminar Series, Broad Institute*, Feb. 2024, [Upcoming Invited Talk].
- [A2] **B. Oubre**, J.-F. Daneault, K. Whritenour, N. C. Khan, C. D. Stephen, J. D. Schmahmann, S. I. Lee, and A. S. Gupta, “Decomposition of reaching movements enables detection and measurement of ataxia,” *2nd Annu. Massachusetts General Hospital Ataxia Center Symp.*, May 2021, [Invited Talk].
- [A3] **B. Oubre**, K. Whritenour, J.-F. Daneault, A. S. Gupta, and S. I. Lee, “Estimation of ataxia severity using wrist-worn sensors and the finger-to-nose test,” *Nat. Ataxia Found. Ataxia Investigators Meeting*, Mar. 2020.

- [A4] **B. Oubre**, K. Whritenour, J.-F. Daneault, A. S. Gupta, and S. I. Lee, “Estimation of ataxia severity using wrist-worn sensors and the finger-to-nose test,” *1st Annu. Massachusetts General Hospital Ataxia Center Symp.*, Mar. 2020, [Invited Talk].
- [A5] J. Yang, A. Varga, K. Tung, A. Chandra, **B. Oubre**, N. Ramasarma, E. K. Choe, P. Bonato, and S. I. Lee, “A finger-worn sensor network for monitoring the real-world performance of stroke survivors,” *16th IEEE Int. Conf. Wearable Implantable Body Sensor Netw.*, May 2019.

Teaching Experience

COMPSCI 590W / INFO 390W: Health Informatics and Data Science

UMass Amherst

Teaching Assistant

Spring 2022

Teaching Assistant

Spring 2021

- Joint masters-level and undergraduate course tailored for students with either clinical or computational backgrounds.
- Developed content for first course offering and refined content in subsequent semester.
- Taught weekly discussion sections and held office hours.
- Nominated for outstanding teaching assistant in Spring 2022.

COMPSCI 240: Reasoning Under Uncertainty

UMass Amherst

Lead Teaching Assistant

Fall 2021

Teaching Assistant

Fall 2020

- Large (over 300 students) undergraduate course covering the fundamentals of counting, probability, and probabilistic reasoning.
- Taught weekly discussion sections, held office hours, and answered student questions.
- As lead TA, managed many aspects of course administration and ensured consistent student experience across discussion sections.
- Nominated for outstanding teaching assistant in Fall 2021.

Outreach and Volunteer Activity

Women in Engineering Day and Girls Inc. Workshops

Amherst, Massachusetts

Co-Organizer, Volunteer

Oct. 2017 – July 2022

FIRST FRC Team 4209

Baton Rouge, Louisiana

Mentor

Jan. 2012 – May 2015

FIRST FTC Tournament

Baton Rouge, Louisiana

Volunteer Judge

Dec. 2014