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 — *Boston, Massachusetts*
Research Fellow in Neurology — *Sept. 2022 – Present*

Biogen Digital Health — *Cambridge, Massachusetts*
Research Intern: Movement Data Analyst — *June 2021 – Aug. 2021*

UMass Amherst Manning College of Information and Computer Sciences — *Amherst, Massachusetts*
PhD Student (Advised by Prof. Sunghoon Ivan Lee) — *Sept. 2017 – Aug. 2022*

CenturyLink — *Monroe, Louisiana*
Software Developer II — *June 2015 – Aug. 2017*

NASA Johnson Space Center — *Houston, Texas*
Software Engineering Intern — *May 2014 – July 2014*

NASA Ames Research Center — *Mountain View, California*
Software Engineering Intern — *June 2013 – Aug. 2013*

Education

University of Massachusetts Amherst — *Amherst, Massachusetts*
PhD Computer Science Outstanding Dissertation Award — *September 2022*

University of Massachusetts Amherst — *Amherst, Massachusetts*
MS Computer Science — *May 2020*

Louisiana State University — *Baton Rouge, Louisiana*
BS Computer Science and BS Mathematics — *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] J.-F. Daneault, **B. Oubre**, J. G. V. Miranda, and S. I. Lee, "Variability in voluntary human movement can be accounted for by a small number of motor primitives," *Frontiers Human Neurosci.*, [Under Review].

[J4] 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].

[J5] **B. Oubre** and S. I. Lee, "Using wearable and deep learning techniques to assess performed movement in stroke survivors: Kinematic analysis of point-to-point movements during functional activities," *IEEE J. Biomed. Health Inform*, [Major Revisions].

[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 Insitute*, 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*