

# Brandon Oubre

RESEARCH FELLOW

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## Education

### University of Massachusetts Amherst

PH.D. COMPUTER SCIENCE

Amherst, Massachusetts

September 2022

### University of Massachusetts Amherst

M.S. COMPUTER SCIENCE

Amherst, Massachusetts

May 2020

### Louisiana State University

B.S. COMPUTER SCIENCE AND B.S. MATHEMATICS

Baton Rouge, Louisiana

May 2015

## Experience

### Harvard Medical School, Massachusetts General Hospital

RESEARCH FELLOW IN NEUROLOGY

Boston, Massachusetts

Sept. 2022 – Present

### UMass Manning College of Information and Computer Sciences

PHD STUDENT (ADVANCED HUMAN HEALTH ANALYTICS LAB, ADVISED BY PROF. SUNGHOON IVAN LEE)

Amherst, Massachusetts

Sept. 2017 – Aug. 2022

### Biogen Digital Health

INTERN: MOVEMENT RESEARCH DATA ANALYST

Cambridge, Massachusetts

June 2021 – Aug. 2021

### CenturyLink

SOFTWARE DEVELOPER II

Monroe, Louisiana

June 2015 – Aug. 2017

### LSU Robotics Research Lab

UNDERGRADUATE RESEARCHER (ADVISED BY PROF. SUPRATIK MUKHOPADHYAY)

Baton Rouge, Louisiana

May 2012 – May 2015

### NASA Johnson Space Center (Wearable Electronics Applications Research Lab)

SOFTWARE ENGINEERING INTERN

Houston, Texas

May 2014 – July 2014

### NASA Ames Research Center

SOFTWARE ENGINEERING INTERN

Mountain View, California

June 2013 – Aug. 2013

## 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**, UMass Amherst 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**, UMass Amherst Manning College of Information and Computer Sciences
- 2017 **James Kurose Scholar**, UMass Amherst 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 Activities and Service

- 2023 **Associate Editor**, IEEE International Engineering in Medicine and Biology Conference (EMBC)
- 2023 **Organizing Committee**, IEEE-EMBS Int. Conf. on Wearable and Implantable Body Sensor Networks (BSN)

# Publications

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## Journal Publications

- [J1] 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.
- [J2] “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.*, Dec. 2022, [Submitted].
- [J3] **B. Oubre** and S. I. Lee, “Towards estimating upper-limb impairment in stroke survivors using a single wrist-worn sensor,” *J. Neuroeng. Rehabil.*, Aug. 2022, [Submitted].
- [J4] 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,” *Ann. Neurology*, Jul. 2022, [Submitted].
- [J5] 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.
- [J6] **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].
- [J7] **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.
- [J8] **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.
- [J9] **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].
- [J10] 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,” *IEEE EMBS Int. Conf. Biomed. Health Inform.*, Sep. 2022, [Accepted].
- [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,” *42nd Annu. Int. Conf. IEEE Eng. Medicine Biol. Soc.*, Jul. 2020.

## Abstracts, Talks, and Posters

- [A1] **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].
- [A2] **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.
- [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,” *1st Annu. Massachusetts General Hospital Ataxia Center Symp.*, Mar. 2020, [Invited Talk].
- [A4] 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

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

UMass Amherst

TEACHING ASSISTANT

Spring 2022

- Small (about 35 students), joint masters-level and undergraduate course tailored for students with both clinical and computational backgrounds.
- Developed and refined course content, held office hours, and taught weekly discussion sections.
- 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 (about 300 students), lower-division undergraduate course covering the fundamentals of counting, probability, and probabilistic reasoning.
- Held office hours, taught weekly discussion sections, 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.

## COMPSCI 590W: Health Informatics and Data Science

UMass Amherst

TEACHING ASSISTANT

Spring 2021

- Small (about 20 students), masters-level course tailored for students with both clinical and computational backgrounds.
- First offering of course; worked with faculty from both the computer science department and medical school to develop course content.

# Outreach and Volunteer Activity

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## Women in Engineering Day and Girls Inc. Workshops

Amherst, Massachusetts

CO-ORGANIZER, VOLUNTEER

Oct. 2017 – July 2022

- Organized (July 2019–Present) and participated in biannual educational outreach workshops for high school girls.
- Lead a workshop (Oct. 2019) and presented an introductory lecture on programming (Oct. 2019, July 2022).
- Guided students in an educational programming activity, where they programmed LED light strips using Arduino and ArduBlock.
- Trained other volunteers and ensured that the workshops ran smoothly.

## FIRST FRC Team 4209

Baton Rouge, Louisiana

MENTOR

Jan. 2012 – May 2015

## FIRST FTC Tournament

Baton Rouge, Louisiana

VOLUNTEER JUDGE

Dec. 2014