

AKSHAY SUJATHA RAVINDRAN

@ akshay.s.ravindran@gmail.com
✉ E413 Engineering Bldg. II, 77204
in linkedin.com/in/akshay-ravindran
github.com/akshaysravindran
📧 https://scholar.google.com/citations?user=jtah_PwAAAAJhl=en
☎ 281.301.9876
📍 Houston, TX, USA
🐦 @AkshaySujatha
🌐 www.akshayravindran.com



RESEARCH INTERESTS


Explainable Deep Learning in Neuroscience Computational Neuroscience Brain-Machine Interfaces
Machine Learning Mindfulness Mobile Brain-Body Imaging Neuroaesthetics

EDUCATION


Ph.D. Electrical & Computer Engineering - Advisor: Dr. Jose Luis Contreras-Vidal Fall 2016-Present
University of Houston, Houston, TX

Bachelor of Technology, Electrical and Electronics Engineering 2015
University of Kerala, Kerala, India


RESEARCH EXPERIENCE

Laboratory for Non-Invasive Brain-Machine Interfaces  Fall 2016–Present
Electrical & Computer Engineering, University of Houston
Supervisor: Jose L. Contreras-Vidal, Ph.D.

1. Performed systematic analysis of explainable deep learning using simulated and real EEG 2020 - 21
2. Nahual: developed a real-time BCI-GAN model to generate immersive digital art 2020 - 21
3. Early detection of the loss of balance in exoskeleton users from EEG 2019 - 20
4. Identified periodic spectral changes associated with guided online Isha Kriya meditation 2019 - 20
5. Developed control strategies for combining FES with robot-assisted gait rehabilitation 2018 - 19
6. Assaying EEG activity in natural real world settings 2017 - Present

Computational Medicine Lab  Spring 2019
Electrical & Computer Engineering, University of Houston
Supervisor: Rose T. Faghih, Ph.D.

1. Point process characterization of heartbeat dynamics

Healthcare Technology Innovation Centre  July 2015–July 2016
Dept. of Electrical & Computer Engineering, Indian Institute of Technology, Madras
Supervisors: Preejith SP, MS; Mohanasankar Sivaprakasam, Ph.D.

1. Estimating blood oxygen saturation using custom wearable device Fall 2015 - Spring 2016
2. Cuffless blood pressure measurement using pulse transit Spring 2016
3. Decoding hand movements from muscle activity using neural networks Fall 2015

FELLOWSHIPS & AWARDS

Graduate Tuition Fellowship 2016-Present
BCI society student award 2021
Cullen Graduate Student Success Fellowship (UH) 2020
Brain-Computer Interface Designers Hackathon Winner (IGS-BOA conference) 2019
Seed Funding for Advanced Computing (UH) 2017
Center for Advanced Computing and Data Science Fellow (UH) 2017
99.9 percentile National Merit Certificate for Science (AISSCE, India) 2009

PUBLICATIONS

Book Chapters

1. Nakagome S, Craik A, **Ravindran AS**, He Y, Cruz-Garza JG, and Contreras-Vidal JL. Springer Handbook of Neuroengineering. In: ed. by Thakor NV. Springer Nature. Chap. Deep learning methods for EEG neural classification. *In Press*.

Publications

1. Paek AY, Brantley JA, **Ravindran AS**, et al. A roadmap towards standards for neurally controlled end effectors. *IEEE open journal of engineering in medicine and biology* 2021;2. DOI: 10.1109/OJEMB.2021.3059161.
2. Cruz-Garza JG, **Ravindran AS**, Kopteva AE, Rivera Garza C, and Contreras-Vidal JL. Characterization of the stages of creative writing with mobile EEG using generalized partial directed coherence. *Frontiers in human neuroscience* 2020;14:533. DOI: 10.3389/fnhum.2020.577651.
3. **Ravindran AS**, Cestari M, Malaya C, et al. Interpretable deep learning models for single trial prediction of balance loss. 2020 IEEE International Conference on Systems, Man, and Cybernetics (SMC) 2020:268–73. DOI: 10.1109/SMC42975.2020.9283206.
4. Nakagome S, Luu TP, He Y, **Ravindran AS**, and Contreras-Vidal JL. An empirical comparison of neural networks and machine learning algorithms for EEG gait decoding. *Scientific Reports* 2020;10:1–17. DOI: 10.1038/s41598-020-60932-4.
5. **Ravindran AS**, Nakagome S, Wickramasuriya DS, Contreras-Vidal JL, and Faghieh RT. Emotion recognition by point process characterization of heartbeat dynamics. *IEEE Healthcare Innovations and Point of Care Technologies* 2019:13–6. DOI: 10.1109/HI-POCT45284.2019.8962886.
6. **Ravindran AS**, Mobiny A, Cruz-Garza JG, Paek A, Kopteva A, and Vidal JLC. Assaying neural activity of children during video game play in public spaces: a deep learning approach. *Journal of neural engineering* 2019;16:036028. DOI: 10.1088/1741-2552/ab1876.
7. Preejith S, **Ravindran AS**, Hajare R, Joseph J, and Sivaprakasam M. A wrist worn SpO₂ monitor with custom finger probe for motion artifact removal. 2016 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC) 2016:5777–80. DOI: 10.1109/EMBC.2016.7592040.

Under Preparation / Review

1. **Ravindran AS**, Cestari M, Malaya C, et al. Decoding neural activity preceding balance loss with and without lower-limb exoskeletons for gait rehabilitation. In: *Scientific Reports*, 2021. *In preparation*.
2. **Ravindran AS**, Upadhyay P, Susheela AT, Contreras-Vidal JL, and Subramaniam B. A longitudinal study of the periodic EEG changes associated with Isha Kriya meditation. In: *Frontiers in Psychology*, 2021. *In review*.

Publicly Contributed Data

1. Cruz-Garza JG, Hendry MF, **Ravindran AS**, et al. Mobile brain-body imaging and audio-visual data of theatrical actors during rehearsal and performances. *Scientific data*. 2021. *In preparation*.
 2. **Ravindran AS**, Cruz-Garza JG, Kopteva A, et al. Multi-modal mobile brain-body imaging (MoBI) dataset for assaying neural and head movement responses associated with creative video game play in children. *IEEE Dataport*. 2017. DOI: 10.21227/H23W880. URL: <http://dx.doi.org/10.21227/H23W880>.
-

TEACHING EXPERIENCE

| | |
|--|-------------|
| Guest Lecturer/ Teaching Assistant at University of Houston, TX <i>Neurohumanities (ECE 6397)</i> | Spring 2021 |
| Summer EEG Bootcamp Lead at University of Houston, TX <i>BRAIN Center Summer workshop series</i> | Summer 2020 |

MENTORSHIP

University of Houston

| | |
|---|---------------------|
| 1. Vidisha Ganesh (Undergrad Trainee, Rice University) | Spring 2021-Present |
| 2. Anjana Ganesh (Undergrad Trainee, UT Austin) | Summer 2020-Present |
| 3. Brett Velasquez (Research Assistant) | Spring 2021-Present |
| 4. Adriana Lopez Cajigas (Undergraduate Trainee, UH) | Spring 2021-Present |
| 5. Karthikeya Gullpalli (High school Trainee, Carnegie Vanguard High School) | Fall 2020-Present |
| 6. Dhivya Venkatraghavan (High school Trainee, Seven Lakes High School) | Spring 2021-Present |
| 7. Adhithi Venkatraghavan (High school Trainee, Seven Lakes High School) | Spring 2021-Present |
| 8. Lakshya Gupta (High school Trainee, Tompkins High School) | Summer 2020-Present |
| 9. Lakshya Gupta (High school Trainee, Tompkins High School) | Summer 2020-Present |
| 10. Anika Patel (High school Trainee, Dulles High School) | Fall 2019-Fall 2020 |
| 11. José Angel Pérez Alonso (International Trainee, UDEM) | Summer 2020 |
| 12. Chase Philip (Undergrad Trainee, UH) | Summer 2020 |
| 13. Christian Alacorn (Undergrad Trainee, UH) | Summer 2020 |
| 14. Devika Dileep (Undergrad Trainee, ASU) | Summer 2020 |
| 15. Yuchien Lin (Undergrad Trainee, UH) | Summer 2020 |
| 16. Jeana Joo (High school Trainee, Klein Cain High School) | Summer 2020 |
| 17. Rhea Phatak (High school Trainee, DeBaKey High School for Health Professions) | Summer 2020 |
| 18. Lanvy Vu (Undergrad Trainee, UH) | Fall 2017 |
| 19. Mominah Shaik (Undergrad Trainee, UH) | Fall 2017 |

Healthcare Technology Innovation Center, IIT-Madras, India

| | |
|--|-------------|
| Deeksha Karanjgaokar, Priyanka Vinod, Ashwin R, Santhana Bharathi N, S Rahul, V Poornima | Summer 2016 |
|--|-------------|

LEADERSHIP

| | |
|---|--------------|
| Treasurer: BRAIN Student Group (UH) | 2021-Present |
| President: BRAIN Student Group (UH) | 2020-21 |
| Secretary: IEEE EMB Chapter Houston Section | 2020-21 |
| Vice President: Graduate and Professional Student Association (UH) | 2018-20 |
| Student Representative: IEEE Section Travancore HUB (R10, Kerala Section) | 2014-15 |
| Chairman: IEEE Student Branch (R10, Kerala Section) | 2014-15 |

PROFESSIONAL SERVICE

1. **Ad hoc reviewer**
IEEE Transactions on Human-Machine System, Neural Networks, Physiological Measurement, Brain Sciences, Journal of Physiology, IEEE EMBC, International Graphonomics conference 2019

2. **President (2020-2021) BRAIN Student Group, UH**
Organized 11 technical workshops specializing in EEG during summer 2020. Personally handled two of the workshops. In addition, organized various networking events.
3. **Vice President (2020-2021) IEEE EMB, Houston Chapter**
Coordinated a panel discussion on career transition for Ph.D. students. Later in collaboration with the NSF IUCRC BRAIN Center, multiple virtual lab tours of ASU and UH labs that do research in various areas of neurotechnology were facilitated.
4. **Vice-President (2018-present) Graduate and Professional Student Association, UH**
Organized over 15 academic and networking events during the term and won the outstanding educational program as well as the outstanding collaboration award for 2019
5. **Graduate AdHoc committee member (2018-19) Graduate School, UH**
Drafting the graduate bill of rights for the university.
6. **Graduate Panelist**
Graduate Orientation (Fall 2019); UH National Society of Black Engineers Student Interaction (Spring 2020)

SOFTWARE PROFICIENCY

1. **Languages:** Matlab, Python (Advanced); R, C, C++ (Basic)
2. **Toolboxes:** EEGLab, FieldTrip, SEREEGA, Keras, Tensorflow, FOOF (Advanced); Pytorch, MNE (Intermediate); visbrain, SIMEEG, Brainstorm (Basic)
3. **Development Environments/ Other Softwares:** Spyder, Microsoft Office, Inkscape, LaTeX (Advanced); Arduino, Adobe Illustrator, Anaconda, Github (Intermediate); Labview, Adobe Premier, IAR workbench, Altium designer (Basic)

PROFESSIONAL AFFILIATIONS

| | |
|---|--------------|
| Institute of Electrical and Electronics Engineers (IEEE) | 2012-Present |
| Brain Computer Interface Society | 2020-Present |
| Building Reliable Advances and Innovation in Neurotechnology Center | 2019-Present |
| Graduate and Professional Student Association | 2018-20 |
| Toastmaster Internationals | 2017-18 |

MEDIA COVERAGE

📺 Videos

1. Neurapod podcast | Neuralink Pros and Cons w/ Akshay Ravindran| Youtube [🔗](#) Feb 2021
2. Self-Conscience/Physical Memory | Kinetic, neurofeedback art installation| Vimeo [🔗](#) May 2020
3. The Nahual Project | Your Brain on Art | Youtube [🔗](#) Nov 2019

LANGUAGES

Proficiency in conversational English, Hindi, Malayalam and Tamil

SCIENCE COMMUNICATION & OUTREACH

- **K12 students lab tour** Spring 2017-present
STEAM outreach-introduce K12 students to the state of the art research related to non-invasive brain-machine interface systems
📍 University of Houston, Houston, TX
- **NAHUAL Project** Fall 2019
STEAM outreach-art science demonstration at the intersection of neuro-engineering, artificial intelligence and visual art
📍 Midtown Arts and Theater Center Houston, Houston, TX

- UTHHealth Stomp Out Stroke Festival
Demonstration of brain imaging devices and rehabilitation robotics to the general public and people affected by stroke
📍 Discovery Green, Houston, TX Summer 2017-2019
- Girls in Engineering
STEAM outreach–Chevron outreach event for inspiring girls to choose STEM career
📍 University of Houston, Houston, TX Spring 2019
- Your Brain on Wine: The Exquisite Corpse
STEAM outreach–demonstrating neuroimaging during wine tasting
📍 Hilton College of Hotel and Restaurant Management, University of Houston, TX Spring 2019
- Your Brain on Art: The Exquisite Corpse
STEAM outreach–demonstrating neuroimaging during collaborative art creation by children
📍 Children’s Museum of Houston, Houston, TX Summer 2017, 2019
- Brain on Art workshop
Workshop and performance on music, improvisation, and technology
📍 University of Houston, Houston, TX Summer 2018
- Your Brain on Music: : The Exquisite Corpse
Demonstrated neuroimaging technology and visualize EEG during live music presentation
📍 Houston Health Museum, Houston, TX Summer 2018
- National Geography Documentary: The Exquisite Corpse
STEAM outreach–demonstrating neuroimaging during painting, music, and dance performance
📍 University of Houston, TX December 2017
- Your Brain on Music
STEAM outreach–demonstrating neuroimaging during music improvisation
📍 Houston Community College Spring Branch Performing Arts Center, Houston, TX Spring 2017
- Your Brain on Art Appreciation
STEAM outreach–demonstrating neuroimaging during art appreciation; over 100 people reached
📍 Indianapolis Museum of Art, Indianapolis Spring 2017