

# Jesus G. Cruz-Garza

## Postdoctoral Fellow

Houston, TX | [jgcruzgarza@houstonmethodist.org](mailto:jgcruzgarza@houstonmethodist.org) | <https://jgcruzgarza.com/> | [Google Scholar](#)

My expertise is in mobile brain-body imaging (MoBI), through mobile EEG. My research is at the intersection of neuroscience, machine learning, engineering, the study of the human creative process. I apply machine learning techniques in mobile brain-body imaging data to identify neural features associated to how humans experience the creative process in real-world and immersive virtual reality settings. I am also experienced with in vivo convection-enhanced drug delivery mechanisms for the brain.

## Research Focus

Mobile Brain-Body Imaging | Mobile EEG | Brain-Computer Interfaces | Neuroaesthetics | Creativity | Machine Learning | Neuro-engineering | Nerve-computer interfaces

## Skills

Mobile Brain-Body Imaging | EEG | Matlab | EEGLAB | Neural Signal Processing | Machine Learning | Deep Learning | Functional Connectivity | Research Supervision and Evaluation | Scientific Outreach | Editor | English (full proficiency), Spanish (native) | Organizational Leadership

## Research Experience

- |                      |   |
|----------------------|---|
| Oct 2021 - Present   | <p>Postdoctoral Fellow<br/>Neural Electrokinetics Laboratory, Dept of Neurosurgery, Houston Methodist Research Institute, Houston TX.<br/>PI: Amir Faraji</p> <ul style="list-style-type: none"> <li>• Brain/nerve-computer interfaces, in augmented reality (AR). Invasive and non-invasive.</li> <li>• Electro-kinetic drug delivery into and from brain tissue.</li> </ul>   |
| Jan 2020 - Sept 2021 | <p>Postdoctoral Associate<br/><b>Design and Augmented Intelligence Laboratory, Cornell University</b>, Ithaca, NY<br/>PI: Saleh Kalantari</p> <ul style="list-style-type: none"> <li>• Neural dynamics associated to retail store design in VR:<br/>Memory recollection of product location in different layout.</li> <li>• Neural markers of landmark recognition in VR.<br/>When people navigate in an urban VR environment, salient features of building landmarks were shown to be associated to theta-band modulation in parietal scalp regions.</li> <li>• Classroom design effect on cognitive performance and neural features.<br/>Neural features in frontal, parietal and occipital regions in frontal, parietal and occipital regions are affected by window placement and room dimensions in a VR classroom.</li> <li>• Navigation-related brain dynamics in a VR pre-occupancy healthcare setting.<br/>The addition of color to highlight architectural features, and enhanced signage, yielded more efficient navigation strategies, and beta-band desynchronization in occipital regions.</li> </ul> |
| 2017-2019            | <p>Graduate Research Fellow: Doctoral Fellowship in High Performance Computing<br/><b>Center for Advanced Computing and Data Science, University of Houston</b>, Houston, TX<br/>PI: Jose L. Contreras-Vidal</p> <ul style="list-style-type: none"> <li>• Multidisciplinary research in neuroaesthetics with mobile brain-body imaging. Co-editor in the book "Mobile Brain-Body Imaging and the Neuroscience of Art, Innovation and Creativity". <i>Springer Series on Bio- and Neurosystems</i>. Springer, 2019.</li> <li>• Developed classical and deep learning techniques for neural feature extraction and visualization in real-world settings with freely moving participants.</li> <li>• Conducted longitudinal assay of individual neural patterns in the creative art over the span of approximately 18 months, developing the first longitudinal EEG dataset in a real-world setting.</li> </ul>  |
| 2014-2017            | <p>Graduate Research Fellow: Doctoral Fellowship in Translational Research<br/><b>Houston Methodist Research Institute-University of Houston</b>, Houston, TX<br/>PI: Jose L. Contreras-Vidal</p> <ul style="list-style-type: none"> <li>• Assaying neural individuality and variation in freely behaving people based on qEEG.<br/>First mobile EEG data collection in hundreds of participants in museum settings.</li> <li>• Functions and Development of Mirror Neuron System.</li> </ul>   |

Neural patterns associated to imitation behaviors in human infants (6-24 mo). Eunice Kennedy Shriver National Institutes of Child Health & Human Development, Program Grant P01 HD064653-01; 2014-2015.

## Teaching Experience

---

2020-2021 Postdoctoral research mentor, Design and Augmented Intelligence Laboratory, Cornell University.  
 2018-2020 Graduate research mentor, NSF Research Experience for Undergraduates, University of Houston BRAIN Center.  
 2014-2018 Graduate research mentor, Laboratory for Noninvasive Brain-Machine Interface Systems, University of Houston.  
 2015-2016 Teaching Fellow for first year Exploratory Studies students at University of Houston, Houston TX.  
 2010-2014 Physics laboratory instructor, Department of Physics, Tecnológico de Monterrey.

## Education

---

2014-2019 Doctor of Philosophy, Electrical and Computer Engineering  
**University of Houston**, Houston, TX  
 Dissertation: Neural Characterization of the Improvisational Creative Process

2009-2014 Bachelor of Science, Engineering Physics  
**Tecnológico de Monterrey**, Monterrey, México

## Awards (Selected)

---

2018 NSF ACACEME Fellowship. Future Faculty training and mentoring program.  
 2017 Fellow Center for Advanced Computing and Data Systems (CACDS) in High Performance Computing (HPC).  
 2015 University of Houston– Methodist Hospital Research Institute Graduate Fellowship in Translational Research.  
 2015 Future Faculty Fellowship at University of Houston.

## Memberships & Associations

---

### Founder

2018-2019 BRAIN Center Student Group, at the University of Houston.

### Executive Board

2018-2019 Co-President. Graduate and Professional Student Association (GPSA), at University of Houston.  
 2017-2018 Treasurer. Graduate and Professional Student Association (GPSA), at University of Houston.

### Member:

2015-Present IEEE, IEEE-EMBS, SFN, SHPE, BCI Society.

## Professional Service

---

2020-Present Review Board Member, Sensors, MDPI. Reviewer, Mobile Brain-Body Imaging. Conference.  
 Reviewer, MDPI: Sensors, Applied Sciences, Reviewer, Groundworks. Arts-inclusive research platform.  
 Brain Sciences, Electronics. Reviewer, Alliance for the Arts and Research Universities.

2019-Present Reviewer, Frontiers in: Neuroscience, Human Neuroscience.

2020 Workshop organizational committee and reviewer. International Conference on Pattern Recognition (ICPR)-  
 International Workshop on Artificial Intelligence for Healthcare Applications (AIHA).

2017-2019 Conference organizational committee and reviewer. Mobile Brain-body imaging and the neuroscience of art,  
 innovation and creativity.

2017-2019 Logistics Coordinator, IEEE Engineering in Medicine and Biology Society, Houston Chapter.

2016-2017 IEEE Graduate Representative Chair, University of Houston.  
 IEEEExtreme Logistics Coordinator.

## Publications

---

1 Book (editor). 2 datasets.  
 10 Peer-reviewed journal articles. 30+ Conference abstracts and presentations.  
 6 Peer-reviewed book chapters. 6 Peer-reviewed journal articles currently in review.  
 4 Peer-reviewed conference articles.