

# Justin A. Brantley



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## RESEARCH INTERESTS

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Brain/Human-Machine Interfaces

Neuro-prosthetics & Exoskeletons

Biomechanics

EEG

EMG

IMUs

Machine Learning

Deep Learning

Motor Control

Bayesian Behavior

## EDUCATION

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Ph.D Electrical & Computer Engineering

Dec 2019

### University of Houston

📍 Houston, TX

- Advisor: Jose Luis Contreras-Vidal, Ph.D
- Thesis: A Noninvasive Neural Interface for Control of a Powered Lower Limb Prosthesis [↗](#)
- NIH Doctoral Fellow—NIH Blueprint Diversity Specialized Predoctoral to Postdoctoral Advancement in Neuroscience (D-SPAN) Award (NIH 1F99NS105210-01) [↗](#)

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M.S., Biomedical Engineering

Dec 2014

### University of New Mexico

📍 Albuquerque, NM

- Advisor: Mahmoud Reda Taha, Ph.D, PEng
- Thesis: A Biomechanical Analysis of One-Third Tubular Plates for the Treatment of Benign Lesions in the Distal Femur. [↗](#)
- *Graduated with Distinction*

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B.S., Mechanical Engineering

Dec 2011

### New Mexico State University

📍 Las Cruces, NM

- Minor: Mathematics
- NIH Building Research Achievement in Neuroscience (BRAiN) Scholar [↗](#)  
Advisor: Elba Serrano, Ph.D

## RESEARCH EXPERIENCE

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Kording Lab [↗](#)

Feb 2020–Present

### Department of Bioengineering, University of Pennsylvania

Supervisor: Konrad Kording, Ph.D.

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Laboratory for Non-Invasive Brain Machine Interfaces [↗](#)

Aug 2014–Jan 2020

### Electrical & Computer Engineering, University of Houston

Advisor: Jose L. Contreras-Vidal, Ph.D.

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UNM Orthopaedic Biomechanics & Biomaterials Laboratory [↗](#)

Aug 2012–Aug 2014


### Dept. of Orthopaedics & Rehabilitation, University of New Mexico

Advisors: Mahmoud Reda Taha, Ph.D, PEng; Deana Mercer, MD;

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Building Research Achievement in Neuroscience (BRAiN)  Aug 2011–May 2012  
**Dept. of Biology, New Mexico State University**  
Advisor: Elba Serrano, Ph.D

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Building Research Achievement in Neuroscience (BRAiN)  Jun 2011 - Aug 2011  
**Department of Bioengineering, Center for NeuroScience**  
**University of Colorado Anschutz Medical Campus**  
Supervisors: Emily Gibson, Ph.D. and Diego Restrepo, Ph.D.






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NASA Lunabotics Mining Competition  Jan 2011 - Aug 2012  
**Dept. of Mechanical Engineering, University of New Mexico**  
Supervisor: Gabe Garcia, Ph.D

## FELLOWSHIPS & AWARDS

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NIH Blueprint D-SPAN Award (F99/K00) Aug 2020  
**K00 Phase: NIH Award 4K00NS105210-03  , DPSAN Biography **

UH Graduate Research Showcase 1<sup>st</sup> Place Poster  Nov 2019  
UH Graduate Research Showcase 3-Minute Thesis (3MT) Finalist  Jan 2019  
SFN Trainee Professional Development Award Nov 2018  
UH Cullen Fellowship Travel Grant  May 2016, Oct 2017, Nov 2018  
NIH Blueprint D-SPAN Award (F99/K00) Sep 2017  
**F99 Phase: NIH Award 1F99NS105210-01  , DPSAN Biography **

1<sup>st</sup> Place Urvis Medh & Betty Barr Award, ECE GRC 2017 May 2017  
UH College of Engineering Future Faculty Program Aug 2016  
MS Defense Passed with Distinction Aug 2014  
UNM Graduate & Professional Student Association Travel Award Feb 2014  
UNM Department of Orthopaedics Research Assistantship Aug 2012  
BP ENDURE BRAiN Cohort Participant  Jan 2011  
**NIH R25GM097633**

NMSU Engineering College Scholarship Aug 2011  
NMSU Regents Scholarship Aug 2007

## PUBLICATIONS

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A list of my publications can be found at:



**\*\* Indicates joint first authorship**

### Book Chapters

1. **\*\*Brantley JA, \*\*Paek A, Steele A, and Contreras-Vidal JL.** Springer Handbook of Neuroengineering. In: ed. by Thakor NV. Springer Nature. Chap. BMI for Upper and Lower Limb Prostheses. *In press.*

## Unpublished Journal Articles

1. **Brantley JA** and Contreras-Vidal JL. Decoding of Phantom Limb Movements from EEG in Lower Limb Amputees. *In preparation*.
2. **Brantley JA** and Kording KP. Bayesball: Bayesian Integration in Professional Baseball Batters. 2022. *Ready to submit*.  
[▶ Neuromatch Conference 4.0 Presentation](#).
3. **Brantley JA**, Luu TP, Nakagome S, and Contreras-Vidal JL. EEG Correlates of Walking During Level Ground to Stair Transitions. 2021. *In review*.

## Journal Articles

1. **Paek AY**, **Brantley JA**, Evans BJ, and Contreras-Vidal JL. Concerns in the Blurred Divisions Between Medical and Consumer Neurotechnology. *IEEE Systems Journal* 2021;15:3069–80.
2. Paek AY, **Brantley JA**, Sujatha Ravindran A, et al. A Roadmap Towards Standards for Neurally Controlled End Effectors. *IEEE Open Journal of Engineering in Medicine and Biology* 2021;2:84–90.
3. **Brantley JA**, Luu TP, Nakagome S, Zhu F, and Contreras-Vidal JL. Full body mobile brain-body imaging data during unconstrained locomotion on stairs, ramps, and level ground. *Scientific data* 2018;5. PubMed PMID: 29989591; PubMed Central PMCID: PMC6038848.
4. Salas C, **Brantley JA**, Clark J, Taha MR, Myers OB, and Mercer D. Damage in a Distal Radius Fracture Model Treated With Locked Volar Plating After Simulated Postoperative Loading. *The Journal of Hand Surgery* 2018;43. PubMed PMID: 29426604; PubMed Central PMCID: PMC6035079.
5. **Cruz-Garza JG**, **Brantley JA**, **Nakagome S**, et al. Deployment of Mobile EEG Technology in an Art Museum Setting: Evaluation of Signal Quality and Usability. *Frontiers in Human Neuroscience* 2017;11. PubMed PMID: 29176943; PubMed Central PMCID: PMC5686057:527.
6. **Luu TP**, **Brantley JA**, Nakagome S, Zhu F, and Contreras-Vidal JL. Electrocortical correlates of human level-ground, slope, and stair walking. *PLOS ONE* 2017;12:1–15. PubMed PMID: 29190704; PubMed Central PMCID: PMC5708801.
7. **Brantley J**, Majumdar A, Jobe JT, Kallur A, and Salas C. A Biomechanical Comparison Of Pin Configurations Used For Percutaneous Pinning Of Distal Tibia Fractures In Children. *The Iowa Orthopaedic Journal* 2016;36. PubMed PMID: 27528850; PubMed Central PMCID: PMC4910788:133.
8. Contreras-Vidal JL, Bhagat NA, **Brantley J**, et al. Powered exoskeletons for bipedal locomotion after spinal cord injury. *Journal of Neural Engineering* 2016;13:031001. PubMed PMID: 27064508.
9. Evans S, **Brantley J**, Brady C, Salas C, and Mercer D. Structures at risk during volar percutaneous fixation of scaphoid fractures: a cadaver study. *The Iowa Orthopaedic Journal* 2015;35:119. PubMed PMID: 26361453; PubMed Central PMCID: PMC4492137.
10. Kontson K, Megjhani M, **Brantley JA**, et al. 'Your Brain on Art': Emergent cortical dynamics during aesthetic experiences. *Frontiers in Human Neuroscience* 2015;9:626. PubMed PMID: 26635579; PubMed Central PMCID: PMC4649259.

## Conference Proceedings

1. **Brantley JA**, Luu TP, Nakagome S, and Contreras-Vidal JL. Prediction of lower-limb joint kinematics from surface EMG during overground locomotion. In: *2017 IEEE International Conference on Systems, Man, and Cybernetics (SMC)*. IEEE. 2017.

2. **Brantley JA**, Luu TP, Nakagome S, and Contreras-Vidal JL. Towards the development of a hybrid neural-machine interface for volitional control of a powered lower limb prosthesis. In: *2017 International Symposium on Wearable Robotics and Rehabilitation (WeRob)*. IEEE. 2017:1–1.
3. Luu TP, **Brantley JA**, Zhu F, and Contreras-Vidal JL. Cortical features of locomotion-mode transitions via non-invasive EEG. in: *2017 IEEE International Conference on Systems, Man, and Cybernetics (SMC)*. IEEE. 2017:2437–41.
4. Luu TP, **Brantley JA**, Zhu F, and Contreras-Vidal JL. Electrocortical amplitude modulations of human level-ground, slope, and stair walking. In: *2017 39th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*. PubMed PMID: 29190704; PubMed Central PMCID: PMC5708801. IEEE. 2017:1913–6.
5. Nakagome S, Luu TP, **Brantley JA**, and Contreras-Vidal JL. Prediction of EMG envelopes of multiple terrains over-ground walking from EEG signals using an unscented Kalman filter. In: *2017 IEEE International Conference on Systems, Man, and Cybernetics (SMC)*. IEEE. 2017:3175–8.
6. **Brantley JA**, Luu TP, Ozdemir R, et al. Noninvasive EEG correlates of overground and stair walking. In: *2016 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*. PubMed PMID: 28325029. IEEE. 2016.
7. Winslow AT, **Brantley J**, Zhu F, Vidal JLC, and Huang H. Corticomuscular coherence variation throughout the gait cycle during overground walking and ramp ascent: a preliminary investigation. In: *2016 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*. PubMed PMID: 28269308. IEEE. 2016:4634–7.

### Publicly Contributed Data



1. **Brantley J**, Luu TP, Zhu F, Nakagome S, and Contreras-Vidal JL. Full body mobile brain-body imaging data (EEG, EMG, and kinematics) during unconstrained locomotion on stairs, ramps, and level ground. 2018. DOI: [10.6084/m9.figshare.5616109.v5](https://doi.org/10.6084/m9.figshare.5616109.v5). URL: [https://figshare.com/articles/EEG\\_Data/5616109/5](https://figshare.com/articles/EEG_Data/5616109/5).
2. Cruz-Garza JG, **Brantley JA**, **Nakagome S**, Kontson K, Robleto D, and Contreras-Vidal JL. Mobile EEG Recordings in an Art Museum Setting. 2017. DOI: [10.21227/H2TM00](https://doi.org/10.21227/H2TM00). URL: <http://dx.doi.org/10.21227/H2TM00>.

### Theses

1. **Brantley J**. A Noninvasive Neural Interface for Control of a Powered Lower Limb Prosthesis. University of Houston, 2019.
2. **Brantley J**. A Biomechanical Analysis of One-Third Tubular Plates for the Treatment of Benign Lesions in the Distal Femur. University of New Mexico, 2015.

## INVITED PRESENTATIONS

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| <ol style="list-style-type: none"> <li>1. Recent Advances in NeuroRobotics for Rehabilitation<br/>  9th International IEEE EMBS Conference on Neural Engineering, San Francisco CA</li> <li>2. Enhancing Neuroscience Diversity through Undergraduate Research Education Experiences (ENDURE) 8th Annual Meeting<br/>  Society for Neuroscience (SFN 2018), San Diego CA</li> </ol> | <p>Mar 2019</p> <p>Nov 2018</p> |
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## PROFESSIONAL AFFILIATIONS

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Institute of Electrical and Electronics Engineers (IEEE)	2016-Present
Society for Neuroscience	2014-Present

## PROFESSIONAL SERVICE

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Ad hoc reviewer: Neuroscience, IEEE Society for Systems, Man, and Cybernetics, BCI Society

## MENTORSHIP

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NSF Research Experiences for Undergraduates (REU) Student <b>Dana Seibert - BS, Mechanical Engineering expected 2020</b>	May 2018 - Present
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## TECHNICAL SKILLS

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**Languages:** (Native) English; (Advanced) Spanish

**Programming:** (Advanced) Matlab, Python; (Basic) C, JavaScript

**Toolboxes/ Libraries:** (Advanced) EEGLab, FieldTrip, Python generic libraries, PyBaseball; (Intermediate) Pytorch, DeepLabCut, VIBE, OpenPose, OpenAI Gym; (Basic) Tensorflow, Brainstorm, AFNI

**Other:** (Advanced) Inkscape, LaTeX; (Intermediate) Illustrator, Anaconda, Github, Markdown, Arduino; (Basic) Labview

## MEDIA COVERAGE

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### News Articles




1. Prosthetics' Signal Processing Connection: Sophisticated Prosthetic Controls Allow Amputees to Engage More Fully in Everyday Life [Special Reports] [↗](#) Jun 2019
2. Researchers Map Brain Activity to Improve Prosthetic Design [↗](#) Nov 2017
3. Researchers Observe Effects of Art on the Brain - Wall Street Journal [↗](#) Dec 2015
4. At the intersection of neuroscience and art [↗](#) Nov 2015


### Videos

1. Your Brain On Art - Exquisite Corpse [↗](#) Oct 2015
2. Minecraft Brainwave Reading Event [↗](#) Aug 2015
3. Dario Robleto: The Boundary of Life is Quietly Crossed [↗](#) Nov 2014

## OUTREACH & SERVICE

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- 2019 REU Camp: Neuro  Summer 2019  
Demonstration of neurotechnology for 2019 UH REU students  
 University of Houston, Houston, TX
- Your Brain on Art: The Exquisite Corpse Summer 2018  
STEAM outreach—demonstrating neuroimaging during art creation  
 Children's Museum of Houston, Houston, TX

- Your Brain on Music: : The Exquisite Corpse Summer 2018  
 Demonstrated neuroimaging technology and recorded EEG during live music presentation  
 📍 Houston Health Museum, Houston, TX
- UTHealth Stomp Out Stroke Festival Summer 2017  
 Demonstration of brain imaging devices and rehabilitation robotics  
 📍 Discovery Green, Houston, TX
- Seminar for Baylor Orthotics & Prosthetics Students Spring 2017  
 Demonstration of brain imaging devices, rehabilitation robotics, and neuro-prosthetics  
 📍 Non-Invasive Brain-Machine Interfaces Lab, University of Houston, Houston, TX
- UTHealth Stomp Out Stroke Festival Summer 2016  
 Demonstration of brain imaging devices and rehabilitation robotics  
 📍 Bray's Bayou, Houston, TX
- Your Brain on Art: The Exquisite Corpse Fall 2016  
 STEAM outreach—demonstrating neuroimaging during art creation  
 📍 Children's Museum of Houston, Houston, TX
- National Engineers Week Spring 2016  
 Demonstration of brain imaging devices and rehabilitation robotics  
 📍 The Children's Museum of Houston, Houston, TX
- Minecraft Mayhem  Summer 2015  
 Recorded brain activity of over 200 children while playing Minecraft  
 📍 The Children's Museum of Houston, Houston, TX
- UTHealth Stomp Out Stroke Festival Summer 2015  
 Demonstration of brain imaging devices and rehabilitation robotics  
 📍 Discovery Green, Houston, TX
- The Menil Collection STEAM Outreach Fall 2014  
 Discussed interface of art and science. Recorded brain activity of 430 participants during weekly four hour session every Saturday for fourteen weeks  
 📍 The Menil Collection, Houston TX
- Middle School Structures Seminar Spring 2014  
 Day long workshop on structures. Provided lessons and demos on the human body as a mechanical structure.  
 📍 Bosque School, Albuquerque, NM
- The Perry Initiative Volunteer Fall 2013  
 Assisted in planning and organization. Led station on engineering in medicine  
 📍 UNM Health Sciences Center, Albuquerque, NM
- FIRST Robotics Mentor (Las Cruces, NM Team) Spring 2012  
 Provided semester-long mentorship to highschool robotics team  
 📍 Las Cruces, NM
- FIRST Robotics Mentor (Deming, NM Team) Spring 2012  
 Provided semester-long mentorship to highschool robotics team  
 📍 Deming, NM

Spring 2012

- FIRST Robotics Competition Volunteer  
Assisted in competition setup and daily maintenance  
📍 NMSU, Las Cruces, NM