Brian A. Cohn

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(323) 455-4184
brian.cohn@usc.edu

Curriculum Vitae

March 24, 2019

Professional Areas

Neuromechanics of vertebrates and robots (Ph.D. Thesis), Application of VR/AR to a clinical exam-room environment, Strategic consulting for biotech artificial intelligence, Data analysis and visualization at scale, design and fabrication of custom scientific equipment.

Academic Summary

University of Southern California *2015-Present*
Ph.D. Computer Science, Viterbi Dean's Doctoral Fellowship

University of Southern California *2018*
Masters Degree - Computer Science

Pitzer College *2014*
B.A. with Honors - Computational Biology

Current Research Support

National Science Foundation Graduate Research Fellowship (GRFP) *2017-2020*
PI: **Brian A. Cohn, M.S.**

2019-2020

Consortium for Technology & Innovation in Pediatrics (CTIP)
An FDA-Funded Medical Technology Accelerator
Co-PIs: **Brian A. Cohn, M.S.**, Christopher Laine, Ph.D.

Experience

USC Viterbi School of Engineering *May 2015 - Present*
Los Angeles, California **Computer Science Ph.D. Student**

- Wrote a neural network learning algorithm to control a human cadaveric hand by its muscles.
- Mentored over 40 industry-projects through the USC Capstone Program
- Designed partnerships with USC, Northeastern University, and Pomona College to host 22 internship fellows with funding or credit, and led teams in designing research-grade code.

Tools: Scala, Python, R.

Swiss Federal Institute of Technology *April 2015 - May 2015*
Zürich, Switzerland **Visiting Computer Scientist**

- Taught biostatistical techniques to 5 professors and 6 students at the Department of Computer Science.
- Presented multiple research talks in Zürich and published research in IEEE EMBC in Milan, Italy.

Tools: Scala, Spark, HDFS, Python, R, Amazon EC2, and MongoDB.

Toyota Motor Sales *January 2015 - April 2015*
Torrance, California **Consultant to**

- Single-handedly developed a crowd-sourced data validation platform that connected with tens of thousands of participants.
- Evaluated the statistical effectiveness of machine learning algorithms implemented.
- Identified significant flaws in a model, and provided exceptional data-driven evidence for the new redesign.

Tools: Amazon Mechanical Turk, Python, R, Scala.

Eli Lilly and Company *September 2013 - May 2014*
Indianapolis, Indiana **Consultant to**

- Interfaced directly with Tony Zhang, the Vice President of R&D-Asia for 9 months.
- Led a team of six people in developing proprietary software to improve patient compliance.
- Wrote a real-time machine-learning pipeline that tags tweets about issues with competing medications.

Tools: AWS, Python, scikit-learn, and R

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Peer-Reviewed Journal Articles

"Autonomous Functional Movements in a Tendon-Driven Limb via Limited Experience" *2019*
Nature Machine Intelligence: Cover Article, March 2019
Marjaninejad A, Urbina-Meléndez D, **Cohn BA**, Valero-Cuevas FJ

"Feasibility Theory reconciles and informs alternative approaches to neuromuscular control" *2018*
Frontiers in Computational Neuroscience
Cohn BA, Szedlák M, Gärtner B, Valero-Cuevas FJ

"Eye histology and ganglion cell topography of northern elephant seals (Mirounga angustirostris)." *2016*
The Anatomical Record, 2016.
Smodlaka H, Khamas W, Palmer L, Lui B, Borovac J, **Cohn BA**, Schmitz L

"Exploring the nature of muscle redundancy via subject-specific and generic musculoskeletal models" *2015*
Journal of Biomechanics, 2015; *Featured Publication*
Valero-Cuevas FJ, **Cohn BA**, Yngvason HF, Lawrence EL

"Retinal topography maps in R: new tools for the analysis and visualization of spatial retinal data." *2015*
Journal of Vision July 2015, Vol.15, 19.
Cohn BA, Wainwright P, Collin S, Schmitz L

Full-length Peer-Reviewed Conference Papers

"Structure of the set of feasible neural commands for complex motor tasks" *2015*
37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society
Valero-Cuevas FJ, **Cohn BA**, Szedlák M, Gärtner B, Fukuda K

Submitted Manuscripts

"Quantifying and attenuating pathologic tremor in virtual reality" *2018*
Quantitative Biology: arXiv.org
Cohn BA, Shah DD, Marjaninejad A, Shapiro M, Ulkumen S, Laine CM, Valero-Cuevas FJ, Hayashida KH, Ingersoll S

Project Involvement

Kaspect Reach A virtual-reality Experience that quantifies symptoms of Tremor in Parkinson's Disease — Co-Investigator
Collaborators: Sarah Ingersoll, Kenneth Hayashida, Francisco J. Valero-Cuevas Active IRB: HS-18-00345

ReachVR Therapeutic application of virtual reality: development of a training system for patients with cerbral palsy — Co-Investigator
Collaborators: Sae Franklin and David Franklin (TUM Institute of Cognitive Systems and TUM Neuromuscular Diagnostics), Francisco J. Valero-Cuevas Active IRB: HS-12-00228, CCI-13-00324

VR-driven muscle coherence A virtual reality system for acquiring muscle coherence patterns under different experimental conditions — Technical Lead
Collaborators: Christopher Laine, Francisco Valero-Cuevas

Kleo Dextrous control of a bio-inspired tendon-driven robot — Responsibilities: Transfer Learning and Data Acquisition
Collaborators: Ali Marjaninejad, Darío Urbina-Meléndez, Francisco J. Valero-Cuevas

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Intellectual Property

Cohn, BA. "METHOD AND APPARATUS FOR CONTINUOUSLY PRODUCING ANALYTICAL REPORTS"
U.S. Patent Application No.: 15/645,860. Jul. 7, 2017.

Cohn, BA. "NON-INTUITIVE MUSCULOSKELETAL MAPPING TO MIXED REALITY"
U.S. Provisional Patent; USC-0237-PRV; 2018-140, Nov. 15, 2018
USC Stevens Center for Innovation, Technology Transfer Office

News and Press

TuniseSoir News	Mar-2019
ScienceDaily	Mar-2019
Nature: Editorial	Mar-2019
Longroom	Mar-2019
Nanowerk	Mar-2019
TechXplore: Robotics	Mar-2019
Neuroscience News	Mar-2019
USC Viterbi School of Engineering	Mar-2019
PCMag	Mar-2019
EurekAlert-AAAS Photo	Mar-2019
EurekAlert-AAAS Article	Mar-2019
USC Daily Trojan	Feb-2019
USC News	Jan-2019
Boston Globe ('Move2Improve')	Jan-2019
PCMag	Sep-2018
InMotion Magazine; Archive	Fall-2018
WITH FoundationVideo	Sep-2018
The Ambient	Sep-2018
Chicaco Now	Sep-2018
KeckGrad Podcast- Keck Graduate Institute	Jul-2018
USC News	Mar-2017
Pitzer College News	Apr-2017
USC-News: Health	Apr-2017
USC-Dornsife News	Apr-2017
Design News	Jun-2016

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Awards and Distinctions

Major Awards

National Science Foundation Graduate Research Fellowship | **Recipient**	Mar-2017
National Science Foundation Graduate Research Fellowship | **Honorable Mention**	Mar-2016
Cancer Research Fellowship, USC Michelson Center for Convergent Bioscience	Apr-2017
USC Viterbi Dean's Doctoral Fellowship	May-2015
Keck Science Department Summer Research Grant	Apr-2013

Distinctions

Finalist, Viterbi Innovation Maseeh Prize Competition	Mar-2019
Finalist, Amazon Alexa Voice Prize Competition - USC Viterbi	Mar-2019
2nd Prize, Consortium for Technology and Innovation in Pediatrics - Pitch Competition, ScaleLA	Jan-2019
Finalist, American Academy of Neurology (AAN) Brain Storm	Apr-2018
HTC Vive Industry Pick, Creating Reality Hackathon	Mar-2017
3rd Place, Oral Presentations. 6th Annual SWOB SICB Meeting	Oct-2017
Top 10 Finalist, USC Stevens Innovator Showcase	Oct-2017
Young Investigator Award, Alternative Muscle Club & Genera Biocells, San Diego, CA	Sep-2017
2nd Prize, USC CancerBase Hackathon	Apr-2017
Top 8 Finalist, Viterbi Innovation Maseeh Prize Competition ($2.5k Award)	Nov-2016
Top 10 Finalist, USC Stevens Innovator Showcase	Oct-2016
Semi-Finalist, Microsoft US Imagine Cup	Dec-2015
USC Health Technology Innovation Fellowship in Digital Health	Aug-2015

Awards

$3,490 Grant, USC Viterbi - Alexa Prize	Mar-2019
$3,000 Grand Prize, Best VR, MIT Media Lab Reality Virtually Hackathon	Jan-2019
$10,000 Grand Prize, USC CBC & WITH Foundation Voice-Computing Hackathon	Jul-2018
Student Travel Grant, De Luca Foundation	May-2017
$10,000 Grand Prize (USC Virtual Medicine Competition) IEEE Standards Association	Oct-2015
Pitzer College Student Research Award	Nov-2013
Pitzer College Student Research Award	Mar-2013

Resources Awarded

$5,000 AWS Credits, USC Maseeh Competition	Mar-2019
$24,000 Rackspace Startup Credits, USC Viterbi Startup Garage	Dec-2015
$5,000 AWS Credits, USC Venture Incubation Program (Virtual Reality)	Nov-2015
$5,000 AWS Credits, USC Venture Incubation Program (Biomedical Compute Cloud)	Nov-2015

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Conference Presentations

Peer Reviewed Abstracts

South West Regional Meeting of Organismal Biologists SICB, UC Irvine, CA — Oct-2017
"Analytics for tendon-driven robotic limb endpoint force production"

37th Annual International IEEE Engineering in Medicine and Biology Society, Milan Italy — Aug-2015
"Structure of the set of feasible neural commands for complex motor tasks"

National Society for Integrative and Comparative Biology, Austin TX — Jan-2014
"Influence of Zooplanktivory on Retinal Ganglion Cell Topography in Labrid Reef Fishes"

Symposia

Talk: NeuroRehab Series, USC Department of Biokinesiology and Physical Therapy — Dec-2018
Invited Demo: WITH Foundation Beta Day, California Community Foundation — Nov-2018
Poster and Demo: USC Virtual Technologies for Health Symposium — Sep-2018
Talk: USC Viterbi School of Computer Science Seminar Series — Aug-2015
Talk: Masters Capstone Research Symposium, Keck Graduate Institute — May-2014
Talk: UC Davis College of Biological Sciences, FishLab — Oct-2013

Peer-Reviewed Posters

Society for Brain Mapping and Therapeutics, Los Angeles, CA — Mar-2019
Society for Neuroscience, San Diego, CA — Nov-2018
Society for Neuroscience, San Diego, CA — Nov-2016
Winter Workshop on Neuromechanics, New Orleans, LA — Jan-2016
39th Annual Conference of the American Society of Biomechanics, Columbus, OH — Aug-2015
25th Annual Conference of the Society for the Neural Control of Movement, Charleston, NC — Apr-2015
Mathematical Bioscience Institute, Ohio State University, Columbus OH — Jul-2013

Non-Academic Presentations

Expo Demo: Special Interest Group on Computer Science Education, Minneapolis MN — Feb-2019
Talk: Microsoft Health, Redmond WA — Jan-2019
Talk: Microsoft General Engineering, Redmond WA — Jan-2019
Talk: Microsoft University Relations, Accessiblity, and Device Teams, Redmond WA — Jan-2019
Talk: USC Body Computing Conference, Los Angeles — Sep-2018
The Southern California Biomedical Council, Los Angeles — Feb-2018
Los Angeles Venture Association, Los Angeles — Feb-2018
Talk: MedTechWorld-West Annual Conference, Anaheim — Feb-2017
Talk: National Science Foundation - Innovation (I) Corps Fall Networking Event — Nov-2015

Teaching

T.A. For Computer Science 401: Capstone — Spring-2018
Professor Jeffrey Miller, Ph.D. Role: Mentored over 30 teams working on industry-academia joint projects, each of 2-8 undergraduate students

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Academic Lectures

Invited *IndustryTalk* — Oct-2018
Keck Graduate Institute, Corporate Partnerships
"The Use of Virtual Reality Platforms for Clinical Applications"

Invited *IndustryTalk* — Jul-2018
Keck Graduate Institute, Corporate Partnerships
"Artificial intelligence as a competitive strategy in biotech"

Invited Lecturer — Feb-2016
USC Marshall School of Business, MBA Program
"Financial analytics and scalable visualizations in R"

Invited Lecturer — May-2015
ETH-Zúrich Department of Computer Science
"Hit-and-Run Sampling of Neuromechanical Polytopes"

Guest Lecture for BME 504 — Oct-2015
USC Viterbi School of Engineering; Graduate School Department of Biomedical Engineering
"Linear program design for tendon driven systems"

Guest Lecture for Neuromuscular Systems — Oct-2014
USC Division of Biokinesiology and Physical Therapy
"Neuromechanical optimization in open source software"
https://github.com/briancohn/biokinesiology

Guest Lecture for Sensory Evolution — Apr-2014
W.M. Keck Science Department
"Retinal Specializations in the Vertebrate Eye"

Panels

Panelist — Dec-2016
BioTech Connection Los Angeles, UCLA

Panelist — Jun-2016
MedTech-World Conference EAST, New York City, NY
"Making Sense of Big Data: Determining Actionable Data & Your Roadmap for Utilization (II)"

Panelist — Feb-2016
Annual Medical Device & Manufacturer - MedTech-World Conference WEST, Anaheim, CA
"Making Sense of Big Data: Determining Actionable Data & Your Roadmap for Utilization (I)"

Corporate Presentations

Eli Lilly and Company Headquarters, Indianapolis, IN — May-2014
"Big Data Analytics in Post-Market Surveillance and Pharmacological Vigilance"

Workshops Led

Invited Speaker — Jul-2018
Keck Graduate Institute, *IndustryTalk*, Claremont CA
"Artificial intelligence as a competitive strategy in biotech"

Workshop Speaker — Aug-2016
Summer School in Computational Sensory-Motor Neuroscience, Minneapolis, MN

PharmaPack North America Conference — Jun-2014
"Driving Pharmaceutical Product Design with Consumer Intelligence"

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Professional Engagement

Journal Reviewer

Nature, Scientific Reports — Jul-2018 - Current
Elsevier, Journal of Biomechanics — Sep-2017 - Current

Society Memberships

Mentor, Children's Hospital of Los Angeles' Center for Innovation Finance Chair, Society for Brain Mapping and Therapeutics, US-USC Chapter
Member, Society for Neuroscience
Member, Society for Integrative and Comparative Biology
Member, Southwestern Regional Meeting of Organismal Biologists
Member, HPC Technical Computing Advisory Panel