Brian A. Cohn

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

Areas of Expertise

Theoretical (and applied) tendon-driven motor control, Application of VR/AR to a clinical exam-room environment, Strategic consulting for biotech artificial intelligence, Data analysis and visualization at scale.

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

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 Theoretical 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**

- 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**

- 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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Publications

Autonomous functional locomotion in a tendon-driven limb via limited experience *2018*
Submitted, Under Evaluation: Nature Machine Intelligence
Marjaninejad A, Urbina-Meléndez D, **Cohn BA**, Valero-Cuevas FJ

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

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

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

"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

"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

"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

Intellectual Property

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

News and Press

PCMag	Sep-2018
WITH FoundationVideo	Sep-2018
The Ambient	Sep-2018
Chicaco Now	Sep-2018
KeckGrad - Keck Graduate Institute	Jul-2018
USC News	Mar-2017
Pitzer College News	Apr-2017
USC-News: Health	Apr-2017
USC-Dornsife News	Apr-2017

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Project Involvement

PD-Paradigm A VR Experience that quantifies symptoms of Tremor in Parkinson's Disease — Co-Investigator
Collaborators: Sarah Ingersoll, Kenneth Hayashida, Francisco Valero-Cuevas

CP-Paradigm A VR-EEG-EMG-DBS assessment platform for children with Cerebral palsy — Co-Investigator
Collaborators: Sae Franklin (TUM Institute of Cognitive Systems), David Franklin (TUM Neuromuscular Diagnostics), Terence Sanger (Children's Hospital of Los Angeles), Francisco Valero-Cuevas

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

Amplify A choose-your-own-adventure style game to provide voice therapy treatment for Cerebral Palsy patients — Co-Investigator
Collaborators: Christopher Laine, Juan Espinoza (Children's Hospital of Los Angeles)

Kleo Dextrous control of a bio-inspired tendon-driven robot — Head of Transfer Learning Effort
Collaborators: Ali Marjaninejad, Darío Urbina-Meléndez, Francisco Valero-Cuevas

Cradle A solution for reducing chronic back pain — Entrepreneurial Lead
HTE@USC Student Project

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
Howard Hughes Medical Institute Research Grant	Apr-2013

Selected Awards

$10,000 Grand Prize, USC CBC & WITH Foundation Voice-Computing Hackathon	Jul-2018
Finalist, American Academy of Neurology (AAN) Brain Storm	Apr-2018
Finalist and 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
Alternative Muscle Club Young Investigator Award, by Genera Biocells	Sep-2017
Student Travel Grant, De Luca Foundation	May-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
Microsoft US Imagine Cup Winter Semi-Finalist	Dec-2015
$24,000 Rackspace Startup Credits	Dec-2015
$5,000 AWS Prize, USC Venture Incubation Program (Virtual Reality)	Nov-2015
$5,000 AWS Prize, USC Venture Incubation Program (Biomedical Compute Cloud)	Nov-2015
$10,000 Grand Prize (USC Virtual Medicine Competition) IEEE Standards Association	Oct-2015
USC Health Technology Innovation Fellowship in Digital Health	Aug-2015
20,000 Compute-Hour Credits, USC HPC Cluster	Nov-2014
Pitzer College Student Research Award	Nov-2013
Pitzer College Student Research Award	Mar-2013

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Talks and Posters

Invited Presentation: USC Body Computing Conference, Los Angeles	Sep-2018
Poster: Society for Neuroscience, San Diego	Nov-2018
Talk: The Southern California Biomedical Council, Los Angeles	Feb-2018
Talk: Los Angeles Venture Association, Los Angeles	Feb-2018
Talk: South West Regional Meeting of Organismal Biologists SICB	Oct-2017
Podium Presentation: Alternative Muscle Club 5th Annual Meeting	Sep-2017
Talk: MedTechWorld-West Annual Conference, Anaheim	Feb-2017
Poster: Society for Neuroscience, San Diego	Nov-2016
Talk: U. of Minnesota Computational Sensory-Motor Neuroscience (CoSMo)	Mar-2016
Poster: Winter Workshop on Neuromechanics, New Orleans	Jan-2016
Talk: National Science Foundation - Innovation (I) Corps Fall Networking Event	Nov-2015
Talk: 37th Annual International IEEE Engineering in Medicine and Biology Society, Milan Italy	Aug-2015
Talk: USC Viterbi School of Computer Science Seminar Series	Aug-2015
Poster: 39th Annual Conference of the American Society of Biomechanics	Aug-2015
Poster: 25th Annual Conference of the Society for the Neural Control of Movement	Apr-2015
Talk: Masters Capstone Research Symposium, Keck Graduate Institute	May-2014
Talk: Masters Project Thesis Defense, Keck Graduate Institute	Apr-2014
Talk: Public Masters Capstone Talk, Keck Graduate Institute	Dec-2013
Invited speaker: UC Davis FishLab	Oct-2013
Talk: Regional Society for Integrative and Comparative Biology, UC Riverside	Oct-2013
Talk: Science Department Symposium, Keck Graduate Institute	Oct-2013
Poster: Mathematical Bioscience Institute, Ohio State University	Jul-2013
Talk: Howard Hughes Medical Institute Student Seminar	Apr-2013

Teaching

T.A. For Computer Science 401: Capstone — Spring-2018
Professor Jeffrey Miller, Ph.D. Role: Mentored over 30 teams, each of 2-8 undergraduate students and liased with project leads with industry partners

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Workshops

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

Panelist — Dec-2016
BioTech Connection Los Angeles, UCLA

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

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

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"

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

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

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

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

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

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

Journal Reviewer

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