

## Curriculum Vitae

October 13, 2020

### Professional Areas

Neuromechanics of vertebrates and robots, Application of AI, VR, and AR to clinical exam-room environments, Strategic consulting for biotech artificial intelligence to Fortune 10 companies, Data analysis and visualization at scale, design and fabrication of custom scientific signal-processing electronics.

### Academic Summary

**Ph.D. - Computer Science, Viterbi Dean's Merit Fellowship** 2020  
*University of Southern California*

**Graduate Certificate - Health Technology and Engineering** 2019  
*University of Southern California*

**M.S. - Computer Science** 2018  
*University of Southern California*

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

### Active Research Support

<https://viterbiinnovation.usc.edu/mousetrap-fund/> 2020-2021  
Co-PIs: Valero-Cuevas FJ and **Cohn BA**

National Science Foundation Graduate Research Fellowship (GRFP)  
PI: **Cohn BA** 2017-2020

Consortium for Technology & Innovation in Pediatrics (CTIP)  
An FDA-Funded Medical Technology Accelerator  
Co-PIs: **Cohn BA** and Laine, CM 2019-2020

USC Marshall School of Business Incubator: Incubated Venture  
Co-PIs: **Cohn BA**, Dr. Kenneth Hayashida, M.D.

### Industry Experience

**Microsoft Research** June 2019 - August 2019  
*Redmond, Washington* **Doctoral Research Intern**

- EPIC (Extended Perception Interaction and Cognition) with [Mar Gonzalez-Franco](#)
- Culminated in a peer-reviewed full-length [article](#) in IEEEVR 2020.

*Tools: Vive Pro and Hololens 2; Unity, C#, R, Python, Bash*

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

- Identified root-cause flaws in a deployed model, and provided exceptional data-driven evidence for the new redesign.
- Single-handedly developed a crowd-sourced data-validation system, connecting over 10k 'Mechanical Turk'ers' to label data.

*Tools: Scala/Spark, AWS mTurk/boto, Python, R*

**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*

**Peer-Reviewed Journal Articles**

- "SnapMove: Movement Projection Mapping in Virtual Reality" 2020  
(Accepted) Proceedings of IEEE AIVR  
**Cohn BA**, Maselli A, Ofek E, Gonzalez-Franco M
- "Simulating clinical confidence intervals for black-box algorithmic predictions of liver steatosis" 2020  
American Association for the Study of Liver Diseases (AASLD 2020)  
**Cohn BA** Munteanu MC, de Ledinghen V, Safadi R, Pavlov C, Gonzalo T, Quiambao R
- "Evaluating serum biomarkers: LiverFASt surrogates of liver fibrosis and steatosis could identify risks in a clinical population experiencing SARS-COV2 infection (COVID)" 2020  
American Association for the Study of Liver Diseases (AASLD 2020)  
Raskin M, Syed S, Corbett E, Sharak Z, Managadze G, Munteanu M, **Cohn BA**, Gonzalo T, Amiel R, Quiambao R
- "The Self-Avatar Follower Effect in Virtual Reality" 2020  
IEEE Conference on Virtual Reality and 3D User Interfaces  
Gonzalez-Franco M, **Cohn BA**, Ofek E, Burin D
- "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**

- "Virtual Reality for Post-Stroke Rehabilitation" 2020  
Proceedings of IEEE VR 2020, March 2020  
Boyd TA, Nahe E, **Cohn BA**, Barmaki R
- "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**

Clinical study in artificial intelligence and health insurance optimization. PI: **Cohn BA**, Co-PI: Kenneth Hayashida, M.D. Active IRB: USC-HS-18-00345

#### **ReachVR** Therapeutic application of virtual reality: development of a neuromotor reflex assessment system — Co-Investigator

Collaborators: Franklin S, Franklin D, (TUM Institute of Cognitive Systems and TUM Neuromuscular Diagnostics), and Valero-Cuevas FJ. Active IRB: HS-12-00228, CCI-13-00324; BaCaTech Grant2

#### **Adventure Biofeedback** A choose-your-own-adventure style game to provide voice therapy treatment for Cerebral Palsy patients

Co-I's: **Cohn BA**, Laine CM

#### **Kleo** Dextrous control of a bio-inspired tendon-driven robot — Responsibilities: Transfer Learning and Data Acquisition

Collaborators: Marjaninejad A, Urbina-Meléndez D, Valero-Cuevas FJ

### Intellectual Property

Cohn, BA. "EFS ID 36180052"

U.S. Provisional Patent Application No.: 62856238. Jun. 3, 2019.

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

Cohn, BA. "METHOD AND APPARATUS FOR CONTINUOUSLY PRODUCING ANALYTICAL REPORTS"

U.S. Patent Application No.: 15/645,860. Jul. 7, 2017.

### News and Press

|   |           |
|---|-----------|
| Science World Report                      | Apr-2019  |
| Electronics Weekly                        | Apr-2019  |
| Elite CME                                 | Apr-2019  |
| UDaily: University of Delaware            | Mar-2019  |
| 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  |

## Awards and Distinctions

### Major Awards

|   |          |
|---|----------|
| National Science Foundation Graduate Research Fellowship   <b>Recipient</b>         | Mar-2017 |
| National Science Foundation Graduate Research Fellowship   <b>Honorable Mention</b> | 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

|  |          |
|--|----------|
| Semi-Finalist, Humana-Mays Healthcare Analytics Case Competition on Opioid Prediction (AUC 0.92)           | Sep-2019 |
| 4th Place, Viterbi Innovation Maseeh Prize Competition   | Mar-2019 |
| 1 <sup>st</sup> Prize, Amazon Alexa Voice Prize Competition - USC Viterbi                                  | Mar-2019 |
| 2 <sup>nd</sup> 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 |
| 3 <sup>rd</sup> Place, Oral Presentations. 6 <sup>th</sup> 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 |
| 2 <sup>nd</sup> 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

|  |          |
|--|----------|
| \$7,500 Grand Prize, USC Viterbi - Alexa Prize                                     | Apr-2019 |
| \$5,000 Legal Support, USC Maseeh Entrepreneurship Prize Competition               | Mar-2019 |
| \$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 |

### Compute 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 |

**Conference Presentations****Peer Reviewed Abstracts**

|  |          |
|--|----------|
| South West Regional Meeting of Organismal Biologists SICB, UC Irvine, CA<br><i>"Analytics for tendon-driven robotic limb endpoint force production"</i>                      | Oct-2017 |
| 37th Annual International IEEE Engineering in Medicine and Biology Society, Milan Italy<br><i>"Structure of the set of feasible neural commands for complex motor tasks"</i> | Aug-2015 |
| National Society for Integrative and Comparative Biology, Austin TX<br><i>"Influence of Zooplanktivory on Retinal Ganglion Cell Topography in Labrid Reef Fishes"</i>        | Jan-2014 |

**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 Neuroscience ( <a href="#">Poster A</a> , <a href="#">Poster B</a> ), Chicago IL | Oct-2019 |
| 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**

|   |          |
|---|----------|
| Talk: Unity for Humanity Summit, San Francisco CA                                       | Oct-2020 |
| Keynote: Foundations of Digital Games "Games for Everyone"; Co-talk with Microsoft XBOX | Aug-2019 |
| Talk: Unity Headquarters, San Francisco CA  | Apr-2019 |
| 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, Accessibility, and Device Teams, Redmond WA       | Jan-2019 |
| Talk: USC Body Computing Conference, Los Angeles  | Sep-2018 |
| Pitch: The Southern California Biomedical Council, Los Angeles                          | Feb-2018 |
| Pitch: 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 |             |

**Academic Lectures**

|   |          |
|---|----------|
| Invited <i>IndustryTalk</i><br>Keck Graduate Institute, Corporate Partnerships<br>"The Use of Virtual Reality Platforms for Clinical Applications"                        | Oct-2018 |
| Invited <i>IndustryTalk</i><br>Keck Graduate Institute, Corporate Partnerships<br>"Artificial intelligence as a competitive strategy in biotech"                          | Jul-2018 |
| Invited Lecturer<br>USC Marshall School of Business, MBA Program<br>"Financial analytics and scalable visualizations in R"  | Feb-2016 |
| Invited Lecturer<br>ETH-Zürich Department of Computer Science<br>"Hit-and-Run Sampling of Neuromechanical Polytopes"  | May-2015 |
| Guest Lecture for BME 504<br>USC Viterbi School of Engineering; Graduate School Department of Biomedical Engineering<br>"Linear program design for tendon driven systems" | Oct-2015 |
| Guest Lecture for Neuromuscular Systems<br>USC Division of Biokinesiology and Physical Therapy<br><a href="#">"Neuromechanical optimization in open source software"</a>  | Oct-2014 |
| Guest Lecture for Sensory Evolution<br>W.M. Keck Science Department<br>"Retinal Specializations in the Vertebrate Eye"  | Apr-2014 |

**Panels**

|   |          |
|---|----------|
| Panelist<br>BioTech Connection Los Angeles, UCLA  | Dec-2016 |
| Panelist<br>MedTech-World Conference EAST, New York City, NY<br>"Making Sense of Big Data: Determining Actionable Data & Your Roadmap for Utilization (II)"                                 | Jun-2016 |
| Panelist<br>Annual Medical Device & Manufacturer - MedTech-World Conference WEST, Anaheim, CA<br>"Making Sense of Big Data: Determining Actionable Data & Your Roadmap for Utilization (I)" | Feb-2016 |

**Corporate Presentations**

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

**Workshops Led**

|  |          |
|--|----------|
| Invited Speaker<br>Keck Graduate Institute, <i>IndustryTalk</i> , Claremont CA<br>"Artificial intelligence as a competitive strategy in biotech" | Jul-2018 |
| Workshop Speaker<br>Summer School in Computational Sensory-Motor Neuroscience, Minneapolis, MN   | Aug-2016 |
| PharmaPack North America Conference<br>"Driving Pharmaceutical Product Design with Consumer Intelligence"  | Jun-2014 |

### **Professional Engagements**

#### **Scientific Advisory Board Member**

ARK Venture Capital,

Aug-2020 - Current

#### **Journal Reviewer**

Nature, Scientific Reports  
Elsevier, Journal of Biomechanics

Jul-2018 - Current  
Sep-2017 - Current

#### **Professional Mentoring**

Mentor, Children's Hospital of Los Angeles' Center for Innovation

#### **Society Memberships**

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