*updated: 2/20*

# Chad McKell

## CONTACT


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## EDUCATION

9/19– **Ph.D. Student, University of California San Diego**, Computer Music
*GPA: 4.0.* Coursework: audio DSP, acoustic modeling, computer graphics, computer animation. Research interests: acoustic and graphic simulation using physical modeling and machine learning. Advisors: TBD.

9/16–10/17 **M.S., University of Edinburgh**, Acoustics and Music Technology
*Graduated with merit.* Coursework: acoustics, audio DSP, physical modeling, complex analysis, speech processing. Research: acoustic simulation. Advisor: Stefan Bilbao.

8/09–12/15 **M.S., Wake Forest University**, Physics

6/02–8/09 **B.S., Brigham Young University**, Biophysics

## ACADEMIC APPOINTMENTS

9/19– **University of California San Diego**, Instructional Assistant/GSR (Music)

9/12–12/12 **University of North Carolina School of the Arts**, Adjunct Instructor (Physics)

9/09–9/11 **Wake Forest University**, Teaching Assistant (Physics)

9/08–6/09 **Brigham Young University**, Tutorial Lab Assistant (Physics)

8/07–3/09 **Brigham Young University**, Research Assistant (Philosophy)

## PROFESSIONAL EMPLOYMENT

7/18–7/19 **Applied Research in Acoustics**, R&D Scientist
Culpeper, Virginia. Developed physics-based signal processing algorithms for naval sonar systems. Processed sound simulations and recordings using methods such as matched filtering and beamforming. Researched sound propagation and reverberation.

10/14–8/16 **J.P. Morgan/Neovest**, Software Development Engineer in Test
Orem, Utah. Developed Java-based automation software for J.P. Morgan's investment trading platform, Neovest. Created object-oriented unit tests to validate new features and locate software bugs.

## CONSULTING

5/18–5/18 **Moog Music**: Audio effects development in C++ for digital and analog synthesizers.

4/17–9/17 **Lofelt**: Audio algorithm development and mathematical modeling for audio-haptic devices, including the Razer Nari Ultimate headsets.

## ACADEMIC RESEARCH ACTIVITIES

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| 1/20– | **University of California San Diego**, Ph.D. Student (Acoustics/Graphics)<br>La Jolla, California. Currently researching physical modeling and maching learning approaches to sound synthesis for computer animation with Shlomo Dubnov. |
| 1/17–8/17 | **University of Edinburgh**, Master's Student (Acoustics)<br>Edinburgh, Scotland. Developed physics-based numerical simulation algorithms of speech sounds and rigid body vibrations with Stefan Bilbao. Study topics included speech synthesis, haptic feedback rendering, modal synthesis, and FDTD methods. |
| 1/10–9/13 | **Wake Forest University**, Master's Student (Optics)<br>Winston-Salem, North Carolina. Achieved the first known realization of transverse particle tracking in surface-isolated laser traps with Keith Bonin. Study topics included laser beam characterization, fluorescence microscopy, particle tracking, and fluid mechanics. |
| 8/07–8/09 | **Brigham Young University**, Undergraduate Student (Biophysics/Philosopy)<br>Provo, Utah. Imaged lipid bilayers exposed to isofluorane using atomic force microscopy. Illustrated and edited two philosophy books published by Indiana University Press. |

## UNIVERSITY TEACHING EXPERIENCE

**UC San Diego**

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| MUS 15 | Interactive Music for Video Games (Teaching Assistant). Winter 2020. |

**UNCSA**

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| SCI 1100 | General Physics (Instructor). Fall 2012. |

**Wake Forest**

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| PHY 114 | General Physics II (Teaching Assistant). Winter 2010. |
| PHY 113 | General Physics I (Teaching Assistant). Fall 2009. |

## PH.D. COURSEWORK

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| CSE 167 | Computer Graphics I (Jürgen Schulze) |
| CSE 168 | Computer Graphics II (Ravi Ramamoorthi) – **planned: Spring 2020** |
| CSE 163 | Advanced Computer Graphics (TBD) – **planned: Spring 2021** |
| CSE 169 | Computer Animation—taken as MUS 298 (Steve Rotenberg) – **current** |
| CSE 291D | Physical Simulation (Steve Rotenberg) – **planned: Spring 2020** |
| CSE 250B | Learning Algorithms (TBD) – **planned: Winter 2020** |
| CSE 253 | Neural Networks for Pattern Recognition (TBD) – **planned: Fall 2021** |
| ECE 251A | Digital Signal Processing I (TBD) – **planned: Fall 2020** |
| MUS 270A | Digital Audio Processing (Tamara Smyth) |
| MUS 270B | Computational Audio Analysis (Miller Puckette) – **current** |
| MUS 270C | Compositional Algorithms (TBD) – **planned: Winter 2021** |
| MUS 270D | Advanced Projects in Computer Music (TBD) – **planned: Fall 2020** |
| MUS 206 | Deep Learning for Music Generation (Shlomo Dubnov) – **planned: Fall 2020** |
| MUS 206 | Computational Acoustic Modeling (Tamara Smyth) – **current** |
| MUS 206 | Pure Data Seminar (Miller Puckette) – **planned: Spring 2020** |
| MUS 267 | Computer Music Programming (Tom Erbe) – **planned: Fall 2021** |
| MUS 201A | Just Intonation (TBD) – **planned: Winter 2021** |

## PUBLICATIONS

### Journal Articles

(1) **C. McKell** and K. Bonin, "Optical corral using a standing-wave Bessel beam," *Journal of the Optical Society of America B*, Vol. 35, No. 8, 1910–1920, 2018.

### Conference Proceedings

(2) **C. McKell**, "Sonification of Optically-Ordered Brownian Motion," Proceedings of the International Computer Music Conference (ICMC), Utrecht, Netherlands, September 2016.

### Master's Theses

(3) **C. McKell**, *Real-Time Physical Modeling for Haptic Feedback Rendering*, Final Project Dissertation, University of Edinburgh, Acoustics and Audio Group, 2017.

(4) **C. McKell**, *Finite-Difference Simulations of Speech with Wall Vibration Losses*, Special Project Dissertation, University of Edinburgh, Acoustics and Audio Group, 2017.

(5) **C. McKell**, *Confinement and Tracking of Brownian Particles in a Bessel Beam Standing Wave*, Master's Thesis, Wake Forest University, Department of Physics, 2015.

### Technical Reports

(6) **C. McKell**, H. Conley, and D. Busath, "AFM Study of Structural Changes in Supported Planar DPPC Bilayers Containing General Anesthetic Isoflurane," Brigham Young University, Paper 827, 2010.

### Conference Abstracts

(7) K. Bonin and **C. McKell**, "Tracking Brownian Particles in a Standing-Wave Bessel Beam 2D Optical Trap," SPIE: Optical Trapping and Optical Micromanipulation, XIV Meeting, 2017.