

Garrett J. Cardon
Au.D., Ph.D., CCC-A

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EDUCATION

Postdoctoral Fellow, 2015-2018

University of Colorado Denver Anschutz Medical Campus, Developmental Psychobiology Research Group. *Mentor*: Don Rojas, Ph.D.

Ph.D. – Neuroscience, Cognitive Science, and Speech, Language, and Hearing Sciences, 2015

University of Colorado at Boulder, Boulder, CO

Dissertation: Somatosensory cross-modal re-organization in children with cochlear implants

Doctoral Advisor: Anu Sharma, Ph.D.

Au.D. – Doctor of Audiology, 2008

University of Colorado at Boulder, Boulder, CO

B.S. – Audiology and Speech Language Pathology, 2004

Brigham Young University, Provo, UT

PROFESSIONAL EXPERIENCE

Assistant Professor (8/2019-present) Communication Disorders and Neuroscience, Brigham Young University

Fellow (8/2019-present) Utah Regional Leadership Education in Neurodevelopmental Disabilities (URLEND)

Research Scientist (2018-2019) Psychology Department, Colorado State University

Funding: NIDCD K01 DC016339-01A1 – Neurophysiological and Behavioral Correlates of Sensory and Communication Dysfunction in Children with Autism Spectrum Disorder

Postdoctoral Research Associate (2015-2018) University of Colorado Denver Anschutz Medical Campus

Research Focus: Neuroimaging and sensory dysfunction in Autism Spectrum Disorder and other developmental disabilities

Funding: National Institutes of Health NIMH T32-MH015442 Institutional National Research Training Award and Developmental Psychobiology Endowment Fund

Mentor: Donald Rojas, Ph.D., Professor, Psychology Department, Colorado State University

AWARDED RESEARCH GRANTS

Cardon, G. (Principle Investigator; Mentor: Don Rojas, Ph.D.) Neurophysiological and Behavioral Correlates of Sensory and Communication Dysfunction in Children with Autism Spectrum Disorder. *National Institutes of Health NIDCD K01 DC016339-01A1- Mentored Career Development Award*. Total Amount: \$394,889. Award Duration: 2018-2021.

Cardon, G. (Principle Investigator) Resting State Functional Connectivity of Sensory Networks in Children with Autism Spectrum Disorder. *Developmental Psychobiology Research Fund Seed Grant*. Total Amount: \$7,500.

Cardon, G. (Principle Investigator; Sponsor: Anu Sharma, Ph.D.) Somatosensory-to-Auditory Cortical Cross-Modal Reorganization in Children with Cochlear Implants. *National Institutes of Health NIDCD F31 DC013218-01A1 - Ruth L. Kirchstein NRSA*. Total Amount: \$105,000. Award Duration: 2013-2015.

SCIENTIFIC PUBLICATIONS

Cardon, G., Sharma, A. (2019) Somatosensory cortical cross-modal reorganization in children with cochlear implants. *Frontiers in Neuroscience*, 13(469).

Cardon, G. (2018). Neural Correlates of Sensory Abnormalities Across Developmental Disabilities. *International Review of Research in Developmental Disabilities* (Vol. 55, pp. 83–143).

Cardon, G., Sharma, A. (2018) Somatosensory cross-modal reorganization in adults with early stage, age related, hearing loss. *Frontiers in Human Neuroscience*, 12(172), 1-11.

McKnight, R. J., Glick, H., **Cardon, G.,** & Sharma, A. (2018). The effects of stimulus rate on ABR morphology and its relationship to P1 CAEP responses and auditory speech perception outcomes in children with auditory neuropathy spectrum disorder: evidence from case reports. *Hearing, Balance and Communication*, 16(1), 1–12.

Cardon, G., Hepburn, S., Rojas, D. (2017) Structural covariance of sensory networks, the cerebellum, and amygdala in individuals with Autism Spectrum Disorder. *Frontiers in Neurology: Applied Neuroimaging*, 8:615

Sharma, A., **Cardon, G.** (2015) Patterns of cortical development and neuroplasticity in children with Auditory Neuropathy Spectrum Disorder. *Hear Res*, 330 (Pt B): 221-232 PMID: [PMC4675684](#)

Sharma, A., Campbell, J., **Cardon, G.** (2015) Developmental and cross-modal plasticity in deafness: Evidence from the P1 and N1 cortical auditory evoked potentials in cochlear implanted children. *Int J Psychophysiol.* 95(2): 135-144. PMID: [PMC4209331](#)

Sharma, A., **Cardon, G.** (2014) Developmental plasticity of the central auditory system: Evidence from deaf children fitted with cochlear implants. In Romand, R., & Varela-Nieto, I. (Eds.) *Development of the auditory and vestibular systems-4e* (pp. 316-331). Waltham, MA: Academic Press

Cardon, G., Sharma, A. (2013) Cortical maturation and auditory skill development in children with auditory neuropathy spectrum disorder who use cochlear implants. *Int J Audiol* 52(9): 577-586. PMID: [PMC3781925](#)

Cardon, G., Campbell, J., Sharma, A. (2012) Plasticity in the developing brain: evidence from children with sensorineural hearing loss and auditory neuropathy spectrum disorder. Accepted for publication: *J Amer Acad Audiol* 23(6): 396-411. PMID: [PMC3733172](#)

Campbell, J., **Cardon, G.,** Sharma, A. (2011) Clinical applications of the P1 biomarker in children with sensorineural hearing loss and auditory neuropathy spectrum disorder. *Semin Hear* 32(2):147-155. PMID: [PMC3782746](#)

Cardon, G., Sharma, A. (2011) Cortical auditory evoked potentials in auditory neuropathy spectrum disorder: clinical implications. *Perspectives on Hearing and Hearing Disorders in Childhood* 21: 31-37

Sharma, A., **Cardon, G.,** Martin, K., Roland, P. (2011) Cortical maturation and auditory skill development in children with auditory neuropathy spectrum disorder. *Int J Audiol* 50: 98-106. PMID: [PMC3735347](#)

MANUSCRIPTS IN PREPARATION

- Cardon, G.**, Rojas, D. (in preparation) Restricted and repetitive behaviors and social communication deficits: their association and underlying functional connectivity in children with Autism Spectrum Disorder
- Cardon, G.**, Sharma, A. (in preparation) Cortical neurophysiological correlates of auditory threshold in adults and children with normal hearing and Auditory Neuropathy Spectrum Disorder. *Hearing, Balance, and Communication*
- Sharma, A., **Cardon, G.** (in preparation) The effect of amplification on cortical synchrony in children with Auditory Neuropathy Spectrum Disorder.

RESEARCH PRESENTATIONS

- Cardon, G.**, Rojas, D. (2019) Resting-State Functional Connectivity of Sensory Networks in Children with Autism Spectrum Disorder. Poster, Annual Meeting of the Organization for Human Brain Mapping, Rome, Italy
- Cardon, G.** (2018) Sensory Dysfunction in Autism Spectrum Disorder: Neural and Behavioral Correlates. Invited presentation, Developmental Psychobiology Research Group, University of Colorado Denver, Anschutz Medical Campus
- Cardon, G.**, Buard, I., Rojas, D. (2018) Neural correlates of observation and imitation of human and robot hand motion in Autism Spectrum Disorder. Poster: Department of Psychiatry, University of Colorado School of Medicine
- Cardon, G.**, Buard, I., Rojas, D. (2017) Neural correlates of observation and imitation of human and robot hand motion in Autism Spectrum Disorder. Poster: Flux Congress
- Cardon, G.** (2017) Functional and morphological connectivity of sensory networks in autism spectrum disorder. Invited presentation, Developmental Psychobiology Research Group, University of Colorado Denver, Anschutz Medical Campus
- Cardon, G.** (2016) Functional and morphological connectivity of sensory networks in autism spectrum disorder. Invited presentation, Developmental Psychobiology Research Group, University of Colorado Denver, Anschutz Medical Campus
- Cardon, G.**, Sharma, A. (2016) Somatosensory-auditory cross-modal reorganization in adults with early stage hearing loss. Poster: annual poster session, Department of Psychiatry, University of Colorado School of Medicine
- Cardon, G.** (2015) Sensory dysfunction in autism spectrum disorder. Invited presentation, Developmental Psychobiology Research Group, University of Colorado Denver, Anschutz Medical Campus
- Cardon, G.**, Sharma, A. (2015) Somatosensory-auditory cross-modal reorganization in adults with early stage hearing loss. Poster: annual convention of the American-Speech-Language-Hearing Association
- Cardon, G.**, Sharma, A. (2015) Cortical neurophysiologic correlates of auditory threshold in normal hearing and Auditory Neuropathy Spectrum Disorder. Poster: annual convention of the American-Speech-Language-Hearing Association
- McKnight, R., Auerbach, M., Landwehr, T., **Cardon, G.**, Sharma, A. (2015) Effects of stimulus rates on auditory brainstem response in patients with Auditory Neuropathy Spectrum Disorder. Poster: annual convention of the American-Speech-Language-Hearing Association
- Cardon, G.**, Sharma, A. (2014) Multimodal cortical mechanisms in sound processing. Poster: Annual poster session, Institute of Cognitive Science, University of Colorado at Boulder
- Cardon, G.**, Sharma, A. (2014) Multimodal cortical mechanisms in sound processing. Poster: Annual meeting of the Cognitive Neuroscience Society, Boston, MA.
- Cardon, G.**, Sharma, A. (2013) Somatosensory-to-auditory cross-modal plasticity in deafness. Poster: Annual meeting of the Society for Neuroscience, San Diego, CA.

- Cardon, G.,** Sharma, A. (2012) Cortical correlates of neural dys-synchrony in auditory neuropathy spectrum disorder. Poster: Annual meeting of the American Auditory Society, Scottsdale, AZ.
- Cardon, G.,** Sharma, A. (2012) Cortical correlates of neural dys-synchrony in auditory neuropathy spectrum disorder. Poster: Annual poster session, Institute of Cognitive Science, University of Colorado at Boulder
- Cardon, G.,** Sharma, A. (2011) Subcortical auditory dys-synchrony affects cortical maturation in children with Auditory Neuropathy Spectrum Disorder. Poster: Front Range Neuroscience Group.
- Syzmanski, A., **Cardon, G.,** Sharma, A. (2011) Evaluation of cortical auditory evoked potential thresholds in a hearing impaired and normal hearing neonate. Poster: Annual conference of the Educational Audiology Association.
- Cardon, G.,** Sharma, A. (2010). Central auditory maturation and auditory skill development in children with Auditory Neuropathy/Dys-synchrony. Research Presentation: Student Research Forum, Convention of the American Academy of Audiology, 2010.
- Sharma, A., **Cardon, G.,** Gilley, P., Nash, A., Wallace, A. (2010). Cortical development and re-organization in children with Auditory Neuropathy/Dys-synchrony. Poster: Association of Research in Otolaryngology Midwinter Meeting.
- Cardon, G.,** Sharma, A., Gabbard, S., Burns, S., Claycomb, S., Lupo, V., Strong, D. (2009). Clinical utility of the P1 cortical auditory evoked potential. Poster: Colorado Academy of Audiology, 2009
- Cardon, G.,** Sharma, A., Martin, K. (2008). Central auditory maturation and speech perception in children with Auditory Neuropathy/Dysynchrony. Research presentation: Annual convention of the Colorado Academy of Audiology, 2008
- Cardon, G.,** Sharma, A., Martin, K. (2008). Central auditory maturation in children with Auditory Neuropathy/Dysynchrony. Research presentation: Annual convention of the American Academy of Audiology, 2008
- Cardon, G.,** Yoshinaga-Itano, C. (2008). Latino Cultures: Issues and implications in audiology practice. Web publication, Marion Downs Hearing Center Foundation: <http://www.mariondowns.com/multicultural.htm>. Posted 2008
- Cardon, G.,** Yoshinaga-Itano, C. (2006). Social development of hard of hearing children from Spanish speaking homes. Research presentation: Annual convention of the American Academy of Audiology, 2006
- Cardon, G.,** Nelson, R., Yoshinaga-Itano, C. (2005). Language development of hard of hearing children from Spanish speaking homes. Poster: Annual convention of the Colorado Academy of Audiology, 2005
- Cardon, G.,** Nelson, R., Yoshinaga-Itano, C. (2005). Developmental outcomes of hard of hearing children from Spanish speaking homes. Research presentation: Annual convention of the American Speech Language and Hearing Association, 2005
- Nelson, R., **Cardon, G.,** Yoshinaga-Itano, C. (2005). Language development of hard of hearing children from Spanish speaking homes. Research presentation: Annual convention of the American Academy of Audiology, 2005

HONORS AND AWARDS

- 2015 Research poster entitled *Cortical Neurophysiologic Correlates of Auditory Threshold in Normal Hearing & Auditory Neuropathy Spectrum Disorder* designated as a meritorious poster submission at the annual convention of the American Speech-Language-Hearing Association.
- 2015 Research Travel Award, American Speech-Language-Hearing Association
- 2013 New Century Scholars Doctoral Scholarship, American Speech-Language-Hearing Foundation

- 2013 Research poster entitled *Somatosensory-to-auditory cross-modal plasticity in deafness* selected by a review panel to be featured in the conference book of "Hot Topics" at the annual meeting of the Society for Neuroscience and for release to the press.
- 2012 Mentored Research Award, American Auditory Society (funding provided by the National Institutes of Health), Funded travel to annual conference of the American Auditory Society and poster presentation during a special mentored session
- 2011 Nominated by SLHS department to be featured as an outstanding graduate student on the University of Colorado's Graduate School Website
- 2010 Audiology and Hearing Science Research Travel Award, American Speech-Language-Hearing Association
- 2010 Student Research Forum Award, American Academy of Audiology
- 2009 Graduate Student Scholarship, American Speech-Language-Hearing Foundation
- 2009 Best Should Teach Silver Award, University of Colorado at Boulder
- 2003-2004 President, Brigham Young University Chapter of the National Student Speech Language Hearing Association
- 1997 Eagle Scout, Three Palms, Order of the Arrow, Boy Scouts of America

GRADUATE AND UNDERGRADUATE COURSE INSTRUCTION EXPERIENCE

Brigham Young University Provo, Communications Disorder Department

Hearing Science (Fall 2019, Spring 2020; undergraduate)

Neurofoundations of Language, Speech and Hearing (Spring, 2020; undergraduate)

Colorado State University, Psychology Department

Cognitive Neuroscience (Fall 2017, Spring 2017; undergraduate)

University of Colorado Boulder, Speech, Language and Hearing Sciences Department

Signals and Systems in Audiology (Fall 2016; graduate)

Auditory Rehabilitation (Spring 2013, undergraduate)

Audiological Evaluation (Fall 2012, undergraduate)

Multicultural Aspects of Communication Differences and Disorders (Fall 2008 & 2009, undergraduate)

OTHER TEACHING EXPERIENCE

2011-2015 Teaching Assistant and Guest Lecturer, *Neurodiagnostics and Pediatric Audiology* (graduate), Speech, Language and Hearing Sciences Department, University of Colorado at Boulder

2009-2010 Lead Graduate Instructor, Speech Language and Hearing Sciences Department, University of Colorado at Boulder

2005-2014 Invited Guest Lecturer, Course Titles: *Audiologic Evaluation, Auditory Rehabilitation, Introduction to Communication Disorders Multicultural Aspects of Communication Differences and Disorders, and Aural Rehabilitation*, Speech, Language and Hearing Sciences Department, University of Colorado at Boulder

ACADEMIC AND RESEARCH ADVISING

- 2019-present Master's Thesis Committee Chair, Brigham Young University
- Kelsey Tindall (Communication Disorders) – *Sensory processing and fear and anxiety in children with Autism Spectrum Disorder: their behavioral association and neurophysiological underpinnings*
 - Charlie Pasquale (Communication Disorders) – *Sensory processing, autistic traits, and intolerance of uncertainty in children with Autism Spectrum Disorder: their behavioral association and neurophysiological underpinnings*
 - Maggie Buckhannon (Communication Disorders) – *Sensory processing and social communication in children with Autism Spectrum Disorder: their behavioral association and neurophysiological underpinnings*
- Undergraduate Research Advisor, Brigham Young University
- Lauren Clarke (Communication Disorders) – *The association and neurophysiologic correlates of Autistic traits and sensory processing abnormalities in typically developing young adults*
 - Rylie Dunton (Communication Disorders) – *The association and neurophysiologic correlates of Autistic traits and sensory processing abnormalities in typically developing young adults*
- 2017-2019 Undergraduate Senior Honors Thesis Committee Member, Colorado State University
- Davis Reina-Guerra (Psychology and Neuroscience) – *Sensory Phoneme Mimicry and Arbitrary Methods of Language Encoding on the Effectiveness of Auditory-Tactile Sensory Substitution Devices*
 - Katherine Erler (Psychology) – *Applying Concepts of Cognitive Psychology to CPR Training to Improve Retention*
 - Jared Presnell (Molecular, Cellular, and Integrated Neuroscience) – *A Review and Analysis of the Use of Machine Learning in Autism Spectrum Disorder Research*
- 2010-2015 Au.D. Capstone Project and Honors Thesis Co-Advisor with Dr. Anu Sharma, Brain and Behavior Laboratory, University of Colorado at Boulder
- Project Titles: *The Effect of Amplification on Cortical Synchrony in Children with Auditory Neuropathy Spectrum Disorder; Central Auditory Development in Children with Hearing Loss and Multiple Disabilities; Development of Frequency Content of the P1 Cortical Auditory Evoked Potential in Children; Intra-individual Variability in Children with Auditory Neuropathy Spectrum Disorder; Evaluation of Cortical Auditory Evoked Potential Thresholds in a Hearing Impaired and Normal Hearing Neonate*

UNIVERSITY SERVICE

- 2019-present Member, Strategic Planning Committee, Communication Disorders Department, Brigham Young University

COMPUTER, PROGRAMMING, AND RESEARCH TOOL PROFICIENCIES

- Neuroimaging Modalities:
- EEG (low- and high-density)—Neuroscan, EGI, Biologic
 - MRI/fMRI—Siemens, GE

Software Packages: Matlab, SPM, EEG Lab, SPSS, Microsoft Office Suite, E-Prime, Neuroscan EEG, Electrical Geodesics EEG, Biologic EEG, Gift Toolbox, Conn Toolbox

PEER REVIEW SERVICE

2019 Invited Reviewer, *Brain Imaging and Behavior*
2018, 2019 Invited Reviewer, *PeerJ*
2011-2019 Invited Reviewer, *International Journal of Audiology*
2017 Invited Reviewer, *European Journal of Neuroscience*
2017 Invited Reviewer, *Trends in Hearing*
2016 Invited Reviewer, *Hearing Research*
2010-2015 Reviewer & SLHS Representative, Institute of Cognitive Science Research/Travel Award Review Committee
2012 Mentored student reviewer, *Ear and Hearing*

PROFESSIONAL MEMBERSHIP

2019-present Member, Organization for Human Brain Mapping
2010-present Member, American Speech Language and Hearing Association
2017-2018 Member, Flux Congress
2015-2016 Member, The Autism Society
2014-2016 Member, Association for Research in Otolaryngology
2013-2014 Member, Cognitive Neuroscience Society
2013-2014 Member, Society for Neuroscience
2004-2011 Member, American Academy of Audiology

CLINICAL CERTIFICATION

2014-present Certificate of Clinical Competence in Audiology (CCC-A), American Speech-Language-Hearing Association

CLINICAL TRAINING AND EXPERIENCE

2019-present Licensed Audiologist, State of Utah
2008-2019 Licensed Audiologist, State of Colorado
2008-2015 Research Audiologist, Brain and Behavior Laboratory, Speech, Language and Hearing Sciences Department, University of Colorado at Boulder
2008-2015 Early Intervention Provider and Family Facilitator, Colorado Home Intervention Program (CHIP)
2009 Expert Witness (Audiologist), Gilpin County Courts, Gilpin County, CO
2006 Volunteer Audiologist, Mante Mexico Medical Mission (organized by Boulder Community Hospital), Mante Mexico
2005-2008 Audiology Graduate Clinician, Greater Denver / Boulder area, CO (sites included University of Colorado Hospital, The Children's Hospital, Denver Health Hospital, Boulder Community Hospital, Boulder Valley School District, University of Colorado at Boulder Hearing Center)

OTHER EXPERIENCE

2008-2015 Research Audiologist and Laboratory Manager, Brain and Behavior Laboratory, University of Colorado at Boulder

- Performed clinical EEG testing on approximately 100 infants and children (2010-2014). Some of these cases featured in publications.

- Provided clinical reports of EEG findings for managing medical professionals and families of patients
- Responsible for all equipment and materials acquisition and maintenance for the laboratory and in charge of design and maintenance of laboratory website.
- Responsible for IRB protocol updates and maintenance

LANGUAGES WRITTEN AND SPOKEN

English & Spanish