

Aaron Nidiffer, Ph.D.

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Education

- 2009 – 2018 *Doctor of Philosophy, Hearing and Speech Sciences*
Vanderbilt University, Nashville, Tennessee
Advisor: Dr. Mark Wallace
Dissertation title: *Temporal Correlation and Its Role in Multisensory Binding and Integration*
- 2005 – 2009 *Bachelor of Science, Neuroscience (Honors Fellow)*
King College, Bristol, Tennessee
- 2001 – 2005 *High School Diploma (Summa Cum Laude)*
Sullivan South High School, Kingsport, Tennessee.

Experience

- 2021 – pres. *Organizer, Cognitive and Natural Sensory Processing Workshop.*
<https://cnspworkshop.net>
- 2018 – pres. *Postdoctoral Research Associate, Department of Biomedical Engineering*
University of Rochester, Rochester, New York
Advisor: Dr. Edmund Lalor
- 2015 – 2018 *Personal tutor, science, programming, and statistics, Nashville, Tennessee*
- 2014 *Lecturer, PAVE (Preparatory Academics for a Vanderbilt Education), Vanderbilt University*
- 2012 – 2013 *Teaching Assistant, Neuroscience Graduate Program, Vanderbilt University*
- 2009 *Research Assistant, Department of Hearing and Speech Sciences, Vanderbilt University*
- 2008 – 2009 *Tutor, Snider Honors Program, King College (now King University)*
- 2008 – 2009 *Teaching Assistant, Department of Chemistry, King College*
- 2008 – 2009 *Lab Assistant, Department of Biology, King College*
- 2007 – 2009 *Lab Assistant, Department of Psychology, King College, Bristol, Tennessee*
- 2007 – 2009 *Undergraduate internship; Department of Psychology*
King College, Bristol, Tennessee
Advisor: Dr. J. Kevin DeFord

Peer-Reviewed Publications

- Nidiffer AR**, Cao CZ, O'Sullivan AE, Lalor EC (2023). *A representation of abstract linguistic categories in the visual system underlies successful lipreading*. *NeuroImage*.
<https://doi.org/10.1016/j.neuroimage.2023.120391>
- Ahmed F, **Nidiffer AR**, O'Sullivan AE, Zuk NJ, Lalor EC (2023). The integration of continuous audio and visual speech in a cocktail-party environment depends on attention. *NeuroImage* 274. <https://doi.org/10.1016/j.neuroimage.2023.120143>
- Lindboom E, **Nidiffer AR**, Carney L, Lalor EC (2023). Incorporating models of subcortical processing improves the ability to predict EEG responses to natural speech. *Hearing Research* 433. <https://doi.org/10.1016/j.heares.2023.108767>
- Crosse MJ, Zuk NJ, Di Liberto GM, **Nidiffer AR**, Molholm S, Lalor EC (2021). Linear Modeling of Neurophysiological Responses to Naturalistic Stimuli: Methodological Considerations for Applied Research. *Frontiers in Neuroscience* 15.
<https://doi.org/10.3389/fnins.2021.705621>
- Nidiffer AR**, Diederich A, Ramachandran R, Wallace MT (2018). Multisensory perception reflects individual differences in processing temporal correlations. *Scientific Reports* 8.
<https://doi.org/10.1038/s41598-018-32673-y>
- Simon, DK, **Nidiffer AR**, Wallace MT (2018). Rapid recalibration of audiovisual synchrony judgements is driven by changes in sensory evidence. *Scientific Reports* 8.
<https://doi.org/10.1038/s41598-018-30414-9>
- Nidiffer AR**, Stevenson RA, Krueger Fister JK, Barnett ZP, Wallace MT (2016). Interactions between space and effectiveness in human multisensory performance. *Neuropsychol.* 88: 83-91. <https://doi.org/10.1016/j.neuropsychologia.2016.01.031>
- Krueger Fister JK, Stevenson RA, **Nidiffer AR**, Barnett ZP, Wallace MT (2016). Stimulus intensity modulates multisensory temporal processing. *Neuropsychol.* 88: 92-100.
<https://doi.org/10.1016/j.neuropsychologia.2016.02.016>
- Stevenson RA, Ghose D, Fister JK, Sarko DK, Altieri NA, **Nidiffer AR**, Kurela LR, Siemann JK, James TW, Wallace MT (2014). Identifying and quantifying multisensory integration: A tutorial review. *Brain Topography.* 27(6): 707-730.
<https://doi.org/10.1007/s10548-014-0365-7>
- Ghose D, Maier A, **Nidiffer AR**, Wallace MT (2014). Multisensory response modulation in the superficial layers of the superior colliculus. *J Neurosci.* 43(12): 4332-44.
<https://doi.org/10.1523/JNEUROSCI.3004-13.2014>
- Stevenson RA, Fister JK, Barnett ZP, **Nidiffer AR**, Wallace MT (2012). Interactions between the spatial and temporal stimulus factors that influence multisensory integration in human performance. *Exp Brain Res.* 219(1): 121-37.
<https://doi.org/10.1007/s00221-012-3072-1>

Preprints

- Di Liberto GM, **Nidiffer AR**, Crosse MJ, Zuk N, Haro S, Cantisani G, Winchester MM, Igoe A, McCrann R, Chandra S, Lalor EC, Baruzzo G (2023). A standardised open science framework for sharing and re-analysing neural data acquired to continuous sensory stimuli. <https://arxiv.org/abs/2309.07671>
- Ahmed F, **Nidiffer AR**, Lalor EC (2023). The effect of gaze on EEG measures of multisensory integration in a cocktail party scenario. <https://www.biorxiv.org/content/10.1101/2023.08.23.554451v1>
- Nidiffer AR**, Ramachandran R, Wallace MT (2018). Temporal correlation drives multisensory binding. <https://psyarxiv.com/vzbmw/>

Book Chapters

- Wallace MT, Ghose D, Fister MC, Krueger Fister J, **Nidiffer AR** (2012). Development of multisensory integration in subcortical and cortical brain networks. In A. J. Bremner, D. J. Lewkowicz, and C. Spence (Eds.), *Multisensory Development*. Oxford: Oxford University Press.
- Sarko DK, **Nidiffer AR**, Powers AR III, Ghose D, Hillock A, Fister MC, Krueger J, Wallace MT. (2012). Spatial and temporal features of multisensory processes: bridging between animal and human studies. In M. M. Murray & M. T. Wallace (Eds.), *Frontiers in the neural bases of multisensory processes*. New York: Taylor and Francis.

Posters and Abstracts

- Nidiffer AR**, O'Sullivan AE, Lalor EC (2023). Assessing the contribution of visual speech features to audiovisual speech perception in noise. International Multisensory Research Forum (IMRF), Brussels, Belgium.
- Ahmed F, **Nidiffer AR**, Lalor EC (2023). - Investigating the bidirectional interaction between multisensory integration and selective attention in the context of naturalistic audiovisual speech. IMRF, Brussels Belgium.
- Nidiffer AR**, Dye MWG, Lalor EC (2022). Visual speech tracking and linguistic processing in Deaf individuals. Society for Neuroscience (SfN), San Diego, CA, USA.
- Bialas O, **Nidiffer AR**, Lalor EC (2022). Differences between generic and individualized TRF-models for tracking the cortical processing of speech. SfN, San Diego, CA, USA.
- Ahmed F, **Nidiffer AR**, Lalor EC (2021). The integration of audio and visual speech in a cocktail party environment depends on attention. SfN, virtual.
- Schoenhaut A, Thelen A, **Nidiffer AR**, van der Stoep N, Ramachandran R, Wallace MT (2021). Effects of motion coherence and congruency on evidence accumulation during audiovisual integration. SfN, virtual.
- Nidiffer AR**, Cao Z, O'Sullivan AE, Lalor EC (2020). Does auditory cortex receive linguistic information from visual cortex? Advances and Perspectives in Auditory Neuroscience (APAN), virtual.

Ahmed F, **Nidiffer AR**, O'Sullivan AE, Zuk N, Lalor EC (2020). The integration of audio and visual speech in a cocktail party environment depends on attention. APAN, virtual.

Nidiffer AR, Lalor EC (2020). A temporally correlated visual signal improves the neural representation of an auditory object. IMRF, Ulm, Germany. (postponed)

O'Sullivan, AE, **Nidiffer AR**, Lalor EC (2020). The contribution of visual dynamics and articulatory details to audiovisual speech perception in noise. IMRF, Ulm, Germany. (postponed)

Nidiffer AR, Lalor EC (2019). Alpha and beta band brain activity tracks the temporal correlation between auditory and visual stimuli. SfN, Chicago, IL.

O'Sullivan AE, **Nidiffer AR**, Lalor EC (2019). The Contribution of visual speech features to audiovisual speech perception in noise. SfN, Chicago, IL.

Nidiffer AR, Ramachandran R, and Wallace MT, and Ramachandran, R (2018) A perspective on a potential mechanism bridging two modes of multisensory integration. IMRF, Toronto, ON, Canada.

Nidiffer AR, Diederich A, Ramachandran R, and Wallace MT, and Ramachandran, R (2017) Audiovisual stimulus correlation drives multisensory perceptual decisions. SfN, Washington, DC.

Simon DK, **Nidiffer AR**, and Wallace MT (2017) Rapid recalibration to asynchronous audiovisual speech modulates the rate of evidence accumulation. SfN, Washington, DC.

Nidiffer AR, Ramachandran R, and Wallace MT, and Ramachandran, R (2017) Audiovisual stimulus correlation drives multisensory perceptual decisions. IMRF, Nashville, TN.

Thelen A, Chadha M, **Nidiffer AR**, Wallace MT, and Ramachandran, R (2016) Neural correlates of ambiguous motion stimuli. SfN, San Diego, CA.

Chadha M, Thelen A, **Nidiffer AR**, Ramachandran, R, and Wallace MT (2016) Integration of ambiguous audio-visual motion stimuli on the formation of perceptual judgements. SfN, San Diego, CA.

Nidiffer AR, Ramachandran, R, and Wallace MT (2015) Multisensory temporal processing in the inferior colliculus. SfN, Chicago, IL.

Krueger Fister J, Kurela LR, **Nidiffer AR**, Hackett TA, and Wallace MT (2015) Differential visual modulation of auditory activity in cat A1 between supra- and infragranular layers. SfN, Chicago, IL.

Nidiffer AR, Zheng QQ, Ramachandran, R, and Wallace MT (2014) Multisensory temporal processing is dependent upon stimulus intensity. SfN, Washington, DC.

Krueger Fister J, Kurela LR, **Nidiffer AR**, Hackett TA, and Wallace MT (2014) Visual influences in cat auditory cortex are lamina-specific. SfN, Washington, DC.

Nidiffer AR, Zheng QQ, and Wallace MT (2013) Role of inverse effectiveness in multisensory evidence accumulation. SfN, San Diego, CA.

Krueger Fister J, Kurela LR, **Nidiffer AR**, Lee WH, Hackett TA, and Wallace MT (2013) Local field potentials reveal novel multisensory interactions in cat cortex. SfN, San Diego, CA.

Kurela LR, Krueger Fister J, **Nidiffer AR**, Lee WH, Hackett TA, and Wallace MT (2013) The effects of adult visual deprivation on multisensory integration in the cat superior colliculus. SfN, San Diego, CA.

- Nidiffer AR**, Sarko DK, and Wallace MT (2013) Effects of audiovisual motion coherence on multisensory processing. IMRF, Jerusalem, Israel.
- Nidiffer AR**, Sarko DK, and Wallace MT (2012) Predictors of multisensory integration in the alert cat. SfN, New Orleans, LA.
- Sarko DK, **Nidiffer AR**, and Wallace MT (2012) Multisensory integration is related to changes in neuronal response reliability in awake animals. SfN, New Orleans, LA.
- Wallace MT, **Nidiffer AR**, and Sarko DK (2012) Effects of audiovisual motion coherence on multisensory processing. SfN, New Orleans, LA.
- Nidiffer AR**, Stevenson RA, Krueger Fister J, Barnett ZP, and Wallace MT (2011) Multisensory integrative principles in human performance: Interaction of stimulus location and salience. SfN, Washington, D.C.
- Wallace MT, Krueger Fister J, Barnett ZP, **Nidiffer AR**, and Stevenson RA (2011). The multisensory temporal binding window: Impact of stimulus location and salience. SfN, Washington, D.C.
- Nidiffer AR**, Stevenson RA, Krueger-Fister J, Barnett ZP, and Wallace MT (2011) Interaction between space and effectiveness in multisensory integration: behavioral and perceptual measures. IMRF, Fukuoka, Japan
- Stevenson RA, Krueger-Fister J, Barnett ZP, **Nidiffer AR**, and Wallace MT (2011) Modulating the Temporal Binding Window: Impacts of Stimulus Location and Salience. IMRF, Fukuoka, Japan
- Nidiffer AR**, DeFord JK, and Sutherland MA (2009) Auditory Discrimination in Noise. Southeastern Psychological Association, New Orleans, Louisiana
- DeFord JK, **Nidiffer AR**, and Sutherland MA (2008). Visual and Auditory Sensitivity to Changes in the Amplitude Spectrum of Temporal Noise. Eastern Psychological Association, Boston, Massachusetts
- Nidiffer AR** (2008). Auditory Frequency Discrimination Sensitivity. Blue Ridge Undergraduate Research Conference, Tusculum College, Greenville, Tennessee

Lectures

- 2020-pres. "Some multisensory considerations for Augmented and Virtual Reality" *Brain and Cognitive Sciences*, University of Rochester, Rochester, New York
- 2018 "Real basic statistics," Undergraduate boot camp – *Department of Psychology*, Vanderbilt University
- 2013 "Animal Behavior and Training Techniques," *Neuroscience Boot Camp* – *Neuroscience Graduate Program*, Vanderbilt University

Seminars and Invited Talks

- 2023 "Disentangling (Multi)sensory and Cognitive Responses to Complex, Continuous Signals: Overview of the Temporal Response Function," *CNSP Workshop*, virtual.
- 2022 "Linear Modeling of Neurophysiological Data with Banded Ridge Regression," *CNSP Workshop*, virtual.

- 2021 "Linear Modeling of Multiple Feature Representations in Neurophysiological Data," *CNSP Workshop*, virtual.
- 2020 "Lipreading relies on a representation of language established by the visual system," *Department of Psychology*, University of Michigan, Ann Arbor, Michigan
- 2020 "Lipreading relies on a representation of language established by the visual system," *UR Postdoc Association*, University of Rochester, Rochester, New York
- 2019 "The effect of temporal correlation on multisensory behavior and its neural tracking" *Department of Psychiatry*, Yale School of Medicine, New Haven, Connecticut
- 2018 "The Role of Stimulus Correlation in Audiovisual Feature Integration and Binding" *Department of Psychology*, Southern Illinois University, Carbondale, Illinois
- 2018 "Temporal Correlation and its role in multisensory processes," *Department of Neuroscience*, University of Rochester, Rochester, New York
- 2018 "Correlation as a mechanism for feature binding," *Research Seminar – Department of Hearing and Speech Sciences*, Vanderbilt University Medical Center
- 2017 "Modeling correlation during feature binding," *Cognition and Cognitive Neuroscience Modeling Group – Department of Psychology*, Vanderbilt University
- 2015 "Multisensory temporal processing in the inferior colliculus," *Advances and Perspectives in Auditory Neuroscience*, Chicago, Illinois
- 2015 "Neuronal predictors of multisensory integration in cat midbrain and cortex," *Research Seminar – Department of Hearing and Speech Sciences*, Vanderbilt University Medical Center
- 2014 "Interactions between space and effectiveness in multisensory integration," *Research Seminar – Department of Hearing and Speech Sciences*, Vanderbilt University Medical Center
- 2013 "Inverse Effectiveness: Less is More," *Brown Bag Seminar Series – Department of Psychology*, Vanderbilt University
- 2010 "The Maturation of the Superior Collicular Map of Auditory Space in the Guinea Pig is Disrupted by Developmental Visual Deprivation," *Spatial Hearing – Department of Hearing and Speech Sciences*, Vanderbilt University Medical Center
- 2010 "Neuronal Processing for Coding Interaural Time Disparities," *Spatial Hearing – Department of Hearing and Speech Sciences*, Vanderbilt University Medical Center
- 2010 "A Comparison of Superior Colliculus Receptive Field Architectures of Awake and Anesthetized Cats," *Neuroscience Discussions – Neuroscience Graduate Program*, Vanderbilt University
- 2009 "Phasic Firing in Dopaminergic Neurons Is Sufficient for Behavioral Conditioning," *Systems Neuroscience – Neuroscience Graduate Program*, Vanderbilt University
- 2009 "The Ethics Concerning Scientific Research," *Senior Honors Thesis – Snider Honors Department*, King College
- 2008 "Visual and Auditory Sensitivity to Changes in the Amplitude Spectrum of Temporal Noise," *Eastern Psychology Association*, Boston, Massachusetts
- 2008 "Auditory Frequency Discrimination Sensitivity," *Blueridge Undergraduate Research Conference*, Tusculum College, Greeneville, Tennessee

2007 "Observations on Visual Perception after Disconnection of the Cerebral Hemispheres in Man," *Neuroscience – Department of Biology*, King College

Scholarships

2009 – 2018 *Research Assistantship*, full-tuition scholarship plus stipend, Vanderbilt University
2005 – 2009 *Academic Scholarship*, \$3000/year, King College
2005 – 2009 *HOPE Scholarship*, \$4000/year, Tennessee Lottery Foundation
2005 – 2009 *General Assembly Merit Scholarship*, \$1500/year, Tennessee Lottery Foundation

Awards and Honors

2020 *University of Rochester Postdoc Appreciation Week Showcase*, 2nd place, \$300
multiple years *Vanderbilt Kennedy Center Travel Award*, \$250/year (2014, '15, '17, '18)
multiple years *Vanderbilt Graduate School Travel Award*, \$500/year (2011, '12, '13, '17, '18)
2012 *Fine Science Tools Travel Award*, \$500
Multiple years *President's List*, King College (2007, 07)
2005 – 2009 *Jack E. Snider Honors Fellow*, King College
2005 – 2009 *King College Research Grant*, \$500/year

Professional Memberships

2010 – present *Postdoc Member*, Society for Neuroscience
2010 – 2018 *Member*, Middle Tennessee Chapter Society for Neuroscience
2009 *Member*, Southeastern Psychological Association
2008 – 2009 *Member*, Eastern Psychological Association
2007 – 2009 *Student Member*, Psi Chi – Appalachian Chapter

Ad-hoc Journal Referee

Brain Topography
Cerebral Cortex
eLife
European Journal of Neuroscience
FrontiersIn Neuroscience
Hearing Research
Heliyon
Imaging Neuroscience
iScience
Journal of Cognitive Neuroscience
Journal of Neurophysiology
Journal of Neuroscience
Journal of the Acoustical Society of America
Journal of Vision

Multisensory Research
NeuroImage
Neuropsychologia
PLOS Computational Biology
Proceedings of the National Academy of Science

On-going Projects

Nidiffer AR, O'Sullivan AE, Lalor EC (analysis, writing). The contribution of visual dynamic and articulatory cues to audiovisual speech perception in noise.

Ahmed F, **Nidiffer AR**, Lalor EC (analysis, writing) Investigating how visual input helps solve a highly competitive cocktail-party problem.

Przysinda E, **Nidiffer AR**, Lalor EC, Dodell-Feder D, et al (analysis, writing). Social and Language Processing Differences in Schizophrenia During Naturalistic Video Viewing.

Nidiffer AR, Lalor EC (data collection, analysis). Multisensory temporal correlation and its effect on object formation.

Nidiffer AR, Dye MWG, Lalor EC (data collection). Sensory and linguistic responses to visual speech and sign language in Deaf individuals.

Nidiffer AR, Lalor EC (analysis). Cortical tracking of temporal correlation across multiple frequencies and time scales.