

## **Joe Toscano, Ph.D.**

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### **Areas of Specialization**

cognitive science, cognitive psychology; cognitive neuroscience; speech perception; language processing; hearing; computational modeling.

### **Education**

2011 Ph.D., Psychology—Cognition and Perception, University of Iowa  
2005 B.S., Brain and Cognitive Sciences, Honors in Research, University of Rochester

### **Academic Appointments**

2014– Assistant Professor, Department of Psychological and Brain Sciences  
Villanova University

2011–2014 Postdoctoral Fellow, Beckman Institute for Advanced Science and Technology  
University of Illinois at Urbana-Champaign

2005–2011 Graduate Research Assistant, Department of Psychology  
University of Iowa (Advisor: Dr. Bob McMurray)

2004 Research Assistant, Human Information Processing Branch  
NASA Ames Research Center (Advisors: Drs. Lee Stone & Brent Beutter)

2003–2005 Research Assistant, Department of Brain & Cognitive Sciences  
University of Rochester (Advisor: Dr. Michael Tanenhaus)

### **Selected Honors & Awards**

2019–2020 NIH Loan Repayment Program Award Renewal  
2015–2017 NIH Loan Repayment Program Award  
2014 Select-Speaker Award, Psychonomic Society  
2011 Beckman Fellowship, Beckman Institute for Advanced Science and Technology  
2011 Don Lewis Dissertation Year Award, University of Iowa, Dept. of Psychology  
2010 Graduate College Summer Fellowship, University of Iowa  
2008 Best Student Paper in Speech Communication—2nd Prize, Acoustical Society of America  
2008 Computational Modeling Prize in Perception & Action, Cognitive Science Society  
2007 J.R. Simon Early Scholarship Potential Award, University of Iowa, Dept. of Psychology  
2006 Best Student Paper in Speech Communication—1st Prize, Acoustical Society of America  
2004 Undergraduate Student Research Program, NASA Ames Research Center

## Professional Development

2017 Classification and Clustering Workshop, Center for Statistics Education, Villanova University  
2011 Fast Optical Imaging Summer Workshop, University of Illinois at Urbana-Champaign  
2006 ERP Boot Camp, University of California, Davis

## Professional Affiliations

2018 Auditory Perception and Cognition Society  
2012 Psychonomic Society (Fellow: 2015)  
2006 Acoustical Society of America

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## Research

### Publications (\* Mentored grad student/postdoc, †Mentored undergraduate)

#### Journal Articles

\*Getz LM, Toscano JC. (in press) The time-course of speech perception revealed by temporally-sensitive neural measures. To appear in *WIREs Cognitive Science*.

†Crinnion AM, Malmskog B, Toscano JC. (in press). A graph theoretic approach to identifying acoustic cues for speech sound categorization. To appear in *Psychonomic Bulletin & Review*.

\*Falandays JB, Brown-Schmidt S, Toscano JC (2020). Long-lasting gradient activation of referents during spoken language processing. *Journal of Memory and Language*, 112, 104088.

\*Getz LM, Toscano JC (2019). Electrophysiological evidence for top-down lexical influences on early speech perception. *Psychological Science*, 30, 830–841.

Toscano JC, Lansing CR (2019). Age-related changes in temporal and spectral cue weights in speech. *Language and Speech*, 62, 61–79.

\*Gao YA, Toscano JC, Shih C, Tanner D (2019). Reassessing the electrophysiological evidence for categorical perception of Mandarin lexical tone: ERP evidence from native and naïve non-native Mandarin listeners. *Attention, Perception, & Psychophysics*, 81, 543–557.

\*Pereira O, \*Gao YA, Toscano JC (2018). Perceptual encoding of natural speech sounds revealed by the N1 event-related potential response. *Auditory Perception & Cognition*, 1, 112–130.

\*Tabachnick AR, Toscano JC (2018). Perceptual encoding in auditory brainstem responses: Effects of stimulus frequency. *Journal of Speech, Language, and Hearing Research*, 61, 2364–2375.

Toscano JC, \*Anderson ND, Fabiani M, Gratton G, Garnsey SM (2018). The time-course of cortical responses to speech revealed by fast optical imaging. *Brain and Language*, 184, 32–42.

\*Buxó-Lugo A, Toscano JC, Watson DG (2018). Effects of participant engagement on prosodic prominence. *Discourse Processes*, 55, 305–323.

Brown-Schmidt S, Toscano JC (2017). Gradient acoustic information induces long-lasting referential uncertainty in short discourses. *Language, Cognition, & Neuroscience*, 32, 1211–1228.

\*Getz LM, \*Nordeen ER, \*Vrabic SC, Toscano JC (2017). Modeling the development of audiovisual cue integration in speech perception. *Brain Sciences*, 7, 32.

Toscano JC, McMurray B (2015). The time-course of speaking rate compensation: Effects of sentential rate and vowel length on voicing judgments. *Language, Cognition, and Neuroscience*, 30, 529–543.

Toscano JC, Allen JB (2014). Across and within consonant errors for isolated syllables in noise. *Journal of Speech, Language, and Hearing Research*, 57, 2293–2307.

Toscano JC, \*Anderson ND, McMurray B. (2013). Reconsidering the role of temporal order in spoken word recognition. *Psychonomic Bulletin and Review*, 20, 981–987.

Toscano JC, McMurray B (2012). Cue integration and context effects in speech: Evidence against speaking rate normalization. *Attention, Perception, & Psychophysics*, 76, 1284–1301.

Toscano JC, McMurray B, Dennhardt J, Luck SJ (2010). Continuous perception and graded categorization: Electrophysiological evidence for a linear relationship between the acoustic signal and perceptual encoding of speech. *Psychological Science*, 21, 1532–1540.

Toscano JC, McMurray B (2010). Cue integration with categories: Weighting acoustic cues in speech using unsupervised learning and distributional statistics. *Cognitive Science*, 34, 434–64.

McMurray B, Aslin RN, Toscano JC (2009). Statistical learning of phonetic categories: Insights from a computational approach. *Developmental Science*, 12, 369–378.

Toscano JC, Perry LK, Mueller KL, Bean AF, Galle ME, Samuelson LK (2008). Language as shaped by the brain; the brain as shaped by development. Commentary on Christiansen & Chater, “Language as shaped by the brain”, *Behavioral and Brain Sciences*, 31, 535–536.

### **Book Chapters**

Toscano JC, \*Buxó-Lugo A, Watson DG (2015). Using game-based approaches to increase level of engagement in research and education. In S. Dijkers (Ed.), *TeacherCraft: Using Minecraft for Teaching and Learning*. Pittsburgh: ETC Press.

McMurray B, Horst, J, Toscano JC, Samuelson, LK (2009). Towards an integration of connectionist learning and dynamical systems processing: Case studies in speech perception and lexical development. In J.P. Spencer, M. Thomas, & J. McClelland (Eds.), *Toward a Unified Theory of Development: Connectionism and Dynamic Systems Theory Re-Considered* (pp. 218–249). New York: Oxford University Press.

### **Refereed Proceedings Papers**

Toscano JC, Mueller, K.L., McMurray B, & Tomblin, J.B. (2010). Simulating individual differences in language ability and genetic differences in FOXP2 using a neural network model of the SRT task. In S. Ohlsson

& R. Catrambone (Eds.), *Proceedings of the 32nd Annual Conference of the Cognitive Science Society* (pp. 2230–2235). Austin, TX: Cognitive Science Society.

Toscano JC, McMurray B (2008). Using the distributional statistics of speech sounds for weighting and integrating acoustic cues. In B.C. Love, K. McRae, & V.M. Sloutsky (Eds.), *Proceedings of the 30th Annual Conference of the Cognitive Science Society* (pp. 433–438). Austin, TX: Cognitive Science Society.

### **Technical Reports & Other Manuscripts**

Toscano JC (2011). Perceiving speech in context: Compensation for contextual variability during acoustic cue encoding and categorization. Doctoral dissertation, University of Iowa.

Toscano JC (2005). Effect of object salience on eye movements in a visual-linguistic task. Honors thesis for the B.S. in Brain and Cognitive Sciences, University of Rochester.

Toscano JC, & Beutter, B.R. (2005). Performance during visual search: Designing spacecraft with humans in mind. *University of Rochester Journal of Undergraduate Research*, 3, 8–12.

Toscano JC (2004). Effect of salience on saccadic performance during visual search. NASA Undergraduate Student Research Program Technical Report.

### **Presentations** (\* Mentored grad student/postdoc, †Mentored undergraduate)

#### **Invited Talks and Colloquia**

Toscano JC (2019, April). Going forward, looking back: Sensitivity to bottom-up input and top-down information during speech processing. Invited talk presented at Dept. of Neurosurgery and Dept. of Psychological & Brain Sciences, University of Iowa, Iowa City, IA.

Toscano JC (2019, April). Perceiving speech in the moment: What real-time measures of language processing reveal about the information used to recognize spoken words. Keynote lecture presented at 2019 Linguistics and Cognitive Science Student Conference, University of Delaware, Newark, DE.

Toscano JC (2019, April). Acoustic characteristics of English stop consonants: Phonetic measurements and information theoretic models. Invited talk presented at Dept. of Linguistics and Cognitive Science, Phonetics Lab, University of Delaware, Newark, DE.

Toscano JC (2017, May). What does the speech system know and when does it know it? Invited talk presented at Dept. of Psychological & Brain Sciences, University of Iowa, Iowa City, IA.

Toscano JC (2015, November). Encoding continuous acoustic cues in speech: An approach for understanding speech perception and development. Invited talk presented at Nemours duPont Hospital for Children, Translational Science Seminar, Wilmington, DE.

Toscano JC (2014, October). The time-course of spoken word recognition: Continuous cues operating continuously in time. Invited talk presented at the Department of Communication Sciences and Disorders, Northwestern University, Evanston, IL.

Toscano JC (2014, October). The neural organization of speech perception. Invited talk presented at the

*Beckman Institute 25th Anniversary Symposium.*

Toscano JC (2014, October). Continuity in spoken word recognition revealed in the time-course of processing. Invited talk presented at the Institute for Research in Cognitive Science, University of Pennsylvania, Philadelphia, PA.

Toscano JC (2014, April). The time-course of spoken word recognition. Invited talk presented at the Volen National Center for Complex Systems, Brandeis University, Waltham, MA.

Toscano JC (2013, May). Computing the reliability of acoustic information in speech. Invited talk presented at the Dept. of Linguistics, Northwestern Univ., Evanston, IL.

Toscano JC (2013, April). Computational approaches to speaker adaptation and perceptual learning. Invited paper presented at the *Workshop on Current Issues and Methods in Speaker Adaptation*, Department of Linguistics, Ohio State University, Columbus, OH.

Toscano JC (2013, February). Acquiring and adapting phonological categories: Insights from computational modeling approaches. Invited talk presented at the Department of Linguistics, University of Illinois at Urbana-Champaign, Urbana, IL.

Toscano JC (2005, November). Category acquisition through statistical learning using a mixture of Gaussians model. Invited talk presented at the University of Rochester Speech Group, Rochester, NY.

### **Conference Symposia**

Toscano JC (2017, August). Using statistical learning to acquire speech categories: A computational framework for studying phonological development. Invited talk presented at the *13th International Conference for Cognitive Neuroscience*, Amsterdam, Netherlands.

Toscano JC, Allen JB. Idiosyncratic effects in speech-based hearing tests. In J. Toscano, B. McMurray, E. Myers, & M. Goldrick, *Unifying principles and individual differences: What should we focus on to understand speech? 15th Annual Auditory Perception, Cognition, and Action Meeting*, Boston, MA.

McMurray B, Toscano JC (2012, October). The consequences of lexical sensitivity to fine grained detail: Solving the problems of integrating cues and processing speech in time. In A. Jongman & J. Sereno (Chairs), *The nature of lexical representations in the perception and production of speech*. Symposium presented at the *164th Meeting of the Acoustical Society of America*, Kansas City, MO.

McMurray B, Apfelbaum KS, Toscano JC, Samuelson, LK (2010, March). Something old and something new: Word learning as the interaction of statistical association and dynamic competition. In C. Yu (Chair), *Modeling statistical word learning*. Symposium presented at the *International Conference on Infant Studies*, Baltimore, MD.

### **Conference Presentations**

\*Getz LM, Toscano JC (2019, December). McGurk Doesn't Work: Individual differences and task demands explain the McGurk illusion. 178th Meeting of the Acoustical Society of America, San Diego, CA.

\*Martinez EL, \*Ruggiero AM, †Javardian AN, †Feeley NF, Morlet T, Toscano JC (2019, November). Electrophysiological measures of speech sound encoding in background noise reflect accuracy and self-reported hearing difficulty. Poster presented at the *60th Annual Meeting of the Psychonomic Society*, Montréal, QC.

†Henderson MR, Toscano JC (2019, November). Fricative/affricate perception measured using auditory brainstem responses. Poster presented at the *2019 Auditory Perception, Cognition, and Action Meeting*, Montréal, QC.

†Saccocia G, Toscano JC (2019, May). Effects of self-reported hearing difficulty on intensity discrimination judgments. Poster presented at the *177th Meeting of the Acoustical Society of America*, Louisville, KY.

\*Getz L, Toscano JC (2019, May). Semantic context influences early speech perception: Evidence from electrophysiology. Paper presented at *177th Meeting of the Acoustical Society of America*, Louisville, KY.

\*Wu Y, \*Lu J, Toscano JC, Johnson C, Allen JB (2019, May). Speech perception in children with reading disabilities: Phonetic perception is the problem. Poster presented at the *177th Meeting of the Acoustical Society of America*, Louisville, KY.

†Feeley N, Toscano JC (2019, April). Influence of dialect region on vowel perception and vowel production. Paper presented at the 2019 Linguistics and Cognitive Science Student Conference, University of Delaware, Newark, DE.

\*Getz LM, Toscano JC (2019, March). When classroom demonstrations fail, the real learning begins: Why McGurk doesn't work. Annual Meeting of the Eastern Psychological Association, New York City, NY.

\*Gao YA, \*Pereira O, Toscano JC (2018, November). Sensitivity to continuous acoustic cues across spectral and temporal dimensions in speech. Poster presented at the *59th Annual Meeting of the Psychonomic Society*, New Orleans, LA.

\*Getz LM, Toscano JC (2018, November). McGurk doesn't work: Evidence against the McGurk effect as a perceptual illusion. Poster presented at the *59th Meeting of the Psychonomic Society*, New Orleans, LA.

Toscano JC, †Saccocia G (2018, November). Differences in intensity discrimination predicted by self-reported speech recognition difficulty. Paper presented at the *17th Annual Auditory Perception, Cognition, and Action Meeting*, New Orleans, LA.

\*Getz LM, Toscano JC (2018, November). Top-down lexical knowledge directly influences early speech perception. Paper presented at the *17th Annual Auditory Perception, Cognition, and Action Meeting*, New Orleans, LA.

\*Faladays JB, Spivey MB, Toscano JC (2018, July). Phonological representations in Spanish-English bilinguals: Unitary or dual sets? Poster presented at the *40th Annual Meeting of the Cognitive Science Society*, Madison, WI.

\*Thomas C, Morlet T, Toscano JC (2018, April). The effects of hearing loss on speech sound processing: Is the N100 measure a more sensitive tool? Poster presented at the *2018 Linguistics and Cognitive Science Student Conference*, University of Delaware, Newark DE.

\*Falandays JB, Spivey MJ, Toscano JC (2018, March). Investigating phonemic representations in Spanish-English bilinguals using mouse-tracking: A laboratory/MTurk comparative study. Paper presented at the *60th Conference of Experimental Psychologists (TeaP 2018)*, Marburg, Germany.

\*Getz LM, Toscano JC (2018, March). Top-down semantic information influences early speech sound encoding. Talk presented at the *Annual Meeting of the Eastern Psychological Association*, Philadelphia PA.

\*Gao YA, \*Pereira O, Toscano JC (2018, March). Acoustic cue encoding in speech revealed by event-related potentials. Poster presented at the *Annual Meeting of the Eastern Psychological Association*, Phila. PA.

\*Thomas C, Morlet T, Toscano JC (2018, March). Electrophysiological measures of speech sound encoding and the effects of hearing loss. Poster presented at the *Annual Meeting of the Eastern Psychological Association*, Philadelphia PA.

\*Benecke A, Toscano JC (2018, January). How far can VOT take us? Voicing categorization with and without the use of VOT. Poster presented at *Society for Computation in Linguistics*, Salt Lake City, UT.

†Crinnion AM, Malmskog B, Toscano JC (2018, January). A graph theoretic approach for generating hypotheses about phonetic cues in speech. Talk presented at *Society for Computation in Linguistics*, Salt Lake City, UT.

\*Gao YA, Pereira O, Toscano, JC (2017, November). Encoding acoustic cues in speech: Electrophysiological measurements. Poster presented at the *16th Auditory Perception, Cognition, and Action Meeting*, Vancouver, BC.

Toscano, JC, \*Folk E (2017, November). From Sounds to Words in 90 Milliseconds: The Time-Course of Spoken Word Recognition. Talk presented at *58th Meeting of the Psychonomic Society*, Vancouver, BC.

Fischer-Baum S, Toscano JC (2017, November). Dissociation between lexical and indexical processing during speech perception. Poster presented at the *55th Meeting of the Academy of Aphasia*, Baltimore, MD.

\*Benecke A, Toscano JC (2017, November). Classification of English Stop Consonants: A Comparison of Multiple Models of Speech Perception. Poster presented at the *58th Annual Meeting of the Psychonomic Society*, Vancouver, BC. (Recipient of Psychonomic Society Graduate Travel Award).

\*Falandays JB, Brown-Schmidt S, Toscano JC (2017, November). Long-Lasting gradient activation of referents during spoken sentence processing. Poster presented at the *58th Annual Meeting of the Psychonomic Society*, Vancouver, BC.

\*Biro T, Viswanathan N, Toscano JC (2017, November). How Task Engagement Influences Speech Production: A Look at Phonetic Convergence, Poster presented at the *58th Annual Meeting of the Psychonomic Society*, Vancouver, BC.

\*Getz L, Toscano JC (2017, November). Marching Bands and Butter Bombs: Semantic Association Modulates the Auditory N100 Response to Speech Sounds. Poster presented at the *58th Annual Meeting of the Psychonomic Society*, Vancouver, BC.

\*Biro T, Toscano JC, Viswanathan N (2016, November). Phonetic convergence in an immersive game-based

task. Poster presented at the *5th Joint Meeting of the Acoustical Society of America and Acoustical Society of Japan*, Honolulu, HI.

†Crinnon AM, Malmskog B, Toscano JC (2016, October). Which cues do listeners use? Discovering networks of phonetic cues for speech sound categorization using a graph theoretic approach. Poster presented at the *15th Auditory Perception, Cognition, and Action Meeting*, Boston, MA.

\*Falandays JB, Brown-Schmidt S, Toscano JC (2016, November). Time Course of Maintenance and Use of Gradient Acoustic Information During Pronoun Referent Interpretation. Poster presented at the *5th Joint Meeting of the Acoustical Society of America and Acoustical Society of Japan*, Honolulu, HI.

\*Folk E, Toscano JC (2016, November). Event-related potential responses reveal simultaneous processing across multiple levels of representation in spoken word recognition. Poster presented at the *5th Joint Meeting of the Acoustical Society of America and Acoustical Society of Japan*, Honolulu, HI.

\*Getz LM, \*Nordeen E, \*Vrabic S, Toscano JC (2016, October). Modeling Audiovisual Cue Integration in Speech Perception. Poster presented at the *15th Auditory Perception, Cognition, and Action Meeting*, Boston, MA.

\*Pereira O, Toscano JC (2016, November). The N1 Event-Related Potential Component as an Index of Speech Sound Encoding for Multiple Phonetic Contrasts. Poster presented at the *5th Joint Meeting of the Acoustical Society of America and Acoustical Society of Japan*, Honolulu, HI.

\*Saltzman D, Rhone A, McMurray B, Toscano JC (2016, October). Listeners use sentential rate, but not envelope information, to compensate for speaking rate during spoken word recognition. Poster presented at the *57th Meeting of the Psychonomic Society*, Boston, MA.

\*Tabachnick AR, Toscano JC (2016, November). High-pass filtering distorts auditory brainstem responses: Evidence from click and tone stimuli. Poster presented at the *5th Joint Meeting of the Acoustical Society of America and Acoustical Society of Japan*, Honolulu, HI.

\*Pereira O, Toscano, JC (2016, August). Auditory N1 Amplitude varies across multiple acoustic and phonological dimensions in speech. Poster presented at the *38th Annual Meeting of the Cognitive Science Society*, Philadelphia, PA.

\*Vrabic S, \*Nordeen E, & Toscano JC. (2016, August). Speech perception across the lifespan: Using a Gaussian mixture model to understand changes in cue weighting between younger and older adults. Poster presented at the *38th Annual Meeting of the Cognitive Science Society*, Philadelphia, PA.

\*Biro T, Viswanathan N, Toscano JC (2016, March). Using naturalistic and engaging tasks to measure phonetic convergence. Poster presented at the *Sociolinguistic Variation and Language Processing Conference*, Virginia Tech, Blacksburg, VA.

\*Biro T, Toscano JC, Viswanathan N. (2015, November). Measuring phonetic convergence and acoustic properties of speech with engaging, naturalistic tasks. Poster presented at the *14th Annual Auditory Perception, Cognition, & Action Meeting*, Chicago, IL.

\*Curley T, Toscano JC (2015, November). Overcoming talker variability when learning speech sound cate-



gories: A computational approach. Poster presented at the *56th Annual Meeting of the Psychonomic Society*, Chicago, IL. (Recipient of Psychonomic Society Graduate Travel Award).

\*Folk E, Toscano JC (2015, November). Rapid lexical processing revealed by the timecourse of ERP responses. Poster presented at the *56th Annual Meeting of the Psychonomic Society*, Chicago, IL.

\*Saltzman D, Rhone A, McMurray B, Toscano JC (2015, November). Artificially natural: Creating carefully-controlled acoustic cue continua from natural speech. Poster presented at the *14th Annual Auditory Perception, Cognition, and Action Meeting*, Chicago, IL.

\*Tabachnick A, \*Brooks B, Allen JB, & Toscano JC (2015, November). Speech testing using token-level error thresholds: Comparison with pure-tone audiograms. Poster presented at the *14th Annual Auditory Perception, Cognition, and Action Meeting*, Chicago, IL.

Zhou P, Toscano JC, Garnsey SM, Christianson K (2015, March). Structural complexity modulates “semantic P600” in sentence processing. Poster presented at the *Annual Meeting of the Cognitive Neuroscience Society*, San Francisco, CA.

Toscano JC, Anderson ND, Garnsey SM, Fabiani M, Gratton G (2014, November). Speech sound encoding in the brain measured using fast diffuse optical imaging. Paper presented at the *55th Annual Meeting of the Psychonomic Society*, Long Beach, CA. (Recipient of Psychonomic Society Select Speaker Award).

Toscano JC (2014, May). Unsupervised learning of phonetic cues in speech. Paper presented at the *2014 Midwest Speech and Language Days*, Urbana, IL.

Anderson, ND, Toscano JC, Garnsey SM, Fabiani M, Gratton G (2014, May). Gradient coding of voice onset time in posterior temporal cortex. Poster presented at the *167th Meeting of the Acoustical Society of America*, Providence, RI.

Anderson, N.D., Toscano JC, Garnsey SM, Fabiani M, Gratton G (2014, April). Graded representations of voice onset time: Evidence from optical imaging. Poster presented at the *Annual Meeting of the Cognitive Neuroscience Society*, Boston, MA.

Brown-Schmidt S, Toscano JC (2014, March). Continuous acoustic information trickles up; discourse information trickles down. Poster presented at the *27th Annual CUNY Conference on Human Sentence Processing*, Columbus, OH.

Toscano JC, Trevino A, Allen JB (2013, October). Assessing the assessment: Measuring listeners’ speech recognition errors for specific consonants and tokens. Poster presented at the *2013 Aging and Speech Communication Conference*, Indiana University, Bloomington, IN.

Buxó-Lugo, A, Toscano JC, & Watson DG (2013, March). Task effects on prosodic prominence. Paper presented at the *26th Annual CUNY Conference on Human Sentence Processing*, Columbia, SC.

Toscano JC, McMurray B (2012, November). Combining cues to recognize speech: Acoustic measurements of phonetic cues to word-medial voicing. Poster presented at the *53rd Annual Meeting of the Psychonomic Society*, Minneapolis, MN.

Toscano JC, McMurray B (2012, November). An approach for manipulating the perceived gender of a talker's voice for studies of indexical effects in speech perception. Paper presented at the *11th Auditory Perception, Cognition, & Action Meeting*, Minn., MN.

Toscano JC, McMurray B (2012, October). Voicing in English revisited: Measurement of acoustic features signaling word-medial voicing in trochees. Poster presented at the *164th Meeting of the Acoustical Society of America*, Kansas City, MO.

Toscano JC, McMurray B (2012, October). Perception of continuous acoustic cues in speech revealed by the auditory N1 and P3 ERP components. Poster presented at the *2012 Neurobiology of Language Conference*, San Sebastian, Spain.

Toscano JC, McMurray B (2012, January). Measuring perceptual encoding and categorization of speech sounds using an ERP approach. Poster presented at the *6th Annual Conference of the Auditory Cognitive Neuroscience Society*, Tucson, AZ.

Toscano JC, Anderson, ND, & McMurray B (2011, November). The role of time in spoken word recognition: Evidence against temporal order in lexical representations. Poster presented at the *52nd Annual Meeting of the Psychonomic Society*, Seattle, WA.

Toscano JC, & McMurray B (2011, November). Measuring acoustic cue encoding and categorization during speech processing using the auditory N1 and P3 ERP components. Paper presented at the *10th Auditory Perception, Cognition, and Action Meeting*, Seattle, WA.

Toscano JC, Anderson ND, McMurray B (2011, October). The role of phoneme order and phonetic detail in spoken word recognition. Paper presented at the *17th Mid-Continental Workshop on Phonetics and Phonology*, Urbana, IL.

Clayards M, Toscano JC (2010, August). Modeling age of exposure in L2 learning of vowel categories. Poster presented at the *32nd Annual Conference of the Cognitive Science Society*, Portland, OR.

Toscano JC, McMurray B, Luck, SJ, Dennhardt J. (2009, April). Listeners' sensitivity to acoustic detail in speech at the level of both early encoding and categorization. Poster presented at the *15th International Congress on Event-Related Potentials of the Brain*, Indiana University, Bloomington, IN.

Toscano JC, & McMurray B (2008, November). Online processing of acoustic cues in speech perception: Comparing statistical and neural network models. Poster presented at the *156th Meeting of the Acoustical Society of America*, Miami, FL. (Winner of Best Student Paper in Speech Communication—2nd Prize).

Toscano JC, McMurray B (2008, October). Perception of voicing is graded all the way down: Evidence from electrophysiology. Paper presented at the *14th Mid-Continental Workshop on Phonology*, University of Minnesota, Minneapolis, MN.

Toscano JC, Galle ME, & McMurray B (2007, October). Learning positional variation and place of articulation in stop consonants from the distributional statistics of acoustic cues. Poster presented at the *13th Mid-Continental Workshop on Phonology*, Ohio State University, Columbus, OH.

Toscano JC, McMurray B (2007, October). Integrating acoustic cues to phonetic features: A computational

approach to cue weighting. Poster presented at *Where Do Features Come From? Phonological Primitives in the Brain, the Mouth, and the Ear*. Paris, France.

Toscano JC, McMurray B (2007, March). Taking statistical learning to the next level: A computational approach to the acquisition of multi-dimensional categories. Poster presented at the *2007 Biennial Meeting of the Society for Research in Child Development*, Boston, MA.

Toscano JC, McMurray B (2006, October). Acoustic cue integration in natural speech: Empirical and computational results. Paper presented at the *12th Mid-Continental Workshop on Phonology*, University of Iowa, Iowa City, IA.

Toscano JC, McMurray B (2006, June). A lexical locus for the integration of asynchronous cues to voicing: An investigation with natural stimuli. Poster presented at the *151st Meeting of the Acoustical Society of America*, Providence, RI. (Winner of Best Student Paper in Speech Communication—1st Prize).

Dennhardt J, McMurray B, Luck, SJ, Toscano JC (2006, June). Gradient effects of continuous acoustic detail revealed in event-related potentials. Poster presented at the *151st Meeting of the Acoustical Society of America*, Providence, RI.

Toscano JC, McMurray B (2005, November). Statistical learning, cross-linguistic constraints, and the acquisition of speech categories: a computational approach. Paper presented at the *11th Mid-Continental Workshop on Phonology*, University of Michigan, Ann Arbor, MI.

Beutter BR, Toscano JC, Stone LS (2005, May). Top-down and bottom-up influences on saccades in a visual search task. Poster presented at the *Annual Meeting of the Vision Sciences Society*, Sarasota, FL.

## **Grants and Research Support**

### **Ongoing**

*CAREER: Integrating information across levels of processing during real-time spoken language comprehension*, National Science Foundation. Amount: \$605,267. Role: PI. (sub: 7/19/19, start: 6/1/20, end: 5/31/25).

*Improving speech recognition for listeners with auditory neuropathy*, Capita Foundation Auditory Research Grant. Amount: \$15,000, Role: PI. (sub: 5/29/19, start: 12/1/19, end: 1/1/21).

*Cortical EEG measures of speech sound encoding for hearing assessment*. Emerging Research Grant, Hearing Health Foundation. Amount: \$29,815. Role: PI. (sub: 12/17, start: 7/1/18, end: 6/30/20).

### **Completed**

*Engaging students in the science of speech*, VITAL Mini-grant, Villanova University. Amount: \$6,980. Role: PI. (sub: 3/18/19, start: 6/1/19, end: 5/31/20).

*Using neural network models to study language processing from sounds to meaning*. Match Research Program for First Year Students, Center for Research and Fellowships and Dept. of Psychological and Brain Sciences, Villanova University. Amount: \$2,000. (Spring 2020).

*Psychophysical methods for assessing auditory neuropathy.* University Summer Grant, Villanova University. Amount: \$12,203. Role: PI. (sub: 12/1/17, start: 6/1/18, end: 8/1/18).

*Using statistical learning to acquire speech categories: A computational framework for studying phonological development.* Faculty Research & Development Grant, College of Liberal Arts & Sciences, Villanova Univ. Role: PI. Amount: \$2,500. (sub: 2/3/17, start: 6/1/7, end: 5/31/18).

*Using statistical learning to acquire speech categories: A computational framework for studying phonological development.* University Conference Travel Grant, Office of the Provost, Villanova Univ. Role: PI. Amount: \$3,741. (sub: 2/3/17, start: 6/1/17, end: 5/31/18).

*The Sounds of Human Language.* Mendel Science Experience Postdoctoral Fellows Program, College of Liberal Arts & Sciences, Villanova University. Role: Postdoc Supervisor. (sub: 1/15/16, start: 8/22/16, end: 8/21/19).

*Phonetic competition in English-Spanish bilinguals as a function of language context and age of onset.* Center for Marketing & Consumer Insights Mini-Grant, Villanova University. Role: PI. Amount: \$295. (sub: 6/27/16, start: 8/5/16, end: 12/31/17).

*Speech-based tests for diagnosis and treatment of hearing loss.* Match Research Program for First Year Students, Center for Undergraduate Research and Fellowships, Villanova University. Role: PI. Amount: \$1,000. (sub: 11/16/16, start: 1/17/17, end: 5/4/17).

*Unifying principles and individual differences: What should we focus on to understand speech?* University Conference Travel Grant, Office of the Provost, Villanova University. Role: PI. Amount: \$857. (sub: 10/7/16, start: 11/1/16, end: 5/31/17).

*Continuous acoustic cues in speech: Implications for language processing models and hearing tests.* Summer Research Fellowship and Research Support Grant, Villanova University. Role: PI. Amount: \$12,200. (sub: 12/12/14, start: 6/1/15, end: 8/31/15).

*Neural representation of speech sounds in auditory cortex.* Campus Research Board Award, University of Illinois at Urbana-Champaign. Role: Co-PI. Amount: \$28,960.

Beckman Fellowship Research Funding, Beckman Institute for Advanced Science and Technology. Role: PI. Amount: \$25,000.

*Listeners' use of multiple acoustic cues in speech.* Research Grant, University of Iowa Student Government. Role: PI. Amount: \$660.

### **Mentored Student Support**

*Individual differences in language ability assessed by top-down lexical activation.* Villanova Undergraduate Research Fellowship. Student: Nabiha Shahid. (Summer 2019).

*Integration of acoustic cues in speech measured using auditory brainstem responses.* Villanova Undergraduate Research Fellowship. Student: Michael Ryan Henderson. (Summer 2019).

*Predictive effects of visual speaking rate information on speech recognition.* Villanova Graduate Student Summer Fellowship. Student: Andrea Ruggiero. (Summer 2019).

*Influence of dialect region on vowel perception and production.* Villanova Undergraduate Research Fellowship. Student: Nicole Feeley. (Summer 2018).

*Effects of semantic similarity on speech perception during sentence processing.* Villanova Graduate Student Summer Fellowship. Student: Agnes Gao (Summer 2018).

*Discovering networks of phonetic cues for speech sound categorization using graph theory.* Herschel-Smith Summer Undergraduate Research Fellowship, Harvard University. Student: Anne Marie Crinnion. (Summer 2017).

*Redundancy and variability in speech: Listeners' use of token-level phonetic cues.* Villanova Graduate Student Summer Fellowship. Student: Abigail Benecke. (Summer 2017).

*How long can listeners maintain gradient acoustic information?* Villanova Graduate Student Summer Fellowship. Student: J. Benjamin Falandays. (Summer 2016).

*The role of theta waves in speaking rate compensation.* Villanova Graduate Student Summer Fellowship. Student: David Saltzman. (Summer 2016).

*Enhancing tools for measuring phonetic convergence.* Villanova Graduate Student Summer Fellowship. Student: Tifani Biro. (Summer 2015).

*Bottom-up perceptual processes and short-term chord expectancy.* Villanova Graduate Student Summer Fellowship. Student: Beach Brooks. (Summer 2015).

*Parallel vs. serial processing in language comprehension.* Villanova Graduate Student Summer Fellowship. Student: Emma Folk. Summer (2015).

## **Media and Outreach**

- 2018 Interviewed for "What's Up With All These Viral Illusions?" by Julie Beck (*The Atlantic*).
- 2018 Interviewed for CBS3 news segment, "The Science Of Hearing Yanny Or Laurel."
- 2018 Interviewed for NBC 10 news segment, "Locals React to Laurel vs. Yanny Debate."
- 2016 Flame Challenge Top 25, *What is Sound?* Alan Alda Center for Communicating Science. Entry submitted with Neil Bardhan and Alexandra Tabachnick.
- 2016 USA Science & Engineering Festival, American Inst. of Physics/Acoustical Soc. of America.
- 2015 *Speech recognition in a noisy world.* Presentation for Villanova Psi Chi.
- 2015 Quoted in "The white and gold (no, blue and black!) dress that melted the Internet." (*NY Times*).
- 2012 *Understanding speech: Human perception and machine recognition.* Chambana Science Café.

## Teaching

### Instructor (Villanova Univ.)

Semester	Course	Students	Advisees (UG)	MS Thesis Students
Sp 2020	PSY 8150: Cognitive Psychology	19	26	4
Fa 2020	MSE 2701: Sounds of Human Language	24	26	4
Fa 2019	MSE 2701: Sounds of Human Language	23	27	4
Sp 2019	<i>Sabbatical</i>		25	3
Fa 2018	CGS 5910: Psychology of Language PSY 3300: Perception PSY 8200: Perception (Graduate)	20 36 11	25	3
Sp 2018	MSE 2701: Sounds of Human Language PSY 5250: Contemporary Issues in Psych	41 14	26	4
Fa 2017	<i>Parental leave</i>		26	4
Sp 2017	CBN 5000: Advanced Lab in Neuroscience PSY 8150: Cognition (Graduate)	23 19	30	5
Fa 2016	MSE 2701: Sounds of Human Language PSY 5250: Contemporary Issues in Psych	20 12	30	5
Sp 2016	PSY 3300: Perception PSY 5250: Contemporary Issues in Psych	35 15	29	4
Fa 2015	MSE 2701: Sounds of Human Language PSY 5250: Contemporary Issues in Psych	21 9	21	4
Sp 2015	PSY 1000: General Psychology PSY 8200: Perception (Graduate)	63 11	7	0
Fa 2014	PSY 1000: General Psychology	70	0	0

### Instructor (Univ. of Iowa)

Semester	Course	Students
Fa 2008	031:014 Intro to Developmental Science	25
Su 2008	031:043 Evaluating Psych Research (Methods course)	30
Su 2006	031:043 Evaluating Psych Research (Methods course)	33

## Graduate Teaching Assistant (Univ. of Iowa)

Semester	Course	Students
Sp 2011	031:010 Research Methods	44
Fa 2010	031:016 Introduction to Cognitive Psychology	123
Sp 2010	031:010 Research Methods	58
Fa 2007	031:001 Elementary Psychology	120
Fa 2006	031:121 Experimental Psychology II (Lab)	23

## Guest Lectures (Villanova Univ.)

Sp 2020	PSY 5250 Contemporary Issues in Psychology
Sp 2020	CGS 5910 Psychology of Language
Fa 2018	PSY 5250 Contemporary Issues in Psychology
Fa 2018	PSY 8000 Seminar (Graduate)
Sp 2018	PSY 5250 Contemporary Issues in Psychology
Fa 2017	PSY 8000 Seminar (Graduate)
Fa 2017	MSE 2701 Sounds of Human Language (two class sessions)
Sp 2017	PSY 5250 Contemporary Issues in Psychology (two class sessions)
Fa 2016	PSY 8000 Seminar (Graduate)
Fa 2016	CGS 5910 Language Processes
Sp 2016	PSY 8150 Cognitive Psychology (Graduate)
Fa 2015	PSY 8000 Seminar (Graduate)
Sp 2015	PSY 5250 Contemporary Issues in Psychology
Fa 2014	PSY 8000 Seminar (Graduate)
Fa 2014	PSY 5250 Contemporary Issues in Psychology

## Guest Lectures (Univ. of Illinois)

Sp 2013	Psych 593SG Language Comprehension (Graduate)
Fa 2012	Psych 593SG Language Comprehension (Graduate)

## Guest Lectures (Univ. of Iowa)

2009	031:014 Intro to Developmental Science
2005	031:118 Infant Development

## Formal Student/Trainee Supervision

Years	Student/Trainee	Project(s) and Outcomes
2019–	Jenah Black	M.S. Thesis
2019–	Siyu Lin	M.S. Thesis
2018–	Emily Martinez	M.S. Thesis
2018–2020	Tess Heinrichs	Honors Thesis; Undergraduate Independent Research

2019–2020	Gwen Saccocia	Honors Thesis
2020	Jake Leonard	Graduate Independent Research
2018–2020	Andrea Ruggiero	M.S. Thesis; Graduate Independent Research
2016–2019	Laura Getz	Postdoctoral Fellow; Outcome: Asst. Prof., Univ. of San Diego
2017–2019	Yang Agnes Gao	M.S. Thesis; Outcome: PhD student, UC Davis
2017–2019	Zachary Oxford	M.S. Thesis (Supervised w/ Katina Sawyer); PhD student, UCLA
2018–2019	Anne Mozel	M.S. Thesis Committee Member
2018–2019	Adam Dávila	M.S. Thesis Committee Member
2017–2018	Sarah Vrabic	M.S. Thesis Committee Member
2017–2018	Elke Nordeen	M.S. Thesis Committee Member
2017–2019	Courtney Thomas	M.S. Thesis Committee Member
2016–2018	Abigail Benecke	M.S. Thesis; Outcome: PhD student, Ohio State University
2018	Nicole Feeley	Undergraduate Independent Research
2017	Ani Javardian	Undergraduate Independent Research
2017–2018	Daniel Cordero	M.S. Thesis (Software Engineering; Supervised w/ Edward Kim)
2017	Rakshana Selvarajan	Undergraduate Independent Research
2017	Mackenzie Jorgensen	Undergraduate Independent Research
2017	Sarah Vrabic	Graduate Independent Research
2017	Jordan Rast	Graduate Independent Research
2016	Sarah Welch	Undergraduate Independent Research
2016	Emily Tenuta	Undergraduate Independent Research
2015–2017	Benjamin Falandays	M.S. Thesis; Outcome: PhD student at UC Merced
2014–2016	Tifani Biro	M.S. Thesis; Outcome: PhD student at University of Kansas
2014–2016	Emma Folk	M.S. Thesis; Outcome: MA student at Indiana University
2014–2016	David Saltzman	M.S. Thesis; Outcome: Research Assistant at Univ. of Connecticut
2014–2016	Alexandra Tabachnick	Graduate Independent Research
2014–2015	Taylor Curley	Graduate Independent Research
2013–2014	Michael Hudgins	Senior Thesis (UIUC)
2012–2014	Alexander Senetar	Senior Thesis (UIUC)
2012–2014	Paoula Dyanova	Senior Thesis (UIUC)
2012–2013	Bhavika Patel	Senior Thesis (UIUC)
2012	Stephanie Lutz	Senior Thesis (UIUC)
2010–2011	Lisa Vangsness	Independent Research (Iowa)

### **Informal Research Supervision**

*Graduate* (excluding students formally supervised above): 2 total; Olivia Pereira, Stephanie Vicari.

*Undergraduate* (excluding students formally supervised above): 34 total; Nabiha Shahid, Annie DiRenzo, Victoria Primiano, Charli White, Elise Miller, Amogh Bharadwaj, Ander Swartz, Kayla Adornatto, Jesse Zimmermann, Ryan Henderson, Julie Capece, Thea Callen, Jocelyn Rego, Olivia Hacker, Cara Colao, Caroline Lee, Pankhuri Walia, Anne Marie Crinnion, Elizabeth Day, Janice Puder, Katherine French, Carlin Welter, Christina Nashed, Claire McCann, Marissa Pharel, Nicole Johnson, Marissa Osowski, Jacklyn Coelho, Jesse Pazdera, John Kay, Christopher Burley, Brandon Henken, Grace Kerrigan, Tyler Re.



## Service

### University (Villanova Univ.)

- 2018 Presentation on Responsible Conduct of Research, Center for Research and Fellowships
- 2017 VURF Review Committee, Center for Undergraduate Research and Fellowships

### College (Villanova Univ.)

- 2019– CLAS Sustainability Committee, Advocacy Sub-committee Member
- 2018– Graduate Summer Research Fellowship Committee Member
- 2017– Cognitive Science Brown Bag, Organizer
- 2015– Faculty Committee, Cognitive Science Program
- 2014–2015 Cluster Computing Task Force

### Department (Villanova Univ.)

- 2019– Outcomes Liaison, CBN Program
- 2015– Faculty Advisor, Undergraduate Psychology/CBN Club
- 2015– Committee Member, CBN Undergraduate Advisory Committee
- 2015–2016 Committee Member, Ph.D. Proposal Task Force
- 2014–2015 Committee Member, Website Revision Committee
- various Colloquium Committee (2014, 2016, 2018)

### Department (Univ. of Iowa)

- 2007–2009 Graduate Resources Committee
- 2006–2007 Faculty Meeting Representative

## Editorial Positions

- 2018– Associate Editor, *Auditory Perception and Cognition*
- 2017– Editorial Board Member, *Journal of Speech, Language, and Hearing Research*

## Grant Panels

- 2016 NSF Panelist

### Ad-hoc Reviews (Journals; various years)

*Attention, Perception, & Psychophysics, Brain & Language, Clinical Neurophysiology, Cognition, Cognitive Science, Ear & Hearing, Journal of the Acoustical Society of America, Journal of Experimental Psychology: General, Journal of Experimental Psychology: Human Perception & Performance, Journal of Experimental Psychology: Learning, Memory, & Cognition, Journal of Memory & Language, Journal of Phonetics, Language Learning, Laboratory Phonology, Language, Cognition, & Neuroscience/Language & Cognitive Processes, Language & Speech, Neurobiology of Language, Psychonomic Bulletin & Review, Quarterly Journal of Experimental Psychology, WIREs Cognitive Science*

### Ad-hoc Reviews (Funding Agencies)

- 2020 NSF, Division of Behavioral and Cognitive Sciences (Perception, Action, and Cognition)

- 2017 NSF, Division of Behavioral and Cognitive Sciences (Perception, Action, and Cognition)
- 2016 NSF, Division of Behavioral and Cognitive Sciences (Linguistics)
- 2013 NSF, Division of Behavioral and Cognitive Sciences (Linguistics)
- 2012 NSF, Division of Behavioral and Cognitive Sciences (Linguistics)
- 2011 NSF, Division of Behavioral and Cognitive Sciences (Cognitive Neuroscience)

**Ad-hoc Reviews (Conferences)**

- 2020 CogSci 2020 (4)
- 2016 CogSci 2016 (3)
- 2013 CogSci 2013 (3)
- 2011 CogSci 2011 (3)

**Ad-hoc Reviews (Book Chapters)**

- 2006 Chapter in J.P. Spencer, M. Thomas, & J. McClelland (Eds.), *Toward a Unified Theory of Development: Connectionism and Dynamic Systems Theory Re-Considered*.

**Conference Organization**

- 2016 Panel Discussion Organizer, “Unifying principles and individual differences: What should we focus on to understand speech?” *15th Annual Auditory Perception, Cognition, and Action Meeting*, Boston, MA.
- 2015 Program Committee, Graduate Student Symposium on Literature and Psychology, Department of Romance Languages and Literatures, Villanova University
- 2015 Program Committee, CogSci 2015
- 2006 Co-organizer, 12th Midcontinental Workshop on Phonology, University of Iowa

**Other Professional Service**

- 2018– Webmaster, Auditory Perception and Cognition Society
- 2012–2014 Co-founder and Organizer, Chambana Science Café
- 2006– Webmaster, Praat Script Archives (<https://sites.google.com/site/praatscripts/>)