

Curriculum Vitae

Benjamin Parrell

Dept. of Communication Sciences & Disorders
University of Wisconsin–Madison
1975 Willow Dr.
Madison, WI 53706

web: smac.waisman.wisc.edu
email: bparrell@wisc.edu
phone: 608-957-1371

Academic Appointments

- 2017-current Assistant Professor, Department of Communication Sciences & Disorders
Faculty Trainer, Neuroscience Training Program
University of Wisconsin–Madison
- 2015-2017 Assistant Professor, Department of Linguistics & Cognitive Science
Faculty, Biomechanics and Movement Science program
University of Delaware
- 2014-2015 NIH NRSA Postdoctoral fellow, Department of Psychology
University of California, Berkeley
Sponsors: Rich Ivry (UC-Berkeley, Dept. of Psychology)
 John Houde (UCSF, Dept. of Otolaryngology)

Education

- 2014 Ph.D., Linguistics
University of Southern California
- 2013 Diploma in Innovation
University of Southern California
- 2009 M.A., Linguistics
University of Southern California
- 2006-2007 Visiting Academic
Universitat Rovira i Virgili (Tarragona, Spain)
- 2004 B.A., Spanish, *summa cum laude* with departmental honors
University of Oregon

Publications (* denotes equal contribution)

Journal Publications

- B. Parrell, A. Lammert, G. Ciccarelli, & T. Quatieri (accepted). Current Speech Motor Control Models: An Overview of Architectures & Properties. *Journal of the Acoustical Society of America*. Preprint DOI: <https://doi.org/10.1101/197285>.
- Y. Lee, S. Gordon Danner, B. Parrell, S. Lee, L. Goldstein, & D. Byrd (2018). Articulatory, Acoustic, and Prosodic Accommodation in a Cooperative Maze Navigation Task. *PLoS One*. DOI: <https://doi.org/10.1371/journal.pone.0201444>.
- B. Parrell & S. Narayanan (2018). Explaining coronal reduction: prosodic structure and articulatory posture. *Phonetica*, 75(2), 151-181. DOI: <https://doi.org/10.1159/000481099>.

- B. Parrell, Z. Agnew, J. Houde, S. Nagarajan, & R. Ivry (2017). Impaired feedforward control and enhanced feedback control of speech in patients with cerebellar degeneration. *Journal of Neuroscience*, 37(38), 9249-9258. DOI: <https://doi.org/10.1523/JNEUROSCI.3363-16.2017>.
- B. Parrell, L. Goldstein, S. Lee, & D. Byrd (2014). Spatiotemporal coupling between speech and manual motor actions. *Journal of Phonetics*, 42, 1-11. DOI: <https://doi.org/10.1016/j.wocn.2013.11.002>.
- B. Parrell, S. Lee, & D. Byrd (2013). Evaluation of prosodic juncture strength using functional data analysis. *Journal of Phonetics*, 41(6), 442-452. DOI: <https://doi.org/10.1016/j.wocn.2013.08.001>.
- B. Parrell (2012). The role of gestural phasing in Western Andalusian Spanish aspiration. *Journal of Phonetics*, 40(1), 37-45. DOI: <https://doi.org/10.1016/j.wocn.2011.08.004>.
- B. Parrell (2011). A dynamical account of how /b, d, g/ differ from /p, t, k/ in Spanish: evidence from labials. *Laboratory Phonology*, 2(2), 423-450. DOI: <https://doi.org/10.1515/labphon.2011.016>.
- B. Parrell (2011). Articulatory Phonology and the Task Dynamics model. *Studies in Hispanic and Lusophone Linguistics*, 4(2), 531-542. DOI: <https://doi.org/10.1515/shll-2011-1112>.

Papers in Peer-Reviewed Conference Proceedings

- B. Parrell*, V. Ramanarayanan*, S. Nagarajan, & J. Houde (2018). FACTS: A hierarchical task-based control model of speech incorporating sensory. *Proceedings of Interspeech 2018*.
- V. Ramanarayanan*, B. Parrell*, L. Goldstein, S. Nagarajan, & J. Houde (2016). A New Model of Speech Motor Control based on Task Dynamics and State Feedback. *Proceedings of Interspeech 2016*, San Francisco, CA, September 2016.
- B. Parrell & S. Narayanan (2014). Interaction between general prosodic factors and language-specific articulatory patterns underlies divergent outcomes of coronal stop reduction. In *Proceedings of the tenth International Seminar on Speech Production*, Cologne, Germany, May 2014.
- B. Parrell, L. Goldstein, S. Lee, & D. Byrd (2011). Temporal coupling between speech and manual motor actions. In *Proceedings of the ninth International Seminar on Speech Production*, Montreal, Canada, June 2011.
- B. Parrell, S. Lee & D. Byrd (2010). Evaluation of juncture strength using articulatory synthesis of prosodic gestures and Functional Data Analysis. In *Proceedings of Speech Prosody V*, Chicago, Illinois, May 2010.
- B. Parrell, L. Goldstein, S. Lee & D. Byrd (2010). Articulatory evidence for functional coupling of speech and non-speech motor tasks. In *Proceedings of Speech Prosody V*, Chicago, Illinois, May 2010.

Book Chapters

- M. Riera, J. Romero, & B. Parrell (2009). Schwa in American English V+/r/ sequences. In M. Vigário, S. Frota, & M.J. Freitas (Eds.), *Phonetics and Phonology: Interactions and interrelations*. John Benjamins: Amsterdam.

Presentations

Invited Talks and Colloquia

- 2018 J. Krivokpić, W. Styler, B. Parrell (2018). Articulation During Pauses, *SPAN group meeting, University of Southern California, August 2018*.
- 2017 B. Parrell (2017). Feedforward and feedback control in patients with cerebellar degeneration, *Neural Bases of Speech Production Symposium, University of California, San Francisco, March 2017*.
- B. Parrell (2017). Speech as a feedback control system, *Department of Communications Sciences & Disorders seminar, University of Wisconsin–Madison, January 2017*.
- B. Parrell (2017). A sensory feedback control framework for speech: model architecture, neural bases, and open questions, *Staff Talks seminar, Haskins Laboratories, January 2017*.
- 2016 B. Parrell (2016). The wide world of prosody: Prosodic structure in sound change and prosodic breakdown in disordered speech, *Department of Linguistics Thursday Thoughts series, University of Pennsylvania, February 2016*.
- 2014 B. Parrell (2014). Time and space in speech: control and production, *Department of Linguistics and Cognitive Science colloquium, University of Delaware, March 2014*.
- B. Parrell (2014). Time and space in phonology, *Department of Hispanic and Italian Studies talk series, University of Illinois at Chicago, January 2014*.
- 2011 B. Parrell (2011). (New) approaches to old problems: Articulatory Phonological applications in Spanish, *Phonetics seminar series, University of California Los Angeles, May 2011*.

Campus talks

- 2018 B. Parrell (2018). Towards a new theory of speech motor control, *Department of Communications Sciences & Disorders seminar, University of Wisconsin–Madison, November 2018*.
- B. Parrell (2018). Speech motor control: models, neural bases, and learning, *Department of Communications Sciences & Disorders seminar, University of Wisconsin–Madison, April 2018*.
- B. Parrell (2018). Speech as a dynamical system, *Chaos and Complex Systems Seminar, University of Wisconsin–Madison, March 2018*.
- 2016 B Parrell (2016). Cerebellar function in speech motor control: feedforward and feedback processes, *Biomechanics and Movement Science seminar, University of Delaware, May 2016*.
- B. Parrell (2016). Towards a new theory of speech motor control, *Department of Linguistics and Cognitive Science colloquium, University of Delaware, May 2016*.
- 2015 B. Parrell (2015). The role of the cerebellum in speech motor control: Evidence from speakers with ataxia, *Berkeley Phonetics and Phonology Phorum, University of California, Berkeley, April 2015*.

Conference Presentations & Published Abstracts

- 2018 B. Parrell, H. Kim, A. Breska, A. Saxena, R. Ivry (2018). Augmented use of feedback for online control in patients with cerebellar ataxia across different

motor domains. Poster presented at Society for Neuroscience 2018, San Diego, CA, November 2018.

H. Kothare, I. Raharjo, K. Ranasinghe, V. Ramanarayanan, B. Parrell, J. Houde, S. Nagarajan (2018). Sensorimotor adaptation in speech is sensitive to vowel targets of altered feedback. Poster presented at the 10th annual meeting of the Society for the Neurobiology of Language, Quebec City, Quebec, Canada, August 2018.

B. Parrell*, V. Ramanarayanan*, S. Nagarajan, J. Houde (2018). A hierarchical task-based control model of speech incorporating sensory feedback. Talk presented at the Madonna Motor Speech Conference, Savannah, GA, February 2018. (*equal contribution)

2017

W. Styler, J. Krivokapic, B. Parrell, J. Kim (2017). Using machine learning to identify articulatory gestures in time course data. *Journal of the Acoustical Society of America* 142, 2579.

J. Krivokapic, W. Styler, B. Parrell, J. Kim (2017). Pause postures in American English. *Journal of the Acoustical Society of America* 142, 2584.

B. Parrell (2017). Evidence for reward learning in speech production. Poster presented at Society for Neuroscience 2017, Washington, DC, November 2017.

B. Parrell*, V. Ramanarayanan*, S. Nagarajan, J. Houde (2017). A hierarchical state feedback control model for speech simulates task-specific responses to auditory and articulatory perturbations. Poster presented at the 7th International Conference on Speech Motor Control, Groningen, the Netherlands, July 2017. (*equal contribution)

B. Parrell (2017). Evidence for reward learning in speech production. Poster presented at the 7th International Conference on Speech Motor Control, Groningen, the Netherlands, July 2017.

J. Houde, S. Nagarajan, B. Parrell, V. Ramanarayanan (2017). Advances in modeling speech production as state feedback control. Talk presented at the 7th International Conference on Speech Motor Control, Groningen, the Netherlands, July 2017.

B. Parrell, Z. Agnew, J. Houde, S. Nagarajan, R. Ivry (2017). Cerebellar damage leads to changes in both feedforward and feedback control of speech. Poster presented at the 2017 Boston Speech Motor Control Mini-Symposium, Boston, MA, March 2017.

2016

B. Parrell, Z. Agnew, J. Houde, S. Nagarajan, R. Ivry (2016) Individuals with cerebellar degeneration correct for within-category variation of vowels even in the absence of auditory feedback. Talk presented at Society for Neuroscience 2016, San Diego, CA, November 2016.

H. Kothare, V. Ramanarayanan, B. Parrell, J. Houde, S. Nagarajan (2016). Sensorimotor adaptation to real-time formant shifts is influenced by the direction and magnitude of shift. Talk presented at Society for Neuroscience 2016, San Diego, CA, November 2016.

Y. Lee, S. Gordon Danner, B. Parrell, S. Lee, L. Goldstein, D. Byrd (2016). Acoustic and articulatory measures of prosodic convergence in a cooperative maze navigation task. Poster presented at the 5th Joint Meeting of the

Acoustical Society of America and Acoustical Society of Japan, Honolulu, HI, November 2016.

V. Ramanarayanan*, B. Parrell*, L. Goldstein, S. Nagarajan, J. Houde (2016). A New Model of Speech Motor Control based on Task Dynamics and State Feedback. Talk presented at SECNS 2016: The 1st Workshop on Speech Engineering and Computational Neuroscience of Speech, San Francisco, CA, September 2016. (*equal contribution)

V. Ramanarayanan*, B. Parrell*, L. Goldstein, S. Nagarajan, J. Houde (2016). A New Model of Speech Motor Control based on Task Dynamics and State Feedback. Talk presented at Interspeech 2016, San Francisco, CA, September 2016. (*equal contribution)

Y. Lee, S. Gordon Danner, B. Parrell, S. Lee, L. Goldstein & D. Byrd (2016). Prosodic Convergence During and After a Cooperative Maze Task. Poster presented at LabPhon 15, Ithaca, NY, July 2016.

2015 B. Parrell, J. Houde, S. Nagarajan & R. Ivry. (2015) Disrupted feedforward but spared feedback control during speech in patients with cerebellar degeneration. Poster presented at Society for Neuroscience 2015, Chicago, IL, October 2015.

B. Parrell, J. Houde, S. Nagarajan & R. Ivry. (2015) Disrupted feedforward but spared feedback control during speech in patients with cerebellar degeneration. Poster presented at the Seventh Annual Meeting of the Society for the Neurobiology of Language, Chicago, IL, October 2015.

2014 B. Parrell & S. Narayanan (2014). Interaction between general prosodic factors and language-specific articulatory patterns underlies divergent outcomes of coronal stop reduction. Talk presented at the 10th International Seminar on Speech Production, Cologne, Germany, May 2014.

2013 B. Parrell, A. Lammert, S. Narayanan & L. Goldstein (2013). Simulations of sound change resulting from a production-recovery loop. *Journal of the Acoustical Society of America*, 134(5), 4167.

2012 B. Parrell (2012). How tongue posture differences affect reduction in coronals: Differences between Spanish and English. *Journal of the Acoustical Society of America*, 132(3), 1936.

2011 B. Parrell, A. Lammert, L. Goldstein, D. Byrd, & S. Narayanan (2011). Imaging and quantification of glottal kinematics with ultrasound during speech. *Journal of the Acoustical Society of America*, 130(4), 2548.

B. Parrell, L. Goldstein, S. Lee, & D. Byrd (2011). Temporal coupling between speech and manual motor actions. Poster presented at the ninth International Seminar on Speech Production, Montreal, Canada, June 2011.

B. Parrell & S. Tilsen (2011). Control of duration and magnitude in speech imitation. Paper presented at the sixth International Conference on Speech Motor Control, Groningen, The Netherlands, June 2011.

2010 B. Parrell (2010). Articulation from acoustics: estimating constriction degree from the acoustic signal. *Journal of the Acoustical Society of America*, 128(4), 2289.

- B. Parrell, S. Lee, & D. Byrd (2010). Quantifying prosodic boundary strength using functional data analysis of articulatory movement. *Journal of the Acoustical Society of America*, 128(4), 2289.
- B. Parrell (2010). Romance lenition revisited: articulatory and model evidence from Spanish. Poster presented at the Workshop on Sound Change, Barcelona, Spain, October 2010.
- B. Parrell, M. Proctor & L. Goldstein (2010). Towards a computational articulatory model of Spanish phonology. Paper presented at Laboratory Approaches to Romance Phonology, Provo, Utah, September 2010.
- B. Parrell (2010). How /b d g/ differ from /p t k/ in Spanish: A dynamic account. Paper presented at LabPhon 12, Albuquerque, New Mexico, July 2010.
- B. Parrell (2010). How /b d g/ differ from /p t k/ in Spanish: A dynamic account. Poster presented at São Paulo School of Advanced Studies in Speech Dynamics, São Paulo, Brazil, June 2010.
- B. Parrell, S. Lee & D. Byrd (2010). Evaluation of juncture strength using articulatory synthesis of prosodic gestures and Functional Data Analysis. Paper presented at Speech Prosody V, Chicago, Illinois, May 2010.
- B. Parrell, L. Goldstein, S. Lee & D. Byrd (2010). Articulatory evidence for functional coupling of speech and non-speech motor tasks. Poster presented at Speech Prosody V, Chicago, Illinois, May 2010.
- 2009 B. Parrell (2009). Rate conditioned aspiration change in Western Andalusian Spanish. Poster presented at the Phonetics and Phonology in Iberia conference, Las Palmas, Spain, June 2009.
- S. Lee, B. Parrell, & D. Byrd (2009). Computational modeling of juncture strength using articulatory synthesis of prosodic gestures. *Journal of the Acoustical Society of America*, 125(4), 2572 - 2572.
- B. Parrell (2009). Rate conditioned variability in Western Andalusian Spanish aspiration. *Journal of the Acoustical Society of America*, 125(4), 2570 - 2570.
- 2008 B. Parrell (2008). /s/ + stop gestural reorganization in Western Andalusian Spanish. Poster presented at the Southern California Workshop on Phonetics/Phonology, Pomona, California, November 2008.
- 2007 J. Romero, B. Parrell, & M. Riera (2007). What distinguishes /p/, /t/, /k/ from /b/, /d/, /g/ in Spanish? Poster presented at the Phonetics and Phonology in Iberia Conference, Braga, Portugal, June 2007.
- M. Riera, J. Romero, & B. Parrell (2007). Schwa in American English V+*r*/ sequences. Paper presented at the Phonetics and Phonology in Iberia Conference, Braga, Portugal, June 2007.

Grants

External grants

2018-2023

“The role of the cerebellum in speech”
(Total: \$2,459,501 DC)
1R01DC017091

National Institute on Deafness and other Communication Disorders

Role: Co-Investigator

2018-2021 “CRCNS: Modeling the role of auditory feedback in speech motor control”
(Total: \$1,112,519 DC)
1R01DC017696

National Institute on Deafness and other Communication Disorders

Role: Co-Investigator

2014-2015 “Control of duration in speech and temporal deficits in Ataxic Dysarthria”
(Total: \$49,850 DC)

F32DC014211, NIH Ruth L. Kirschstein National Research Service Award

National Institute on Deafness and other Communication Disorders

Role: Principal investigator

Internal grants

2016-2018 “Reinforcement learning in speech motor control” (Total: \$35,000)

University of Delaware Research Foundation

Role: Principal investigator

2012-2013 “Ultrasound imaging and automatic quantification of glottal dynamics during
speech” (Total: \$5,000)

University of Southern California Diploma in Innovation grant

Role: Principal investigator (co-PI: Adam Lammert)

2012 Del Amo Research Award (Total: \$4,000)

University of Southern California

2011 Del Amo Research Award (Total: \$3,200)

University of Southern California

2010 Del Amo Research Award (Total: \$5,000)

University of Southern California

2009 Del Amo Research Award (Total: \$5,000)

University of Southern California

2008 Del Amo Research Award (Total: \$5,000)

University of Southern California

Honors, Fellowships, and Awards

2012-2013 Russell Fellowship

The Graduate School, University of Southern California

2012 Raymond H. Stetson scholarship in phonetics and speech science

Acoustical Society of America

2012 Best paper award for students and young professionals (second place):

“How tongue posture differences affect reduction in coronals: Differences
between Spanish and English”

Masters Students Supervised

2016-2017: Sam Cheng, MA (UD)

2013: Alba Aguete Cajiao, Masters thesis, (CSIC, Madrid, Spain)

Professional Activities

External Service

Ad hoc reviewer (journal)

Brain and Language

Cognitive Science

Computer Speech & Language

eLife

Experimental Brain Research

Journal of the Acoustical Society of America

Journal of Cognitive Neuroscience

Journal of the International Phonetic Association

Journal of Neurophysiology

Journal of Neuroscience

Journal of Phonetics

Laboratory Phonology

Language and Speech

Loquens: Spanish Journal of Speech Science

Neuroscience Letters

Motor Control

Phonetica

Quarterly Journal of Experimental Psychology

Grant reviewer

Ad-hoc reviewer for *Deutsche Forschungsgemeinschaft (DFG)*, 2018

Ad-hoc reviewer for *Ohio University Research Council*, 2017

Ad-hoc reviewer for *National Science Foundation*, 2015

Conference abstract reviewer

LabPhon 16, 2018

LabPhon 15, 2016

International Seminar on Speech Production, 2014

International Congress of Phonetic Sciences, 2019

Institutional Service

2018- Undergraduate Committee
Dept. of Communication Sciences and Disorders, University of Wisconsin–Madison

2017- Faculty Senator
Dept. of Communication Sciences and Disorders, University of Wisconsin–Madison

2017- Technology Committee
Dept. of Communication Sciences and Disorders, University of Wisconsin–Madison

- 2016-2017 Colloquium Committee
Dept. of Linguistics and Cognitive Science, University of Delaware
- 2015-2017 Graduate Student Committee
Dept. of Linguistics and Cognitive Science, University of Delaware
- 2015-2016 Search Committee member, Psycho-/Neuro-linguistics search
Dept. of Linguistics and Cognitive Science, University of Delaware
- 2010-2013 Secretary, Hispanic Linguistics Student Association
University of Southern California
- 2009-2010 Vice President, Hispanic Linguistics Student Association
University of Southern California
- 2008-2009 President, Hispanic Linguistics Student Association
University of Southern California
- 2007-2008 Treasurer, Hispanic Linguistics Student Association
University of Southern California

Professional Societies

Society for Neuroscience

Languages

English (Native), Spanish (Fluent), Catalan (Intermediate), French (Basic)