

**BIOGRAPHICAL SKETCH**

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NAME: Idsardi, William

eRA COMMONS USER NAME (agency login):

POSITION TITLE: Chair, Department of Linguistics

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
University of Toronto, Toronto, Ontario	BA	06/1988	Mathematical Linguistics
Massachusetts Institute of Technology, Cambridge, MA	PHD	09/1992	Linguistics

**A. Personal Statement**

My research investigates the nature of human speech sounds and speech sound systems in language. My approach is methodologically eclectic, including traditional formal analyses of languages' sound patterns using data from typologically diverse languages, psycholinguistic and neurolinguistic studies of speech perception and learning, computational models of speech processing and learning, and comparisons with closely analogous systems such as music and animal communication systems. My overall goal is to identify the fundamental units and computations involved in building mental representations for speech in perception, action and memory, and to identify any characteristics peculiar to speech and language.

1. Kazanina N, Phillips C, Idsardi W. The influence of meaning on the perception of speech sounds. *Proc Natl Acad Sci U S A*. 2006 Jul 25;103(30):11381-6. PubMed PMID: [16849423](#); PubMed Central PMCID: [PMC3020137](#).
2. Poeppel D, Idsardi WJ, van Wassenhove V. Speech perception at the interface of neurobiology and linguistics. *Philos Trans R Soc Lond B Biol Sci*. 2008 Mar 12;363(1493):1071-86. PubMed PMID: [17890189](#); PubMed Central PMCID: [PMC2606797](#).
3. Heinz J, Idsardi W. Psychology. Sentence and word complexity. *Science*. 2011 Jul 15;333(6040):295-7. PubMed PMID: [21764736](#).
4. Lago S, Scharinger M, Kronrod Y, Idsardi WJ. Categorical effects in fricative perception are reflected in cortical source information. *Brain Lang*. 2015 Apr;143:52-8. PubMed PMID: [25791247](#); PubMed Central PMCID: [PMC4380610](#).

**B. Positions and Honors****Positions and Employment**

1985 - 1988	Computational linguist and product manager, ESP: Educational Software Products, Toronto
1988 - 1988	Member, technical staff, Bell-Northern Research, Ottawa
1992 - 1998	Assistant Professor of Linguistics and Cognitive Science, University of Delaware, Newark, DE
1998 - 2005	Associate Professor of Linguistics and Cognitive Science, University of Delaware, Newark, DE

- 1999 - 1999 Visiting Associate Professor of Linguistics, University of Toronto, Toronto
- 1999 - 2002 Acting Chair, Department of Linguistics, University of Delaware, Newark, DE
- 2002 - 2005 Chair, Department of Linguistics, University of Delaware, Newark, DE
- 2005 - 2011 Associate Professor of Linguistics and Neuroscience and Cognitive Science, University of Maryland, College Park, MD
- 2006 - 2006 Fulbright-York University Distinguished Chair in Linguistics and Cognitive Science, York University, Toronto
- 2011 - Professor of Linguistics and Neuroscience and Cognitive Science, University of Maryland, College Park, MD
- 2012 - Chair, Department of Linguistics, University of Maryland, College Park, MD

### **Other Experience and Professional Memberships**

- 1991 - Member, Linguistic Society of America

### **Honors**

- 1999 Fulbright Senior Scholar, Council for the International Exchange of Scholars
- 2006 Fulbright-York University Distinguished Chair, Council for the International Exchange of Scholars

### **C. Contribution to Science**

1. The special nature of sound systems in human language. A common misconception about human sound systems is that they are just codified versions of the tendencies shown in co-articulation patterns. That is, speech sounds naturally smear together in speaking, and become systematic through habit. But listeners selectively ignore variation irrelevant to meaning (a), process speech differently from music (b) and extract patterns unlike sentence patterns (c).
  - a. Kazanina N, Phillips C, Idsardi W. The influence of meaning on the perception of speech sounds. *Proc Natl Acad Sci U S A*. 2006 Jul 25;103(30):11381-6. PubMed PMID: [16849423](#); PubMed Central PMCID: [PMC3020137](#).
  - b. Heinz J, Idsardi W. Psychology. Sentence and word complexity. *Science*. 2011 Jul 15;333(6040):295-7. PubMed PMID: [21764736](#).
  - c. Bergelson E, Shvartsman M, Idsardi WJ. Differences in mismatch responses to vowels and musical intervals: MEG evidence. *PLoS One*. 2013;8(10):e76758. PubMed PMID: [24143193](#); PubMed Central PMCID: [PMC3797141](#).
  
2. The neural code for speech sounds. If speech is special, then we should find neural specializations for speech (a). So far we have found specialized abilities for online speaker normalization (b), and special cortical maps for vowels (c) and consonants (d).
  - a. Poeppel D, Idsardi WJ, van Wassenhove V. Speech perception at the interface of neurobiology and linguistics. *Philos Trans R Soc Lond B Biol Sci*. 2008 Mar 12;363(1493):1071-86. PubMed PMID: [17890189](#); PubMed Central PMCID: [PMC2606797](#).
  - b. Monahan PJ, Idsardi WJ. Auditory Sensitivity to Formant Ratios: Toward an Account of Vowel Normalization. *Lang Cogn Process*. 2010 Jul;25(6):808-839. PubMed PMID: [20606713](#); PubMed Central PMCID: [PMC2893733](#).
  - c. Scharinger M, Idsardi WJ, Poe S. A comprehensive three-dimensional cortical map of vowel space. *J Cogn Neurosci*. 2011 Dec;23(12):3972-82. PubMed PMID: [21568638](#).
  - d. Lago S, Scharinger M, Kronrod Y, Idsardi WJ. Categorical effects in fricative perception are reflected in cortical source information. *Brain Lang*. 2015 Apr;143:52-8. PubMed PMID: [25791247](#); PubMed Central PMCID: [PMC4380610](#).

### 3. Listeners' identification of speakers' language group affiliation.

We have shown that listeners rapidly and accurately divide speech into the message and the messenger, and they thereby extract substantial knowledge about the speaker, including the speaker's race if they speak a racially affiliated dialect (a). We have shown that these differences are evident in primary auditory cortex within the first syllable that the speaker utters (b), establishing a firm scientific basis for the potential for racial discrimination on the basis of voice information alone.

- a. Purnell TC, Idsardi WJ, Baugh J. Perceptual and phonetic experiments on American English dialect identification. *Journal of language and social psychology*. 1999; 18:10-30.
- b. Scharinger M, Monahan PJ, Idsardi WJ. You had me at "Hello": Rapid extraction of dialect information from spoken words. *Neuroimage*. 2011 Jun 15;56(4):2329-38. PubMed PMID: [21511041](#); PubMed Central PMCID: [PMC3105187](#).
- c. Scharinger M, Idsardi WJ. Sparseness of vowel category structure: Evidence from English dialect comparison. *Lingua*. 2014 Feb 1;140:35-51. PubMed PMID: [24653528](#); PubMed Central PMCID: [PMC3956075](#).

### 4. The abstract, non-linear nature of speech.

Speech is also special in showing non-local effects, such as long-distance harmony (a, b) and reduplication (c). Such phenomena require mathematical structures that go beyond modelling speech as strings of adjacent sounds, and which directly account for these action-at-a-distance effects. My work argues for models of long-distance effects through subsequence structures (b) and circular directed graph structures (c).

- a. Scharinger M, Poe S, Idsardi WJ. Neuromagnetic reflections of harmony and constraint violations in Turkish. *Laboratory phonology*. 2011; 2(1):99-123.
- b. Idsardi WJ, Raimy E. Challenges to linearization. Biberauer T, Roberts I, editors. Berlin: De Gruyter; 2013. Three types of linearization and the temporal aspects of speech; p.31-56.
- c. Heinz J, Idsardi W. What complexity differences reveal about domains in language. *Top Cogn Sci*. 2013 Jan;5(1):111-31. PubMed PMID: [23335576](#).

## D. Research Support

### Ongoing Research Support

1449815, NSF Phillips, Colin (PI) 04/01/15-03/31/20

NRT-DESE: Flexibility in Language Processes and Technology: Human- and Global-Scale.

This project is a multi-disciplinary training grant focusing on language processing in individuals and machines across a broad range of languages representing situations with high, low and zero language resources.

Role: CPI

### Completed Research Support

1124877, NSF Idsardi, William (PI) 09/01/11-02/15/15

BCS: Collaborative Proposal: Neuromagnetic Correlates of American Dialect Perception

The goal of this project was to find neural correlates of fundamental units and processes in speech perception as they pertain to linguistic group affiliation and identification in the US.

Role: PI

R01 DC005660, NIH Poeppel, David (PI) 08/01/07-07/31/12

Cortical mechanisms in speech perception: MEG studies

The goal of this project was to find neural correlates of fundamental units and processes in speech perception.

Role: CPI