

RICHARD WILLIAM SPROAT

May 31, 2023

Richard Sproat
Google, Japan
3-21-3 Shibuya
Shibuya City
Tokyo 150-0002 Japan

EDUCATION

1981-1985. Massachusetts Institute of Technology, Cambridge, Massachusetts, Department of Linguistics and Philosophy. Ph.D. September 1985. Thesis Title: *On Deriving the Lexicon*. Thesis Supervisor: Kenneth Locke Hale. Minor: Artificial Intelligence.

1977-1981. University of California at San Diego, La Jolla, California. B.A. June 1981. *Summa cum Laude*, with Department Honors in Linguistics with Highest Distinction. Minors: Music, Classical Greek.

EMPLOYMENT

November 2015 —

Senior Staff Research Scientist, Google.

October 2012 — November 2015

Staff Research Scientist, Google.

January 2009 — October 2012

Professor, Center for Spoken Language Understanding (CSLU) and Division of Biomedical Computer Science – Department of Science and Engineering, Oregon Health & Science University (OHSU).

August 2003 — January 2009

Professor, Department of Linguistics, Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign.

Courtesy (adjunct) appointment in Psychology (January 2007–).

Courtesy (adjunct) appointment in Computer Science (January 2005–).

Fulltime faculty, Beckman Institute.

December 2005 —

Visiting Scientist, Google Labs.

March 1999 — August 2003.

Technology Consultant (AT&T Labs' Distinguished Member of the Technical Staff job title), AT&T Labs – Research,

- Until February 2002: Human–Computer Interaction Research Department
- From February 2002: Information Systems and Analysis Research Department

June 1997 — March 1999.

Distinguished Member of the Technical Staff, Language Modeling Research Department, Bell Laboratories, Lucent Technologies.

January 1996 — June 1997.

Member of the Technical Staff, Language Modeling Research Department, Bell Laboratories, Lucent Technologies.

March 1987 — January 1996.

Member of the Technical Staff, Linguistics Research Department, AT&T Bell Laboratories.

June 1986 — March 1987.

Member of the Technical Staff, Linguistics and Artificial Intelligence Research Department, AT&T Bell Laboratories.

September 1985-May 1986.

Post-doctoral Member of the Technical Staff, Linguistics and Artificial Intelligence Research Department, AT&T Bell Laboratories. Supervisor: Mark Y. Liberman.

June 1984-September 1984.

Member of the Technical Staff, Linguistics and Artificial Intelligence Department, AT&T Bell Laboratories. Supervisor: Kenneth W. Church.

TEACHING EXPERIENCE

Students for whom I have been the primary advisor.

- Cecilia Ovesdotter Alm (Linguistics) ‘Affect in Text and Speech.’ UIUC Linguistics, 2007.
- Hahn Koo (Linguistics) “Learning Non-adjacent Phonotactic Constraints from Brief Experience” . UIUC Linguistics, 2007.
- Suma Pramod (ECE). “Estimation Problems in Speech and Natural Language.” UIUC ECE. 2009.
- Su-youn Yoon. “Automated Assessment of Speech Fluency for L2 English Learners.” UIUC Linguistics, 2009.
- Boon-pang Lim. “Computational Differences in Whispered and Non-Whispered Speech.” UIUC ECE. 2010.
- Kyoung-young Kim. “Opinion Topic, Holder and Polarity in Texts: Exploration and Automatic Identification from Cross-Lingual Data.” UIUC Linguistics, 2011.

Courses at OHSU

Fall 2009. Computational Linguistics.

Spring 2010. Seminar on Speech and Language Processing for Augmentative and Alternative Communication (with Brian Roark).

Fall 2010. Practical Linguistics.

Spring 2011. Problem solving with large clusters (with Zak Shafran).

Fall 2011. Text Normalization (with Steven Bedrick).

Courses at UIUC

Spring 2008. LING270, Language, Technology and Society

Spring 2008. LING406, Introduction to Computational Linguistics.

Spring 2007. LING270, Language, Technology and Society

Fall 2006. ECE398RS, Speech Technology.

Fall 2006. LING402, Tools and Techniques for Speech and Language Processing.

Spring 2006. LING406, Introduction to Computational Linguistics.

Spring 2006. LING408, Writing Systems.

Fall 2005. LING506, Topics in Computational Linguistics.

Fall 2005. LING402, Tools and Techniques for Speech and Language Processing.

Spring 2005. LING406, Introduction to Computational Linguistics

Fall, 2004. LING 490, Tools and Techniques for Speech and Language Processing.

Fall, 2004. ECE 598, Speech Synthesis.

Spring, 2004. LING 406, Topics in Computational Linguistics.

Spring, 2004. LING 403C, Writing Systems.

Fall, 2003. LING 306, Introduction to Computational Linguistics.

Named in "Research Memorandum #271: Teachers Ranked as Excellent by their Students, Spring 2004", *Daily Illini*, September 8, 2004.

Courses and Lectures Prior to Coming to UIUC

August 2002. "Corpus-Based Methods in Chinese Morphology", COLING 2002, Taipei, Taiwan.

July 2001. "Corpus-based Methods in Chinese Morphology and Phonology", (with Chilin Shih), 2001 LSA Institute, Santa Barbara, CA.

August 1997. "Finite-state Methods in Morphology, Text Analysis and the Analysis of Writing Systems," Tutorial given at ROCLING X, Academia Sinica, Taiwan, ROC.

August 1996. "Algorithms for speech recognition and language processing," Tutorial given at COLING '96, Copenhagen, Denmark (with Mehryar Mohri and Michael Riley).

July 1994. Australian Linguistic Institute, 2-week course in computational morphology.

July 1994. "Text Analysis Tools in Spoken-Language Processing," Tutorial given at the Association for Computational Linguistics, 32nd Annual Meeting, New Mexico State University (with Michael Riley).

June 1989. "Tutorial on Morphology and Computational Morphology," Tutorial given at the Association for Computational Linguistics, 27th Annual Meeting, University of British Columbia.

February 1988-May 1988. Visiting Assistant Professor, Program in Linguistics, Rutgers University. Title of course: Linguistic Analysis.

January 1985. Organized and taught a course in LISP to fellow graduate students in linguistics at the Massachusetts Institute of Technology.

September 1984-December 1984. Teaching Assistant for Prof. Moira Yip, Massachusetts Institute of Technology. Title of Course: The Study of Language.

September 1983-December 1983. Teaching Assistant for Prof. Wayne O'Neil, Massachusetts Institute of Technology. Title of Course: The Study of Language.

Other Teaching-Related Experience Prior to Coming to UIUC

1987, 1993, 1994, 1995, 1998, 2000, 2002. Supervision of summer projects for students in Bell Laboratories Summer Research Program, Graduate Research Program for Women, and University Relations programs, and the AT&T Labs Summer Research Programs.

1992 External member of thesis committee for Jill Burstein, CUNY, (thesis title: *The Stress and Syntax of Compound Nominals*).

2002 External member of thesis committee for Scobie Smith, Harvard, (thesis title: *Hurrian Interference in Nuzi Akkadian: Comparative Graphemics*).

2002 External member of thesis committee for Martin Jansche, Ohio State University, (thesis title: *Inference of String Mappings for Speech Technology*)

2003 External Examiner, Swarthmore Honors Program.

OTHER PROFESSIONAL ACTIVITIES

Action Editor, *Transactions on Computational Linguistics*, 2019 —

Editor in Chief, *ACM Transactions on Asian Language Information Processing*, June 2013 — June 2015

International Advisory Committee, International Speech Communication Association, 2012 —

General chair, InterSpeech 2012.

Local sponsorship chair, ACL-HLT 2011

Workshops Co-chair, NAACL 2010.

Tutorial (with Kevin Knight) on “Writing Systems, Transliteration and Decipherment”, NAACL 2009, Boulder, May 31, 2009.

Team Leader for “Multilingual Spoken Term Detection: Finding and Testing New Pronunciations” Workshop '08 (July 7 – August 14, 2008), Center for Language and Speech Processing, Johns Hopkins University.

Area Chair—phonology/morphology/finite-state technology/tagging/word segmentation—ACL 2007.

Co-organizer (with Steve Farmer) of *Scripts, Non-scripts and (Pseudo)decipherment*, a workshop held in conjunction with the 2007 LSA Summer Institute, Stanford, CA, July 11, 2007.

<http://catarina.ai.uiuc.edu/2007Workshop/>.

Technical co-chair (with Yuji Matsumoto) of the 21st International Conference on Computer Processing of Oriental Languages, December 17–19, 2006, <http://www.iccpol-06.org/>.

Co-organizer (with Dan Roth) of the Third Midwest Computational Linguistics Colloquium, May 20–21, University of Illinois at Urbana-Champaign, <http://l2r.cs.uiuc.edu/cogcomp/mclc/>.

External member on Parsing Arabic Dialects project, Workshop '05 (July 11 – August 19, 2004), Center for Language and Speech Processing, Johns Hopkins University.

Team Leader for the Chinese Dialectal Speech Recognition project, Workshop '04 (July 6 – August 18, 2004), Center for Language and Speech Processing, Johns Hopkins University.

Guest editor, *Journal of Computational Linguistics and Chinese Language Processing* special issue on “Word Formation and Chinese Language Processing.”

Co-organizer, AT&T Speech Days Symposium, October 14 – 16, 2002, Florham Park, NJ,
<http://www.research.att.com/conf/spchday2002/>

Chair for SIGHAN (ACL Special Interest Group on Chinese Language Processing), 2003.

Vice-Chair and Treasurer for SIGHAN (ACL Special Interest Group on Chinese Language Processing), 2002.

Archivist for the Association for Computational Linguistics, 2000 – 2003.

Member of the W3C Voice Browser Working Group, 1999 – present.

Team Leader for the Text Normalization project, Workshop '99 (July 12 – August 20, 1999), Center for Language and Speech Processing, Johns Hopkins University.

Tutorials Chair, ACL 1999.

Co-organizer (with Mari Ostendorf and Andrew Hunt) of the *NSF Workshop for Discussing Research Priorities and Evaluation Strategies in Speech Synthesis*, Arlington, VA, August 6–7, 1998.

International Co-Chair, ROCLING (Republic of China Computational Linguistics Society), 1997.

Chair, LSA Committee on Computing, 1997.

Editorial Board, *COLIPS*, 1996– .

Editorial Board, *Computational Linguistics and Chinese Language Processing*, 1996– .

Visiting scholar, Max Planck Institute for Psycholinguistics (Nijmegen, the Netherlands), August 1996.

Chair of Program Committee, Second SIGPHON Workshop, June 1996.

Editor, *The Finite String* (newsletter of the Association for Computational Linguistics), 1996–1997.

Executive Committee, Special Interest Group in Phonology (SIGPHON), 1995–.

Associate Editor, *Language*, 1994–1996.

Co-organizer, Second ESCA/IEEE Workshop on Speech Synthesis, September 1994.

Visiting scholar, Max Planck Institute for Psycholinguistics (Nijmegen, the Netherlands), April 1994.

Editorial Board, *Natural Language and Linguistic Theory*, 1993–1995.

Editorial Board, *Computational Linguistics*, 1991–1993.

Program Committee, *Association for Computational Linguistics*, 1993.

Program Committee, *American Association for Artificial Intelligence*, 1992.

Prepublication reviewer (subset):

Journals: *Artificial Intelligence*, *Cognition*, *Computational Linguistics*, *Computer Speech and Language*, *Journal of East Asian Linguistics*, *Language*, *Linguistic Inquiry*, *Natural Language and Linguistic Theory*, *Yearbook of Morphology*, inter alia.

Book manuscripts: University of Chicago Press, MIT Press, Kluwer, inter alia.

Conferences: AAAI, GLOW, IJCAI, LabPhon, North East Linguistics Society, West Coast Conference on Formal Linguistics, inter alia.

RESEARCH INTERESTS

Accent Prediction, Articulatory Phonetics, Chinese Linguistics, Computational Morphology, Computational modeling of language change, Corpus-Based Methods, Morphology, Pronunciation Modeling, Speech Data Mining, Syntax, Text Analysis/Normalization, Text-to-Scene Conversion, Text-to-Speech Synthesis, Writing Systems.

For details on some of these, see <http://www.research.att.com/~rws/newindex/research.html>.

PATENTS

1. Awarded Patents

- (a) “Text to Scene Conversion” (with B. Coyne). December 27, 2011, U.S. Pat. Num. 8,086,028
- (b) “System and Method of Using Meta-Data in Speech Processing” (with M. Bacchiani, S. Maskey, B. Roark). August 9, 2011, U.S. Pat. Num. 7,996,224
- (c) “Text to Scene Conversion” (with B. Coyne). June 14, 2011, U.S. Pat. Num. 7,962,329
- (d) “System and Method of Lattice-Based Search for Spoken Utterance Retrieval” (with M. Saraçlar) March 22, 2011, U.S. Pat. Num. 7,912,699
- (e) “Text to Scene Conversion” (with B. Coyne). February 16, 2010, U.S. Pat. Num. 7,664,313
- (f) “Text to Scene Conversion” (with B. Coyne). May 13, 2008, U.S. Pat. Num. 7,373,292
- (g) “Text to Scene Conversion” (with B. Coyne). March 21, 2006, U.S. Pat. Num. 7,016,828
- (h) “E-Mail Signature Block Analysis” (with H. Chen and J. Hu) April 16, 2002, U.S. Pat. Num. 6,373,985.
- (i) “E-Mail Signature Block Segmentation” (with H. Chen and J. Hu), March 19, 2002, U.S. Pat. Num. 6,360,010.
- (j) “A Method and Apparatus for Measuring the Degree of Polysemy in Polysemous Words” (with J. van Santen), July 3, 2001, U.S. Pat. Num. 6,256,629.
- (k) “Compilation of Weighted Finite-State Transducers from Decision Trees”, September 8, 1998, U.S. Pat. Num. 5,806,032.
- (l) “Grapheme-to-phoneme conversion of digit strings using weighted finite state transducers to apply grammar to powers of a number basis” (with F. Pereira and M. Riley), July 14, 1998, U.S. Pat. Num. 5,781,884.
- (m) “Method for conversion of phonetic Chinese to character Chinese,” December 14, 1993, U.S. Pat. Num. 5,270,927.
- (n) “Semiotic class normalization” (with Kyle Gorman and Ke Wu), December 26, 2017, U.S. Pat. Num. 9,852,123.
- (o) “Conversion of Input Text Strings” (with Sascha Brawer and Martin Jansche), filed August 26, 2010. US 2014/0163952 A1..

FUNDING

1. DARPA BOLT (SRI prime, with Brian Roark), “Activity A: Genre-Independent Translation and Information Retrieval System”, October 2011–.
2. Sproat, Richard (PI), NIH-K25DC011308, “Natural Language Processing for Augmentative and Alternative Communication in Adults,” August, 2011–July, 2014, \$487K.

3. Sproat, Richard (PI et al.), NIH-R01-DC012033, “Computational characterization of language use in autism spectrum disorder,” August, 2011–July, 2016, \$3.7M.
4. Sproat, Richard (PI). NSF-BCS-1137631, “Corpora of Non-Linguistic Symbol Systems, and Statistical Analysis”, 04/01/2011 – 03/31/2012, \$114,140
5. Sproat, Richard (PI, et al.). Intelligence Community Postdoc, 2010*1043506*00, “Stochastic Text Normalization and Automatic Genre Adaptation for Structured Text Processing” 07/12/2010 — 07/11/2013, \$360,000.
6. Roark, Brian (PI, et al.). NSF-IIS-0964102, “RI: Medium: Semi-Supervised Discriminative Training of Language Models”, 07/01/2010 — 06/30/2013, \$500,000.
7. Julia Hirschberg (PI), Owen Rambow (co-PI), Richard Sproat (co-PI). “RI Medium: Collaborative Research: From Text to Pictures,” NSF-RI, July 2009 — June 2012, \$259,862.
8. Richard Sproat (PI), Mark Hasegawa-Johnson (co-PI), Chilin Shih (co-PI), Kay Bock (co-PI), Brian Ross (co-PI), Fred Davidson (Senior Researcher), “DHB: An Interdisciplinary Study of the Dynamics of Second Language Fluency”, NSF-IIS-0623805, February 2007 — January 2010, **\$680,781**.
9. Richard Sproat (PI), “Segmental Awareness and Indic Writing Systems”, NIH, 1R03HD048644-01, August 2006–August 2008, **\$108,259**.
10. Richard Sproat (PI), Mark Hasegawa-Johnson (co-PI), Chilin Shih (co-PI), Kay Bock (co-PI), Brian Ross (co-PI), Dan Roth (co-PI) “Automated Methods for Second-Language Fluency Assessment.” University of Illinois Critical Research Initiative. August 2005 – July 2007, **\$147,019**; with possibility of extension to a third year.
11. Richard Sproat (PI), “Segmental Awareness and Indic Writing Systems”, University of Illinois Research Board, January 2006 – May 2006. **\$6120**.
12. Richard Sproat (PI), “Machine transliteration for underresourced languages”, Google, Inc, February 2006 –, **\$150,000**.
13. P. Bryan Heidorn (PI), Richard Sproat (co-PI), “Spatial language and spatial reasoning for understanding geo-reference information in natural history collections.” University of Illinois Research Board, August 2005 – May 2006. **\$6120**.
14. Richard Sproat (PI), Elabbas Benmamoun (co-PI), “Language Adaptation for Colloquial Arabic”, Supplemental NSF grant from National Security Agency, Grant Code A6206, September 2004 — August 2005, **\$125,237**.
15. Richard Sproat (PI), Dan Roth (co-PI), Elabbas Benmamoun (co-PI), Chengxiang Zhai (co-PI), “Named Entity Recognition and Transliteration for 50 Languages”, Department of Interior/National Security Agency, NBCHC040176, 30 September 2004 – 29 September 2006, **\$377,930**.
16. Jan van Santen (PI), Alan Black (co-PI), John-Paul Hosom, Richard Sproat (co-PI). “Prosody Generation for Child Oriented Speech Synthesis.” NSF#0205731 \$2.75 Million, September 2002–August 2007.

PUBLICATIONS

Books

1. Richard Sproat. *Symbols: An Evolutionary History from the Stone Age to the Future*. Heidelberg, SpringerNature, 2023.
2. Kyle Gorman and Richard Sproat. *Finite-State Text Processing*. Williston, VT, Morgan Claypool, 2021.

3. Fabian Brackhane, Richard Sproat and Jürgen Trouvain (editors). *Wolfgang von Kempelen's Mechanismus der menschlichen Sprache*. New edition with English translation, and commentary. Technische Universität Dresden Press, 2017.
4. Richard Sproat. *Language, Technology and Society*. Oxford, Oxford University Press, 2010.
5. Brian Roark, Richard Sproat. *Computational Approaches to Syntax and Morphology*. Oxford, Oxford University Press, 2007.
6. Martin Neef, Anneke Neijt and Richard Sproat (editors). *The Relation of Writing to Spoken Language*. Tübingen: Niemeyer (= Linguistische Arbeiten 460), 2002.
7. Richard Sproat, *A Computational Theory of Writing Systems*, (ACL Studies in Natural Language Processing Series), Cambridge, Cambridge University Press, 2000.
8. Richard Sproat (editor), *Multilingual Text-to-Speech Synthesis*, Boston, MA, Kluwer Academic Publishers, 1997.
9. Jan van Santen, Richard Sproat, Joseph Olive and Julia Hirschberg (editors), *Progress in Speech Synthesis*, New York, Springer, 1997.
10. Richard Sproat, *Morphology and Computation*, Cambridge, MA, MIT Press, 1992.

Refereed Journals

1. Llion Jones, Richard Sproat, Haruko Ishikawa and Alexander Gutkin. "Helpful Neighbors: Leveraging Neighbors in Geographic Feature Pronunciation." *Transactions of the Association for Computational Linguistics*, To appear.
2. Richard Sproat. "Last Words: Boring Problems are Sometimes the Most Interesting." *Computational Linguistics*, 48(2): 483–490.
3. Richard Sproat and Alexander Gutkin. "The Taxonomy of Writing Systems: How to Measure how Logographic a System is." *Computational Linguistics*, 47(3), 477–528, 2021.
4. Richard Sproat. "Review of Zev Handel. 2019. Sinography: The Borrowing and Adaptation of the Chinese Script." *Asiatische Studien/Études Asiatiques*, 74(4): 1103–1115, 2021.
5. Juliette Blevins, Richard Sproat. "Statistical Evidence for the Proto-Indo-European-Euskarian Hypothesis: A word-list approach integrating phonotactics". *Diachronica*, 2021.
6. Hao Zhang, Richard Sproat, Axel Ng, Felix Stahlberg, Xiaochang Peng, Kyle Gorman, Brian Roark. "Neural models of text normalization for speech applications." *Computational Linguistics*, 45(2), 2019: 293-337.
7. Richard Sproat. "Review of Daniels *An Exploration of Writing*", *Written Language and Literacy*, 21(2), 2018: 269–278.
8. Richard Sproat. "A Computational Model of the Discovery of Writing", *Written Language and Literacy*, 20(2), 2017: 194–226.
9. Richard Sproat, "Language typology in speech and language technology", *Linguistic Typology*, 20(3), 2016.
10. Kyle Gorman and Richard Sproat. "Minimally supervised models for number normalization". *Transactions of the Association for Computational Linguistics*. 2016.
11. Richard Sproat. "On misunderstandings and misrepresentations: A reply to Rao et al." *Language*, 91(4), 2015.

12. Peter Ebden and Richard Sproat. "The Kestrel TTS Text Normalization System." *Journal of Natural Language Engineering*, December 2014.
13. Richard Sproat, Mahsa Yarmohammadi, Izhak Shafran and Brian Roark. "Applications of Lexicographic Semirings to Problems in Speech and Language Processing," *Computational Linguistics*, 40(4), 2014.
14. Richard Sproat, "A statistical comparison of written language and non-linguistic symbol systems," *Language*, 90(2), 2014.
15. Richard Sproat, "A note on Unger's 'What linguistic units do Chinese characters represent?'" , *Written Language & Literacy*, 16(1), 107–111, 2013.
16. Jan van Santen, Richard Sproat and Alison Presmanes Hill, "Quantifying Repetitive Speech in Autism Spectrum Disorders and Language Impairment," *Autism Research*, 2013.
17. Padmapriya Kandhadai and Richard Sproat, "Impact of spatial ordering of graphemes in alphasyllabic scripts on phonemic awareness in Indic languages," *Writing Systems Research*, 2(2), 105-116, 2010.
18. Richard Sproat. "Reply to Rao et al. and Lee et al." *Computational Linguistics*, 36:4, 2010.
19. Richard Sproat. "Last Words: Ancient symbols, computational linguistics, and the reviewing practices of the general science journals" *Computational Linguistics*, 36:3, 2010.
20. Aamir Wali, Richard Sproat, Prakash Padakannaya and Bhuvaneshwari, B. "Model for phonemic awareness in readers of Indian script." *Written Language and Literacy*, 12:2, 161-169, 2009.
21. Su-Youn Yoon, Lisa Pierce, Amanda Huensch, Eric Juul, Samantha Perkins, Richard Sproat, and Mark Hasegawa-Johnson, Construction of a rated speech corpus of L2 learners' speech, *CALICO journal*, 2009
22. Richard Sproat. "Brahmi-Derived Scripts, Script Layout, and Phonological Awareness." *Written Language and Literacy*, 9(1), 45–66, 2006.
23. Steve Farmer, Richard Sproat and Michael Witzel. "The Collapse of the Indus-Script Thesis: The Myth of a Literate Harappan Civilization." *Electronic Journal of Vedic Studies*, 11(2), 2004
24. Michiel Bacchiani, Brian Roark, Michael Riley and Richard Sproat "MAP Adaptation of Stochastic Grammars". *Computer Speech and Language*, 20(1):41-68, 2006.
25. Narasimhan, Bhuvana, Sproat, Richard, and Kiraz, George. "Schwa-deletion in Hindi Text-to-Speech Synthesis," *International Journal of Speech Technology*, 7(4), 319–333, 2004.
26. Richard Sproat, Alan Black, Stanley Chen, Shankar Kumar, Mari Ostendorf, and Christopher Richards. "Normalization of non-standard words." *Computer Speech and Language*, 15(3), 287–333, 2001.
27. Richard Sproat. "Multilingual Text Analysis for Text-to-Speech Synthesis", *Natural Language Engineering*, 2(4), 369–380, 1996.
28. Chilin Shih and Richard Sproat, "Issues in Text-to-Speech Conversion for Mandarin," *Computational Linguistics and Chinese Language Processing*, 1996.
29. Richard Sproat, Chilin Shih, William Gale and Nancy Chang, "A Stochastic Finite-State Word-Segmentation Algorithm for Chinese," *Computational Linguistics*, 22(3), 1996.
30. Harald Baayen and Richard Sproat, "Estimating Lexical Priors for Low-Frequency Morphologically Ambiguous Forms," *Computational Linguistics*, 22(2), 1996.

31. Richard Sproat and Chilin Shih. "A Corpus-Based Analysis of Mandarin Nominal Root Compounds." *Journal of East Asian Linguistics*, 5, 49–71, 1996.
32. Richard Sproat and Joseph Olive, "Text to Speech Synthesis," *AT&T Technical Journal*, 74(2), 35–44, 1995.
33. Richard Sproat, "English Noun-Phrase Accent Prediction for Text-to-Speech." *Computer Speech and Language*, 8, 79–94, 1994.
34. Richard Sproat and Chilin Shih, "Why Mandarin Morphology is not Stratum-Ordered." *Yearbook of Morphology*, 185–217, 1993.
35. Richard Sproat and Osamu Fujimura, "Allophonic variation in English /l/ and its implications for phonetic implementation," *Journal of Phonetics*, 21, 291–311, 1993.
36. Gail McKoon, Gregory Ward, Roger Ratcliff and Richard Sproat, "Morphosyntactic and pragmatic factors affecting the accessibility of discourse entities," *Journal of Memory and Language*, 32, 1–20, 1993.
37. David Roe, Pedro Moreno, Richard Sproat, Fernando Pereira, Michael Riley and Alejandro Macarrón. "A Spoken Language Translator for Restricted-Domain Context-Free Languages," *Speech Communication*, 11, 1–9, 1992.
38. Richard Sproat, "Unhappier is not a Bracketing Paradox," *Linguistic Inquiry*, 23, 347–352, 1992.
39. Gregory Ward, Richard Sproat and Gail McKoon, "A Pragmatic Analysis of So-Called Anaphoric Islands," *Language*, 67, 439–474, 1991.
40. Richard Sproat and Chilin Shih, "A Statistical Method for Finding Word Boundaries in Chinese Text," *Computer Processing of Chinese and Oriental Languages*, 4, 336–351, 1990.
41. Richard Sproat, "Welsh Syntax and VSO Structure," *Natural Language and Linguistic Theory*, 3, 173–216, 1985.
42. Richard Sproat, "Southern California Reflexives: An Example of Translation Borrowing?" *Journal of California and Great Basin Anthropology: Papers in Linguistics*, 3, 77–94, 1981.

Refereed Collections

1. Christo Kirov and Richard Sproat. "Computational Morphology". *Probabilistic Linguistics*, CSLI, to appear.
2. Richard Sproat. "Writing Systems". *Oxford Handbook of the History of Phonology*, to appear.
3. Gregory Ward and Richard Sproat. "Anaphoric Islands: A History of a Misleading Geographical Metaphor". *The Wiley-Blackwell Companion to Morphology*. Oxford: Wiley-Blackwell, to appear.
4. Sproat, Richard. "English among the writing systems of the world", in Vivian Cook and Des Ryan, *Handbook of the English Writing System*, Routledge.
5. Sproat, Richard and Prakash Padakannaya. "Script Indices". in N. Srinivasan, A.K. Gupta and J. Pandey, *Advances in Cognitive Science*, Volume 1. New Delhi, Sage: 2008.
6. Sproat, Richard. "The Consistency of the Orthographically Relevant Level in Dutch." in Martin Neef, Anneke Neijt and Richard Sproat (editors). *The Relation of Writing to Spoken Language*. Tübingen: Niemeyer (= Linguistische Arbeiten 460), 2002.
7. Jianying Hu, Richard Sproat and Hao Chen. "Electronic Mail", in *McGraw-Hill Yearbook of Science and Technology, 2001*, 144–146, McGraw-Hill, New York, 2000.

8. R. Harald Baayen, Robert Schreuder and Richard Sproat. “Morphology in the Mental Lexicon: A Computational Model for Visual Word Recognition”, in F. Van Eynde and D. Gibbon (eds.) *Lexicon Development for Speech and Language Processing*, 267–293, Dordrecht, Kluwer Academic Publishers, 2000.
9. Richard Sproat, Christer Samuelsson, Jennifer Chu-Carroll and Bob Carpenter. “Computational Linguistics”, in Mark Aronoff and Janie Rees-Miller (eds.) *The Blackwell Handbook of Linguistics*, Oxford, Blackwell, 2000.
10. Richard Sproat, “Lexical Analysis”, in Robert Dale, Hermann Moisl, and Harold Somers (eds.) *Handbook of Natural Language Processing*, 37–58, New York, Dekker, 2000.
11. Richard Sproat and Joseph Olive, “Text-to-Speech Synthesis,” in L. Rabiner and R. Cox (eds.), *IEEE/CRC Press Handbook of Signal Processing*, Cleveland, CRC Press, 1997.
12. Richard Sproat, “Text Interpretation for TtS Synthesis”, in Ron Cole (ed.) *Survey of the State of the Art in Human Language Technology*, <http://www.cse.ogi.edu/CSLU/HLTsurvey/HLTsurvey.html>, 1996.
13. Richard Sproat and Joseph Olive, “A Modular Architecture for Multilingual Text-to-Speech,” in J. van Santen, R. Sproat, J. Olive and J. Hirschberg (eds.), *Progress in Speech Synthesis*, New York, Springer, 1997.
14. Richard Sproat and Joseph Olive, “An Approach to Text-to-Speech Synthesis,” in W. Kleijn and K. Paliwal (eds.), *Speech Coding and Synthesis*, 611–633, Amsterdam, Elsevier, 1995.
15. Julia Hirschberg and Richard Sproat, “Pitch Accent Prediction from Text Analysis,” in J. Cole, G. Green and J. Morgan (eds.), *Linguistics and Computation*, 281–296, CSLI Publications, Chicago, University of Chicago Press, 1995.
16. Richard Sproat, “Looking into Words,” in S. Hargus and E. Kaisse (eds.), *Studies in Lexical Phonology*, 173–195, San Diego, Academic Press, 1993.
17. Mark Liberman and Richard Sproat, “The Stress and Structure of Modified Noun Phrases in English,” in I. Sag (ed.), *Lexical Matters*, 131–181, CSLI Publications, Chicago, University of Chicago Press, 1992.
18. Richard Sproat and Chilin Shih, “The Cross-Linguistic Distribution of Adjective Ordering Restrictions,” in C. Georgopoulos and R. Ishihara (eds.), *Interdisciplinary Approaches to Language: Essays in Honor of S.-Y. Kuroda*, 565–593, Dordrecht, Kluwer Academic Publishers, 1990.
19. Richard Sproat, “Bracketing Paradoxes, Cliticization and Other Topics: The Mapping Between Syntactic and Phonological Structure,” in M. Everaert, A. Evers, R. Huybregts and M. Trommelen (eds.), *Morphology and Modularity: In Honour of Henk Schultink*, 339–360, Dordrecht, Foris, 1988.
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2. Abhirut Gupta, Ananya B. Sai, Richard Sproat, Yuri Vasilevski, James S. Ren, Ambarish Jash, Sukhdeep S. Sodhi and Aravindan Raghuvver. “Bi-Phone: Modeling Inter Language Phonetic Influences in Text.” Association for Computational Linguistics, Toronto, July 9-14, 2023.
3. Richard Sproat. “A Computational Model of the Invention of Writing.” Anchoring the Invention of Writing. Leiden, December 15–17, 2022.

4. Alexander Gutkin, Cibu Johny, Raiomond Doctor, Brian Roark and Richard Sproat. "Beyond Arabic: Software for Perso-Arabic Script Manipulation," *WANLP*, 2022.
5. Christo Kirov, Richard Sproat and Alexander Gutkin. "Mockingbird at the SIGTYP 2022 Shared Task: Two Types of Models for the Prediction of Cognate Reflexes," *ACL SIGTYP*, July, 2022.
Raiomond Doctor, Alexander Gutkin, Cibu Johny, Brian Roark and Richard Sproat "Graphemic Normalization of the Perso-Arabic Script," *Grapholinguistics in the 21st Century*, June 2022.
6. Raiomond Doctor, Alexander Gutkin, Cibu Johny, Brian Roark and Richard Sproat "Graphemic Normalization of the Perso-Arabic Script," *Grapholinguistics in the 21st Century*, June 2022.
7. Kyle Gorman and Richard Sproat. "On the Persistent Conflation of Writing and Language," *Grapholinguistics in the 21st Century*, June 2022.
8. Richard Sproat. "Computational Methods in the Analysis of Graphical Symbol Systems," Keynote Presentation, *Grapholinguistics in the 21st Century*, June 2022.
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10. Jae Ro, Hao Zhang and Richard Sproat. "Semi-supervised URL Segmentation with Recurrent Neural Networks Pre-trained on Knowledge Graph Entities". *COLING*, 2020.
11. Alexander Gutkin and Richard Sproat, "NEMO: Frequentist Inference Approach to Constrained Linguistic Typology Feature Prediction in SIGTYP 2020 Shared Task". *SIGTYP Workshop*, 2020.
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34. Margaret Mitchell and Richard Sproat. "Discourse-Based Modeling for AAC". *Third Workshop on Speech and Language Processing for Assistive Technologies* Montreal, Canada, June, 2012.
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44. Masoud Rouhizadeh, Margit Bowler, Richard Sproat and Bob Coyne. "Collecting Semantic Data from Amazon's Mechanical Turk for a Lexical Knowledge Resource in a Text to Picture Generating System." *International Conference on Computational Semantics (IWCS 2011)*, Oxford, January, 2011.
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71. Michael Riley, Brian Roark and Richard Sproat. "Good-Turing Estimation from Word Lattices for Unsupervised Language Model Adaptation." *IEEE Automatic Speech Recognition and Understanding Workshop*. Fisherman's Reef, U.S. Virgin Islands. December 2003.

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Invited Review Articles and Commentaries

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Invited Book Reviews

1. Richard Sproat, "Review of Shouhui Zhao & Richard B. Baldauf, Jr., *Planning Chinese Characters: Reaction, Evolution or Revolution*. (Language Policy, 9.)," *Written Language and Literacy*, 11(2), 2008.
2. Chilin Shih, Richard Sproat, "Review of Horne (ed.) *Prosody: Theory and Experiment*. *Studies Presented to Gösta Bruce*, *Computational Linguistics*, 27(3), 2001.
3. Richard Sproat, "Review of Packard (ed.) *New Approaches to Chinese Word Formation*." *Yearbook of Morphology*, 1999.
4. Richard Sproat, "Review of Daniels and Bright, *The World's Writing Systems*," *Written Language and Literacy*, 1(1), 129–137, 1998.
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1. Richard Sproat, "Review of Packard: *The Morphology of Chinese: A Linguistic and Cognitive Approach*", LINGUIST List: Vol-12-11.
2. Richard Sproat, "Review of Bright and Daniels: *The World's Writing Systems*", LINGUIST List: Vol-7-400.

Other Publications

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3. M. Rouhizadeh, J. van Santen, R. Sproat, K. Gorman, P. Heeman, A. P. Hill, S. Bedrick, E. T. Prud'hommeaux and G. Kiss. "Children's Differing Patterns of Discourse Marker Use in ASD and Typical Development" *IMFAR*, 2014, Atlanta.
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5. Steve Farmer, Richard Sproat and Michael Witzel. "The Collapse of the Indus Script Thesis: The Myth of a Literate Harappan Civilization" in R.S. Bisht and M.P. Joshi, eds. *The Roots of the South Asian Civilisations: The Harappans*. 2005.
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8. Richard Sproat, "On Deriving the Lexicon," *The Linguistic Review* (Dissertation Abstracts), 5, 185–196, 1985.
9. Richard Sproat, "A Note on Rebracketing in Morphology," in D. Archangeli, A. Barss and R. Sproat (eds.), *MIT Working Papers in Linguistics*, 6, 199–205, 1985.
10. Richard Sproat, "Review of Schank's 'Identification of Conceptualizations Underlying Natural Language'," In B. Levin (ed.), *Lexical Semantics in Review*, Lexicon Project Working Papers, number 1, Cambridge, MA, Center for Cognitive Science, Massachusetts Institute of Technology, 1985.
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13. Richard Sproat, "VSO Languages and Welsh Configurationality," in I. Haik and D. Massam (eds.), *MIT Working Papers in Linguistics*, 5, 243–276, 1983.

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MISCELLANEOUS INVITED TALKS AND CONFERENCE PRESENTATIONS

1. Keynote speaker, EMNLP 2009, Singapore, August 6-7, 2009.
2. Invited lecturer, Winter School in Speech and Audio Processing, January, 2008, Chennai.
3. Invited speaker, Second Workshop on Computational Approaches to Arabic Script-Based Languages, Stanford University, July 21-22, 2007.
4. Invited Workshop on Text-to-Speech Synthesis, National University of Computer and Emerging Sciences, Lahore, Pakistan, June, 2005.
5. Keynote speaker, Second Midwest Computational Linguistics Colloquium, Ohio State University, May 14-15, 2005.
6. Invited speaker, PorTAL', Faro, Portugal, June 23-26, 2002.
7. Invited panelist, "Symposium on Finite-State Methods in Natural Language Analysis," American Academy of Sciences, Boston, MA, February 18, 2002.
8. Invited panelist at "Symposium on Distributed Morphology," 1994 Annual Meeting of the Linguistic Society of America, Boston, MA.
9. "Recent work on TTS at Bell Labs," Telecommunications Laboratories, Taiwan, August 1993.
10. "Computational Interpretations of Neurolinguistic Observations." McDonnell Summer Institute on Cognitive Neuroscience, July, 1993.
11. "Recent work on TTS at Bell Labs," Kiel University, Germany, October 1992.
12. "VEST: A Restricted-Domain Spoken Language Translation System." First International Workshop on Speech Translation, Schloß Dagstuhl, Germany, October 1992.
13. "Pitch Accent Prediction from Text Analysis," (with Julia Hirschberg) presented at the University of Illinois Workshop on Computational Linguistics, June 13-15, 1991.
14. "A pragmatic analysis of so-called anaphoric islands," (with Gregory Ward and Gail McKoon) University of Pennsylvania, November, 1990.
15. "Phonetic and pragmatic evidence that interpretive components can 'see' morphological structure," NSF Workshop on Lexical Phonology, University of Washington, Seattle, WA, June 8-10, 1990.
16. "Light and dark /l/ are not categorical in English: Articulatory and physiological evidence for phonetic implementation," (with Osamu Fujimura) University of Texas at Austin, October, 1989; Cornell University, October, 1989.
17. "The Articulation of /l/ in English: an Investigation of the Conditioning of Allophony," (with Osamu Fujimura) Tianjin Conference on Phonetics and Phonology, Tianjin, People's Republic of China, May 1989.
18. "Computational morphology," The Massachusetts Institute of Technology, April 1989.

19. "Connectionist Networks and Natural Language Morphology," (with Dania Egedi) University of Maryland Conference on Grammar and Language Processing, December, 1988.
20. "Connectionist Networks and Natural Language Morphology," (with Dania Egedi) SUNY Stonybrook, October 1987; University of Toronto, November 1987; Yale University, April 1988.
21. "The Analysis of English Compounds for Text-to-Speech," The Massachusetts Institute of Technology, May 1988.
22. "Constituent-Based Morphological Parsing," University of North Carolina, October 1986; Northwestern University, October 1986.
23. "On Bracketing Paradoxes: The Mapping Between S-Structure and PF," Workshop on Morphology and Modularity, University of Utrecht, June, 1986.
24. "More on Celtic Consonant Mutation," Kentucky Foreign Language Conference, University of Kentucky, Lexington, April, 1986.
25. "Constituent-Based Morphological Parsing," Bell Communications Research, Morristown, NJ, February 1985.
26. "Parsing Morphology," University of California at Irvine, October 1984; University of California at Los Angeles, October 1984.
27. "INFL and the Configurationality of VSO Languages," University of California at San Diego, October 1984; University of Southern California, October 1984.
28. "Some Issues in Current Morphological Theory," AT&T Bell Laboratories, Murray Hill, NJ, February 1984.

OTHER UNPUBLISHED CONFERENCE PRESENTATIONS

1. "Mandarin second-tone sandhi is not a phonological rule," (with Chilin Shih) International Conference on Chinese Linguistics, Singapore, June 1992.
2. "Mandarin morphology is not stratum-ordered," (with Chilin Shih) LSA Winter Meeting, 1992. Also presented at the University of Delaware, April, 1992, and Düsseldorf University, Germany, October, 1992.
3. "A pragmatic analysis of outbound anaphora and *vice-versa*," (with Gregory Ward) presented at the NSF-Sponsored Conference on 'Grammatical Foundations of Prosody and Discourse', July, 1991.
4. "Articulatory evidence for the non-categoricalness of English /l/ allophones," (with Osamu Fujimura) LSA Winter Meeting, 1989.
5. "An Investigation of Tag-Intonation in English," (with Shirley Steele) Acoustical Society of America, Miami, FL, November 1987.
6. "On the Resyllabification of /l/ in English," (with Toni Borowsky) Acoustical Society of America, Indianapolis, IN, May 1987.
7. "Stressing English Compounds Correctly," (with Mark Liberman) Acoustical Society of America, Anaheim, CA, December 1986.
8. "On the Phonological and Morphological Characterization of Celtic Consonant Mutation," The International Linguistics Association Meeting, New York, NY, March 1985.
9. "VSO Languages and Welsh Configurationality," Harvard Celtic Colloquium and the Massachusetts Institute of Technology, April 1983.

10. "Redundancy Rules and Welsh Mutation," Workshop in Morphology, Massachusetts Institute of Technology, January 1983.

LANGUAGES

At various points in my life I have had knowledge of German, French, Spanish and Mandarin. Reading knowledge of Dutch, Italian, Russian, Welsh, Old English, Classical Greek, Old Icelandic, Latin.

COMPUTER LANGUAGES AND SYSTEMS

Many years' experience programming in C, C++, Python, Lisp.

C++ code I have written is running in production at Google, and in open-sourced software (<http://www.openfst.org/twiki/bin/view/GRM/Thrax>).

Many years' experience with Linux/Unix.

Knowledge of R.

CURRENT SOCIETY MEMBERSHIPS

Linguistic Society of America, Association for Computational Linguistics.

UNIVERSITY SERVICE

Executive Committee, College of Liberal Arts and Sciences, University of Illinois at Urbana Champaign, 2007–2009.

Executive Committee, Graduate College, University of Illinois at Urbana Champaign, 2007–2009.

Program Advisory Committee, Beckman Institute, University of Illinois at Urbana Champaign, 2007–2010.

Department of Electrical and Computer Engineering, Graduate Committee, 2007–2008

Independent Program of Study Committee, College of LAS, University of Illinois at Urbana Champaign, 2005–.

Chair, UIUC Language and Speech Certificate Program, 2005–

Department of Electrical and Computer Engineering, Curriculum Committee, 2006–2007

Department of Linguistics, Institutional Review Board Committee, 2006–

Department of Linguistics, Promotions and Tenure Committee, 2006–2007

Department of Linguistics, Curriculum Committee, 2006–2007

UI College of LAS, Independent Program of Study Committee, 2005–2007

Department of Linguistics, Departmental Webpage Committee, 2004–

Department of Linguistics, Advisory Committee, 2004–2006

AWARDS AND HONORS

Fellow of the Association of Computational Linguistics. 2012.

NIH Career Development Award (K25), 2011-14.

Best Short Paper Award (with Brian Roark and Izhak Shafran), ACL 2011.

University Scholar, University of Illinois at Urbana Champaign, 2007–2008.

Associate, Center for Advanced Studies, University of Illinois at Urbana Champaign, Fall 2007.

UIUC College of Liberal Arts and Sciences Alumni Discretionary Award in recognition of exceptional service, July 2005.

Distinguished Member of the Technical Staff, Bell Laboratories, June 1997.

National Science Foundation Graduate Fellowship Award (awarded in 1982).

Phi Beta Kappa (awarded June 1981).

University of California President's Undergraduate Fellowship Award (awarded in 1979).

EARLY BACKGROUND

Born in National City, California. Raised in San Diego, California, subsequently in Romsey, England, and finally again in San Diego.

REFERENCES

Available upon request.