

# Sandiway Fong

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## Education

Ph.D. (1991) **Artificial Intelligence (AI)**. AI Laboratory, Dept. of Electrical Engineering and Computer Science (EECS). Massachusetts Institute of Technology (MIT), Cambridge MA.

S.M. (1986) **Computer Science**. EECS. MIT, Cambridge MA.

B.Sc(Eng). (1984) **Computing Science**. First Class Honours. Imperial College of Science and Technology. University of London, London UK. Associateship of the City and Guilds of London Institute (ACGI).

## Appointments

- **Associate Professor**. (Tenured.) Department of Linguistics and Department of Computer Science. University of Arizona. Tucson AZ. 2005-*present*
- **Director, Human Language Technology (HLT) Master's Program**. In-Person Program, Dept. of Linguistics, University of Arizona. 2006-*present*

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- Sabbatical leave at Kyoto University. 2016-2017
- **Project Professor**. Dept of Language and Information Sciences. Graduate School of Arts and Sciences. University of Tokyo, Tokyo, Japan. Jan-Mar 2010
- **Visiting Associate Professor**. Carnegie Mellon University (CMU) in Qatar. Doha, Qatar. Nov-Dec 2009
- **Japan Society for the Promotion of Science (JSPS) Fellow**. Dept of Language and Information Sciences. Graduate School of Arts and Sciences. University of Tokyo, Tokyo, Japan. Dec 2008 - Oct 2009
- **Visiting Researcher**. Laboratory for Information and Decision Systems (LIDS). MIT, Cambridge MA. Jan-Aug 2008
- **Assistant Professor**. Depts. of Linguistics and Computer Science. University of Arizona. Tucson AZ. 2003-2005
- **Visiting Lecturer**. Linguistics Program. Princeton University, Princeton NJ. 2002
- **Research Scientist**. (1994-2003). Provisional Research Scientist (1991-1994). Computer Science Division. NEC Research Institute. Princeton NJ. 1991-2003

## Letters and Commentaries

- AI doesn't model human language. Bolhuis, J., S. Crain, S. Fong & A. Moro. *Nature*. Mar 2024  
Vol 627, pg.489.
- Open Peer Commentary: Even deeper problems with neural network models of language. Bever, T.G., N. Chomsky, S. Fong & M. Piattelli-Palmarini. *Behavioral and Brain Sciences*, Cambridge University Press. Volume 46, e387. Dec 2023
- Navigating AI in Education. Fong, S. *Data Connects Us*. The University of Arizona. Fall 2023

## Publications (Computational Modeling)

- Towards a Biologically-Plausible Computational Model of Human Language Cognition. Alers-Valentin, H. and S., Fong. In proceedings of *ICAART 2024*, February 24–26, Rome, Italy. 2024
- On the computational modeling of English relative clauses. Fong, S. & J. Ginsburg. *Open Linguistics*, vol. 9, no. 1. Article number: 20220246, De Gruyter. 2023
- Simple Models: Computational and Linguistic Perspectives. Fong, S. *Journal of Institute for Research in English Language and Literature*. Vol 46, 1–48. Tohoku Gakuin University Press. 2022
- Towards a Minimalist Machine. Fong, S. & J. Ginsburg. In *Minimalist Parsing*. Stabler, E.J. & R.C. Berwick (eds.). Oxford University Press. 2019
- Combining linguistic theories in a Minimalist Machine. Ginsburg, J. & S. Fong. In *Minimalist Parsing*. Stabler, E.J. & R.C. Berwick (eds.). Oxford University Press. 2019
- Stack-based Agree. Ginsburg, J. & S. Fong. *Proceedings of JELS 32* (Papers from the 32nd Conference and the 7th International Spring Forum). 2015
- A Computational Implementation of Classifier Structures in Mandarin Chinese. Chen, Y-L. and S. Fong. *Proceedings of Logic and Engineering of Natural Language Semantics 12* (LENLS 12), Tokyo, Japan. November 15–17. 2015
- Unification and Efficient Computation in the Minimalist Program. Fong, S. In *Language and Recursion*. Lowenthal, F. and L. Lefebvre (Eds.) Springer-Verlag. 2015
- Computation with doubling constituents: Pronouns and antecedents in Phase Theory. Fong, S. and J. Ginsburg. In *Towards a Bilingual Understanding of Grammar*. Ed. Di Sciullo, A.M. John Benjamins. 2012
- Modeling of Coreference Relations in Multi-Object Constructions. Fong S. and J. Ginsburg. In *Proceedings of TCP 2012*. Ed. Otsu, Y. Hituzi Publishing Company. 2012
- Parsing in the Minimalist Program: On SOV Languages and Relativization. Fong, S. *Canadian Journal of Linguistics (CJL)* 53(2-3), 237–252. 2009
- A Computational Analysis of Turkish in the Principles and Parameters Framework. Birturk, A. and S. Fong. In *Proceedings of the 4th Language & Technology Conference (LTC): Human Language Technologies as a Challenge for Computer Science and Linguistics*. Poznań, Poland. 2009

- Arabic PAPPI. Fong, S. In Benmamoun, B. (Ed.) *Perspectives on Arabic Linguistics XIX*. John Benjamins, 19–35. 2007
- Constructing filler-gap dependencies in Chinese possessor relative clauses. Lin, C.-J., S. Fong & T. G. Bever. In *Proceedings of PACLIC19*. Academica Sinica, 143-154. 2005
- Minimalist parsing and Japanese: on theory and experiential factors. Fong, S. and Y. Hirose. In *Proceedings of the Sixth Tokyo Conference on Psycholinguistics*, Ed. Otsu, Y. Hituzi Syobo Publishing Co., 95-116. 2005
- Computation with probes and goals: a parsing perspective. Fong, S. In Di Sciullo, A.M. & R. Delmonte (Eds.) *UG and External Systems*. John Benjamins, 311-334. 2005
- Morpho-syntax parsing. Di Sciullo, A.-M. and S. Fong. In Di Sciullo, A.M. & R. Delmonte (Eds.) *UG and External Systems*. John Benjamins, 247-268. 2005
- Prosodic phrasing in Japanese and parsing in the minimalist program. Fong, S. & Y. Hirose. In *Proceedings of the 21st Annual Meeting of the Japanese Cognitive Science Society*, 314-315. 2004
- Japanese PAPPI. Fong, S. In *Researching and Verifying an Advanced Theory of Human Language, Report (5)*, Kanda University of International Studies (KUIS), Chiba, Japan. 445-464. 2001
- Efficient parsing for word structure. Di Sciullo, A.M. & S. Fong. In *Proceedings of the 6th Natural Language Processing Pacific Rim Symposium (NLPRS-2001)*, 741-748. 2001
- A modular approach to Turkish noun compounding: The Integration of a Finite-State Model. Birturk, A. & S. Fong. In *Proceedings of the 6th Natural Language Processing Pacific Rim Symposium (NLPRS-2001)*, 525-531. 2001
- Asymmetry, zero morphology and tractability. Di Sciullo, A.M. & S. Fong. In *Proceedings of the 15th Pacific Asia Conference on Language, Information and Computation (PACLIC-15)*, 61-72. 2001
- Parallel principle-based parsing. Fong, S. In *Proceedings of the Sixth International Workshop on Natural Language Understanding and Logic Programming (NLULP '99)*, International Conference on Logic Programming (ICLP), 45-57. 1999
- Dealing with nominalization in Mandarin Chinese using a principles and parameters parser. Lin, Koong H.C., V.W. Soo & S. Fong, *International Journal of Computer Processing of Oriental Languages (CPOL)*, Vol 11(3), 291-310. 1998
- A quarter century of computation with transformational grammar. Berwick, R.C. & S. Fong. In *Linguistics and Computation*, Eds. Cole, J. et al., CSLI Lecture Notes No. 52, Stanford University, 103-143. 1995
- Madama Butterfly redux: parsing English and Japanese with a principles-and-parameters approach." Berwick, R.C. & S. Fong. In *Japanese Sentence Processing*, Eds. R. Mazuka et al. Lawrence Erlbaum, 177-208. 1995
- Cartesian computation: the PAPPI project, S. Fong. In *Proceedings of the Fifth International Workshop on Natural Language Understanding and Logic Programming (NLULP'95)*. 1995

- Towards a proper linguistic and computational treatment of scrambling: An Analysis of Japanese. Fong, S. In *Proceedings of the Sixteenth International Conference on Computational Linguistics (COLING-94)*. 1994
- Isolating cross-linguistic parsing complexity with a principles-and-parameters parser: a case study of Japanese and English.” Fong, S., & R.C. Berwick. In *Proceedings of the Fifteenth International Conference on Computational Linguistics (COLING-92)*. 1992
- Principle-based parsing and type inference. Fong, S. In *Natural Language and Logic Programming, III*. Eds. Brown, C. & G. Koch, Elsevier Science Publishers B.V. (North Holland), 43–60. 1991
- The computational implementation of principle-based parsers. Fong, S. In *Principle-Based Parsing: Computation and Psycholinguistics*, Ed. Berwick, R.C. et al. Studies in Linguistics and Philosophy 44. Kluwer, 65–82. 1990
- Free indexation: combinatorial analysis and a composition algorithm. Fong, S. In *Proceedings of the 28th Annual Meeting of the Association for Computational Linguistics (ACL)*. 1990
- The computational implementation of principle-based parsers. Fong, S. & R.C. Berwick. In *Current Issues in Parsing Technologies*. Ed. Tomita, Kluwer. 1990
- Principle-based parsing: natural language processing for the 1990s. R.C. Berwick & S. Fong. In *Artificial Intelligence at MIT: Expanding Frontiers*. Ed. Winston, P.H. MIT Press, 286–325. 1990
- New approaches to parsing conjunctions using Prolog. Fong, S. & R.C. Berwick. In *Proceedings of the 23rd Annual Meeting of the Association for Computational Linguistics (ACL)*, 118–126. Revised version of paper also appears in the *Proceedings of the 9th International Joint Conference on Artificial Intelligence (IJCAI-85)*. 1985

### Publications (Linguistic Theory)

- *Merge and the Strong Minimalist Thesis*. Chomsky, N., T. D. Seely, R. C. Berwick, S. Fong, M.A.C. Huybregts, H. Kitahara, A. McInerney, & Yushi Sugimoto. Cambridge University Press. 2023
- The Strong Minimalist Thesis (SMT): Form Copy (FC) and the Serial Verb Construction (SVC). Fong, S., J. Ginsburg, M. Matsumoto & H. Terada. In *Proceedings of Japanese/Korean Linguistics 30 (JK30)*, pp.411-421, CSLI. 2023
- On the selection of clausal complements in a Minimalist framework. Ginsburg, J., H. Terada, Hiroshi and S. Fong. In *Memoirs of Osaka Kyoiku University, Humanities and Social Science, Natural Sciences* 70: 109-120. DOI: 10.32287/TD00032216 2022
- A new approach to tough-constructions. Ginsburg, J. and S. Fong. In *Proceedings of the 31st West Coast Conference on Formal Linguistics (WCCFL 31)*, ed. by Robert E. Santana-LaBarge. 180-188. Somerville, MA: Cascadilla Proceedings Project. 2014

- Pronoun-Antecedent Relations from Last Resort Movement. Ginsburg, J. and S. Fong. In *Proceedings of the thirty-ninth Western Conference on Linguistics*. (WECOL 2010). Eds. Bailey, D. and V. Teliga. 277–288. 2010
- Modeling Q-Feature Movement in Japanese. Ginsburg, J. and S. Fong. *Volume 15: Coyote Papers: Working Papers in Linguistics, Psycholinguistic and Computational Perspectives*. Brewer, Jordan, P. O'Rourke & P. Richtsmeier (eds.). University of Arizona Linguistics Circle. 2007

### Publications (Other)

- Colorless green ideas do sleep furiously: gradient acceptability and the nature of the grammar. Sprouse, J., B. Yankama, S. Indurkha, S. Fong & R.C. Berwick. *Linguistic Review* Vol 35, issue 3. 2018
- Treebank Parsing and Knowledge of Language. Fong, S. et al. (pp. 133-172). In T. Poibeau et al. (eds.), *Cognitive Aspects of Computational Language Acquisition*, 133 Theory and Applications of Natural Language Processing, Springer-Verlag Berlin Heidelberg. Earlier version in *Proceedings of the 30<sup>th</sup> Annual Meeting of the Cognitive Science Society*. 2008. 2012
- Improving and Aligning Speech with Presentation Slides. Swaminathan, R., M.E. Thompson, S. Fong, A. Efrat & K. Barnard. In *Proceedings of the 20<sup>th</sup> International Conference on Pattern Recognition (ICPR)*. 23-26 August. Istanbul, Turkey. IEEE. 3280-3283. 2010
- Obstacles and regions. Fellbaum, C. and S. Fong. *Linguistica Computazionale, Vol XXII-XXIII*. Istituti Editoriali E Poligrafici Internazionali, Pisa-Rome. 69-88. 2006
- Semantic opposition and WordNet. Fong, S. *Journal of Logic, Language and Information*. 13: 159–171. Earlier version in *Proceedings of the 3rd Workshop on Inference in Computational Semantics (ICoS-3)*, Siena, Italy. 2001. 2004
- On the ontological basis for logical metonymy: telic/agentive roles and WordNet. Fong, S. *Proceedings of OntoLex 2002*. Las Palmas, Canary Islands, Spain. 2002
- What does it mean to be a shelf? Semantic bleaching and WordNet.” Fong, S. *Proceedings of the 1st Global WordNet Conference (GWN)*, January 22–25, Mysore, India. 351–359. 2002
- Ghosts, Shadows and resultatives: the lexical representation of verbs. Fong, S., C. Fellbaum & D. Lebeaux. *Traitement Automatique des Langues (TAL)* journal, issue 42:3. 2001
- Shadows: a type of non-subcategorized object. Fong, S., C. Fellbaum & D. Lebeaux. In *Proceedings of the First International Workshop on Generative Approaches to the Lexicon (GL-2001)*. 2001
- On mending a torn dress: the frame problem and WordNet. Fong, S. *Proceedings of the Workshop on WordNet and Other Lexical Resources*, North American Chapter of the Association for Computational Linguistics (NAACL). 2001

- Natural Language Grammatical Inference with Recurrent Neural Networks, 2000  
Lawrence, S., C.L. Giles & S. Fong. *IEEE Trans. on Knowledge and Data Engineering*.  
Vol. 12, No. 1, 126–40.
- Verb classes and resultative selection in a computational lexicon. Fong, S., C. Fellbaum 2000  
& D. Lebeaux. In *Proceedings of the 1st Meeting on Speech Technology*, Seville, Spain.
- Semantic templates and transitivity alternations in the lexicon. Fong, S., C. Fellbaum 2000  
& D. Lebeaux. In *Proceedings of the 7th Conference on Automatic Natural Language  
Processing (TALN-2000)*, pp. 167–176.
- The representation of verbs and resultatives in a computational lexicon. Fong, S., C. 2000  
Fellbaum & D. Lebeaux. In *Proceedings of the Workshop on Computational Lexicography  
and Multimedia Dictionaries (COMLEX-2000)*, 67-70.
- Natural language grammatical inference: a comparison of recurrent neural networks 1996  
and machine learning methods. Lawrence, S., S. Fong & C. L. Giles. In *Connectionist,  
statistical, and symbolic approaches to learning for natural language processing*. Eds:  
Wermter, S. & E. Riloff & G. Scheler. Lecture Notes in Artificial Intelligence.  
Springer-Verlag, 33-47.
- On the applicability of neural network and machine learning methodologies to natural 1995  
language processing. Lawrence, S., S. Fong & C. L. Giles. In *Proceedings of the  
Workshop on New Approaches to Learning for Natural Language Processing*. International  
Joint Conference on Artificial Intelligence (IJCAI).

### Presentations (since 2011)

- Poster: *Reconciling Serial Verbs with Labeling and Theta Theory*. 17th English Linguistic May 25-26  
Society of Japan (ELSJ) International Spring Forum. Kyoto, Japan. 2024
- Invited participant: *Workshop on Algebraic Models of Generative Linguistics*. Fong, S. Mar 9-10  
Merkin Center, Caltech. (*Could not attend in person, spoke via Zoom from Osaka, Japan.*) 2024
- Invited lecture: *On the nature of FormSet*. Fong, S. & M. Oishi. Keio University, Tokyo, Feb 28-29  
Japan. (*Much expanded version of Conference talk below.*) 2024
- Conference talk: *On the nature of FormSet*. Fong, S. & M. Oishi. FIND-Workshop Dec 11-12  
2023. Göttingen, Germany. 2023
- Invited lecture: *Generative AI: the Good, the Bad and the Ugly*. Fong, S. Osaka Kyoiku May 22  
University, Japan. 2023
- Poster: *The Strong Minimalist Thesis (SMT): Form Copy (FC) and the Serial Verb* Mar 11-13  
*Construction (SVC)*. The 30th Japanese/Korean Linguistics Conference. Simon Fraser 2023  
University, BC, Canada.
- Invited talk: *On Computational Efficiency and Human Language*. First International Jun 24-26,  
Conference on Bilingualism of the UQTR: Meeting the Conditions of Learnability 2022  
and Evolvability. Université du Québec à Trois-Rivières,
- Invited talk: *On Modeling Human Language: Computational and Linguistic Perspectives*. Oct 20  
Fong, S. Tohoku Gakuin University, Sendai, Japan. 2021

- Poster: *On the selection of clausal complements in a Minimalist framework*. Ginsburg, J., H. Terada & S. Fong. The English Linguistic Society of Japan (ELSJ) 13th International Spring Forum. Kansai University. May 2020
- Conference talk: *The combinatorics of Merge and Workspace right-sizing*. Fong, S., R. Berwick & J. Ginsburg. Evolving Linguistics Workshop. University of Tokyo. Tokyo, Japan. May 26  
2019
- Conference talk: *On constraining Free Merge*. Ginsburg, J. & S. Fong. The 43rd Meeting of the Kansai Linguistic Society. Konan University: Kobe, Japan. Jun 10  
2018
- Poster: *Japanese Internally-Headed Relative Clauses and Relabeling*. Workshop on Altaic Formal Linguistics 13 (WAFL 13). Fong, S., J. Ginsburg J. & H. Terada. May 25–28  
2017
- Conference talk: *A Relabeling Analysis of English Possessives*. 10<sup>th</sup> International Spring Forum, English Linguistic Society of Japan (ELSJ). Ginsburg, J. & S. Fong. Apr 22–23  
2017
- Poster: *uT Checking in Relative Clauses*. Ginsburg, J. & S. Fong. LSA Annual Meeting. Washington DC. Jan 7–10  
2016
- Conference talk: Colorless green ideas do sleep furiously: the necessity of grammar. Sprouse, J., I. Sagar, S. Fong, R.C. Berwick. NELS-46. Concordia University. Apr 5–8  
2016
- Invited talk: *Towards a Minimalist Machine: A Stack Architecture*. Fong, S. & J. Ginsburg. Computation and Linguistic Theory: First Workshop on Minimalist Parsing. MIT. Oct 10–11  
2015
- Invited talk: *Towards a Minimalist Machine: Combining Linguistic Theories*. Ginsburg, J. & S. Fong. Computation and Linguistic Theory: First Workshop on Minimalist Parsing. MIT. Oct 10–11  
2015
- Conference talk: *Stack-Based Agree*. The English Linguistic Society of Japan (ELSJ) 7th International Spring Forum. Doshisha University: Kyoto, Japan. Apr 19–20  
2014
- Poster: *Modeling of Coreference Relations in Multi-Object Constructions*. Ginsburg, J. & S. Fong. The 13<sup>th</sup> Tokyo Conference on Psycholinguistics. Keio University. Japan. Mar 1–10  
2012
- Invited talk. *On the generative capacity of languages: human and non-human*. Fong, S. Computer Science Seminar Series. Carnegie Mellon University at Qatar. Doha. Nov 28  
2011, also  
*Also at* School of Modern Languages and School of Interactive Computing. Georgia Institute of Technology, Linguistics Colloquium. University of Arizona and *SISTA (School of Information: Science, Technology and Arts) Colloquium Series*. University of Arizona. August 26  
April 11
- *Idioms and Culture: Challenge and Opportunity*. Fong, S. ICSR (International Conference on Social Robotics) 2011. University of Amsterdam, The Netherlands. Nov 25  
2011
- *Natural language parsing: Treebanks and the knowledge of language*. 2011  
Invited talk. School of Modern Languages and School of Interactive Computing. Georgia Institute of Technology. November  
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## Grant Activity

- Co-PI, *Collaborative Research: CISE-MSI: DP: IIS: Hybrid-Architecture Symbolic Parser with Neural Lexicon* (HASPNeL). PI: 2023–2025

- Professor Hilton Alers-Valentin, University of Puerto Rico-Mayaguez. NSF Grant 2219713. 2011-2014
- Co-PI on Natural Human-Robot Interaction in Bilingual Cross Cultural Settings. With Carnegie Mellon University (CMU) Qatar and Pittsburgh. Qatar National Research Foundation (QNRF). 2004-2009
  - Co-PI on *Asymmetry at the Interfaces*. Amount: CDN\$2.5M, 6.25% effort. Social Sciences and Humanities Research Council of Canada (SSHRC). Project Director: Anna Maria Di Sciullo. Lead institution: University of Québec at Montréal (UQAM). 2000-2003
  - Collaborateur (Consultant) Computational Morphology. *Les asymétries des langues naturelles et leur traitement par les systèmes de performance*. Amount: CDN\$1.8M, 5% effort. Social Sciences and Humanities Research Council of Canada (SSHRC). Project Director: Anna Maria Di Sciullo, University of Québec at Montréal (UQAM), 1998-2000
  - Cooperative Member (Consultant) Natural Language Parsing in Japanese. *Researching and Verifying an Advanced Theory of Human Language*. Amount: ¥300M, 5% effort. Grant-in Aid for Center of Excellence (COE) Research. Japanese Ministry of Education, Science and Culture. Research Leader: Kazuko Inoue. Graduate School of Language Sciences, Kanda University of International Studies (KUIS), Chiba, Japan.

### Internships

- IBM T.J. Watson Research Center. Hawthorne. N.Y. 1986-1987  
Prototype qualitative reasoning system for computer system performance diagnosis.
- Daresbury Nuclear Physics Laboratory. Science and Engineering Research Council of Great Britain (SERC). Warrington. England. 1983  
Implementation of relational database management package

### Awards

- Japan Society for the Promotion of Science (JSPS) Invitational Fellowship Award. 2008  
Tokyo, Japan.
- IBM Graduate Fellow Award. EECS. MIT, Cambridge MA. 1987-1990
- J.F. Kennedy Scholar. Kennedy Memorial Trust. MIT, Cambridge MA 1984-1986
- Governors' Prize in Computing Science. Imperial College. London UK. 1984
- IBM Prize in Computing Science. Imperial College. London UK. 1984
- Arthur Anderson Prize in Computing Science. Imperial College. London UK. 1983