

Liang Huang

CURRENT POSITIONS	¹ Research Assistant Professor, Department of Computer Science ² Computer Scientist, Information Sciences Institute (ISI) University of Southern California (USC)	
CONTACT INFORMATION	Information Sciences Institute University of Southern California 4676 Admiralty Way, Suite 1001 Marina del Rey, CA 90292, USA	lhuang@isi.edu liang.huang.sh@gmail.com http://www.isi.edu/~lhuang
EDUCATION	University of Pennsylvania Ph.D., Computer and Information Science <i>Sep 2003 - Sep 2008</i> Advisors: Aravind Joshi and Kevin Knight (external, USC/ISI) Committee: M. Marcus, F. Pereira, B. Taskar, and M. Johnson (external, Brown) Thesis: <i>Forest-based Algorithms in Natural Language Processing.</i> (Nominated for the ACM Doctoral Dissertation Award.) <i>Received University Prize for Teaching by Graduate Students.</i> Shanghai Jiao Tong University B.S., Computer Science (summa cum laude) <i>Sep 1999 - July 2003</i> Thesis: <i>Probabilistic k-best Earley Parsing for Classical and Modern Chinese.</i>	
RESEARCH INTERESTS	[major] Computational Linguistics, (Structured) Machine Learning, Algorithms, and Compilers/Programming Languages I design efficient (preferably linear-time) algorithms and data structures for large-scale natural language understanding and machine translation systems, which make machine learning of these applications practical on huge datasets. I also study general structured learning problems that arise from these applications (esp. learning with inexact/approximate inference). I am also interested in the intersection of natural language processing and programming languages/compiler theory. [minor] Psycholinguistics: Computational Models of Human Sentence Processing (Affiliated Faculty, Language Processing Lab, USC Department of Linguistics)	
PROFESSIONAL EXPERIENCE	<i>Research Assistant Professor</i> , Department of Computer Science, University of Southern California (USC), Los Angeles, CA <i>July 2010 - present</i> <i>Computer Scientist</i> , Information Sciences Institute, University of Southern California (USC/ISI), Marina del Rey, CA <i>July 2009 - present</i> <i>Research Scientist</i> , Google Research, Mountain View, CA <i>Jan - July 2009</i> <i>Visiting Scholar</i> , HK Univ. of Science and Technology (HKUST) <i>Nov - Dec 2008</i> <i>Visiting Scholar</i> , Institute of Computing Technology, Chinese Academy of Sciences, Beijing (CAS/ICT) <i>Oct 2007 - Jan 2008</i>	

Summer Intern, USC Information Sciences Institute (USC/ISI) *2005 and 2006*

TEACHING
EXPERIENCE

University of Southern California (USC) – all graduate courses

CS 570, Analysis of Algorithms *Spring 2012*
CS 561, Artificial Intelligence (in Prolog, with K. Sagae) *Spring 2012*
CS 562, Statistical Natural Language Processing (with D. Chiang) *Fall 2011*
CS 599, Machine Translation (*new course*, with Chiang and Knight) *Spring 2011*
CS 562, Statistical Natural Language Processing (with K. Knight) *Fall 2010*
CS 544, Natural Language Processing (with Hovy et al.) *Spring 2010*
CS 562, Statistical Natural Language Processing (with D. Chiang) *Fall 2009*

University of Pennsylvania – all undergraduate courses

CSE 399-004 Python Programming (*new course*) *Spring 2006*
Teaching Assistant, CSE 320 Analysis of Algorithms *Spring 2005*
Teaching Assistant, CSE 262 Automata, Complexity & Computability *Fall 2004*

Conference Tutorials: Advanced Dynamic Programming for Computational Linguists

COLING 2008, Manchester, UK (attendance: ~70) *Aug 2008*
NAACL 2009, Boulder, CO (attendance: ~65) *May 2009*

Conference Tutorials: Tree-based and Forest-based Translation (with Y. Liu)

ACL 2010, Uppsala, Sweden (attendance: ~65) *July 2010*

HONORS AND
AWARDS

- **Best Paper Award**, *ACL 2008*
- Best Paper Award Nominations: *ACL 2007*, *EMNLP 2008*, and *ACL 2010*
- Nominated for the ACM Doctoral Dissertation Award, *2009*
- **Champions (as faculty advisor)**, ACM/ICPC Southern California Regionals (advanced to the World Finals for the first time), 2011-2012.
- Finalist, Microsoft Graduate Fellowship, *2006* and *2007*
- **University Prize for Excellence in Teaching by Graduate Students**, University of Pennsylvania, *2005*
- Dean's Fellowship, Dept. of Computer and Information Science, University of Pennsylvania, *2003-2004*
- First Prize, National Finals, China Undergrad Math. Contest in Modeling, *2002*
- 4th Place, ACM International Collegiate Programming Contest, Shanghai site, *2000*
- Bronze Medal (16th nationwide), National Olympiads in Informatics, China, 1996.

FUNDING

- **Google Faculty Research Award**, "Linear-time Dynamic Programming for Parsing and Machine Translation" (PI), unrestricted gift, \$75,000 for one year, 2011.

PROFESSIONAL
SERVICE

- **Area Chair (Syntax and Parsing)**, ACL 2012

- Textbook Reviewer, *Oxford University Press*, 2010
- Journal Reviewer for
 - *Journal of Natural Language Engineering*, 2011
 - *Computational Intelligence*, 2011
 - *ACM Transactions on Intelligent Systems and Technology*, 2010–2011
 - *Journal of Computer Science and Technology*, 2010
 - *Computational Linguistics*, 2008–2009, 2011
 - *IEEE Transactions on Audio, Speech and Language Processing*, 2008
 - *ACM Transactions on Asian Language Information Processing*, 2008, 2011
- Conference PC Member for
 - ACL, annually 2006–2011 (top conference)
 - HLT-NAACL, annually 2007–2011 (top conference)
 - EMNLP, annually 2007–2011 (top conference)
 - IWPT 2011; MT Summit 2009; AMTA 2008; CoNLL 2007–2009
 - ICCPOL (Computer Processing of Oriental Languages) 2006
- Reviewer, IJCAI 2007

PUBLICATIONS

PREPRINTS

1. Liang Huang and Suphan Fayong (2012). Structured Perceptron with Inexact Search. *Submitted*.
2. Ashish Vaswani, Liang Huang and David Chiang (2012). Smaller Alignment Models for Better Translations: Unsupervised Word Alignment with the ℓ_0 -norm. *Submitted*.

THESES/DISSERTATIONS

3. Liang Huang (2008). Forest-Based Algorithms for Natural Language Processing. *Ph.D. Dissertation, University of Pennsylvania*.
Nominated for the ACM Doctoral Dissertation Award.
4. Liang Huang (2003). Probabilistic k -best Earley Parsing for Classical and Modern Chinese. *Bachelor's Thesis, Shanghai Jiao Tong University*.

BOOKS

5. Liang Huang (forthcoming 2012). Search Algorithms for Natural Language Processing. Synthesis Lectures on Human Language Technologies, G. Hirst (ed.), Morgan & Claypool Publishers.
6. Rujia Liu and Liang Huang (2003). The Art of Algorithms and Programming Contests (*in Chinese*). Tsinghua University Press, Beijing.

JOURNAL ARTICLES

7. Liang Huang, Hao Zhang, Daniel Gildea, and Kevin Knight (2009). Binarization of Synchronous Context-Free Grammars. *Computational Linguistics*, 35 (4). December 2009. Conference version appeared at HLT-NAACL 2006 (see below).
8. Adam Lucas, Liang Huang, Aravind Joshi, and Ken Dill (2007). Statistical Mechanics of Helix Bundles using a Dynamic Programming Approach. *J. Am.*

Chem. Soc. (JACS), 129 (14), pp. 4272-4281.

9. Ken Dill, Adam Lucas, Julia Hockenmaier, Liang Huang, David Chiang, and Aravind Joshi (2007). Computational Linguistics: a new tool for exploring biopolymer structures and statistical mechanics. *Polymer*, 48 (15), pp. 4289-4300.

REFEREED CONFERENCE AND WORKSHOP PAPERS

10. Ashish Vaswani, Haitao Mi, Liang Huang and David Chiang (2011). Rule Markov Models for Fast Tree-to-String Translation. In *Proceedings of ACL 2011*.
11. Liang Huang and Haitao Mi (2010). Efficient Incremental Decoding for Tree-to-String Translation. In *Proceedings of EMNLP 2010*.
12. Liang Huang and Kenji Sagae (2010). Dynamic Programming for Linear-time Incremental Parsing. In *Proceedings of ACL 2010*.

Nominated for the Best Paper Award.

13. Haitao Mi, Liang Huang, and Qun Liu (2010). Machine Translation with Lattices and Forests. In *Proceedings of COLING 2010*.
14. Liang Huang, Wenbin Jiang, and Qun Liu (2009). Bilingually-Constrained (Monolingual) Shift-Reduce Parsing. In *Proceedings of EMNLP 2009*.
15. Wenbin Jiang, Liang Huang, and Qun Liu (2009). Automatic Adaptation of Annotation Standards: Chinese Word Segmentation and POS Tagging: A Case Study. In *Proceedings of ACL-IJCNLP 2009*.
16. Liang Huang (2008). Forest Reranking: Discriminative Parsing with Non-Local Features. In *Proceedings of ACL 2008*.

Received the Best Paper Award.

17. Liang Huang (2008). Advanced Dynamic Programming in Semiring and Hypergraph Frameworks. In *Proceedings of COLING 2008*. Survey paper to accompany the conference tutorial.
18. Haitao Mi and Liang Huang (2008). Forest-based Translation Rule Extraction. In *Proceedings of EMNLP 2008*.

Nominated for the Best Paper Award.

19. Haitao Mi, Liang Huang and Qun Liu (2008). Forest-based Translation. In *Proceedings of ACL 2008*.
20. Wenbin Jiang, Liang Huang, Qun Liu, and Yajuan Lü (2008). A Cascaded Linear Model for Joint Chinese Word Segmentation and Part-of-Speech Tagging. In *Proceedings of ACL 2008*.
21. Liang Huang and David Chiang (2007). Forest Rescoring: Faster Decoding with Integrated Language Models. In *Proceedings of ACL 2007*.

Nominated for the Best Paper Award.

22. Liang Huang (2007). Binarization, Synchronous Binarization, and Target-side Binarization. In *Proceedings of NAACL Workshop on Syntax and Structure in Statistical Translation (SSST)*.
23. Liang Huang, Kevin Knight, and Aravind Joshi (2006). Statistical Syntax-Directed Translation with Extended Domain of Locality. In *Proceedings of AMTA 2006*.

Preliminary version appeared in Proceedings of NAACL 2006 workshop on Computational Hard Problems in Speech and Language Processing.

24. Hao Zhang, Liang Huang, Dan Gildea and Kevin Knight (2006). Synchronous Binarization for Machine Translation. In *Proc. of NAACL 2006*.
Journal version appeared in *Computational Linguistics* (2009). (see above)
25. Liang Huang and David Chiang (2005). Better k -best Parsing. In *Proceedings of the 9th International Workshop on Parsing Technologies (IWPT)*.
26. Liang Huang, Hao Zhang and Daniel Gildea (2005). Machine Translation as Lexicalized Parsing with Hooks. In *Proceedings of the 9th International Workshop on Parsing Technologies (IWPT)*.
27. Stephanie Weirich and Liang Huang (2005). A Design for Type-Directed Programming in Java. In *Electronic Notes in Theoretical Computer Science*, **138** (2), 117-136. (conference version listed below)
28. Stephanie Weirich and Liang Huang (2004). A Design for Type-Directed Programming in Java. In *Proceedings of the Workshop on Object-Oriented Developments (WOOD)*. Extended version as Penn/CIS Technical Report MS-CIS-04-11.
29. L. Huang, Y. Peng, Z. Wu, Z. Yuan, H. Wang and H. Liu (2003). Pseudo Context-Sensitive Models for Parsing Isolating Languages: Classical Chinese – A Case Study. In *Proceedings of the International Conference on Intelligent Text Processing and Computational Linguistics (CICLING)*. (poster)
30. L. Huang, Y. Peng, H. Wang, and Z. Wu (2002). PCFG Parsing for Restricted Classical Chinese Texts. In *Proceedings of the COLING Workshop on Chinese Processing (SIGHAN)*, Taipei.

INVITED TALKS

“Better k -best Parsing, Hypergraphs, and Dynamic Programming.”

- USC Information Sciences Institute (NL seminar), Marina del Rey, CA *June 2005*
- Google Research, Mountain View, CA *Oct 2005*
- New York University (NYCNLP series), New York, NY *Nov 2005*
- Johns Hopkins University, Baltimore, MD *Nov 2005*
- University of Rochester (big picture series), Rochester, NY *Nov 2005*
- Microsoft Research, Redmond, WA *Dec 2005*
- University of Alberta (AI Seminar), Edmonton, Canada *Oct 2006*
- Universität Potsdam (CL Kolloquium), Potsdam, Germany *June 2007*
- Microsoft Research Asia, Beijing *July 2007*

“Binarizing Synchronous Grammars for Machine Translation.”

- Institute of Computing Tech., Chinese Academy of Sciences, Beijing *July 2007*
- Hong Kong University of Science and Technology (HKUST) *July 2007*

“Forest-based Algorithms in Natural Language Processing.”

- University of California at Berkeley, Berkeley, CA *Mar 2008*
- Stanford University, Stanford, CA *Mar 2008*
- Google Research, Mountain View, CA *Mar 2008*
- Johns Hopkins University (CLSP Seminar), Baltimore, MD *Apr 2008*
- MIT CSAIL, Cambridge, MA *Oct 2008*
- Carnegie Mellon University (LTI Seminar), Pittsburgh, PA *May 2009*
- Yahoo! Research, Santa Clara, CA *Aug 2009*

“Tree-based and Forest-based Translation.”

- BBN Technologies, Cambridge, MA *Oct 2008*
- Hong Kong University of Science and Technology (HKUST) *Nov 2008*
- The Chinese University of Hong Kong (CUHK) *Nov 2008*
- USC Information Sciences Institute (USC/ISI), Marina del Rey, CA *Dec 2008*
- University of California at Berkeley (host: Dan Klein) *Feb 2009*
- Pomona CS Colloq. w/ Harvey Mudd, (hosts: K. Bruce and D. Kauchak) *Oct 2010*

“Linear-time Dynamic Programming for Incremental Parsing.”

- University of California at San Diego (host: Roger Levy) *May 2010*
- Google Research, Mountain View (host: Hiyan Alshawi) *July 2010*
- Johns Hopkins University (CLSP Seminar, host: Fred Jelinek) *Sep 2010*
- MIT CSAIL (host: Michael Collins) *Oct 2010*
- IBM Research, T.J. Watson (hosts: Salim Roukos and Bing Zhao) *May 2011*
- University of Rochester (big picture series) *May 2011*

INTERNAL SERVICE

- PhD Admissions and Fellowship Committee, USC CS Dept, 2010–2011.
- Co-Organizer, USC Programming Contests (ACM/ICPC), 2009–.
Champions, Southern California Regionals, 2011 (first time in USC history).
- Co-Organizer, NACLO: Computational Linguistics Olympiad, USC/ISI site, 2009–.

ADVISEES

Visiting Scientists hosted at ISI: Dr. Haitao Mi, from CAS/ICT, China, 2010–2011

PhD students at USC

- Ashish Vaswani (co-advised by D. Chiang), expected 2012; topic: sparse models

Master’s Students at USC

- Phani Vempaty (2011–, parsing), Suphan Fayong (Fulbright Scholar, 2011–, structured learning), Yixuan Wu (2011, poetry), Jun Ma (2011, structured learning), Yang Guo (2010–2011, parsing and POS tagging), Jayadev Jayaraman (2010, co-advised by D. Chiang, machine translation), William Chang (2009, reranking)

Undergraduate Students at USC: Elizabeth Deng, 2011

Summer Interns at ISI

- Alexander “Sasha” Rush, Summer Intern from MIT, 2010
- Yoav Goldberg, Summer Intern from Ben Gurion, 2010 (with Knight & Chiang)
- Licheng Fang, Summer Intern from University of Rochester, 2011

Serving on PhD dissertation committee:

- Licheng Fang, PhD student from Rochester (advisor: Dan Gildea), expected 2013

Mentoring at Institute of Computing Technologies, Chinese Academy of Sciences

- Haitao Mi, Ph.D. 2009 (primary advisor: Prof. Qun Liu)
- Wenbin Jiang, Ph.D. expected 2011 (primary advisor: Prof. Qun Liu)

OTHER
INFORMATION

- Citizen of the P. R. China. H-1B visa in the United States.
- Born April 1981, Shanghai, China.
- Languages: Wu and Mandarin (native); English (fluent); French, Spanish and Italian (basic); Japanese (basic conversational).
- Programming Languages: Python, Java, C/C++, Pascal, O’Caml, Prolog, Perl.
- Hobbies/Interests: Historical Geography, Historical Linguistics, History of Mathematics, Classical Chinese (esp. poetry), Classical Music (esp. Bach), Ping-Pong, Badminton, Soccer, Go, etc.

REFERENCES Available upon request.

LAST UPDATED January 2012.

REFERENCES

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