

# Asli Celikyilmaz

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[google.scholar](https://scholar.google.com/)

## Employment

*Senior Researcher, Microsoft Research*

09/2010 – Present

Neural Methods for natural language generation, and language understanding

*Postdoctoral Research Employee, University of California, Berkeley*

09/2008 – 09/2010

Question answering, textual entailment, topic models for document summarization

*Research Assistant, University of Toronto*

09/2003 – 09/2008

Software risk analysis, credit worthiness analysis, ontology engineering

*Machine Learning and Data Scientist, Information Intelligence, Co. Toronto*

09/2002 – 09/2004

Building data mining and machine learning software

## Education

*Post-Doctorate Research, Computer Science, University of California, Berkeley*

05/2008 - 10/2010

Probabilistic Graphical Models with applications to question answering, textual entailment and multi-document summarization

*Ph.D., Information Science, University of Toronto*

05/2005 - 10/2008

Uncertainty modeling with evolutionary functions.

*Master of Applied Science, Information Science, University of Toronto*

01/2003 - 05/2005

Ontology engineering and applications of soft computing.

*Computer Programming and Analysis, Information Science, Seneca College*

01/2000 - 05/2002

Enterprise web applications.

*Bachelor of Applied Science, Industrial Engineering, Istanbul Technical University*

09/1993 - 06/1997

Multi-objective decision making.

## Honors and Awards

- Best Paper Award, IEEE Int. Conference on Semantic Computing, Berkeley, 2009.
- Postdoctoral Fellowship from British Telecom University of California, Berkeley, 2008-2010.
- NSERC - Natural Science and Engineering Research Council of Canada, Postdoctoral Fellowship (PDF), 2008-2010.
- NSERC - Natural Science and Engineering Research Council, Graduate Scholarships and Fellowships, PGSD2, 2007-2009.
- OGS-Ontario Graduate Scholarships in Science and Technology, Ph.D., 2007-2008.
- Ph.D. Fellowship, University of Toronto, 2005-2008.
- Student Travel Grant from IEEE Computational Intelligence Society, 2007.
- Best Paper Award, North American Fuzzy Information Processing Society, 2007.
- Ontario, Canada Graduate Scholarship in Science and Tech. (OGS-ST), 2006-2007.
- Research Assistantship Support, University of Toronto, 2005-2006.
- Master of Science Fellowship, University of Toronto, 2004-2005.
- Research Assistantship Support, University of Toronto, 2004-2005
- Full Grant for Undergraduate Study, ISTEK Foundation, 1993-1997

## Recent Publications

1. *Hierarchically Structured Variational Autoencoders for Long Text Generation*  
Dinghan Shen, Asli Celikyilmaz  
Under Review, ICLR 2019
2. *Deep Multi-Agent Reward Learning for Diverse Dialog Response Generation*  
Antoine Bosselut, Asli Celikyilmaz, Yejin Choi  
In preparation, 2019
3. *Multi-Teacher Imitation Learning for Sequence Generation*  
Amr Sharaf, Asli Celikyilmaz  
In preparation, 2019
4. *Sentence Mover's Distance for Paragraph Semantic Evaluation*  
Elizabeth Clark, Asli Celikyilmaz, Noah Smith  
In preparation, 2019
5. *Hierarchically Structured Reinforcement Learning for Visual Story Generation*  
Qiuyuan Huang, Zhe Gan, Asli Celikyilmaz, Dapeng Wu, and Xiaodong He  
AAAI 2019
6. *Deep Communicating Agents for Abstractive Summarization*  
Asli Celikyilmaz, Antoine Bosselut, and Xiaodong He, Yejin Choi  
NAACL 2018

7. *Discourse-Aware Neural Rewards for Coherent Text Generation*  
Antoine Bosselut, Asli Celikyilmaz, Xiaodong He, Jianfeng Gao, Po-Sen Huang, Yejin Choi  
NAACL 2018
8. *Learning and analyzing vector encoding of symbolic representations*  
Roland Fernandez\*, Asli Celikyilmaz\*, Rishabh Singh, Paul Smolensky  
\*Equal Contribution  
ICLR 2018
9. *Deep Learning for Spoken and Text Dialog Systems*  
Asli Celikyilmaz, Li Deng, Dilek Hakkani-Tur  
Springer, Book Chapter, 2018.
10. *Deep Learning in Conversational Language Understanding*  
Gokhan Tur, Asli Celikyilmaz, Xiaodong He, Dilek Hakkani-Tur, Li Deng  
Springer, Book Chapter, 2018.
11. *Deep Learning for Dialogue Systems Tutorial*  
Yun-Nung Chen\*, Asli Celikyilmaz\*, Dilek Hakkani-Tur\* (\*Equal Contribution)  
ACL 2017
12. *End-to-End Task-Completion Neural Dialogue Systems*  
Xiujun Li, Yun-Nung Chen, Lihong Li, Jianfeng Gao, Asli Celikyilmaz  
IJCNLP 2017
13. *Composite Task-Completion Dialogue Policy Learning via Hierarchical Deep Reinforcement Learning*  
Baolin Peng, Xiujun Li, Lihong Li, Jianfeng Gao, Asli Celikyilmaz, Sungjin Lee, et.al.  
EMNLP 2017
14. *Spoken language understanding and interaction: machine learning for human-like conversational systems*  
Milica Gasic\*, Dilek Hakkani-Tur\*, Asli Celikyilmaz\* (\*Equal Contribution)  
Computer Speech and Language, 2017
15. *Language Understanding Impact for Reinforcement Learning Based Dialogue Systems*  
Xiujun Li, Yun-Nung Chen, Lihong Li, Jianfeng Gao, Asli Celikyilmaz  
arXiv preprint, March 21, 2017
16. *Scaffolding Networks for Teaching and Learning to Comprehend*  
Asli Celikyilmaz, Li Deng, Lihong Li, Chong Wang  
arxiv preprint, February 28, 2017
17. *Associative Adversarial Networks*  
Tarik Arici\*, Asli Celikyilmaz\* (\*Equal Contribution)  
NIPS 2016 Workshop on Generative Adversarial Networks
18. *Syntax or Semantics? Knowledge-Guided Joint Semantic Frame Parsing*  
Yun-Nung (Vivian) Chen, Dilek Hakkani-Tur, Gokhan Tur, Asli Celikyilmaz, Jianfeng Gao, Li Deng  
SLT 2016 (IEEE Workshop on Spoken Language Technology)

19. *An Overview of End-to-End Language Understanding and Dialog Management for Personal Digital Assistants*  
Ruhi Sarikaya, Paul A. Crook, Alex Marin, Minwoo Jeong, Jean-Philippe Robichaud, Asli Celikyilmaz, Young-Bum Kim, Alexandre Rochette, Omar Z. Khan, Xiaohu Liu, et.al.  
SLT 2016 (IEEE Workshop on Spoken Language Technology)
20. *Intent Detection using Semantically Enriched Word Embeddings*  
Joo-Kyung Kim, Gokhan Tur, Asli Celikyilmaz, Bin Cao, Ye-Yi Wang  
SLT 2016 (IEEE Workshop on Spoken Language Technology)
21. *Knowledge as a Teacher: Knowledge-Guided Structural Attention Networks*  
Yun-Nung Chen, Dilek Hakkani-Tur, Gokhan Tur, Asli Celikyilmaz, J. Gao, Li Deng  
arXiv preprint September 12, 2016
22. *A New Pre-training Method for Training Deep Learning Models with Application to Spoken Language Understanding*  
Asli Celikyilmaz, Ruhi Sarikaya, Dilek Hakkani-Tür, Xiaohu Liu, Nikhil Ramesh, et.al.  
Interspeech 2016
23. *Multi-Domain Joint Semantic Frame Parsing using Bi-directional RNN-LSTM*  
Dilek Hakkani-Tür, Gokhan Tur, Asli Celikyilmaz, Yun-Nung Vivian Chen, Jianfeng Gao, Li Deng, Ye-Yi Wang  
Interspeech 2016
24. *Task Completion Platform: A self-serve multi-domain goal oriented dialogue platform*  
Paul A. Crook, Alex Marin, V. Agarwal, K. Aggarwal, T. Anastasakos, R. Bikkula, D. Boies, Asli Celikyilmaz, S. Chandramohan, Z. Feizollahi, R. Holenstein, M. Jeong, et. al.  
ACL 2016
25. *Natural Language Understanding for Partial Queries*  
Xiaohu Li, Asli Celikyilmaz, Ruhi Sarikaya  
ICASSP 2015
26. *Convolutional Neural Network Based Semantic Tagging with Entity Embeddings*  
Asli Celikyilmaz, Dilek Hakkani-Tur  
NIPS 2015
27. *Investigation of ensemble models for sequence learning*  
Asli Celikyilmaz, Dilek Hakkani-Tur  
ICASSP 2015
28. *Enriching Word Embeddings Using Knowledge Graph for Semantic Tagging in Conversational Dialog Systems*  
Asli Celikyilmaz, Dilek Hakkani-Tur, Panupong Pasupat and Ruhi Sarikaya  
AAAI 2015
29. *A Toolkit for Building Conversational Understanding Models using Semantic Graphs (Demo)* Dilek Hakkani-Tur, Asli Celikyilmaz and Geoff Zweig  
SLT-2014
30. *Resolving Referring Expressions in Conversational Dialogs for Natural User Interfaces*  
Asli Celikyilmaz, Zhaleh Feizollahi, Dilek Hakkani-Tur and Ruhi Sarikaya  
EMNLP 2014

31. *Eye Gaze for Spoken Language Understanding in Multi-Model Conversational Interactions*  
Dilek Hakkani-Tur, Malcolm Slaney, Asli Celikyilmaz, Larry Heck  
ICMI 2014
32. *No Evidence Left Behind: Understanding Semantics in Dialogs using Relational Evidence Based Learning*  
Asli Celikyilmaz, Dilek Hakkani-Tur and Minwoo Jeong  
PMLC 2014
33. *A Variational Bayesian Model for User Intent Detection*  
Yangfeng Ji, Dilek Hakkani-Tur, Asli Celikyilmaz, Larry Heck, Gokhan Tur  
ICASSP 2014
34. *Semi-Supervised Semantic Tagging for Conversational Understanding Using Markov Topic Regression*  
Asli Celikyilmaz, Dilek Hakkani-Tur, Gokhan Tur, Ruhi Sarikaya  
ACL 2013
35. *Learning to Relate Literal and Sentimental Descriptions of Visual Properties*  
Mark Yatskar, Svitlana Volkova, Asli Celikyilmaz, Bill Dolan, Like Zettlemoyer  
NAACL 2013
36. *IsNL? A Discriminative Approach to Detect Natural Language Like Queries for Conversational Understanding*  
Asli Celikyilmaz, Gokhan Tur, Dilek Hakkani-Tur  
Interspeech 2013
37. *Discovering New User Intents from Search Query Logs for Spoken Language Understanding*  
Dilek Hakkani-Tur, Asli Celikyilmaz, Larry Heck, Gokhan Tur  
Interspeech 2013
38. *Easy Contextual Intent Prediction and Slot Detection*  
Aditya Bhargava, Asli Celikyilmaz, Dilek Hakkani-Tur, Ruhi Sarikaya  
ICASSP 2013
39. *Latent Semantic Modeling for Slot Filling in Conversational Understanding*  
Gokhan Tur, Asli Celikyilmaz, Dilek Hakkani-Tur  
ICASSP 2013
40. *Weakly Supervised Approach for Building Conversational Interaction System*  
Dilek Hakkani-Tur, Asli Celikyilmaz, Gokhan Tur, Larry Heck  
MSR-ML-SUMMIT 2013
41. *A Joint Model for Discovery of Aspects in Utterances*  
Asli Celikyilmaz, Dilek Hakkani-Tur  
ACL 2012
42. *Mining Search Query Logs for Spoken Language Understanding*  
Dilek Hakkani-Tur, Gokhan Tur, Asli Celikyilmaz  
NAACL 2012 (Workshop on Future Directions and Needs in the Spoken Dialog Comm.)

43. *A Discriminative Classification-Based Approach to Information State Updates for a Multi-Domain Dialog System*  
Dilek Hakkani-Tür, Gokhan Tür, Larry Heck, Ashley Fidler, Asli Celikyilmaz  
Interspeech 2012
44. *Statistical Semantic Interpretation Modeling for Spoken Language Understanding with Enriched Semantic Features*  
Asli Celikyilmaz, Dilek Hakkani-Tür, Gokhan Tür  
SLT 2012
45. *An Overview of Speech and Related Papers @ACL 2012*  
Asli Celikyilmaz  
IEEE Spoken Language Technologies (SLT) Newsletter, 2012.
46. *Leveraging Web Query Logs to Learn User Intent via Bayesian Latent Variable Model*  
Asli Celikyilmaz, Dilek Hakkani-Tur, Gokhan Tur  
ICML 2011 (Workshop on Combining Learning Strategies to Reduce Label Cost)
47. *Discovery of Topically Coherent Sentences for Extractive Summarization*  
Asli Celikyilmaz, Dilek Hakkani-Tur  
ACL 2011
48. *Exploiting Distance Based Similarity in Topic Models for User Intent Detection*  
Asli Celikyilmaz, Dilek Hakkani-Tur, Gokhan Tur, Ashley Fidler, Dustin Hillard  
ASRU 2011
49. *Employing Web Search Query Click Logs for Multi-Domain Spoken Language Understanding*  
Dilek Hakkani-Tür, Gokhan Tur, Larry Heck, Asli Celikyilmaz, Ashley Fidler, Dustin Hillard, Rukmini Iyer, S. Parthasarathy  
ASRU 2011
50. *Multi-Domain Spoken Language Understanding with Approximate Inference*  
Asli Celikyilmaz, Dilek Hakkani-Tür, Gokhan Tur  
Interspeech 2011
51. *Learning Weighted Entity Lists from Web Click Logs for Spoken Language Understanding*  
Dustin Hillard, Asli Celikyilmaz, Dilek Hakkani-Tür, Gokhan Tur  
Interspeech 2011
52. *Towards Unsupervised Spoken Language Understanding: Exploiting Query Click Logs for Slot Filling*  
Gokhan Tur, Dilek Hakkani-Tür, Dustin Hillard, Asli Celikyilmaz  
Interspeech 2011
53. *Concept-based Classification for Multi-Document Summarization*  
Asli Celikyilmaz, Dilek Hakkani-Tür  
ICASSP 2011
54. *The Actor-Topic Model for Extracting Social Networks in Literary Narrative*  
Asli Celikyilmaz, Dilek Hakkani-Tur, Hua He, Grzegorz Kondrak, Denilson Barbosa  
NIPS 2010 (Workshop on Machine Learning for Social Computing Workshop)

55. *A Hybrid Hierarchical Model for Multi-Document Summarization*  
Asli Celikyilmaz, Dilek Hakkani-Tür  
ACL 2010
56. *LDA Based Similarity Modeling for Question Answering*  
Asli Celikyilmaz, Dilek Hakkani-Tür, and Gokhan Tur  
NAACL-HLT 2010 (Workshop on Semantic Search)
57. *A Graph-Based Semi-Supervised Learning for Question Semantic Labeling*  
Asli Celikyilmaz, Dilek Hakkani-Tür  
NAACL-HLT 2010 (Workshop on Semantic Search)
58. *Semantic Question Answering System with Topic Models*  
Asli Celikyilmaz  
NIPS 2010 (Workshop on Applications of Topic Models : Text and Beyond)
59. *Extractive Summarization using A Latent Variable Model*  
Asli Celikyilmaz, Dilek Hakkani-Tür  
Interspeech 2010
60. *Probabilistic Model-Based Sentiment Analysis of Twitter Messages*  
Asli Celikyilmaz, Dilek Hakkani-Tür, Junlan Feng  
SLT 2010
61. *Decision Making With Imprecise Parameters*  
Asli Celikyilmaz, I. Burhan Turksen  
IJAR 2010 (International Journal of Approximate Reasoning)
62. *Information Extraction From Text - Dealing With Imprecise Data*  
Asli Celikyilmaz, I. Burhan Turksen  
INTECH 2010 - Book Chapter.
63. *A Graph-based Semi-Supervised Learning for Question Answering*  
Asli Celikyilmaz, Marcus Thint, Zhiheng Huang  
ACL 2009
64. *Investigation of Question Classifier in Question Answering*  
Zhiheng Huang, Marcus Thint, Asli Celikyilmaz  
EMNLP 2009
65. *Accurate Semantic Class Classifier for Coreference Resolution*  
Zhiheng Huang, Guangping Zeng, W. Xu, Asli Celikyilmaz  
EMLNP 2009
66. *Soft-Link Spectral Clustering for Information Extraction*  
Asli Celikyilmaz  
ICSC 2009 (Third IEEE Int. Conf. on Semantic Computing)  
**Winner of Best Paper Award\***
67. *Graph-Based Semi-Supervised Learning for Learning Semantic Relations from Text*  
Asli Celikyilmaz  
NIPS 2009 (Women in Machine Learning Workshop)

68. *Spectral Learning with Type-2 Fuzzy Numbers for Question/Answering System*  
Asli Celikyilmaz, I. Burhan Turksen  
IFSA 2009 (World Congress EUSFLAT Conference, 2009)
69. *Kernel Based Hybrid Fuzzy Clustering for Non-Linear Fuzzy Classifiers*  
Asli Celikyilmaz, I. Burhan Turksen  
NAFIPS 2009 (Int. Conf. on North American Fuzzy Inf. Processing Society Annual Conf.)
70. *Modeling Uncertainty with Fuzzy Logic: With Recent Theory and Applications*  
Asli Celikyilmaz, I. Burhan Turksen  
Springer Book 2009
71. *A Soft Link Spectral Model for Link Prediction*  
Asli Celikyilmaz  
International Journal of Semantic Computing 3:4 2009
72. *Genetic Fuzzy System Based on Improved Fuzzy Functions*  
Asli Celikyilmaz, I. Burhan Turksen  
Journal of Computers 4:2 2009
73. *Increasing Accuracy of Two Class Pattern Recognition with Improved Fuzzy Functions*  
Asli Celikyilmaz, I. Burhan Turksen  
Expert Systems with Applications, volume 36, 2009
74. *Semantic Approach to Text Entailment for Question Answering*  
Asli Celikyilmaz, Marcus Thint  
ICCI 2008 (IEEE Intern. Conf. on Cognitive Informatics)
75. *Type-2 Fuzzy Classifier Ensembles for Text Entailment*  
Asli Celikyilmaz, I. Burhan Turksen  
JCIS 2008 (Joint Conference on Information Sciences)
76. *Uncertainty Bounds of Fuzzy C-Regression Method*  
Asli Celikyilmaz, I. Burhan Turksen  
WCCI 2008 (IEEE Int. Conf. on Fuzzy Systems-World Congress on Comp. Intelligence)
77. *Genetic Type-2 Fuzzy Classifier Functions*  
Asli Celikyilmaz, I. Burhan Turksen  
NAFIPS 2008 (Int. Conf. of North American Fuzzy Information Processing Society Annual Conf.)
78. *A Type-2 Fuzzy C-regression Method*  
Asli Celikyilmaz, I. Burhan Turksen  
IPMU 2008 (Int. Conf. on Information Processing and Management of Uncertainty in Knowledge-Based Systems)
79. *A New Classifier Design with Fuzzy Functions*  
Asli Celikyilmaz, I. Burhan Turksen  
RSKT 2007 (Int. Conf. on Rough Sets and Knowledge Technology)
80. *Evolution of Fuzzy System Models: An Overview and New Directions*  
Asli Celikyilmaz, I. Burhan Turksen  
RSKT 2007 (Int. Conf. on Rough Sets and Knowledge Technology)

81. *Type 2 Fuzzy System Models with Improved Fuzzy Functions*  
Asli Celikyilmaz, I. Burhan Turksen  
NAFIPS 2007 (Int. Conf. of North American Fuzzy Information Processing Society)  
**Winner of Best Student Paper Award\***
82. *Evolutionary Fuzzy System Models with Improved Fuzzy Functions and Its Application to Industrial Process*  
Asli Celikyilmaz, I. Burhan Turksen  
IEEE-SMC 2007 (IEEE Int. Conf. on Systems, Man, Cybernetics)
83. *Improved Interval Valued Fuzzy Reasoning with Evolutionary Computing*  
Asli Celikyilmaz, I. Burhan Turksen  
JCIS (Int. Conf. on Fuzzy Theory & Technology)
84. *A New Cluster Validity Index with Fuzzy Functions*  
Asli Celikyilmaz and I. Burhan Turksen  
IFSA 2007 (Proc. of Int. Fuzzy Systems Association - World Congress EUSFLAT Conf.)
85. *Validation Criteria for Enhanced Fuzzy Clustering*  
Asli Celikyilmaz, I. Burhan Turksen  
Pattern Recognition Letters 29, 2008.
86. *Uncertainty modeling with evolutionary improved fuzzy functions approach*  
Asli Celikyilmaz, I. Burhan Turksen  
IEEE Systems, Man, and Cybernetics- Part B 38:4 2008.
87. *Enhanced Fuzzy System Models with Improved Fuzzy Clustering Algorithm*  
Asli Celikyilmaz, I. Burhan Turksen  
IEEE Transactions on Fuzzy Systems 16:3 2008.
88. *Fuzzy Functions with Support Vector Machines*  
Asli Celikyilmaz, I. Burhan Turksen  
Information Sciences, 177 2007.
89. *Comparison of Fuzzy Functions with Fuzzy Rule Bases*  
Asli Celikyilmaz, I. Burhan Turksen  
International Journal of Fuzzy Systems, 8:3 2006.

## Invited Talks

1. Invited talk at HCI-MSR Workshop at Stanford University on Deep Generation, 2018
2. Invited Talk ICML Workshop on Exploration in Reinforcement Learning, 2018.
3. Invited Talk NIPS Workshop on Conversational AI, 2017.
4. Panelist at NIPS Workshop on Conversational AI, 2017.
5. *Intelligent Personal Assistants and Signal Processing Challenges*, IEEE Signal Processing Society Santa Clara Valley Chapter, November 2014.
6. *Language Understanding*, Machine Learning Summer School, UC Santa Cruz, 2012.
7. *Conversational Understanding*, BISC Lab in Computer Science, UC Berkeley, 2011.
8. *Question Answering Made Easy*, Int. Computer Science Institute, Berkeley, 2010.
9. *Question Answering Effort in BISC Lab* IEEE Int. Conf. Semantic Computing, Stanford, CA, 2009.

## Teaching Experience

1. Tutorial on Next Generation Conversational AI, COLING 2018.
2. Tutorial on Deep Learning for Conversational Dialog Systems, ACL 2017.
3. Tutorial on Deep Learning for Conversational Dialog Systems, Interspeech 2017.
4. Tutorial on Deep Learning for Conversational Dialog Systems, ICASSP 2017.
5. TA for “Knowledge Modeling and Management”, Univ. of Toronto, 2007.
6. TA for “Data Modeling”, University of Toronto, 2006.
7. TA for “Decision Analysis”, University of Toronto, 2005.
8. TA Training Program, a year-long peer-training program, 2006.
9. Supervised 2 Undergraduate Students, University of Toronto, 2005-2006.
10. TA for “Database Design and Modeling with Oracle”, Seneca College, 2001.

## Interns Mentored

1. *Antoine Bosselut*, University of Washington, summer/winter 2017,2018  
Learning Neural Reward Functions for Text Generation.
2. *Amr Sharaf*, University of Maryland, summer 2018  
Learning from Multi-Agents via Imitation Learning
3. *Elizabeth Clark*, University of Washington, summer 2018  
Evaluation for Text Generation
4. *Dinghan Shen*, Duke University, summer 2018  
Hierarchical Latent Variable Models for Text Generation
5. *Xin Wang*, University of California, Santa Barbara, summer 2018  
Language Grounded Navigation
6. *Pedro Rodriguez*, University of Maryland, summer 2018  
Teaching machines to Teach with Guiding Questions
7. *Baolin Peng*, Chinese University of Hong Kong, winter 2017  
Dialog Policy Learning with Hierarchical Reinforcement Learning
8. *Joo-Kyung Kim*, Ohio State University, summer 2016  
Intent Classification using Semantically Enriched Word Embeddings
9. *Yangfeng Ji*, Georgia Tech, summer 2014  
Latent Variable Models of Intent Detection
10. *Young-Bum Kim*, University of Wisconsin, Madison, summer 2013  
Task Dependent Word Embeddings for Slot Filling in Conversational Understanding
11. *Aditya Bhargava*, University of Toronto, summer 2012  
Context Analysis for Conversational Dialog.
12. *Svitlana Volkova*, John Hopkins University, summer 2011  
Sentiment Analysis in Conversational Text

## Professional Activities

11. Transactions of ACL (TACL) Area Editor, selected in 2017-2019.
12. Elected SLTC Member, for the term of 2017-2020.
13. Senior Program Chair for AAAI 2019.
14. Senior Area Chair for Dialog and Interactive Systems for ACL 2018.
15. Area Chair for Discourse and Generation at IJCNLP 2017.
16. NIPS 2015 Workshop organizer: SLU and Interaction 1-day workshop.
17. Local Organization Chair of Spoken Language Technologies, SLT 2014.
18. Area Chair for Dialog and Interactive Systems at ACL 2014, NAACL 2016.
19. Co-Chair for the NAFIPS Soft Computing Conference in Berkeley, CA, 2012
20. Program Committee member for:
  - Association of Computational Linguistics (ACL) 2012-2018
  - North American Computational Linguistics (NAACL) 2010-2018
  - Special Interest Group on Discourse and Dialog (SIGDIAL) 2014
  - Int. Conf. on Computational Linguistics (COLING) 2014
  - Neural Information Processing Systems (NIPS) 2012-2018
  - Annual Conf. of the Int. Speech Communication Association, 2010-2016
  - IEEE Int. Conf. on Acoustics, Speech and Signal Processing (ICASSP) 2012-2013
  - IEEE Workshop on Spoken Language Technology, 2010-2014
2. Int. Conf. on Semantic Computing (ISCS) 2010-2013 - ACL Student Research Workshop and Mentorship 2013-2014.

## Research Projects

### 1. *Learning Hierarchical Structures on Variable Models @ Microsoft Research*

Lead a research project on long form generation for learning to plan. Some of the methods we work on includes hierarchical latent variable models to learn the plan vectors from the sequence of images and documents, learning topic sequences from language and vision. Ref: [ICLR 2019 (under review), AAAI 2019]

### 2. *Multi-Agent Imitation Learning @ Microsoft Research*

Build an imitation learning approach for the task of long text generation. The new approach distills the knowledge from the ensemble of “teacher” networks, which is then used as a dynamic oracle to build a smaller student network, which imitates the teacher’s behavior using Dagger imitation learning algorithm.

### 3. *Neural Methods for Structural Learning @ Microsoft Research*

Build novel approaches with deep reinforcement learning for long form text generation. Defined new neural metrics to evaluate semantic similarity of two long text (e.g., list of instructions, or a paragraph). Designed a new framework for using multi-agent learning for building sequence-to-sequence structural learning. Worked on hierarchically structured structural learning for decoding stories, which is a novel approach to define “planning” in creative writing task. Leading a special intern project 2018 project on Hierarchical Multi-Agent Learning methods for sequence to sequence learning. Ref: [NAACL 2018]

#### 4. *Reinforcement Learning for Dialog for Cortana @ Microsoft Research*

Worked with the Cortana Sciences team on the dialog language understanding models with the goal of building reinforcement learning based dialog policy learning system combined with a deep learning-based language understanding. Also advised Cortana team's LU scientists on building LU models using deeper NN architectures and they use my Deep Language Understanding Modelling code. Ref: [EMNLP 2017]

#### 5. *Language Understanding from Unstructured Text @ Microsoft Research*

Worked on automatic tools to convert unstructured data into machine readable and structured format. Implemented a new interactive learning approach, called scaffolding learning, that uses instructional scaffolding teaching for student neural agents by repetitive questioning, which systematically builds on students' experiences and knowledge as they are learning new 12 skills. This new deep architecture uses a dynamic memory and learns the information from the text through questioning analogous to scaffolding teaching. Our empirical results showed improvements over supervised learning methods proving the importance of using reinforcement learning for reasoning task. Ref: [arxiv preprint, 2017]

#### 6. *Deep Conversational Understanding @ Microsoft Bing*

Built a new end-to-end scalable conversational understanding tool using Tensorflow. Worked with a team of applied scientists and developers for embedding the neural models into the Bing's platform. Investigated scalable cold start modelling for Bing Query Understanding. Built and supported the query understanding models for handling 2016 Summer Olympics queries. Worked on neural models to improve and enrich common sense knowledge with rich context that is beyond-Ngrams. These features improved the prediction accuracy of the query understanding models in production. Ref: [SLT 2016][Interspeech 2016]

#### 7. *Referring Expression Resolution @ Microsoft Bing*

Built an entirely new locale independent on-screen item resolution model for Cortana. The tool is injected into the Cortana's Dialog pipeline as a new module. Also, built a feature engineering tool for finding similarity between an utterance and a subscript text item user sees on the X-Box or Cortana Screen. Extended the tool for other locales and languages. REF: [EMNLP 2014]

#### 8. *Multi-Lingual Multi-Turn Conversational Understanding @ Microsoft Bing*

Built a pipeline for building scalable conversational understanding (CU) model for different languages that uses joint features learnt from multi-language datasets as well as contextual information from dialog history. The CU models built through this pipeline are shipped as part of Xbox's Language expansion pipeline. Built a new annotator evaluation expert system extending Kappa. Ref: [MSR-Machine Learning-SUMMIT 2013]

#### 9. *Utterance Level Latent Context for Slot Filling @ Microsoft Bing*

Proposed a new framework for semantic template filling in a conversational understanding (CU) system. Our method decomposed the task into two steps: latent n-gram clustering using a semi-supervised latent Dirichlet allocation (LDA) and sequence tagging for learning

semantic structures in a CU system. This method is generic and theoretically sound mechanism for understanding natural language utterances that goes beyond local lexical features but rather enables longer dependencies using utterance level features for semantic tagging. Our context sensitive clustering approach naturally suggests semi- Markov CRF modeling, instead of linear CRF. REF: [ICASSP 2013]

#### *10. Joint Models for Spoken Language Understanding in Dialog @ Microsoft Bing*

Built a pipeline for joint structural learning for identifying user intents as well as semantic slots in natural language utterances. This approach defines relational priors on user intent, entities and semantic slots, which can be extracted from query click logs and knowledge graph are injected into the joint learner to enhance the natural language understanding task. Joint representations are used in Cortana's Language Understanding Models. REF: [ACL'13][ACL'12]

#### *11. New Intent Detection @ Microsoft Bing*

Developed an unsupervised approach to discover new user intents using Bayesian hierarchical models. In this model, search query click logs are used to provide implicit supervision and knowledge graph is used to extract and extend the relational information learnt from the model. This tool is used offline to capture hidden intents in user conversations in Cortana. We developed a toolkit for building conversational understanding models using semantic graphs. REF: [ICML'11][InterSpeech'13] [MSR-ML SUMMIT'13]

#### *12. Easy Dialog State Update Model for Multi-Domain Dialog System @ Microsoft Bing*

Built a model to learn to update current information state in a multi-domain dialog based on user responses. A simple and easily interpretable discriminative classification approach is used. This model is used in the Cortana Dialog Engine. REF: [Interspeech'12]

#### *13. Natural Language Query Detection @ Microsoft Bing*

Built an efficient statistical approach to filter web search queries to select the natural language like queries to boost language understanding. This model is shipped and embedding into the Cortana query classifier stack.

#### *14. Sentiment Analysis in User Utterances and Short Conversations @ Microsoft Bing*

Investigated visual language, both literal and sentimental, for building human computer interaction systems, i.e., build your own avatar via visual descriptions. The model I built uses our new dataset (publicly available) for learning the relationship between literal and semantic descriptions. [REF: NAACL'13]

#### *15. Multi-Document Summarization @ Microsoft and @ UC Berkeley*

Learning salient aspects of utterances to construct coherent and accurate summaries using various topic models. REF: [ACL'10]

#### *16. Question Answering and Textual Understanding @ UC Berkeley*

Semi-Supervised Graph-based approach to question answering via learning textual entailment relations from question and answer pairs, and propagating information onto the unlabeled search query-snippet pairs extracted from a search engine. REF: [ACL'09]

## Patents

- P1. Scaffolding Networks for Teaching and Learning Comprehension*  
Asli Celikyilmaz, Lihong Li, Chong Wang, Li Deng  
2017
- P2. Composite Task Completion Dialog System Via Hierarchical Deep RL*  
Jianfeng Gao, Asli Celikyilmaz, Sungjin Lee, Xiujun Li, Lihong Li, Baolin Peng  
2017
- P3. Knowledge-Guided Structural Attention Processing*  
Yun-Nung Chen, Dilek Hakkani-Tur, Gokhan Tur, Asli Celikyilmaz, J. Gao, et. al.  
2016
- P4. Multi-Domain Joint Semantic Frame Parsing*  
Dilek Hakkani-Tur, Asli Celikyilmaz, Yun-Nung Chen, Li Deng, Jianfeng Gao, Gokhan Tur, Ye-Yi Wang  
2016
- P5. Configurable Generic Language Understanding Models*  
Ruhi Sarikaya, Asli Celikyilmaz, Young-Bum Kim, Zhaleh Feizollahi, N. Ramesh, et.al  
2016
- P6. Discriminating Between Natural Language and Keyword Language Items*  
Gokhan Tur, Asli Celikyilmaz, Dilek Hakkani-Tur, Larry Heck  
2016
- P7. Language and Domain Independent Model Based Approach for On-Screen Item Selection*  
Asli Celikyilmaz, Zhaleh Feizollahi, Dilek Hakkani-Tur, Ruhi Sarikaya  
2015
- P8. Discriminating Between Natural Language and Keyword Language Items*  
Gokhan Tur, Asli Celikyilmaz, Dilek Hakkani-Tur, Larry Heck  
2014
- P9. Model based Approach for On-Screen Item Selection and Disambiguation*  
Ruhi Sarikaya, Asli Celikyilmaz, Zhaleh Feizollahi, Larry Heck, Dilek Hakkani-Tur  
2014
- P10. Contextual Language Understanding for Muti-Turn Language Tasks*  
Ruhi Sarikaya, Puyang Xu, Alexandre Rochette, Asli Celikyilmaz  
2014
- P11. Eye Gaze For Spoken Language Understanding in Multi-Modal Conversations*  
Anna Prokofieva, Asli Celikyilmaz, Dilek Hakkani-Tur, Larry Heck, Malcolm Slaney  
2014

- P12. *Model Based Approach for On-Screen Item Selection and Disambiguation*  
Ruhi Sarikaya, Asli Celikyilmaz, Zhaleh Feizollahi, Larry Heck, Dilek Hakkani-Tur  
2014
- P13. *Techniques for Inferring The Unknown Intents of Linguistic Items*  
Dilek Hakkani-Tur, Asli Celikyilmaz, Larry Heck, Gokhan Tur, Yangfeng Ji  
2014
- P14. *Discriminating Between Natural Language and Keyword Language Items*  
Gokhan Tur, Asli Celikyilmaz, Dilek Hakkani-Tur, Larry Heck  
2014
- P15. *Using Human Perception in Building Language Understanding Models*  
Ruhi Sarikaya, Anoop Deoras, Asli Celikyilmaz, Zhaleh Feizollahi  
2013
- P16. *Scaling Statistical Language Understanding Systems Across Domains and Intents*  
Ruhi Sarikaya, Anoop Deoras, Asli Celikyilmaz, Ravikiran Janardhana, Daniel Boies  
2013
- P17. *Building Multi-Language Processes From Existing Single-Language Processes*  
Ruhi Sarikaya, Daniel Boies, Asli Celikyilmaz, Anoop Deoras, Dustin Hillard, Dilek  
Hakkani Tur, Gokhan Tur, Fil Alleva  
2012
- P18. *Probability-Based State Modification For Query Dialogues*  
Dilek Hakkani-Tur, Gokhan Tur, Larry Heck, Ashley Fiddler, Asli Celikyilmaz  
2012
- P19. *Probability Based State Modification for Query Dialogues*  
Dilek Hakkani-Tur, Gokhan Tur, Larry Heck, Ashley Fidler, Fehtiye Asli Celikyilmaz  
2012
- P20. *Named entity variations for multimodal understanding systems*  
Dustin Hillard, Fethiye Asli Celikyilmaz, Dilek Hakkani-Tur, R. Iyer, Gokhan Tur  
2012
- P21. *Building Multi-Language Processes from Existing Single-Language Processes*  
Ruhi Sarikaya, Daniel Boies, Fethiye Asli Celikyilmaz, Anoop K. Deoras, Dustin Rigg  
Hillard, Dilek Z. Hakkani-Tur, Gokhan Tur, Fileno A. Alleva  
2012