

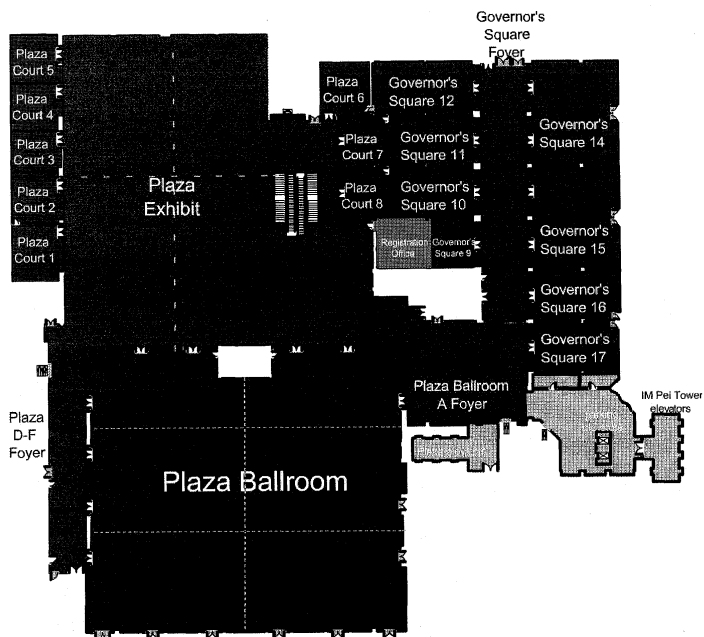
# EMNLP 2021

7th - 11th November  
Online & in the Dominican Republic

The 2021 Conference on  
Empirical Methods in  
Natural Language Processing

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**CONFERENCE HANDBOOK**



**CONCOURSE LEVEL**  
**LOBBY LEVEL**

*Cover by Nathan Cornille Handbook assembled by Els Lefever, Pranaydeep Singh and Loic  
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## Conference Information

### Message from the General Chair

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EMNLP 2021 is one of the first hybrid conferences in the field of natural language processing. It is also for us, the organizing team, uncharted domain. Organizing a hybrid conference has felt like organizing two conferences, a virtual one and an in-person one, which seamlessly must work together and with a kind of multi-task objective make the conference experience synergistic and successful both remotely and in person. With this challenge come opportunities. The hybrid format allows remote participation in a conference that is held onsite in Punta Cana, The Dominican Republic, and allows creating a real conference feeling for those who do not want to travel the many miles from the other side of the world and increase their carbon footprint, and for those who have budget restrictions for traveling. We welcome you all!

As in previous years, the purpose of the General Chairs preface is to express thanks to the amazing team of organizing chairs whose heroic efforts made this hybrid conference possible. The organizing team includes:

- The Programme Chairs – Xuanjing Huang, Lucia Specia and Scott Yih – who did a tremendous job to manage the reviewing process and set up an outstanding scientific program.
- The Senior Area Chairs, Area Chairs and Reviewers whose expertise enabled authors to learn from their reviews and to deliver papers that improved on their original submissions.
- The Demonstration Chairs – Heike Adel and Shuming Shi – who selected outstanding demonstrations to complement the program of the main conference.
- The Workshop Chairs – Minlie Huang and Parisa Kordjamshidi – who made a huge effort for organizing hybrid workshops and satellite conferences.
- The Publication Chairs – Loic Barrault, Greg Durrett and Yansong Feng – who met the challenge of identifying and correcting the myriad ways in which papers could be wrongly formatted, and who assembled the result into the conference proceedings.
- The Handbook Chair – Els Lefever – for the timely delivery of handbook information.

- The Publication Chairs of Findings – Gabriel Stanovsky and Tim Van de Cruys – who made it possible that many interesting papers and their findings can be accessed and cited by the public.
- The Tutorial Chairs – Jing Jiang and Ivan Vulic – who selected six excellent tutorials to be presented at the conference.
- The Ethics Chairs – Margot Mieskes and Christopher Potts – who undertook the delicate task of checking papers that had been flagged for potential ethical issues.
- The Website Chair – Miryam de Lhoneux – who ensured that the EMNLP 2021 website promoting this hybrid conference stayed up to date; Mingxiao Li who offered website support; and Nathan Cornille who was responsible for the graphical designs.
- The Virtual Infrastructure Chairs – Quinh Do, Zhaopeng Tu and Dani Yogatama – and the Underline team – Sol Rosenberg, Daniel Luise, Jernej Masnec, Luka Simic, Alexandru Pricop and various support staff.
- The Volunteer Coordinators and Scholarship Chairs – Qi Wu and Diyi Yang – who managed to attract over 200 student and early career volunteers willing to make EMNLP 2021 a success.
- The Publicity Chairs – Raffaella Bernardi and Preethi Jyothi – who have served as both the voice of EMNLP 2021 in communicating with the community and as its ears, reporting on community concerns as soon as they were expressed.
- The Diversity Inclusion Chairs – Laura Alonso Alemany and Toshiaki Nakazawa – who have worked tirelessly to make EMNLP 2021 as welcoming and inclusive as possible for all participants. They have worked with community members to create Birds of a Feather sessions, Affinity Group sessions, student panels and mentoring sessions which contribute to reinforcing the EMNLP community (and sub-groups within this community).

We also want to express special thanks to Priscilla Rasmussen, the ACL Business Manager, first for booking EMNLP 2021 into a beautiful resort in the Dominican Republic, and for the local organization of a hybrid conference. Many thanks, Priscilla!

Finally, we would like to express gratitude to our sponsors, whose generous support has been invaluable in building up EMNLP 2021 to what it is now. These include the Diamond-level sponsors – Apple, Bloomberg Engineering, Facebook AI and Google Research; the Platinum-level sponsors – Amazon Science, Baidu, ByteDance, DeepMind, G Research and Megagon Labs; the Gold-level sponsors – Grammarly and Microsoft; the Silver-level sponsors – duolingo, Naver and Naver Labs Europe; the Bronze-level sponsors – Adobe, Babelscape, human language technology center of excellence and LegalForce; and the Supporter servicenow. I would like to thank the Diversity and Inclusion Champion sponsors – Amazon Science, Deepmind, Google Research and Microsoft; the Diversity and Inclusion Ally sponsor – Morgan Stanley; and the Diversity and Inclusion Contributor sponsors – Adobe and IBM. ACL SIGDAT has also generously contributed to supporting scholarships for attending the conference.

*Marie-Francine Moens*, KU Leuven, Belgium  
EMNLP 2021 General Chair

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## Message from the Program Committee Co-Chairs

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Welcome to the EMNLP 2021, the first hybrid conference in EMNLPs history, which is to be held online and in Punta Cana, Dominican Republic.

EMNLP 2021 has received 3,717 full paper submissions, the largest number to date. After excluding papers withdrawn by the authors, and desk rejecting papers which violated the anonymity policy, the multiple submission policy, or the formatting requirements, we were left with 3,600 submissions to be sent out for review. Despite the record-breaking number of submissions, we were able to keep the acceptance rates at a similar level as past years. 841 submissions were accepted to the main conference. Among them, 315 were accepted as oral papers, and 526 were accepted as posters. The decision between oral and poster presentations was not based on the quality/merit of the papers, but on our understanding of what would be the best format for presentation of each individual paper.

We continued providing the acceptance option of “Findings”, following last years initiative in the form of a companion publication, for papers that narrowly missed acceptance to the main conference, but were judged to be solid, well-executed research, and worthy of publication. After the review process, 445 papers were invited to be included in the Findings. 26 papers declined the offer, leading to 419 papers to be published in the Findings. Some statistics of the accepted papers are shown below.

	Long	Short	Total
Reviewed	2,540	1,060	3,600
Accepted as Oral	249	66	315
Accepted as Poster	402	124	526
Acceptance Rate (Main Conference)	25.6%	17.9%	23.4%
Accepted to Findings	300	119	419

To meet the reviewer demands of a large conference, we organized the program committee into 22 tracks, including a special “Multidisciplinary and Area Chair Conflict of Interest” track, based on the track information in past conferences. We also introduced a new track called “Efficient methods for NLP” to promote work aiming to reduce the costs of NLP design and experimentation, similar to the “Green NLP” tracks in EACL 2021 and NAACL 2021. In terms of submissions per track, 9 tracks received more than 200 submissions. Particularly popular were the tracks NLP Applications, Machine Learning for NLP, Machine Translation and Information Extraction, which have around 300 submissions each.

We adopted a hierarchical program committee structure similar to that of recent NLP conferences. For each area, we invited 1-4 Senior Area Chair (SACs), who worked with a team of Area Chairs (ACs) they nominated, as well as an army of reviewers that we put together. We used the submission numbers per track from past conferences to estimate the number of SACs and ACs required for each track, leading to 46 SACs and 237 ACs. For reviewer recruitment, we started with the reviewer lists from past conferences and sent out initial invitations asking reviewers to express their track preferences. We then passed the reviewer list to SACs and asked them to select reviewers from these candidate reviewers based on their expertise, and Semantic/Google Scholar profiles. Overall, this resulted in a total of 3,112 reviewers.

Each submission was assigned to three reviewers and one AC. The initial paper assignment was first made using an automatic algorithm to match the abstracts with ACs/reviewers’ past publication records, then adjusted by SACs/PCs. We adapted the review forms from EMNLP 2020, NAACL 2021, and ACL-IJCNLP 2021. Besides the overall recommendation, reviewers were asked to evaluate how reproducible the results in the paper were, and whether there was any ethical concern. Our final decisions were made not just on the review scores, but also took into account the reviews, author responses, discussions among reviewers, meta-reviews and S(AC) recommendations. To ensure the review quality, we provided detailed guidelines about what reviewers should and shouldn’t do in a review.

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We also formed an Ethics Committee (EC) dedicated to ethical issues. 203 papers with ethical concerns raised by the technical reviewing committee were sent to the EC. The EC chairs went over the papers to determine whether a full EC review would be required. If so, the paper received one or two ethics reviews from additional reviewers recruited by the EC chairs. For any paper that was recommended to be accepted based on technical reviews and that had been referred to the EC, the EC chairs recommended one of the following to the PC chairs: (a) accept (12 EMNLP, 11 Findings), (b) conditionally accept (the ethical issues must be addressed in the camera-ready version; 17 EMNLP, 20 Findings), and (c) reject due to ethical issues (1 paper). The authors of all conditionally accepted papers (except 1 paper declining the Findings offer) submitted the camera-ready version and a short response that explained how they had made the changes requested by the EC meta-reviews. The EC chairs double-checked these revised submissions and responses, and confirmed that the ethical concerns had been addressed. As a result, all conditionally accepted papers were accepted to the main conference or Findings.

ACL Rolling Review (ARR) is a new initiative of the Association for Computational Linguistics, where the reviewing and acceptance of papers to publication venues is done in a two-step process: (1) centralized rolling review and (2) submission to a publication venue. Working closely with the ARR organizers, we ran a pilot at EMNLP 2021. 17 papers (16 long, 1 short) were submitted via ARR to EMNLP 2021, accounting for 25% of the ARR May submissions. After the decision process involving only PCs and SACs, 6 papers (5 long, 1 short) were accepted to the main conference, among which 2 papers were accepted orally. The other 5 long papers were accepted to the Findings. These papers will be published in the respective proceedings as any other EMNLP/Findings paper.

Based on the nominations from SACs and ACs, we identified 21 candidates for the best papers and outstanding papers award. These papers are assessed by the Best Paper Award Committee. The award winners will be announced at the closing ceremony. EMNLP 2021 will also feature 28 papers accepted by the Transactions of the Association for Computational Linguistics (TACL) and 7 papers from the journal of Computational Linguistics (CL), out of which 29 will be presented as orals and 6 as posters. Another highlight of our program is the three exciting keynote talks, presented by Professor Ido Dagan from Bar-Ilan University, entitled “Where next? Towards multi-text consumption via three inspired research lines”, Professor Steven Bird from Charles Darwin University, entitled “LT4All!? Rethinking the Agenda”, and Professor Evelina Fedorenko from Massachusetts Institute of Technology, entitled “The language system in the human brain”.

There are many people we would like to thank for their significant contributions. EMNLP 2021 would not be possible without their support:

- Our General Chair, Marie-Francine Moens, who has led the whole organizing team, and helped with many of our decision processes;
- 46 SACs who have helped us comprehensively throughout the entire review process, from recruiting ACs and reviewers, assigning papers, checking review quality, making recommendation on final paper decisions, suggesting presentation formats, to recommending best paper candidates; special thanks to Jesse Dodge, who advocated to set up the “Efficient methods for NLP” track, volunteered to serve as the SAC, and helped us update the Reproducibility Checklist to encourage authors to report the computational budget for the experiments in their paper;
- 237 ACs who checked the initial submissions, led paper discussions, wrote meta reviews, ensured review quality, suggested best paper candidates, and recommended outstanding reviewers;

- 3,112 reviewers, 369 secondary reviewers for reviewing papers and actively participating in paper discussions; special thanks to those who stepped in at the last minute to serve as emergency reviewers;
- 35 Ethics Committee members, chaired by Margot Mieskes and Chris Potts, for their hard work to provide ethical reviews and meta-reviews for all papers with serious ethical issues, and ensure that all the conditionally accepted papers have addressed the ethical issues appropriately in a very tight schedule;
- Best Paper Award Committee: Luke Zettlemoyer (chair), Raffaella Bernardi, Mikel L. Forcada, Pascale Fung, Jianfeng Gao, Min Yen KAN, Heng Ji, Mausam, and Ivan Titov, for selecting best papers and outstanding papers under a tight schedule.
- Our postdoc and student assistants Fernando Alva-Manchego, Zichu Fei, Yiding Tan, Yongxin Zhang and Xingwu Hu, who helped with the initial reviewer assignment, anonymity, multiple submission and format checking;
- Past \*ACL PCs, including Trevor Cohn, Yulan He and Yang Liu (EMNLP 2021), Fei Xia, Wenjie Li, Roberto Navigli (ACL-IJCNLP 2021), and Anna Rumshisky, Luke Zettlemoyer and Dilek Hakkani-Tur (NAACL 2021) for all the useful guidance, tips and suggestions on the organization of NLP conferences;
- ARR Editors-in-chief Pascale Fung, Goran Glava?, Sebastian Riedel, Amanda Stent, and CTO Graham Neubig, for their support in running the first ARR pilot, and providing the code for reviewer COI detection and paper assignment;
- Publication Chairs Loic Barrault, Greg Durrett and Yansong Feng, and Findings Chairs Gabriel Stanovsky and Tim Van de Cruys, for completing the final proceedings within a short period;
- ACL Anthology Director Matt Post, for his help in the production of the conference proceedings;
- TACL editors-in-chief Mark Johnson, Ani Nenkova, and Brian Roark, TACL Editorial Assistant Cindy Robinson, and CL Editor-in-Chief Hwee Tou Ng for coordinating TACL and CL presentations with us;
- Workshop Chair Parisa Kordjamshidi and Minlie Huang, for connecting Findings paper authors with workshop organizers for possible presentations.
- Publicity Chairs Raffaella Bernardi and Preethi Jyothi, Website Chair Miryam de Lhoneux, and Website Support Mingxiao Li, who announced conference news on EMNLP Website and social media, collected feedback from the community, and disseminated EMNLP papers with potential public interests via media;
- Rich Gerber at SoftConf, who set up the EMNLP conference site, and was always quick to respond to our emails and resolve any problems we encountered with the START system;
- Sol Rosenberg, Daniel Luise and the whole Underline team, for creating the virtual site for the conference and helping put the hybrid program in place;
- Virtual Infrastructure Chairs Zhaopeng Tu, Dani Yogatama and Quynh Do, who have made the virtual part of the conference possible;
- Els Lefever for preparing the conference handbook;

## *Message from the Program Committee Co-Chairs*

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- Priscilla Rasmussen and members of the Local Organizing Committee, for various discussions on organizing EMNLP, and making the local arrangements for a hybrid conference;
- SIGDAT board members, Iryna Gurevych, Hang Li, Mona Diab and Chin-Yew Lin, for their guidance regarding various decisions;
- The entire EMNLP organizing committee, who have worked together to make EMNLP a success;
- 19,272 authors for submitting their work to EMNLP 2021.

Our deepest gratitude to all of you. We hope you will enjoy the hybrid conference experience.

EMNLP 2021 Program Co-Chairs

*Xuanjing Huang*, Fudan University  
*Lucia Specia*, Imperial College London  
*Scott Wen-tau Yih*, Facebook

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Lucia Specia, Imperial College London

Scott Wen-tau Yih, Facebook

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Christopher Potts, Stanford University

### **Student Volunteer Coordinator and Scholarship Chairs**

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## Program Committee

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### Program Committee Co-chairs

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Minjoon Seo, KAIST  
Pontus Stenetorp, University College London  
Alon Talmor, Allen Institute for AI, Tel-Aviv University

*Resources and Evaluation*

Yvette Graham, ADAPT, Trinity College Dublin (senior chair)  
Barbara Plank, IT University of Copenhagen  
Ines Rehbein, University of Mannheim  
Maja Popovic, ADAPT, Dublin City University  
Gerasimos Lampouras, Huawei Noahs Ark Lab  
Markus Freitag, Google Research  
Simon Mille, Pompeu Fabra University  
Ajay Nagesh, DiDi Labs  
Gareth Jones, Dublin City University

*Semantics: Lexical, Sentence level, Textual Inference and Other areas*

Tim Baldwin, The University of Melbourne (senior chair)  
Sonal Gupta, Facebook (senior chair)  
James Henderson, Idiap Research Institute (senior chair)  
Marianna Apidianaki, University of Helsinki  
Wai Lam, The Chinese University of Hong Kong  
Jey Han Lau, The University of Melbourne  
Mike Lewis, Facebook AI Research  
Koji Mineshima, Keio University  
Nafise Sadat Moosavi, UKP Lab, Technische Universität Darmstadt  
Naoaki Okazaki, Tokyo Institute of Technology  
Tommaso Pasini, University of Copenhagen

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Panupong Pasupat, Google  
Michael Roth, University of Stuttgart  
Swabha Swayamdipta, University of Washington  
Aline Villavicencio, University of Sheffield, UK  
Ivan Vulic, University of Cambridge  
Diyi Yang, Georgia Institute of Technology  
Yi Zhang, Amazon AI

*Sentiment Analysis, Stylistic Analysis, and Argument Mining*

Veronique Hoste, LT3, Ghent University (senior chair)  
Yue Zhang, Westlake University (senior chair)  
Lidong Bing, Alibaba DAMO Academy  
Cristina Bosco, Dipartimento di Informatica - Università di Torino  
Eric Cambria, Nanyang Technological University  
Orphé De Clercq, LT3, Ghent University  
Ivan Habernal, Technische Universität Darmstadt  
Roman Klingner, University of Stuttgart  
Anh Tuan Luu, NTU  
Soujanya Poria, Singapore University of Technology and Design  
Zhiyang Teng, Westlake University  
Zhongqing Wang, Soochow University  
Zhongyu Wei, School of Data Science, Fudan University  
Meishan Zhang, Tianjin University, China

*Speech, Vision, Robotics, Multimodal Grounding*

Hung-yi Lee, Westlake University (senior chair)  
Pranava Madhyastha, City, University of London (senior chair)  
Yonatan Bisk, Carnegie Mellon University  
Christian Fügen, Facebook AI  
David Harwath, The University of Texas at Austin  
Lisa Ann Hendricks, DeepMind  
Chiori Hori, Mitsubishi Electric Research Laboratories (MERL)  
Douwe Kiela, Facebook  
Florian Metze, Carnegie Mellon University  
Tara Sainath, Google, Inc.  
Radu Soricut, Google LLC  
William Wang, University of California, Santa Barbara

*Summarization*

Xiaojun Wan, Peking University (senior chair)  
Lu Wang, University of Michigan (senior chair)  
Giuseppe Carenini, university of british columbia  
Michael Elhadad, Ben Gurion University  
Pengfei Liu, Carnegie Mellon University  
Shashi Narayan, Google  
Manabu Okumura, Tokyo Institute of Technology  
Jessica Ouyang, University of Texas at Dallas  
Maxime Peyrard, EPFL  
Caiming Xiong, Salesforce  
Rui Zhang, Penn State University

*Syntax: Tagging, Chunking and Parsing*

Wanxiang Che, Harbin Institute of Technology (senior chair)  
Liang Huang, Oregon State University and Baidu Research

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Zhenghua Li, Soochow University  
Weiwei Sun, University of Cambridge  
Kewei Tu, ShanghaiTech University  
Anders Søgaard, University of Copenhagen

*Multidisciplinary and AC COI*

Diana Inkpen, University of Ottawa (senior chair)  
Lluís Màrquez, Amazon SSI (senior chair)  
Cecilia Alm, Rochester Institute of Technology  
Paul Cook, University of New Brunswick  
Zornitsa Kozareva, Facebook AI  
German Rigau, UPV/EHU

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## Meal Info

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The following meals are provided as part of your registration fee:

- A full buffet breakfast will be provided each day in the Plaza Exhibit (foyer)
- Mid-Morning breaks include coffee and tea in the Plaza Exhibit (foyer)
- Mid-Afternoon breaks include coffee, tea, soda, water, and snacks in the Plaza Exhibit (foyer)
- A full dinner buffet is provided during the poster sessions on Monday and Tuesday evenings in the Plaza Exhibit (foyer)

Lunch is provided for students on Monday, but you are otherwise on your own.

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## Tutorials: Wednesday, November 10

### Overview

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9:00 – 12:30 **Morning Tutorials**

**tutorial-final-01**  
**tutorial-final-01**

*Governor's Square 15*

**tutorial-final-02**  
**tutorial-final-02**

*Governor's Square 15*

**tutorial-final-03**  
**tutorial-final-03**

*Governor's Square 15*

10:30 – 11:00 **Coffee break**

## Tutorial 1

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### tutorial-final-01

#### tutorial-final-01

Wednesday, November 10, 2021, 9:00–12:30pm

Governor's Square 15

Crowdsourcing from non-experts is one of the most common approaches to collecting data and annotations in NLP. It has been applied to a plethora of tasks, including question answering, instruction following, visual reasoning, and commonsense reasoning. Even though it is such a fundamental tool, crowdsourcing use is largely guided by common practices and the personal experience of researchers. Developing a theory of crowdsourcing use for practical language problems remains an open challenge. However, there are various principles and practices that have proven effective in generating high quality and diverse data. The goal of this tutorial is to expose NLP researchers to such data collection crowdsourcing methods and principles through a detailed discussion of a diverse set of case studies.

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**Alane Suhr** is a PhD student at Cornell University who's research focuses on grounded natural language understanding. Alane has designed crowdsourcing tasks for collecting language data to study situated natural language understanding. Alane co-presented a tutorial in ACL 2018.

**Clara Vania** is an applied scientist at Amazon. Her research focuses on crowdsourcing, transfer learning, and multilingual NLU. Recently, she has been working on semi-automatic data collection for natural language inference and crowdsourcing methods for question answering.

**Nikita Nangia** is a PhD student at New York University. Nikita's work focuses on crowdsourcing methods and data creation for natural language understanding. Her recent work explores using incentive structures to illicit creative examples. Nikita co-organized a tutorial on latent structure models for NLP at ACL 2019.

**Maarten Sap** is a PhD student at the University of Washington. His research focuses on endowing NLP systems with social intelligence and social commonsense, and understanding social inequality and bias in language. His substantial experience with crowdsourcing includes the collecting of the SOCIALIQA commonsense benchmark as well as the creation of knowledge graphs with inferential knowledge (ATOMIC, Social Bias Frames).

**Mark Yatskar** is an assistant professor at the University of Pennsylvania. His research focuses on the intersection of natural language processing and computer vision. Mark's work has resulted in the creation of datasets such as imSitu, QuAC and WinoBias and recent research has focused on gender bias in visual recognition and coreference resolution.

**Sam Bowman** is an assistant professor at New York University. Sam works on data creation, benchmarking, and model analysis for NLU and computational linguistics. Sam has had a substantial role in several NLU datasets, including SNLI, MNLI, XNLI, CoLA, and BLiMP, and his recent work has focused on experimentally evaluating methods for crowdsourced corpus construction.

**Yoav Artzi** is an associate professor at Cornell University. Yoav's research focuses on learning expressive models for natural language understanding, most recently in situated interactive scenarios. Yoav led tutorials on semantic parsing in ACL 2013, EMNLP 2014 and AAAI 2015.

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## Tutorial 2

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### tutorial-final-02

#### tutorial-final-02

Wednesday, November 10, 2021, 9:00–12:30pm

Governor's Square 15

In this tutorial, we disassemble a financial opinion into 12 components. This tutorial starts by introducing the components one by one and introduces the related studies from both NLP technical aspects and the real-world applications. Besides, in the FinTech trend, financial service gets much attention from the financial industry. However, few studies discuss the opinion toward financial service. In this tutorial, we will also introduce this kind of opinion and provide a comparison with the opinion of investors and customer's opinions in other industries. Several unexplored research questions will be proposed. The audiences of this tutorial will gain

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**Chung-Chi Chen** is a postdoctoral researcher at the MOST Joint Research Center for AI Technology and All Vista Healthcare, Taiwan. He got the Ph.D. degree in the Department of Computer Science and Information Engineering at National Taiwan University. He received the M.S. degree in Quantitative Finance from National Tsing Hua University, Taiwan. His research focuses on opinion mining and sentiment analysis in finance. He is the organizer of FinNum shared task series in NTCIR (2018-2022) and the FinNLP workshop series in IJCAI (2019-2021). He is the presenter of the AACL-2020 "Natural Language Processing in Financial Technology Applications" tutorial and the presenter of the EMNLP-2021 "Financial Opinion Mining" tutorial. His work has been published in ACL, WWW, SIGIR, IJCAI, and CIKM, and served as PC members in ACL, AAAI, EMNLP, CIKM, and WSDM. He won the 1st prize in both the Jih Sun FinTech Hackathon (2019) and the Standard Chartered FinTech competition (2018), and the 2nd prize in both the Jih Sun FinTech Hackathon (2018) and the E.SUN FHC FinTech Hackathon (2017).

**Hen-Hsen Huang** is an assistant research fellow at the Institute of Information Science, Academia Sinica, Taiwan. His research interests include natural language processing and information retrieval. His work has been published in ACL, SIGIR, WWW, IJCAI, CIKM, COLING, and so on. Dr. Huang received the Honorable Mention of Doctoral Dissertation Award of ACLCLP in 2014 and the Honorable Mention of Master Thesis Award of ACLCLP in 2008. He served as the registration chair of TAAI 2017, the publication chair of ROCLING 2020, and as PC members of representative conferences in computational linguistics including ACL, COLING, EMNLP, and NAACL. He was one of organizers of FinNum Task at NTCIR and FinNLP Workshop at IJCAI.

**Hsin-Hsi Chen** is a professor in the Department of Computer Science and Information Engineering, National Taiwan University. He was conference chair of IJCNLP 2013, program co-chair of ACM SIGIR 2010, senior PC member of ACM SIGIR 2006, 2007, 2008 and 2009, area/track chair of AAAI 2020, EMNLP 2018, ACL 2012, ACL-IJCNLP 2009 and ACM CIKM 2008, and PC member of many conferences (IJCAI, SIGIR, WSDM, ACL, COLING, EMNLP, NAACL, EACL, IJCNLP, WWW, and so on). He will be conference chair of ACM SIGIR 2023. He received Google research awards in 2007 and 2012, MOST Outstanding Research Award in 2017, and the AmTRAN Chair Professorship in 2018.

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an overview of financial opinion mining and figure out their research directions based on the proposed research agenda.

## Tutorial 3

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### **tutorial-final-03**

#### **tutorial-final-03**

Wednesday, November 10, 2021, 9:00–12:30pm

Governor's Square 15

Knowledge-enriched text generation poses unique challenges in modeling and learning, driving active research in several core directions, ranging from integrated modeling of neural representations and symbolic information in the sequential/hierarchical/graphical structures, learning without direct supervisions due to the cost of structured annotation, efficient optimization and inference with massive and global constraints, to language grounding on multiple modalities, and generative reasoning with implicit commonsense knowledge and background knowledge. In this tutorial we will present a roadmap to line up the state-of-the-art methods to tackle these challenges on this cutting-edge problem. We will dive deep into various technical components: how to represent knowledge, how to feed knowledge into a generation model, how to evaluate generation results, and what are the remaining challenges?

**Wenhao Yu** is a Ph.D. student in the Department of Computer Science and Engineering at the University of Notre Dame. His research lies in controllable knowledge-driven natural language processing, particularly in natural language generation. His research has been published in top-ranked NLP and data mining conferences such as ACL, EMNLP, AAAI, WWW, and CIKM. Additional information is available at <https://wyu97.github.io/>.

**Meng Jiang** is an assistant professor in the Department of Computer Science and Engineering at the University of Notre Dame. He received his B.E. and Ph.D. in Computer Science from Tsinghua University and was a postdoctoral research associate at the University of Illinois at Urbana-Champaign. His research interests focus on knowledge graph construction and natural language generation for news summarization and forum post generation. The awards he received include Notre Dame Faculty Award in 2019 and Best Paper Awards at ISDSA and KDD-DLG in 2020. Additional information is available at <http://www.meng-jiang.com/>.

**Zhiting Hu** is an assistant professor in Halicioğlu Data Science Institute at UC San Diego. He received his Ph.D. in Machine Learning from Carnegie Mellon University. His research interest lies in the broad area of natural language processing in particular controllable text generation, machine learning to enable training AI agents from all forms of experiences such as structured knowledge, ML systems and applications. His research was recognized with best demo nomination at ACL 2019 and outstanding paper award at ACL 2016. Additional information is available at <http://www.cs.cmu.edu/?zhitingh/>.

**Qingyun Wang** is a Ph.D. student in the Computer Science Department at the University of Illinois at Urbana-Champaign. His research lies in controllable knowledge-driven natural language generation, with a recent focus on the scientific paper generation. He served as a program committee in generation track for multiple conferences including ICML 2020, ACL 2019-2020, ICLR 2021, etc. He previously entered the finalist of the first Alexa Prize competition. Additional information is available at <https://eaglew.github.io/>.

**Heng Ji** is a professor at Computer Science Department of University of Illinois at Urbana-Champaign, and Amazon Scholar. She has published on Multimedia Multilingual Information Extraction and Knowledge-enriched NLG including technical paper generation, knowledge base description, and knowledge-aware image and video caption generation. The awards she received include “Young Scientist” by World Economic Forum, “AIÖs 10 to Watch” Award by IEEE Intelligent Systems, NSF CAREER award, and ACL 2020 Best Demo Award. She has served as the Program Committee Co-Chair of many conferences including NAACL-HLT2018, and she is NAACL secretary 2020-2021. Additional information is available at <https://blender.cs.illinois.edu/hengji.html>.

**Nazneen Rajani** is a senior research scientist at Salesforce Research. She got her PhD in Computer Science from UT Austin in 2018. Several of her work has been published in ACL, EMNLP, NACCL, and IJCAI including work on generating explanations for commonsense and physical reasoning. Nazneen was one of the finalists for the VentureBeat Transform 2020 women in AI Research. Her work has been covered by several media outlets including Quanta Magazine, VentureBeat, SiliconAngle, ZDNet. More information on <https://www.nazneenrajani.com>.

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## Tutorials: Thursday, November 11

### Overview

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9:00 – 12:30 **Morning Tutorials**

**tutorial-final-04**

*Governor's Square 15*

**tutorial-final-04**

**tutorial-final-05**

*Governor's Square 15*

**tutorial-final-05**

**tutorial-final-06**

*Governor's Square 15*

**tutorial-final-06**

## Tutorial 4

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### tutorial-final-04

#### tutorial-final-04

Thursday, November 11, 2021, 9:00–12:30pm

Governor's Square 15

Question answering (QA) is one of the most challenging and impactful tasks in natural language processing. Most research in QA and tutorials, however, has focused on the open-domain or monolingual setting while most real-world applications deal with specific domains or languages. In this tutorial, we attempt to bridge this gap. Firstly, we introduce standard benchmarks in multi-domain and multilingual QA. In both scenarios, we discuss state-of-the-art approaches that achieve impressive performance by either zero-shot learning or out-of-the-box training on open (and closed)-domain QA systems. Finally, we will present open research problems that this new research agenda poses such as multi-task learning, cross-lingual transfer learning, domain adaptation and training large scale pre-trained multilingual language models.

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**Sebastian Ruder** is a research scientist at DeepMind where he works on transfer learning and multilingual natural language processing. He has been area chair in machine learning and multilinguality for major NLP conferences including ACL and EMNLP and has published papers on multilingual question answering (Artetxe et al., 2020; Hu et al., 2020). He was the Co-Program Chair for EurNLP 2019 and has co-organized the 4th Workshop on Representation Learning for NLP at ACL 2019. He has taught tutorials on “Transfer learning in natural language processing” and “Unsupervised Cross-lingual Representation Learning” at NAACL 2019 and ACL 2019 respectively. He has also co-organized and taught at the NLP Session at the Deep Learning Indaba 2018 and 2019.

**Avirup Sil** is a Research Scientist and the Team Lead for Question Answering in the Multilingual NLP group at IBM Research AI. His team (comprising of research scientists and engineers) works on research on industry scale NLP and Deep Learning algorithms. His team's system called ‘GAAMA’ has obtained the top scores in public benchmark datasets (Kwiatkowski et al., 2019) and has published several papers on question answering (Chakravarti et al., 2019; Castelli et al., 2020; Glass et al., 2020). He is also the Chair of the NLP professional community of IBM. Avi is a Senior Program Committee Member and the Area Chair in Question Answering for major NLP conferences e.g. ACL, EMNLP, NAACL and has published several papers on Question Answering. He has taught a tutorial at ACL 2018 on “Entity Discovery and Linking”. He has also organized the workshop on the “Relevance of Linguistic Structure in Neural NLP” at ACL 2018. He is also the track coordinator for the Entity Discovery and Linking track at the Text Analysis Conference.

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## Tutorial 5

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### tutorial-final-05

#### tutorial-final-05

Thursday, November 11, 2021, 9:00–12:30pm

Governor's Square 15

Recent studies show that many NLP systems are sensitive and vulnerable to a small perturbation of inputs and do not generalize well across different datasets. This lack of robustness derails the use of NLP systems in real-world applications. This tutorial aims at bringing awareness of practical concerns about NLP robustness. It targets NLP researchers and practitioners who are interested in building reliable NLP systems. In particular, we will review recent studies on analyzing the weakness of NLP systems when facing adversarial inputs and data with a distribution shift. We will provide the audience with a holistic view of 1) how to use adversarial examples to examine the weakness of NLP models and facilitate debugging; 2) how to enhance the robustness of existing NLP models and defense against adversarial inputs; and 3) how the consideration of robustness affects the real-world NLP applications used in our daily lives. We will conclude the tutorial by outlining future research directions in this area.

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**Kai-Wei Chang** is an assistant professor in the Department of Computer Science at the University of California Los Angeles. His research interests include designing robust, fair, and accountable machine learning methods for building reliable NLP systems (e.g., Alzantot et al., 2018; Shi et al., 2019). His awards include the EMNLP Best Long Paper Award (2017), the KDD Best Paper Award (2010), and the Sloan Research Fellowship (2021). Kai-Wei has given tutorials at NAACL 15, AAAI 16, FAccT18, EMNLP 19, AAAI 20, MLSS 21 on different research topics. Additional information is available at <http://kwchang.net>.

**He He** is an assistant professor in the Department of Computer Science and the Center for Data Science at the New York University. Her research interests include reliable natural language generation and robust learning algorithms that avoid spurious correlations in the data (e.g., He et al., 2019; Tu et al., 2020). She has given tutorials at NAACL 15 and EMNLP 19. Additional information is available at <http://hhexiy.github.io>.

**Robin Jia** is currently a visiting researcher at Facebook AI Research, and will be an assistant professor in the Department of Computer Science at the University of Southern California starting in the Autumn of 2021. His research focuses on making natural language processing models robust to unexpected test-time distribution shifts (e.g., Jia and Liang, 2017; Jia et al., 2019). Robin's work has received an Outstanding Paper Award at EMNLP 2017 and a Best Short Paper Award at ACL 2018. Additional information is available at <https://robinjia.github.io>.

**Sameer Singh** is an Assistant Professor of Computer Science at the University of California, Irvine. He is working on large-scale and interpretable machine learning models for NLP (e.g., Wallace et al., 2019a; Pezeshkpour et al., 2019). His work has received paper awards at ACL 2020, AKBC 2020, EMNLP 2019, ACL 2018, and KDD 2016. Sameer presented the Deep Adversarial Learning Tutorial (Wang et al., 2019) at NAACL 2019 and the Mining Knowledge Graphs from Text Tutorial at WSDM 2018 and AAAI 2017, along with tutorials on Interpretability and Explanations in upcoming NeurIPS 2020 and EMNLP 2020. Sameer has also received teaching awards at UCI. Website: <http://sameersingh.org/>.

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## Tutorial 6

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### tutorial-final-06

#### tutorial-final-06

Thursday, November 11, 2021, 9:00–12:30pm

Governor's Square 15

This tutorial surveys the latest technical progress of syntactic parsing and the role of syntax in end-to-end natural language processing (NLP) tasks, in which semantic role labeling (SRL) and machine translation (MT) are the representative NLP tasks that have always been beneficial from informative syntactic clues since a long time ago, though the advance from end-to-end deep learning models shows new results. In this tutorial, we will first introduce the background and the latest progress of syntactic parsing and SRL/NMT. Then, we will summarize the key evidence about the syntactic impacts over these two concerning tasks, and explore the behind reasons from both computational and linguistic background.

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**Hai Zhao** is a professor at the Department of Computer Science and Engineering, Shanghai Jiao Tong University, China. His research interest is natural language processing. He has published more than 120 papers in ACL, EMNLP, COLING, ICLR, AAAI, IJCAI, and IEEE TKDE/TASLP. He won the first place in several NLP shared tasks, such as CoNLL and SIGHAN Bakeoff and top ranking in remarkable machine reading comprehension task leaderboards such as SQuAD2.0 and RACE. He has taught the course “natural language processing” in SJTU for more than 10 years. He is ACL-2017 area chair on parsing, and ACL- 2018/2019 (senior) area chairs on morphology and word segmentation.

**Rui Wang** is a tenured researcher at the Advanced Translation Technology Laboratory, National Institute of Information and Communications Technology (NICT), Japan. His research focuses on machine translation (MT), a classic task in NLP. His recent interests are traditional linguistic based and cutting-edge machine learning based approaches for MT. He (as the first or the corresponding authors) has published more than 30 MT papers in top-tier NLP/ML/AI conferences and journals, such as ACL, EMNLP, ICLR, AAAI, IJCAI, IEEE/ACM transactions, etc. He has also won several first places in top-tier MT shared tasks, such as WMT- 2018, WMT-2019, WMT-2020, etc. He has given several tutorial and invited talks in conferences, such as CWMT, CCL, etc. He served as the area chairs of ICLR-2021 and NAACL- 2021.

**Kehai Chen** is a postdoctoral researcher at the Advanced Translation Technology Laboratory, National Institute of Information and Communications Technology (NICT), Japan. His research focuses on linguistic-motivated machine translation (MT), a classic NLP task in AI. He has published more than 20 MT and NLP papers in top-tier NLP/ML/AI conferences and journals, such as ACL, ICLR, AAAI, EMNLP, IEEE/ACM Transactions on Audio, Speech, and Language Processing, ACM Transactions on Asian and Low-Resource Language Information Processing, etc. He served as a senior program committee of AAAI-2021.

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## **Welcome Reception**

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Thursday, November 11, 2021, 6:00pm – 9:00pm

Sheraton Denver Downtown Hotel (conference venue)  
Foyer

Catch up with your colleagues at the **Welcome Reception!** It will be held immediately following the Tutorials on Thursday, November 11 at 6:00pm in the Plaza Exhibit (foyer) of the Sheraton Denver Downtown Hotel (the conference venue). Refreshments and a light dinner will be provided, and a cash bar will be available.

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