

ICON 2022

**International Conference on Natural Language Processing**

**Proceedings of the Conference**

December 15-18, 2022

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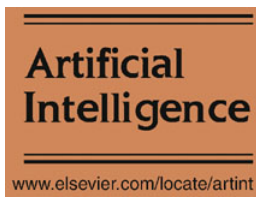


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## Introduction

There has been a distinct upward trend within NLP and allied areas, primarily since the recent advent of Large Language Models (LLM). The astounding availability of large amounts of information and data has spurred this evolution. This has made developing language technologies for Indian languages quite amenable, with exponential monolingual and multilingual data being constantly added across the web. Similar adoption of LLM-based NLP solutions aimed at complex use cases like multilingual chatbots and sentiment analysis for social media discourses is in demand by businesses across industries. Another prominent application that has predominantly captured the technology market space is text-based search in non-Anglophonic languages. An example of increased industrial adoption is accelerating state-of-the-art development in prominent research areas including searching, information extraction, sentiment analysis, and question-answering capabilities for low-resource languages.

The pursuit of solutions to the current existent challenges has led various players across the industry and academia to nurture their research ecosystem right from the funding stage, leading up to tech transfer and adoption. This has facilitated reviewing the tractability of complex use cases that would have been considered a distant dream until a few years ago. Various startups have started venturing into businesses that tread NLP space for applications like multilingual conversation analysis, transcription, and conversational platforms. Similarly, government agencies, institutions, and industry stakeholders have started building consortia-like collaborations that work towards common large-scale objectives involving linguistic and user studies, dataset building, investigation setup design, etc. Leveraging the scope that NLP and allied areas project within the context of Indian research and development, more and more undergraduate and graduate students have started to demonstrate keenness within these areas.

Higher participation, reverberating enthusiasm, and engagement amongst researchers from academia and industry alike have resulted in greater standardization and seamless cross-technology development. The effect can be uniformly seen gaining momentum across various NLP research initiatives, especially across Indian languages. This is also evident in the submissions received as part of ICON-2022, which pertained to knowledge integration, code-mixing, semantic structure, and sentiment analysis within unsupervised and meta-learning frameworks. Recently, advancement in this field has been observed due to the increased accessibility and development of several linguistic resources and rich corpora for Indian languages. This also encourages contemplating language agnostic representation learning and language modeling capabilities. Through such collaborative efforts, it is apt to envision technological advancements that will cater not only to the Indian NLP area but the whole world.

These conference proceedings embody papers selected for presentation in technical sessions of ICON-2022. We thank our excellent reviewers from across different parts of the world, for maintaining the highest of standards in critically assessing the quality of . Out of 101 submissions, a total of 40 papers were accepted. Amongst these, 28 were long papers and 12 were short papers, representing diverse, novel and insightful research findings and encompassing a broad spectrum of topics within NLP and linguistics. In addition, the conference featured multiple engaging presentations – 7 tutorials, 5 workshops, and 1 shared task.

We are grateful to Prof. Tim Baldwin, MBZUAI (Abu Dhabi), Prof. Maria Liakata, Queen Mary University of London, and Prof. Pascale Fung, Hong Kong University of Science Technology for honoring us with their keynote lectures at ICON-2022.

We thank all the area chairs at ICON-2022, especially Pushpak Bhattacharyya, Tirthankar Dasgupta, So-bha L, Vasudeva Varma, Dipankar Das, Monojit Chaudhary, Hema A Murthy, C V Jawahar, Kalika Bali, Sudip Kumar Naskar, Sriparna Saha, Ashwini Vaidya, Kamal Kumar Choudhary, Asif Ekbal, Sukomal Pal, Amitava Das, Manish Srivastava, Vinayak Abrol, N. Kishorjit Singh, Raksha Sharma, Siddhartha Mukherjee, Mayank Singh, Thoudam Doren Singh, Debdoot Mukerjee, for the areas: Syntax and Semantics, Computational Psycholinguistics, QA, Information Extraction, Information Retrieval, and Text Mining, Sentiment Analysis and Emotion Recognition, Language Resources and Evaluation, Speech, Multimodality, Machine Translation, NLP Applications, Machine Learning in NLP, Natural Language Text Generation, along with Doctoral Consortium, Shared Task/Tool Contest and Workshop/Tutorials.

We sincerely express our gratitude to the team members of the Laboratory of Computational Social Systems (LCS2) and the Department of CSE - IIITD, especially, Shivani Kumar, Yash Kumar Atri, Sarah Masud, Aseem Srivastava, Megha Sundriyal, Shivam Sharma, Ayan Sen Gupta, Aayushi Shisodia, and Priti Patwal for their timely assistance in organizing the event at the Indraprastha Institute of Information Technology (IIIT-Delhi) a memorable success. We also thank all the volunteers who assisted us in various activities of the conference. We are grateful to all the researchers, academicians, industry liaisons, and all the participants of ICON-2022 who responded to our call for papers, industry connect outreach, collocated shared tasks and workshop proposals; without whose spirited engagements, the conference would not have been a success. We wholeheartedly thank the reviewers who kindly agreed to review the papers and enabled the quality review ecosystem. We also thank the session chairs for dedicating their valuable time to ICON-2022. We also appreciate the financial support from our sponsors, Adobe (Gold), Samsung Research (Gold), TCS Research (Silver), Trink AI (Silver), Bobble AI (Silver), Infosys Center of Artificial Intelligence - IIITD (Silver), and Department of CSE - IIITD (Silver) in organizing the in-person conference possible after two years of hiatus. Finally, we thank everyone who participated in ICON-2022 in any possible manner.

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# Keynote Talk: (Un)fairness in Fairness Evaluation

Tim Baldwin

MBZUAI, Abu Dhabi

**Abstract:** Natural language processing (NLP) has made truly impressive progress in recent years, and is being deployed in an ever-increasing range of user-facing settings. Accompanied by this progress has been a growing realisation of inequities in the performance of naively-trained NLP models for users of different demographics, with minority groups typically experiencing lower performance levels. In this talk, I will discuss the complexities of the evaluation of model fairness, and how standard evaluation practice has led to unfair/misleading claims in the literature.

**Bio:** Tim Baldwin is Associate Provost (Academic and Student Affairs) and Head of the Department of Natural Language Processing, Mohamed bin Zayed University of Artificial Intelligence in addition to being a Melbourne Laureate Professor in the School of Computing and Information Systems, The University of Melbourne. Tim completed a BSc(CS/Maths) and BA(Linguistics/Japanese) at The University of Melbourne in 1995, and an MEng(CS) and PhD(CS) at the Tokyo Institute of Technology in 1998 and 2001, respectively. Prior to joining The University of Melbourne in 2004, he was a Senior Research Engineer at the Center for the Study of Language and Information, Stanford University (2001-2004). His research has been funded by organisations including the Australia Research Council, Google, Microsoft, Xerox, ByteDance, SEEK, NTT, and Fujitsu, and has been featured in MIT Tech Review, IEEE Spectrum, The Times, and ABC News. He is the author of over 450 peer-reviewed publications across diverse topics in natural language processing and AI, with around 20,000 citations and an h-index of 66 (Google Scholar), in addition to being an ARC Future Fellow, and the recipient of a number of awards at top conferences.

# Keynote Talk: Personalised Longitudinal Natural Language Processing

**Maria Liakata**

Queen Mary University of London

**Abstract:** In most of the tasks and models that we have made great progress with in recent years, such as text classification and natural language inference, there isn't a notion of time. However many of these tasks are sensitive to changes and temporality in real world data, especially when pertaining to individuals, their behaviour and their evolution over time. I will present our programme of work on personalised longitudinal natural language processing. This consists in developing natural language processing methods to: (1) represent individuals over time from their language and other heterogeneous and multi-modal content (2) capture changes in individuals' behaviour over time (3) generate and evaluate synthetic data from individuals' content over time (4) summarise the progress of an individual over time, incorporating information about changes. I will discuss progress and challenges this far as well as the implications of this programme of work for downstream tasks such as mental health monitoring.

**Bio:** Maria Liakata is Professor in Natural Language Processing (NLP) at the School of Electronic Engineering and Computer Science, Queen Mary University of London and Honorary Professor at the Department of Computer Science, University of Warwick. She holds a UKRI/EPSC Turing AI fellowship (2020-2025) on Creating time sensitive sensors from user-generated language and heterogeneous content. The research in this fellowship involves developing new methods for NLP and multi-modal data to allow the creation of longitudinal personalized language monitoring. She is also the PI of projects on language sensing for dementia monitoring & diagnosis, opinion summarisation and rumour verification from social media. At the Alan Turing Institute she founded and co-leads the NLP and data science for mental health special interest groups. She has published over 150 papers on topics including sentiment analysis, semantics, summarisation, rumour verification, resources and evaluation and biomedical NLP. She is action editor for the ACL rolling review and regularly holds senior roles in conference and workshop organisation.

# Keynote Talk: Mitigating Risks while Forging Ahead with AI Progress

Pascale Fung

Hong Kong University of Science and Technology

**Abstract:** Natural language processing (NLP) has made truly impressive progress in recent years, and is being deployed in an ever-increasing range of user-facing settings. Accompanied by this progress has been a growing realisation of inequities in the performance of naively-trained NLP models for users of different demographics, with minority groups typically experiencing lower performance levels. In this talk, I will discuss the complexities of the evaluation of model fairness, and how standard evaluation practice has led to unfair/misleading claims in the literature.

**Bio:** Pascale Fung is a Chair Professor at the Department of Electronic & Computer Engineering at The Hong Kong University of Science & Technology (HKUST), and a visiting professor at the Central Academy of Fine Arts in Beijing. She is an elected Fellow of the Association for the Advancement of Artificial Intelligence (AAAI) for her significant contributions to the field of conversational AI and to the development of ethical AI principles and algorithms, an elected Fellow of the Association for Computational Linguistics (ACL) for her “significant contributions towards statistical NLP, comparable corpora, and building intelligent systems that can understand and empathize with humans”. She is an Fellow of the Institute of Electrical and Electronic Engineers (IEEE) for her “contributions to human-machine interactions” and an elected Fellow of the International Speech Communication Association for “fundamental contributions to the interdisciplinary area of spoken language human-machine interactions”. She is the Director of HKUST Centre for AI Research (CAiRE), an interdisciplinary research centre on top of all four schools at HKUST. She co-founded the Human Language Technology Center (HLTC). She is an affiliated faculty with the Robotics Institute and the Big Data Institute at HKUST. She is the founding chair of the Women Faculty Association at HKUST. She is an expert on the Global Future Council, a think tank for the World Economic Forum. She represents HKUST on Partnership on AI to Benefit People and Society. She is on the Board of Governors of the IEEE Signal Processing Society. She is a member of the IEEE Working Group to develop an IEEE standard - Recommended Practice for Organizational Governance of Artificial Intelligence. Her research team has won several best and outstanding paper awards at ACL, ACL and NeurIPS workshops.

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# Program

## Friday, December 16, 2022

- 09:00 - 09:30     *Inauguration*
- 09:30 - 10:30     *Keynote 1 - Maria Liakata | Queen Mary University of London*
- 10:30 - 11:00     *Tea Break*
- 11:00 - 11:40     *Rockstar Paper 1*
- 11:40 - 12:20     *Sponsors Sessions*
- 12:30 - 13:30     *Lunch Break*
- 14:00 - 15:00     *Keynote 2 - Pascale Fung | Hong Kong University of Science & Technology*
- 14:00 - 15:00     *Keynote 2 - Pascale Fung | Hong Kong University of Science & Technology*
- 15:00 - 15:20     *Tea Break*
- 15:20 - 16:20     *Technical Session - I*
- 15:20 - 16:20     *Technical Session - II*
- 15:20 - 16:20     *Technical Session - II*
- 15:20 - 16:20     *Technical Session - IV*
- 16:30 - 17:30     *Annual NLP AI Meet*
- 18:30 - 21:00     *Cultural Night & Conference Dinner*
- 14:00 - 15:00     *Technical Session - VI*

**Friday, December 16, 2022 (continued)**

**Saturday, December 17, 2022**

- 09:00 - 10:00     *Keynote 3 - Tim Baldwin | University of Melbourne*
- 10:00 - 10:40     *Rockstar paper 2*
- 10:40 - 11:00     *Tea Break*
- 11:00 - 12:00     *Panel Discussion on 'In the era of Transformers, would the classical NLP be at risk?'*
- 12:00 - 12:20     *Sponsor Session*
- 12:30 - 13:30     *Lunch Break*
- 14:00 - 15:00     *Technical Session - V*
- 14:00 - 15:00     *Technical Session - VII*
- 14:00 - 15:00     *Technical Session - VIII*
- 15:00 - 15:20     *Tea Break*
- 15:20 - 16:05     *Technical Session - IX*
- 15:20 - 16:20     *Technical Session - X*
- 15:20 - 16:05     *Technical Session - XI*
- 16:30 - 17:30     *Valedictory*