

DR SATWINDER SINGH

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RELEVANT EXPERIENCE

2024 onwards	Postdoctoral Research Fellow, DEPARTMENT OF ELECTRICAL, COMPUTER AND SOFTWARE ENGINEERING, UNIVERSITY OF AUCKLAND, Auckland, NEW ZEALAND <ul style="list-style-type: none">➤ Working on <i>Automatic Speech Recognition for Dysarthric Speech</i>➤ Supervising undergraduate and postgraduate research
Jul 2023-Dec 2023	Postdoctoral Research Fellow, SCHOOL OF MATHEMATICAL AND COMPUTATIONAL SCIENCES, MASSEY UNIVERSITY, Auckland, NEW ZEALAND <ul style="list-style-type: none">➤ Worked on <i>Natural language processing for Q&A in indigenous/vernacular languages</i> Project funded by MBIE Catalyst : Strategic – New Zealand-Singapore Data Science Research Programme [https://salp.massey.ac.nz/]
Nov 2022-Mar 2023	Research Assistant, SCHOOL OF MATHEMATICAL AND COMPUTATIONAL SCIENCES, MASSEY UNIVERSITY, Auckland, NEW ZEALAND <ul style="list-style-type: none">➤ Assisted with Course : <i>Information Sciences Research Methods (158750)</i>.➤ Worked on funding applications such as Marsden and MURF.➤ Conducted research and data collection for Catalyst Funding Project.
Jul 2021-Feb 2022	Tutor, PINNACLE GLOBAL ACADEMY (PGA), Auckland, NEW ZEALAND <ul style="list-style-type: none">➤ Taught Mathematics and Python programming➤ Prepared students for competitive exams
Jul 2016-Feb 2018	Assistant Professor, FACULTY OF COMPUTATIONAL SCIENCES, GNA UNIVERSITY, Punjab, INDIA <ul style="list-style-type: none">➤ Taught graduate and post-graduate courses➤ Managed lecture scheduling➤ Supervised examinations➤ Supervised students' postgraduate research

EDUCATION

Jun 2018-Jul 2023	Doctor of Philosophy, PhD (Computer Science), MASSEY UNIVERSITY, Auckland, NEW ZEALAND <ul style="list-style-type: none">➤ Thesis title : End-to-End Automatic Speech Recognition for Low Resource Languages.
Jul 2013-May 2015	Master of Technology (Computer Science & Engineering), GURU NANAK DEV UNIVERSITY, PUNJAB, INDIA <ul style="list-style-type: none">➤ Thesis title : Dual Layer Security to Sensitive Data using LSB based Image Steganography exploiting ARGB color space and AES-128-bit Encryption Algorithm.
Aug 2010-Apr 2013	Bachelor of Technology (Computer Science & Engineering), PUNJAB TECHNICAL UNIVERSITY, PUNJAB, INDIA <ul style="list-style-type: none">➤ Related Course Work : Object Oriented Programming with C++ and Java, Web Development with PHP and MySQL, Design and Analysis of Algorithms, Data Structures, Computer Graphics, Expert Systems.
Aug 2007-May 2010	Diploma (Computer Engineering), MEHR CHAND POLYTECHNIC COLLEGE, PUNJAB, INDIA <ul style="list-style-type: none">➤ Related Course Work : Programming with C, Applied Mathematics 1 and 2, Open Source Technologies, Computer Networks and Architecture, Databases, Software Engineering.

RESEARCH PUBLICATIONS

- 2025 **Satwinder Singh**, Qianli Wang, Zihan Zhong, Clarion Mendes, Mark Hasegawa-Johnson, Waleed Abdulla, and Seyed RezaShahamiri, "Robust Cross-Etiology and Speaker-Independent Dysarthric Speech Recognition," IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), India, 2025.

- 2025 Qianli Wang, Zihan Zhong, **Satwinder Singh**, Clarion Mendes, Mark Hasegawa-Johnson, Waleed Abdulla, and Seyed RezaShahamiri, "Efficient Adaptation of Large-Scale ASR for Robust Dysarthric Speech Recognition," IEEE Signal Processing Letters, 2025. *[Submitted]*
- 2025 Chengxi Lei, **Satwinder Singh**, Feng Hou, Huia Jahnke, and Ruili Wang, "Empowering Māori Automatic Speech Recognition through EMD-Based Augmentation", Pacific Rim International Conference on Artificial Intelligence 2025. *[Submitted]*
- 2025 Zihan Zhong, Qianli Wang, **Satwinder Singh**, Clarion Mendes, Mark Hasegawa-Johnson, Waleed Abdulla, and Seyed RezaShahamiri, "Convolution-Augmented Transformers for Enhanced Speaker-Independent Dysarthric Speech Recognition," IEEE Transactions on Neural Systems and Rehabilitation Engineering, 2025. *[Submitted]*
- 2025 Zihan Zhong, Qianli Wang, **Satwinder Singh**, Clarion Mendes, Mark Hasegawa-Johnson, Waleed Abdulla, and Seyed RezaShahamiri, "Beyond Binary Detection : Multi-Etiology Dysarthria Classification with Pre-trained Speech Models," Asia Pacific Signal and Information Processing Association Annual Summit and Conference, 2025. *[Submitted]*
- 2025 Qianli Wang, Zihan Zhong, **Satwinder Singh**, Clarion Mendes, Mark Hasegawa-Johnson, Waleed Abdulla, and Seyed RezaShahamiri, "Dysarthric Speech Conformer : Adaptation for Sequence-to-Sequence Dysarthric Speech Recognition," IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), India, 2025.
- 2024 **Satwinder Singh**, Zihan Zhong, Qianli Wang, Clarion Mendes, Mark Hasegawa-Johnson, Waleed Abdulla, and Seyed RezaShahamiri, "A Comprehensive Performance Evaluation of Whisper Models in Dysarthric Speech Recognition," in Proceedings of the International Conference on Neural Information Processing (ICONIP), New Zealand, 2024.
- 2023 Chengxi Lei, **Satwinder Singh***, Xiaoyun Jia, Feng Hou, Ruili Wang, "PhasePerturbation : Speech Data Augmentation via Phase Perturbation for Automatic Speech Recognition", ACM MM Asia, 2023.
- 2023 **Satwinder Singh**, Ruili Wang, Feng Hou, "Punjabi Speech : A labeled Speech Corpus", Mendeley Data, V1, DOI : 10.17632/sdbc8f5b77.1, 2023. *[Dataset]*
- 2023 **Satwinder Singh**, Ruili Wang, Feng Hou, "Google-synth : A Synthesized Punjabi Speech Dataset", Figshare, V1, DOI : 10.6084/m9.figshare.23615607.v1, 2023. *[Dataset]*
- 2023 **Satwinder Singh**, Ruili Wang, Feng Hou, "CMU-synth : A Synthesized Punjabi Speech Dataset", Figshare, V1, DOI : 10.6084/m9.figshare.23606697.v1, 2023. *[Dataset]*
- 2023 **Satwinder Singh**, Ruili Wang, Feng Hou, "Real and Synthetic Punjabi Speech Datasets for Speech Recognition", Data in Brief Journal, 2023.
- 2023 **Satwinder Singh**, Ruili Wang, Feng Hou, "A Novel Self-training Approach for Low-resource Speech Recognition" Proc. Interspeech, Ireland, 1588-1592, 2023.
- 2022 **Satwinder Singh**, Ruili Wang, Feng Hou, Zhizhong Ma, "Enhancing End-to-End Automatic Speech Recognition for Low-Resource Punjabi Language Using Synthesized Datasets", Available at SSRN 4181844.
- 2022 **Satwinder Singh**, Ruili Wang, and Feng Hou, "Improved Meta Learning for Low Resource Speech Recognition" In ICASSP 2022-2022 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), pp. 4798-4802. IEEE, 2022, Singapore.
- 2022 Zhihan Wang, Feng Hou, Yuanhang Qiu, Zhizhong Ma, **Satwinder Singh**, and Ruili Wang, "CyclicAugment : Speech Data Random Augmentation with Cosine Annealing Scheduler for Automatic Speech Recognition." Proc. Interspeech, Incheon, Korea, 3859-3863, 2022.
- 2022 Zhizhong Ma, Feng Hou, **Satwinder Singh**, Yuanhang Qiu, Ruili Wang, Christopher Bullen, Joanna Ting Wai Chu, "Automatic Speech-based Smoking Status Identification", Computing Conference, July 2022, London, United Kingdom.
- 2021 **Satwinder Singh**, Ruili Wang, and Yuanhang Qiu, "DEEPF0 : End-To-End Fundamental Frequency Estimation for Music and Speech Signals," In ICASSP 2021-2021 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), pp. 61-65. IEEE, May 2021, Toronto, ON, Canada
- 2021 Zhizhong ma, Chris Bullen, Joanna Ting Wai Chu, Ruili Wang, Yingchun Wang, and **Satwinder Singh**. "Towards the Objective Speech Assessment of Smoking Status based on Voice Features : A Review of the Literature." Journal of Voice, January 2021.
- 2021 Yuanhang Qiu, Ruili Wang, **Satwinder Singh**, Zhizhong Ma, and Feng Hou. "Self-Supervised Learning Based Phone-Fortified Speech Enhancement." Proc. Interspeech, pp. 211-215, August 2021, Brno, Czechia
- 2015 **Satwinder Singh** and Varinder Kaur Attri, "Dual Layer Security of data using LSB Image Steganography Method and AES Encryption Algorithm", International Journal of Signal Processing, Image Processing and Pattern Recognition (IJSIP), Vol. 8, No. 5, pp. 259-266, May 2015.
- 2015 **Satwinder Singh** and Varinder Kaur Attri, "State-of-the-art Review on Stenographic Techniques", International Journal of Signal Processing, Image Processing and Pattern Recognition (IJSIP), Vol. 8, No. 7, pp. 161-170, July 2015.

TEACHING

- 2016 **OOPS101 : Object Oriented Programming with C++**, Theory and Lab, GNA University, India
- 2016 **WBTC101 : Web Technologies**, Theory and Lab, GNA University, India
- 2016 **OSYS101 : Operating System**, Theory, GNA University, India
- 2017 **WBAL101 : Web Analytics**, Theory and Lab, GNA University, India
- 2017 **LISP201 : Linux and Shell Programming**, Theory and Lab, GNA University, India
- 2017 **PYPR101 : Python Programming**, Theory and Lab, GNA University, India.
- 2018 **ARIN101 : Artificial Intelligence**, Theory and Lab, Course Design, GNA University, India.

SUPERVISION/MENTORING

- 2024-2027 **Ben Wang (PhD)**, Automatic Speech Recognition and Assessment for Atypical Speech, University of Auckland
- 2024-2027 **Zihan Zhong (PhD)**, Towards a Speech Therapy System for the Speech Impaired, University of Auckland
- 2023-2026 **Chengxi Lei (PhD)**, Low Resource Automatic Speech Recognition, Massey University
- 2025 **Omar Mourad and Sarah Rabah (BE Hons)**, Towards Objective and AI-Driven Intelligibility Assessment for Dysarthric Speech, University of Auckland
- 2025 **Wilson Liang (BE Hons)**, Data Augmentation for Robust Dysarthric Speech Recognition Using Disorder-Specific Error Patterns, University of Auckland
- 2025 **Jackson Schofield (BE Hons)**, Early detection of neurodegenerative diseases : Applying deep-learning based image classification techniques, University of Auckland
- 2025 **Shaurya Pathak and Zeno Simunic (BE Hons)**, Universal Design for Personalized Automatic Speech Recognition, University of Auckland
- 2025 **Charlie Pellett and Lewis Pratt (BE Hons)**, Dyslexia support tools. Applying LLMs for dyslexic text correction, University of Auckland
- 2024 **Steven Li and Adi Shenoy (BE Hons)**, A Neural Speaker Diarization System for Doctors, University of Auckland [Best Project Award]

INVITED TALKS/POSTERS

- 2022-2024 **Reviewing the Literature : Why? For Whom? and How?**, Guest Lecture (Research Method), Massey University, Albany Campus
- 2022 **Fundamentals of Deep Learning**, Guest Lecture, GNA University, India
- 2025 **Dysarthric Speech Conformer : Adaptation for Sequence-to-Sequence Dysarthric Speech Recognition**, IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), India
- 2022 **Towards exploiting synthetic data to improve Automatic Speech Recognition for Low-resource Punjabi Language**, Artificial Intelligence Researchers Association Annual Conference, Christchurch
- 2020 **End-to-end Pitch Estimation using Deep Learning**, Post Graduate Student Conference, Massey University, Auckland [Best Talk]
- 2019 **Feature Selection for Tonal Languages**, Post Graduate Student Conference, Massey University, Auckland
- 2018 **State-of-the-art of Speech Recognition : From HMMs to E2E Models**, Post Graduate Student Conference, Massey University, Auckland

AWARDS AND SCHOLARSHIPS

- 2018-2023 **Fee Scholarship**, Massey University, Auckland
- 2022 **PhD Stipend**, Massey University, Auckland
- 2022 **COVID-19 Doctoral Student Bursary**, Massey University, Auckland
- 2020 **Best Talk**, SMCS, Postgraduate Student Conference, Massey University, Auckland
- 2013 **Academic Excellence Award**, Annual CT Institute Felicitation Ceremony, India
- 2012 **Best Web design**, Techfest, CT Institute, India

SERVICE

- 2025 **Workshop Organizer**, Lead one day workshop on Transformer models (theory & hands-on practical sessions), University of Auckland, New Zealand

2025 **Grand Challenge Organizer**, Interspeech, Australia, 2026
 2025 **Postdoctoral Constituency Representative**, Artificial Intelligence Researchers Association, New Zealand
 2024 **Local Arrangement Chair**, ACM Multimedia Asia Conference, Auckland
 From 2019 **Reviewer**, Elsevier's Neurocomputing, Springer's Complex and Intelligent Systems, PloS One, Data in Brief, Applied AI Letters, IEEE ICASSP
 2019-2020 **Program Committee Member**, SMCS, Postgraduate Student Conference, Massey University, Auckland
 2016-2018 **Chairperson of Lecture Scheduling**, Faculty of Computational Sciences, GNA University, India
 2016-2018 **Board of Studies Member**, Faculty of Computational Sciences, GNA University, India
 2014, 2017 **Organizer**, Photography Competition Event, GNDU and GNA University, India

RESEARCH EXPERTISE/SKILLS

Research Expertise	<ul style="list-style-type: none"> ➤ Speech technology development for low-resource languages, including te reo Māori, Indian languages ➤ Analyzing and developing AI-based accessibility tools for speech-impaired ➤ Deep learning for speech, image, and text modalities ➤ Neural speaker diarization for speech
Programming	Python, C/C++, Java, Linux Shell Scripting, JavaScript, HTML5, and PHP
Frameworks	Deep/Machine learning using PyTorch, Keras, and Scikit-learn
Databases	Oracle Database and MySQL
Development Tools	Visual Studio Code, PyCharm, Spyder, and Jupyter Notebooks
Operating Systems	Mac OS, Windows Server, Windows, Linux, Android, and iOS
Office Automation	LaTeX, Microsoft Office (Word, Excel, and PowerPoint)
Languages Known	English, Punjabi, Hindi, Urdu