

# Jasivan Alex SIVAKUMAR

Department of Computer Science,  
University of Sheffield, UK  
E-mail: [jasivakumar1@sheffield.ac.uk](mailto:jasivakumar1@sheffield.ac.uk)

Webpage: [jasivan.github.io](https://jasivan.github.io)  
Twitter: [@jasivan\\_s](https://twitter.com/jasivan_s)  
LinkedIn: [Jasivan Sivakumar](https://www.linkedin.com/in/JasivanSivakumar)

## QUALIFICATIONS

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- Sep 21 - Dec 25      **PhD Computer Science** (Supervised by [Dr. Nafise Sadat Moosavi](#))  
    ▷ Natural Language Processing Group, University of Sheffield, United Kingdom  
    ▷ Research title: *Numerical Reasoning for General-Purpose Language Models*  
    ▷ Focus: AI, ML, DL, NLP, NLU, NLG, LLM, Reasoning, Representation Learning, Tokenisation
- Sep 20 - Sep 21      **MA Computational Linguistics** - Distinction  
    ▷ University of Wolverhampton, United Kingdom
- Oct 12 - Jul 16      **Bachelor (MMath) Mathematics** - First Class  
    ▷ University of Warwick, United Kingdom

## PUBLICATIONS

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- Jan 25 (COLING)      **Sivakumar, J., & Moosavi, N. (2025).** [How to Leverage Digit Embeddings to Represent Numbers?](#) International Conference on Computational Linguistics.  
    ▷ Developed a mathematically informed number representation using digit embeddings.  
    ▷ Evaluated the alignment of novel number representations with numerical proximity.  
    ▷ Explored incorporating new number representations at encoding and in loss function.
- Jul 23 (ACL)      **Sivakumar, J., & Moosavi, N. (2023).** [FERMAT: An Alternative to Accuracy for Numerical Reasoning](#). Association for Computational Linguistics.  
    ▷ Designed a multi-view number test set to evaluate arithmetic reasoning robustness.  
    ▷ Published a method for automatic data-augmentation of worded arithmetic problem.  
    ▷ Demonstrated that fine-tuning on diverse language significantly improves performance.  
    ▷ Explored data-leakage to justify improvement of BART and FLAN type LLMs.
- Dec 21 (IALP IEEE)      **Sivakumar, J., et. al. (2021).** [A GRU-based pipeline approach for word-sentence segmentation and punctuation restoration in English](#). International Conference on Asian Language Processing, Institute of Electrical and Electronics Engineers.  
    ▷ Trained GRU models using PyTorch for punctuation retrieval of concatenated strings.  
    ▷ Created deep learning classification systems to identify insertions of punctuation.  
    ▷ Generated synthetic training and testing from a big data source of punctuated text.  
    ▷ Investigated automatic evaluations metrics against human perception.

## PROFESSIONAL ACTIVITIES

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- Jul 24 - Oct 24      **Applied Scientist Intern** - Alexa Int., Amazon (Bellevue, United States)  
    ▷ Created benchmark using AWS tools with human-in-the-loop approach for relevancy.  
    ▷ Optimised prompts of foundational models (Claude, Llama and Mistral) for given tasks.  
    ▷ Presented documentation to cross-functional partners to explain benchmarking need.  
    ▷ Collaborated with software engineers to review code and deploy updates to production.
- Jan 24 - Jun 24      **Consultancy** - Student Marketing / Elevate (Sheffield, United Kingdom)  
    ▷ Researched and explained a RAG solution to automate high-volume query response.  
    ▷ Delivered a Topic Modelling solution to analyse large and complex document sources.  
    ▷ Advised clients on cost, efficiency, scalability, stability and technical skills required.

## SKILLS

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### Programming

- ▷ Python (PyTorch, Huggingface, AWS, scikit-learn, NLTK)
- ▷ MATLAB
- ▷ Bash (HPC)
- ▷ Version control (git/github)
- ▷ Latex

### Languages

- ▷ French (Native)
- ▷ Tamil (Native)
- ▷ English (Native)
- ▷ Spanish (Fluent)
- ▷ German (Conversational)

## RESEARCH ACTIVITIES

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- Sep 21 - Present     **NLP for Endangered Language Revitalisation in Colombia**  
▷ Collected and digitised text using OCR for Palenquero, an endangered language.  
▷ Deploying low-resource language NLP research to develop pedagogical resource.
- Nov 21 - Jun 22     **Speech Processing and NLP to improve Oral History Search functionality**  
▷ Explored existing NER systems to identify domain specific terms.  
▷ Automated annotated transcriptions to improve search and retrieval of video frames.
- Sep 20 - Sep 21     **Semantic Sentence Embeddings for Natural Language Inference**  
▷ Trained BERT embeddings using siamese network contrastive loss over NLI tasks.  
▷ Inductively biased embeddings with semantic parse trees over Graph Neural Network.
- Sep 15 - May 16     **A Mathematical Approach at Analysing the Influence of English on French**  
▷ Generated a diachronic dataset of French news articles to observe language evolution.  
▷ Modelled adoption of English lexica into French with stochastic/differential equations.

## ACADEMIC ACTIVITIES

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- Jan 24 - Present     **Reviewer** - ARR/ACL/EMNLP/NAACL/LREC/COLING  
▷ Tracks: NLP and LLM Applications; Resources and Evaluation; Reasoning, Question Answering, and Sentence-level Semantics; Lexicon and Semantics, and Social Media Processing; Less-Resourced/Endangered/Less-studied Languages; Bio lay summarisation.
- Nov 24     **Invited talk** - Chatbot for legal advice  
▷ Presented a high-level functioning of LLMs in Chatbot to undergraduate law students discussing risk and benefits highlighting ethical and legal considerations.
- Jan 22 - Dec 24     **Human Annotator**  
▷ Followed annotation guidelines and provided feedback for experiments relating to: **Psychology** (Eye-tracking from reading), **Human-Robot Interaction** (Perception of robot feature and interaction), **Text** (Hate Speech detections, Misinformation), Named Entity Recognition, **Speech** (Intelligibility), **Vision** (Naming Images, Bias from Visual Posters).
- Nov 23 - Jun 24     **Supervisor** - final year student research project in number representation  
▷ Weekly supervision for number decoding project, helped with latest deep learning techniques both theoretically and practically including transformers.
- Oct 23 - Jun 24     **Reading Group Co-organiser** - Natural Language Processing  
▷ Organised weekly reading group by securing a presenter and relevant paper, managed by example by presenting three times, facilitate discussion, arrange special lightning conference accepted paper sessions for Neurips and EMNLP
- Jun 23     **Invited Talk** - 3<sup>rd</sup> Speech and Language Technology CDT Conference  
▷ Presented FERMAT research in main talk event.
- Nov 22 - Feb 23     **Examiner** - Text Processing and Professional Issues  
▷ Assessed student code and marked reports, provided feedback on assignments.
- Jul 22     **12th Lisbon Machine Learning Summer School**  
▷ Attended lectures on linear classifiers, seq2seq models, neural networks and talks from industry and academia on novel research, networked with other attendees.
- Jan 22 - Jun 22     **Teaching Assistant** - Foundations of Computer Science  
▷ Taught fundamental mathematics: probability, linear algebra and number theory.
- Jan 21 - May 21     **Tutorial** - Machine Learning for Postgraduate Computational Linguists  
▷ Explained mathematics using linguistics examples for kNN, decision trees, Naive Bayes, linear regressions, regularisation, beam search, EM algorithm, gradient descent, entropy.