# Computer Science Education Research Lab  @ SJSU

*Exploring AI and ML, Programming Transfer, Programming Contextualization, Bilingual programming and Inclusive Computing Education*

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## About the Lab

The Computer Science Education Research Lab investigates how students learn to transfer programming knowledge across languages and contexts. We design tools, learning experiences, and studies that explore contextualization, bilingual programming, and the role of AI/ML in computing education. Our work supports inclusive and effective learning pathways for diverse learners.

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## Who We Are

We are a collaborative group of undergraduate and graduate student researchers at San José State University, led by Dr. Ethel Tshukudu, Assistant Professor of Computer Science and Science Education. Our lab values curiosity, inclusion, and practical impact.

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## Current Projects

- **Bilingual Programming and Tools**:
  - A study examining how bilingual instruction affects non-CSand CS  learners' confidence and attitudes.
  - **AI/ML Bilingual Code Assistant** that accepts a code snippet (e.g., Python or Java) and translates comments, variable names, and explanations into a target natural language (e.g., English ↔ Spanish)
- **Programming Transfer Tools:**
  - **Java to AI Transfer Tutor** – A tool helping students transition from Java programming to AI/ML concepts using contextualized examples.
  - **Scratch to Python Transfer Tutor**- A tool helping students transition from Scratch programming to Java concepts using contextualized examples.
  - **Python to Java Transfer Tutor-** A tool helping students transition from Python programming to Java concepts using contextualized examples.
- **AI in Education**
  - AI for All programming Workshop  for Non-CS majors-Teaching AI and ML to non-cs majors which includes training data and coding

- ○ Investigating how generative AI (like ChatGPT) can support or hinder learning in introductory programming classes.
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## Publications & Outputs

We will regularly present at conferences such as SIGCSE, ITiCSE, and ICLS. Our work includes:

- Poster Presentation
- Publications pending
  - ○ Bilingual programming paper ongoing