

NICY SCARIA

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I am broadly interested in **natural language processing, large language models, generative AI, knowledge graphs, reinforcement learning, and computational social sciences**. I am passionate about education. My research interests are in building **personalized adaptive learning solutions** using lightweight models that can be deployed at scale for students in an Indian context.

EDUCATION

INDIAN INSTITUTE OF SCIENCE, Bengaluru

From August 2022

PhD (Computational and Data Sciences), Current CGPA of 9.10/10

COLLEGE OF ENGINEERING TRIVANDRUM, Trivandrum

August 2017 to July 2019

Master of Technology (Control Systems), **Graduated as a topper with a CGPA of 9.44/10**

Relevant Coursework: Advanced Mathematics and Optimization Techniques, Optimal Control Theory, Nonlinear Control Systems, Sliding Mode Control, Flight Dynamics and Control, Robust Control.

SCMS SCHOOL OF ENGINEERING AND TECHNOLOGY, Ernakulam

August 2012 to June 2016

Bachelor of Technology (Electrical and Electronics Engineering), Graduated with Honours CGPA of 8.41/10

PROFESSIONAL EXPERIENCE

INDIAN INSTITUTE OF SCIENCE, Bengaluru

Research Scholar, Computational and Data Sciences Department

From August 2022

- Working on developing personalized adaptive learning systems through artificial intelligence to enhance student learning.

Project Scientist I, Centre for Continuing Education

May 2021 to July 2022

- Worked with the M.Tech.(Online) Programme Team for supporting faculty in Artificial Intelligence, Data Science and Business Analytics, and Electronics and Communications Engineering streams.
- Created learning materials like interactive simulations and videos using GeoGebra and Manim libraries respectively, for Linear Algebra (E1 219o) and Random Processes (E2 212o) courses.
- Created a Student Lifecycle Management portal for M.Tech.(Online) students of IISc.

MOKUSEI INTELLIGENCE, Bengaluru

Head of Technology (part-time)

January 2022 to June 2022

- Led 2 teams of developers creating a crowdfunding website/platform for education (investment-based) and a mobile application for the prediction of scores and attaining scholarships based on these predictions.
- Developed technological strategies to align with the business goals and ensure the quality of the end product.

TEACH FOR INDIA, Chennai

Fellow

June 2019 to April 2021

- Taught English, Science, and Literacy to 101 grade 7 students and Social and Emotional skills to 174 grade 7 and 8 students at Chennai High School, Thiruvengatasamy Street, Pulianthope. Taught all subjects to 37 grade 4 students at Anjuman Matriculation Higher Secondary School (Primary), T. Nagar.
- Led multiple city-level Fellows-led virtual initiatives such as Madras Party (a platform for students) and Petror Koodam (a space for parents across Teach for India classrooms in the city).
- Assisted the school team of 5 in creating tracking systems for collecting and analyzing student data to administer data-driven interventions and developed frameworks for school projects.

Student Leadership Intern

May 2020 to June 2020

- Created sequenced learning circle plans for Social, Emotional, and Ethical Learning and designed activities and performance tasks to build 21st Century Skills in students for fellows across the city.
- Worked with different stakeholders within and outside the organization to understand various approaches to student leadership in the region.

YOUNG INDIA FOUNDATION, New Delhi

Data and Research Intern - YIF Think Tank

December 2019 to March 2020

- Published an [educational research paper](#) with a team of 5 research interns in Academia to provide suggestions to Think Tanks such as Niti Aayog and the Centre for Civil Society.

- Analysed the National Education Policy - Draft to investigate how the policy is designed to equip the Indian youth to be global leaders.

TATA ELXSI, Trivandrum

Project Intern - Jaguar Land Rover Tata Motors Limited (JLR TML)

May 2018 to June 2019

Tata Elxsi demonstrated Robo-Taxi at CES 2020 in Las Vegas

- Engineered an adaptive PID controller designed in MATLAB/SIMULINK using MicroAutoBox II to operate the steering system autonomously in a Suzuki Ignis (Robo-Taxi).
- Developed a time series model of the Electric Power Steering in Suzuki Ignis using System Identification and designed an Adaptive Model Predictive Controller for motion planning.

RESEARCH ARTICLES/PUBLICATIONS

- 'Automated Educational Question Generation at Different Bloom's Skill Levels using Large Language Models: Strategies and Evaluation' accepted as a long paper at the [25th International Conference on Artificial Intelligence in Education \(AIED 2024\)](#).
- 'How Good are Modern LLMs in Generating Relevant and High-Quality Questions at Different Bloom's Skill Levels for Indian High School Social Science Curriculum?' accepted as a long paper at the [19th Workshop on Innovative Use of NLP for Building Educational Applications \(BEA\), NAACL'24](#).
- 'EvalYaks: A Family of Large Language Models for Evaluation of the CEFR B2 English Speaking Assessment' under review in [Computers and Education Journal](#).
- Research, Y. I. F., D., Scaria, N., Gunasekaran, P., & Raheja, S. (2020). [Significance of Inclusivity and Diversity Framework in 21st Century India](#). Young India Foundation's Research.
- https://www.academia.edu/40429885/Electric_Power_Assisted_Steering_Control_for_Autonomous_Driving

PROJECTS

Understanding the Capabilities of Small Language Models (SLMs)

From April 2024

- Designing prompts to understand the in-context learning capability of SLMs.
- Developing training mechanisms to train the SLMs with noise to understand how well the pre-trained models can learn noise through instruction tuning.

Conversational Engine at Different CEFR Levels of English Language

From January 2024

- Developing conversational engine for different CEFR levels, namely A1, A2, B1, and B2, to learn listening, speaking, and grammar skills for non-native English speakers.

Pedagogical Question Generation at Different Bloom's Taxonomy Skills

August 2023 to February 2024

- Assessed the quality and relevance of pedagogical questions generated by LLMs at different Bloom's taxonomy levels in different subject areas through prompt-tuning to identify the best model for the task.
- Generated synthetic questions using LLMs and evaluated them to train lightweight models for generation and classification tasks.
- Built an automated evaluation mechanism to assess the quality and relevance of the generated pedagogical questions.

Evaluation of CEFR B2 English Speaking Assessment

August 2023 to March 2024

- Developed a family of 7B parameter models, *EvalYaks* to evaluate the CEFR B2 English speaking assessment on grammar and vocabulary, discourse management, and interactive communication.

TEACHING EXPERIENCE

INDIAN INSTITUTE OF SCIENCE, Bengaluru

Teaching Assistant, DS 207, Introduction to Natural Language Processing

January 2024 to April 2024

- Mentored the following student projects
 - Understanding Reasoning Capabilities of LLMs.
 - Efficient Integration of Knowledge into Language Models.
 - Beyond Bias: Can LLMs act as "Society of Mind"

Teaching Assistant, DA 204o, Data Science in Practice

August 2023 to December 2023

Teaching Assistant, DA 202o, Introduction to Data Science

August 2022 to December 2022

COLLEGE OF ENGINEERING, Trivandrum, Trivandrum**Teaching Assistant****August 2017 to June 2019**

- Systems and Control Lab (EE332), August 2018 Term
- Electronic Circuits Lab (EE231), January 2018 Term
- Electrical Machines Lab (EE333), August 2017 Term

PROFESSIONAL SERVICES

- **Volunteer to be**, AIED 2024
- **Program Committee**, BEA, NAACL 2024
- **Reviewer**, GAIED, NeurIPS 2023

LEARNING FORUMS

Kolgai Public Policy Circle, Teach for India Chennai**September 2020 to April 2021**

- Hypothesized solutions and created predictive models using *Python and R packages* to solve real-world problems with the available datasets taken from 'Our World In Data,' IMF, and the World Bank.
- Explored and utilized Bardach's Eightfold Path for policy analysis, developmental frameworks, and advanced Excel to develop statistical models.

VOLUNTEERING EXPERIENCE

INDIAN INSTITUTE OF SCIENCE, Bengaluru**From August 2022****Core Committee Member, Science for Rural India**

- Leading a team of volunteers to create and execute lesson plans that provide basic knowledge about handling emotions for ages 14 to 16, with the help of experts from NIMHANS and Centre for Brain Research, IISc.

SCMS SCHOOL OF ENGINEERING AND TECHNOLOGY, Ernakulam**August 2013 to June 2015****Volunteer Secretary, National Service Scheme**

- Led a team of 120 National Service Scheme volunteers in 2014-2015, led two 7-day camps in 2014 and 2015, and represented the institution twice in state-level camps.