

# SHIVALIKA GOYAL (PhD Scholar)



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I am **Shivalika Goyal**, a cotutelle PhD researcher at **CSIR–Central Scientific Instruments Organisation (CSIO), India**, and the **Royal Melbourne Institute of Technology (RMIT), Australia**, pursuing my PhD through **AcSIR**. I am supervised by **Dr. Amit Laddi**, Principal Scientist in the Biomedical Applications (BMA) group at CSIO, and **Dr. Amirali K. Gostar**, Senior Lecturer at the School of Engineering, RMIT. During my PhD, I secured competitive opportunities including the **cotutelle collaboration with RMIT** and the **ESKAS scholarship in Switzerland**. My research focuses on **computer vision**, particularly advancing **eye gaze tracking** through vision-based approaches. The aim is to make gaze-tracking technologies more efficient and accessible to better understand, support, and predict human behavior in complex environments, ultimately helping bridge the gap between humans and machines for a secure and sustainable future.

## Work Experience

September 2024 - August 2025

### ESKAS - Visiting PhD Scholar

**Computer Systems Institute (SYS), Faculty of Informatics, Università della Svizzera italiana (USI), Lugano, Switzerland**

Swiss Government Excellence Scholarship

27 September 2022 - 31 March 2023

### Project Associate I

**CSIR- Central Scientific Instruments Organisation (CSIO)**

Here, I researched and worked on designing Vascular Sclerotherapy Guidance and Assistance Tools (Vascu-Guide) for vein-detection, employing Image Processing, Machine Learning, and Deep Learning.

01 September 2020 - 31 August 2021

### Research Analyst

**In-Med PROGNOSTICS**

Here, I worked on a project comprised the structuring of algorithms in EEG Data Analysis and Neurodegenerative disease detection & Classification and further to integrate it with different EEG modalities.

01 October 2019 - 30 November 2019

### Special Trainee Officer

**SIDDHARTH CT SCAN & IMAGING CENTRE**

Here, I trained in MRI, CT-SCAN along with conducting Neurological disorders tests using EEG, NCV and EMC (specially in Brain Speculation Field).

01/09/2018 - 03/10/2018

### Technical Intern

**NATIONAL INSTITUTE OF MENTAL HEALTH AND NEURO SCIENCES (NIMHANS)**

Here, I observed EEG-ERP based experiments and carried out recordings and data analysis. Also, I fabricated my skills on Data Analysis in Excel and SPSS on descriptive level.

## Academic / Professional Certifications

- Poster Presentation Certificate:** "AI-Driven Gaze Tracking Optimization for Sustainable Healthcare" Indo-German Science and Technology Center (IGSTC), CSIR-CSIO & IEEE AcSIR-CSIO Student Branch, Chandigarh, Feb 2024
- Elected Secretary,** IEEE WIE Student Chapter (2024–2025), AcSIR-CSIR-CSIO, Chandigarh, India
- Poster Presentation:** "Optimizing Pervasive Gaze Tracking through Embedded System", IIT Ropar, Punjab, India, 2024

## Education

February 2023 - Ongoing

### Cotutelle PhD RMIT

**School of Engineering, Royal Melbourne Institute of Technology (RMIT), Australia**

RMIT Cotutelle Scholarship

August 2021 - Ongoing

### AcSIR PhD Scholar

**CSIR - Central Scientific Instruments Organisation, Chandigarh, India**

Successfully completed PhD Coursework with 8.29 CGPA in Cumulative Grade Report -1.

01 August 2015 - 01 October 2020

### Integrated M.Tech in Cognitive Neurosciences

**Centre for Converging Technologies (CCT), Rajasthan University (RU), Jaipur, Rajasthan, India**

I secured "O" (Outstanding) grade in Dual Degree B.Tech+M.Tech and also ranked "1" in my specific branch of Cognitive Neurosciences.

2013 - 2014

### Intermediate (PCMB)

**ST ANSELM'S PINK CITY MALVIYA NAGAR, JAIPUR (CBSE)**

I scored 80.60% in the Board Examinations with both Mathematics and Biology as the choice of subjects.

2010 - 2012

### Matriculation

**ST ANSELM'S PINK CITY MALVIYA NAGAR, JAIPUR (CBSE)**

I scored 93.10% with all compulsory subjects as per the course curriculum.

### Upadhi of Nipun in Kathak Dance

**BHATKHANDE SANGIT VIDYAPITH, Lucknow, India**

Secured Nipun III in Kathak Dance.

- **Poster Contribution:** "Eye Gaze Tracking with ResNeXt for Consumer-Grade Webcams", Human Computer Interaction and Cognitive Computing Conference (HCICC-25), 2024
- **Certificate of Appreciation** – Organising Committee Member, *Workshop on Instruments for Environment & Food Quality Assurance*, CSIR-CSIO & ACS-CSIO, 29 Jun 2023
- **Certificate of Appreciation** – Webmaster (ACS-CSIO Website), *2nd Bilateral Meet on Innovations in Materials for Energy and Environmental Technologies (iMEET)*, CSIR-CSIO, 28 Jun 2023
- **Poster Presentation Certificate** - "Advancements in Healthcare Technologies (AIHT 2023)", CSIR-CSIO & IEEE AcSIR-CSIO, 28 Jun 2023
- **Paper Presentation Certificate** - "Emerging Sensors and Electronics Systems (ESES 2023)", IETE Zonal Seminar, Chandigarh, 28 Apr 2023
- **Poster Presentation:** *Global Assistive Technology Expo & Conference*, iCONEX, SHESPro & ICMR, New Delhi, 23 Mar 2023
- **Certificate of Participation:** *Winter School in Cognitive Modelling*, IIT Mandi & Waterloo University, 16 Oct 2022
- **Certificate of Participation:** *5-Day Online Workshop on Machine Learning and Cloud Computing (MLCC-2022)*, NIT Hamirpur, 15 Oct 2022
- **Certificate of Participation:** *Short-Term Course on Python Programming for AI*, IIT Warangal, 26 Sep 2022
- **Certificate of Participation:** *5th Workshop on Machine Learning & Data Analytics*, IIIT Allahabad & Victoria University, 20 Jun 2022
- **Paper Presentation Certificate:** "Designing Real-Time Frame Modification Functions Using Hard Gesture Recognition", CVR 2022, 21 May 2022
- **Certificate of Participation:** *National Training Program on Patent Search and Analytics (NTP-PSA)*, CSIR-IMMT & Questel India, 21 Jan 2022
- **Certificate of Completion:** *Workshop on Recent Advancements in Biomedical Imaging and Image Processing*, NEHU Meghalaya, 09 Nov 2021

## Publications

- Laddi, A., Goyal, S., Himani, & Savlania, A. (2024). Vein segmentation and visualization of upper and lower extremities using convolution neural network. *Biomedical Engineering/Biomedizinische Technik*, 69(5), 455-464.
- Goyal, S., & Laddi, A. (2024). Machine Learning Techniques for Emotion Detection Using Eye Gaze Localisation. In *Machine and Deep Learning Techniques for Emotion Detection* (pp. 24-60). IGI Global.
- Goyal, S., & Laddi, A. (2024). Machine learning for Developing neurorehabilitation-aided assistive devices. In *Computational Intelligence and Deep Learning Methods for Neuro-rehabilitation Applications* (pp. 121-148). Academic Press.
- Goyal, S., Himani, & Laddi, A. (2023). Designing Real-Time Frame Modification Functions Using Hand Gesture Recognition. In *Computer Vision and Robotics: Proceedings of CVR 2022* (pp. 341-349). Singapore: Springer Nature Singapore.
- Goyal, S., & Laddi, A. (2023). Applications of Multimodal Biometric Technology. *Multimodal Biometric and Machine Learning Technologies: Applications for Computer Vision*, 85-102.

## Awards/Patents/Copyrights

- **RMIT-AcSIR Joint (Cotutelle PhD) Fellowship**, 2024
- **CSIR-SRF Direct Fellowship**, 2024
- **Swiss Government Excellence Scholarship**, Academic Year 2024–2025
- **Best Poster Award:** *Conference on "AI-Driven Gaze Tracking Optimization for Sustainable Healthcare"*, IGSTC, CSIR-CSIO & IEEE AcSIR-CSIO Student Branch, Chandigarh, Feb 2024
- **Best Paper Award:** *Zonal Seminar on "Emerging Sensors and Electronics Systems (ESES 2023)"*, IETE, Chandigarh, India, 28 Apr 2023
- **Winner – Poster Presentation:** *Global Assistive Technology Expo & Conference*, iCONEX, SHESPro & ICMR, New Delhi, 23 Mar 2023
- **Copyright (Co-Author):** *VASCU-GUIDE: Vascular Sclerotherapy Guidance and Assistance Tools*  
IP India Registration: **SW-17454/2023**  
Software tool using AI/ML for detection and visualization of vascular malformations with treatment guidance for vein morphology and puncture point selection.
- **US Patent (Co-Inventor):** **US Patent No. 11,263,749 B1** - Predictive Prognosis Based on Multimodal Analysis, Granted Mar 2022. Developed AI-driven methods for prognosis using multimodal data, medical imaging, clinical text, and biosignals.

## Skills

**TECHNICAL SKILLS** 90%

Python, OpenCV, sklearn, pandas, MS-Office, SPSS, Adobe Pro, Origin, ChemDraw, Graphics, Mendeley, Turnitin, Data Collection and Draft Preparation, Manuscript Submissions and Response Handling.

**SOFT SKILLS** 90%

Trust, Assertiveness, Team Work and Ethics, Prioritization, Active Listening and Grasping, Respect, Emotional Intelligence

**LANGUAGES** 100%

English - Fluent (Read, Write and Understand)  
Hindi - Native  
German (B1)  
Italian (A1.1)

## Extra Curricular Certifications

- Certificate of Participation for "Kathak Dance" in The World Culture Festival hosted by the Art of Living dated 13 March 2016 at New Delhi, India.
- Certificate of Participation for "Kathak Dance" in college festival "Saanskriya-2016" hosted by Centre for Converging Technologies dated 29 April 2016 at Jaipur.
- Certificate of Participation for "Kathak Dance" in 5th Annual Dance for Kindness Worldwide Flashmob dated 13 November 2016 at Jaipur.
- Certificate of Participation for "Classical Kathak Dance" in Inter College Youth Festival hosted by Centre for Converging Technologies for the session 2016-17.
- Certificate of Participation for "Classical Dance" in 15th International Youth Festival Ghoomar 2017 hosted by University of Rajasthan dated 05 March 2017.
- Certificate of Participation for "Dance (Solo)" in college festival "Saanskriya-2017" hosted by Centre for Converging Technologies dated 10 December 2017 at Jaipur.
- Certificate of Appreciation for "Training the Participants in Dance at Summer Training Camp" in the department of "Department of Lifelong Learning" at University of Rajasthan dated 15 June 2018.
- Certificate of Participation for "Dance" in Summer Camp 2019 hosted by University of Rajasthan dated 15 June 2019.

## Interests and Hobbies

EDIFYING PEOPLE	DANCE AND MUSIC	YOGA & TRAVEL
VALUE BOOKS	ART & CRAFT	NATURE WALK

## References

References are available upon request.

## Self Declaration

I, SHIVALIKA GOYAL, declare that the information provided above is true to the best of my knowledge and belief, and I will be solely responsible for any false information or discrepancies found therein.