

**CHRIST**

(DEEMED TO BE UNIVERSITY)
BANGALORE | DELHI NCR | PUNE

Notice for the PhD Viva Voce Examination

Mr Bineesh M, Registration Number: 2072422, PhD Scholar at the School of Engineering and Technology, CHRIST (Deemed to be University), will defend his PhD thesis at the public viva-voce examination on Tuesday, 15 September 2026, at 11.30 am in CDI Conference Room, Block V, Bangalore Kengeri Campus, CHRIST (Deemed to be University), Bengaluru 560074, Karnataka, India.

Title of the Thesis	:	A Novel Approach for Deep Learning Model Based Early Lung Cancer Prediction Using Metabolomic Pathway and Medical Imaging
Discipline	:	Computer Science and Engineering
External Examiner - I	:	Dr Prabhu M Associate Professor Department of Computer Science and Engineering National Institute of Technology Calicut Kozhikode - 673601 Kerala
External Examiner - II	:	Dr Srinivasa Rao Battula Professor School of Computer and Information Sciences University of Hyderabad Hyderabad - 500046
Supervisor	:	Dr Jayapandian N Associate Professor Department of Computer Science and Engineering School of Engineering and Technology CHRIST (Deemed to be University) Bangalore Kengeri Campus Bengaluru - 560074 Karnataka

The members of the Research Advisory Committee of the Scholar, the faculty members of the Department and the School, interested experts and research scholars of all the branches of research are cordially invited to attend this open viva-voce examination.

Place: Bengaluru

Date: 03 September 2026

Registrar (Academics)

ABSTRACT

Lung cancer remains the leading global cause of cancer mortality in the world with 2.5 million new cases and over 1.8 million deaths reported worldwide in recent estimates (2022–2025) and increasing incidence in low- to middle-income countries since 1990, where early and accurate diagnosis is essential to improve patient outcomes. Low-dose computed tomography (LDCT) screening saves lives by up to 20% yet is constrained by high false positive rates (10-23%), radiation exposure, overdiagnosis, and lack of scalability, especially in resource-limited environments. This research proposes a novel approach to deep learning-based early lung cancer prediction, using symptom-based graph attention networks (GATs), graph learning via metabolomics-weighted pathway scoring, and CT image ensembles. The model uses graph-based learning with attention mechanisms, pathway-aware metabolomics analysis, and image-based deep learning to improve the accuracy of early prediction and provide biological interpretability across heterogeneous biomedical data sources. The new methodology has the potential to fill current gaps in the literature, as it enables the interpretation of clinical, metabolomic, and imaging data, outperforming existing state-of-the-art techniques. Even though issues like a scarcity of data on rare subtypes are still present, such limitations will be overcome in future research due to the use of federated learning and multi-institutional validation to enhance the generalizability and robustness even more.

Keywords: *Metabolomics, Graph Neural Network, Graph Convolutional Network, Deep Learning, Lung Cancer, CT scan, GAN, Ensemble Learning, Bioinformatics, Medical Diagnosis.*

Publications:

1. **Bineesh Moozhippurath**, Jayapandian Natarajan. "Lung cancer prediction with advanced graph neural networks" (2025) Indonesian Journal of Electrical Engineering and Computer Science, 37(2), pp. 1077–1084. DOI: <http://doi.org/10.11591/ijeecs.v37.i2.pp1077-1084>.
2. **Bineesh Moozhippurath**, Jayapandian Natarajan. "Metabolomics Pathway Prediction Using Enhanced-Graph Convolutional Networks with Graph Attention Networks", International Journal of Online and Biomedical Engineering, 2025 August. DOI: <https://doi.org/10.3991/ijoe.v21i10.55539>.
3. **Bineesh Moozhippurath**, Jayapandian Natarajan. "Deep learning ensembles for lung cancer detection in thoracic CT scans leveraging generative adversarial network technology" (2026) IAES International Journal of Artificial Intelligence (IJ-AI), 15(2), 1605-1612. DOI: <http://doi.org/10.11591/ijai.v15.i2.pp1605-1612>.
4. **Bineesh Moozhippurath**, Jayapandian Natarajan. "Enhanced Lung Cancer Detection Using Graph Convolutional Networks (GCN) Approach." 2024 IEEE 4th International Conference on ICT in Business Industry & Government (ICTBIG). IEEE, December 2024. DOI: <http://doi.org/10.1109/ICTBIG64922.2024.10911204>.
5. **Bineesh Moozhippurath**, Jayapandian Natarajan. "Enhancing Metabolomics Pathway Prediction with Sequential Graph Convolutional Network." 2025 IEEE 14th International Conference on Communication Systems and Network Technologies (CSNT). IEEE, APRIL 2025. DOI: <http://doi.org/10.1109/CSNT64827.2025.10967932>.