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Notice for the PhD Viva Voce Examination

Ms Sripavithra C K, Registration Number: 2071311, PhD Scholar at the Department of Computer Science, School of Sciences, CHRIST (Deemed to be University), Bangalore will defend her PhD thesis at the public viva-voce examination on Thursday, 25 September 2025 at 11.00 am in Room No. 044, Ground Floor, R & D Block, CHRIST (Deemed to be University), Bengaluru – 560029, Karnataka, India.

Title of the Thesis	:	**Dynamic Scheduling of Budget-Constrained Workflows in the Cloud Environment with Improved Resource Utilization and Energy Efficiency**
Discipline	:	**Computer Science**
External Examiner - I	:	**Dr Raees A Khan** Professor and Head Department of Information Technology School for Information Sciences and Technology Babasaheb Bhimrao Ambedkar University Vidya Vihar, Raebareli Road Lucknow - 226025 Uttar Pradesh
External Examiner - II	:	**Dr Gladston Raj S** Professor Department of Computer Science Government College, Kariavattom Trivandrum - 695581 Kerala
Supervisor	:	**Dr Kirubanand V B** Associate Professor Department of Computer Science School of Sciences CHRIST (Deemed to be University) Bengaluru – 560029 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.

Registrar (Academics)

Place: Bengaluru
Date: 15 September 2025

ABSTRACT

Cloud computing enables the scalable execution of data-intensive scientific workflows. However, scheduling such workflows under budget constraints is challenging due to task dependencies and heterogeneous resources. This research introduces two dynamic scheduling algorithms: the Enhanced Salp Swarm Algorithm (ESSA) and its energy-aware variant, Energy-Aware Enhanced Salp Swarm Algorithm (EA-ESSA). ESSA integrates a Modified Task Duplication Scheduling Algorithm (M-TDSA) to reduce communication delays and a Multi-objective Salp Swarm Algorithm (M-SSA) to optimize resource allocation using realtime spot pricing. Together, they minimize makespan and enhance resource utilization within user-defined budget limits.

EA-ESSA extends ESSA by incorporating energy awareness and using a power model based on CPU usage and workload distribution to reduce energy consumption without sacrificing performance. Both algorithms are evaluated using synthetic and real-world scientific workflows, demonstrating improved scheduling efficiency, reduced execution time, and energy savings. The proposed methods offer a sustainable and cost-effective approach to workflow execution, benefiting cloud providers and the scientific computing community.

Keywords: *Dynamic scheduling, scientific workflows, budget constraint, resource utilization, makespan, energy consumption.*

Publications:

1. **C. K. Sripavithra** and V. B. Kirubanand, "ESSA Scheduling Algorithm for OptimizingBudget-Constrained Workflows," in *Proc. Int. Conf. Electrical, Computer, Communications and Mechatronics Engineering (ICECCME)*, 2022, pp. 1–8, doi:10.1109/ICECCME55909.2022.9988009.
2. **C. K. Sripavithra** and V. B. Kirubanand, "A Review on Recent Scheduling Algorithms in the Cloud Environment," *AIP Conference Proceedings*, vol. 2909, no. 1, 2023, doi: 10.1063/5.0183242.
3. **C. K. Sripavithra** and V. B. Kirubanand, "Optimizing QoS and Energy using ESSA for Budget-constrained Workflows in the Cloud," *International Journal of Intelligent Systems and Applications in Engineering*, vol. 12, no. 21s, pp. 3491–3498, 2024.
4. **C. K. Sripavithra** and V. B. Kirubanand, "A Systematic Investigation of Workflow Scheduling Techniques in the Cloud," in *Science and Technology: Recent Updates and Future Prospects*, K. Kassmi, Ed., vol. 11, BP International, pp. 1-12, Sep. 2024. doi:10.9734/bpi/strufp/v11/1629.
5. **C. K. Sripavithra** and V. B. Kirubanand, "An Energy-aware Dynamic Scheduling Algorithm for Optimizing Workflows under Budget-constraints," *Journal of Internet Services and Information Security (JISIS)*, vol. 15, no. 1, pp. 182–199, Feb. 2025, doi: 10.58346/JISIS.2025.I1.012.
6. **C. K. Sripavithra**, V. B. Kirubanand, S. P. Dhushyanth and P. T. Bavana, "Dynamic Scheduling of Scientific Workflows with Budget-constraints in the Cloud," *ICSCPS 2024, Smart Innovation, Systems and Technologies*, vol. 435, pp. 575-588, Jul. 2025. Springer, Singapore. doi: 10.1007/978-981-96-2182-8_43