

Bricks with Clay*

The Quarterly Newsletter of MFSDSAI @ IITPk

This is the fifth issue of the quarterly newsletter of the Mehta Family School of Data Science & Artificial Intelligence at IIT Palakkad. The newsletter features important events in the school and the achievements of the members in the quarter. This edition also features conversations with a faculty member and an interview with one of the alumni from the first M.Tech batch.

~ Events ~

1. Talk by Prof. Sriraam Natarajan, University of Texas at Dallas

May 2026



The talk by Prof. Sriraam Natarajan from University of Texas at Dallas on **AI-in-the-loop for Maternal and Pediatric health** explored recent advances in the use of AI in predicting pre-term birth, preeclampsia, gestational diabetes, and hypertension across diverse patient populations. The talk was well-attended. Prof. Natarajan also interacted with the students and the faculty of the school prior to the talk.

2. Invited talk by Dr. Swaprava Nath, IIT Bombay

Jun 2026



Dr. Swaprava Nath delivered a talk on **When Algorithms Meet Self-Interest: Foundations of Multi-Agent AI**. Dr. Nath introduced and explored the fundamental challenges that arise when multiple strategic agents interact with algorithmic platforms. The talk elicited interesting questions from the audience.

3. Invited talk by Dr. Soumajit Pramanik, IIT Bhilai

Jul 2026



Dr. Soumajit Pramanik from IIT Bhilai delivered a talk on **Unified question answering over RDF knowledge graphs and natural language text**. In this talk, Dr. Pramanik explained their newly developed question answering system that seamlessly operates over RDF datasets and text corpora, or both together, in a unified framework.

~ Conferences ~

1. Industry-Academia Summit at Microsoft Research, Bangalore

Jun 2026

Thomas John and Dr. Mrinal Das were invited by MSR to attend an industry-academic summit at Bangalore.

2. Course at IIT Madras, Zanzibar campus

Jun 2026

Dr. Abhinandan Prasad offered a course on **Digital Transformation** at IIT Madras, Zanzibar campus.

3. Workshop on Integrated Technology Platforms, Election Dept. of Tripura

Jun 2026



Dr. V. Raghava Mutharaju was invited to attend a workshop organized by the election department of Tripura, at Agartala. He gave a talk on **AI for Elections: Strengthening Transparency through Structured Data and Explainable Systems**.

4. Conference organized by Office of the Chief Electoral Officer, Kerala

Jul 2026



Dr. Garima Shakya was invited to attend **International Conference on Model Standards for Election Technology**, organised by Office of the Chief Electoral Officer, Kerala at Thiruvananthapuram. Dr. Garima was also part of a panel discussion on *challenges and lessons learnt in the perspective of model standards for election technology*.

~ Publications ~

- “Going Beyond Explainability: Learning Justifiable Vision Transformers Guided by Flow Matching”, Thomas John, Akshay Krishna, Jotipriya Das, Mrinal Das, *accepted to European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML PKDD)*, 2026.
- “Interpretable Anomaly Detection in Space Systems Using Physics-Informed Clustering”, J Samuel, S Bhadra, M Mukundan, Sanood U, M Tharikh, **Journal of Aerospace Information Systems**, 1-12, Jun 2026.
- “Psych-Air: Predictive Smog Analytics for Psychotic Disorder Patients’ Risk Assessment in Smart Cities”, S. Dey, A. S. Prasad, S. Mishra and D. Ramesh, in **IEEE Internet of Things Journal**, vol. 13, no. 15, Aug, 2026.
- “NSORN: Designing a Benchmark Dataset for Neurosymbolic Ontology Reasoning With Noise”, Julie Loesch, Gunjan Singh, Raghava Mutharaju, Remzi Celebi, **Neurosymbolic Artificial Intelligence**, Aug 2026.
- “Secure Distributed Hypothesis Testing”, G. Kurri, V. Narayanan, V. M. Prabhakaran, K. R. Sahasranand, *accepted to IEEE Information Theory Workshop (ITW)*, 2026, Arizona, USA.
- “Apple: A Modular Ontology of Applied Ethics and Event Context for Ethical Decision Modeling”, Aisha Aijaz, Raghava Mutharaju, Manohar Kumar, *accepted at the 45th International Conference on Conceptual Modeling (ER 2026)*, St. John’s, Canada, October 2026.
- “CORE-LLM-Bench: A Benchmark Dataset for Evaluating Complex Ontological Reasoning Capabilities of Large Language Models”, Julie Loesch, Sara Falahatkar, Nicole Makayla Kilk, Rishabh Jakhar, Raghava Mutharaju, Michel Dumontier, Remzi Celebi, *accepted at the 20th International Conference on Neurosymbolic Learning and Reasoning (NeSy 2026)*, Lisbon, Portugal, September 2026.

~ Welcome! ~

The school extends a hearty welcome to the new B.Tech, M.Tech, MS, and PhD students!

~ Achievements ~

- The Australia-India Partnership project for **Addressing Barriers to Safe, Standards-Based AI Adoption**, AIC-CTP DFAT, Australia, was sanctioned with Dr. Narayanan C Krishnan as the Principal Investigator from India in collaboration with Swinburne University, 2026.

Congratulations, CK!

- This year marks the completion of 5 years since the M.Tech Data Science programme was started. *On this occasion, we feature an interview with one of the alumni from the **first M.Tech batch**, in the sequel.*



M.Tech (2021-2022)

- The **first** batch of B.Tech Data Science & Engineering and the **fifth** batch of M.Tech Data Science graduated with flying colours.



B.Tech (2022-2026)



M.Tech (2025-2026)



Mr. Mohammad Tafreeq was awarded the MS degree for his thesis titled *Validation of Numerical Information for Knowledge Graphs*, completed under the guidance of Dr. Koninika Pal.

Congratulations to all the graduates!

~ Alum 'n us speak ~

In conversation with **Mr. Narthu Chandrasekhar**, M.Tech Data Science alumnus, 2021-'22.



Q. *We are proud to feature your interview. How was your experience at IIT Palakkad?*

A. Thanks for this opportunity! Being part of the first M.Tech Data Science batch at IIT Palakkad was a great experience. The curriculum balanced theory and hands-on work, which helped me build solid skills. We also got useful guidance from senior MS students when choosing electives and projects. Initially, we were worried about placements since the program was new, but the Training and Placement Office brought in good companies and created real opportunities.

Q. *Can you tell us about your career path after graduation?*

A. I completed my undergraduate degree in Computer Science and Engineering from Rajiv Gandhi University of Knowledge Technologies (RGUKT), Nuzvid, Andhra Pradesh. After my M.Tech, I joined Wabtec through their LEAD Program, where I worked on industry-oriented data science problems. I eventually became a Senior Data Scientist in the R&D team, working mainly on predictive modeling and computer vision. Later, I moved to **Honeywell**, where I currently work as an Advanced Data Scientist. My current focus is on Generative AI, particularly Small Language Models (SLMs) and Retrieval-Augmented Generation (RAG).

Q. *What tools and ideas do you work with these days?*

A. My work involves a combination of Generative AI and Computer Vision. I primarily work with tools like PyTorch, Dataiku, AWS, and NVIDIA edge devices. I also use TensorRT for model optimization and LoRA for efficient

fine-tuning of language models. GitHub Copilot is another tool I use regularly for AI-assisted development.

Q. *Looking back, from an industry perspective, what do you feel about the relevance of our courses and MTP?*

A. From my experience, I feel the M.Tech courses and project work were highly relevant to industry. Courses like Data Engineering, Machine Learning, Deep Learning, and Computer Vision gave me a strong foundation that I've been able to apply throughout my career. The combination of theory and hands-on projects also helped me transition into industry effectively. From today's industry perspective, I think adding **more cloud- and edge-deployable projects would be beneficial**. Projects that cover the entire journey—from data preparation and model development to deployment—would give students even better exposure to real-world challenges.

Q. *Any suggestions for industry-relevant courses/projects that we could include in the curriculum?*

A. I think the foundation courses should definitely remain an important part of the curriculum, especially Linear Algebra, Probability and Statistics, Data Engineering, Machine Learning, Deep Learning, and Computer Vision. At the same time, since the AI industry is evolving rapidly, I think it would be useful to introduce electives and project-based courses in emerging areas like Generative AI and Agentic AI.

Q. *Are you in touch with your friends from M.Tech? What are they doing, generally?*

A. Yes, I'm still in touch with many of my M.Tech batchmates. Most of them are working in the corporate sector, primarily in roles related to Data Science and AI/ML, across different organizations. We continue to stay connected and share our experiences and updates about the industry. I think that's particularly valuable in AI because the field is evolving so quickly, and staying connected with peers helps us learn about new technologies, trends, and opportunities.

Q. *Any tips for the current and upcoming M.Tech students?*

A. My biggest advice would be to build strong fundamentals. Even

in technical interviews, **the basics are often more important than knowing the latest tools or frameworks**. Don't be intimidated by how quickly AI is evolving. If your fundamentals are strong, it becomes much easier to learn and adapt to new technologies. I'd also encourage students to focus on understanding their projects rather than just completing them. One or two well-executed, deployable projects, combined with strong coursework, can make a big difference when entering the industry.

Chandrasekhar would be happy to connect and share his experience with students.

~ Research Corner ~

In conversation with **Dr. Nikhil Krishnan** who was awarded the Advanced Research Grant (MATRICS) recently.



Q. *Congratulations on the ARG-MATRICS grant! Can you explain the proposal briefly?*

A. Thanks! The explosive growth in data necessitates the use of large-scale distributed storage systems, which commonly employ thousands of servers. Because disk failures in these environments are frequent, we rely on erasure coding techniques to ensure data reliability. As disks age, their reliability characteristics change, and modern systems try to dynamically adjust these erasure codes to optimize storage space. However, convert-

ing from one code to another can incur severe I/O and bandwidth costs. To address this, the theoretical framework of **convertible codes** was recently introduced, leveraging tools from coding and information theory. My ARG-MATRICS project builds on this framework to tackle key open problems—specifically, designing access-optimal codes that are computationally less-complex (require a small alphabet size), finding bandwidth-optimal constructions for different conversion regimes, and extending many of these ideas to codes that are efficient for node repair, like Locally Regenerating Codes.

Q. *The ideas seem to be related to Communication Engineering as well as Data Science. Tell us about your academic background.*

A. The connection is quite direct. My formal degrees are entirely in the communications domain — a

B.Tech in Electronics and Communication Engineering from the Amrita School of Engineering, followed by an M.E. in Telecommunications and a PhD in Electrical Communication Engineering from IISc, Bengaluru. Fundamentally, my training is in coding theory. The intersection with data science happens primarily at the systems level. The mathematical tools used in coding theory to correct errors over noisy communication channels are often the same ones needed to reconstruct lost data in massive distributed storage/compute systems.

Q. *What are your research interests in addition to the above?*

A. Beyond convertible codes, I maintain a strong interest in streaming codes, which are crucial for real-time applications where stringent delay guarantees exist for message packet delivery. I am also working in the area of distributed computing and dis-

tributed learning—specifically looking at problems like distributed linearly separable computations and gradient coding. In these distributed setups, handling slow “straggler” nodes or communication bottlenecks often fundamentally boils down to coding theory problems. Additionally, I am currently looking into **Quantum Error-Correcting Codes** (QECC), which is a very natural and exciting avenue for classical coding theorists.

Q. *Sounds math-heavy. How does one prepare for these areas?*

A. It is math-heavy, but completely approachable if you build the right foundation. For students, that means genuinely investing time in foundational courses like Linear Algebra, Probability and Statistics, or Mathematics for Data Science. I always encourage students not to rush past these basics, and to spend time getting comfortable with mathematical proofs and algorithmic thinking. Once those fundamentals are strong, transitioning into advanced, specialized electives like Error-Correcting Codes and transitioning to research becomes a very natural and manageable step.

Q. *What are the career opportunities for students who specialize in these areas?*

A. At present, students focusing on coding theory typically find roles

in the telecommunications area or in companies building cloud infrastructure. At that scale, simply replicating data to prevent loss is too expensive, so optimizing resources using erasure codes is an absolute necessity. Looking ahead, another critical application is quantum computing. Building reliable quantum computers is currently bottlenecked by the extreme fragility of quantum states. Solving this requires quantum error correction, making this a highly important area for the future. Beyond these specific domains, the mathematical rigour gained is a broader advantage, giving students a distinct edge, perhaps in any technical role.

Q. *Apart from academics, what do you enjoy?*

A. I am trained in Carnatic music and do vocal concerts. I listen to film and independent music as well, especially melodies. We also have a small faculty jamming group here on campus, and we occasionally get together for jamming sessions.

Q. *Carnatic concerts! That must entail preparation as well as spontaneity. Is that how your lectures also go?*

A. Yes, absolutely. While you always need a solid foundation of preparation, another theme that I personally connect with across

a musical performance, a lecture, or research, is creativity. In a concert, creativity often happens spontaneously—an interesting melodic or rhythmic phrase might just emerge naturally from the collaboration with accompanying artists. Classrooms work the same way. *You can prepare extensively, but an unexpected question from a student can spark moments of genuine spontaneity.* Whether in a lecture or during research discussions, that spontaneous back-and-forth is often what naturally leads to a new proof idea or an interesting mathematical construct, or an algorithm.

Q. *Do you have any new ideas for the school or for our students?*

A. It might not be a completely new idea, but there is a general trend of students restricting themselves to being just consumers of black-box AI tools. While staying up-to-date with these tools is absolutely necessary, understanding their mathematical underpinnings is equally important. That is often how real innovation happens. More student-driven activities in informal settings—like reading groups and blackboard sessions—could really help in this regard.

Dr. Nikhil would be happy to chat, particularly if you have any errors to correct. One can find him in his office in B03.

~ Editor's dime for the quarter ~

This argument is very well expressed in Professor Jefferson's Lister Oration for 1949, from which I quote. "Not until a machine can write a sonnet or compose a concerto because of thoughts and emotions felt, and not by the chance fall of symbols, could we agree that machine equals brain-that is, not only write it but know that it had written it. No mechanism could feel (and not merely artificially signal, an easy contrivance) pleasure at its successes, grief when its valves fuse, be warmed by flattery, be made miserable by its mistakes, be charmed by sex, be angry or depressed when it cannot get what it wants."

This argument appears to be a denial of the validity of our test. According to the most extreme form of this view, **the only way by which one could be sure that machine thinks is to be the machine and to feel oneself thinking**. One could then describe these feelings to the world, but of course no one would be justified in taking any notice. Likewise, according to this view the only way to know that a man thinks is to be that particular man. It is in fact the solipsist point of view. It may be the most logical view to hold but it makes communication of ideas difficult. A is liable to believe "A thinks but B does not" whilst B believes "B thinks but A does not". Instead of arguing continually over this point it is usual to have the polite convention that everyone thinks.

I am sure that Professor Jefferson does not wish to adopt the extreme and solipsist point of view. Probably he would be quite willing to accept the imitation game as a test. The game (with the player B omitted) is frequently used in practice under the name of viva voce to discover whether some one really understands something or has "learnt it parrot fashion." Let us listen in to a part of such a viva voce:

Interrogator: In the first line of your sonnet which reads "Shall I compare thee to a summer's day," would not "a spring day" do as well or better?

Witness: It wouldn't scan.

Interrogator: How about "a winter's day," That would scan all right.

Witness: Yes, but nobody wants to be compared to a winter's day.

Interrogator: Would you say Mr. Pickwick reminded you of Christmas?

Witness: In a way.

Interrogator: Yet Christmas is a winter's day, and I do not think Mr. Pickwick would mind the comparison.

Witness: I don't think you're serious. By a winter's day one means a typical winter's day, rather than a special one like Christmas.

And so on. What would Professor Jefferson say if the sonnet-writing machine was able to answer like this in the viva voce? I do not know whether he would regard the machine as "merely artificially signalling" these answers, but if the answers were as **satisfactory and sustained** as in the above passage, I do not think he would describe it as "an easy contrivance."

— Alan M. Turing (1950), **Computing Machinery and Intelligence**, *Mind* 49: 433-460.

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