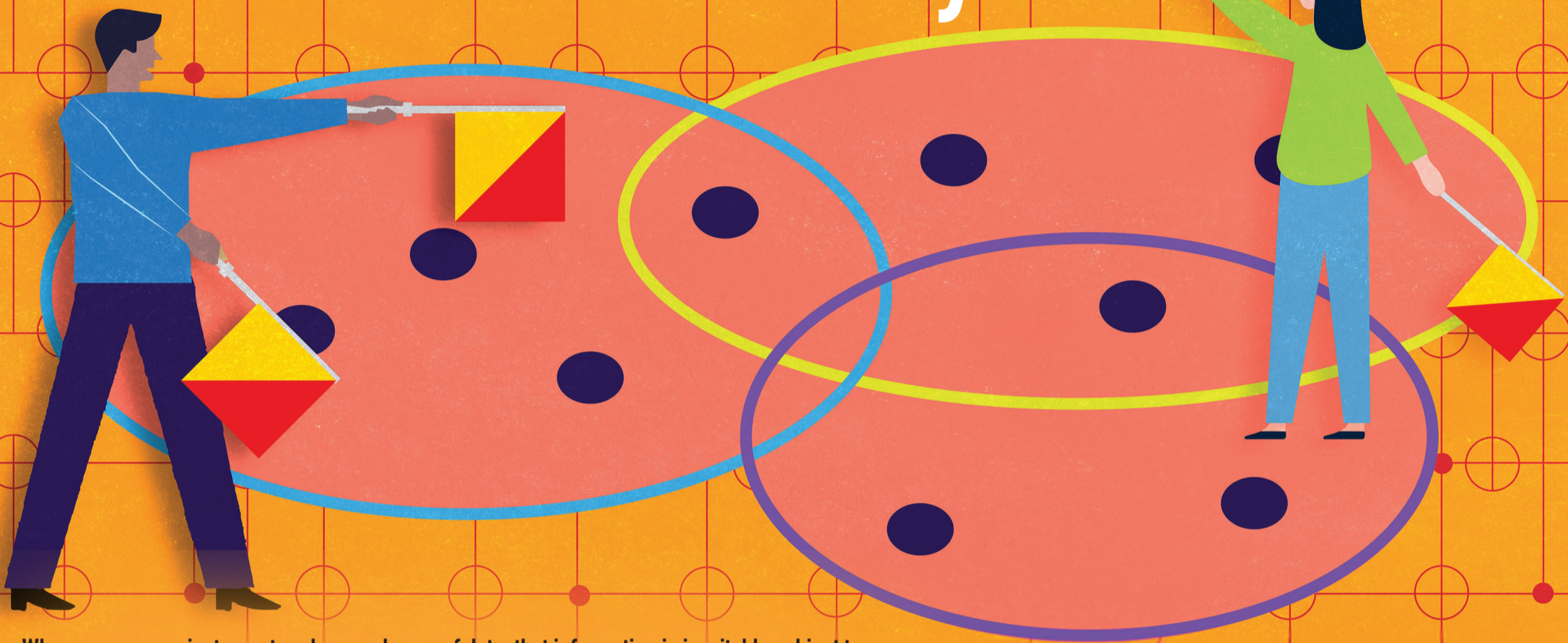# Coding Theory: Error-Resilience via Judicious Redundancy

When we communicate or store large volumes of data, that information is inevitably subject to errors introduced by various forms of noise and interference. Yet, remarkably, we routinely take seamless and reliable digital communication for granted, a foundation without which modern society could not function. At the core of this resilience are *error-correcting codes*---mathematical constructs that impose judiciously tailored redundancies on the data to ensure that errors, within anticipated limits, can be quickly detected and corrected. The talk will offer a gentle introduction to error-correcting codes and the basic principles behind them, highlight some well-known constructions, and showcase a few applications in communication and beyond. Time permitting, we may also touch upon quantum error-correction, which presents unique challenges central to the realization of practical quantum computers.

4 PM, Saturday, 10 May 2025

Jawaharlal Nehru Planetarium, Bengaluru

Registration Link: bit.ly/KwK_May2025
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Venkatesan Guruswami

Venkatesan Guruswami is a Chancellor's Professor of Computer Science and Interim Director of the Simons Institute for the Theory of Computing at the University of California, Berkeley. He received his undergraduate degree at IIT Madras and his doctorate from MIT, where his thesis on list error-correction received the ACM Doctoral Dissertation Award. Venkat is a theoretical computer scientist with research interests spanning coding theory, computational complexity, and related mathematics. He currently serves as the Editor-in-Chief of the Journal of the ACM. A fellow of the ACM, IEEE, and AMS, his recognitions include the Presburger Award, a Simons Investigator award, Guggenheim, Packard and Sloan Fellowships, and a distinguished alumnus award from IIT Madras. In his (alas, limited) time outside work, Venkat enjoys traveling, vegetarian food, racquet sports, suspense movies, and Carnatic music.

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