



NATIONAL INSTITUTE OF TECHNOLOGY
CALICUT

DEPARTMENT OF PHYSICS

GUEST LECTURE

Hydrogels: Next-Generation Smart Materials for Multifunctional Applications

Sustainable Natural Polysaccharide
Platforms for Societal Impact



INVITED SPEAKER

Dr. Vijay Kumar

Assistant Professor,
Department of Physics
NIT Srinagar, Jammu & Kashmir



Featured in Stanford-Elsevier World's Top 2% Scientists
(2023-2025)



DATE

12th October



TIME

11:00 AM – 12:00 PM



VENUE

Raman Hall,
Dept. of Physics



Student Interaction Session following the lecture

MULTIFUNCTIONAL APPLICATION DOMAINS



Biomedical Delivery

pH-responsive swelling for controlled and targeted drug delivery systems.



Smart Agriculture

Soil moisture retention and controlled release of essential fertilizers.



Water Remediation

High surface area networks for dye removal and oil-spill cleanup.



Sustainable Packaging

Antimicrobial, biodegradable, and moisture-regulating biopolymer films.



Talk Highlights:

Hydrogels are three-dimensional crosslinked hydrophilic polymer networks with tunable properties, biocompatibility, and stimuli responsiveness. This lecture highlights natural polysaccharide-based hydrogels derived from neem, amla, guggul, hing, and fenugreek gums as sustainable, versatile smart materials for addressing societal challenges in healthcare, food security, and environmental protection.



ALL FACULTY MEMBERS, RESEARCH SCHOLARS, AND
STUDENTS ARE CORDIALLY INVITED