



DST-AMRITA  
TECHNOLOGY  
ENABLING  
CENTRE



The background of the page features a grayscale photograph of a complex industrial facility. The scene is filled with large pipes, scaffolding, and structural steel. In the foreground, there's a dark, curved graphic element that looks like a stylized 'A' or a wave. The overall atmosphere is technical and modern.

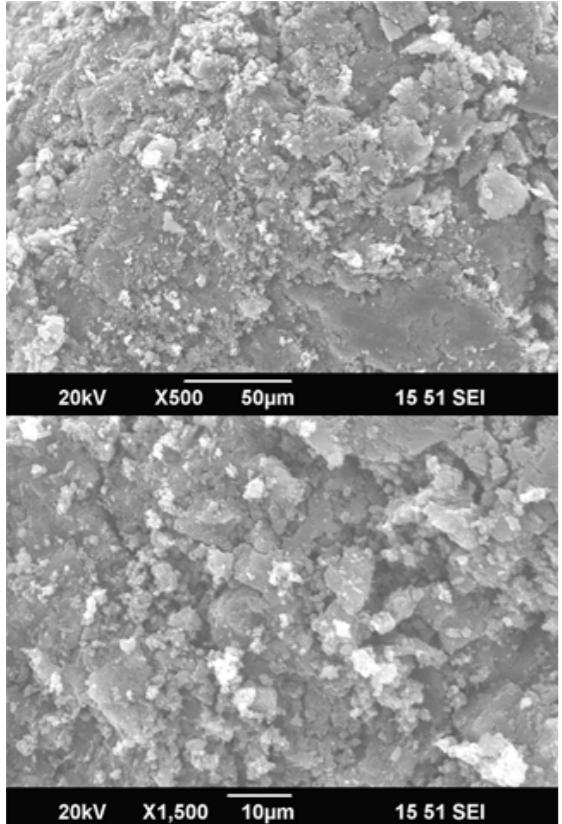
# NEWS LETTER

## DST AMRITA TEC

JAN - JUN 2024

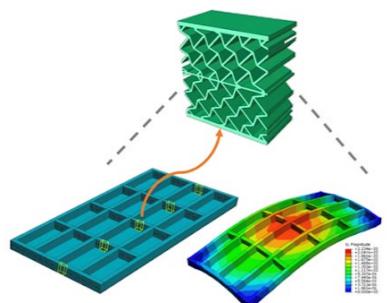
# TECHNOLOGIES DEVELOPED

A Novel & Effective EMI shielding materials



SEM micrographs of polyaniline at two different dimensions.

A Novel & Effective EMI shielding materials



Auxetic structures, a subset of mechanical metamaterials, are gaining significant attention for their unique geometries and negative Poisson's ratio, which impart unconventional properties like negative thermal expansion, enhanced energy harvesting, and superior load-bearing capacities. Recent advancements include the development of high-strength auxetic members with a 65% reduction in material usage compared to conventional

beams while maintaining exceptional load-bearing capabilities. These properties enable diverse applications, from shape-morphing skins in aerospace to impact protection in automotive and aerospace sectors, and advanced nano-scale biomedical devices that improve the biomechanical properties of bone implants.

# TECHNOLOGIES COMMERCIALIZED

A Indigenous composite material for Defence application



A groundbreaking composite material developed by Professor Shantanu Bhowmik, from Amrita Vishwa Vidyapeetham is commercialized for defense technologies that can be impervious to bullets, resistant to explosions, and fireproof. It is projected to save India approximately Rs 20,000 crore annually by reducing reliance on imported defense materials. It aims to enhance the safety of soldiers and paramilitary personnel significantly.

Rigorous tests confirmed its resilience to explosions and its lightweight nature compared to armored steel, with field trials in the Siachen Glacier proving its effectiveness, marking a game-changer for defense and paramilitary forces, anticipating substantial savings and honoring national heroes through dedicated applications in various defense scenarios.

## Commercialisation of IoT Enabled Flood Warning System for Smart Cities



To enhance public safety and address the flooding issues, Thiruvananthapuram, Kerala, has deployed a new flood warning system commercialized by Amrita Technology Enabling Centre (Amrita TEC). Part of the Thiruvananthapuram Smart City project, this system uses radar-based sensors in canals to monitor water levels in real-time. Data is sent to a central control center, enabling timely alerts to residents via sirens, text messages, and social media. This early warning system helps residents take preventative actions, such as evacuating or securing property, to reduce damage and ensure safety during floods.



## Industry Interactions with Wipro Team

Dr. Krishnashree Achuthan, Director of Amrita Technology Enabling Center (TEC), led a strategic meeting with senior leaders from Wipro, including the Senior Partner and Senior Consultant of the Skilling Team, to explore collaboration in cyber technologies and establish a Wipro-Amrita Center of Excellence in Cyber Security. The key initiatives include developing academic programs for Wipro employees, organizing industry-academic events, and launching nationwide cybersecurity outreach to identify and nurture talent.

## Interventions for Coir Industry

"A team from the Technology Enabling Centre (TEC) recently conducted a site visit to evaluate a promising coir pot-making machine designed to produce a range of coir products. The team assessed the machine's vertical design and adjustable stroke capabilities through hands-on trials and facility tours, gaining valuable insights into the associated manufacturing and quality control processes. The visit also included an exploration of a coir root trainer unit, where the team gathered information on production requirements, raw material sourcing, and marketing strategies, underscoring the coir industry's role in sustainable development. Meetings with industry leaders provided further insights into the sector's needs, potential research opportunities, and avenues for collaboration. Additionally, commitments were secured to develop custom coir machinery, with a focus on automation, IoT integration, and energy efficiency."



Amrita TEC team visit to SKS Hydraulics

# INDUSTRY INTERACTIONS FOR TECHNOLOGY ENABLEMENT THROUGH TEC



Interactions with Coir Consultant.



Amrita TEC team engagement with Essar Engineers.



Amrita TEC team at Parambikkulam Forest Reserve Coir Plant



### Interaction Self Help Group (SHG) for Waste to Wealth generation from Water Hyacinth

A team from Amrita Technology Enabling Center visited to identify the challenges faced by the Self Help Group (SHG) in the value addition of water hyacinth. The team interacted to identify the technology intervention required for the SHG to convert the waste to wealth from water hyacinth with affordable advanced technology.

### Engagements with Industrial Association - BCIC, Bangalore.



DST Amrita TEC Interaction with the BCIC Board

Dr. Krishnashree Achuthan, Director of Amrita TEC, along with the governing member of the Bangalore Chamber of Industries and Commerce (BCIC) had an interaction for organizing AR/VR training programs, collaborating on autonomous vehicles, and hosting a technology transfer conference.

### Engagements with Industrial Association - COSIEMA



TEC team visited COSIEMA, Coimbatore

Amrita Vishwa Vidyapeetham's Technology Enabling Centre (TEC) visited the SIDCO Industrial Estate in Eachaneri, Coimbatore, for a meeting with key figures from the Coimbatore SIDCO Industrial Estate Manufacturers' Association (COSIEMA). The meeting explored technology transfer, problem-solving solutions, and driving innovation in Coimbatore's manufacturing sector, aiming to strengthen the link between academia and industry and tailor TEC's services to address local business needs and challenges.

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Technology  
Enabling Centre  
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practices.*

# TRAINING PROGRAMS ORGANIZED

The DST- Amrita Technology Enabling Centre ignites a passion for innovation among students and developers through dynamic training sessions that bridge the gap between theoretical knowledge and cutting-edge engineering practices. TEC's diverse training programs empower participants across all engineering disciplines with the latest knowledge, fostering innovation and curiosity. By equipping students, faculty, researchers, and industry professionals with valuable skills, TEC paves the way for future advancements and groundbreaking discoveries in the ever-evolving world of engineering.

These programs not only cater to skill development but also create awareness about the Technology Readiness Level (TRL) and the activities of the TEC. By addressing industry needs, they facilitate networking, knowledge dissemination, and the transformation of creative ideas into practical applications, contributing to the overall growth and advancement of the community.

**A sneak peek at the rise of Gen AI and what it means for businesses**

**Topics of Discussion:**

- Gen AI presents both opportunities and challenges for businesses.
- Embracing AI responsibly and inclusively is crucial in shaping a better future.

**Date & Time:** Monday, 8 July 2024 | 3:00 PM - 4:00 PM

**Registration Link:** [Register Now](#)

**Accreditation:** NAAC A++ ACCREDITED | NIRF 7TH BEST UNIVERSITY IN INDIA | No.1 THE IMPACT RANKINGS 2023

**Synergistic Integration and Emerging Trends in Multiscale Filler Reinforcement for Smart Hybrid Polymer Composites**

**TOPICS OF DISCUSSION:**

- Processing technologies: commodity and high-performance thermoplastics and thermoset composites
- Reinforcements in multiscale polymer composites
- Multiscale composites manufacturing
- Exploration of the synergy between micron, 0D, 1D, 2D nano fillers
- Evolving strategies and challenges for performance improvement

**Date & Time:** WEDNESDAY/19 JUN 2024 | 10:00 AM TO 11:00 AM

**Registration Link:** [Registration Link](#)

**Accreditation:** NAAC A++ ACCREDITED | NIRF 7TH BEST UNIVERSITY IN INDIA | No.1 THE IMPACT RANKINGS 2023

**Materials for Solid State Hydrogen Storage**

**Date:** June 22nd 2024 | **Time:** 11.00 AM - 12.00 PM

**Topics of Discussion:**

- Hydrogen, as an energy carrier.
- Hydrogen production and storage
- The major challenges in developing hydrogen storage materials
- Various physical and chemical methods of hydrogen storage.
- Competent high-capacity metal hydrides for hydrogen storage.

**Speaker:** Dr. Thirugnasambandam G.M  
Associate Professor,  
Department of Chemical Engineering and Materials Science,  
Amrita Vishwa Vidyapeetham, Coimbatore

**Registration Link:** [Register Here](#)

**Accreditation:** NAAC A++ ACCREDITED | NIRF 7TH BEST UNIVERSITY IN INDIA | No.1 THE IMPACT RANKINGS 2023

**Water-Energy Nexus:  
Sustainable Technologies  
for Real-Time Sensors &  
Hydrogen Production.**

**Date:** JUNE 6<sup>th</sup>, 2024 | **Time:** 10.00 am to 11.00 am

**Topics of Discussion:**

- Green hydrogen production by water electrolysis.
- Real-time sensors in semiconductor industry and precision agriculture.

**Speaker:** Dr. Murali Rengarajan  
Professor, Department of Chemical Engineering & Materials Science, Chairperson, Center of Excellence in Advanced Materials & Green Technologies, Amrita Vishwa Vidyapeetham, Coimbatore

**Registration Link:** [Registration Link](#)

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**FREE WEBINAR**

**Implications of Artificial Intelligence in Biomarker Prediction**

**MAY 25<sup>th</sup>, 2024 | 07:00 PM - 08:00 PM**

**Topics of Discussion:**

- Artificial Intelligence
- Machine Learning
- Graph Algorithm
- Bioinformatics
- Biomarkers
- Computational Systems Biology
- Metabolic Engineering

**Speaker:** Dr. Harishchander Anandaram  
Assistant Professor,  
Center for Computational  
Engineering and Networking (CCEN),  
Coimbatore Campus

**Registration Link:** [Registration Link](#)

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**ARTIFICIAL INTELLIGENCE FOR  
HEALTHCARE DATA  
ANALYSIS**

**Topics of discussion:**

- Introduction to AI
- Role of AI in Healthcare Research Opportunities in Healthcare Data Analysis
- Ongoing Research in AI and Healthcare @ Amrita Vishwa Vidyapeetham

**Speaker:** Dr. V. Sowmya  
Assistant Professor  
Amrita School of Artificial Intelligence,  
Coimbatore

**Registration Link:** [Registration Link](#)

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**A Declarative Approach To Detecting Design Patterns From Object Oriented Software**

**Topics of discussion**

- Gang-of-four patterns
- Design pattern detection
- Declarative specification
- Translation to SQL queries
- Handling variants
- Experimental results

**Speaker:** Dr. Swaminathan. J  
Associate Professor, Chairperson, Department of CSE, School of Computing, Amritapuri.

**Date:** 25 APRIL, 2024 | THURSDAY | 5:00 PM TO 6.00 PM

**Registration link:** [Registration Link](#)

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**EXPLORING THE SPECTRUM: CUTTING-EDGE INSIGHTS INTO HYPERSPECTRAL IMAGING AND ITS DIVERSE APPLICATIONS**

**WEBINAR**

**Dr. Anand R**  
Assistant Professor  
Department of Electrical and Electronics Engineering, School of Engineering, Coimbatore.

**Topics of discussion**

- Signal and image analysis
- Real time implementation of satellite images
- Open source platforms to develop the satellite models
- AI in Satellite Images

**Date:** 24-4-2024 | **6.00PM**

**Registration link:** [Registration Link](#)

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**AI, IOT AND CYBER SECURITY IN SMART GRID**

**Topics of discussion**

- Smart Grid Facilities available in EEE department.
- Cloud Based monitoring of Power System.
- Self Healing capability to Smart Grid.

**Speaker:** Dr. S. Balamurugan  
Professor & Chairperson - EEE  
Amrita School of Engineering, Coimbatore.

**Date:** 19 April 2024 | **5PM to 5:30PM**

**Registration link:** [Registration Link](#)

**NAAC A++** **nirf** **7TH BEST UNIVERSITY IN INDIA** **No.1 THE IMPACT RANKINGS 2023**

**Water-Energy Nexus: Sustainable Technologies for Real-Time Sensors & Hydrogen Production.**

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- Green hydrogen production by water electrolysis.
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**Speaker:** Dr. Murali Rangarajan  
Professor, Department of Chemical Engineering & Materials Science, Chairperson, Center of Excellence in Advanced Materials & Green Technologies, Amrita Vishwa Vidyapeetham, Coimbatore.

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**EVOLUTION OF RESEARCH OPPORTUNITIES IN THE AEROSPACE SECTOR.**

**Topics Of Discussion**

- Research Opportunities in Aerospace
- Publication and Grant opportunities
- Research problems in dynamical systems, uncertainty quantification, low-speed aerodynamics problems and nonlinear aerelasticity

**Speaker:** Dr. J. Venkatramani,  
Assistant Professor, Department of Aerospace Engineering, School of Engineering, Amrita Vishwa Vidyapeetham, Ettimadai, Coimbatore Campus.

**Date:** 26 MARCH, 2024 | TUESDAY | **4:00 PM TO 4:45 PM**

**Registration link:** [Registration Link](#)

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**Expert Talk**

**Security and Trust in Edge Network Environments**

**Prof. Prasad Calyam**  
Professor, University of Missouri-Columbia

**Date:** 22nd March, 2024 | **Time: 10.30 A.M**

**To join Meeting Scan Here ->** [Scan Here](#)

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**AMRITA VISHWA VIDYAPEETHAM**  
ESTD. TO BE UNIVERSITY UNDER SECTION 3 OF UGC ACT, 1956

**DST-AMRITA TECHNOLOGY ENABLING CENTRE**

**Expert Talk**

**Cyber Defence**

**Industry Best Practices**

**Date:** 13th February, 2024.

**Venue:** Sreekrishna Hall, Amrita School of Business, Amritapuri.

**Time:** 3.15 – 4.30 P.M

**Meeting Link:** <https://bit.ly/42Dugpb>  
**Scan Here ->** [Scan Here](#)

**Shanavas Chemmamkuzhi**  
Senior Partner & Head of Cyber Defense Centre, Cybersecurity & Risk Services at Wipro Ltd

**AMRITA VISHWA VIDYAPEETHAM**  
ESTD. TO BE UNIVERSITY UNDER SECTION 3 OF UGC ACT, 1956

**DST-AMRITA TECHNOLOGY ENABLING CENTRE**

**Research Trends in e-Mobility**

**Speaker:** Dr. K. Deepa  
Associate Professor, Electrical and Electronics Engineering, School of Engineering, Bengaluru.

**Topics Of Discussion**

- Electric vehicle charging and balancing techniques
- On board and off board chargers
- V2G, G2V, V2H, H2V, etc
- Battery management systems

**Date:** April 18, 2024 | **6:00 PM to 7:30 PM**

**Registration link:** [Registration Link](#)

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# EVENTS

## DST TEC Conclave 2024

The Department of Science and Technology (DST) organised the 'TEC Conclave 2024' on March 14, 2024 at DELNET, New Delhi. Dr. Krishnashree Achuthan, Director DST-Amrita TEC demonstrated the success story of the DST Amrita Technology Enabling Center. It served as an platform to network with peer TECs for collaborations. Co-ordinators from 22 TECs presented the accomplishments of their centres.

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Department of Science and Technology (DST) organised the 'TEC Conclave 2024' on March 14, 2024 at DELNET, New Delhi.

Technology demonstration at Wipro, info Park, Cochin.



A team from Amrita Vishwa Vidyapeetham's Technology Enabling Centre (TEC) visited Wipro's Kochi office in Infopark to display various technology advancements and explore potential collaborations for technology commercialisation. During the visit, TEC showcased its innovations and research projects, and presented its latest AI technologies designed to revolutionize the field. The visit facilitated valuable discussions and set the stage for future collaboration in technology development.

### A Call to Action for Youth: Human Trafficking and the Role of Youth in Prevention



Amrita Vishwa Vidyapeetham hosted a significant talk titled "A Call to Action for Youth: Human Trafficking and the Role of Youth in Prevention," delivered by Dr. P.M. Nair, a distinguished retired law enforcement official. Organized by the Amrita Technology Enabling Centre, the event focused on human trafficking's pervasive impact on children, women, and labor sectors, and discussed preventative measures. Dr. Nair advocated for a multi-faceted approach involving government, law enforcement, NGOs,

and the community, emphasizing stronger laws, enhanced enforcement, and increased public awareness. He urged young people to raise awareness, volunteer, utilize social media, and engage in advocacy and policy-making. Recommendations include implementing educational programs and fostering partnerships between educational institutions, law enforcement, and NGOs.



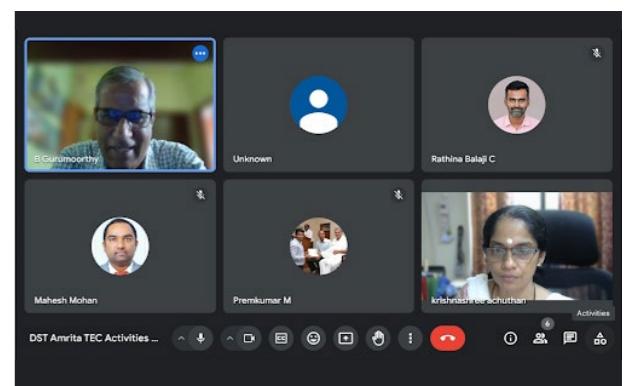
### Industry Academia Meet in association with Saintgits and CII, Kottayam.



#### Discussion of Industry Challenge during Industry Academia Meet.

An Industry-Academia meet, organized in collaboration with Saintgits College of Engineering and Confederation of Indian Industry (CII) Kottayam Zonal Council, was a key highlight of the event. Mr. Philip Thomas, Chairman of the CII Zonal Council, along with representatives from various industries and MSMEs, including Kelachandra Machines and Bioway Packs, presented their problem statements and skilling requirements. They also sought solutions and support through this collaborative partnership.

### Interaction with Prof. B. Gurumoorthy TEC Mentor



Amrita TEC interacted with Prof. B. Gurumoorthy to discuss their activities and challenges. Prof. Gurumoorthy recommended expanding their network to attract more partners and projects. Funding strategies were also discussed, including faculty involvement in negotiations, industry co-funding requirements, and faculty incentives for industry-funded projects. Prof. B. Gurumoorthy suggested leveraging alumni for CSR grants to support technology development. Amrita TEC will implement these suggestions moving forward.

# AWARDS CONSOLATION PRIZE AT IMTEX, 2024



*Amrita TEC impressed at IMTEX FORMING 2024, the International Forming Technology Exhibition held in Bengaluru.*

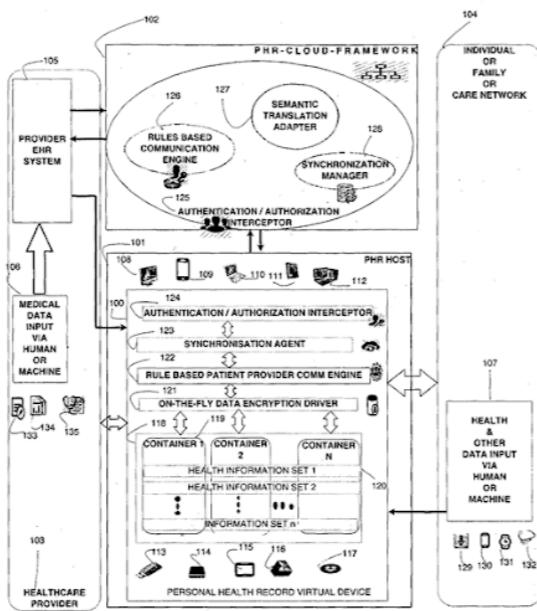
Amrita TEC impressed at IMTEX FORMING 2024, the International Forming Technology Exhibition held in Bengaluru. Our research on "Humanoid Mobile Robots for Multipurpose Societal Applications" in metal forming bagged the Consolation Prize from the Indian Machine Tool Manufacturers' Association (IMTMA).

## PATENTS THROUGH TEC

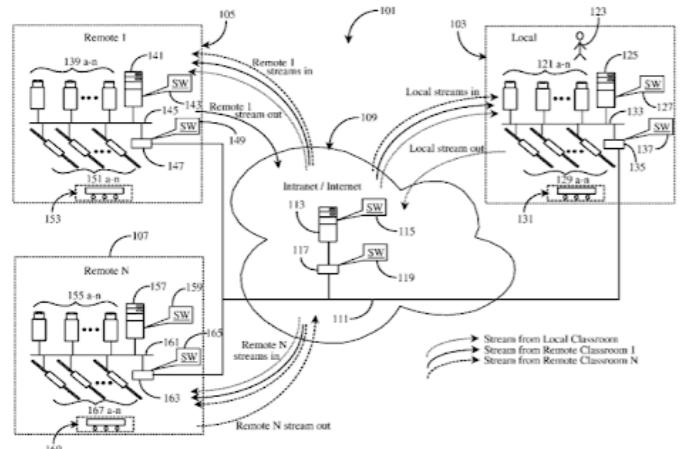
PATENT NAME	TITLE	YEAR
Indian Patent 503394	Portable secure health record device & system for patient-provider communication.	2024
Indian Patent 501351	System And Method For Synthesizing, Preserving Consistent Relative Neighborhood Positions In Multiperspective Multipoint Tele-Immersive Environment.	2024
Indian Patent 498460	Balance Monitoring and Training System	2024
Indian Patent 500165	Hand Orthosis Control Using Electrooculography	2024
Indian Patent 461661	An Automatic Pancake Preparing Machine	2024
Indian Patent 537200	Wearable Wireless Tongue Controlled Devices	2024
Indian patent 509445	Using CPS enabled microgrid system for optimal power utilization and supply strategy"	2024
Indian Patent	System for Self-Driving Wheelchair and the Method Thereof	2024
Indian Patent 501351	System And Method For Synthesizing, Preserving Consistent Relative Neighborhood Positions In Multi-Perspective Multi-Point Tele-Immersive Environment	2024
ndian Patent 500165	Hand Orthosis Control Using Electrooculography	2024

## Indian Patent 503394 – Portable secure health record device & system for patient-provider communication.

The present invention relates to a portable secure health system. The portable secure health system provides communication of a person's personal health record between at least one patient and at least one service provider or among at least two service providers in a secure environment. The system comprises a unique portable personal health record (PHR) device, PHR Host and patient provider communication system. The PHR device may be a physical storage device such as USB flash drive or SD card, or a virtual device entirely contained in a single file system file or cloud drive. The communication systems are also synchronized in a secure environment between PHR device and patient provider communication system.



## Indian Patent 501351 System And Method For Synthesizing, Preserving Consistent Relative Neighborhood Positions In Multiperspective Multipoint Tele-Immersive Environment granted.



An e-learning system has a local classroom with an instructor station and a microphone and a local student station with a microphone, a plurality of remote classrooms with an instructor display and a student station with a microphone, and planar displays and video cameras in each of the classrooms, the remote and local classrooms connected over a network, with a server monitoring feeds and enforcing exclusive states, with sets of video displays, each set dedicated to a remote classroom, arrayed along a line orthogonal to a line between the instructor station and the local student station, with one display in each set facing toward the instructor station, and one display in each set facing toward the local student station.



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