PhD Research Topics at Amrita

As of 9th March, 2023

(Note that this is not a comprehensive list)

Engineering

Coimbatore	Bengaluru
Water Electrolyzers for Hydrogen and Oxygen Production	Deep learning approaches in renewable energy based electrical power system
Unconventional Computing Architectures, Smart Systems	Electrical vehicle
Hyperspectral Image processing for remote sensing applications	Cloud Security
Electrocoagulation Reactors for Continuous Removal of Emerging Contaminants in Water	Data and Text Analytics on Material Data - Machine Learning and Material Science
Optical Wireless Communication	Secure Computations
VLSI Testing, Hardware security and Trust	Big Data based Cyber Security Analytics
Development of Adaptive and Intelligent Methods for Power Quality Monitoring	Tribo-Material
Algal Biodiesel - Synthesis and Characterization	Structural Material
Wireless Communication	Software Defined Networks Security, Machine Learning
Speech Processing	Electric Vehicles - Power electronics and Drives
Algorithms and Architectures for communication systems	Electric Vehicles -Regenerative Energy Recovery
Treatment of emerging contaminants in water	Electric Vehicles - ON board Chargers
Construction Materials	Electric Vehicle V2V converters
Natural Language Processing	Electric Vehicle - Battery Management System
AI for Power System Dynamics	DC Micro grid controlling techniques
Dependency Parser and Its application in Natural Language Processing Applications	Quantum Communication, 5G+ and 6G, Integrated terrestrial and non-terrestrial communication
Stochastic microgrid modelling with AI	Construction Materials, Fiber reinforced concrete, Foam concrete, Cement Superplasticizer Compatibility, Rheology of Cement Paste, Self-compacting concrete etc

Application of Machine Learning for Diagnosing Faults in Electrical Machines (Permanent Magnet Synchronous Motor, Switched Reluctance Motor ot Induction Motor) used in Electric Vehicles	AI for Complex Systems
Atomization & Sprays - Experimental characterization, Pyrolysis, Exergy	HRI, Image and Video Processing
Data (Big Data) Analytics in Smart Grid	Green Computing
Design of Electrical Machines for Electric Vehicles	Blockchain Technology
Development of Hybrid Energy Storage System (HESS) with renewable energy sources powered and utilized with novel converter topologies for effective electric vehicle applications.	Wireless Charger for Electric Vehicles
Electric Drives, Soft Computing, Big Data Analytics	High Level Synthesis, HW/SW Co-design, Design Space Exploration as MOO
Electric Drives, Soft Computing, Machine Learning,	High Level Synthesis, HW/SW Co-design, Design Space Exploration as MOO
Energy Management in Smart Grid /Smart Micro grid	**Amritapuri**
Finite Element Method	Fluid Dynamics, Machine Learning
Machine Learning in Renewable Energy ,Embedded Controllers , IOT Communication	Digital Logic VLSI, FPGA, VLSI Testing, Hardware security
Machine Learning, Signal Processing, VLSI	Fuel Cell
Quantum Sensing Technologies	Computational imaging
Rolling Contact Fatigue	Hardware Security
Smart Grid, Machine Learning in Power Systems, Data Analytics in Power System	Neuroengineering (Amrita Mind Brain Center)
Smart Micro-grid Energy Management & Energy Storage System (Fuel Cell,Algal Fuel Cell,Hydrogen Fuel), Electric Vehicle Impacts on power Quality ,AI/ML applications for Power Quality Improvement	Computational Nanofluidics
Soft Computing, Electric Drives, Machine Learning & Big Data Analytics	Industrial Engineering
Design methodologies for Low power VLSI circuits, VLSI Testing, Hardware Security and Trust, IoT	Industrial Product Design
Biomedical Instrumentation	Computational Material Science

Biomedical Instrumentation (building a non-mydriatic retinal camera)	Micro and Nano fluidic sensors
Biomedical Instrumentation (developing a bloodless test for the detection of Cardio-vascular diseases)	AI in Medical Image Processing
Computational Biology (Application of deep learning on biological research area)	Robotics systems
Electric Vehicles (Artificial Intelligence Based Condition Monitoring of Electrical Motors in Electric Vehicles)	Machine learning in Photonics
Electric Vehicles (Design of Electrical Machines)	Machine Learning
Electric Vehicles (Fault Diagnosis of Electrical Motors)	Breast cancer detection using Elastography
Power Systems, Machine Learning	Wireless Communication(M2M Communication)
Power Quality Enhancement	Decision Making in Medical Diagnosis
Energy Management in Microgrids	Environmental Engineering
Seismic Resilience of Infrastructural system	Computational Imaging
Structural Health Monitoring of Buildings	Medical/ Healthcare Robotics (Surgical robotics)
Power Systems	Medical/ Healthcare Robotics (Rehabilitation robotics)
Energy Storage Systems, Nano Dielectrics	Medical/ Healthcare Robotics (Diagnostic and imaging robotics)
Artifical Intelligence (AI) for Biomedical Data Analysis	Agriculture Robotics (crop classification and yield prediction)
AI in drug discovery (Computational Drug Discovery)	Agriculture Robotics (coconut farming)
Deep learning, Microgrid, State of Charge	Intelligent Transportation System
Hybrid Energy Storage System for Microgrid and Electric Vehicle Applications.	**Chennai**
Artificial Intelligence/Game Theory/Machine Learning Agent based Approach towards flexible Bidding strategy in Day-Ahead/Spot Electricity market operation.	Computer Networks
Development of novel DC-DC/DC-AC converter topology with FuelCell/Battery/Supercapacitor powered drive train applications.	Machine Translation
Bioinformatics and Systems Biology, Artificial Intelligence	IoT Security
Nanotechnology, Computational Biology, Artificial Intelligence	Machine Learning, Wireless Communication
Machine Learning	P2P Computing
Machine Learning,Deep Learning ,Renewable energy	Cryptography and Network Security
Development of Insulin Pump	Data Mining, Machine Learning, Deep Learning
	Decentralized Trust Management

IoT Security and Maldrone Attacks	
Machine Learning, Wireless Communications	
Networks, Machine Learning, Cyber Security	
Secure Coding, Software Engineering	

Physical Sciences

Coimbatore	Amritapuri
Supramolecular chemistry	Biopolymer based voltammetric sensors for synthetic food colourants
Cobaloxime for the removal of Carbon monoxide	Polymer nanocomposites for advanced applications
Paper Analytical Devices (PAD)	Synthesis of Organic Molecules for Medicinal and Material Applications
Wearable Biosensors	Chemistry of Organometallic Compounds and Catalysis
Algebra - Ring Theory, Module Theory, Coding Theory	Green and Sustainable Chemistry
Convective Heat Transfer	Inorganic Medicinal Chemistry
Differential equations and Control theory	Molecular Magnetic Materials
Differential Equations, Fractional differential Equations	Polymer nanocomposites, magnetic materials, EMI Shielding materials
Fluid Dynamics, Conjugate Heat Transfer, MHD in Heat Transfer	Electroluminescent metallo-compounds for LED applications
Fractal Theory and Approximation	Development of advanced anti-oxidant drugs
Graph Theory	ELECTROPOLYMER BASED VOLTAMMETRIC SENSORS FOR ORGANIC WATER POLLUTANTS
Graph Theory based Data Analytics	Disposable Electrochemical Sensor for Biomarkers and Energy Storage Devices
Hemodynamics	Development of near-infrared (NIR) fluorescent probes for light-induced biomedical application
Inventory control (Optimization)	Development of fluorescent organic nanoparticles for detection and degradation of environmental pollutants
Linear Algebra	
Multi Criteria Decision Making (MCDM), Medical Image Processing	Kochi
Numerical Analysis of Singularly Perturbed Differential Equations and Mathematical models of semi-conductor devices	Computer Vision
Numerical methods for singularly perturbed partial differential equations.	

	Chennai
Pulsatile blood flow in large human arteries	
Statistical Inference, Life Time Models and Count Data Models	
Network on Chip: Design and Testing Algorithms	Bioinformatics, Genomics, Biomedical Text Mining
Photocatalysis & Artificial photosynthesis	
Metal organic framework	
polymer nanocomposite	
Biomaterials	
Differential Equations, Fractional Differential Equations, Analytical solutions, Partial Differential Equations, Solitons Theory, Integrable Systems, Fractional Nonlinear PDEs, Analytical Methods to Fractional Order Differential Equations	
Methods and application of nonlinear differential equations, Fractional calculus and their applications to real world problems, Application of ordinary, partial and fractional differential equation to diffusion problems, Lie group analysis and invariant subspace methods, Analytical methods for partial differential equations, Analytical methods for ordinary differential equations, Integral transformation methods, Conservation Laws, Lie Algebra	
Linear Algebra, Differential Equations, Linear algebra and its applications to fractional/integer order differential equations	
Complex Dynamical Systems	
Fractal Analysis and Mathematical Modeling	
supramolecular chemistry	
Singularly Perturbed Problems, Semi-conductor device models, Periodic boundary value problems in Oceanography and Machine learning Techniques	
Data driven prediction in dynamical systems	
Qualitative analysis of predator-prey dynamics	
Perovskites and metal oxides based gas sensors	
Perovskites	
Perovskite-based IR sensors	
Lab-on-a-Chip Devices	
Organ-on-a-Chip	

Flexible supercapacitors
Wearable Devices /Epidermal Electronics
Paper based diagnostic devices
Paper based lateral flow immunoassay (LFIA) for protein detection
Lab-on-a-Chip device for Bacterial detection
Electrochemical Biosensors

Social & Behavioral Sciences

Amritapuri	Coimbatore
AI & Disability Studies	Women empowerment, Disability, rural development, tribal development. community development, sustainable development, disaster risk reduction, GIS applications in rural development
Low-cost Learning Analytics	Health,Mental Health, Adolescent and children, Women
Evidence-based teacher training	

Health Sciences

Kochi	Amritapuri
Temperomandibular Disorders	Neuroengineering (Amrita Mind Brain Center)
Salivary Proteomics, Oral Cancer, Early diagnosis of Oral cancer	
Genetics of familial hypercholestrolemia	
Liver transplantation, Cholestatic drugs	
Neuropsychology, Radiation Oncology	
Prenatal care, Preventive Dentistry, Anticipatory Guidance	
Autoimmune neurology	

Arts, Humanities & Commerce

Life Sciences

Coimbatore	Amritapuri - Biotechnology
Gender Studies	Antimicrobial Resistance
Indian Writing in English & Bhasha literature	Bioinformatics and Systems Genomics
Eco Critical studies, Disability Studies and Marginalized studies	Cardiovascular disease biology
ICT, e-Governance, M-Governance,	

film studies, semiotics, iconography, cultural iconography
digital media, digital wellbeing, digital detox
health communication, game based learning, covid-19
Social media influencersâ€™, Sustainable Fashion Awareness and Consumption
Influence of Eco-friendly Packaging Design, Purchase decision
Development communication, social media usage
mHealth
Consumer buying intention, instagram, sustainable brands
Development Journalism

School of Business	Ayurveda
Coimbatore	Amritapuri
Creativity in Marketing communication and consumer behaviour	Stree Roga and Prasuti Tantra PHD Ayurveda
Research focus on event studies in economics, finance, marketing and law	Adulteration, drug standardisation, drug development, drug action
Business Model Innovation and Digital Transformation	
Social Entrepreneurship enabled by Digital Business Models	
Socio-technical approaches on Industry 5.0 performances	
Application of Artificial Intelligence (AI) and Machine Learning (LM) in Operations Management	
Design Thinking for the designing Socio-technical approaches	
AI & Finance	
Social Innovations driven by Social Alliances	
Strategic Agility & Innovation in SMEs	
Social Innovation and its Impact on Human health	
Intergenerational transmission of entrepreneurship and gender	