INTRODUCTION

BIONIKX- the students association of Biomedical Engineering was founded in the year 2006 by the 1st batch of Biomedical Engineering in response to emerging needs to promote Biomedical Engineering knowledge among students. The name of our association symbolizes the integration of Medical and Engineering emphasizing Biomedical Engineering fraternity.

BIONIKX aims at improving the excellence of students in academics and Professional development by communicating recent advances, discoveries and inventions. The association also aims to improve teamwork and leadership skills among students by organizing various activities.

BIONIKX ASSOCIATION OFFICE BEARERS

SECRETARY : Madhubala E. (FINAL BME)
JOINT SECRETARY : Thamarai Selvan K. (III BME)
TREASURER : Prasitha L. (FINAL BME)
JOINT TREASURER : Amruthavarshini B. (III BME)

EXECUTIVE MEMBERS

S.No.	NAME	YEAR
1	Dharaniya T.	Final A
2	Abinesh K.	Final A
3	Riswanth S.	Final B
4	Dharanidharan R.	Final B
5	Nandhini S.	III A
6	Sowbarnika Sry A. P.	III A
7	Tamilasaran S.	III B
8	Kaviya S.	III B
9	Keerthana T.	II A
10	Sruthi M.	II A
11	Sri Hari M.	II B
12	Dharaniya T.	II B

FACULTY CORNER

"Learning is synthesizing seemingly divergent ideas and data."
-Terry Heick

PATENT

Dr.S.K.Manikandan was granted Patent No.:411731 by the Government of India on 17.11.2022. The work was titled as 'Architecture to Develop Multipliers for High Speed Computing Applications'.

JOURNAL PUBLICATIONS

Dr.S.Mangai, 'Automated Prediction System for Alzheimer Detection based on Deep Residual Auto Encoder and Support Vector Machine', Optik, Volume 272, ISSN 0030 4026, https:// doi.org/10.1016/j.ijleo.2022.170212.

BOOK PUBLICATIONS

Dr.N.Jeyashanthi, 'Textbook on Pathology and Microbiology' published by Evincepub Publishing, ISBN 9789354468308,2022.

Dr.S.Sudha, K.B.Jayanthi, 'Chapter 1- Clinical Decision Support Systems: Benefits, Potential Challenges and Applications in Pneumothorax Segmentation, Computational Intelligence in Healthcare Applications', Academic Press, 2022, Pages 1-12, ISBN 9780323990318, http://doi.org/10.1016/B978-0-323-99031-800009-0.

Dr.S. Mangai, Dr.S. Sudha, 'Brain-Computer Interface: Using Deep Learning Applications-Resting-State fMRI: Large Data Analysis in Neuroimaging' published by Wiley publications, Page No. 127-156, ISBN No. 9781119857204, DOI. No. https://doi.org/10.1002/9781119857655.ch6, 2023.

PROGRAM ORGANIZED

Dr.S.Sudha was the Coordinator in conducting the Intellectual Property Awareness Program under National Intellectual Property Awareness Mission on 20.07.2022

Dr.S.K.Manikandan, **Dr.M.PonniBala & Dr.J.Rajalakshmi** organized a Hands on Training on 15.09.2022for final year Biomedical Engineering Students on 'Design and Development of Medical Devices'by Caliber Embedded Technologies India Pvt. Ltd, Salem.

AWARDS

Mr.V.Loganathan, Mr.R.Saravanakumar acted as a Mentor for Senior Hardware Edition Grand finale - Smart India Hackathon 2022 organized by the Ministry of Education, Government of India from 25.08.22 to 29.08.22.

Mr.R.Saravanakumar won prize in Senior Hardware Edition Grand finale - Smart India Hackathon 2022 organized by the Ministry of Education, Government of India from 25.08.22 to 29.08.22.

RESEARCH GUIDANCE

Dr.A.Manikandan, Part time external research scholar completed his viva-voce examination on the thesis titled **'Certain Investigations on cardiac masses prediction in echocardiogram images**

using soft computing techniques' on 27.06.2023 under the guidance of **Dr.M.Ponni Bala,** Professor, Department of BME, VCET.

NPTEL

Name of the staff	Topic	Program details
Dr.N.Jeyashanthi	Introduction to Biostatistics	Jul-Sep 2022 (8weeks)
Dr.P.Ravikumar	Introduction to Biostatistics	Jul-Sep 2022 (8weeks) Elite+Silver
Dr.J.Rajalakshmi	Digital Image Processing	Jul-Oct 2022 (12weeks)
Dr.S.Sudha	Digital Image Processing	Jul-Oct 2022 (12weeks)
N.N.Balakumar	Medical Image Analysis	Jul-Oct 2022 (12weeks)
P.Georgia chris selwyna	Electronic Systems for cancer Diagnosis	Jul-Oct 2022 (12weeks)
S.Yamunadevi	Electronic Systems for cancer Diagnosis	Jul-Oct 2022 (12weeks)
A.Kalyani	Electronic Systems for cancer Diagnosis	Jul-Oct 2022 (12weeks)
V.Loganathan	Medical Image Analysis	Jul-Oct 2022 (12weeks)
M.Sharmila	Environmental Biotechnology	Jul-Oct 2022 (12weeks)
V.Saranya	Environmental Biotechnology	Jul-Oct 2022 (12weeks)
Dr.S.Sudha	Computer Vision and Image Processing	Jan – Apr 2023 (12 weeks)
S.Maheswari	Computer Vision and Image Processing	Jan – Apr 2023 (12 weeks)
S.Govindaraj	Computer Vision and Image Processing	Jan – Apr 2023 (12 weeks)
N.N. Baalakumar	Deep Learning	Jan – Apr 2023 (12 weeks)
V.Loganathan	Deep Learning	Jan – Apr 2023(12 weeks) Elite

FACULTY DEVELOPMENT TRAINING PROGRAM & SHORT TERM TRAINING PROGRAM

Name of the staff	Topic	Program details	
		Organizer	Date
Dr.S.Mangai	Recent Advancements and Applications of Data Science	Paavai Engineering College	27.06.22-02.07.22
Dr.P.Ravikumar	Research scope in electric vehicles(in collaboration with ANSYS)	National institute of technical teachers training and research, Chandigarh	05.12.22-09.12.22
M.PonniBala Dr.J.Rajalakshmi	Team Building, Motivation &Creativity		12.12.22-16.12.22
M.PonniBala	Exploring the Future Endeavors in the Biomedical Technology	Easwari Engineering college, Chennai	18.01.23-24.01.23
Dr.S.K.Manikandan	Data Science using Python	National Institute of Technical Teachers Training and Research, Chandigarh	10.10.2022 - 14.10.2022
Dr.J.Rajalakshmi Dr.S.Sudha S.Maheswari S.Govindaraj R.Saravanakumar	Open Source Technologies		17.10.22-21.10.22
Dr.J.Rajalakshmi Dr.S.Sudha M.Sharmila	Digital Image Processing techniques	Sreenivasa Institute of Technology and Management,A.P.	05.12.22-09.12.22

C.Radhika D.SasiPreetha M.Sharmila	Wireless Networks	NITTTR, Chandigarh	26.09.22- 30.09.22
R.Saravanakumar	Recent Advancements and Applications of Data Science	Paavai Engineering College, Namakkal	27.06.22- 02.07.22
V.Loganathan	Emerging Technologies on Biomedical Engineering	Sathyabama Institute of Science and Technology, Chennai	12.12.22- 17.12.22
M.Sharmila Dr.P.Ravikumar	Open Source Technologies	National Institute of Technical Teachers Training and Research, Chandigarh	17.10.22- 21.10.22
Dr.P.Ravikumar D.Sasi preetha C.Radhika	Electric Vehicle		05.12.22- 09.12.22
Dr.N.Jeyashanthi Dr.P.Ravikumar	Team Building, Motivation & Creativity		12.12.22 - 16.12.22
Dr.S.Sudha	Computer Vision and Image Processing	NPTEL	Jan-Apr 2023 (12 Weeks)
C.Radhika	Education 5.0	Dr. M.G.R Educational and Research Institute	15.05.23- 19.05.23
N.N.Balakumar V.Loganathan	Deep Learning	NPTEL	Jan-Apr 2023 (12 Weeks)
N.N.Balakumar V.Loganathan	Radiological Equipments	Hindustan College of Engineering and Technology	08.05.23- 12.05.23
P.Georgia chris selwyna	Research Methodology and ethics in research publication	NITTTR, Chandigarh	15.05.23- 19.05.23
S.Maheswari S.Govindaraj	Computer Vision and Image Processing	NPTEL	Jan-Apr 2023 (12 Weeks)

SEMINAR/WEBINAR

Name of the staff	Topic	Program details	
		Organizer	Date
S.Govindaraj	Flexible and Wearable Sensors for Biomedical Applications	KPR institute of Engineering and Technology	26.08.2022
R.Saravanakumar	How to publish a book with ISBN	Iterative International Publishers	27.10.2022

WORKSHOP

Name of the staff	Topic	Program details	
		Organizer	Date
N.N.Baalakumar	Recent Advances In Artificial Intelligence For Biomedical Applications	National Institute of Technology, Rourkela	01.12.22- 07.12.22

S.Govindaraj	30 days master class on Machine learning	Pantech e Learning Pvt. Ltd.,Chennai	30.05.22-28.06.22
S.Govindaraj	Applications of Image Processing in MATLAB	Marcello tech	12.12.22-16.12.22
S.Maheswari	30 days master class on Machine learning	Pantech e Learning Pvt Ltd,Chennai	30.05.22-28.06.22
V.Loganathan	Recent Advances In Artificial Intelligence For Biomedical Applications	National institute of technology,Rourkela	01.12.22-07.12.22
S.Maheswari S.Govindaraj	Python Programming	Marcello Tech., Tiruchirappalli	23.04.23

NPTEL MENTOR

NAME	COURSE	PERIOD
S.Sudha	Principles of Management	Jul-Dec 2022
Dr.P.Ravikumar, C.Radhika D.Sasipreetha	Principles of Management	Jan-Apr- 2023

OTHER PROGRAMS

Name of the staff	Type of Programme	Topic	Program details	
			Organizer	Date
M.PonniBala	Hands on training	Design of sensor based circuit for medical devices	IEEE	29.07.22
M.PonniBala Mr.S.Govindaraj	Hands on training	Design and Development of Medical Devices	VCET	15.09.22
J.Rajalakshmi S.Sudha	Training program	National intellectual property awareness mission	Intellectual property office INDIA	20.07.22
P.GeorgiaChris Selwyna S.Maheswari	Hands on training	Design of sensor based circuit for medical devices	IEEE	29.07.22
S.YamunaDevi Mr.S.Govindaraj	Training program	National intellectual property awareness mission	Intellectual property office INDIA	20.07.22
Mr.S.Govindaraj N.Amaravathi	Hands on training	Design of sensor based circuit for medical devices	IEEE	29.07.22
Dr.S.Mangai, S.Maheswari S.Govindaraj	Training program	One week Industrial Training on Full Stack Web Development	Pantech e- Learning Pvt.Ltd.Chennai	09.04.23-16.04.23
S.Maheswari	Training program	Artificial Intelligence	Pantech e- Learning	24.04.23-23.05.23

CONFERENCES

NAME OF THE STAFF	TITLE OF THE PAPER	NAME OF THE CONFERENCE	VENUE	MONTH YEAR
Dr.S.Sudha	Emerging Reserch in Electronics Computer Science and technology		P.E.S.College of Engineering ,Mandya	26.12.22 27.12.22
S.Yamunadevi	Integrated e-Vaccination chip for covid-19 using IOT		Dr.N.G.P Institute of Technology	08.06.220 9.06.22
S.Govindaraj	Advanced Smart Walking for Visually Impaired and Personalized Monitoring System for Mental Health care		Paavai Engineering college	21.09.22
Dr.S.Mangai	Medical purpose Automated Teller Machine Using Biometric System	International Conference on Science, Technology, Engineering and Management	Kalaignar Karunanidhi Institute of Technology	April, 2023
	Automatic Insulin Injection Using PIC Controller			
Dr.N.Jeyashanthi	Smart Syringe Pump	International Conference on Engineering, Technology and Science	Muthayammal College of Engineering	March, 2023
Dr.N.Jeyashanthi	Development of Bioengineered Smart Bedsheet for the Improvement of Healthcare			
Dr. P.Ravikumar	Simplified Design of Continuous Positive Airway Pressure Device Using Arduino Nano	National Conference on Recent Technologies and Computing Sciences	Velammal Engineering College	April, 2023
Dr.M.PonniBala	Smart Wearable Calf Muscle Band for Spasticity using Vibration with Web Application	International Conference on Adaptive Technologies for Sustainable Growth	Paavai Engineering College	March, 2023
Dr.S.Mangai	Wearable Sensor for Motion Analysis and Pressure Monitoring System	International Conference on Adaptive Technologies for Sustainable Growth	Paavai Engineering College	March, 2023
Dr.M.PonniBala	Video Based 3D Convolution Network for Air Quality Assessment	International Conference on Advanced Computing and Communication Systems	Sri Eshwar College of Engineering	March 2023
Dr.J.Rajalakshmi	Design and Development of Sleep Apnea Monitoring Device for Healthcare Application	International Conference on Adaptive Technologies for Sustainable Growth	Paavai Engineering College	March, 2023
Dr.J.Rajalakshmi	Hybridization of Sector Based and Extremity Based Segmentation for Early Detection of Osteoporosis	International Conference on Science, Technology, Engineering and Management	Kalaignar Karunanidhi Institute of Technology	April, 2023
Dr.S.Sudha	Analysis of Clinical Parameters for Onset of Cardiovascular Events	TENCON 2022	Hong Kong	November, 2022
Dr.S.Sudha	A m-Health Based Mobility Aid for Visually Challenged Persons	Emerging Research in Electronics Computer Science and technology, ICERECT-2022	P.E.S.College of Engineering, Mandya	December, 2022
Dr.S.Sudha	Smart Authentication using Human Ear	International Conference on Innovation in Technology	Sai Vidya Institute of Technology	March, 2023
Dr.S.Sudha	Surgical Assistance Smart Glass Based on Augmented Reality	International Conference on Adaptive Technologies for Sustainable Growth	Paavai Engineering College	March, 2023
Dr.S.Sudha	Deep Learning Based ROI Segmentation Using Convolution Neural Network	International Conference on Applied Artificial Intelligence and Computing	Narasu's Sarathy Institute of Technology	May, 2023
C.Radhika	Smart Epilepsy Prediction Along With Giant Analysis	National Conference on Advancement in Mechanical Sciences	Velammal Engineering College	April, 2023
D. Sasipreetha	Wheelchair that Converts into a	International Conference on	Muthayammal	March,

	Bed with Safety System	Engineering, Technology and Science	College of Engineering	2023
K. Rajaram	Machine Learning Enabled Traffic Sign Detection System	International Conference on Electrical, Computer and Communication Technologies	Velalar College of Engineering and Technology	February 2023
N.N.Baalakumar	Identification and Classification of lung cancer from histopathological images using deep learning	National Conference on Advancement in Mechanical Sciences	Velammal Engineering College	April, 2023
P.Georgia chris selwyna	An E-Nose based Selective and Quantitative Detection of Blood Glucose	National Conference on Recent Technologies and Computing Sciences	Velammal Engineering College	April, 2023
S.Maheswari	Medical Purpose Automated Teller Machine Using Biometric System	International Conference on Science, Technology, Engineering and Management	Kalaignar Karunanidhi Institute of Technology	April, 2023
S.Maheswari	Hybridization of Sector Based and Extremity Based Segmentation for Early Detection of Osteoporosis	International Conference on Science, Technology, Engineering and Management	Kalaignar Karunanidhi Institute of Technology	April, 2023
S.Yamunadevi	Integrated e-Vaccination chip for covid-19 using IOT	Technological Innovations of Artificial Intelligence in Healthcare	Dr.N.G.P Institute of Technology	June, 2022
S.Yamunadevi	Precised Anesthesia Injector for Asthma Patients	National Conference on Recent Technologies and Computing Sciences	Velammal Engineering College	April, 2023
S.Govindaraj	Advanced Smart Walking for Visually Impaired and Personalized Monitoring System for Mental Health care	National conference on Innovative Trends in Communication and Technology	Paavai Engineering college	September , 2022
S.Govindaraj	IoT Based Advanced Intelligent Walking Stick with Personalised Monitoring System for Visually Impaired Persons	International Conference on Adaptive Technologies for Sustainable Growth	Paavai Engineering College	March, 2023
A.Kalyani	Design and Development of Wearable Smart Airbag with Protection and Notification System	Third international Conference on Advances in Management Engineering & Technology	RSP conference Hub	March, 2023
R.Saravanakumar	Sports Applications of Biomechanics Wearable Sensors using IoT	International Conference on Electronics and Renewable Systems	St.Mother Theresa engineering college,Tuticorin	March 2023
R.Saravanakumar	Review of Hybrid Microgrid Power Management Using Renewable Energy Sources	International Conference on Advanced Computing and Communication Systems	Sri Eshwar College of Engineering	March 2023
R Indhumathi	Smart Cradle System for Baby Monitoring using IOT	7th International conference on Engineering, Technology and Science	Muthayammal College of Engineering	March, 2023
V. Loganathan	Design and Development of a Hand Exoskeleton for Stroke Rehabilitation with Real-time Biological Parameter Monitoring	International Conference on Adaptive Technologies for Sustainable Growth	Paavai Engineering College	March, 2023
M. Sharmila	Brain-Computer Interface for Attention Detection	International Conference on Adaptive Technologies for Sustainable Growth	Paavai Engineering College	March, 2023

ASSOCIATION ACTIVITIES

"Alone we can do so little; together we can do so much."

Awareness Program

In association with Women Empowerment Cell organized a Guest Lecture on **'Improve your self-care and personal hygiene' on 15.06.2022.** Dr.V.Sudha Jothi, MBBS, DGO, IOG, Gynecologist, CK Hospital, Erode was the Chief Guest and the resource person.

Hands on Training

Association of BME in association with IEEE & EMBS Student branch organized Hands on Training on **'Design Based Sensors for Medical Devices'** from 29.07.2022 to 30.07.2022. R. Praveen, Technical Lead, SAN Innovations, Erode handled the sessions.

Guest Lecture

Association of BME in association with IEEE & EMBS Student branch organized a Guest Lecture on 12.08.22.Dr.Dharmasa, IEEE Senior Member Program Manager, Department of Electrical and Computer Engineering, National University, Oman gave a talk on **'Energy and It's Cost Benefits Analysis to be a Best Entrepreneur'**

Association Inaugural function and Guest Lecture

Organized the Inaugural function of Association of BME-BIONIKX for the academic year 2022-2023 on 12.09.2022 and the Guest Lecture on the topic **'BME- More important than ever'**. Mr.S.Rajan Singh, Senior Quality Manager, Danaher Corporation, Bangalore was the resource person and the Chief Guest.

Hands on Training

Hands on Training on **'Design and Development of Medical Devices'** for final year students on 15.9.2022.M.Parthiban, Caliber Embedded Technologies, Salem handled the sessions.

Graduation day

17th Graduation day for the batch 2017-2021 and Alumni Induction program was held on 18.09.2022. Seven students from BME have secured ranks.







SHANGAMITHRA S | ***SHANMUGA PRIYA M*** | ***ALAGU CHITHRA DEVI P*** | ***ABARNA B*** | ***KAVIMALAR V*** | ***MAHALAKSHMI B*** | ***PRIYA DHARSHINI R***

Workshop

In association with Entrepreneurship Development Cell, Department of BME organized a Workshop on **'Design Thinking'** on 28.9.2022.Dr.M.Jayaram, Principal, VCET was the resource person and the Chief Guest.

Intra department paper presentation

Association of BME-BIONIKX organized Intra department paper presentation - Ideathon and Non-technical events on 28.09.2022. 50 students have participated in the event and the following students were awarded prizes,

S.No.	Name of the Participant	Name of the paper	Prizes
1	FARTHIMA FARHANA.S KEERTHANA.C ARAM VALAR RADHA.S	DETERMINATION OF SPO2 AND HEARTRATE USING SMARTPHONES	I
2	ANNAPOORANI.K MANIMEGALA.E ABINEYA.K	ADVANCED SMART WALKING STICK	II
3	KAVIYA.S KEERTHANA.T LOGESHWARI.M	TELEMEDICINE APPLICATIONS IN OBSTETRIC AND GYNACOLOGY	III

Inter department paper presentation

Association of BME-BIONIKX organized Inter department paper presentation-Tech Gen 2k22on 29.09.2022. Totally 20 teams participated in this event and the winners are

S.No.	Name of the Participant	Department	Prizes
1	Mithilesh. M & Manojkumar P. S.	IT	I
2	Dhanushya J.& Aswathi G.	ECE	II
3	Sudarshan R. & Saravanan G.	IT	III

Workshop

In association with Institute Innovation Cell &Entrepreneurship Development Cell, Department of BME organized a Workshop on **'Entrepreneurship and Innovation as a Career Opportunity'** on 30.9.2022. Mr.Vasanth Victor, Managing Director, Anchor Meditronics, Salem was the resource person and the Chief Guest.

Hospital Visit

Final year students visited hospital for the inauguration of New Hyperthermia Unit at Erode Cancer Centre, Erode on 21.10.2022.

Alumni Interaction

Association of BME organized an alumni interaction for third year students on **'Artificial Intelligence enabled Medical Devices'** on 26.10.2022. Ms.A.S.Haridharani, Data Scientist and Analytics was the resource person and the Chief Guest.

PG Inauguration

Organized the Inaugural function of PG course M.E. - BME on 03.11.2022.

Quiz competition

Association of BME in association with IEEE & EMBS Student branch organized a Quiz competition

on the occasion of National Cancer Awareness Day on 06.11.2022. 50 students participated in the event and the following students were awarded prizes,

S.No.	Name of the Participant	Prizes
1	Jeevika V. M.	I
2	Nathiya M.	II
3	Kanishka D.	III

Valedictory Function - IEEE

Department of BME in association with IEEE EMBS student chapter organized the valedictory function for the year 2022 on 03.02.2023.

Workshop

IEEE student branch – VCET in association with EMBS student chapter organized a workshop **on 'IEEE XPLORE digital library training program'** on 08.02.2023.Mr.Nanda Lal T. S., Senior Training Manager, EBSCO Information Services & IEEE was the Chief Guest and resource person.

International Conference

In association with IEEE, a Fifth International Conference on **'Electrical, Computer and Communication Technology'** from 22.02.2023 to 24.02.2023. Prof. Dr.Muhammad Usman, Edge Hill University, UK was the resource person and the Chief Guest. 50 students participated in the event and were awarded certificates.

18th National level Technical Symposium

Association of BME organized 18th National level technical symposium BIOSAPIENZA .It was held on 24.02.2023.Mr.M.Sathish kumar, Vice President, Clinical Engineering, Narayana Health, Bangalore was the Chief Guest. Dr.K.N.Balu Prithviraj, Associate Professor, Department of E&I , Kongu Engineering College, Erode acted as the external rapporteur for paper presentation. Non-technical events like mind teaser, minute 2 win were conducted. 55 students from various AICTE approved engineering colleges participated in various events and won cash prizes.

IEEE Inaugural Function and Guest Lecture

IEEE Inaugural Function and Guest Lecture on **'Reasearch and Challenges in Engineering'** was organized on 10.03.2023. Dr.K.Porkumaran, Chairman, IEEE Madras Section, Principal & Professor, Sri Sairam Engineering College, Chennai was the Chief Guest & Dr.K.B.Jayanthi, Chair of IEEE EMB Society of Madras Section, Dean-School of Electrical Sciences KSR College of Technology, Tiruchengode was the resource person.

BIONIKX IN ASSOCIATION WITH WOMEN EMPOWERMENT CELL

- Organized an awareness program on **'Awareness on Nutritional Anemia and its Prevention among Female students'** on 27.01.2023. Dr.S.Ponne, Associate Professor, PG and Research Department of Foods and Nutrition, Vellalar College for Women, Erode was the the Chief Guest and resource person.

- Organized an awareness program on **'Menstrual Health and Hygiene'** on 28.01.2023. Mrs. Nitya Chaudhary & Ms. Roshnee Bhowmick, CSR Executive,Unicharm India, Global Hunt Foundation Bengaluru were the resource persons and the Chief Guest and Guest of Honor respectively.

- On behalf of International Women's Day, Competitions like Glass Painting, Millet Based Food Expo, Jewelery Making, Fashion show: Influential Indian Women Leaders/Indian traditional ethnic dress, Hair

Dressing were conducted for female students & Talent Show, Fun Games were conducted for female faculty members on 07.03.2023. A Guest Lecture was organized on 08.03.2023. Dr. Matilda Daniel, Psychiatrist & Medical Doctor, Joseph hospital, Erode gave a talk on **'Mental health is a Preserved Treasure'.**

Webinar

Association of BME "BIONIKX" organized a Webinar on **'Job Opportunities in Medical Coding'** on 01.04.2023. Mr.Vishnu Suresh, Academic Consultant, Akhil D.,Team Manager, Avodha Edutech Private Limited, Kochi, Kerala was the resource person.

Workshop

In association with IEEE a workshop was organized on **'Poster designing, Certificate designing and Creating Google Forms'**. It was held on 01.04.2023. Sessions were handled by BME students.

Project expo 2023

Project expo 2023 on 12.04.2023. Mr.N.Mithun Chakaravarthi, Associate Director - Systems Administration, KYNDRYL Solutions Private Limited, Manyata Tech Park, Bengaluru was the Chief Guest. 247 students from second, third and final years exhibited their projects. The following students won prizes and awarded with cash prizes.

Place / Prize	Title Of The Project	Name of Team Members	Amount(Rs.)
I	Design And Development of Hand Exoskeleton for Stroke Rehabilitation	Ramya Sri K, Sri Abirami S Suba Shree P, Yeswanth B	1000
II	Foot Step Powered System for Pain Relief	Sainhandhini C K, Subhapriya S Subiksha A	750
III	Automatic Insulin Injection using PIC Controller	Priya V, Sathiya Moorthy R Vidhya M, Yamuna R	500

Valedictory Function - Association of BME–BIONIKX

Valedictory Function for Association of BME–BIONIKX was organized on 21.04.2023.Certificates for prize winners were distributed by Dr.M.Jayaraman, Principal and Mr.P.Jayachandar, Dean.

Farewell day

Farewell day for 2019-2023 batch students was held on 28.04.2023.

Seminar

On 05.05.2023 , Dr.N.Nithyavathy, IEEE Student Branch Counselor & Associate Professor, Department of Mechatronics Engineering, Kongu Engineering College, Erode delivered a talk on **'Role of Women as Engineers'**.

MoUs SIGNED

Organization with which MoU is signed	Name of the Institution/Industry/ Corporate house	Month and Year of signing MoU	Duration
Company	M/s.Cyrix Healthcare Pvt. Ltd., Ernakulam, Kerala	23.08.2022	Continuous
Company	Indian Biomedical Skill Council (IBSC),AMTZ(Andhra Pradesh Med Tech Zone) ,Visakhapatnam	07.04.2023	Continuous

STUDENT'S CORNER

"Be a student as long as you still have something to learn, and this will mean all your life"
-Henry L.Doherty

BEST OUTGOING STUDENT	BEST CO CURRICULAR STUDENT
	
PREETHI S **IV BME B**	**ASWATH C** **IV BME A**

MEMBERSHIP IN PROFESSIONAL SOCIETIES

- Institute of Electrical and Electronics Engineers (IEEE)
- Biomedical Engineering Society of India(BMESI)
- Indian Society for Technical Education(ISTE)
- Engineering in Medicine and Biology Society (EMBS)

ACHIEVEMENTS

SMART INDIA HACKATHON

The Smart India Hackathon a national wide initiative to provide students a platform to solve some of the pressing problems we face in our daily lives, and thus inculcate a culture of product innovation and a mindset of problem solving. Around 5 teams (ASTROS, WORKAHOLIC SPARKS, Enthusiastic Engineers, AKATSUKI and WARRIORS) from Department of BME participated in Smart India Hackathon 2022. The following students awarded prizes,

Name of the Student	Class	Title	Prize
Supriya.A, Riswanth.S, Nivash.T.R, Yeswanth.B, Vishnu.M.K, Mumritha.C	IV BME B	Wearable sensors For Sports Biomechanics Application	Rs. 1lakh

Overall Winner in Intra College Annual Sports Meet



PLACEMENT STATISTICS

Cognizant Technology Solutions (CTS)


RISWANTH S


SUPRIYA A


YESWANTH B

Zifo RnD Solutions


DILIP D


SUBA SHREE P

Tata Consultancy Services (TCS)


BOOMIKA C


CATHERINE BIJU

EPISOURCE PRIVATE LIMITED/ TIME MEDICALS (IBSC)


MUTHU YOGESH B

SASHA HEALTHCARE (IBSC)


VISHNU M K

GE HEALTHCARE (IBSC)


DHARSHAN M

VEE TECHNOLOGIES / ALLSEC TECHNOLOGIES


DISHA MAHZOOZA J

VEE TECHNOLOGIES


SOWMIYA K

HEALTHWATCH TELEDIAGNOSTICS PVT. LTD./ EPISOURCE PRIVATE LIMITED


GOWTHAM P


JANANI G K


SNEGA R


PAVITHRASHREE K


SOBIA M

HEALTHWATCH TELEDIAGNOSTICS PVT. LTD.


AJITH KUMAR V


BALA SUBRAMANIAN G


DURGESWARI B


JAYA VIVEKA B


KAMALI A


THIRUVENGADAM E P


KAVIN RAJ S A


LEKHA C


MADHIVADHANI C


MUMRITHA C


NIVEDHA T


YAMUNA R

ALLSEC TECHNOLOGIES


ABINESH K


AGALYA S


DEEPIKA S


DIVYA K


DIVYA M


HEMAMALINI P


KANNATHASAN S


LEELA P


MAHESH KUMAR M


PAVITHRAA G


PRADHOSHINI N


RANJITH KUMAR P


SANGAVI S


SINDHU R


SRIABIRAMI S

ALLSEC TECHNOLOGIES


TAMILSELVAN M


VIDHYA M

EPISOURCE PRIVATE LIMITED


NESEKA S


ROSHINI K


THARSHINI SRI A S

PROFICIENCY WINNERS

2018 2022 BATCH

KAVYA K K
IV BME A

NITHESHKUMAR S
IV BME B

ASKILLA P
IV BME A

2019 2023 BATCH

JANANI G K
III BME A

SUBA SHREE P
III BME B

2020 2024 BATCH

KEERTHANA A
II BME A

SHAJNA A
II BME B

HOSPITAL TRAINING

Underwent Hospital Training for final year students on 02.09.2022 at Lotus Hospital, Erode.

INDUSTRIAL VISIT

105 students of Third year have undergone Inplant training at M/s.Cyrix Healthcare Pvt., Kerala on .

TNSCST PROJECT GRANT

Neseka S., Pradhoshini N, Sindhu R., Tamilselvan M. have received a grant for Rs.7500 from TNSCST Student Project Scheme for the project titled **'Smart Cradle System for Child Monitoring using IoT'** for the academic year 2022-23 under the guidance of **R.Indhumathi**, Assistant Professor.

TRAINING CUM PLACEMENT

28 students of final year (batch 2020-24) have undergone placement training at IBSC AMTZ campus , Vishakhapatnam from 19.06.2023 to 15.07.2023.

PRIZE WINNERS IN CO-CURRICULAR AND EXTRA-CURRICULAR ACTIVITIES

NAME	TITLE	DATE	VENUE	PRIZE
MADHUBALA E	WORKSHOP	29-07-2022	VCET	
FARSANA BEGAM.S	WORKSHOP	29-07-2022	VCET	
GAYATHRI.S	WORKSHOP	29-07-2022	VCET	
JAYA VIVEKA.B	SEMINAR	12-08-2022	VCET	
SINDHU.R	SEMINAR	12-08-2022	VCET	
DHARANIYA.T	SEMINAR	12-08-2022	VCET	
GAYATHRI.S	SEMINAR	12-08-2022	VCET	
MANIMEGALA E	SEMINAR	12-08-2022	VCET	
DURGESWARI B	SEMINAR	12-08-2022	VCET	
ABINAYA K	SEMINAR	12-08-2022	VCET	
DHARANIYA.T	WORKSHOP	15-09-2022	VCET	
NISHA.S	WORKSHOP	15-09-2022	VCET	
SUBHA SHREE.P	WORKSHOP	15-09-2022	VCET	
SINDHU.R	WORKSHOP	15-09-2022	VCET	
ABINAYA K	WORKSHOP	15-09-2022	VCET	
MANIMEGALA E	WORKSHOP	15-09-2022	VCET	
MADHUMITHA Y	WORKSHOP	15-09-2022	VCET	
TARUNYASREE B	WORKSHOP	15-09-2022	VCET	
PAVITHRA SREE K	WORKSHOP	15-09-2022	VCET	
MUMRITHA C	WORKSHOP	15-09-2022	VCET	
NESEKA S	WORKSHOP	15-09-2022	VCET	
NIVEDHA T	WORKSHOP	15-09-2022	VCET	
FARSANA BEGAM.S	WORKSHOP	15-09-2022	VCET	
GAYATHRI.S	WORKSHOP	15-09-2022	VCET	
ANNAPOORANI K	WORKSHOP	15-09-2022	VCET	
PAVITHRAA G	WORKSHOP	15-09-2022	VCET	
MADHUMITHA Y	SYMPOSIUM	23-09-2022	MAHENDRA COLLEGE OF ENGINEERING	I
MADHUMITHA Y	SYMPOSIUM	23-09-2022		I
MADHUMITHA Y	SYMPOSIUM	23-09-2022		I
MADHUBALA E	SYMPOSIUM	29-09-2022 & 30-09-2022	PAAVAI COLLEGE OF ENGINEERING	
MADHUBALA E	SYMPOSIUM	29-09-2022 & 30-09-2022		
ABISHEK.K.B	WORKSHOP	08-10-2022&09-10-22	STRYKER	
MUTHU YOGESH.B	WORKSHOP	08-10-2022&09-10-22	STRYKER	
NIVASH.T.R	WORKSHOP	08-10-2022&09-10-22	STRYKER	
AJITH KUMAR.V	WORKSHOP	08-10-2022&09-10-22	STRYKER	
YESWANTH.B	WORKSHOP	08-10-2022&09-10-22	STRYKER	
KAVIN RAJ.S.A	WORKSHOP	08-10-2022&09-10-22	STRYKER	
TAMILSELVAN.M	WORKSHOP	08-10-2022&09-10-22	STRYKER	

RISWANTH.S	WORKSHOP	08-10-2022&09-10-22	STRYKER	
DHARANIYA.T	WORKSHOP	12-10-2022&13-10-22	K.S.RANGASAMY COLLEGE OF TECHNOLOGY	
BALASUBRAMANIAN G	SYMPOSIUM	20-10-2022	ERODE SENGUNTHAR ENGINEERING COLLEGE	II
SUBHASRI V	IEI TNSC	2022-2023	IEI-TNSC	

PAPER PRESENTATION/PROJECT PRESENTATION

NAME	TITLE	DATE	VENUE	PRIZE
MADHUBALA E	PAPER PRESENTATION	29/09/22 - 30/09/22	PAAVAI COLLEGE OF ENGINEERING	I
DHARANIYA T	PAPER PRESENTATION	19-10-2022	GNANAMANI COLLEGE OF TECHNOLOGY	II
MADHUMITHA Y	PAPER PRESENTATION	19/10/22 - 20/10/22	SENGUNTHAR ENGINEERING COLLEGE	
DHARANIYA T	PAPER PRESENTATION	20-10-2022	ERODE SENGUNTHAR ENGINEERING COLLEGE	
AJITH KUMAR V	PAPER PRESENTATION	20-10-2022	ERODE SENGUNTHAR ENGINEERING COLLEGE	
MADHUBALA E	PAPER PRESENTATION	20-10-2022	ERODE SENGUNTHAR ENGINEERING COLLEGE	
ABISHEK K B	PAPER PRESENTATION	20-10-2022	ERODE SENGUNTHAR ENGINEERING COLLEGE	
BALASUBRAMANIAN G	PAPER PRESENTATION	20-10-2022	ERODE SENGUNTHAR ENGINEERING COLLEGE	
MUMRITHA C	PAPER PRESENTATION	20-10-2022	SRI RAMAKRISHNA ENGINEERING COLLEGE	
NAZEEHA M S	PAPER PRESENTATION	20-10-2022	SRI RAMAKRISHNA ENGINEERING COLLEGE	
NIVEDHA T	PAPER PRESENTATION	20-10-2022	SRI RAMAKRISHNA ENGINEERING COLLEGE	
PAVITHRAA G	PAPER PRESENTATION	20-10-2022	SRI RAMAKRISHNA ENGINEERING COLLEGE	
YESWANTH B	PAPER PRESENTATION	20-10-2022	SRI RAMAKRISHNA ENGINEERING COLLEGE	I
SUBA SHREE P	PAPER PRESENTATION	20-10-2022	SRI RAMAKRISHNA ENGINEERING COLLEGE	I
TARUNYA SREE B	PAPER PRESENTATION	20-10-2022	SRI RAMAKRISHNA ENGINEERING COLLEGE	
PAVITHRA SHREE K	PAPER PRESENTATION	20-10-2022	SRI RAMAKRISHNA ENGINEERING COLLEGE	
BALASUBRAMANIAN G		12-04-2022	VCET	
KAMALI A		12-04-2022	VCET	
DEEPIKA S		12-04-2022	VCET	
BOOMIKA C		12-04-2022	VCET	
PRIYA V		12-04-2022	VCET	III
MANIMEGALA E		12-04-2022	VCET	
ANNAPOORNA K		12-04-2022	VCET	
VIDHYA M		12-04-2022	VCET	III

YAMUNA R	PROJECT PRESENTATION	12-04-2022	VCET	III
MOHAMMED AZARUDEEN A		12-04-2022	VCET	
DURGESHWARI B		12-04-2022	VCET	
ABINAYA K		12-04-2022	VCET	
FARSANA BEGAM S		12-04-2022	VCET	
KAVINRAJ S A	PROJECT PRESENTATION	12-04-2022	VCET	
CATHERINE BIJU		12-04-2022	VCET	
TAMILSELVAN M		12-04-2022	VCET	
NESEKA S		12-04-2022	VCET	
SINDHU R		12-04-2022	VCET	
PRADHOSHINI N		12-04-2022	VCET	
DISHA MAHOOZA J		12-04-2022	VCET	
DHARANIYA T		12-04-2022	VCET	
ABINESH K		12-04-2022	VCET	
YESWANTH B		12-04-2022	VCET	
SUBA SHREE P		12-04-2022	VCET	
SRI ABIRAMI S		12-04-2022	VCET	
RAMYA SRI K		12-04-2022	VCET	
KEERTHANA.A	PAPER PRESENTATION	19,20-10-2022	SENGUNTHAR ENGINEERING COLLEGE	I
NAVEEN KUMAR G	PAPER PRESENTATION	20-10-2022	SRI RAMAKRISHNA ENGINEERING COLLEGE	I
AMRUTHAVARSHINI.B	PAPER PRESENTATION	20-10-2022	SRI RAMAKRISHNA ENGINEERING COLLEGE	I
KAVIN KUMAR.T	PAPER PRESENTATION	20-10-2022	ERODE SENGUNTHAR ENGINEERING COLLEGE	
NANDHINI.S	PAPER PRESENTATION	20-10-2022	SRI RAMAKRISHNA ENGINEERING COLLEGE	
UVANANDHINI.B	PAPER PRESENTATION	20-10-2022	SRI RAMAKRISHNA ENGINEERING COLLEGE	
SIVASAKTHI M	PAPER PRESENTATION	10-02-2023 & 11-02-2023	BANNARI AMMAN INSTITUTE OF TECHNOLOGY	
DURAIMURUGAN.P	PAPER PRESENTATION	25-02-2023	Dr.N.G.P.INSTITUTE OF TECHNOLOGY	
DHARANIDHARAN.R	PAPER PRESENTATION	25-02-2023	Dr.N.G.P.INSTITUTE OF TECHNOLOGY	
DHIKSHANA.G	PAPER PRESENTATION	02-03-2023	VSB ENGINEERING COLLEGE	
CHRISTINA JENIFER.F	PAPER PRESENTATION	02-03-2023	VSB ENGINEERING COLLEGE	
MOHAMMED HARRISH.N	PAPER PRESENTATION	02-03-2023	VSB ENGINEERING COLLEGE	
JAGAN.S	PAPER PRESENTATION	02-02-2023	VSB ENGINEERING COLLEGE	
DURAIMURUGAN.P	PAPER PRESENTATION	02-02-2023	VSB ENGINEERING COLLEGE	
DHARANIDHARAN.R	PAPER PRESENTATION	02-03-2023	VSB ENGINEERING COLLEGE	
HRITHIKA.A	PAPER PRESENTATION	03-03-2023	KONGU ENGINEERING COLLEGE	
SAI NHANDHINI C K	PAPER PRESENTATION	03-03-2023	VSB ENGINEERING COLLEGE	

NIVETHA S B	PAPER PRESENTATION	03-03-2023	KONGU ENGINEERING COLLEGE	
SHOBIKA T	PAPER PRESENTATION	04-03-2023	KARPAGAM INSTITUTE OF TECHNOLOGY	
DEEPASHRI.P	PAPER PRESENTATION	04-03-2023	KARPAGAM INSTITUTE OF TECHNOLOGY	
AMRUTHAVARSHINI.B				
AMRUTHAVARSHINI.B				I
DEEPANJALI.S				
KEERTHANA.A				
KEERTHANA.A				I
NANDHINI.S				
HEMANANDHINI.J KAVIN KUMAR.M MOHAMMED HARRISH.N DHIKSHANA G DHARANIDHARAN.R	PAPER PRESENTATION	04-03-2023	KARPAGAM INSTITUTE OF TECHNOLOGY	
SINDHUJA B, SOWMIYA S SANTHI J,SUPRITHA S YAZHINI K, VANATHI S SABARIKA D,SRIMATHI R	PAPER PRESENTATION	17-03-2023	NSN COLLEGE OF ENGINEERING & TECHNOLOGY, KARUR	
SOWMYA S, SUPRITHA S SANTHI J, YAZHINI K SRIMATHI R,SABARIKA D SIVASAKTHI A SOWSHIGA K R SUBHASRI V	PAPER PRESENTATION	10-03-2023	KARPAGAM COLLEGE OF ENGINEERING,COIMBATORE	
S SOWMIYA,R.SNEKA RAM CHANDAR S K K VISHNU KUMAR	PROJECT: DIABETIC FOOT ULCER DETECTION USING IOT	24-03-2023	IITM RESEARCH PARK,CHENNAI	

PAPER PRESENTATION/PROJECT PRESENTATION

Name of the Student	Title of the paper / project	Date	Venue
PriyadharsiniS	Genome Editing	11-11-2022	K.S.R.Collegeof Engineering
Pavithra.K	Genome Editing	11-11-2022	K.S.R.Collegeof Engineering
Maheshwari P	Sensory Substitution	20-02-2023	Karpagam Academy of Higher Education
Boomika A	Electronic Skin	20-02-2023	Karpagam Academy of Higher Education
Bhavadharani M	Sensory Substitution		
Divya Sri A	Electronic Skin		
Gifta Jenifer P	Electronic Skin		
Pavithra.C	IOT Based Automated Smart Wheel Chair	02-03-2023	VSB Engineering College (1st PRIZE)
Divya J	Artificial Intelligence	05-04-2023	K.S.R.Collegeof Engineering
Kaviya K Keerthana.C	Low Cost Wheel Chair with Obstacle Avoidance Feature	06-04-2023	K.S.R.Collegeof Engineering
GiftaJenifer P	Saline Level Monitoring System	12-04-2023	VCET

Jenis Christina B	Hospital and Home Automation	12-04-2023	VCET
Akshara Sree J R	Automatic Plant Watering System	12-04-2023	VCET
Divya Sri A	Saline Level Monitoring System	12-04-2023	VCET
AbinDevasia	Heart Beat Sensor	12-04-2023	VCET
Aravindan P	Battery Level Indicator	12-04-2023	VCET
Gokulakannan A	Heart Beat Sensor	12-04-2023	VCET
Dharrani S	Wet Sensitivity with Flasher	12-04-2023	VCET
Dharshni S	Wet Sensitivity with Flasher	12-04-2023	VCET
Dhanasri B	Wet Sensitivity with Flasher	12-04-2023	VCET
Madhiarasi A	Wet Sensitivity with Flasher	12-04-2023	VCET
Madhumitha R M	Laser Security Alarm System	12-04-2023	VCET
Madhumitha V	Music Rhythm Led	12-04-2023	VCET
Kanagavelu S T	Battery Level Indicator	12-04-2023	VCET
Abishek P	Heart Beat Sensor	12-04-2023	VCET
Krishnaraj.V	Battery Level Indicator	12-04-2023	VCET
Kaviya M	Music Rhythm LED	12-04-2023	VCET
Fathima Farhana S	Security Alarm	12-04-2023	VCET
Gobika V	Soil Moister Detector	12-04-2023	VCET
Kaviya S	Security Alarm	12-04-2023	VCET
Keerthana T	Security Alarm	12-04-2023	VCET
Logeswari M	Security Alarm	12-04-2023	VCET
Janani S	Soil Moister Detector	12-04-2023	VCET
Madhumitha S	Automatic Plant Watering System	12-04-2023	VCET
Mathiarasai T S	Automatic Plant Watering System	12-04-2023	VCET
Kaviya K	Soil Moister Detector	12-04-2023	VCET
Keerthana C	Soil Moister Detector	12-04-2023	VCET
Gowri P	Laser Security Alarm System	12-04-2023	VCET
Divya J	Saline Level Monitoring System	12-04-2023	VCET
Bhavadharani M	Hospital and Home Automation	12-04-2023	VCET
Kanimozhi S	Hospital and Home Automation	12-04-2023	VCET
Jothi Sri S	Music Rhythm Led	12-04-2023	VCET
Boomika A	Saline Level Monitoring System	12-04-2023	VCET
Lalithavarshini K B	Laser Security Alarm System	12-04-2023	VCET
Nithya M	Monitoring System for Coma Patients	12-04-2023	VCET
Subaraja.P	Ear Biometrics	18-04-2023 21-04-2023	CEG Campus, Anna University
Shalini J J Suja M Preethika M Sivasakthi M	Information About Brain Chips	27-04-2023	KSR Institute for Engineering and Technology
Sivasakthi M	Pill Camera	10-02-2023 11-02-2023	Bannari Amman Institute of Technology
Duraimurugan.P Dharanidharan.R	Assist Device for Neuro Muscular Disorder In Patients	25-02-2023	Dr.N.G.P. Institute of Technology
Dhikshana.G	Is Nasa Turns to Its Biomedical Engineers?	02-03-2023	VSB Engineering College
Christina Jenifer.F	Google Glasses	02-03-2023	VSB Engineering College
Mohammed Harrish.N	Is Nasa Turns to Its Biomedical	02-03-2023	VSB Engineering College

	Engineers?		
Jagan.S	Google Glasses	02-02-2023	VSB Engineering College
Duraimurugan.P Dharanidharan.R	Assist Device for Neuro Muscular Disorder In Patients	02-02-2023	VSB Engineering College
Hrithika.A	Skin Craft	03-03-2023	Kongu Engineering College
Sai Nhandhini C K	Artificial Kidney	03-03-2023	VSB Engineering College
Nivetha S B	Electrochemical Immuno Sensor	03-03-2023	Kongu Engineering College
Shobika T	Myocardial Infarction Indicator	04-03-2023	Karpagam Institute of Technology
Deepashri.P	Electronic Voting System Using Biometric	04-03-2023	Karpagam Institute of Technology
Amruthavarshini.B Keerthana.A	LABVIEW Based Patient Monitoring System	04-03-2023	Karpagam Institute of Technology
Deepanjali.S Nandhini.S	IOT Based Smart Health Sticker	04-03-2023	Karpagam Institute of Technology
Hemanandhini.J	Electronic Voting System Using Biometric	04-03-2023	Karpagam Institute of Technology
KavinKumar.M	Electric Vehicle	07-03-2023	Hindusthan Institute of Technology
Mohammed Harrish.N	Is Nasa Turns to Its Biomedical Engineers?	07-03-2023	Hindusthan Institute of Technology
Dhikshana G	Is Nasa Turns to Its Biomedical Engineers?	07-03-2023	Hindusthan Institute of Technology
Dharanidharan.R	Electric Vehicle	07-03-2023	Hindusthan Institute of Technology
Sindhuja B	Biochip	17-03-2023	NSN College of Engineering & Technology
Sowmiya S	Pill Camera		
Vanathi S	Pill Camera		
Santhi J	Artificial Intelligence in Wearable System		
Supritha S	Haptic Technology		
Yazhini K	Pill Camera		
Sabarika D	Haptic Technology		
Srimathi R	Fingerprint Sensor and Its Application		
Sowmya S	Biochip	10-03-2023	Karpagam College of Engineering
Supritha S	Haptic Technology		
Santhi J	Fingerprint Sensor and Its Application		
Yazhini K	Red Traction		
Srimathi R	Artificial Intelligence in Wearable System		
Sabarika D	Haptic Technology		
Sivasakthi A	Pill Camera		
Sowshiga K R	Pill Camera		
Subhasri V	Pill Camera		
S Sowmiya R Sneka	Diabetic Foot Ulcer Detection Using IOT	24-03-2023	IITM Research Park, Chennai

Ram Chandar S K K Vishnu Kumar			
SubarnaDhanavanthni S	Prosthetic Arm for Rehabilitation	12-04-2023	VCET
Santhoshkumar T	Development of IOT Based Device For Heart Rate Detecting	12-04-2023	VCET
FarhaaSabrin	IV Drip Monitoring and Alert System Using Embedded Microcontroller	12-04-2023	VCET
Nivetha S B	Smart Home Automation	12-04-2023	VCET
Sai Nhandhini C K	Foot Step Powered System in Pain Relief	12-04-2023	VCET
Sivasakthi A	Heart Disease Detection Using Deep Learning Method	12-04-2023	VCET
Priyadharshni S N	Face Mask Detection Using Arduino	12-04-2023	VCET
Prachitha S	Driver Drowsiness Detector and Alert System	12-04-2023	VCET
ShibiChandru S K	Face Detection Using Arduino	12-04-2023	VCET
Sabhari Ganesan T S	Low Cost Spirometer	12-04-2023	VCET
Thamarai Selvan K	Face Mask Detection Using Arduino	12-04-2023	VCET
Vaishnavi V	Heart Disease Detection Using Deep Learning Method	12-04-2023	VCET
Sweha M	Kidney Stone Detection Using MATLAB	12-04-2023	VCET
Umamaheswari M Sandhiya S Shajna A	Assistive Device for Dumb People	12-04-2023	VCET
Swetha D Nivetha Sri G	Driver Drowsiness Detector and Alert System	12-04-2023	VCET
Santhiya R	Detection of Brain Tumour Using Python	12-04-2023	VCET
Sowmiya S	Smart Shoes for the Blind People	12-04-2023	VCET
Vanathi S Sowmiya S	Real Time Monitoring of Temperature,Humidity,Atmospheric Pressure and Altitude in Arduino IOT Cloud	12-04-2023	VCET
Shobika T	Smart Foot Monitoring System	12-04-2023	VCET
Praveena P	Door Lock Fingerprint Sensor Using Arduino	12-04-2023	VCET
Subiksha A	Foot Step Powered System in Pain Relief	12-04-2023	VCET
Subhasri V	Smart Foot Monitoring System	12-04-2023	VCET
Ramya K	Real Time Monitoring of Temperature,Humidity, Atmospheric Pressure and Altitude in Arduino IOT Cloud	12-04-2023	VCET
Priyadharshini K	IOT IV Bag Monitoring	12-04-2023	VCET
Uvanandhini B	Low Cost Spirometer	12-04-2023	VCET
Sowshiga K R	Low Cost Spirometer	12-04-2023	VCET

Praveen N	Kidney Stone Detection Using MATLAB	12-04-2023	VCET
Poovarasan I	Ventilator Using Arduino With Heart Rate Sensing	12-04-2023	VCET
Praveen P	Development of IOT Based Device for Heart Rate Detecting		
Tamilarasan S	Baby Monitoring System Using IOT And Node MCU		
Oviya M M	Heart Disease Detection Using Deep Learning Method		
Sona B	Door Lock Fingerprint Sensor Using Arduino	12-04-2023	VCET
Amruthavarshini.B Keerthana.A	Recording and Monitoring Parameters of Spinal Cord Injured Patients Using IOT	18-04-2023 21-04-2023	CEG Campus, Anna University
Sandhiya S Sai Nhandhini C K	Foot Step Powered System for Pain Relief	19-04-2023	ISTE-Kongu Engineering College
Sai Nhandhini C K Subiksha A	Foot Step Powered System for Pain Relief	05-05-2023	TN Skill Development Corporation
Balasubramanian G Kamali A Deepika S Boomika C	Identification and Classification of Lung Cancer from Histopathological Images Using Deep Learning	12-04-2023	VCET
Manimegala E Annapoorna K	IOT Based Advanced Intelligent Walking Stick with Personalized Monitoring System for Visually Impaired Persons	12-04-2023	VCET
Vidhya M ,Yamuna R Priya V	Automatic Insulin Injection Using Pic Controller	12-04-2023	VCET
Mohammed Azarudeen A Durgeshwari B Abinaya K FarsanaBegam S	Smart Epilepsy Prediction Along with Gait Analysis	12-04-2023	VCET
Kavinraj S A	Simplified Design of CPAP Device Using Arduino Nano	12-04-2023	VCET
Catherine Biju	Simplified Design of CPAP Device Using Arduino Nano	12-04-2023	VCET
Tamilselvan M Neseka S,Sindhu R Pradhoshini N	Smart Cradle System for Baby Monitoring Using IOT	12-04-2023	VCET
Disha Mahooza J	An E-Noise Based Selective and Quantitative Detection of Blood Glucose Level	12-04-2023	VCET
Dharaniya T Abinesh K	An E-Noise Based Selective and Quantitative Detection of Blood Glucose Level	12-04-2023	VCET
Yeswanth B Suba Shree P Sri Abirami S Ramya Sri K	Design and Development of Hand Exoskeleton for Stroke Rehabilitation	12-04-2023	VCET

NATIONAL/INTERNATIONAL CONFERENCE PRESENTATION

NAME	TITLE	DATE	VENUE	PRIZE
MUMRITHA C	NATIONAL CONFERENCE	8/6/22 - 9/6/22	Dr.NGPIT	
NAZEEHA M S ARSHA V	NATIONAL CONFERENCE	09-07-2022	NIMHANS ,BANGALORE	
KAMALA KANNAN G R MANIMEGALA E ANNAPOORANI K	NATIONAL CONFERENCE	21-09-2022	PAAVAI ENGINEERING COLLEGE	BEST
RANJITH KUMAR P MUTHU YOGESH B ANNAPOORANI K MANIMEGALA E SNEGA R, SNEHA R	INTERNATIONAL CONFERENCE	17-03-2023	PAAVAI ENGINEERING COLLEGE	
SOWMIYA K,THARANI N RAMYA SRI K SRI ABIRAMI S SUBA SHREE P YESWANTH B ROSHINI K, NISHA S MAHESH KUMAR M SUVETHA S NIVASH T R,NIVEDHA T SUSHMA N S GOWTHAM P,DIVYA K TARUNYASREE B PAVITHRAA G MADHUMITHA Y JENIFER SWATHI R NESHAA THEVI A M	INTERNATIONAL CONFERENCE	17-03-2023	PAAVAI ENGINEERING COLLEGE	
KAMALA KANNAN G R RAMANI V THARSHINI SRI A S SOBIA M,SANGAVI S SUPRIYA A,SOUMIYA K	INTERNATIONAL CONFERENCE	17-03-2023	PAAVAI ENGINEERING COLLEGE	
NAZEEHA M S PAVITHRA SHREE K RISWANTH S VISHNU M K	INTERNATIONAL CONFERENCE	25/03/2023- 26/03/2023	RSP CONFERENCE HUB	BEST
MADHIVADHANI C DHARSHAN M KANNATHASAN S HEMAMALINI P GEETHA M, LEKHA C AJITH KUMAR V MADHUBALA E ABISHEK K B SANGEETHA T THIRUVENGADAM E P SINDHU R,NESEKA S MADHUMITHA S DIVYA M,DILIP D	INTERNATIONAL CONFERENCE	31-03-2023	MUTHAYAMMAL COLLEGE OF ENGINEERING	

ARSHA V,GOWTHAM P PRADHOSHINI N TAMILSELVAN M PRASITHA L				
VIDHYA M, NISHA S YAMUNA R, PRIYA V NESHAA THEVI A M PAVITHRAA G	INTERNATIONAL CONFERENCE	05/04/2023-06/04/2023	KALAIGNAR KARUNANIDHI INSTITUTE OF TECHNOLOGY	
JANANI G K, ABINESH K JAYA VIVEKA B MOHAMMED FASEEM R CATHERINE BIJU BOOMIKA C, DEEPIKA S KAMALI A, ABINAYA K BALASUBRAMANIAN G LEELA P, KAVINRAJ S A CHANDRALEKHA A DURGESWARI B FARSANA BEGAM S MOHAMMED AZARUDEEN A,AGALYA S	NATIONAL CONFERENCE	11-04-2023	VELAMMAL ENGINEERING COLLEGE	

NON-TECHNICAL PARTICIPATION

NAME	TITLE	DATE	VENUE	PRIZE
ANNAPOORANI.K	IDEATHON-TECHNICAL	28/09/2022	VCET	II
MANIMEGALA.E	IDEATHON-TECHNICAL	28/09/2022	VCET	II
MADHUBALA E	IDEATHON	28/09/2022	VCET	
ABINESH.K	IDEATHON	28/09/2022	VCET	
DHARANIYA.T	IDEATHON	28/09/2022	VCET	
SINDHU.R	QUIZ COMPETITION	11-06-2022	VCET	
RAMYA SRI K	IEEE EMBS-CHAIRPERSON	2022-2023	IEEE STUDENT BRANCH-VCET	
AMRUTHAVARSHINI.B	CYCLE RALLY	31-07-2022	ROTARY CLUB OF ERODE	
AMRUTHAVARSHINI.B	ENGINEERS DAY QUIZ	28-08-2022	JAI SHRIRAM ENGINEERING COLLEGE	
SABHARI GANESAN.T.S	5KM ERODE MARATHON COMPLETED	11-09-2022	MILKY MIST ERODE MARATHON	SUCCESSFULLY COMPLETED
SABHARI GANESAN.T.S	BLOOD DONATION	27/09/2022	TAMILNADU VOLUNTARY BLOOD BANK & RESEARCH CENTRE	
NEGA.R	IDEATHON	28/09/2022	VCET	
SANDHIYA.S	IDEATHON	28/09/2022	VCET	
TAMILARASAN S	IDEATHON	28/09/2022	VCET	

NIKILA K M	ONLINE QUIZATHON SERIES	30-09-2022	YAVARUM KELIR,NAMAKKAL	
SAINHANDHINI.C.K	QUIZ COMPETITION	11-06-2022	VCET	
NIVETHA.S.B	RUNNER OF IDEA PRESENTATION	13/11/2022	ATHEENAPANDIAN PRIVATE LIMITED	
SURENDIRAN I	37.5 KMS CYCLE RALLY	27-11-2022	NCC-VCET	SUCCESSFULLY COMPLETED
SUBHASRI V	100 HRS IEI TNSC TECHNO CARNIVAL	23-04-23 TO 30-11-23	IEI TNSC	
SURENDIRAN I	COMBINED ANNUAL TRAINING CAMP-V	03-01-2023 TO 10-JAN-2023	VET INSTITUTE OF ARTS AND SCIENCE	L/CPL
SHAJNA S	MEHENDI	06-03-2023	WEC-VCET	
TAMILARASAN S	EXECUTIVE MEMBER-BIONIKX	2022-2023	BME-VCET	
THAMARAI SELVAN K	JOINT SECRETARY-BIONIKX	2022-2023	BME-VCET	
AMRUTHAVARSHINI.B	TECHNICAL EVENTS	18-04-2023 TO 21-04-2023	CEG CAMPUS,ANNA UNIVERSITY	
KEERTHANA.A	TECHNICAL EVENTS	18-04-2023 TO 21-04-2023	CEG CAMPUS,ANNA UNIVERSITY	
HRITHIKA A	TECHNICAL EVENTS	18-04-2023 TO 21-04-2023	CEG CAMPUS,ANNA UNIVERSITY	
SUBHASRI V	800 MTS	2022-2023	ANNUAL SPORTS MEET 2022-2023	
SANTHOSHKUMAR T	TABLE TENNIS	2022-2023	ANNUAL SPORTS MEET 2022-2023	I
SANTHOSHKUMAR T	CARROM	2022-2023	ANNUAL SPORTS MEET 2022-2023	II
THAMARAI SELVAN K	KHO KHO	2022-2023	ANNUAL SPORTS MEET 2022-2023	
SAINHANDHINI.C.K	2KMS/5KMS RUN	23-04-2023	JCI ERODE	
HARITHA J D	ZONAL ROTARY YOUTH LEADERSHIP AWARDS	2022-2023	PANDORA,DIST.ROTRACT ORGANIZATION	award

INTERNSHIP

NAME	YEAR	DATE	COLLEGE NAME
Sindhu R	IV year	19.10.2022	VCET
Sindhu R	IV year	18.11.2022	VCET
Sindhu R	IV year	06.11.2022	IEEE
Dharaniya T	IV year	15.09.2022	VCET
Oviya M M	III year	29.07.2022	VCET
Priyadharshini S N	III year	29.07.2022	VCET
Prachitha S	III year	29.07.2022	VCET
Nivetha S B	III year	13.11.2022	Atheenapandian

Priyadharshini S N	II year	16.07.2022	Lotus Hospital
Prachitha S	II year	16.07.2022	Lotus Hospital
Praveen k	II year	16.07.2022	Lotus Hospital
Praveen k	III year	29.07.2022	VCET
Farsana Begam S	IV year	29.07.2022	VCET
Gayathri S	IV year	29.07.2022	VCET
Kavin Kumar T	III year	29.07.2022	VCET
Kavin Kumar T	III year	16.09.2022	KarmaDev
Deepanjali S	III year	27.12.2022	Kanthamalai Hospital
Sharmika M,Sandhiya S, Sowmiya S	III year	29.07.2022	VCET
Sowmiya S	III year	16.09.2022	VCET
Sabarika B D	III year	10.11.2022	VCET
Janani S	II year	12.06.2022	GIFT OF HEART
Srihari M	II year	12.06.2022	GIFT OF HEART

WORKSHOP

NAME	YEAR	DATE	COLLEGE NAME
Dharaniya T	IV year	03.10.2022	K S R College of Engineering
Oviya M M	III year	03.09.2022	CYRIX
Priyadharshini S N	III year	03.09.2022	CYRIX
Prachitha S	III year	03.09.2022	CYRIX
Praveeen P	III year	03.09.2022	CYRIX
Kavin kumar T	III year	03.09.2022	CYRIX
Sharmika M	III year	03.09.2022	CYRIX
Santhiya R	III year	03.09.2022	CYRIX
Sandhiya S	III year	03.09.2022	CYRIX
Muthu Yogesh R	IV year	9.10.2022	Service camp & care
Nivash T R	IV year	9.10.2022	Service camp & care
Abishek K B	IV year	9.10.2022	Service camp & care
Ajith kumar V	IV year	9.10.2022	Service camp & care
Kavinraj S A	IV year	9.10.2022	Service camp & care
Riswanth S	IV year	9.10.2022	Service camp & care
Tamilselvan M	IV year	9.10.2022	Service camp & care
Yeswanth B	IV year	9.10.2022	Service camp & care
Mohanapriya N	III year	11.10.2022	Karpagam academy of higher education
Vasundra T	III year	11.10.2022	Karpagam academy of higher education
Nithya M	III year	23.09.2022	Mahendra College of Engineering
Sruthi.M	III year	23.09.2022	Mahendra College of Engineering
Sruthi M	I year	13.10.2022	Mahendra College of Engineering

Srihari M	II year	23.09.2022	Mahendra College of Engineering
Srihari M	II year	23.09.2022	Mahendra College of Engineering
Srihari M	I year	13.10.2022	Mahendra College of Engineering
Subaraja P	I year	23.09.2022	Mahendra College of Engineering
Sudhakar R	I year	23.09.2022	Mahendra College of Engineering
Mouli surya	I year	13.10.2022	Mahendra College of Engineering

WORKSHOP /SYMPOSIUM

NAME	TITLE	DATE	VENUE	PRIZE
Nabisathul Musriya S Ashifa S, Preethi K Gobika S, Shobika G Pavithra K, Rohith M	WORKSHOP	11-01-2023	KARPAGAM ACADEMY OF HIGHER EDUCATION	
Pavithra K,Priyanka S Shalini J J	WORKSHOP	10-02-2023	BANNARI AMMAN INSTITUTE OF TECHNOLOGY	
Sanjai Kumar.S Santhosh.S,Saranraj.B	SYMPOSIUM	16/2/2023	M.KUMARASAMY COLLEGE OF ENGINEERING	
Mouli Surya.M	SYMPOSIUM	16/2/2023	M.KUMARASAMY COLLEGE OF ENGINEERING	I
Divya Sri A Gifta Jenifer P Bavadharani M	TEKSPARK'23	20-02-2023	KARPAGAM ACADEMY OF HIGHER EDUCATION	
Subaraja.P, Nithya M Preethika M Suja M,Kaviya M Mathiarasi T S Shalini J J, Rohith M	WORKSHOP	04-03-2023	CYRIX HEALTHCARE	
Thrisha S, Pavithra C Thiruvenkadam.G Sruthi M, Sri Hari.M	SYMPOSIUM	24/3/2023 TO 26/3/2023	PSG COLLEGE OF TECHNOLOGY,COIMBATORE	
Kavya Sree S Subaraja.P	WORKSHOP	30/3/23 & 31/3/23	RATHINAM TECHNICAL CAMPUS,COIMBATORE	
Hrithika.A	MOLECULAR BIOLOGY AND BIOCHEMISTRY TECHINEQES	28-01-2023	IIT MADRAS	
Nivetha S B	BREAK ALL BARRIERS	25-02-23 & 26-02-23	HEARTFULNESS MEDITATION CENTRE	
Dharanidharan.R Duraimurugan.P Christina Jenifer.F	HENOSIS 2K23	25-02-2023	Dr.N.G.P. INSTITUTE OF TECHNOLOGY	II
Christina Jenifer.F Dharanidharan.R Duraimurugan.P, Jagan.S Mohammed Harrish.N	CYBORG 2K23	02-03-2023	V.S.B ENGINEERING COLLEGE	

Dharanidharan.R Kavin Kumar.M	CYBORG 2K23	03-07-2023	HINDUSTHAN INSTITUTE OF TECHNOLOGY	I
Dhikshana.G Amruthavarshini.B Hemanandhini.J Deepashri.P	CYBORG 2K23	04-03-2023	V.S.B ENGINEERING COLLEGE	
Keerthana.A	TEKSPARK'23	04-03-2023	KARPAGAM INSTITUTE OF TECHNOLOGY	
Sowmiya.S	DATA VISUALIZATION USING MODERN COMPUTERIZED ANALOGS	04-03-2023	VELALAR COLLEGE OF ENGINEERING AND TECHNOLOGY	
Amruthavarshini B Keerthana A	BRAIN COMPUTER INTERFACE AN OVERVIEW	30-03-2023 & 31-03-2023	RATHINAM TECHNICAL CAMPUS,COIMBATORE	II
Jana Priya M, Leena A S Arputha S S, Jagan.S Hemanandhini.J Nandhini S, Kaviya S Mohammed Mushfiq Nijamudeen K Dharanidharan.R Mohammed Harrish.N	BRAIN COMPUTER INTERFACE AN OVERVIEW	30-03-2023 & 31-03-2023	RATHINAM TECHNICAL CAMPUS,COIMBATORE	
Shobika T Yashwanth S	ESPERANZA'23	31-03-2023	SRM TRP ENGINEERING COLLEGE	
Subiksha A Sai Nhandhini C K	STARTUP20X-CONCLAVE	28-04-2023	ATAL INCUBATION CENTRE	
Nandhini S, Devika R Ahalya K, Nikila K M	MEDICAL EQIPMENT	28-04-23 & 29-04-23	KPR INSTITUTE OF ENGINEERING AND TECHNOLOGY	

TRAINING

NAME	EVENT	DATE	VENUE
NIVETHA S B	INTERNSHIP-INPLANT TRAINING-EMBEDDED SYSTEMS	24/1/23-28/1/23	CODEBIND TECHNOLOGIES,COIMBATORE
AMRUTHAVARSHINI B	TCS ION CAREER EDGE-YOUNG PROFESSIONAL	10/3/23-28/4/23	TCS ION CAREER EDGE
NIVETHA S B	NHRC -BASIC TRAINING PROGRAM ON HUMAN RIGHTS	28-03-2023	KONGU ENGINEERING COLLEGE
SUBARNA DHANAVANTHNI	ARDUINO TRAINING	20-04-2023	SPOKEN TUTORIAL PROJECT, IIT BOMBAY
SWETHA D, SANDHIYA S SANTHIYA R,SHARMIKA M	ARDUINO TRAINING	20-04-2023	SPOKEN TUTORIAL PROJECT, IIT BOMBAY

UVANANDHINI.B SOWSHIGA K R ,RAMYA K PRIYADHARSHINI K	ARDUINO TRAINING	20-04-2023	SPOKEN TUTORIAL PROJECT, IIT BOMBAY
MAHESH KUMAR M MADHUMITHA Y, DIVYA K JENIFER SWATHI.R	INTERNSHIP	23/01/2023-23/02/2023	XPERT AUTOMATIX
NISHA S SINDHU R	1 WEEK INDUSTRIAL TRAINING	9/4/2023-16/4/2023	PANTECH E-Learning
NAVEENA.N,M SHARMIKA R SANTHIYA	HOSPITAL TRAINING	02/01/2023-05/01/2023	SRI GOKULAM HOSPITAL
KEERTHANA T	HOSPITAL TRAINING	06/01/2023-13/01/2023	LOTUS HOSPITAL
NIVETHA S B	INTERNSHIP-INPLANT TRAINING-EMBEDDED SYSTEMS	24/1/23-28/1/23	CODEBIND TECHNOLOGIES,COIMBATORE
AMRUTHAVARSHINI B	TCS ION CAREER EDGE-YOUNG PROFESSIONAL	10/3/23-28/4/23	TCS ION CAREER EDGE
VASUNDRA.T, VARSINI.G.G SIVASAKTHI.M MOHANAPRIYA.N SUBHARANJANI.M	INTERNSHIP	08/01/2023-12/01/2023	PPSCAANS AND DIAGNOSTIC CENTRE
KAVYASREE S PAVITHRA C	HOSPITAL TRAINING	06/01/23-13/01/23	LOTUS HOSPITAL

CONFERENCES

NAME	TITLE	DATE	VENUE	PRIZE
RANJITH KUMAR P SNEHA R, SNEGA R MUTHU YOGESH B ANNAPOORANI K MANIMEGALA E SOWMIYA K, THARANI N RAMYA SRI K,SRI ABIRAMI S SUBA SHREE P	International Conference on Adaptive Techonogies for Sustainable Growth	17-03-2023	PAAVAI ENGINEERING COLLEGE	
YESWANTH B,ROSHINI K NISHA S,MAHESH KUMAR M SUVETHA S,NIVASH T R NIVEDHA T,SUSHMA N S GOWTHAM P, DIVYA K	International Conference on Adaptive Techonogies for Sustainable Growth	17-03-2023	PAAVAI ENGINEERING COLLEGE	
TARUNYASREE B PAVITHRAA G, RAMANI V MADHUMITHA Y JENIFER SWATHI R NESHAA THEVI A M KAMALA KANNAN G R THARSHINI SRI A S SOBIA M,SANGAVI S SUPRIYA A,SOUMIYA K	International Conference on Adaptive Techonogies for Sustainable Growth	17-03-2023	PAAVAI ENGINEERING COLLEGE	

NAZEEHA M S PAVITHRA SHREE K RISWANTH S, VISHNU M K	International Conference	25/03/2023-26/03/2023	RSP CONFERENCE HUB	BEST
MADHIVADHANI C DHARSHAN M KANNATHASAN S HEMAMALINI P GEETHA M, AJITH KUMAR V	International conference on Engineering	31-03-2023	MUTHAYAMMAL COLLEGE OF ENGINEERING	
MADHUBALA E, SINDHU R ABISHEK K B,SANGEETHA T THIRUVENGADAM E P	International conference on Engineering	31-03-2023	MUTHAYAMMAL COLLEGE OF ENGINEERING	
NESEKA S PRASITHA L MADHUMITHA S DIVYA M,DILIP D ARSHA V,GOWTHAM P LEKHA C,PRADHOSHINI N TAMILSELVAN M	International conference on Engineering	31-03-2023	MUTHAYAMMAL COLLEGE OF ENGINEERING	
VIDHYA M,NISHA S YAMUNA R NESHAA THEVI A M PAVITHRAA G,PRIYA V	International Conference on Science, Technology, Engineering and Management	05/04/2023- 06/04/2023	KALAIGNAR KARUNANIDHI INSTITUTE OF TECHNOLOGY	
AGALYA S,JANANI G K JAYA VIVEKA B ABINESH K MOHAMMED FASEEM R CATHERINE BIJU BOOMIKA C,DEEPIKA S KAMALI A, LEELA P BALASUBRAMANIAN G CHANDRALEKHA A KAVINRAJ S A, ABINAYA K DURGESWARI B FARSANA BEGAM S MOHAMMED AZARUDEEN A	International Conference on Recent Technologies and Computing Sciences	11-04-2023	VELAMMAL ENGINEERING COLLEGE	

OTHERS

NAME	YEAR	DATE	COLLEGE NAME
Sindhu R	IV year	12.08.2022	VCET
Abinesh K	IV year	28.09.2022	BIONIKX
Dharaniya T	IV year	12.08.2022	IEEE
Dharaniya T	IV year	28.09.2022	BIONIKX
Priyadharshini S N	III year	Oct-2022	NPTEL
Prachitha S	III year	Oct-2022	NPTEL
Praveen P	III year	Oct-2022	NPTEL
Jaya viveka B	III year	12.08.2022	IEEE
Uvanandhini B	II year	14.07.2022	Maruthi Medical centre and Hospital
Uvanandhini B	II year	20.07.2022	NIPAM
Uvanandhini B	II year	10.11.2022	Spoken Tutorial

Uvanandhini B	III year	12.08.2022	IEEE
Gayathri S	IV year	16.07.2022	Sudha Hospital
Farsana Begam S	IV year	16.07.2022	Sudha Hospital
Nega R	III year	28.09.2022	BIONIKX
Nega R	III year	14.07.2022	MMCH
Jennifer Swathi R	IV year	05.08.2022	Erode Emergency Care Hospital
Santhiya R	III year	05.11.2022	Spoken tutorial
Santhiya R	III year	20.07.2022	NIPAM
Sandhiya S	III year	28.09.2022	VCET
Sainhandhini CK	III year	12.08.2022	IEEE
Sainhandhini CK	III year	06.11.2022	IEEE
Somiya	II year	20.07.2022	NIPAM
Sandhiya S	II year	10.11.2022	Spoken Tutorial
Sandhiya S	III year	12.08.2022	IEEE
Sharmika M	III year	12.08.2022	IEEE
Pavithra C	III year	23.09.2022	Mahendra college of engineering
Sanjuritha S	III year	23.09.2022	Mahendra college of engineering
Keerthana C	II year	28.09.2022	VCET
Kaviya K	II year	28.09.2022	VCET
Kaviya K	II year	18.10.2022	VCET
Pavithra K	III year	01.09.2022	Bannari amman institute of technology
Giftajenifar P Logeshwari M	II year	28.09.2022	VCET
Aram valar radha S	II year	28.11.2022	KPR institute of engineering and technology
Aram valar radha S	II year	28.09.2022	VCET
Janani S	II year	05.10.2019	Kongu Matric Hr Sec School Keelpakam
Janani S	II year	11.09.2022	Erode marathon
Janani S	II year	18.10.2022	VCET
Krishnaraj V	I year	2022	VCET
Krishnaraj V	I year	29.09.2022	VCET
Kaviya S	II year	28.09.2022	VCET
Keerthana T	II year	28.09.2022	VCET
Madhumitha R M	I year	01.06.2022	VCET
Lalithavarshini KB	I year	2022	Rotary club
Kaviya M	I year	29.09.2022	VCET
Gokila P	I year	01.06.2022	Drawing competition
Maheswari P	II year	28.09.2022	Vcet
Divyasri A	II year	01.09.2022	Bannari Amman Institute of Technology
Divyasri A	II year	28.09.2022	VCET
Bhomika A	II year	28.09.2022	VCET

Saranyadevi B	III year	23.09.2022	Mahendra College of Engineering
Nithya M	III year	23.09.2022	Mahendra College of Engineering
Shuruthi M	III year	23.09.2022	Mahendra College of Engineering
Sruthi M	II year	28.09.2022	VCET
Shobika G	II year	01.09.2022	Bannari Amman Institute of Technology
Srihari M	I year	23.09.2022	Mahendra college of engineering
Sri hari M	I year	27.09.2022	Blood donation
Preethi K	I year	27.09.2022	Blood donation
Suganya S	I year	27.09.2022	Blood donation
Subaraja P	I year	14.12.2022	PALS
Subaraja P	I year	23.09.2022	Mahendra College of Engineering
Subaraja P	I year	23.09.2022	Mahendra College of Engineering
Sudhakar R	I year	23.09.2022	Mahendra College of Engineering
Sudhakar R	I year	23.09.2022	Mahendra College of Engineering
Moulisurya M	I year	23.09.2022	Mahendra College of Engineering
Moulisurya M	I year	23.09.2022	Mahendra College of Engineering
Thiruvengam G	I year	23.09.2022	Mahendra College of Engineering
Thiruvengadam G Pavithra D	II year	28.09.2022	VCET

NON TECHNICAL EVENTS

NAME	EVENT	DATE	VENUE	PRIZE
KEERTHANA.A HRITHIKA A	TECHNICAL EVENTS	18-04-2023 to 21-04-2023	CEG CAMPUS,ANNA UNIVERSITY	
SURENDIRAN I	COMBINED ANNUAL TRAINING CAMP-V	03-01-2023 - 10-JAN-2023	VET INSTITUTE OF ARTS AND SCIENCE	
SHAJNA S	MEHENDI	06-03-2023	WEC-VCET	
SAINHANDHINI.C.K	2KMS/5KMS RUN	23-04-2023	JCI ERODE	
PREETHIKA M	BLOOD DONATION CAMP	09-02-2023	LIONS CLUB ERODE	
SUJA M	BLOOD DONATION CAMP	09-02-2023	LIONS CLUB ERODE	
MOULI SURYA M	TECH IQ	16-02-2023	M KUMARASAMY COLLEGE OF ENGINEERING	
DIVYA J	CODING	24-02-2023 & 25-02-2023	SONA COLLEGE OF TECHNOLOGY	
MANOJ R	KHO KHO	09-03-2023 & 10-03-2023	KONGU ENGINEERING COLLEGE	

SUBARAJA.P	TECHNICAL EVENTS-KURUKSHETRA	18-04-2023 TO 21-04-2023	CEG CAMPUS,ANNA UNIVERSITY	
MOULI SURYA M SANTHOSH S SARANRAJ B	CIRCUIT DEBUGGING	27-04-2023	ADITHYA INSTITUTE OF TECHNOLOGY	
SARANRAJ B MOULI SURYA M SANTHOSH S	E-SPORTS	27-04-2023	ADITHYA INSTITUTE OF TECHNOLOGY	I
JANANI.S	BALL BADMINTON	2022-2023	ANNUAL SPORTS MEET-VCET	I
JANANI.S	1500 MTS	2022-2023	ANNUAL SPORTS MEET-VCET	III
ATHUL KRISHNA M	TABLE TENNIS	2022-2023	ANNUAL SPORTS MEET-VCET	I
ATHUL KRISHNA M	CARROM	2022-2023	ANNUAL SPORTS MEET-VCET	II
JERRWIN JOSHUA M	TABLE TENNIS	2022-2023	ANNUAL SPORTS MEET-VCET	I
JENIS CHRISTINA B	CARROM	2022-2023	ANNUAL SPORTS MEET-VCET	I
JOTHI SRI S	CARROM	2022-2023	ANNUAL SPORTS MEET-VCET	I
SYED ABDULLAH	CARROM	2022-2023	ANNUAL SPORTS MEET-VCET	II
NABISATHUL MUSRIYA S	CARROM	2022-2023	ANNUAL SPORTS MEET-VCET	I

RECENT BIOMEDICAL ARTICLES

ROBOTICISTS WANT TO GIVE YOU A THIRD ARM

Robotic limbs have come a long way in recent decades, and some are already used by people to enhance their abilities. Most are operated via a joystick or other hand controls. For example, that's how workers on manufacturing lines wield mechanical limbs that hold and manipulate components of a product. Similarly, surgeons who perform robotic surgery sit at a console across the room from the patient. While the surgical robot may have four arms tipped with different tools, the surgeon's hands can control only two of them at a time. Robotic limbs are also used by people who have amputations or paralysis. That includes people in powered wheelchairs controlling a robotic arm with the chair's joystick and those who are missing limbs controlling a prosthetic by the actions of their remaining muscles. But a truly mind-controlled prosthesis is a rarity.

The pioneers in brain-controlled prosthetics are people with tetraplegia, who are often paralyzed from the neck down. Some of these people have boldly volunteered for clinical trials of brain implants that enable them to control a robotic limb by thought alone, issuing mental commands that cause a robot arm to lift a drink to their lips or help with other simple tasks of daily life. These systems fall under the category of brain-machine interfaces (BMI). Other volunteers have used BMI technologies to control computer cursors, enabling them to type out messages, browse the Internet, and more. But most of these BMI systems require brain surgery to insert the neural implant and include hardware that protrudes from the skull, making them suitable only for use in the lab.

Augmentation of the human body can be thought of as having three levels. The first level increases an existing characteristic, in the way that, say, a powered exoskeleton can give the wearer super strength. The second level gives a person a new degree of freedom, such as the ability to move a third arm or a sixth finger, but at a cost—if the extra appendage is controlled by a foot pedal, for example, the user sacrifices normal mobility of the foot to operate the control system. The third level of augmentation, and the least mature technologically, gives a user an extra degree of freedom without taking mobility away from any other body part. Such a system would allow people to use their bodies normally by harnessing some unused neural signals to control the robotic limb. That's the level that we're exploring in our research.

Deciphering electrical signals from muscles

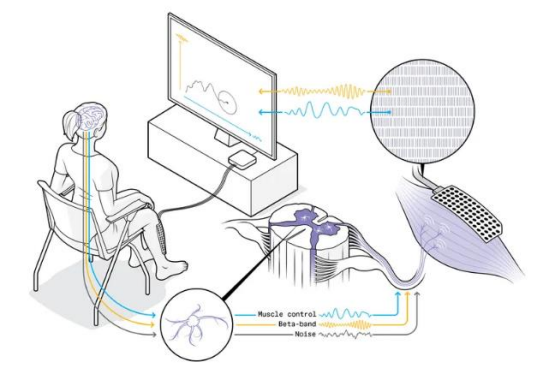
Third-level human augmentation can perhaps be achieved with invasive BMI implants, but for everyday use, we need a noninvasive way to pick up brain commands from outside the skull. For many research groups, that means relying on tried-and-true electroencephalography (EEG) technology, which uses scalp electrodes to pick up brain signals. Our groups are working on that approach, but we are also exploring another method: using electromyography (EMG) signals produced by muscles. We've spent more than a decade investigating how EMG electrodes on the skin's surface can detect electrical signals from the muscles that we can then decode to reveal the commands sent by spinal neurons.

Electrical signals are the language of the nervous system. Throughout the brain and the peripheral nerves, a neuron "fires" when a certain voltage—some tens of millivolts—builds up within the cell and causes an action potential to travel down its axon, releasing neurotransmitters at junctions, or synapses, with other neurons, and potentially triggering those neurons to fire in turn. When such electrical pulses

are generated by a motor neuron in the spinal cord, they travel along an axon that reaches all the way to the target muscle, where they cross special synapses to individual muscle fibers and cause them to contract. We can record these electrical signals, which encode the user's intentions, and use them for a variety of control purposes.

How the Neural Signals are Decoded

Deciphering the individual neural signals based on what can be read by surface EMG, however, is not a simple task. A typical muscle receives signals from hundreds or thousands of spinal neurons. Moreover, each axon branches at the muscle and may connect with a hundred or more individual muscle fibers distributed throughout the muscle. A surface EMG electrode picks up a sampling of this cacophony of pulses.



A breakthrough in noninvasive neural interfaces came with the discovery two decades ago that the signals picked up by high-density EMG, in which tens to hundreds of electrodes are fastened to the skin, can be disentangled, providing information about the commands sent by individual motor neurons in the spine. Such information had previously been obtained only with invasive electrodes in muscles or nerves. Working with amputees in 2017, showed that this approach with high-density EMG could potentially be used for improved control of prosthetic limbs.

Our high-density surface electrodes provide good sampling over multiple locations, enabling us to identify and decode the activity of a relatively large proportion of the spinal motor neurons involved in a task. And we can now do it in real time, which suggests that we can develop noninvasive BMI systems based on signals from the spinal cord.The current version of our system consists of two parts: a training module and a real-time decoding module. To begin, with the EMG electrode grid attached to their skin, the user performs gentle muscle contractions, and we feed the recorded EMG signals into the training module. This module performs the difficult task of identifying the individual motor neuron pulses (also called spikes) that make up the EMG signals. The module analyzes how the EMG signals and the inferred neural spikes are related, which it summarizes in a set of parameters that can then be used with a much simpler mathematical prescription to translate the EMG signals into sequences of spikes from individual neurons.

With these parameters in hand, the decoding module can take new EMG signals and extract the individual motor neuron activity in real time. The training module requires a lot of computation and would be too slow to perform real-time control itself, but it usually has to be run only once each time the EMG electrode grid is fixed in place on a user. By contrast, the decoding algorithm is very efficient, with latencies as low as a few milliseconds, which bodes well for possible self-contained wearable BMI systems. We validated the accuracy of our system by comparing its results with signals obtained concurrently by invasive EMG electrodes inserted into the user's muscle.

Exploiting extra bandwidth in neural signals

Developing this real-time method to extract signals from spinal motor neurons was the key to our present work on controlling extra robotic limbs. While studying these neural signals, we noticed that they have, essentially, extra bandwidth. The low-frequency part of the signal (below about 7 hertz) is converted into muscular force, but the signal also has components at higher frequencies, such as those in the beta band at 13 to 30 Hz, which are too high to control a muscle and seem to go unused. We don't

know why the spinal neurons send these higher-frequency signals; perhaps the redundancy is a buffer in case of new conditions that require adaptation. Whatever the reason, humans evolved a nervous system in which the signal that comes out of the spinal cord has much richer information than is needed to command a muscle.That discovery set us thinking about what could be done with the spare frequencies. In particular, we wondered if we could take that extraneous neural information and use it to control a robotic limb. But we didn't know if people would be able to voluntarily control this part of the signal separately from the part they used to control their muscles.

SUPRIYA A
IV BME B

"BRAIN AGE" AI DISCOVERS EARLY ALZHEIMER'S SIGNS

Although your brain has chronologically the same number of years in the world as the rest of you, determining its medical "age," a measure of how processes of aging impact the brain, is far from obvious or straightforward. Now, researchers are testing an AI-based model that determines brain age via magnetic resonance imaging (MRI) data, potentially helping identify early signs of dementia and Alzheimer's disease.This latest research is hardly the first machine-learning model to be applied to the "brain age" problem. But the new research, published in the *Proceedings of the National Academy of Sciences,* looks like it could help buy high-risk patients crucial time."If we do identify people at high risk early, we can mitigate the risk through lifestyle changes or potential treatments," said Andrei Irimia, an assistant professor of gerontology at the University of Southern California and the senior author of the study.

Irimia and his colleagues trained their model using MRIs from 4,681 cognitively normal patients sampled from a combination of databases, with the largest number coming from the UK Biobank. The researchers used a different set of 1,170 MRIs from the same databases to test their network. For each MRI, the neural network produces an estimate of a patient's chronological age. The researchers referred to this value as the patient's brain age, which should be as close to a person's chronological age as possible when it is given scans from cognitively normal adults.The algorithm predicted chronological age with an average error of about 2.3 years, which the researchers said is more accurate by about a year than other comparable brain-age techniques.Of course, as with much of AI, brain-age algorithms are often black boxes—inscrutable from inspection and unrevealing about how they generated their findings. Irimia's team, however, wanted to make their algorithm interpretable. So it also generates what are called saliency maps—showing the areas of the MRIs the network relies most on to make its decisions.

The researchers used 650 more MRIs from cognitively normal patients, as well as 359 who had Alzheimer's dementia and 351 with less severe effects from the disease called mild cognitive impairment (MCI). About half of the patients with MCI later developed dementia. The saliency maps supported findings from other studies, including ones on normal aging in the brain and how Alzheimer's might impact the brains of male and female people differently."We found that our method could confirm and reproduce other findings from other studies that use completely different methods," Irimia said.

The researchers found that a larger gap between brain age and chronological age increased the risk that someone with MCI would eventually develop dementia, which previous studies have also found. They also found that for patients with either MCI or dementia, brain age was more correlated with their level of cognitive functioning than their chronological age was. This was also true of patients with MCI, but not for the group with dementia. That may be because the model was trained using data from

cognitively normal patients, the researchers write, although there could be multiple explanations, Irimia said.

Though this study used a large data set, the sample still skews heavily toward white people of European descent, said James Cole, a professor of neuroimage computing at University College London. Specific racial demographics are not given for the study because the authors didn't have access to that information, said Irimia. However, the UK Biobank, the study's largest data source, is about 95 percent white. It's crucial that researchers be able to show that their research applies to a diverse group of people, said Cole.It's hard to say how meaningful the one-year increase in accuracy is, said Eran Dayan, an associate professor in the department of radiology at the University of North Carolina, Chapel Hill's school of medicine.To know this, Dayan said, future research would have to incorporate more clinical data. Though this study did incorporate some data on cognitive function, Dayan says more studies using longitudinal data, or patient data over time, would be needed to eventually use this technology with real patients.

LEKHA C
IV BME A

WEARABLE ULTRASOUND PATCH IMAGES THE HEART IN REAL TIME

A wearable ultrasound imager for the heart that is roughly the size of a postage stamp, can be worn for up to 24 hours, and works even during exercise may one day help doctors spot cardiac problems that current medical technology might miss, a new study finds.

Heart disease is the leading cause of death among the elderly, and is increasingly becoming a problem among those who are younger as well because of unhealthy diets and other factors. The signs of heart disease are often brief and unpredictable, so long-term cardiac imaging may help spot heart anomalies that might otherwise escape detection.For instance, patients with heart failure may at times seem fine at rest, "as the heart sacrifices its efficiency to maintain the same cardiac output," says study colead author Hongjie Hu, a nanoengineer at the University of California, San Diego. "Pushing the heart towards its limits during exercise can make the lack of efficiency become apparent."

In addition, the heart can quickly recover from problems it may experience during exercise. This means doctors may fail to detect these issues, since cardiac imaging conventionally happens after exercise, not during it, Hu says.However, cardiac imaging techniques are often limited in terms of when they can analyze the heart, due in large part to the bulkiness of the equipment. For example, traditional cardiac ultrasound imaging"evaluates images of the heart right before and right after intensive exercise, as holding an ultrasound probe over the chest by hand and maintaining a stable position for it is impossible during this process," Hu says. Previous wearable heart sensors could capture signals only on the skin.Now scientists have developed a wearable ultrasound device that can enable safe, continuous, real-time, long-term, and highly detailed imaging of the heart. They detailed their findingsonline on 25 January in the journal *Nature*.

"Potential applications include continuously monitoring the heart in daily life, during exercise, during surgery, and much more," says study coauthor Ray Wu, a nanoengineer at UC San Diego. "This will open up the possibility to detect previously undetectable symptoms of disease, identify symptoms in their very early stages, and greatly improve patient outcomes."

The new device is a patch 1.9 centimeters long by 2.2 cm wide and only 0.9 millimeters thick. It uses an array of piezoelectrictransducers to send and receive ultrasound waves in order to generate a constant

stream of images of the structure and function of the heart. The researchers were able to get such images even during exercise on a stationary bike. No skin irritation or allergy was seen after 24 hours of continuous wear.

“The most exciting result is that our patch performs well when an individual is moving,” Hu says. “Our patch allows us to evaluate heart performance throughout exercise, providing valuable information about the heart when it is under high stress.”The new patch is about as flexible as human skin. It can also stretch up to 110 percent of its size, which means it can survive far more strain than typically experienced on human skin. These features help it stick onto the body, something not possible with the rigid equipment often used for cardiac imaging.“The wearable imager removes much of the bulkiness of traditional imagers and adheres to the body on its own,” Wu says. “This enables the heart to be imaged in ways and scenarios that were never possible before while also freeing up the hands of the doctor from having to continuously operate a traditional ultrasound probe.”

In the new study, the researchers focused on imaging the left ventricle, the largest of the heart’s four chambers “and strongly considered to be the most important in terms of cardiovascular health, as it is responsible for pumping oxygenated blood to the entire body,” Wu says. Cardiac imaging generally focuses on the left ventricle, but the new device can image all of the heart’s four chambers simultaneously, “so it may be possible for future research to focus on other or multiple chambers,” he adds. In addition, “the imager can be applied to image various other organs, such as the stomach, kidney, or liver.”

Traditional cardiac ultrasound imaging constantly rotates an ultrasound probe to analyze the heart in multiple dimensions. To eliminate the need for this rotation, the array of ultrasound sensors and emitters in the new device is shaped like a cross so that ultrasonic waves can travel at right angles to each other.The scientists developed a custom deep-learning AI model that can analyze the data from the patch and automatically and continuously estimate vital details, such as the percentage of blood pumped out of the left ventricle with each beat, and the volume of blood the heart pumps out with each beat and every minute. The root of most heart problems is the heart not pumping enough blood, issues that often manifest only when the body is moving, the researchers note.The scientists did not begin investigating heart imaging until after they developed a wearable ultrasound device.

“After learning in a casual chat that one of our colleague’s relatives had died of a sudden heart attack, we realized our technology could make real impacts on people’s lives,” says study colead author Hao Huang, a nanoengineer at UC San Diego. “We did not expect the imaging quality of the imager to be very good. However, it turned out we could achieve a comparable quality to commercial probes after careful engineering. We knew we were onto something big when we saw the images full of details after many rounds of improvement, and we thought we should keep pursuing this path to not waste the capabilities of the imager.”

In the beginning, “we were always struggling with focusing of the ultrasound beam,” Huang recalls. “Debugging involved intensive trial and error based on the readings. After many failures, we used an automatic alignment strategy to make the transducer array with a high uniformity and perfect alignment so that it guarantees beam focusing.”

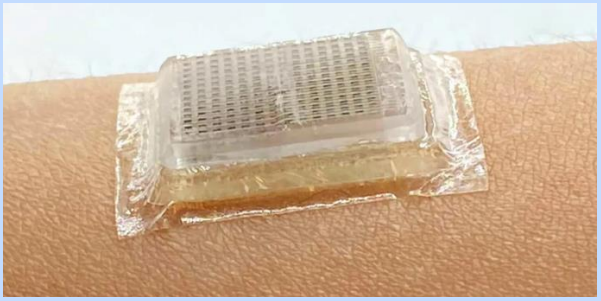
Another set of problems involved noise in the signals. “We did lots of trial and error to identify all the sources of noise and isolate the imager from all of them but were still left with the most major one, the human body,” Huang says. They ultimately developed a stretchable electromagnetic shield made of the same liquid metal used in the device’s electrodes “to remove the noise from the human body while

maintaining the flexibility and stretchability of the imager. It turned out that the optimized shielding layer worked very well, and we could finally remove the noise from the images."

The researchers note that right now, the device is connected through cables to a computer. They have developed a wireless version of the patch, details of which are in a study currently under review, Hu says.The study's senior author, Sheng Xu, a professor at UC San Diego, plans to commercialize this technology through Softsonics, a company cofounded with another of the study's coauthors, Shu Xiang. Further work is needed to develop this device into a fully integrated wearable system with a built-in power source, Hu says.

ARUNA S
III BME A

ULTRASOUND STICKERS LOOK INSIDE THE BODY



A wearable ultrasound sticker roughly the size of a postage stamp could help enable continuous medical imaging of internal organs for patients on the move, a new study finds.Ultrasound imaging is one of the most common medical tools for scanning inside the body in a safe, noninvasive manner. Currently, to image with ultrasound, first a liquid gel is applied to a patient's skin that helps transmit ultrasound waves. Then an ultrasound probe, or transducer, is pressed against the gel.Continuous long-term ultrasound imaging could help shed light on potentially vital changes in a patient's health over days or even months. However, ultrasound imaging currently requires bulky, rigid equipment, making long-term monitoring difficult.

In addition, capturing ultrasound images demands highly trained sonographers to properly apply and orient the ultrasound probes onto a patient's body. Practically speaking, and even just to avoid repetitive motion injuries, these practical restrictions often limit the length of ultrasound sessions. For patients who need long periods of imaging, some hospitals offer probes on robotic arms that can hold a transducer in place without tiring. However, the liquid ultrasound gel flows away and dries out over time, interrupting the sessions and producing less-than-ideal results.

Recently scientists have explored stretchable ultrasound probes that can better conform to a patient's body for potential wearable applications. However, such designs have suffered from low resolution and poor image quality during body movements, among other problems.Now scientists have developed an ultrasound sticker they say can overcome many of these challenges. They detailed their findings in the 29 July issue of the journal *Science*.

The new device consists of a thin, rigid scanner array possessing 400 ultrasound transducers per square centimeter. This array is coupled to a soft, durable, sticky layer that can bond onto skin. The entire sticker measures 3 millimeters thick and 2 square centimeters in size.The device's adhesive layer contains a soft hydrogel, a material similar to the absorbent stuffing inside disposable diapers. This hydrogel easily transmits sound waves, and unlike traditional ultrasound gels, is stretchy and elastic. The hydrogel is encapsulated between two thin rubbery layers that help keep the hydrogel wet so

acoustic waves can pass through it.In tests, the researchers had healthy volunteers wear the devices on various parts of their body, including the neck, chest, abdomen and arms. They also had the participants perform a variety of activities in the lab, such as sitting, standing, jogging, biking, weightlifting and drinking juice.

The devices stuck onto the skin of the volunteers and produced clear images of underlying structures for up to 48 hours. They could watch how the jugular vein widened after volunteers went from sitting or standing to a supine position; how the heart swelled after a half hour of exercise; how the lungs behaved during jogging and cycling; how the stomach distended and shrank as the volunteers drank juice that later flowed out; and how biceps became flooded with blood after lifting weights.

The image resolution of the bioadhesive ultrasound (BAUS) device "is on a similar level to point-of-care ultrasound," says study senior author Xuanhe Zhao, a mechanical engineer at MIT. More work is needed to reach the performance of mature conventional ultrasound machines, he adds.Although the stickers do continuously image the body with ultrasound waves, "the imaging frequency is low, such as one image per 30 minutes or 1 hour," Zhao says. "Therefore, BAUS is safe for the body."

Currently, the devices need to be connected with instruments that can translate their ultrasound data into images. Even with this tethered design, the researchers suggest the stickers could have a variety of applications. For instance, they can be applied to patients in the hospital, similar to heart-monitoring EKG stickers, and help continuously scan internal organs without requiring a technician to hold a probe in place for long stretches of time.

The scientists now seek to make wireless versions of their device. In addition, they are working on integrating data-processing circuitry and other components onto the stickers. Moreover, they are developing software algorithms based on artificial intelligence that can better interpret and diagnose the stickers' images.The ultimate goal are wearable ultrasound stickers, each designed for a different location on the body, that patients could take home from a doctor's office or even buy at a pharmacy or get shipped to them. The patches could communicate with your cellphone, where AI algorithms could then automatically analyze the images on demand. Such a setup could, for example, help doctors continuously monitor the symptoms of possibly infected COVID-19 patients at home with minimal exposure risk to medical staff, Zhao says. They might also help monitor the development of fetuses in the womb or the progression of tumors."Continuous monitoring and diagnosis of chronic conditions is a grand challenge in health care," Zhao says. "

POOVARASAN I
III BME B

SELF-*POWERED ELECTRONIC PILL MONITORS GUT CHEMISTRY*

A battery-free electronic pill that can help doctors wirelessly analyze molecules generated during vital bodily chemical reactions in the gut has been demonstrated for the first time, say the researchers behind a new study. The team of engineers, from the University of California at San Diego (UCSD), detailed their findings online in the 1 December edition of the journal Nature Communications.Previously, scientists had developed camerapills to help doctors look for cancer and other problems in the gut. Swallowable electronic capsules also exist that can report body temperature and heart rate, as well as other vital signs, and gases linked with inflammation and changes in diet.

However, until now there was no electronic pill that could monitor glucose (the main sugar found in blood) and other metabolites—chemicals that are key to or formed during bodily metabolism—in the gut in real time. Instead, doctors have been analyzing metabolites using procedures that can result in significant discomfort, such as sticking probes into the stomach or intestines to collect fluids, while only generating snapshots of a constantly shifting environment.Now researchers have created an electronic pill to help analyze gut metabolites in real time.

“Real-time data is always better—we can use the data to make real-time interventions,” says study cosenior author Patrick Mercier, an electrical engineer at the UCSD. “If we are doing nutrition monitoring, we can better determine real-time intake of food, real-time uptake of glucose into the body, and so on. If we extend our solution to measure other parameters such as pH, we could do real-time quantified intervention in the form of antacids, for example.”

This pill could help analyze the gastrointestinal disorders that affect roughly one in five people at some point in their lives, the scientists note. These may include diabetes, inflammatory bowel disease, obesity, and other chronic diseases caused by abnormal intestinal processes involving the absorption or digestion of gut metabolites.“I think the big takeaway here is that this allows us to see a new window into the body,” Mercier says. “The gut and its microbiome are such an integral part in human health, and yet we have no real way to sample its operation beyond stool samples or via invasive endoscopies, neither of which capture dynamics. The ability to study these dynamics will potentially revolutionize our understanding of the gut microbiome, and offer opportunities for on-demand personalized therapies.”Most prior electronic pills made use of batteries. However, batteries often contain toxic elements that could result in serious complications. In contrast, the new battery-free device runs off a tiny fuel cell that consumes glucose in the intestines for energy, while simultaneously monitoring changing glucose concentrations.

Batteries had been an important element of electronic pill design, in part because of the power demands of wireless communications; the small antennas used in those capsules were not good at long-range transmissions, and the body can absorb a significant amount of electromagnetic power. In contrast, the new device relies on energy-efficient magnetic human body communication, which transmits signals using magnetic fields.

An outer coating on the new pill helps protect it from stomach acids, which previously were a major barrier to creating an electronic capsule to analyze intestinal metabolites. This coating dissolves in the gut once the pill is out of harm’s way. Once that layer is gone, the pill is free to monitor the intestines.The battery-less design and ultralow-power circuitry used in the capsule helped conserve space and enable significant miniaturization. All in all, the prototype device measures 2.6 centimeters long and 0.9 centimeters in diameter.

The scientists experimented on pigs, which have a gastrointestinal tract similar in size to that in humans. The pill continuously monitored glucose levels for 14 hours after it was swallowed, transmitting data every 5 seconds for 2 to 5 hours. If doctors could use this pill in humans, “we would be able to study clinical glucose uptake by the body upon ingestion of food in real time,” Mercier says. “This could be quite interesting in applications concerning nutrition, diabetes, and so on.”The researchers now plan to shrink the pill to make it easier to swallow, potentially enabling human use. In addition,

they aim to add more sensors to "enable all sorts of other interesting clinical applications," Mercier says. "The clinical applications are potentially vast."

SOWMIYA R
II BME B

ROBOPILL DRILLS THROUGH MUCUS TO DELIVER DRUGS

Mucus plays a key role in protecting the body from harm, preventing potentially dangerous substances from reaching the gastrointestinal system. But it also makes it virtually impossible to give certain medications orally, including insulin. That means people with diabetes must regularly inject insulin, which is unpleasant and can cause people with diabetes to be inconsistent in taking their medication.

Researchers at MIT wanted to come up with a way around this problem, so they invented a robotic pill, called RoboCap, which can tunnel like a drill through the mucus protecting the GI tract. In a study published in Science Robotics, they tested the invention in pigs, finding that it was effective at getting the pigs' bodies to absorb medications, including insulin and an IV antibiotic. Though the research is preliminary, it could one day make treatment of many medical conditions easier and more convenient."The results that we're seeing are able to be applied to any drug," said Shriya Srinivasan, a postdoctoral researcher at MIT's Koch Institute for Integrative Cancer Research and junior fellow at the Society of Fellows at Harvard University. Srinivasan is the lead author of the Science Robotics paper.

How RoboCap Works

RoboCap has several parts that allow it to get to the right place and to penetrate mucus. The entire pill is coated with a gelatinous substance that responds to pH, allowing easy swallowing and activation only upon reaching the small intestine. Once there, the coating dissolves, closing the pill's circuit and triggering its mechanical components. On one side of the pill is a weight attached to an internal motor, which makes the pill start to vibrate and spin as the motor is activated. RoboCap begins drilling through the mucus that lines the small intestine, eventually depositing its drug load, which is on the other side of the pill.

It effectively drill through the mucus, the pill uses surface features like spiral turbine fins, inspired by torpedo fins, and helical grooves. It's also coated with small studs to help "brush" mucus aside, similar to how a toothbrush works. Srinivasan said she was also inspired by online videos of tunnel-boring machines called moles, which push through rock and dirt to drill narrow channels.The researchers tested their invention with two different drugs: insulin and vancomycin, an IV antibiotic. They tested the method on a resected portion of a pig's small intestine. This allowed them to measure how much of the drug they injected above the mucous layer got through to the other side. They also tested RoboCap on live pigs, in both instances comparing the RoboCap to sham, or control pills, which didn't have a drilling mechanism."When we look at it, it's anywhere between a 20-to-40-fold increase in the amount of drug that actually is reaching the bloodstream, when you compare [the control] to RoboCap," said Srinivasan.

Potential Applications

After making its drug delivery, RoboCap moves through the digestive system and out of the body on its own. The researchers found no evidence that the pill caused any damage to the pigs' GI system, and frequent mucus production meant that the drilling action had no lasting impact on infection risk or the body's ability to protect itself.

Both the study and the technology have limitations, said Srinivasan. It's unclear how to dispose of RoboCap once it's out of the body. The study also did not examine medication dosing, or how the drug

would be loaded into the pill. The study also only compared the release of drugs administered orally; it did not compare, for instance, how much insulin gets into the bloodstream when delivered with RoboCap versus insulin injection, as it normally would be. The invention is also a long way from being used in people; it would have to undergo extensive development so that it could be mass-produced and would need to go through the clinical trial process.

Using mechanical methods like this has many advantages over approaches that use chemical methods to accomplish oral drug delivery for the drugs where that ingestion path is indicated. But just because the approach could be used with a variety of drugs doesn't mean it would necessarily be practical."I think some of the political and societal pressures right now on insulin pricing maybe make it such that this particular mode of delivery would always kind of make it too expensive," said Matthew Webber, a professor of chemical and biomolecular engineering department at the University of Notre Dame.Webber does see the approach being potentially useful for other drugs, such as antibody therapies for cancer, which usually have to be given through an IV in the hospital. Regardless of the drug's possibilities for oral drug delivery, Webber says the idea is an innovative one.

KAVIYA S
II BME A

NEW HEAT CIRCUITS CAN MOVE TEMPERATURE LIKE CURRENT

For instance, more than 70 percent of the energy that humanity uses originates in heat, such as combustion engines. Heat switches can boost the efficiency of entire classes of heat engines, such as solar thermal power plants, which use heat from the sun to generate electricity."The thermodynamic efficiency of a power generation circuit depends critically on the temperature difference between the hot and the cold thermal reservoirs," Heremans says. "With a heat switch and a heat storage system, it is possible to keep the temperature of the storage medium far above the average temperature of the hot source and close to its maximum, which can as much as double the thermal efficiency of the system."

Modern-day heat switches are nearly all mechanical in nature—for instance, working by pumping gases. Their moving parts make them vulnerable to failure due to fatigue over time. Current solid-state heat switches either only work at very cold temperatures or are based on phase changes that work in a limited range of temperatures, Heremans says.

How does the new heat switch work?

The researchers analyzed the material lead zirconium titanate (PZT). This ceramic is piezoelectric, meaning it can convert mechanical oscillations to electrical signals and vice versa.PZT is a kind of piezoelectric substance known as a ferroelectric. Electric charges within materials separate into positive and negative poles, and in ferroelectrics, these electric dipoles are generally polarized, or aligned in the same direction. Electric fields can switch the way in which these dipoles are oriented.

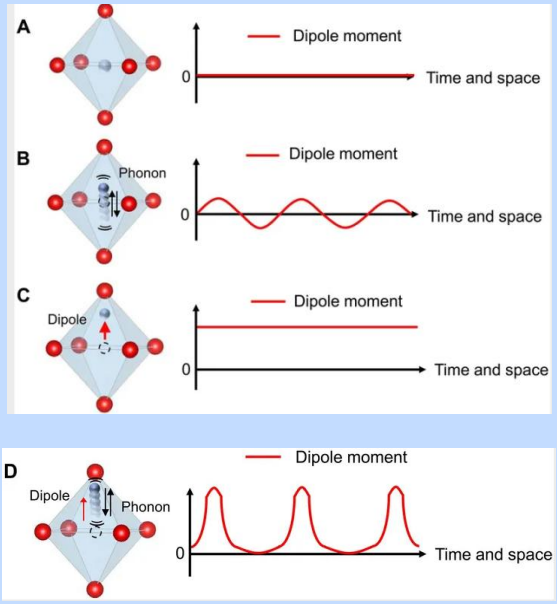
Previous research suggested that polarization in ferroelectrics can move as quasiparticles—ripples that move inside lattices of atoms much like particles zipping through space—theoretically known as ferrons. Similar quasiparticles known as magnons can influence magnetic poles in magnetic materials. Magnons can carry heat, leading the researchers to wonder if ferrons can manipulate heat as well.Now the scientists have discovered the first experimental evidence the ferron exists, and that this quasiparticle can indeed carry heat. Moreover, their work shows the ferron is sensitive to electric fields, suggesting that ferroelectrics could serve as heat switches.

The researchers found that atomic vibrations—that is, heat—in a ferroelectric can respond to electric fields because of an effect known as piezoelectric strain. When a voltage is applied to the ferroelectric,

the lattice of atoms may contract or stretch, altering the mechanical properties of the material as well as its thermal conductivity.“We show that phonons [vibration waves in a crystal lattice] can be controlled by electric fields,” says study lead author Brandi Wooten, a materials scientist at Ohio State University. “The trick is to find the right material that hosts the desired properties to make this true. Thinking outside the box, particularly with older ‘heritage’ materials, can lead to new and interesting results.”

The scientists found that applying an electric field to PZT could make it act like a heat switch, resulting in a two percent difference between its maximum and minimum thermal conductivity, as they had predicted. This is a four to five times greater effect of an electric field on thermal conductivity at room temperature than previously seen.The results proved very consistent. “The mechanism is very robust and reliable—perfect for a thermal switch that should last decades in a device,” Wooten says.

The researchers developed a theoretical model to predict ferron properties in ferroelectrics. They are now looking to see if they can find materials in which the heat switching effect is very large.“Now that we have a predictive theory, the optimization work can start,” Heremans says. “We hope of course that many groups around the world will participate in this work.”Heremans says there are piezoelectric materials that may fit the bill for practical applications for this new heat switch technology. “It is not a pipe dream,” he says.Common ferroelectrics include “widely used, relatively inexpensive oxides that do not use rare materials and are readily accessible in the market,” Wooten says. They anticipate ferroelectric-based heat switching “will lead to a cheap option for thermal switching—cheap due to the material costs and due to the ease of implementation into devices and infrastructure.”



BOOMIKA A
II BME A

RAT SPERM GENERATED FROM STEM CELLS

In recent years, though, Kobayashi and colleagues have been constructing rat mutants that have allowed them to visualize the development of primordial germ cells in vivo. Using fluorescent markers to trace the expression of genes that are key to the transition from stem cells to primordial germ cells, they have learned more about how gene expression changes over time, all of which was helpful to finally recapitulate the process in vitro, he says.The first step of the recipe was to induce epiblast-like cells

those giving rise to all the cells in the embryo from rat embryonic stem cells. Once this transition was accomplished, the epiblast-like cells were placed on a medium to induce what they call primordial germ cell–like cells. Among other ingredients, the medium contained BMP4, a signaling molecule critical for this step in both mice and rats. Kobayashi explains that performing these transitions in vitro was challenging: he and his colleagues had to optimize the culture conditions to induce the desired cell fates because the recipes used for mice were not the most appropriate for rats.

Then, in order to mature the primordial germ cell–like cells derived from this process into a later stage of germ cell development, Kobayashi and colleagues cultured them alongside gonadal somatic cells, simulating the environment they would normally be in during maturation. After a few days, the cells had a pattern of gene expression associated with this later stage of development. Both early and late primordial germ cell–like cells were then transplanted into rat testes lacking endogenous germ cells, where the team confirmed that they developed into mature sperm. Finally, to assess if the sperm derived from this protocol was actually functional, the team injected it into rat oocytes, yielding normal offspring capable of reproducing.

However, the rats were unable to successfully produce offspring with the lab-grown sperm via normal mating. Primordial germ cells require further maturation to achieve this, explains Kobayashi. “I assume that we may need another type of gonadal cells as well as [an] optimized culture condition,” he writes in a follow-up email—a problem he is interested in exploring further. University of Southern California stem cell researcher Qi-Long Ying, who did not participate in the study, says that the new report demonstrates that this approach to in vitro gametogenesis is reproducible and solid. It might be eventually possible to apply this to other species, such as those at risk of extinction, he adds—it will just take time to improve and optimize the conditions to do so.

But more work will need to be done before these methods might be applied to humans, says Ying. Clark explains that in addition to the challenges of translating the technique posed by developmental differences among species, attempts to generate human germ cells have to date involved cells from two different species: the stem cells come from humans while the supporting somatic cells needed to promote maturation are from mice. In these scenarios, so far, germline development stops before the sperm is mature, Clark explains, and she hypothesizes this might be partly due to not having interactions with the right somatic cells.

What has now been achieved in rats is very similar to what was observed in mice back in 2011, adds Clark. Both successes show the importance of maturing cells in the right environment, including doing so alongside somatic cells from the same species at the appropriate stage.Even if not immediately applicable to humans, in vitro gametogenesis could be a tool for making rat models of human disease for biomedical research. “Some human diseases can only be modeled in the rat but not in the mice”—for instance, a number of neurological diseases, says Ying. Before the advent of transgenic and gene targeting technologies—where mice have played a predominant role—many more papers were published “using rats as a model to study human diseases” than those using mice, he adds, because rats are more physiologically similar to humans.Being able to recapitulate the germline development in a dish may also help in gaining a better understanding of human reproductive biology and diseases associated with it. Infertility, for example, affects millions of people, says Clark, and many of its causes

"are not well understood because the field lacks a variety of models to be able to study the formation of the germline."

M.K.VISHNU
IV BME B

UNLOCKING THE SECRETS OF THE HEART – SCIENTISTS CREATE A MINIATURE HEART IN A PETRI DISH

Researchers at the Technical University of Munich (TUM) have successfully induced stem cells to mimic the process of human heart development, resulting in a "mini-heart" or organoid. This breakthrough will allow for a deeper understanding of the initial stages of heart development and will support research into heart-related diseases.The human heart begins to take shape roughly three weeks post-conception, often a period when many women still haven't realized they're pregnant. This factor contributes to our relatively limited knowledge regarding the intricate details of early heart formation. Insights gained from animal research are not entirely applicable to human beings, hence the significance of the organoid created by the TUM team to the scientific community.

A ball of 35,000 cells

The team working with Alessandra Moretti, Professor of Regenerative Medicine in Cardiovascular Disease, has developed a method for making a sort of "mini-heart" using pluripotent stem cells. Around 35,000 cells are spun into a sphere in a centrifuge. Over a period of several weeks, different signaling molecules are added to the cell culture under a fixed protocol. "In this way, we mimic the signaling pathways in the body that control the developmental program for the heart," explains Alessandra Moretti. The group has now published its work in the journal *Nature Biotechnology*.

First-ever "epicardioids"

The resulting organoids are about half a millimeter in diameter. Although they do not pump blood, they can be stimulated electrically and are capable of contracting like human heart chambers. Prof. Moretti and her team are the first researchers in the world to successfully create an organoid containing both heart muscle cells (cardiomyocytes) and cells of the outer layer of the heart wall (epicardium). In the young history of heart organoids – the first were described in 2021 – researchers had previously created only organoids with cardiomyocytes and cells from the inner layer of the heart wall (endocardium).

New cell type discovered

Along with the method for producing the organoids, the team has reported its first new discoveries. Through the analysis of individual cells, they have determined that precursor cells of a type only recently discovered in mice are formed around the seventh day of the development of the organoid. The epicardium is formed from these cells. "We assume that these cells also exist in the human body – if only for a few days," says Prof. Moretti.These insights may also offer clues as to why the fetal heart can repair itself, a capability almost entirely absent in the heart of an adult human. This knowledge could help to find new treatment methods for heart attacks and other conditions.

Producing "personalized organoids"

The team also showed that the organoids can be used to investigate the illnesses of individual patients. Using pluripotent stem cells from a patient suffering from Noonan syndrome, the researchers produced organoids that emulated characteristics of the condition in a Petri dish. Over the coming months, the team plans to use comparable personalized organoids to investigate other congenital heart defects.With

the possibility of emulating heart conditions in organoids, drugs could be tested directly on them in the future. “It is conceivable that such tests could reduce the need for animal experiments when developing drugs,” says Alessandra Moretti.

Organoid research is a key research area at TUM

The researchers have registered an international patent for the process of creating heart organoids. The Epicardioid model is one of several organoid projects at TUM. At the Center for Organoid Systems, work groups from various departments and chairs will collaborate. They will conduct interdisciplinary research into pancreas, brain, and heart organoids with state-of-the-art imaging and cellular analysis to study the formation of organs, cancer, and neurodegenerative diseases and achieve progress for medicine with human 3D systems.

J.R.AKSHARA SREE
II BME A

NEW WINDOW INTO AUTISM FROM BRAIN-LIKE ORGANOIDS GROWN IN A DISH

Investigating autism

Having the ability to model aspects of the brain in this way gives scientists a glimpse into the inner workings of a living organ that is otherwise nearly impossible to access. And since the organoids grow in a dish, they can be tested experimentally in ways that a brain cannot.Shcheglovitov’s team used an innovative process to investigate the effects of a genetic abnormality associated with autism spectrum disorder and human brain development. They found that organoids engineered to have lower levels of the gene, called *SHANK3*, had distinct features.Even though the autism organoid model appeared normal, some cells did not function properly:

- Neurons were hyperactive, firing more often in response to stimuli,
- Other signs indicated neurons may not efficiently pass along signals to other neurons,
- Specific molecular pathways that cause cells to adhere to one another were disrupted.

According to the authors, these findings are helping to uncover the cellular and molecular causes of symptoms associated with autism. They also demonstrate that the lab-grown organoids will be valuable for gaining a better understanding of the brain, how it develops, and what goes wrong during disease.“One goal is to use brain organoids to test drugs or other interventions to reverse or treat disorders,” says Jan Kubanek, PhD, a co-author on the study and an assistant professor of biomedical engineering at the U.

Building a better brain model

Scientists have long searched for suitable models for the human brain. Lab-grown organoids are not new, but previous versions did not develop in a reproducible way, making experiments difficult to interpret.To create an improved model, Shcheglovitov’s team took cues from how the brain develops normally. The researchers prompted human stem cells to become neuroepithelial cells, a specific stem cell type that forms self-organized structures, called neural rosettes, in a dish. Over the course of months, these structures coalesced into spheres and increased in size and complexity at a rate similar to the developing brain in a growing fetus.After five months in the lab, the organoids were reminiscent of “one wrinkle of a human brain” at 15 to 19 weeks post-conception, Shcheglovitov says. The structures contained an array of neural and other cell types found in the cerebral cortex, the outermost layer of the brain involved in language, emotion, reasoning, and other high-level mental processes.Like a human embryo, organoids self-organized in a predictable fashion, forming neural networks that pulsated with

oscillatory electrical rhythms and generated diverse electrical signals characteristic of a variety of different kinds of mature brain cells.“These organoids had patterns of electrophysiological activity that resembled actual activity in the brain. I didn’t expect that,” Kubanek says. “This new approach models most major cell types and in functionally meaningful ways.”

Shcheglovitov explains that these organoids, which more reliably reflect intricate structures in the cortex, will allow scientists to study how specific types of cells in the brain arise and work together to perform more complex functions.“We’re beginning to understand how complex neural structures in the human brain arise from simple progenitors,” Wang says. “And we’re able to measure disease-related phenotypes using 3D organoids that are derived from stem cells containing genetic mutations.”He adds that by using the organoids, researchers will be able to better investigate what happens at the earliest stages of neurological conditions, before symptoms develop.

P.LEELA
IV BME A

SCIENTISTS DISCOVER HOW HUMANS DEVELOP MUCH LARGER BRAINS THAN OTHER APES

A new study is the first to identify how human brains grow much larger, with three times as many neurons, compared with chimpanzee and gorilla brains. The study, led by researchers at the Medical Research Council (MRC) Laboratory of Molecular Biology in Cambridge, UK, identified a key molecular switch that can make ape brain organoids grow more like human organoids, and vice versa.

The study, published in the journal *Cell*, compared ‘brain organoids’ — 3D tissues grown from stem cells which model early brain development — that were grown from human, gorilla, and chimpanzee stem cells. Similar to actual brains, the human brain organoids grew a lot larger than the organoids from other apes.Dr. Madeline Lancaster, from the MRC Laboratory of Molecular Biology, who led the study, said: “This provides some of the first insight into what is different about the developing human brain that sets us apart from our closest living relatives, the other great apes. The most striking difference between us and other apes is just how incredibly big our brains are.”

During the early stages of brain development, neurons are made by stem cells called neural progenitors. These progenitor cells initially have a cylindrical shape that makes it easy for them to split into identical daughter cells with the same shape.The more times the neural progenitor cells multiply at this stage, the more neurons there will be later.As the cells mature and slow their multiplication, they elongate, forming a shape like a stretched ice-cream cone.Previously, research in mice had shown that their neural progenitor cells mature into a conical shape and slow their multiplication within hours. Now, brain organoids have allowed researchers to uncover how this development happens in humans, gorillas, and chimpanzees. They found that in gorillas and chimpanzees this transition takes a long time, occurring over approximately five days.

Human progenitors were even more delayed in this transition, taking around seven days. The human progenitor cells maintained their cylinder-like shape for longer than other apes and during this time they split more frequently, producing more cells.This difference in the speed of transition from neural progenitors to neurons means that the human cells have more time to multiply. This could be largely responsible for the approximately three-fold greater number of neurons in human brains compared with gorilla or chimpanzee brains.Dr. Lancaster said: “We have found that a delayed change in the shape

of cells in the early brain is enough to change the course of development, helping determine the numbers of neurons that are made."It's remarkable that a relatively simple evolutionary change in cell shape could have major consequences in brain evolution. I feel like we've really learnt something fundamental about the questions I've been interested in for as long as I can remember — what makes us human." To uncover the genetic mechanism driving these differences, the researchers compared gene expression — which genes are turned on and off — in the human brain organoids versus the other apes.

They identified differences in a gene called 'ZEB2', which was turned on sooner in gorilla brain organoids than in the human organoids.To test the effects of the gene in gorilla progenitor cells, they delayed the effects of ZEB2. This slowed the maturation of the progenitor cells, making the gorilla brain organoids develop more similarly to human — slower and larger.Conversely, turning on the ZEB2 gene sooner in human progenitor cells promoted premature transition in human organoids, so that they developed more like ape organoids.The researchers note that organoids are a model and, like all models, do not to fully replicate real brains, especially mature brain function. But for fundamental questions about our evolution, these brain tissues in a dish provide an unprecedented view into key stages of brain development that would be impossible to study otherwise.

S.V.JANANI
III BME A

HUNDREDS OF IN VITRO BRAINS WERE GROWN IN A LAB IN ITALY – HERE'S WHY

A large-scale production of in vitro tumors could make it possible to perform large drug screenings to identify new brain cancer drugs. Researchers are at work to find effective treatments to help young patients with brain tumors. Hundreds of brain organoids have been developed in the laboratories of the University of Trento to understand the genetic mechanisms responsible for these hard to treat diseases.In this way, the research team coordinated by Luca Tiberi of the Armenise-Harvard Laboratory of Brain Disorders and Cancer of Cibio Department of the University of Trento developed a new strategy to study brain tumors of childhood.The University of Trento led the research study, coordinating a research team involving Sapienza University of Rome, Ospedale pediatrico Bambino Gesù in Rome, and Irccs Neuromed-Istituto neurologico mediterraneo in Pozzilli (Isernia), with support from the Armenise-Harvard Foundation, the Italian Association for Cancer Research-Airc, and Fondazione Caritro in Trento.The organoids were used to create in vitro tumor models. The results achieved will make it possible to advance brain cancer research, as in the near future the large-scale production of in vitro tumors could provide a low-cost method for the screening of new drugs compared with previous technologies."Creating brain tumor organoids is very difficult — underlined Tiberi, the research team coordinator — and requires specific scientific capabilities that Cibio department managed to attract and develop in its research laboratories."

"Organoids, generated from skin or blood cells, shaped like irregular spheres the size of a small peanut, were grown by the University of Trento and examined and characterized with Sapienza University of Rome and Ospedale pediatrico Bambino Gesù in Rome. They can show signs of disease and provide a model of the tumors affecting young patients — he added. This work demonstrates how important it is to collaborate for universities and research institutes to initiate innovative projects.""We also have grown organoids from the cells of healthy donors — explained Tiberi — and these gave us the opportunity to understand some of the genetic mechanisms responsible for the onset and development

of brain tumors. In particular, the study confirmed the key role of two proteins (Otx2 and c-Myc) and investigated the efficacy of a number of therapeutic options (based on the drug Tazemetostat)."Tiberi continued: "These in vitro tumors will help us fine-tune research on the genes that cause cancer and on possible prevention and treatment strategies. Organoids give us the opportunity to study brain tumors without using experimental animals in a context that is similar to a real-patient scenario. They can be a reliable tool for developing personalized therapies."

Brain tumors in childhood

Brain tumors are the first cause of death due to cancer in children. They are very aggressive and require a multidisciplinary and integrated approach. While significant progress has been made in treating these tumors, surviving patients may suffer long-term side effects that significantly compromise their quality of life. When the tumor reappears after some time, therapies are usually ineffective. Medulloblastoma, the focus of this study, is the most common malignant brain tumor in children affecting the central nervous system. The survival rate at five years from the diagnosis of medulloblastoma is around 70% (source: AIRC Italian Association for Cancer Research).

A.SHAJNA
III BME A

SCIENTISTS GROW "MINI BRAINS" IN THE LAB – FIND POTENTIAL TREATMENT PATH FOR FATAL NEUROLOGICAL DISEASE

Cambridge researchers have developed 'mini brains' that allow them to study a fatal and untreatable neurological disorder causing paralysis and dementia – and for the first time have been able to grow these for almost a year.A common form of motor neuron disease, amyotrophic lateral sclerosis, often overlaps with frontotemporal dementia (ALS/FTD) and can affect younger people occurring mostly after the age of 40-45. These conditions cause devastating symptoms of muscle weakness with changes in memory, behavior, and personality. Being able to grow small organ-like models (organoids) of the brain allows the researchers to understand what happens at the earliest stages of ALS/FTD, long before symptoms begin to emerge, and to screen for potential drugs.In general, organoids, often referred to as 'mini organs', are being used increasingly to model human biology and disease. At the University of Cambridge alone, researchers use them to repair damaged livers, study SARS-CoV-2 infection of the lungs, and model the early stages of pregnancy, among many other areas of research.

Typically, researchers take cells from a patient's skin and reprogramme the cells back to their stem cell stage – a very early stage of development at which they have the potential to develop into most types of cell. These can then be grown in culture as 3D clusters that mimic particular elements of an organ. As many diseases are caused in part by defects in our DNA, this technique allows researchers to see how cellular changes – often associated with these genetic mutations – lead to disease.Scientists at the John van Geest Centre for Brain Repair, University of Cambridge, used stem cells derived from patients suffering from ALS/FTD to grow brain organoids. These resemble parts of the human cerebral cortex in terms of their embryonic and fetal developmental milestones, 3D architecture, cell-type diversity and cell-cell interactions.

Although this is not the first time scientists have grown mini-brains from patients with neurodegenerative diseases, most efforts have only been able to grow them for a relatively short time frame, representing a limited spectrum of dementia-related disorders. In findings published on October

21, 2021, in *Nature Neuroscience*, the Cambridge team reports growing these models for 240 days from stem cells harboring the commonest genetic mutation in ALS/FTD, which was not previously possible – and in unpublished work the team has grown them for 340 days.

Dr. András Lakatos, the senior author who led the research in Cambridge's Department of Clinical Neurosciences, said: "Neurodegenerative diseases are very complex disorders that can affect many different cell types and how these cells interact at different times as the diseases progress."To come close to capturing this complexity, we need models that are more long-lived and replicate the composition of those human brain cell populations in which disturbances typically occur, and this is what our approach offers. Not only can we see what may happen early on in the disease – long before a patient might experience any symptoms – but we can also begin to see how the disturbances change over time in each cell."While organoids are usually grown as balls of cells, first author Dr. Kornélia Szebényi generated patient cell-derived organoid slice cultures in Dr. Lakatos' laboratory. This technique ensured that most cells within the model could receive the nutrients required to keep them alive.Dr. Szebényi said: "When the cells are clustered in larger spheres, those cells at the core may not receive sufficient nutrition, which may explain why previous attempts to grow organoids long term from patients' cells have been difficult."

Using this approach, Dr. Szebényi and colleagues observed changes occurring in the cells of the organoids at a very early stage, including cell stress, damage to DNA, and changes in how the DNA is transcribed into proteins. These changes affected those nerve cells and other brain cells known as astroglia, which orchestrate muscle movements and mental abilities."Although these initial disturbances were subtle, we were surprised at just how early changes occurred in our human model of ALS/FTD," added Dr. Lakatos. "This and other recent studies suggest that the damage may begin to accrue as soon as we are born. We will need more research to understand if this is in fact the case, or whether this process is brought forward in organoids by the artificial conditions in the dish."As well as being useful for understanding disease development, organoids can be a powerful tool for screening potential drugs to see which can prevent or slow disease progression. This is a crucial advantage of organoids, as animal models often do not show the typical disease-relevant changes and sampling the human brain for this research would be unfeasible.

P.SYED ABDULLAH
II BME B