

#### **ABES INSTITUTE OF TECHNOLOGY**

# NATIONAL BOARD

#### **Department of Electronics and Communication Engineering**

July 2019—December 2019

Volume – 4

#### **Advisory Board**

Prof. (Dr.) Vipin Garg Advisor, ABESIT

Prof. (Dr.) M.K Jha Director, ABESIT

Dr.Sapna Katiyar
Professor &
Head of Department, ECE

Vision

To impart in depth knowledge to the students of Electronics & Communication Engineering for achieving academic excellence, professional attitude and ethical values, inculcating research culture to meet the challenges of global industrial demands.

#### Mission

#### Editorial Board

Ms. Sugandh Gupta Asst. Professor, ECE

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- Impart quality and value based education, with practical orientation to transform students into the skilled, trained and competent individuals.
- Infusing research culture among students and faculty so that the Department be recognized as Center of Excellence in various domains.
- Inculcating team work, leadership qualities, professional ethics and social responsibilities.
- Prepare graduates for working in multicultural and multidisciplinary environment.

### **Program Educational Objectives**

- Graduates of the program will be able to identify and apply domain specific knowledge to have a successful career in real world applications by keeping abreast of the technological changes.
- Graduates of the program will continue to learn and adapt in a world of constantly evolving technology through advanced degrees, professional courses and/or re search.
- Graduates of the program will be committed to acquire professional ethics, moral values and devotion to duty so that they prove to be worthy citizen of India with International outlook.

#### **Proud Moment!!**

Congratulations! to all the members of ECE Department for achieving National Board of Accreditation in B.Tech Programme.



# **Industrial Visits**

• Students of 4<sup>th</sup> Year visited to Prasar Bharti (Doordarshan), New Delhi on 26<sup>th</sup> September, 2019. Students interacted with senior experts and discuss the latest technologies in the field of broadcasting and also they had seen the Doordarshan servers and labs where they can monitor all the data that can flow over the Doordarshan network.



• An Industrial visit to Zee Media Corporation Ltd, Noida was organized for the students of 2<sup>nd</sup> Year on 28<sup>th</sup> September, 2019. During the visit, students came to know about the various processes involved in the broadcasting of channels. The officials from Zee Media have demonstrated all the channels involved, from selecting a content from physical space to airing it on a channel in India as well other countries.



An Industrial visit to UniConverge Technologies Pvt. Ltd, Noida was organized for the students of 3<sup>rd</sup> Year on 16<sup>th</sup> November, 2019.
 Students interacted with Mr. Rabi Kant Das and Ms. Prabha Singh (IoT and Embedded System expert), and discussed about the new era of the technologies in the field of IoT and Embedded systems.



• Students of 2<sup>nd</sup> and 3<sup>rd</sup> Year got the opportunity to visit India TV News Channel on 6<sup>th</sup> December, 2019. They also got the opportunity to participate as the audience in the original shoot where Author Tarek Fatah was questioned by India TV Editor-in-Chief and Chairman Mr. Rajat Sharma. Students interacted with the experts and understood the various concepts associated with broadcasting.



# **Expert Talks & Workshops**

• Expert talk on "Future of Technology" was organized for the Students of 4<sup>th</sup> Year on 8<sup>th</sup> August 2019. The Speaker, Mr Rajeev Kumar Singh (Head-Cloud COE, Sopra Steria India) discussed in detail about the current as well as the prospective future technologies. However, the main focus of the session was to foster a sense of curiosity, learning and expanding the imaginative abilities in the students.



• Expert Talk on "RF Analog IC Design" was delivered by Dr. Sandeep Kumar, Professor, NIT Surathkal and was attended by Students of 3<sup>rd</sup> and 4<sup>th</sup> year on 13<sup>th</sup> August, 2019. The Expert not only discussed the current and Future Technologies in this area but also displayed some of the hardware projects in the field of Chip Designing.



 Live Session on "Innovation for Resurgent India" was telecasted on 22<sup>nd</sup> August, 2019 by MHRD Innovation Cell for the Students of the Department. The speaker for this live session was Dr. Ramesh Pokhriyal 'Nishank' (Hon'ble Minister of HRD).



Workshop on "Benefits of Professional Bodies in Research and Development" was organized by the Department for the Students of 2<sup>nd</sup> and 3<sup>rd</sup> year, on 27<sup>th</sup> August, 2019. Ms. Megha Padoh, Assistant Manager-Business Development, IET gave the introduction of Professional Bodies and described their importance in the field of academics and research.



• Interactive Session on "Career Counselling" by T.I.M.E Education Pvt. Ltd. was organized by the Department for the Students of the Department, on 6<sup>th</sup> September, 2019. Mr. Chandan Baranwal, speaker of the activity explained the importance of being aware about different processes and procedures related to different placement and technical exams. The Session was attended by 120 Students.



Hands-on Session on "Python" was organized for the Students of 2<sup>nd</sup> and 3<sup>rd</sup> year on 12<sup>th</sup> November, 2019. The Session was taken by Industry Expert, Mr. Avinash where he gave the introduction of Python and explained its utility in various domains.



- Workshop on "Career Counseling" was organized for the Students of 3<sup>rd</sup> and 4<sup>th</sup> year on 25<sup>th</sup> November, 2019 under AKTU's TEQIP-III Programme. Counsellor Mr. Dinesh Pathak addressed the Students on initiatives by University Industry Interface Cell (UIIC) of AKTU and also deliberated the importance of skill enhancement, time management and other aspects of life.
- 2-days Workshop on "Manuscript Writing using LaTeX" was organized for Research Enthusiast of Institute from 4<sup>th</sup> December to 5<sup>th</sup> December, 2019. All the Sessions were taken by Dr. Hari Mohan Gaur, Associate Professor, ECE and was attended by 22 Faculties from various Departments.





# **Club Activities**

#### Cultural Club 'Orators'

• Cultural Club 'Orators' organized a video Awareness Session (Man vs. Wild with PM Narendra Modi and Bear Grylls) on CLIMATE CHANGE for the students of 2<sup>nd</sup> and 3<sup>rd</sup> Year on 22<sup>nd</sup> August, 2019.



#### **Technical Club 'Technovation'**

Technical Club, "TECHNOVATION" organized a Two Day event "Hacknovate 1.0" along with Institution's Innovation Cell and IT TECHNICAL CLUB under the banner of ISTE and CSI from 18<sup>th</sup>-19<sup>th</sup> October, 2019. It featured a 12 hour hackathon (Software and Hardware edition) in which a total of 53 teams from various colleges of NCR participated. The projects were evaluated by the Industry experts Anshu Tiwari, Camilla Mondani, Mattia Messaggio, Chiara Fornaciari.





# **Student's Achievements**

Smart India Hackathon, 2019 organized by AICTE, Govt. of India from 8<sup>th</sup> July, 2019 to 12<sup>th</sup> July, 2019 at NIT, Trichy

- Ashish Bhatnagar 3<sup>rd</sup> Year ECE, Veral Agrawal and Kajal Verma, 2<sup>nd</sup> Year ECE and their team, "TechWizards" participated in Grand Finale with their project, "Sorting and Packaging Machine" under the problem statement "Customizable Sorting and Packaging System" which is given by MSME Di Guwahati.
- Ravaishmi Gupta, 2<sup>nd</sup> Year ECE and her team, "Technocrats" participated in Grand Finale with their project "Smart Vehicles" under the problem statement "Truck Weighing Suspension System" which is given by Himalayan Chamber of Commerce (Smart Vehicles).





#### World Robotics Championship (WRC)



### Congratulations!!

#### Shikhar

Student, 2<sup>nd</sup> Year ECE
For successfully participating in
World Robotics Championship (WRC) Roborace,
an International event of
TechnoXian
held at Thyagaraj Stadium, New Delhi from 23<sup>rd</sup>- 25<sup>th</sup>
September, 2019

#### Hacknovate 1.0 (18th- 19th October, 2019)

 Tanisha Agrawal, Avni Sharma and Ashee Mishra, Students of 2<sup>nd</sup> Year secured second position in Hackathon and were awarded with a cash prize of Rs. 3000.



• Vishal Kumar Giri, Students of 2<sup>nd</sup> Year secured third position in Hackathon and were awarded with a cash prize of Rs. 2000.



Ritik Bharadwaj, Aaradhya Nain and Aarushi, Students of 2<sup>nd</sup> Year secured fourth position in Hackathon and were awarded with a cash prize of Rs. 1000.



#### CSTUP Student's Project Grant Scheme 2019-20

#### Congratulations!!

Two Teams of the Department have been selected under the CSTUP Student's Project Grant Scheme 2019-20

Project 1: Garbage Classifier using Image Processing, being developed by Monika Kaushik and Tanushree Pandey, 4<sup>th</sup> Year ECE under the guidance of Dr. H.M Gaur (Associate Professor, ECE)

Project 2: Customized Sorting & Packaging Machine, being developed by Ashish Bhatnagar, 4<sup>th</sup>Year ECE under the guidance of Prof. Rachit Patel (Assistant Professor, ECE)

# Abdul Kalam Sports Fest 2019-20 (Zonal Level) held from 24<sup>th</sup>- 26<sup>th</sup> September, 2019 at Vishveshwarya Group of Institutions, Gautam Buddh Nagar.

- Jyoti Chaudhary, Student of 3<sup>rd</sup> Year ECE won Silver Medal in 1500m Race.
- Tanisha Agrawal, Student of 2<sup>nd</sup> Year ECE won Silver Medal in Discuss Throw.





### AKTU State Level SportsFest 2019-20 held from 21st- 23rd October, 2019

The Girls' Volleyball Team, comprising of

#### Vishakha Gupta

Student of 3<sup>rd</sup> Year ECE
secured **Silver Medal** in

AKTU State Level Sports Fest 2019-20 held at BBDNITM, Lucknow
from 21<sup>st</sup>- 23<sup>rd</sup> October, 2019 at BBDNITM, Lucknow





# **Placements**

Sr. No	Name of Student	Company	
	Aamir Ali Kadri	Wipro	
1		Nucleus Software	
2	Hritvik Srivastava	TCS	
	Aditya Kumar Pandey	NTT Data	
3		Fluper	
4	Aakash Yadav	Fluper	
5	Adarsh Bhardwaj	Fluper	
6	Aditya Kumar Pandey	Fluper	
7	Akash Tevatia	Fluper	
	Ashish Bhatnagar	Raptor Supplies	
8		Fluper	
9	Ayush Kumar	Fluper	
10	Gaurav Gaur	Fluper	
11	Jyoti Gupta	Fluper	
12	Kunwar Pratap Singh	Fluper	
13	Monica Kaushik	Fluper	
14	Shivam Choudhary	Fluper	
15	Sumit Singh	Fluper	
16	Tarun Tyagi	Fluper	
17	Nitish Sharma	Vivo Mobiles	
18	Raunak Kumar Mishra	Vivo Mobiles	
19	Ashish Bhatnagar	Raptor Supplies	
20	Harsh Vardhan Singh	Raptor Supplies	
21	Mansi Sharma	Raptor Supplies	

# **Faculty's Corner**

# Faculty Development Programs & Workshops



Prof. (Dr.) Sapna Katiyar attended a Workshop on "Practices of Comprehensive Sanitation Management (CSM-including ODF)" under Swachhta Action Plan on 3<sup>rd</sup> September, 2019 at University of Delhi. This program was organized by Mahatma Gandhi National Council of Rural Education, Department of Higher Education, Ministry of Human Resource Development, Government of India.



Ms. Anchal Tyagi attended a 3-days Management Development Program on "Effective Communication for Managerial Success" from 30<sup>th</sup> August to 1<sup>st</sup> September, 2019 at Indian Institute of Management Lucknow (Noida Campus) and a 5-days Faculty Development Program on "Data Analytics with Python" from 7<sup>th</sup> September to 11<sup>th</sup> September, 2019 conducted by Centre for Continuing Education, funded by TEQIP-III, AKTU at Indian Institute of Technology Kanpur.



Ms. Aakansha Garg attended a 5-days Faculty Development Program on "Data Analytics with Python" from 9<sup>th</sup> November to 13<sup>th</sup> November, 2019 conducted by Centre for Continuing Education, funded by TEQIP-III, AKTU at Indian Institute of Technology Kanpur.



Mr. Vaibhav Jain attended a 5-days Faculty Development Program on "Artificial Intelligence" conducted by Centre for Continuing Education, funded by TEQIP-III, AKTU from 14<sup>th</sup> September to 18<sup>th</sup> September, 2019 at Indian Institute of Technology Kanpur.



Ms. Sugandh Gupta attended a 5-days Faculty Development Program on "Internet of Things (IoT)" conducted by Centre for Continuing Education, funded by TEQIP-III, AKTU from 16<sup>th</sup> November to 20<sup>th</sup> November, 2019 at Indian Institute of Technology Kanpur.



• 3hrs meditation session was attended by the faculty members of the Department which was organized by Zen Club of IT Department on 26<sup>th</sup> November, 2019. Faculty members enjoyed Osho Stop dance, Gibberish meditation followed by silence sitting.



• Faculties of the Department attended a Workshop on "National Innovation and Start-up Policy (NISP) for Faculty" organized by Institution's Innovation Cell from 24<sup>th</sup> December to 25<sup>th</sup> December, 2019.

# **Faculty Achievements**

Congratulations.....



- Mr. Vaibhav Jain, Assistant Professor, ECE got enrolled in Ph.D from SRM University, Chennai in the field of VLSI.
- He also successfully completed the NPTEL Course with Elite Gold Certificate on "Accreditation and Outcome Based Learning" and secured place in top 1% of Certified Candidates with a score of 96%.



Ms. Aakansha Garg, Assistant professor ECE, successfully completed the NPTEL Course on "Intellectual Property Rights and Competition law" with a score of 70%.



- Dr. Hari Mohan Gaur, Associate Professor, ECE successfully completed the NPTEL Course with Elite Gold Certification on "Accreditation and Outcome Based Learning" with a score of 90%.
- His Research Proposal entitled "Implementation and Development of Logic Designs for Emerging Quantum Computing Machines" got shortlisted for presentation under Collaborative Research and Innovative Program (CRIP) at Centre for Advanced Studies, AKTU.

#### **Publications:**

- HM Gaur, AK Singh, TN Sasamal, A Mohan, DK Pradhan, "Reversible Logic: An Introduction," In Design and Testing of Reversible Logic, pp. 3-18. Springer, Singapore, 2020.
- HM Gaur, TN Sasamal, AK Singh, A. Mohan, "Fault Models and Test Approaches in Reversible Logic Circuits," In Design and Testing of Reversible Logic, pp. 153-167. Springer, Singapore, 2020.
- TN Sasamal, HM Gaur, AK Singh, A Mohan, "Novel Approaches of Designing Reversible Counters," In Design and Testing of Reversible Logic, pp. 37-48. Springer, Singapore, 2020.
- TN Sasamal, HM Gaur, AK Singh, A Mohan, "Reversible Circuit Synthesis using Evolutionary Algorithms- A Comparative Study," In Design and Testing of Reversible Logic, pp. 115-128. Springer, Singapore, 2020.

# 5<sup>th</sup> September, 2019 Foundation Day

5<sup>th</sup> September is celebrated as the Foundation Day, Teachers' Day and Fresher's Day in the Institute every Year. The top five students along from each Year of the Department were awarded on this Day. Parents of these Students also witnessed the awarding Ceremony.



S.No.	Year	Name of Student	Rank
1		ARVIND KUMAR YADAV	FIRST
2	1 <sup>st</sup> Year	AVNI SHARMA	SECOND
3	1 Tear	SURASHIKA TOMAR	THIRD
4	]	SHIVAM KUMAR YADAV	FOURTH
5	1	TANISHA AGRAWAL	FIFTH
6		ARPIT KUMAR	FIRST
7	2 <sup>nd</sup> Year	SAKSHI KUMARI	SECOND
8	2 Teal	NITESH KR DIXIT	THIRD
9	1	KAJAL VERMA	FOURTH
10	1	VISHAKHA GUPTA	
11	]	PRATYUSH PRIYANSH	FIFTH
12		TANUSHREE PANDEY	FIRST
13	] .	AKASH TEVATIA	SECOND
14	3 <sup>rd</sup> Year	RAUNAK KUMAR MISHRA	THIRD
15		MONICA KAUSHIK	FOURTH
16	1	JYOTI GUPTA	FIFTH
17		MEDHA TIWARI	FIRST
18	1	PALLAVI GOSWAMI	SECOND
19	4 <sup>th</sup> Year	PRACHI BHARADWAJ	THIRD
20		AMAN RAJ	FOURTH
21		SHIVAM SINGH	FIFTH









# **Annual Fest, Festin-O-Beats 11.0**

Annual Fest,2019 "Festin-O-Beats 11.O" is a 3-day fest which comprised of events in cultural, fine arts, literary, technical events and Sports with recognizable participation from the Institute as well as from other colleges of Delhi-NCR too. Following is the list of Students of the Department who secured various positions in respective events.



S.No.	Event	Name of Student	Year	Rank	
1	Nukkad Natak	Tanisha Aggarwal	2 <sup>nd</sup>		
		Jayant Singh	2	Runner-up	
		Naveen Sharma			
2		Shubham Kumar	$3^{\mathrm{rd}}$	Winner	
	Fashion Show	Kajal Tyagi	3"		
		Aayushi Singh			
		Prithviraj Pilania	$1^{\mathrm{st}}$	Runner-up	
3	Group Singing	Ravaishmi Gupta	3 <sup>rd</sup>	Winner	
3		Shubhangi Khare		Winner	
4	Carrom (Boys)	Raj Kanojia	$3^{\rm rd}$	Runner-up	
		Vishakha Gutpa	$3^{\rm rd}$	Winner	
5	Carrom (Girls)	Yamini Gupta	$2^{\rm nd}$	Dunner un	
		Pragati Tiwari	$3^{\rm rd}$	Runner- up	
	Kabaddi	Nitish Sharma	$4^{th}$		
		Prafful Garg	$4^{th}$		
		Chandresh Negi	$3^{\rm rd}$		
		Nishant	$4^{th}$		
6		Shivam Tomar	$2^{nd}$	Dunn on Lin	
0		Chirag Sharma	$3^{\rm rd}$	Runner Up	
		Naresh Sharma	$3^{\rm rd}$		
		Vikas Tiwari	$3^{\rm rd}$		
		Sumit Singh	4 <sup>th</sup>		
		Priyanshu Agarwal	$4^{th}$		
	Basketball (Boys)	Prafful Garg	4 <sup>th</sup>		
7		Nitish Sharma	4 <sup>th</sup>		
		Ayush Kumar	$4^{th}$		
		Sumit Singh	$4^{th}$		
		Asar Ahmad	3 <sup>rd</sup>		
		Raj Kanojia	3 <sup>rd</sup>	Runner-Up	
		Chandranesh Negi	3 <sup>rd</sup>		
		Prince Diwedi	2 <sup>nd</sup>		
		Lakshay Lohumi	2 <sup>nd</sup>		
		Prithvi Raj	1 <sup>st</sup>		







S.No.	Event	Name of Student	Year	Rank	
		Himanshu Bisht			
		Nitish Sharma		- Runner-Up	
		Priyanshu Agarwal			
		Prafful Garg			
0	V 11 D 11 (D )	Chirag Sharma			
8	Volley Ball (Boys)	Chandresh Negi			
		Nitesh Dixit			
		Vikas Tiwari		<u> </u>	
		Ketan Chauhan			
		Shivam Tomar			
		Jyoti Chaudhary			
		Ravaishmi Gupta			
9	Kho-Kho (Girls)	Vishakha Gupta	3rd	Runner-Up	
		Shubhangi Khare			
10	Race (100 m)	Jyoti Chaudhary	$3^{\mathrm{rd}}$	Runner-Up	
11	Race (200 m)	Jyoti Chaudhary	3 <sup>rd</sup>	Winner	
12	Race (400 m)	Jyoti Chaudhary	3 <sup>rd</sup>	Winner	
13	Long Jump (Girls)	Jyoti Chaudhary	3 <sup>rd</sup>	Winner	
14	High Jump (Boys)	Ketan Chauhan	3 <sup>rd</sup>	Winner	
15	Shot- Put (Boys)	Nitish Sharma	4 <sup>th</sup>	Runner-Up	
16	Shot- Put (Girls)	Tanisha Agrawal	2 <sup>nd</sup>	Winner	
17	Discus Throw (Boys)	Nitish Sharma	4 <sup>th</sup>	Runner-Up	
18	Discus Throw (Girls)	Tanisha Agrawal	2 <sup>nd</sup>	Winner	
		Jyoti Chaudhary	3 <sup>rd</sup>		
19	RELAY RACE - 4*100M (Girls)	Vishakha Gupta		Runner-Up	
		Ravaishmi Gupta			
20	Race (800 m) Girls	Jyoti Chaudhary	3rd	Winner	
	(2.2.2.)	Prafful Garg	4 <sup>th</sup>		
		Nitish Sharma	4 <sup>th</sup>	-	
		Priyanshu Agarwal	4 <sup>th</sup>	-	
		Sumit Singh	4 <sup>th</sup>	-	
	21 Tug of War (Boys)	Gaurav Gaur	4 <sup>th</sup>	Runner-Up	
		Ketan Chauhan	3 <sup>rd</sup>		
		Chandresh Negi	3 <sup>rd</sup>		
21		Vikash Tiwari	3 <sup>rd</sup>		
		Chirag Sharma	3 <sup>rd</sup>		
		Raj Kanojia	3 <sup>rd</sup>		
		Utkasrh Arora	3 <sup>rd</sup>	-	
		Asar Ahmad	3 <sup>rd</sup>		
		Kunwar Pratap Singh	2 <sup>nd</sup>		
		Vaibhav	2 <sup>nd</sup>		
		Shivam Tomar	2 <sup>nd</sup>		











S.No.	Event	Name of Student	Year	Rank
22	Tug of War (Girls)	Tanisha Agarwal	2 <sup>nd</sup>	
		Ravaishmi Gupta	3 <sup>rd</sup>	Winner
		Jyoti Chaudhary	3 <sup>rd</sup>	
	Basket Ball (Girls)	Ravaishmi Gupta	3 <sup>rd</sup>	Winner
23		Jyoti Chaudhary	$3^{\rm rd}$	Dynas on Lie
		Tanisha Agarwal	$2^{\rm nd}$	Runner-Up
		Jyoti Chaudhary	$3^{\rm rd}$	Winner
24	Technical Quiz	Pragati Tiwari	$3^{rd}$	winner
		Vikas Tiwari	$3^{rd}$	Runner-Up
25	Empost Empires anima	Pragati Tiwari	$3^{\rm rd}$	Winner
23	Frugal Engineering	Dewesh Kumar	$3^{\rm rd}$	winner
26	Robotics (Robo	Akash Tevatia	, th	D 11
26	Race) and Robo War	Aamir Ali Kadri	4 <sup>th</sup>	Runner-Up
	Technical Event (PUBG)	Abhishek Singh	1 <sup>st</sup>	Winner
27		Dipanshu Mauti- yal	$3^{\rm rd}$	Runner-Up
28	Clay Art	Aamir Ali Kadri	$4^{th}$	Runner-Up
29	Best Shot: Still Photography	Naveen Kr. Singh	$1^{st}$	Runner-Up
30	Collage Making	Pratyush Priyansh and Team	$3^{\rm rd}$	Winner
31	Poster Making	Riya Sharma and Team	$4^{th}$	Winner
	Dumb Charades on Books	Dipanshu Nautiyal		
32		Arushi Samanth	$3^{\rm rd}$	Winner
32		Aruj Singh		
		Arushi Gupta	2 <sup>nd</sup>	Runner-Up
33	AD MAD Show	Pragati Tiwari	3 <sup>rd</sup>	Runner-Up
34	Debate (English)			Winner
35	Elocution	Avni Sharma	$2^{\mathrm{nd}}$	Runner-Up
36	National Youth Parliament			Runner-Up
37	Slogan Writing	Arushi Samanth	$3^{rd}$	Runner-Up
38	Check Your knowledge (General Quiz)	Ankur Kumar	2 <sup>nd</sup>	Runner-Up











## Upcoming Events

Come and Join us! In

Training Program on

# "Debugging and Application Development in Embedded Systems & IoT using

Microcontrollers"

(starting from 25th January, 2020)

• Workshop on

"Antenna Design, Fabrication & Testing"

(to be held on 11th February 2020)

Reminiscence 2020 (Alumni Meet)

(to be held on 15th February 2020)

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· Smart India Hackathon, 2020

### Article on "Detecting the future of healthcare"

New sensor capabilities are creating new possibilities for identifying, managing, treating illness. Technology has transformed medicine, helping healthcare professionals better identify and treat illness or disease. Sensors play a vital role in numerous devices – from x-ray imaging to thermometers – and further development to achieve new capabilities, functionalities or miniaturisation promises to unlock new heights for these components.

Filip Frederix, Head of Business Imaging at ams, credits the rise of the 'P4' approach to medicine. This is made up of four core pillars: preventative, participatory, predictive and personalised. Technology, medical and pharmaceutical companies alike are promoting this as a natural evolution of reactive disease care.

"To enable these models, you need to have a lot more sensors so you can monitor your health at home when you're not even ill. Then if you look what predictive health means, it also requires some artificial intelligence and big data analysis to make sense of certain symptoms or readings. Here you need to have very accurate sensors that can be used at home."

Veral Agarwal Student, 3rd Year, ECE