RES NOVAE

CURIN Research and Development News

CURIN
Chitkara University
Research & Innovation
Network

Volume 2020, Issue 1
R&D Activities During
April – June 2020

COVER STORY

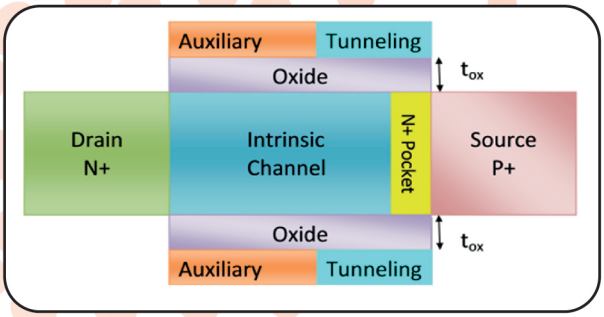
Funding Support ₹1 Crore

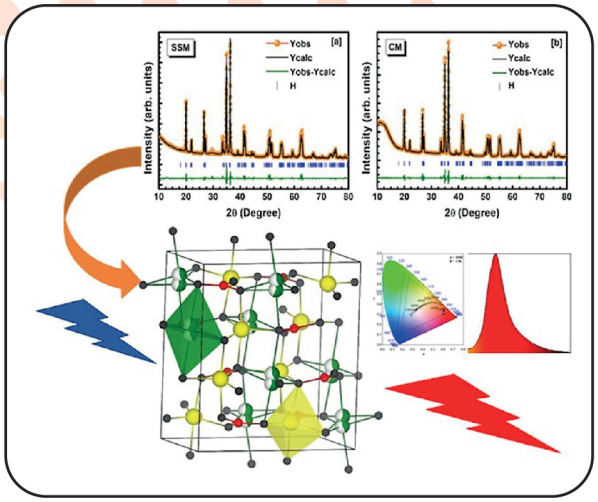
NOVATE+2020

Supporting the National effort against COVID-19

Articles on Top-5 Research Papers Published During the Quarter

- Detection of Snow Cover Himalayan Region using Image Processing Technique
- Green Macroalgae for the Treatment of Wastewater
- Improving Red Component in White LEDs
- Semiconductor Device for Next-Generation Supercomputing Applications
- Antenna for High-Speed Wireless Communication





29 Research Publications

45 Patents

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EDITORIAL

I am extremely glad to write an editorial for this rejuvenated version of Res Novae, realms of which now have been taken over by a newly formed editorial team, that has decided to not only revamp the whole layout but also worked extremely hard to ensure that it proves to be extremely useful and enriching for the reader.

For this particular issue a cover story on NOVATE+ 2020 has been included. NOVATE+ 2020 has been a great initiative of team CURIN to find solutions for various COVID-19 challenges by organizing a national level competition. Chitkara University decided to give funding support of INR 1 Crore for top ideas/solutions of NOVATE+ 2020.

Doing great research and publishing quality research papers has always been a mandate for all CURIN members. Res Novae editors have handpicked top-five research publications of the last few months and have tried to present the reported work in easy and understandable context in Res Novae. Many congratulations to all the authors of these top-five research papers. Thanks are due to the PhD scholars who wrote articles for Res Novae around these research papers.

This issue has also covered the latest work being done in four CURIN labs namely - Centre for Liquid Crystal Research headed, CoE – Artificial Intelligence, AR/ VR Lab and Centre for Life Sciences.

Delivering five expert talks on IPR, Proposing a novel air purifier to kill viruses, Editing a book on Machine Vision published by Wiley-Scrivener, Delivering a keynote in IEEE sponsored conference are some of the key contributions of CURIN faculty members to research and development. All these stories have been covered in this issue of Res Novae.

CURIN is now a family of more than 100 researchers. A dedicated section has been prepared to showcase individual achievements and contributions for CURIN faculty members and research scholars.

“Where there is CURIN, there is innovation”. Wow! 45 patents filed in just three months that goes on to indicate that we are successfully traversing the difficult terrain of innovation and invention in CURIN. You will find a section in Res Novae that features an overview on these 45 patents.

CURIN is accomplishing all these feats with the immense support and trust from the management. We always remain grateful to Dr. Ashok K Chitkara - Chancellor, Chitkara University, Dr. Madhu Chitkara - Pro Chancellor Chitkara University and our Dear Mr. Mohit Chitkara sir – VP, Chitkara University for being such a huge inspiration and motivation to do nothing less than best.

As per Dr. Chitkara’s world, “We don’t want to be big, but we aspire to be great”. Such brief but powerful words always show us the path in case we get across any kind of dilemma at any stage of time.

I sincerely hope that you will find this issue of Res Novae resourceful. Kindly do share your feedback with us.

Dr. Rajnish Sharma
Dean (Research)
Consulting Editor (Res Novae)
Chitkara University

NOVATE+2020 - Supported The National Effort Against COVID-19 Through Innovation

Organized by Chitkara University during April – June 2020

By Mr. Sagar Juneja – Editor, Res Novae and Dr. Sachin Ahuja – Consulting Editor, Res Novae

Today the entire world is going through an unprecedented pandemic which has affected each and every individual directly or indirectly across various boundaries. Broadly, COVID-19 brought along two sets of challenges – a) how to stay positive in this difficult times and b) how to use technology to address various problems that came along with COVID-19.

Chitkara University proactively decided to take these challenges head-on through NOVATE+ 2020. NOVATE+ 2020 was announced in the beginning of April 2020 and it encouraged innovators from all over the country to understand these challenges and find suitable solutions for them. Chitkara University announced funding support of INR 1 Crore to be given to top ideas for building market ready solutions, and also announced cash prizes of INR 5 Lacs. Soon after the announcement of the competition in April 2020, a webinar-cum-bootcamp was organized on May 1, 2020 in order to give prospective participants right direction for the competition, and at the same time motivate them to find solutions to COVID-19 challenges. The panellists in the webinar were Dr. Archana Mantri (Vice Chancellor, Chitkara University, Punjab), Mr. Arijit Bhattacharyya (Founder, Virtualinfocom), Mr. Bhavish Sood (Co-Founder – Modulor Capital Investor), Mr. Nalin Singh (Co-founder, NatioCultus Consultancy Pvt. Ltd.), and it was moderated by Mr. Sumeer Walia (Director, CEED).

Chitkara University announced funding support of INR 1 Crore to be given to top ideas for building market ready solutions, and also announced cash prizes of INR 5 Lacs.

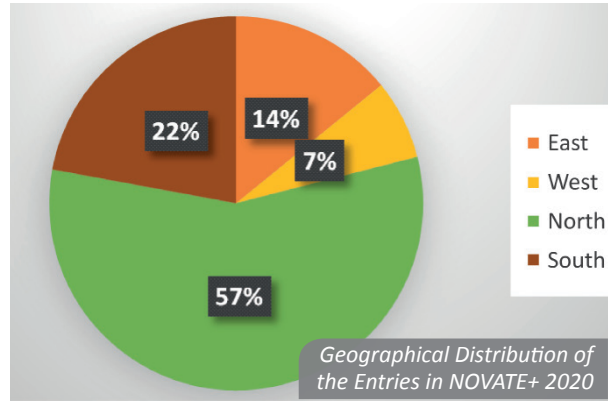
Panellists of the Webinar

Theme of NOVATE+ 2020 was derived from three step process followed for Prayer as described in Norman Vincent Peale's book entitled The Power of Positive Thinking. This three-step process include – Prayerise, Picturise and Actualise.

In the Prayerise segment, ideas for keeping and thinking positive during this lockdown period were invited. Participants could draw inspiration from one of the following sources– Medical science, Ancient and old practices, Alternate therapies and Diverse cultures. A total of 109 submissions were made in the Prayerise segment of the competition.

In the Picturise segment, technology and innovation related ideas for finding solutions to the following problems were invited - Tracking and geofencing COVID-19 patients, Scalable solutions for sanitization, Effective delivery of essential supplies to people, Effective implementation of social distancing, Crop harvesting using minimal labor,

Work from home solutions, DIY (Do-It-Yourself) kit ideas etc. A total of 167 submissions were made in this category, and that way a total of 276 submissions were made to NOVATE+ 2020 combining both the Prayerise and Picturise segment entries. The competition saw participation from all over the country as shown in the pie chart here. Some of the premier institutions like IIT Kharagpur, IIM Kolkata, IIM Udaipur, IIT BHU etc. submitted entries to the competition as well.



Geographical Distribution of the Entries in NOVATE+ 2020

In the Actualise round, shortlisted teams from both Prayerise and Picturise rounds were given an opportunity to develop their proof-of-concepts and submit the same in the form of 5 minutes video for evaluation. 63 video submissions were received in the Actualise round that were evaluated by the panel and Top 30 ideas were selected for the Jury round that was held as a live online session on June 25, 2020. The jury panel comprised of four experts - Mr. Nalin Singh (Investor and Founder CULTUS & Partner Orbit Future Academy, Indonesia), Mr. Avelo Roy (Managing Director, Kolkata Ventures), Mr. Bhavish Sood (Investor & Partner, Modular Capital, Gurgaon) and Mr. Raghav Hunasgi (CMO, Evolutyz Corp).

Live Online Jury Session

Here is a list of proud winners of NOVATE+ 2020 that were selected after multiple rounds of rigorous evaluations.

- Winner of Research Funding Award of INR 75 lacs sponsored by Chitkara University was the project titled 'Novel Inhalable Microparticle Delivery System for Hydroxychloroquine and Surfactants for Pulmonary Delivery for Management of ARDS in COVID' that was submitted by Dr. Sandeep Arora, Dr. Sukhbir Singh and Dr. Neelam Sharma - Chitkara College of Pharmacy, Chitkara University.
- Cash Prize of INR 500,000 sponsored by Chitkara University was jointly shared by two project ideas –'Low Cost Rapid Smart and Safe Sanitization' submitted by Raghav Sharma and team from Xovian Aerospace and 'ASHA-Tele-Health Platform in the Mental Health Space' by Shashwat Agarwal and team from IIT BHU.

- Four teams won prototyping funding of INR 250,000 each from Chitkara University NewGen IEDC. Title of the winning ideas were – 'Saral Udyog' by Gurditt Singh and team (Chitkara University), 'Mano-Aid' by Gurwinder Singh and team (Chitkara University), 'UV Rakshak' by Gyan Singh and team (Chitkara University) and 'Novel Inhalable Microparticle Delivery System for Hydroxychloroquine and Surfactants for Pulmonary Delivery for Management of ARDS in COVID' by Dr. Sandeep Arora and team (Chitkara University).
- Four teams won start-up funding of INR 700,000 each from Chitkara University MeitY TIDE 2.0. Title of the winning ideas were 'Currency Sanitizing Machine' by Dr. Sachin Ahuja (Chitkara University), 'Low Cost Rapid Smart and Safe Sanitization' by Raghav Sharma and team (Xovian Aerospace), 'ASHA-Tele-Health Platform in the Mental Health Space' by Shashwat Agarwal and team (IIT BHU) and 'Dhanrakshak' by Dr. Virender Kadyan and team (UPES University, Dehradun)
- One team won Entrepreneurship in Residence (EIR) and funding of INR 4 Lacs from MeitY TIDE 2.0. The project idea was titled 'COVID-PDS+' by Vedant Shrivastava and team from KIIT University, Bhubaneswar.
- Lastly, in each of the Prayerise and Picturise round separate cash prize of INR 15,000 was given away by Chitkara University to the best idea. In Prayerise category the prize was bagged by Dr. Jyotsna Kaushal and team from Chitkara University for their idea titled 'Enhancement of Youth Resilience through Yoga, Pranayama & Meditation- Blend of Ancient & Scientific Approach' and in the Picturise category it was bagged by 'Intelligent Crowd Surveillance System For Social Distancing' submitted by Vignesh Charan and team from MIT World Peace University, Pune, Maharashtra.

NOVATE+ 2020 was jointly organized by Chitkara University Research and Innovation Network (CURIN) and Chitkara University Centre for Entrepreneurship Education & Development (CEED) and it was supported by NewGen IEDC (NSTEDB) , MeitY TIDE 2.0, FICCI, MeitY Start-up Hub, IEEE Student Chapter, ACM Student Chapter, and Modular Capital.

The core team from Chitkara University that organized NOVATE+ 2020 comprised of Dr. Archana Mantri (Vice Chancellor, Chitkara University, Punjab), Dr. Sachin Ahuja (Director, CURIN, Chitkara University, Punjab), Mr. Sumeer Walia (Director, CEED, Chitkara University, Punjab), Dr. Nitin Saluja (Associate Director, CURIN, Chitkara University, Punjab), Dr. Adarsh Aggarwal (Professor, CEED, Chitkara University, Punjab), Dr. Neeraj Kumar (Asst. Professor (ECE), Chitkara University, H.P.), Ms. Abha Sharma (Asst. Professor (CSE), Chitkara University, H.P.) and Mr. Sagar Juneja (Asst. Dean (CURIN), Chitkara University, Punjab).

Face Shield for Protection Against Virus

Developed by Chitkara University

Chitkara University has developed a lightweight, robust, and uniquely designed face shield using 3D printing technology that can be very effective in preventing the spread of viruses.

The University has decided to distribute 100 of them free-of-cost in the community. About 50 shields have been distributed already and are being used by the people. This face shield can be an excellent alternative to face mask. The forehead mount is uniquely designed to give flexibility. The shield can be adjusted comfortably on the forehead according to different head sizes, without the need for the elastic string. The soft nitrile foam pasted on the forehead mount ensures comfort while wearing for a longer period. The unique support structure at the bottom makes the shield more robust and stronger.

100 shields to be distributed free of cost

The face shield has been designed, developed, and manufactured in Chitkara University New Generation Innovation and Entrepreneurship Development Centre (NewGen IEDC) that is headed by Dr. Archana Mantri (Vice Chancellor, Chitkara University, Punjab). Industrial Design of this uniquely designed face shield has been registered in the Indian Patent Office and Mr. Sagar Juneja (Asst. Dean, CURIN and Coordinator, NewGen IEDC) and Mr. Chanpreet Singh (Project Manager, CURIN) are the co-applicants.

Research@CURIN

Top 5 High Impact Research Papers Published by CURIN During April – June 2020

Following five articles have been written by our PhD scholars around top-five research papers published by CURIN researchers during April – June 2020. Each of these articles is respectively going to summarize each of the top-five research papers.

A complete list of publications by CURIN faculty members and scholars during April – June 2020 is presented in a separate section.

Detection of Snow/Ice Cover Changes in Western Himalayan Region using a Novel Image Processing Technique

By Vatsala Anand – PhD Scholar

This article is based on the research paper titled Detection of Snow/Ice Cover Changes using Subpixel-Based Change Detection Approach over Chhota-Shigri Glacier, Western Himalaya, India published by Vishakha Sood, Dr. Sheifali Gupta and Dr. Sartajvir Singh from Chitkara University and team in Elsevier journal entitled Quaternary International.

A glacier is a combination of snow, sediments, rocks, water and ice which moves down under its own weight and gravity. These runoffs from glaciers make the water sources cool and also provides habitation for plants and animals during dry periods. But, the glaciers are melting because of the increase in amount of carbon dioxide in the atmosphere and other harmful emissions from the industries, burning of fossil fuels, transport etc. As soon as the glaciers melt, water level rises in seas and oceans resulting in floods.

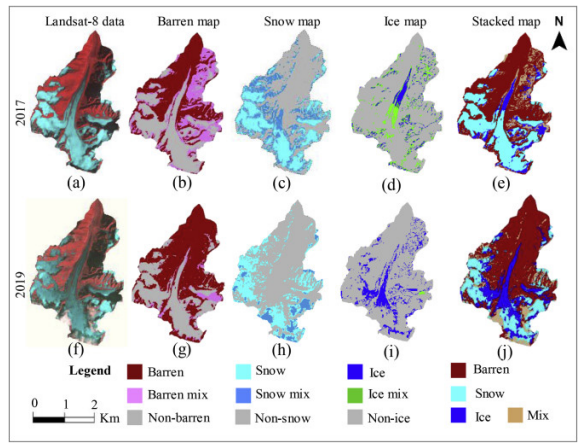


Illustration has been borrowed from this published paper

Recent studies have suggested that due to climate variability, Himalayan glaciers are retreating at a very fast pace and widely recognized as sensitive climate indicators. Therefore, continuous monitoring of glacier movements is required. Although, because of tough climate situations, field surveys become challenging therefore large scale remote sensing is adopted.

A team of researchers at Chitkara University headed by Dr. Sartajvir Singh, Dr. Sheifali Gupta along with their PhD scholar, Vishakh Sood have proposed a Subpixel-based Change Detection (SCD) approach for monitoring the glaciers. This study was performed using Landsat series dataset on Chhota-Shigri glacier, located on the basins of Chandra river in Western Himalaya, India. Their approach consists of integration of subpixel classification and change vector analysis which outlines the modifications in the form of magnitude and direction between two multitemporal dates at the subpixel level.

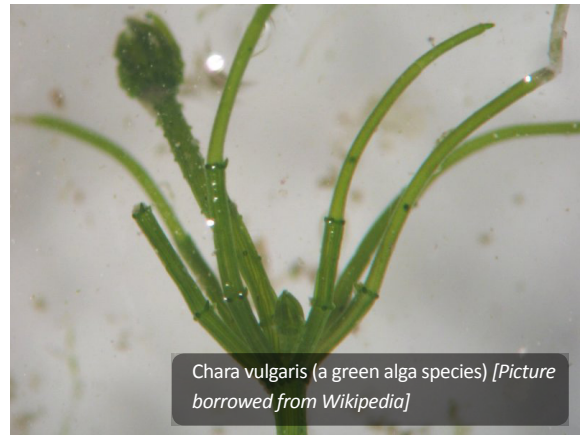
This study offers an effective way of estimating the snow/ice changes around the globe and has the possibility to make change maps show best accuracy. There are many advantages of this approach like no requirement of radiometric correction, effective in identifying transition zones (mixed pixels), and accurate change maps over Himalayan region.

Fresh Water Green Macroalgae for the Treatment of Wastewater Containing Methyl Red Dye Discharged from Textile Industry

By Adhish Singh – PhD Scholar

This article is based on the research paper titled Phytoremediation of Azo Dye Methyl Red by Macroalgae Chara vulgaris L.: Kinetic and Equilibrium Studies published by Dr. Pooja Mahajan and Dr. Jyotsna Kaushal from Chitkara University in Springer Nature journal entitled Environmental Science and Pollution Research.

Textile industry in India has always been a pillar of strength for the economic growth in the pre-independence and post-independence period. With industrialization and globalization of textile and fabric industry picking its pace, it has posed a new problem for the communities residing in the vicinity. Discharge from textile factories usually contain harmful and carcinogenic synthetic dyes. The use of chemical/physical/biological technologies that have claimed to treat the harmful dyes from the waste water suffer from problem of excessive utilization of chemicals and improper disposal of effluent. In the last couple of decades, there has been a paradigm shift towards adoption of plant-based green technology, called Phytoremediation. The technology is a cost-effective and sustainable approach to clean wastewater.



Chara vulgaris (a green alga species) *[Picture borrowed from Wikipedia]*

Driven by curiosity and purpose, a team of researchers at Chitkara University comprising of Dr. Pooja Mahajan and Dr. Jyotsna Kaushal recently evaluated C. Vulgaris, a fresh water green macroalgae for the phytoremediation of methyl red (MR) dye, which is usually discharged in water from textile industries. This team at the Center for Water Sciences, Chitkara University analysed the effect of dye concentration, and carried out kinetic and equilibrium studies for the phytoremediation process. The mechanism of phyto-absorption of the dye inside the macroalgae and the decolorization was confirmed with the help of Fourier Transform Infrared Spectroscopy (FTIR) and UV-visible spectroscopy respectively.

The latest investigation suggests 50% removal of the dye within the first three hours, followed by reduction in the rate due to the absence of active absorption sites on the surface of C. vulgaris. The growth of macroalgae was not hindered by the toxicity inducement even after 8 repeated cycles of phytoremediation of acidic azo dye.

Scientists are excited about the bio-inspired solution of incorporation of C. Vulgaris into dye-laden water treatment plants as a part of an integrated and sustainable process. The process doesn't need any modification and utilizes live C. Vulgaris under ambient condition for wastewater treatment.

Improving Red Component in White LEDs using Non-rare Earth Doped Phosphorous Material

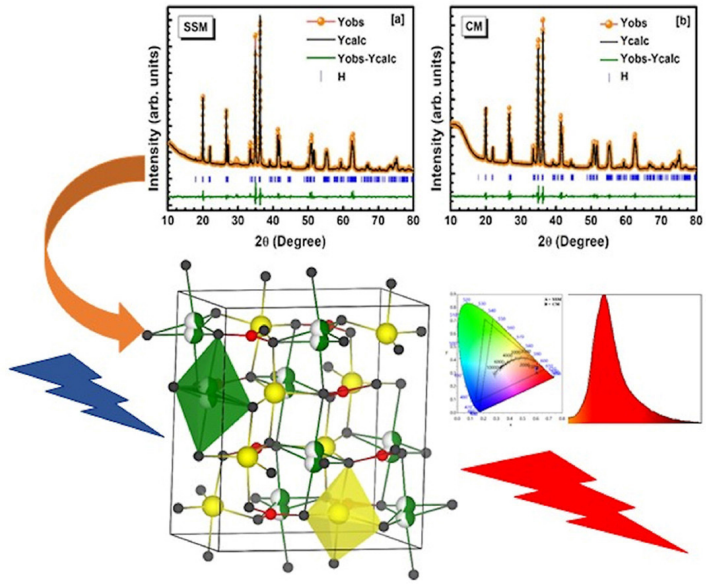
By Ankit Rai Dogra – PhD Scholar and JRF

This article is based on the research paper titled Red Emitting Non-Rare Earth Doped $LiMgBO_3$ Phosphor for Light Emitting Diodes published by Dr. A. K. Bedyal from Chitkara University and his team in Journal of Alloys and Compounds (Elsevier).

Nowadays, with the rapid development of light emitting diode (LED) technology, especially the advances in luminous flux and efficiency, LEDs have gradually replaced Cold Cathode Fluorescent Lamps (CCFLs). Now-a-days, almost all liquid crystal displays use LED lights. LEDs are environment friendly, thermally and chemically stable, have low energy consumption and longer life. In order to meet the global energy requirements, LED is a perfect candidate for lighting and displays. Consequently, white light emitting diodes (WLEDs) have replaced almost all conventionally used light sources and have captured the market effectively.

The only drawback of WLEDs is lack of red-light component that limit the use of WLEDs in the areas where warm light is needed. In order to overcome this problem, rare or non-rare earth doped red emitting phosphorous material is used in lighting solution. Non-rare earth doped phosphorous material is cost effective but it is challenging to synthesise this material when compared to rare-earth doped phosphorus material.

In this work, Dr. A.K. Bedyal from Chitkara University and his team has reported a new non-rare earth doped red-emitting phosphorus using Mn^{4+} doped $LiMgBO_3$ and synthesized it using solution combustion and solid-state routes. They have investigated the emission range from Mn^{4+} ions in this host lattice as well as realized its use as a red component that can be coupled with the YAG: Ce^{3+} phosphor to emit white light for WLED applications. Chemical state of the ions and thermal stability of the material have been determined and analysed with X-ray Photoelectron Spectroscopy (XPS). Temperature dependent photoluminescence (PL) and photometric properties such as color purity have also been evaluated. As a result, the synthesized non-rare earth doped phosphor with high PL intensity, high color purity can be used as a potential candidate for red component in WLEDs.



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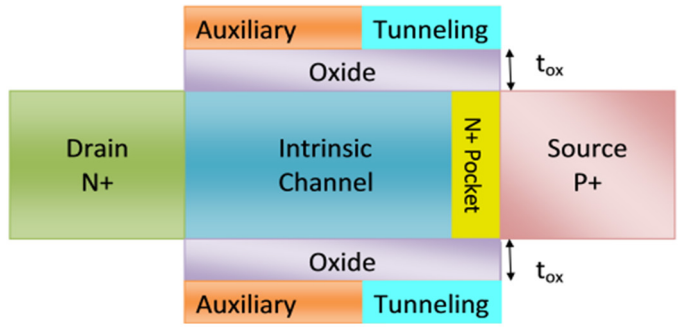
Innovative Semiconductor Device for Next-Generation Supercomputing Applications

By Preeti Sharma – PhD Scholar

This article is based on the research paper titled Investigation of Electrical/Analog Performance and Reliability of Gate Metal and Source Pocket Engineered DG-TFET published by Dr. Jaya Madan, Dr. Rahul Pandey, and Dr. Rajnish Sharma from Chitkara University and Dr. Rishu Chaujar from DTU, New Delhi in Springer Nature journal entitled Microsystem Technologies.

In present times, relentless growth of next-generation wireless communication technology (5G and beyond) demands for energy-efficient and advanced RF front end and high-speed processors. It is estimated by International Data Corporation (IDC) that 5G would connect 41.6 billion IoT devices that may use 79.4 Zettabytes (ZB) of data by 2025. These projections put forward a need for new nano scale devices that are faster, smaller in size and less power hungry. Tunnel Field Effect Transistors (TFET) is one nano scale device that is characterized by low power of operation and is ideal for implementing low power IoT systems.



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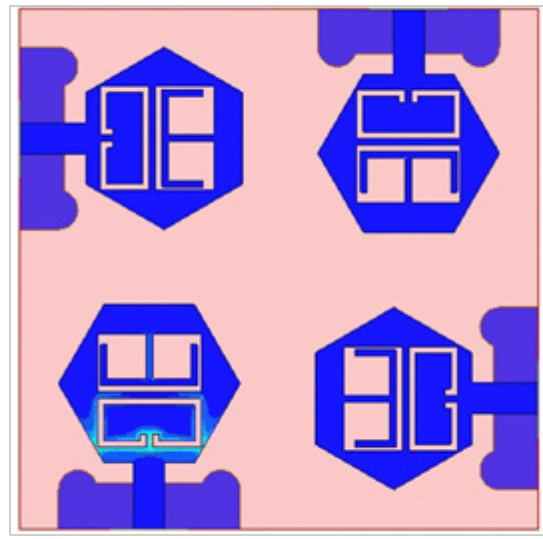
A research group in VLSI Centre of Excellence, Chitkara University, Punjab comprising of Dr. Rajnish Sharma, Dr. Jaya Madan and Dr. Rahul Padey is working on this new nano-scale device. In this current research work they have reported a new industry ready TFET structure for supercomputing applications. The have used Gate Metal Engineering (GME) and n+ Source Pocket (SP) schemes on Double Gate TFET (or DG-TFET) and studied the electrical characteristics and analog parameters of the proposed device. They have been able to achieve remarkable improvement in I_{ON}/I_{OFF} by a factor of 100 and decrease in threshold voltage by 27.1% in comparison to conventional DG-TFET. It has been claimed by the authors that the proposed device is far better for implementing analog and RF circuits.

Planar Antenna Design for High-Speed Wireless Communication

By Shiva Sharma - PhD Scholar

This article is based on the research paper titled Design, Analysis and Characterization of Four Port Multiple-Input-Multiple-Output UWB-X Band Antenna with Band Rejection ability for Wireless Network Applications published by Dr. Manish Sharma, Dr. Sudesh Kumar Mittal from Chitkara University and team in Springer Nature journal entitled Wireless Networks.

In this new era of growing data needs in wireless communication, there is an utmost requirement of increased channel capacity to support large data rates and large number of users. Antenna is one of the most important components of any wireless communication system, therefore careful design of antenna is important. Single element antenna system suffer from channel fading resulting in signal loss, therefore in order to prevent signal fading and also to increase channel capacity Multiple-Input-Multiple-Output (MIMO) antenna systems are quite essential and desirable. In the proposed work Dr. Manish Sharma and his team has dealt with the designing and analysis of 4X4 MIMO antenna system for Ultra Wide Band (UWB) and X-Band frequencies in the range of 3.15-11.36 GHz. This antenna can be used for multiple high speed wireless applications. The proposed antenna has a good band reject capability wherein interfering WLAN bands (4.90–5.99 GHz) and WiMAX bands (3.30-3.80 GHz) have been notched using C-slot and T-stub that act as band stop filters.



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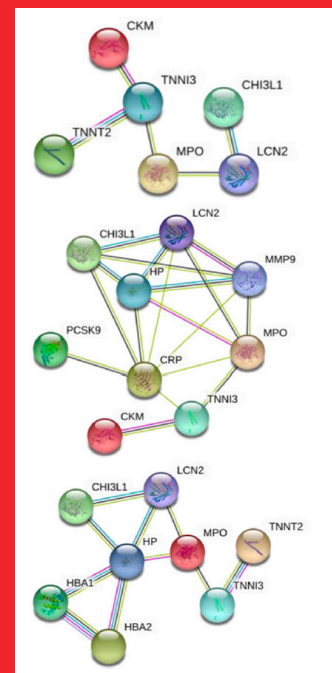
Design procedure started with the single element patch antenna using EM Simulator Ansys HFSS v14. This design was fabricated and converted into 2X2 MIMO configuration and then to 4x4 MIMO system. Each antenna in the design is consisted of a partial ground plane with 2 semicircular patches to improve the impedance matching. All 4X4 antenna elements are placed orthogonally to each other in order to minimize mutual coupling between them. The proposed antenna is claimed to have high gain and high efficiency and is ideal for high speed wirless communication. The team has fabricated and tested this antenna on RT Duroid substrate.

State-of-the-art Research Work Happening in Chitkara University Centre of Life Sciences (CLS)

CLS has published a paper relevant to COVID-19

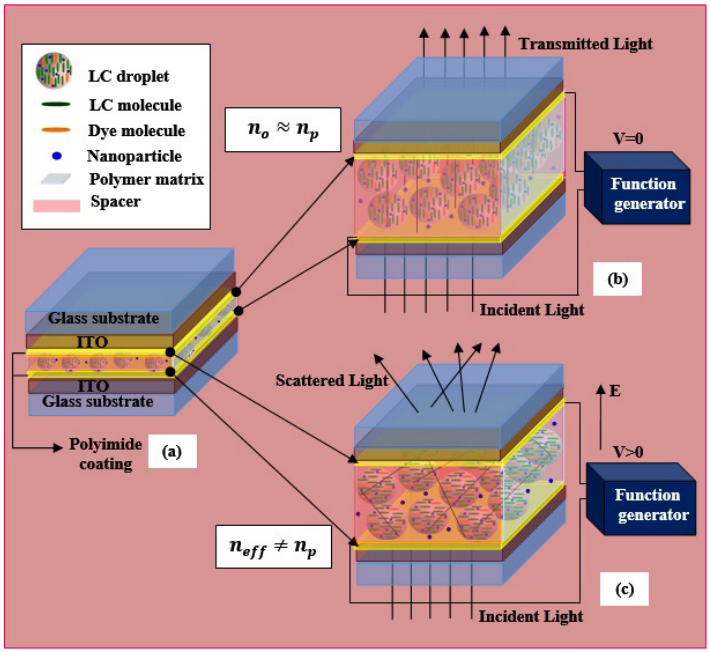
- Chitkara University Centre of Life Sciences (CLS), Molecular Biology and Bioinformatics has been carrying out research work in the area of non-communicable diseases like cardio-renal and type-2-diabetes.
- CLS has established a tissue culture lab and will been soon working on human gene cloning using one of the gene plasmids that has been donated by Max Planck Institute, Germany.
- CLS has established a collaboration with National Institute of Immunology, New Delhi for research work and their team of research scholars is working on introducing techniques like microarray analysis using R package, bacterial transformation, gene analysis and human cell culture techniques.
- CLS has recently published two SCI papers that are relevant to the ongoing thrust areas of medical sciences. One of the papers is titled 'Can Vitamins, as Epigenetic Modifiers, Enhance Immunity in COVID-19 Patients with Non-communicable Disease?' authored by Dr. Varsha Singh has been published in Springer Nature journal entitled Nutrition Reports. Springer Nature has flagged this publication for submission to WHO. The second publication is titled 'Overexpression of YKL-40 (CHI3L1 gene) in patient fluids may be a potential predictive marker for early detection of comorbidity in non-communicable Disease' authored by Raj Rani and Dr. Varsha Singh and is published in Elsevier journal Medical Hypotheses. CLS has also published a book chapter in collaboration with Food Safety and Standards Authority of India (FSSAI), INDIA. The book chapter is titled Quality Issues in Meat and Poultry Processing Sector and is published by Springer Nature in book entitled Emerging Technologies in Food Science.



Orientation Control of Liquid Crystals to Enhance their Performance

Remarkable Work Happening in the Centre for Liquid Crystal Research (CLCR), Chitkara University, Punjab

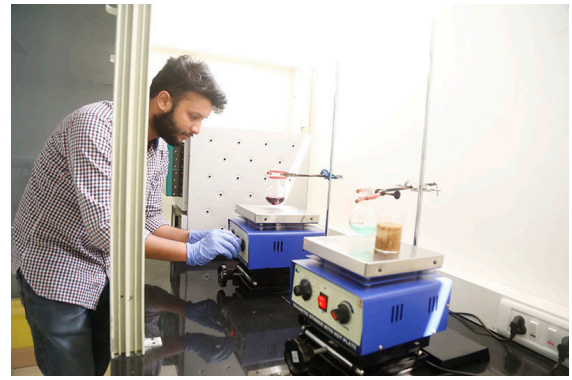
CLCR, Chitkara University is currently carrying out experimental work related to liquid crystal display technology to enhance the performance of liquid crystals. The main focus of the center is the preparation of high performance vertically aligned liquid crystals (VALCs) with the use of nano scale materials. Polymer dispersed liquid crystals, Polymer stabilized liquid crystals and dye doped liquid crystal devices are also being studied in the centre. Synthesis and characterization of graphene-based materials for energy storage super capacitors is another area of study that is currently happening in CLCR. The CLCR is headed by Dr. Pankaj Kumar – Professor, Chitkara University Research and Innovation Network (CURIN), and his team of researchers have published over 30 research articles in reputed SCI and Scopus indexed journals, in addition to publications in the national and international conferences. Some of the prominent SCI journals in which these publications have happened include Optics Express, JAPS, JMS, JML, Liquid Crystals, Micron, and Chem Plus Chem. CLCR is also doing two Government of India funded projects, where one of the projects is funded by SERB DST and other one is funded under DST INSPIRE Scheme. The CLCR has a total government funding of INR 3,700,000.



Top three SCI papers from CLCR in 2020 are -

1. Vandna Sharma, Pankaj Kumar, Chinky, Praveen Malik and K K Raina, "Preparation and electro-optic study of reverse mode polymer dispersed liquid crystal: Performance augmentation with the doping of nanoparticles and dichroic dye" Journal of Applied Polymer Science, 137, (2020), 1-10. (Impact Factor 2.188 & H-Index 159)
2. Amit Sharma, Pankaj Kumar and Praveen Malik, "Textural and electro-optical study of a room temperature nematic liquid crystal 4-pentyl-4-biphenylcarbonitrile doped with metal oxide nanowires in planar and in-plane switching cell configurations" Liquid Crystals, (2020), 1–15. (Impact Factor 3.078 & H-Index 73)
3. Gagandeep Kaur, Pankaj Kumar, Ashwani Kumar Singh, Divya Jayoti and Praveen Malik, "Dielectric and electro-optic studies of a ferroelectric liquid crystal dispersed with different sizes of silica nanoparticles" Liquid Crystals, (2020), 1-15. (Impact Factor 3.078 & H-Index 73)

The centre has recently filed a patent titled Nanoparticle Doped Vertically Aligned Liquid Crystal Display in Indian Patent Office with patent application number 202011016944. Inventors in this patent are Pankaj Kumar, Chinky, Vandna Sharma and Praveen Malik.

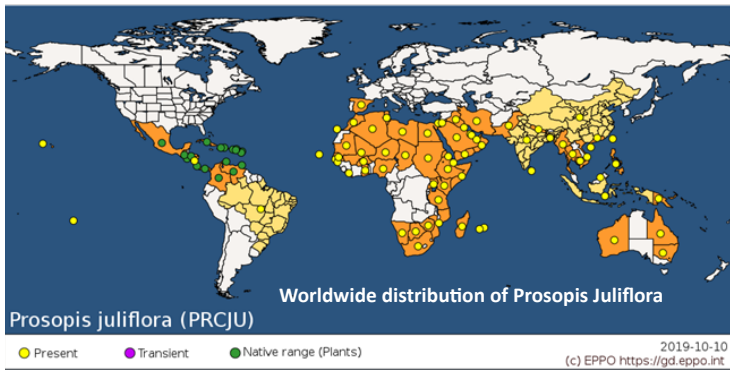


Online Events Attended by CLCR Researchers during April – June 2020

- Vandna Sharma attended a Short Course on Instrumented Indentation Techniques: Part I & Part II that was organized by Anton Paar, India Pvt. Ltd. on April 13 & 20, 2020.
- During May 26 to June 1 Dr. Pankaj Kumar attended a workshop on Research Methodology in Physical Sciences organized by Chaudhary Ranbir Singh University, Jind, Haryana, India.
- On May 29 Vandana Sharma attended an International Webinar on MATLAB Applications in Science and Engineering that was organized by Baba Farid College, Bathinda, Punjab, India.
- Vandna Sharma attended a webinar on Green Chemistry for Sustainable Environment organized by CSIO, India on June 5.
- Ankit Rai Dogra attended a faculty development program on Managing Reference and Citations using Mendeley that was organized by Chitkara University Research and Innovation Network (CURIN) on June 10.
- Dr. Pankaj Kumar, Vandana Sharma and Ankit Rai Dogra attended a one-day program on Emerging Trends in Physics and its Applications in Agriculture that was organized by College of Basic Sciences and Humanities, Haryana Agricultural University, Hisar, Haryana, India on June 29.

CoE–Artificial Intelligence, Chitkara University won a grant of INR 15,00,000 from National Geographic and Microsoft

For Scientific Eradication of Prosopis Juliflora Trees



Agriculture land of Indian subcontinent and some of African countries have been badly affected by the enormous growth of a tree called Prosopis Juliflora that grows at a very fast rate and is a reason for many problems leading to negative biodiversity.

Rapid growth of Prosopis Juliflora plant is due to high germination of its seeds that can survive for 10 long years and its ecological adaptability. The areas that receive low rainfall are severely affected by this fast-growing plant. Its rapid growth has led to the reduction in grasslands, woodlands, and bare lands. Moreover, in the shades of Prosopis Juliflora trees no other plants can thrive. Deep roots of this tree can go underneath upto 35 meters and deplete soil moisture. Removing this tree can cost upto INR 10,000 per acre with the help of earthmover machines.

Centre of Excellence (CoE) - Artificial Intelligence, Chitkara University submitted a project to National Geographic Channel under Artificial Intelligence for Earth Scheme during 2019-20 for the prediction of different negative impacts of Prosopis Juliflora in future using Artificial Intelligence model. The have received one-year free subscription of complete Microsoft Azure services for the project that otherwise cost INR 15 lacs. The team headed by Dr. K.R. Ramkumar is collecting the data of rainfall, ground water, temperature, humidity, CO_2 level, nitrogen deposit, health index of people living in the areas of Prosopis Juliflora, diminishing rate of animals, and other vital parameters. Using this data, they are going to train their machine learning model to predict the negative impacts of unchecked growth of this plant. The team has completed modelling of rainfall data from various states of the country and has developed a prediction model to analyse the diminishing rate of rainfall due to Prosopis Juliflora.

The team that is working on this project include Dr. K.R. Ramkumar (Associate Professor, CURIN), Dr. Partha Khanra (Assistant Professor, CURIN), Ms. Shabnam Choudhary and Ms. Vaishali Bhatia (M.E. Scholars).

Guest lectures and workshops delivered by Dr. K.R. Ramkumar

1. Dr. K.R. Ramkumar delivered a guest lecture on Swarm Intelligence and Its Applications during an online Faculty Development Program on Recent Advancements in Artificial Intelligence organized by Shri Vishnu Engineering College for Women, Bhimavaram during June 23 to June 27, 2020.
2. Dr. K.R. Ramkumar delivered a lecture on IoT and Security during a two-day online lecture series conducted by PG Department of Information Technology, GGDSD College, Chandigarh during May 25-26, 2020.
3. Dr. K.R. Ramkumar, Dr. Amanpreet Kaur and Mr. Keshav from Chitkara University Research & Innovation Network (CURIN), Chitkara University, Punjab organized a one-day workshop on Cyber Security and FPGA: The Future Technology. The workshop was held on July 7, 2020 and was organized by 70 participants from different parts of India as well as from outside India.

External Competition Won by Our Students' Team

Three students of second year from Department of Computer Science, Chitkara University, Punjab secured a third position in a hackathon event titled Hack Overflow held at Chandigarh University during March 6-8, 2020. This student team was mentored by Dr. K.R. Ramkumar and their idea was counterfeit detector for the detection of fake products especially FMCG products and medicines.

Events Attended by Research Scholars from CoE- Artifical Intelligence during April-June 2020

Ravneet Kaur – PhD Scholar attended a Three Minute Thesis competition organized by Deakin University, Australia. As a precursor to this competition she attended a session on 'Pitching Your Research in a Single Slide' organized by Deakin University, Australia under Isaac Newton Training Workshop Series. She participated in a quiz competition on Padma Awards organized by Government of India. She attended a webinar by IEEE Bangalore on AI and Data Science. She attended a workshop on Learning Heterogeneous Information Networks for Link Prediction organized by Deakin University and delivered by Dr. Hongxu Chen. She also attended a webinar on Topological Data Analysis delivered by Dr. Maia Angelova from Deakin University Australia.

Tarandeep Kaur – PhD Scholar also participated in a Three Minute Thesis competition organized by Deakin University, Australia. She attended a National Level Online FDP on Recent Advancements in Artificial Intelligence during June 23-27, 2020

Sonam Mittal – PhD Scholar attended multiple FDPs and webinars during April – June 2020. Details of the FDPs attended by her are as follows – A Symposium on Global Pandemic Outbreak: Role of Technology and Automation (by JSS Academy of Technical Education, Noida, India), FDP on Developing New Perspective in the Era of AI/ML (Meerut Institute of Technology, Meerut), FDP on E-Content Development (International Institute of Organized Research) Python Programming course organized by IETE-Mumbai in association with Pantech Learning, and Five-day workshop on Gateway to Innovation during June 22-26. Different webinars she attended include Relevance of AI in Covid-19, Patenting your Innovations, How to Develop Web Application and Data Science using Python.

Keshav Kumar – M.E. Scholar presented a paper in IEEE CSNT 2020. The paper was titled A Survey on Hardware Implementation of Cryptographic Algorithms using Field Programmable Gate Array. He attended a FDP on Evolutionary Trends in IoT, Blockchain and Networking that was organized by Amity University, Noida during June 19-20, 2020.

Shabnam Choudhary – M.E. Scholar participated in several workshops including one-day FDP on Recent Developments & Future Directions on Artificial Intelligence (by Amity University, Noida), one week short term training program on Data Science & Learning Systems for Engineering Research & Design (jointly organized by National Institute of Technology, Kurukshetra and Engineering College of Bikaner), Prior Art Searching on Industrial Design and Patents held during June 19 and 20, Code-e-Python Workshop organized by IEEE Student Chapter of Chitkara University and she received a gold level certificate in this workshop.

Vaishali Bhatia – M.E. Scholar presented a paper titled A Comparative Study on Various Intrusion Detection Techniques using Machine Learning and Neural Network at the IEEE 8th International Conference on Reliability Infocom Technologies and Optimization held during June 4-5, 2020. In the same conference Keshav Kumar presented a paper titled A Design Implementation and Comparative Analysis of Advanced Encryption Standard (AES) Algorithm on FPGA and Shabnam Choudhary presented a paper titled IoT Based Navigation System for Visually Impaired People. Vaishali attended workshops on Introduction to Automotive Cybersecurity, Ten-day coding workshop on Python and seminar on Learning Tools in the Age of Innovation

Soni Singh – PhD Scholar, Vaishali Bhatia and Ravneet Kaur attended a one-day faculty development program on Managing References and Citations using Mendeley on June 10 organized by Chitkara University. Soni Singh also attended two talks in Chitkara University VC Lecture Series on Ramcharitmanas and its Teachings that was held on June 14 and Building Resilience: A Deep Dive that was held on June 23. These same sessions were also attended by Ms. Neha Sharma – M.E. Scholar from this CoE. Neha Sharma also attended a VC Lecture series on Possible Do's and Don'ts for Publishing Research Paper in High Impact Journals on June 10.

45 Patents have been Filed

By CURIN Faculty Members and Scholars During April - June 2020

The patent filings have witnessed collaboration between CURIN members and faculty members as well as scholars from various other departments of the university. Here are the details of these patent applications sorted in alphabetical order.

A DEVICE FOR GENERATING WEATHER FORECAST

By – Nitin Saluja, Kartik Vij, Rahul Kinra, Rouble Gupta

Application No. - 201811048842

The system predicts weather based on the detection of signals' strength broadcasted using active channel. The received signal strength is compared against the reference signal strengths stored in the database, and based on this comparison weather forecast is generated.

A MARKING DEVICE

By – Puneet Bawa, Virender Kadyan, Sachin Ahuja, Pranav Garg

Application No. - 202011020278

It is a portable and multifunctional marking device for e-presentations, wherein based on the user inputs, the device is configured to select a particular output unit from a set of output units and in a particular mode from a set of modes.

ANTI-THEFT DEVICE FOR ROLLING SHUTTERS

By – Naveen Kumar, Surya Narayan Panda, Rajesh Kumar Kaushal, Jyoti Sharma, Prasant Kumar Pattnaik, Simranjeet Singh, Sushil Kalra

Application No. - 202011017203

The present invention relates to anti-theft device for roller shutters comprising of a pressure sensor, a heat sensor, a controlling unit, a lithium ion battery and a Wi-Fi module.

ANTI-THEFT SYSTEM FOR A VEHICLE

By – Shalli Rani, Shvet Jain, Debarshi Ghosh, Jashanveer Singh, Anirudh Garg

Application No. - 202011027232

Proposed anti-theft system features a GSM module for a vehicle, a positioning unit and a control unit to track its location and to access its controls. For correct authentication, system can also include image recognition, iris, fingerprint, license scans in order to ensure that only authorised users get to drive the vehicle.

APPARATUS TO CONTROL TEMPERATURE OF A CASING

By – Sushil Kalra, Sachin Bhogal, S.N. Panda, Ravi Kapila, Naveen Kumar, Simranjeet Singh

Application No. - 202011017892

An electronic system for controlling temperature inside a casing that can house one or more objects is proposed. One or more sensors generate a set of signals for the processing unit and based on these signals the processing unit give instructions to the control unit to regulate the temperature. The control unit comprises of a heat sink, fan coupled to the heat sink and a Peltier plate.

APPARATUS AND METHOD FOR NON-THERMAL RADIATION-BASED STERILIZATION

By – Nitin Saluja, Varinder Singh, Chinky Rani

Application No. – 202011016943

The invention is related to apparatus and method for non-thermal radiation based sterilization for destroying harmful microorganisms like bacteria, fungi or viruses from different objects.

CHARGE PLASMA PEROVSKITE SOLAR CELL DEVICE

By – Rahul Pandey, Jaya Madan

Application No. - 202011022005

The device consists of front IDA electrode blocks that are positioned between top insulating surface and top layer of charge carriers. Back IDA electrode blocks are placed on bottom insulating surface in a way that there is no electrical connection between front and back IDA electrode blocks. Electron-hole charge plasma is created in the absorber layer near the front surface of the insulating layer.

CHILD SAFETY ENABLED ALDROP LATCHES

By – Rajesh Kaushal, Naveen Kumar, S. N. Panda, Simranjeet Singh, Sukhdev Singh

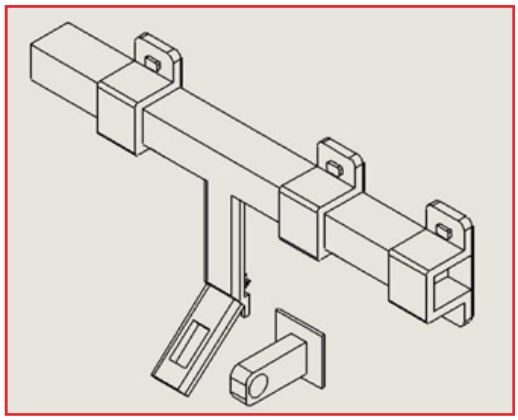
Application No. - 202011026266

This invention relates to aldrop door latch having a security feature for child safety and is comprised of spring based foldable handle and square rod.

CHILD SAFETY ENABLED ALDROP LATCH (Design)

By – Rajesh Kaushal, S N Panda, Naveen Kumar, Simranjeet Singh, Sukhdev Singh

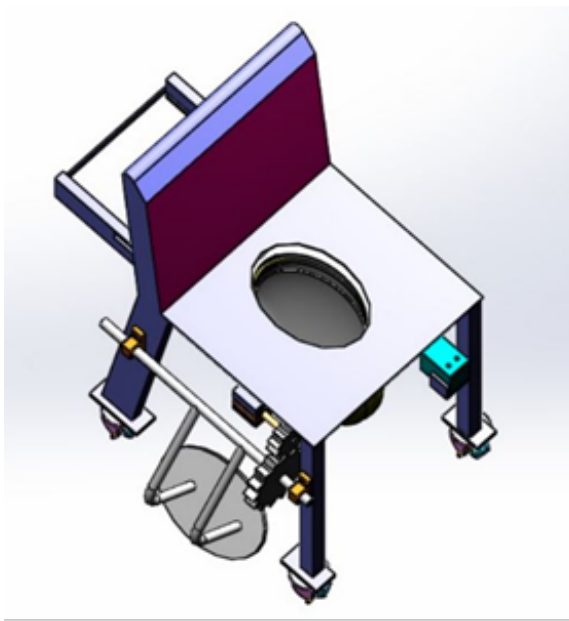
Design Registration No. - 329157-001



COMMODE CHAIR

By – Surya Narayan Panda, Simranjeet Singh, Sachin Ahuja, Naveen Kumar, Rajesh Kaushal, Sumit Badotra

Design Registration No. - 323652-001



DECONTAMINATION APPARATUS FOR SANITIZATION

By – Anshuman Lal, Charu Khosla, Sachin Ahuja

Application No. - 202011024084

This invention relates to the apparatus that allow inlet and outlet of entities that can be sanitized. The apparatus consists of both detection unit to detect the entity and sanitization unit that contains one or more sanitization elements. The sanitization elements can include disinfectants, ultraviolet sources, and dryer assembly.

DEVICE FOR TRACKING FOREIGN ENTITY

By – Shalli Rani, Sachin Ahuja, Shvet Jain, Cherry Mangla

Application No. - 202011026876

A device that does data acquisition to scan codes associated with travelling information of foreign entities, positioning unit to detect position and location of foreign entities and processing unit that use this data and identifies the foreign entities.

DIGITAL BODY TEMPERATURE SENSING FACE SHIELD

By – Rajesh Kumar Kaushal, S N Panda, Naveen Kumar, Prasant Kumar Pattnaik, Simranjeet Singh, Jaspreet Singh Bajaj

Design Registration No. 330489-001

ERGONOMIC COMMODE CHAIR

By – Simranjeet Singh, Surya Narayan Panda, Naveen Kumar, Rajesh Kumar Kaushal, Sumit Badotra, Priyanka Datta, Dimple Nagpal, Shanu Bhardwaj

Application No. - 202011027366

The chair has been designed to aid disabled persons, bed-ridden patients, and old-age people in defecation. The various components of the chair include a seat with a cavity, a detachable section to cover and uncover the cavity of the seat, a sliding tray and a disposable bag.

HIGHLY LINEAR PSEUDO-RESISTIVE ELEMENT

By – Kulbhushan Sharma, Rajnish Sharma

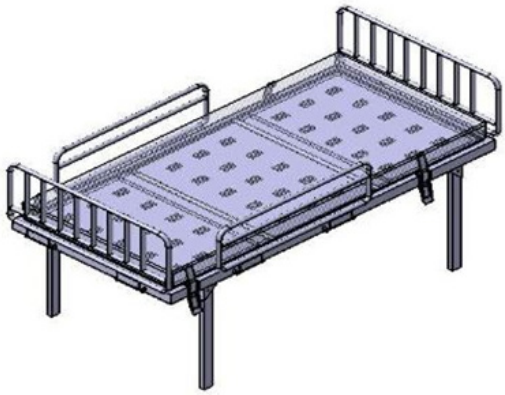
Application No. - 202011019705

A novel pseudo-resistive element has been implemented using a particular topology of MOS transistors and it can provide a highly linear characteristics over a wide range of voltage. A biasing voltage is applied to facilitate operation of the pseudo-resistive element and it is capable of providing enhanced performance against Process Voltage and Temperature (PVT) variations.

HOSPITAL BED

By – Jaskaran Bhullar, Akarshit Aulakh, Surjit Kumar Sha, Varinder Singh, Nitin Kumar Saluja

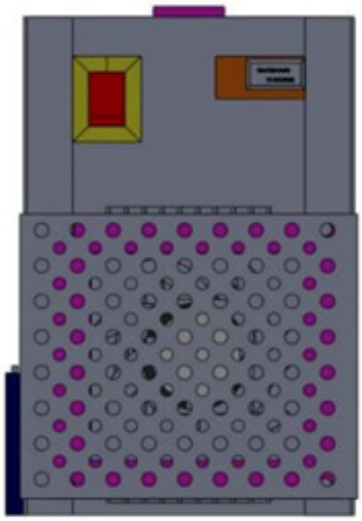
Design Registration No. - 328983-001



HOSPITALITY KIT

By – Sushil Kalra, Sachin Bhogal, Ravi Kapila, S. N. Panda, Naveen Kumar, Simranjeet Singh

Design Registration No. - 328884-001



INSECT REPELLENT FLOOR CLEANER

By – K. R. Ramkumar, Sugasini Ketti Ramkumar

Application No. - 202011026532

This invention proposes a novel antibacterial and antifungal insect repellent floor cleaner comprising of common household ingredients and spices.

KIT FOR ANALYSING PD-1 IMMUNOLOGICAL COMPLEX

By – Varsha Singh

Application No. - 202011024396

It is a biochemical diagnostic kit for the determination of PD-1 immunological complex in a sample. The kit comprises of a dissolution solution comprising of ammonium sulfate, ethylenediaminetetraacetic acid (EDTA), and trifluoroethanol; a reaction medium comprising of copper solution and a base; and adenaturation solution comprising of an acid.

MATCHSTICK HOLDER

By – Nitin Goyal, Sachin Ahuja, Ajay Kumar Sharma, Rakesh Kumar, Nonita Sharma, Ashok Kumar

Design Registration No. - 330225-001

METHOD AND SYSTEM FOR SECURE TRANSMISSION OF DATA IN UNDERWATER NETWORK

By – Nitin Goyal, Mayak Dave, Anil Kumar Verma, Lalit Kumar Awasthi

Application No. - 202011026267

A proposed method for secure transmission of data through a network that comprises of receiving hash

value signed encrypted authentication request from cluster head nodes that are configured to receive data from sensor nodes, decrypting request for each gateway node that is configured to generate authentication confirmation signal, receiving the data from cluster head node wherein data is transmitted to a base station to determine its integrity based on hash value.

MOUSE TRAP

By – Nitin Saluja, Kartik Vij, Rahul Kinra, Rouble Gupta, Chanpreet Singh

Application No. - 201811047766

It is a rotating type mouse trap, wherein mouse enters the opening of the trap and as soon as sensors detects the presence of mouse, the rotary mechanism closes the entry gate to restrict the exit. Once inside the trap, mouse is transported to a different section automatically to allow exit through a dedicated section and there is no need for the user to touch the mouse trap unit during this whole process.

NANOPARTICLE DOPED VERTICALLY ALIGNED LIQUID CRYSTAL DISPLAY

By – Pankaj Kumar, Chinky, Vandna Sharma, Praveen Malik

Application No. - 202011016944

This invention is related to a method of forming vertically aligned liquid crystal display devices using two Indium tin oxide substrates that sandwich a mixture of Zinc Oxide (ZnO) nanoparticles doped nematic liquid crystal of a positive or a negative dielectric anisotropy.

POSITION DETERMINING SYSTEM

By – Shalli Rani, Himanshi Babbar

Application No. - 202011026534

It is a position determining system that comprises of a processing unit, a positioning unit and a GSM module.

PRIORITY DETERMINING SYSTEM FOR ELEVATOR

By – Ashok Kumar, Sachin Ahuja, Nitin Goyal

Application No. - 202011025947

The system is based on the image acquisition and extracting the features from the images. These extracted features are compared against a dataset the determine priority and based on one or more of these priorities the control unit facilitates the movement of the elevator.

PROTECTIVE FACE SHIELD

By – Sagar Juneja, Chanpreet Singh

Design Registration No. - 330407-001

PROTECTIVE CASE

By – Pranav Garg, Pranav Kumar, Puneet Bawa, Virender Kadyan

Application No. - 202011016321

The idea is about protective case for electronic devices especially smartphones; it is equipped with different sensors to detect and protect the devices from any kind of physical damage, the case also comes with air bag like assembly to protect the device from damage if it falls.

SANITIZER DISPENSER

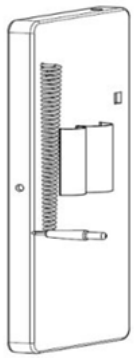
By – Surya Narayan Panda, Simranjeet Singh, Naveen Kumar, Rajesh Kumar Kaushal, Kirti Pradhan, Kailash Kumar Panda, Prasant Kumar Pattnaik, Jyoti Sharma

Design Registration No. - 328985-001

SMART PHONE MOUNTABLE SELFIE CLICKING DEVICE

By – Sagar Juneja

Design Registration Number - 329506-001



STERILIZING AND SANITIZING SYSTEM FOR OBJECTS

By – Anshuman Lal, Charu Khosla, Sachin Ahuja

Application No. - 202011022304

The system that is based on various sets of sensors in order to carry out efficient screening, disinfection, sterilization and sanitations of different types of objects.

STERILIZING APPARATUS

By – Shalli Rani, Mohit Kapoor, Sushil Kalra, Sachin Bhogal, Adhish Singh, Richa Sharma

Application No. - 202011018805

The sterilizing apparatus for chopping board that features a heating source, a steam source and a lamp that are controlled by a control unit, and this apparatus kills the bacteria and infectants from the chopping board.

SURVEILLANCE SYSTEM

By – Kunal Gagneja

Application No. - 202011015297

It is a surveillance system for monitoring the movements of a vehicle. Vehicle is fitted with a system that measures its locomotion attributes and send the data to a satellite. A remote-control unit fetches this locomotion data and use it for monitoring.

SYSTEM AND METHOD TO FACILITATE VIDEO CALLING

By – Ashu Taneja, Nitin Saluja, Deepak Saluja, Varinder Singh, Shalli Rani

Application No. - 202011022733

The system is composed of video calling devices each comprising of a set of antennas for communication. Using the control instructions, the processing unit selects the desired antennas for the desired devices in order to have video calling among them.

SYSTEM FOR REAL-TIME MONITORING OF TREES

By – Sarvesh Tanwar, S. N. Panda, Sachin Ahuja, Vishal Verma, Priyanaka Datta

Application No. - 202011021078

An electronic system that relies on real time monitoring of kinesiological parameters, acoustic parameters and combustion parameters using a set of sensors and generating alarms if their values exceed the pre-determined limits.

SYSTEM AND METHOD FOR CONVERTING EEG SIGNAL TO SPEECH

By – S. N. Panda, Sachin Ahuja, Shalli Rani, Nancy Masih, Vishal Verma

Application No. - 201811048840

In the proposed system EEG signal is captured using EEG sensor and analog front end is used for necessary amplification and filtering. This signal is then sent to the processor where it is compared with the pre-stored audio signals in the database. The comparison outputs the audio signal based on the EEG signal.

SYSTEM AND METHOD FOR NETWORK SECURITY

By – Sumit Badotra, S. N. Panda

Application No. - 202011016945

The system comprises of a processing unit that receives data packets from various network nodes, and it extract traffic attributes from these data packets. These traffic attributes are then compared against the reference traffic attributes in the database and alert is generated if these attributes exceed pre-determined limits.

SYSTEM FOR QUANTIFYING MOVEMENTS OF A SUBJECT

By - Sheifali Gupta, Sarang Sharma, Deepali Gupta, Rupesh Gupta

Application No. - 202011017201

It is a wearable device that is used to quantify movements of any subject by using the data collected by different sensors. It measures any variations in the movements of the subject and generates alerts. It also allows users to input various types of input signals, it determines the pattern and generate set of status signals.

SYSTEM AND METHOD FOR MONITORING CARDIOVASCULAR PARAMETERS OF A SUBJECT

By – Luxmi Sapra, Varun Sapra, Jasminder Kaur Sandhu , Sachin Ahuja

Application No. - 202011017202

The system consists of two-set of sensors, the first set of sensors sense a certain set of parameters of the subject and generate a set of signals that act as trigger for the second set of sensors. This second set of sensors sense some other attributes associated with the subject and generate a set of signals which are then converted into graphical representations of cardiovascular activities. This graphical data can be sent to any computing device for analysis.

SYSTEM AND METHOD FOR FACILITATING DATA FLOW THROUGH AR SIMULATED NODES

By – Chander Pratap Singh, Manisha, Bhanu Sharma, Narinder Pal Singh

Application No. - 202011018804

In this system, AR unit is configured to simulate AR view of a set of nodes wherein user is allowed to configure the nodal attributes through a user interface. The data that is input by the user establishes a communication channel and simulates data flow.

THERMAL SAFETY SYSTEM

By – Rupesh Gupta, Vishal, Sahib Singh, Jatin Sharma, Sheifali Gupta, Harsh Gupta, Utkarsh Upadhyay, Chandan Singh Jaura, Prashant Kashyap

Application No. - 202011015295

It is an electronic safety system for automobiles comprising of thermal and combustion sensors to detect temperature and fire in the vehicles. The system generates alerts and provide information to user in case of fire in the automobile. The system is also composed of GPS and display unit.

TEMPERATURE REGULATING DEVICE

By – Sushil Kalra, Sachin Bhogal, S.N.Panda, Ravi Kapila, Naveen Kumar, Simranjeet Singh, Prasant Kumar Pattnaik

Application No. - 202011017893

It is an efficient, smart, reliable, and cost-effective temperature regulating device that has multiple compartments for holding different objects like hand sanitizer, lighter, wine opener, comb, notepad, face towel, and pen. There is a provision to place both cooling and warming gel packs to maintain appropriate temperature of the face towel.

TRAFFIC MONITORING SYSTEM TO FACILITATE PASSAGE OF EMERGENCY VEHICLES

By – Ashok Kumar, Monika Mangla, Subhash K Shinde, Vaishali Mehta, Megha Bhushan

Application No. - 202011022305

A system to allow rapid and safe movement of traffic at intersections upon arrival of any emergency vehicle. The system consists of microphone to listen to the siren of emergency vehicle and camera unit that detect the presence of emergency vehicle upon hearing the siren. The processing unit then generates a set of control signals to direct to movement of traffic accordingly.

UNMANNED AERIAL VEHICLE (UAV) BASED IMAGING SYSTEM

By – Vishakha Sood, Hemendra Singh Gosain, Sheifali Gupta, Sartajvir Singh

Application No. - 202011025948

The system is proposed for forecasting natural disasters like floods, droughts, landslide etc. and is based on UAV imaging system. Sensors like tracking camera, HD camera, driving unit, altimeter and magnetometer are proposed for the imaging system that are controlled by a processing unit.

WATER PURIFICATION DEVICE

By – Himanshu Jindal, Inderjeet Singh Sandhu, Mansi Chitkara, Surya Narayan Panda

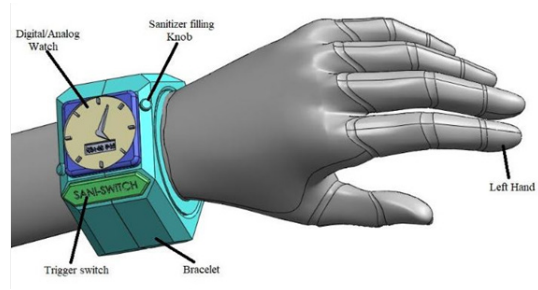
Application No. - 202011017894

It is a water purification device that has inlet for contaminated water from the top and outlet for purified water at the bottom. The device contains large number of filters in a form of layers wherein at least one layer each comprise of sediments, absorbent, micro fibre mesh, and a foam layer to lower the Total Dissolved Solids (TDS).

WEARABLE HAND SANITIZER DEVICE

By – S. N. Panda, Simranjeet Singh, Naveen Kumar, Rajesh Kumar Kaushal, Kirti Pradhan, Kailash Kumar Panda

Design Registration No. - 328984-001



Invited Talks on Innovation to Intellectual Property Protection

Delivered by Dr. S.N. Panda to Spread IPR Awareness in the Region

An innovation is a reliable solution to a particular problem and therefore there are two important element of innovation. First element is a problem that needs to be identified and understood. If we look around carefully, we will find tons of problems that need to be addressed. The second element is a solution to the problem. Now, if we use our creativity, imagination, and intellect in finding a novel solution to particular problem then it can become an invention.

Today a lot of innovation is happening in a large number of academic institutions and universities in India. Students and researchers are working very hard for finding novel solutions for pressing problems they see around them and also the problems faced by the country and the whole world. Despite of so many innovations and inventions that are happening in academia, there is a dearth of awareness about how one should protect his/her novel ideas, innovations, and inventions.

Our novel ideas, innovations and inventions that could change the world are our intellectual property and we must know about intellectual property rights or IPR in order to protect them.

Chitkara University has a very strong IPR Cell by the name of Office of Patent Facilitation, Licensing and Consultancy (OPFLC). Dr. Sachin Ahuja – Director (Research), CURIN is driving this initiative since 2014. So far Chitkara University has filed close to 450 patent applications and 20 patents have been granted to the university. Details of patents filed by the university during April – June 2020 have been included in this issue in a different section.

Dr. S.N. Panda – Director (Research), CURIN, Chitkara University delivered multiple invited talks on IPR at different academic institutions with an objective of spreading IPR awareness in the region. During his talks he discussed about how to convert your ideas into patentable inventions, different types of IPRs that are available, different policies of Government of India with respect to IPR etc.

The details of the talks delivered by Dr. Panda are as follows –

1. On May 19th he delivered a session on Innovation and IPR : With Special Reference to COVID-19. The session was organized by S.A. Jain (PG) College, Ambala City, Haryana and was attended by 1100 faculty members from 20 different states.
2. On May 20th he delivered a talk on IPR Laws and Patent Filling and it was organized by

D.A.V College for Girls, Yamunanagar. About 70 faculty members attended this session.

3. On May 22nd Dr. Panda delivered a webinar on IPR for the delegates of Mata Gujri PG College, Fatehgarh Sahib. He delivered a same talk for students and faculty members of S.D. College, Ambala City, Haryana on May 27th and for MDSD Girls College, Ambala City, Haryana on 29th June 2020.
4. On June 4th he delivered a keynote talk on IPR in IEEE 8th International Conference on Reliability, Infocom Technologies and Optimization (ICIRITO-2020) organized by Amity University, Noida. He also chaired a technical session during the conference.

All his sessions were very well received and also got coverage in local newspapers

एमएड क्षेत्रीय शिक्षा महाविद्यालय की ममूराक्षी बासु तीसरे स्थान पर रही।

फॉर वूमेन की पारुल बाली तीसरे स्थान पर रही।

बौद्धिक संपदा अधिकार विषय पर पेटेंट के बारे में समझाया

भास्कर न्यूज | अम्बाला सिटी

एसएजैन (पीजी) कॉलेज के इंटरनल क्वालिटी एस्योरेंस सैल ने मंगलवार को एक दिवसीय फैकल्टी डिवेलपमेंट प्रोग्राम का ऑनलाइन आयोजन किया। कार्यक्रम का मुख्य विषय बौद्धिक संपदा अधिकार रहा। इसमें भारत के लगभग 20 राज्यों तथा केंद्र शासित प्रदेशों से 1169 प्रतिभागियों ने भाग लिया।

कार्यक्रम की शुरुआत में कॉलेज प्राचार्या डॉ. आभा बंसल ने मुख्य वक्ताओं का स्वागत किया। प्रथम वक्ता के तौर पर चितकारा यूनिवर्सिटी के निदेशक (शोध) डॉ. एसएन पांडा ने अपना वक्तव्य रखा। डॉ. पांडा ने मूल विचार, उसके अभिनव तथा बौद्धिक संपदा पर विचार रखे। उन्होंने व्यवसाय जगत के अन्वेषण व पेटेंट से जुड़े विभिन्न उदाहरण देकर विषय को समझाया। राजीव गांधी राष्ट्रीय बौद्धिक संपदा प्रबंधन संस्थान नागपुर के उप नियंत्रक डॉ. पंकज प्रभाकर बोरकर ने विषय से जुड़े पेटेंट तथा डिजाइन पर विचार रखे। डॉ. रविंद्र पाल ने सभी प्रतिभागियों के सवालों तथा शंकाओं का मुख्य वक्ताओं के समक्ष रखा। दोनों वक्ताओं ने कॉपीराइट, ट्रेडमार्क, पेटेंट व डिजाइन से जुड़े अनेक सवालों का जवाब दिया। कार्यक्रम व तकनीकी व्यवस्था का संचालन डॉ. जयदीप अत्री ने किया। कार्यक्रम के अंत में डॉ. आभा बंसल ने मुख्य वक्ताओं का आभार व्यक्त किया गया। कार्यक्रम के संयोजक डॉ. राजेश चौहान ने सभी प्रतिभागियों, आयोजक टीम तथा माइक्रोसॉफ्ट टीम का धन्यवाद किया।

लॉकडाउन में ई-प्लेटफार्म पर बढ़ी टीचर्स और स्टूडेंट्स की निर्भरता : पांडा

■ डीएवी गर्ल्स कॉलेज में इनोवेशन और बौद्धिक संपदा अधिकार विषय पर वेबिनार का आयोजन

हरिभूमि न्यूज ▶▶ यमुनानगर

लॉकडाउन के दौरान डीएवी गर्ल्स कॉलेज के कंप्यूटर साइंस विभाग की ओर से इनोवेशन और बौद्धिक संपदा अधिकार विषय वेबिनार का आयोजन किया गया। चितकारा यूनिवर्सिटी राजपुरा (पंजाब) के अनुसंधान निदेशक डॉ. सूर्य नारायण पांडा मुख्य वक्ता रहे। कॉलेज प्रिंसिपल डॉ. आभा खेतरपाल व कंप्यूटर साइंस विभाग अध्यक्ष डॉ. रचना सोनी ने संयुक्त रूप से कार्यक्रम की अध्यक्षता की। कार्यक्रम में कॉलेज के 70 टीचर्स ने भाग लिया। डॉ. पांडा ने कहा कि लॉकडाउन के समय में ई-प्लेटफॉर्म छात्र व शिक्षकों के लिए सबसे प्रभावी विकल्प के रूप में उभरा है। आज देश के सभी कॉलेजों व विश्वविद्यालयों द्वारा छात्रों को पढ़ाने के लिए इसका प्रयोग किया जा रहा है। लॉकडाउन के दौरान एकाएक जब सब कुछ बंद हुआ, तो अकादमिक दुनिया पर भी इसका गहरा प्रभाव पड़ा। लेकिन ई-प्लेटफॉर्म ने मुश्किल राह को आसान बना दिया। कहा कि किसी भी देश के विकास के लिए नवाचार बहुत ही आवश्यक है। नवाचार के माध्यम से ही तकनीकी एवं प्रौद्योगिकी का विकास संभव हो पाता है। वास्तविक जीवन के उदाहरणों के माध्यम से नवाचार और आविष्कार की अवधारणा को विस्तार से समझाया।

अपने विचार व्यक्त करती प्राचार्या।

सरकार ने कारगर कदम उठाए

डॉ. रचना सोनी ने कहा कि लॉकडाउन के दौरान टीचर्स व स्टूडेंट्स को ऑन लाइन प्लेटफार्म का बखूबी इस्तेमाल कर रहे हैं। सरकार ने भी इस दिशा में कारगर कदम उठाए हैं। डॉ. आभा खेतरपाल ने कहा कि इस प्रकार के वेबिनार का मुख्य उद्देश्य टीचर्स को ऑनलेज को अपडेट करना रहा। साथ ही उन्हें नए ई-प्लेटफार्म के बारे में अवगत कराया गया। ताकि वे विद्यार्थियों के साथ उन्हें साझा कर सकें।

एक विचार आविष्कार का बीज है : एसएन पांडे

एमजी कालेज में इनोवेशन और इंटलैक्चुअल प्रापर्टी राइट्स पर वैबिनार

फतेहगढ़ साहिब, 23 मई (लक्की): माता गुजरी कालेज में इनोवेशन और इंटलैक्चुअल प्रापर्टी राइट्स विषय पर एक वैबीनार हुआ। जिसमें चितकारा यूनिवर्सिटी के डायरैक्टर रिसर्च एसएन पांडे ने इस वैबीनार दौरान अपने विचार रखे। कालेज के डायरैक्टर प्रिंसिपल डा कश्मीर सिंह ने मुख्य वक्ता का स्वागत किया। डा. सिंह ने अध्यापकों को अपने खोज कार्य उच्च दर्जे के करने के लिए प्रेरित करते कहा कि वह अपनी खोज और नवीनतम तकनीकें विकसित कर रजिस्टर करवाने की प्रक्रिया भी अपनाएं। यह भी कहा कि इनोवेशन और इंटलेक्चुअल प्रापर्टी राइट्स कानूनी अधिकार हैं जो औद्योगिक, वैज्ञानिक, साहित्यक या कलात्मिक क्षेत्रों में एक व्यक्ति को बौद्धिक गतिविधि के नतीजे के तौर पर प्राप्त होते हैं। यह उस व्यक्ति के ज्ञान को दिखाता है जो पेटेंट या कॉपीराइट के रूप में हो सकता है।

माता गुजरी कालेज में इनोवेशन और इंटलैक्चुअल प्रापर्टी आइट्स विषय पर एक वैबीनार का दृश्य।

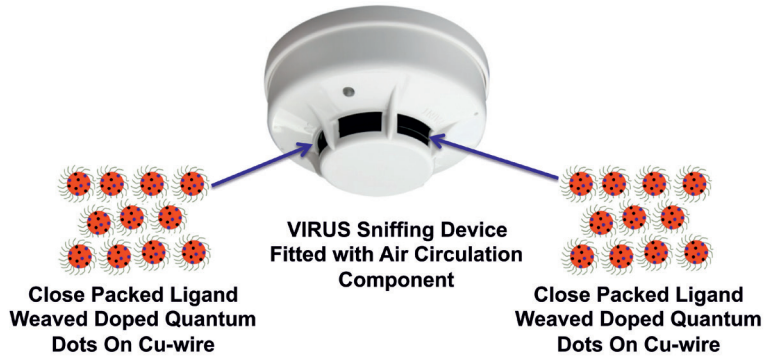
इस अवसर पर प्रो मुकेश कुमार प्रमुख, पीजी कोर्सेस कंप्यूटर विज्ञान विभाग ने वैबीनार करवाने के उद्देश्य बताया। डा हरजीत सिंह प्रमुख यू.जी. कोर्सिस कंप्यूटर विज्ञान विभाग ने डा. एसएन पांडे की जान पहचान करवाते हुए उनके उत्तम खोज कार्यों बारे भी बताया। डा. पांडे ने सैशन की शुरूआत नवीनता की परिभाषा के साथ करते कहा कि एक विचार आविष्कार का बीज है। उन्होंने नवीनता के संकल्प को असली जीवन की कई उदाहरण देते कहा कि एक विचार और आलोचनात्मक सोच एक नये अविष्कार की तरफ लेकर जाती है। इस वैबिनार में डीन अकादमिक डा. विक्रमजीत सिंह संधू, वाइस प्रिंसिपल डा राजिंदर कौर, डा हरबीन कौर के अलावा वैबीनार में कालेज के तकरीबन 90 अध्यापकों ने हिस्सा लिया।

दैनिक सवेरा Sun, 24 May 2020
epaper.dainiksaveratimes.org/c/52178868

Air Purifier that Kills Viruses

A Proposed Solution from CURIN

The pandemic of COVID-19 has brought a major halt in our day-to-day life and is affecting every single move we do to live. The great risk that virus poses to the human being has also presented an opportunity for the researchers to propose innovative solutions to tackle various problems associated with the virus. A team of researchers at CURIN, Chitkara University, Punjab comprising of Dr. Mohit Kapoor (Assistant Professor) along with his PhD scholar Adhish Singh is working on one such solution. They have proposed an air purifier that can capture and kill different types of viruses using Doped Quantum Dots based air filter. The material for the proposed filter has been synthesized in the university and can be manufactured using organic waste. This purifier can be installed in different places ranging from homes, offices to public places like railway stations, airport etc.

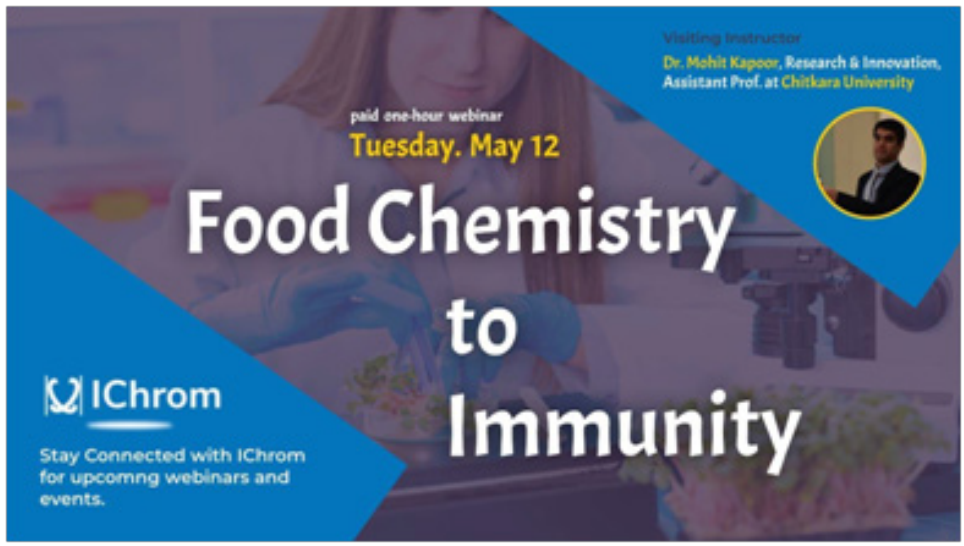


Dr. Mohit Kapoor has entered into a collaboration with Prof. Nikodem Kuznik from Silesian University of Technology, Poland for the advanced synthesis of Quantum Dot-Nanotube Conjugates for their antiviral applications.

Dr. Mohit Kapoor delivered three webinars during April- June 2020

On May 1, Dr. Mohit delivered a webinar for the students and faculty members of Chitkara University on the topic Chemistry Behind the Role of Wonder Foods as Antiviral Agents – Guide to Tackle COVID19. The webinar was attended about 50 participants in which Dr. Mohit talked about immunity booster food items, benefits of organic food etc.

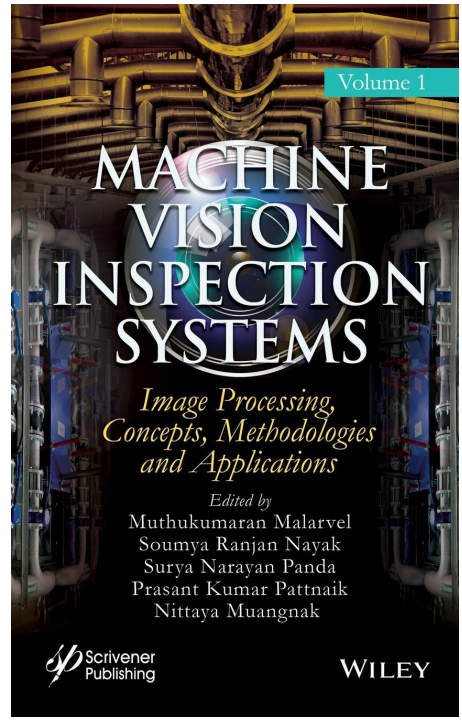
Dr. Kapoor was invited by IChrom Labs Chandigarh and Sri Sai Group of Institutes to deliver a webinar on Food Chemistry to Immunity on May 12 and June 12 respectively. The focus of the webinar was on how our regular diet have significant impact on our immunity. He emphasized on the use of food items that are having quercetin, ascorbic acid, alliin, curcuminetc. in the regular diet. Total attendance during these two talks was 150.



Book on Machine Vision for Inspection Systems by Wiley – Scrivener

Edited by Dr. Muthukumaran M. from Chitkara University

Machine Vision Inspection Systems (MVIS) is a research field for industrial applications that falls under a broad spectrum of Image Processing and Computer Vision. MVIS has gained a lot of popularity over the manual inspection systems as manual systems suffer from problem of false assessment. The techniques and methods of digital image processing are used in MVIS. This book that has been published by Wiley – Scrivener on Machine Vision for Inspection Systems is focussing on concepts and methodologies of image processing that can be used for MVIS. Muthukumaran Malarvel – Associate Professor, CURIN, Chitkara University, Punjab is one of the editors of this book.



About the Editor

Dr. Muthukumaran Malarvel is working as Associate Professor in Chitkara University Research and Innovation Network (CURIN), Chitkara University, Punjab. He has over 17 years of experience in IT industry, teaching and research. He did his PhD in Digital Image Processing and then he got senior research fellowship from the Board of Research in Nuclear Sciences (BRNS), India. His research interests include digital image processing, machine vision systems, image statistical analysis & feature extraction, and machine learning algorithms.

There are a total of 10 chapters in the book on the topics including Land-Use Classification with Integrated Data, Indian Sign Language Recognition, Stored Grain Pest Identification Using an Unmanned Aerial Vehicle (UAV), Object Descriptor for Machine Vision, Flood Disaster Management, Temporal Color Analysis of Avocado Dip, Image and Video Processing for Defect Detection, Detection of Asymptomatic Diabetic Retinopathy, Offline Handwritten Numeral Recognition and A Review on Phishing—Machine Vision and Learning Approaches.

The book features latest trends and methodologies in the area of inspection systems using computer vision and image processing. Young researchers who are working in the area of image processing would find this book useful.

Sessions Conducted and Attended by Dr. Muthukumaran M. during April – June 2020

- He delivered three webinars on the topics Mastering the Art of Scientific Publication (organized by Arasu Engineering College, Tamil Nadu), Art of Writing a Best Research Paper (organized by Dr. NGP Institute of Technology, Tamil Nadu) and Simple Steps of Writing a Research Article (organized by Jairams Arts and Science College, Tamil Nadu).
- He attended JCR-South Asia Training and Certification Program conducted by Web of Science and Clarivate.
- He participated in two webinars titled AI - ML Advancements and Potential Applications and Interdisciplinary Projects in Assistive Technology Engineering organized by IEEE Madras Section. He also participated in a workshop on Designing IoT Based application to fight COVID-19 organized by The Institute of Engineering Technology (IET).

Keynote Talk on IoT Data Analytics as a Solution in Pandemic

Delivered by Dr. Sachin Ahuja during IEEE Sponsored Conference

Dr. Sachin Ahuja was invited as keynote speaker for a technical session in IEEE 8th International Conference on Reliability, Infocom Technologies and Optimization (ICRITO'2020). He delivered a talk on IoT & Data Analytics as a solution in Pandemic. Research scholars, faculty members and session experts from various countries attended the talk that addressed the some of the key issue of COVID-19 pandemic. Dr. Sachin discussed about novel methods of checking and preventing the spread of virus using IoT and Data Analytics. Few of the solutions proposed during the talk were RFID based tracking methods of COVID-19 suspects, Sensor based devices for home quarantine patients, Drones and robots for sanitization, Mobile app-based data analytics for contact tracing of confirmed cases etc.


IEEE 8TH INTERNATIONAL CONFERENCE ON RELIABILITY, INFOCOM TECHNOLOGIES AND OPTIMIZATION (ICRITO'2020)
(TRENDS AND FUTURE DIRECTIONS)

IEEE

IEEE CONFERENCE RECORD NUMBER 48877
JUNE04-05, 2020 / AMITY UNIVERSITY, NOIDA, INDIA

ICRITO

Technical Sessions

Session – 16

Keynote Speaker: Dr. Herald Noronha, *Middle East College, OMAN*
Topic: Digital Data Security- The future reinvented

Keynote Speaker: Dr. Sachin Ahuja, *Chitkara University, India*
Topic: IoT Data Analytics as a solution in Pandemic

Dr. Sachin Ahuja also served as Co-Chair in the International Conference on Information Management & Machine Intelligence (ICIMMI 2020) that was held in July 2020 at Poornima Institute of Engineering & Technology, Jaipur. The conference was sponsored by AICTE and the conference proceedings will be published in Scopus indexed publication.

Technical Sessions Chaired by Our Faculty Members in International Conferences

Dr. Rakesh Ahuja – Professor (CURIN), Chitkara University, Punjab was invited as Technical Session Chair in one of the sessions in the International Conference on Reliability, Infocomm Technologies and optimization (ICRITO' 2020) organized by Amity University during June 4-5, 2020. He reviewed four papers in the conference as well. Also, in the same conference his PhD Scholar Ms. Purnima presented a research paper titled Secure and Robust Watermarking Scheme based on Motion Features for Video Objects.

Dr. Ashok Kumar – Assistant Professor (CURIN), Chitkara University, Punjab chaired a technical session in the International Conference on Applications of AI and Machine Learning held on 21-22 May, 2020 at Punjabi University, Patiala.

180 Faculty Members across India Participated in AR/VR Workshop

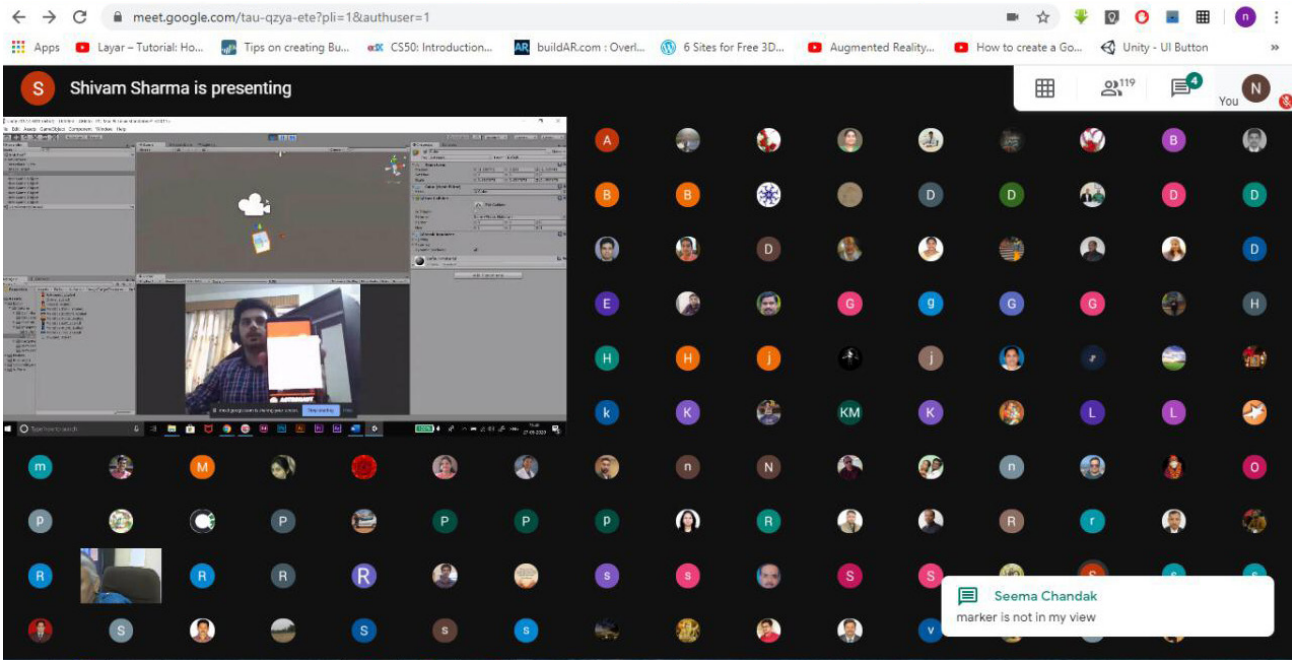
Organized by AR/VR Lab, Chitkara University, Punjab

A five-day online hands-on Faculty Development Program (FDP) on Augmented and Virtual Reality was conducted by Augmented & Virtual Reality (AR/VR) Lab, Chitkara University Research and Innovation Network (CURIN), Chitkara University, Punjab during May 25-29, 2020. The FDP was sponsored by AICTE Training and Learning (ATAL) Academy and was organized in collaboration with UIET, Kurukshetra University. A total of 180 faculty participants from all over India attended the workshop.

This FDP introduced Unity 3D as a gaming platform, 3D modelling, designing user interface and 2D game development to the participants. The area of augmented and virtual reality was also introduced with a focus on Vuforia SDK and its integration with Unity 3D. After attending this workshop participants would be able to develop their own 2D games and different Augmented Reality and Virtual Reality applications.

The resource persons for the program were: Ms. Neha Tuli (Asst. Professor, CSE), Ms. Bhanu Sharma (Asst. Professor, ECE), Ms. Amanpreet Kaur (Asst. Professor, ECE), Ms. Shubham Gargrish (Asst. Professor, ECE), Mr. Gurwinder Singh (M.E. Scholar), Ms. Manisha (M.E. Scholar), Mr. Harun Faridi (M.E. Scholar), Mr. Shivam Sharma (Developer, AR/VR Lab) and Mr. Narinder Pal Singh (Lead Game Developer, AR/VR Lab).

All these resource persons are experts from AR/VR Lab of Chitkara University, Punjab. In this lab the research group headed by Dr. Archana Mantri – Vice Chancellor, Chitkara University, Punjab works in the field of Educational Research, Training and Industrial Management. The group focuses on the pedagogical improvements in K12 and engineering education. Some of the solutions that are being developed by this lab include – a solution for Military



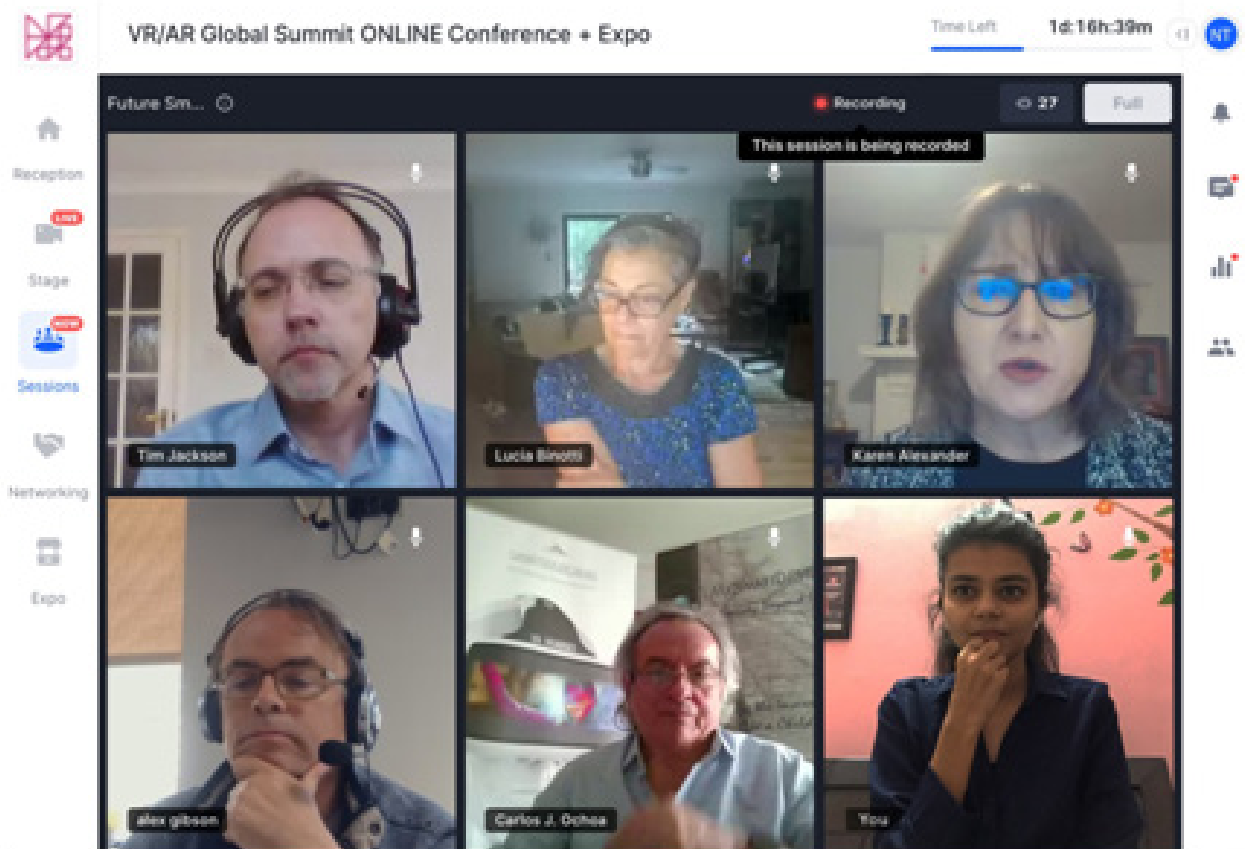
training by creating AR/VR based war like environment, virtual driving simulators for test driving of cars, solution for training of midwives for delivery of a new born, mathematical simulations by combining the artificial intelligence and augmented reality and lot more. Some of the tools and technologies that are available in this lab include Unity 3D and Unreal gaming engines; Modeling softwares like Maya, 3D Max, Blender, and Photoshop; Vuforia and EasyAR SDKs; Google Cardboard and HTC Viveheadsets; Leap Motion Controller and Kinnect gesture recognition systems.

AR/VR Lab at Chitkara University

Three research papers from AR/VR lab got published in reputed Elsevier Journal entitled Procedia Computer Science during April – June 2020. Dr. Archana Mantri and Neha Tuli co-authored two of these papers titled Usability Principles for Augmented Reality based Kindergarten Applications and Experience Fleming's rule in Electromagnetism Using Augmented Reality: Analyzing Impact on Students Learning. The third paper was co-authored by Shubham Gargrish, Dr. Archana Mantri and Deepti Prit Kaur and it was titled Augmented Reality-Based Learning Environment to Enhance Teaching-Learning Experience in Geometry Education.

Faculty members and scholars of AR/VR lab participated in various conferences, workshops, webinars during April-June 2020

1. Dr. Amanpreet Kaur participated in two international conferences - International Conference on Communication Systems and Network Technologies (CSNT-2020) organized by IEEE MP Sub Section with the support of IEEE Bombay Section during April 10-12, 2020 and IEEE 8th International Conference on Reliability, Infocom Technologies and Optimization organized by Amity University, Noida during 4-5 June 2020. She also attended a webinar on Artificial Intelligence and Data Sciences on June 5 which was organized by Thangavelu Engineering College, Chennai.
2. Shubham Gargrish, Bhanu Sharma and Dr. Amanpreet Kaur attended FDP on Managing References and Citations using Mendeley on 10 June that was organized by CURIN, Chitkara University, Punjab. Shubham also completed a course on Introduction to Augmented Reality from Coursera.
3. Bhanu Sharma, Neha Tuli, Shivam Sharma and Dr. Amanpreet Kaur attended a webinar on How to Write a Great Research Paper, and get it Accepted by a Good Journal by Dr Anthony Newman, Senior Publisher, Elsevier June 3. Bhanu Sharma participated in FDP on LaTeX that was organized by Department of Applied Sciences, Chitkara University during April 23-26. She participated in two webinars organized by Department of Applied Sciences – 'Optimization Techniques: An Introduction with Applications' and 'Water, Sanitation, Hygiene, and Waste Management during COVID 19'. She also



participated in state level online quiz competition on Mobile Application Development held on 6 June, 2020 under Computer Society of India.

4. Dr. Amanpreet Kaur, Bhanu Sharma and Shubham Gargrish participated in Sahayak Virtual Hackathon 1.0 organized by University of Petroleum and Energy Studies (UPES), Dehradun during June 25-26, 2020. Dr. Amanpreet and Bhanu also participated in VC Lecture series on Possible Do's and Don'ts for Publishing Research Papers in High Impact Journals that was delivered by Dr. Rajnish Sharma – Dean (Research), Chitkara University on June 10.
5. Gurwinder Singh, Shubham Gargrish, Neha Tuli and Shivam Sharma attended a two-day webinar on Community and Research held during 29-30 June which was organized by Department of Applied Sciences, Chitkara University, Punjab.
6. Narinderpal Singh, Gurwinder Singh, Neha Tuli, Shubham Gargrish, and Shivam Sharma attended a Master Class on June 22 by ED Hooks who is world renowned animation acting coach. Mr. Narinderpal Singh attended Fourth BigBrain Launch of the Helmholtz International BigBrain Analytics and Learning Laboratory in June 26. The event featured invited talks covering recent work on the BigBrain data. He also participated in the Neural Simulation Technology and NEST Simulator Conference 2020 that was held during June 29-30.
7. Neha Tuli, Gurwinder Singh, Shivam Sharma, Dr. Amanpreet Kaur and Bhanu Sharma attended a webinar on Gamification in Computer Science by Dr. Silvester Czanner from Liverpool University, UK on June 4. Neha and Shivam attended India's first Augmented Reality Lens creation hackathon conducted by Snapchat India during May 9 – June 6. They also attended the AR/VR Global Summit from June 1 to 4, 2020 which was organized by the VR/AR Association. Neha and Shivam completed capstone project title Game Design Document: Define the Art & Concepts from Coursera. Neha also completed two more courses from Coursera titled Visual Elements of User Interface Design and Character Design for Video Games.

Individual Contributions and Achievements

of CURIN faculty members and scholars

Young Achiever Award Won by Dr. Nitin Goyal

Institute of Scholars (InSc) presented Young Achiever Award to Dr. Nitin Goyal - Associate Professor (CURIN), Chitkara University, Punjab during InSc Awards 2020. The award is given for research excellence to a young research who is below the age of 40.

Two Scholars from CURIN completed their PhDs

Amanpreet Kaur and Kulbhushan Sharma have completed their PhD degrees. The PhD topic of Amanpreet Kaur was An Efficient Hybrid Tracking for Virtual and Augmented Reality Applications and that of Kulbhushan Sharma was Design of Neural Amplifier with Low Power and Low Noise using Non-Conventional Techniques.

Our Scholars Participated and Won in Several Competitions

- A team comprising of Gurwinder Singh (M.E. Scholar), Neha Tuli (PhD Scholar) and Shivam Sharma (Project Manager) from Augmented & Virtual Reality Lab has won a funding of INR 250,000 for their project titled Mano-Aid. They submitted their project idea to NOVATE+ 2020 – A national level competition organized by Chitkara University to find innovative solutions to COVID-19 challenges. This project was among the four other projects that have won funding from NewGen IEDC through NOVATE+ 2020. Mano-Aid is a VR based system that runs on a smartphone and provides virtual cognitive behavioral therapy to mental health patients through an electronic glove by monitoring physiological signals.

  In the same competition Neha Tuli and Shivam Sharma jointly submitted three more project ideas titled YogVR, GoPure+ and CovidFighter and they made it to the final round of the competition.

- A team from CURIN, Chitkara University comprising of M.E. and PhD scholars - Vishal Verma, Harsha Chauhan, Udit Jindal, Huma Naz, Vaishali Bhatia, Neha Sharma and mentored by Dr. Deepali Gupta (Professor, CURIN) and Dr. Sheifali Gupta (Professor, CURIN) has been selected in the second round of Smart India Hackathon (SIH) 2020. They have submitted their project video in the second round and are waiting for the results. The name of their team in the competition is Techdroid and their idea is related to husk aspiration process and using the husk as raw material in industries.

- Another team named Phoenix mentored by Dr. Deepali Gupta and Dr. Sheifali Gupta comprising of research scholars - Vishal Verma, Udit Jindal, Anchit Shrivastav, Aacham Garg and Nandita Katoch participated in Virtual Hackathon titled Sahayak 1.0 organized by UPES Dehradun during June 25-26, 2020. This team competed against 65 other teams in the competition and reached the final round where they won the title of Most Innovative/Fresh Idea. Their idea was related to providing one-stop medical solutions and facilities to differently abled people during COVID-19 pandemic.

Webinars and Talks delivered from IoT & Cloud Computing Lab of CURIN

Dr. Naveen Kumar and Dr. Rajesh Kumar Kaushal - Assistant Professors (CURIN) were invited as speakers in a Faculty Development Program on Education through Virtual Classrooms, MOOCs and E-Learning Technologies in collaboration with Wakalet under Paramarsh Scheme of UGC for Mentee Institutes. The webinar was held during May 20-21 and was attended by 107 participants.

Dr. Rajesh Kumar Kaushal – Assistant Professor (CURIN) was invited by A.S. College, Khanna City (affiliated to Panjab University, Chandigarh) to deliver a webinar on the topic Google Classroom on May 31, 2020. More than 60 participants attended the session that covered how to conduct online classes, sharing assignments with the students, conducting online exams, and evaluating them on Google Classroom Platform.

Dr. S.N. Panda – Director (Research) heads the IoT & Cloud Computing Lab at CURIN, Chitkara University.

FDP delivered by Dr. Nitin Goyal on the topic Research and Innovation

Dr. Nitin Goyal delivered a Faculty Development Program (FDP) on the topic Research and Innovation that was organized by Sri Sai Group of Institutes from during June 5-9, 2020. The program was attended by 285 participants from all over the country and the topics that were covered during the session include Foundation of research, Research design, Multi-objective optimization, Hybrid optimization, Research paper writing skills, Journal selection and Plagiarism checking. The workshop was very comprehensive and was very well received by the participants.

In addition to delivering a FDP, Dr. Nitin also attended a few webinars and FDP during April – June 2020. Details of these events that he attended are as follows – Five-day FDP on Applications of Machine Learning and Deep Learning (organized by Raj Kumar Goel Institute of Technology, Uttar Pradesh), Two-day Webinar on Community and Research (organized by Chitkara University, Punjab) and three webinars organized by Sri Sai Group of Institutes, Punjab titled E-Content Dissemination and Collaborative Learning using Wakelet, Quadrants of MOOCs & E-Content Development and Students Internship Program Powered by Spoken Tutorials IIT Bombay.

Editorial and Reviewer Roles Performed by Dr. Nitin Goyal

Dr. Nitin Goyal - Associate Professor (CURIN), Chitkara University, Punjab has joined the editorial board of International Journal of Electrical, Electronics, & Computer Science and Engineering that is published by IGI Global. He is going to be one of the editors of the book titled Energy Efficient Underwater Wireless Communications and Networking to be published by IGI Global. He has also reviewed two papers for International Journal of Communication Systems published by Wiley.

Research Proposals Submitted by CURIN Faculty Members

Dr. Partha Khanra – Assistant Professor has submitted two project proposals for funding. The details of these project proposals are as follows –

1. A project proposal of INR 2,644,620 has been submitted to Start-up Research Grant for the project titled Development of High Energy Density Graphene Quantum Dot/Binary Metal Composite Flexible Supercapacitor for Pulse Power Application.
2. Dr. Partha along with his team comprising of Dr. Ramkumar Ketti Ramachandran (Associate Professor, CURIN), Dr. Pankaj Kumar (Professor, CURIN) submitted a project titled Manufacturing of Echo-friendly Personal Hygiene Products from Crops-Residues to Solve Major Threats to the Environment for funding support of INR 4,866,000 to Biotechnology Industry Research Assistance Council.

Dr. Harjeet Singh – Assistant Professor has submitted following three projects for funding –

1. Project titled Monitoring, Analysis and Correlating the Effect of Climate Change on Landslide Stability and Glacial Retreat in the Himachal Pradesh (Mandi-Kullu-Rohtang pass area) using SAR Interferometry has been submitted for a funding support of INR 47.77 Lacs to Ministry of Electronics & Information Technology, Government of India, New Delhi, India.
2. Project titled TyD-2 An Integrated personalized e-Health Tool for Prediction of Multiple Organ Dysregulation and Forecast Health Risk Events in Type- 2-Diabetes Patients has been submitted for a funding support to Department of Biotechnology, Ministry of Science and Technology, Government of India, New Delhi, India.
3. Dr. Ashok Kumar, Dr. Harjeet Singh and Dr. Nitin Goyal have submitted a project titled Fund for Improvement of S&T Infrastructure in Universities and Higher Educational Institutions (FIST) to DST.

List of Publications

CURIN faculty members and scholars have published research papers/book chapters in SCI and Scopus indexed journals, conferences, and books. This alphabetically sorted list contains all those publications that have been indexed in Scopus during April – June 2020.

- A. Bansal, A. Tewari, P. Aggarwal and A. Sharma, "Study of Buyer Contentment on Online Banking: A Case Study of Tricity Chandigarh,"International Journal of Scientific & Technology Research,vol. 9, pp.175-178, 2020
- A. Bedyal, A. Kunti, S. G. Menon, V. Kumar and H. Swart, "Red Emitting Non-Rare Earth Doped $LiMgBO_3$ Phosphor for Light Emitting Diodes,"Journal of Alloys and Compounds, vol. 830, pp 1-11, 2020.
- A. Sharma, L. Mathew, S. Chatterji and D. Goyal, "Artificial Intelligence-Based Fault Diagnosis for Condition Monitoring of Electric Motors,"International Journal of Pattern Recognition and Artificial Intelligence, 2020.
- D. P. Singh and M. Sharma, "A UWB MIMO Antenna with Circular Ring Slotted Dual Notched Band High Isolation between Two Input Ports for Wireless Network Applications,"in 2020 10th International Conference on Cloud Computing, Data Science & Engineering (Confluence),pp. 200-204, 2020.
- H. Naz and S. Ahuja, "Deep Learning Approach for Diabetes Prediction using PIMA Indian Dataset,"Journal of Diabetes & Metabolic Disorders,vol. 19, pp. 391-403, 2020.
- H. Singh, R. Sharma, R. Kumar, K. Verma, R. Kumar and M. Kumar, "A Benchmark Dataset of Online Handwritten Gurmukhi Script Words and Numerals,"in International Conference on Computer Vision and Image Processing,pp. 457-466, 2019.
- I. Sharma and K. Ramkumar, "Routing Methods for Wireless Networks Using MIMO Support: A Survey and Future Scope,"in 2020 10th International Conference on Cloud Computing, Data Science & Engineering (Confluence), pp. 469-473, 2020.
- J. Madan, R. Pandey, R. Sharma, and R. Chaujar, "Investigation of Electrical/Analog Performance and Reliability of Gate Metal and Source Pocket Engineered DG-TFET,"Microsystem Technologies, 2020.
- M. Chitkara, R. K. Sindhu, I. Singh, D. Kumar, I. S. Sandhu and S. Arora, "Formulation and Evaluation of Essential Oils based Liquid Herbal Hand Wash,"Research Journal of Pharmacy and Technology,vol. 13, pp. 1917-1920, 2020.
- M. Sharma, "Design and Analysis of Multiband Antenna for Wireless Communication,"Wireless Personal Communications,vol. 114, pp. 1389–1402, 2020.
- M. Sharma, V. Vikas and N. Kumar, "RF PIN Diodes Triggered Frequecny Reconfigurable Multiband (UMTS/Bluetooth/WiMAX) Antenna for Applications in Wireless System,"in 2020 7th International Conference on Signal Processing and Integrated Networks (SPIN),pp. 307-311, 2020.
- N. Bhatia and M. Sharma, "A CPW-Fed Square Monopole Triple Notch Band Superwideband Antenna for Wireless Communication Applications and Optimization by using Artificial Intelligence (Back Propagation Model),"in 2020 10th International Conference on Cloud Computing, Data Science & Engineering (Confluence),pp. 464-468, 2020.
- N. Kumar, P. Kumar and M. Sharma, "Compact Dual Notched Band Monopole Antenna and Analysis in Frequency/Time Domain for UWB Wireless Applications,"in 2019 4th International Conference on Information Systems and Computer Networks (ISCON),pp. 763-767, 2019.
- N. Sharma and R. K. Ramachandran, "Security Challenges for Water Distribution System Using Supervisory Control and Data Acquisition (SCADA),"in 2019 Fifth International Conference on Image Information Processing (ICIIP),pp. 234-239, 2019.
- P. K. Katkuri, A. Mantri and S. Anireddy, "Innovations in Tourism Industry & Development Using Augmented

Reality (AR), Virtual Reality (VR)," in TENCON 2019-2019 IEEE Region 10 Conference (TENCON),pp. 2578-2581, 2019.

- P. Mahajan and J. Kaushal, "Phytoremediation of Azo Dye Methyl Red by Macroalgae Chara Vulgaris L.: Kinetic and Equilibrium Studies,"Environmental Science and Pollution Research, vol. 27, pp. 1-13, 2020.
- P. Sharma, K. Sharma, H. Jatana, J. Madan, R. Pandey and R. Sharma, "A 1.1 mu W Biopotential Amplifier based on Bulk-Driven Quasi-Floating Gate Technique with Extremely Low-Value of Offset Voltage,"Analog Integrated Circuits And Signal Processing,vol.103, pp. 303-313, 2020.
- R. Dogra, S. Rani, and B. Sharma, "Two-Level Data Dissemination for Energy-Efficient Routing in IoT-Based Wireless Sensor Network," in Proceedings of International Conference on IoT Inclusive Life (ICIIL 2019),pp. 127-142, 2020.
- R. Sharma, S. Rani, and S. Tanwar, "Machine Learning Algorithms for Building Recommender Systems,"in 2019 International Conference on Intelligent Computing and Control Systems (ICCS),pp. 785-790, 2019.
- S. Badotra and S. N. Panda, "SNORT based Early DDoS Detection System using Opendaylight and Open Networking Operating System in Software Defined Networking,"Cluster Computing, 2020.
- S. Bhogal, S. Kalra, D. Puri and S. Ahuja, "Evaluating the impact of Atmospheric Elements on Behavioral Intentions of Indian Customers,"International Journal of Advanced Science and Technology,vol. 29, pp. 3148-3163, 2020.
- S. Juneja and P. Joshi, "Design and Development of a Low Cost and Reliable Writing Aid for Visually Impaired Based on Morse Code Communication,"Technology and Disability,vol. 32, pp. 59-67, 2020.
- S. N. Panda and Shanu Bhardwaj, "A Roadmap of Challenges for OpenFlow-SDN Based IoT Networks,"International Journal of Advanced Science and Technology,vol. 29, pp. 947-961, 2020.
- S. Tiwari, S. Kumar and K. Guleria, "Outbreak Trends of Coronavirus Disease–2019 in India: A Prediction,"Disaster Medicine and Public Health Preparedness, 1-6, 2020.
- T. K. Bhatia, R. K. Ramachandran, R. Doss and L. Pan, "A Review of Simulators used for VANETs: The Case-Study of Vehicular Mobility Generators," in 2020 7th International Conference on Signal Processing and Integrated Networks (SPIN),pp. 234-239, 2020.
- V. Dhasarathan, T. K. Nguyen, M. Sharma, S. K. Patel, S. K. Mittal and M. T. Pandian, "Design, Analysis and Characterization of Four Port Multiple-Input-Multiple-Output UWB-X Band Antenna with Band Rejection Ability for Wireless Network Applications,"Wireless Networks, vol. 26, pp. 4287–4302, 2020.
- V. Malik, T. Sharma, and M. Sharma, "A Multiband (WWAN/Bluetooth/WiMAX) Square Monopole Antenna with Simple Structure for Wireless Communication System Applications and Optimization by using Artificial Intelligence,"in 2020 10th International Conference on Cloud Computing, Data Science & Engineering (Confluence),pp. 440-444, 2020.
- V. Sood, H. S. Gusain, S. Gupta, A. K. Taloor, and S. Singh, "Detection of Snow/Ice Cover Changes Using Subpixel-based Change Detection Approach over Chhota-Shigri Glacier, Western Himalaya, India,"Quaternary International, In Press, 2020.
- V. Sood, S. Gupta, H. S. Gusain, and S. Singh, "Performance Assessment of Different Topographic Correction Techniques over Subpixel Classification,"in 2019 Fifth International Conference on Image Information Processing (ICIIP),pp. 536-541, 2019.

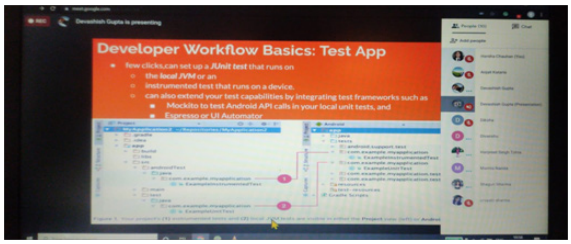
17 Consultancy Projects during April – June 2020

CURIN facilitated 17 consultancy projects that have been carried out by various faculty experts from different departments of the university. Most of these projects were carried out for industry and a few of them were for skill development through virtual training programs. Titles of some of these consultancy projects are Workshop on Art of Writing a Research Paper; COVID-19 UNICEF CRA Project; Coordination of Clinical Trial Protocol Specification, IEC Approval, CTR, Clinical Study of Product VIROWIN; Managing Short Term Financing and Doing Market Research for Business Expansion etc. As per the consultancy policy of Chitkara University, 90% of the consultancy fee is retained by the project heads.

Other Relevant Research and Development Activities

CURIN Members Organized and Attended Various FDPs During April – June 2020

- Dr. Deepali Gupta – Professor (CURIN) along with her research scholar Harsha Chauhan organized a hands-on session on Android on May 21. The session covered topics like fundamentals of android applications, building blocks of android software and hands-on practise session. Mr. Devashish Kumar AWS Certified Solutions Architect from WhiteHat JR. Mumbai, India also shared his expertise with the participants who were mainly the M-Tech students.



- Dr. Rajnish Sharma – Dean (Research), CURIN, Chitkara University delivered a webinar on Possible Do's and Don'ts for Publishing Research Papers in High Impact Journals on June 10. The objective of webinar was to sensitize the research community about various important aspects of writing a good research article, selection of a relevant journal and carrying out impactful research. The session was attended by a large number of internal as well as external participants.
- Dr. Rajesh Kaushal and Dr. Naveen Kumar organized and delivered a FDP on Managing References and Citations Using Mendeley on June 10. Both internal as well as external participants attended the session.
- Dr. Ashok Kumar and Dr. Kalpana Guleria - Assistant Professors (CURIN), Chitkara University, Punjab attended a five-day national level FDP on Research and Innovation organized by Sri Sai Group of Institutes, Punjab during June 5-9, 2020. Dr. Ashok also attended two webinars organized by Chitkara University – A two-day webinar on Fuzzy Linear Programming Problems and its Applications in Sciences and Engineering held during June 17-18, 2020 and a two-day webinar on Community and Research held during June 29-30.
- Dr. Deepali Gupta attended a two-week program on Latex that was organized by Sri Sai College of Engineering & Technology, Badhani Pathankot in association with IIT Bombay Spoken Tutorial (An initiative of National Mission on Education through ICT, MHRD, Govt of India) during March 30 – April 13.

- Dr. Harjeet Singh – Assistant Professor (CURIN) attended three FDPs titled Faculty Development Program on Research and Innovation (June 05-09, 2020), Optimization Techniques: An Introduction with Applications (June 12-13, 2020) and Fuzzy Linear Programming Problems and its Applications in Science and Engineering (June 17-18, 2020).
- Dr. Kalpna Guleria – Assistant Professor (CURIN) attended various webinars and FDPs. The details of these programs that she attended are as follows – a webinar on COVID-19 Public Health Perspective held April 29 and jointly organized by Chitkara University, Punjab and Department of Post Graduate Institute for Medical Education and Research (PGIMER), Chandigarh, a webinar on Research Workflows, Research Metrics and Excellence in Academic Institutes conducted by AICTE and Elsevier on May 14, a webinar on Possible Do's and Don'ts for Publishing Research Papers in High Impact Journals organized by Chitkara University on June 10, two-day webinar on Fuzzy Linear Programming Problems and its Applications in Sciences and Engineering (by Chitkara University during June 17-18), and FDP on Cyber Threats and Ethical Hacking (organized by Poornima Institute of Engineering and Technology, Jaipur during June 29-July 1).
- Dr. Rakesh Ahuja, Professor (CURIN), Chitkara University, Punjab attended a five-day FDP on Latest Trends in Digital Image Processing that was organized by GATE Institute of Technology, A.P. during June 15-19, 2020. The focus of the workshop was on the current topics in image processing like computer vision in healthcare, gaming, robotics and traffic control, satellite image processing etc. He also attended a FDP on Machine Learning and Deep Learning that was organized by Rajkumar Goel Institute of Technology, Ghaziabad during June 4 – 8, 2020. Machine Learning and Deep Learning in different application areas like recommendation-based system, social media, healthcare, gaming, robotics, IoT etc. was the key focus of the workshop.
- Dr. Shalli Rani, Associate Professor, CURIN attended a two-day webinar on Digitally Skilled Teacher as a Transformational Leader organized by ICFAI, Business School during 25-26, June 2020.
- Harsha Chauhan – M.E. Scholar (CURIN) attended various workshops and webinars. These include FDP on Novel Approaches on Blockchain Technology and its Applications (organized by Teerthankar Mahaveer University, U.P. during May 22-28), five-day E-Symposium on Global Pandemic Outbreak: Role of Technology & Automation (held during June 1–5 and organized by JSS Mahavidyapeetha, Noida), a course on Introduction to Blockchain and Cryptocurrency (by Blockgeeks on April 29), a course on Blockchain Basics (by University of Buffalo on May 31), a course on Smart Contracts by University of Buffalo on June 9), webinar on WebApps with React JS (by Coding Blocks on June 13) and a webinar on Writing a Research Grant Proposal (by Teerthanker Mahaveer University, Moradabad, UP. on June 15).
- Mudita – PhD Scholar, attended various events organized by Chitkara University as well as by other institutions. These events are – training program on R, Latex and Python (organized by GNIT under spoken tutorial IIT Bombay project during May 25-30), FDP on Latex (by Chitkara University during April 23-26), FDP on Blockchain (by ATAL Academy during May 27-May 31), FDP on Research Methodology, Tools and Techniques (QIS College of Engineering and Technology during June 8-12), FDP on Machine Learning using Python (by BV Raju Institute of Technology during June 15-20), two-day webinar on Fuzzy Linear Programming Problems and its Applications in Sciences and Engineering (by Chitkara University during June 17-18), training program on Data Science and Learning Systems for Engineering Research and Design (by NIT Kurukshetra during June 24-30) webinar on Learning Tools in the Age of Innovations (by Chitkara University on June 29), and international e-conference on Industry 4.0: Future Perspective and Agility (by Sandip University during June 29-30).
- Ramneet, Mudita, Himanshi Babbar– PhD Scholars (CURIN) and Harsha Chauhan – M.E. Scholar (CURIN) attended a faculty development program on Managing References and Citations using Mendeley that was organized by Chitkara University, Punjab on June 10, 2020.
- Vishal Verma (M.E. Scholar) and Ramneet (PhD Scholar) attended a webinar on Gender Equality in Education Institutes organized by Rajasthan Technical University, Kota on June 26.
- Ramneet – PhD Scholar, CURIN attended various FDPs and webinars organized by Chitkara University, Punjab. The title of these programs are five-day FDP on Data Analysis using R Programming (May 18-23), five-day FDP on Machine Learning using Weka (May 26-30), five-day FDP on Research Document Preparation Using Overleaf (June 1 – 5), five-day FDP on Data Analysis and Business Intelligence Using Power BI (June 7-11) and two-day webinar on Fuzzy Linear Programming Problems and its Applications in Sciences and Engineering (June 17-18).

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