

Volume 2020, Issue 2

R&D Activities During July – September 2020

Cover Story

Grand Finale of SIH 2020 Software Edition

Organized by Chitkara University



Smart India Hackathon 2020

Awards/Competitions Won

- 3AI Pinnacle Award 2020
- Gandhian Young Technological Innovation Award (GYTI) 2020
- Third Position in International Hackathon – ReHack
- Second Position in Technology Exposition Organized by BIRAC and IKP



Highlights of the Quarter

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Events Attended

*By our Faculty Members and Scholars
during July – Sep 2020*

EDITORIAL TEAM

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Dr. Sachin Ahuja – *Director (Research)*

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Aaishwarika Sharma – *Research Scholar*

Ravi Gupta – *Asst. Manager, VC Office*

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78 Patents have been Filed

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**Team from Chitkara University has
won a prestigious GYTI 2020 Award**

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**Expert Talks Delivered at
Multiple Forums**

*By Faculty Members from Doctoral Research
Centre (DRC), Chitkara Business School (CBS)*

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**A book published by three faculty
members from CURIN**

With IGI Global Academic Publisher, USA

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**Workshops and Training Programs
Conducted by CURIN Faculty
Members**

*17 such Sessions were Conducted during
July – Sep 2020*

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List of Publications

EDITORIAL

We are glad that you liked the new-look last issue of Res Novae and found it quite resourceful. We received quite encouraging feedback through emails as well as through social media posts from some of our readers.

This current issue of Res Novae that we are sharing with you today is packed with details of lots of research, development and innovation activities carried out by CURIN faculty members and scholars during July – September 2020. It is my proud privilege to mention that Chitkara University co-organized the Grand Finale of Smart India Hackathon (SIH 2020) Software Edition. The cover story in the current issue is about SIH2020. In these three months, CURIN faculty members conducted as many as 17 different workshops on new tools & technologies and these workshops received participation from all over the country. The details about these workshops have been included in this issue. Our faculty members and scholars have won prestigious awards & recognition and their achievements have been discussed in the newsletter. In addition, there has been one book publication; invited talks by our faculty members at various forums that have been covered. Lastly and most importantly, our faculty members and students have filed 78 patents, done 42 Scopus indexed publications and our faculty members signed-up for 31 consultancy projects, all in the last 3 months (July – September 2020) only!

Thanks are due to my team that has nicely compiled this newsletter and thanks are also due to those five PhD scholars (their names are available inside) who have written articles for this issue.

Please keep on writing to us with your feedback!

Happy Reading

Sagar Juneja

Editor (Res Novae)

Smart India Hackathon 2020

Software Edition – Grand Finale

Organized by Ministry of Human Resource Development's Innovation Cell (MIC) with Chitkara University, Punjab being one of the Nodal Centres

By - Dr. Sachin Ahuja – Consulting Editor, Res Novae

Introduction

Smart India Hackathon (SIH) provides students a platform to solve some of the pressing problems we face in our daily lives, and thus inculcate a culture of product innovation and a mindset of problem solving in students. Smart India Hackathon is conducted every year since 2017 in two formats i.e. SIH Software and SIH Hardware Editions. The first three editions of SIH2017, SIH2018 and SIH2019 proved to be extremely successful in promoting innovation and out-of-the-box thinking in young minds, especially engineering students from across India.

Smart India Hackathon used to be conducted at various nodal centres each year, where student participants, industry representative and mentors used to congregate at the assigned centres to provide a solution on the selected problems. This year, due to the COVID-19 pandemic, which restricted movement and mass gatherings throughout the country, the SIH Software Edition was conducted in ONLINE mode. Student participants, SIH coordinators and industry evaluators came together on a digital platform designed to facilitate the implementation of the event seamlessly, managed centrally by MHRD's Innovation Cell & All India Council for Technical Education. This year there were 40 Nodal Centres for 243 problem statements designed by 63 organizations/ministries. The total submissions received were 11919 out of which 1081 teams were shortlisted to compete for prestigious event from all over India that was held during August 1-3, 2020. The problem statements were classified into 11 broad categories ranging from healthcare, agriculture, smart cities, waste management, renewable energy, smart vehicles, security and surveillance, robotics and drones, food processing and clean water.

Chitkara University, Punjab was selected as one of the nodal centers to facilitate the SIH software edition operations and to host the problem statements from the Department of IT & Cyber Security, DRDO. This was the second time when Chitkara University was shortlisted by the SIH team to host this prestigious event. Last time during SIH 2018 our university was chosen by Honorable Prime Minister of India Mr. Narendra Modi Ji for live interaction session.

This year in SIH2020 a total of 25 teams (Void, Titans 007, ORCA, Neoteric, Hexabyte, Technogeeks, The Eminent, Paandav, SFM, Aryavarta, HOUSTON, Challengers of the Unknown, Brahmastra, Hokageclan, Bits Nd Bytes, Cluster Champs, Esaviour, ELITE TECH CODERZ, FLASH_UNVEILED, Level 6 Crew, Aztecss, LANNISTERS, Synergy, Badgers And Nocturnal) having 150 participants competed against 5 problem statements (CK107, CK108, CK116, CK139, CK146) given by the Department of IT & Cyber Security, DRDO. Each Problem statement had a winning amount of Rs 100,000.

Organisers: MHRD, MIC, etc.

CHITKARA UNIVERSITY

Cordially Invites you to the inaugural function of
Grand Finale - Software Edition of

SMART INDIA HACKATHON 2020

YouTube/user/chitkarau/live
1st August 2020 | 08:00AM to 08:50 AM

Chief Guest
Mr. RAMA IYER
Chief Innovation Officer
T-Hub Hyderabad

Mentor & Evaluator
Mr. CP KULKARNI
Associate Director/Scientist G at
Directorate of IT & Cyber Security,
DRDO HQ Delhi.

Partners: DEVNET, intel, KPIT, etc.

Inauguration of SIH2020

The inauguration ceremony of SIH2020 was held in two phases- Local Inauguration of Chitkara University, Punjab from 8:00 to 8:40 AM and Central Inauguration from New Delhi by Minister for HRD and Hon'ble Minister of State for HRD. The local inauguration ceremony was held on a virtual platform using ZOOM, which was also broadcasted live on YouTube. The local inauguration ceremony started with the welcome address by Honorable Vice-Chancellor Dr. Archana Mantri - Chitkara University, Punjab. Dr. Mantri highlighted the pressing need for hackathons and innovation competitions for solving pressing problems of the society. The talk was followed by the address of one of our guest Mr. C.P. Kulkarni - Associate Director/ Scientist G at Directorate of IT & Cyber Security, DRDO HQ Delhi. Mr. Kulkarni is the curator of problems submitted by DRDO and in his address he highlighted expectations from the students in solving these problems. The Chief Guest of the ceremony was Mr. Rama Iyer - Chief Innovation Officer, T-Hub Hyderabad. Mr. Rama enlightened the participants about the evolving entrepreneurship culture in India and its benefits for the society. Dr. Madhu Chitkara – Pro Chancellor, Chitkara University also graced the inauguration ceremony with her kind presence and she highlighted how Chitkara University is leading by example when it comes to conducting such hackathons. She mentioned about the recent hackathon NOVATE+ 2020 organized by Chitkara University during the lockdown where the cash prizes worth of INR 1 crore were distributed.



Local Inauguration Ceremony at Chitkara University, Punjab

The program was centrally inaugurated from New Delhi by Minister for HRD and Hon'ble Minister of State for HRD. The Hon'ble Prime Minister also interacted with the students on August 1, 2020, at 4:30 PM like he does every year.



The Three-day Hackathon

The hackathon was scheduled for 3 days starting from 1st August to 3rd August till 5:00 PM. There were three mentoring sessions and three evaluation rounds in the morning and evening on each day respectively. This year SIH team and experts from Participating Ministries/ Companies/ Organizations centrally monitored the performance of each student innovator along with internal jury members from Chitkara University during the hackathon. A leadership talk on Transforming Innovations into Patents was also conducted for the benefit of the participants on Day 2 of the SIH2020 by Dr. Sachin Ahuja.

The local valedictory ceremony of SIH2020 was held at Chitkara University from 2:00-2:40 pm. Dr. Archana Mantri – Vice Chancellor, Chitkara University, Punjab was the chief guest for ceremony that was also attended by Mr. CP Kulkarni - Associate Director/ Scientist G at Directorate of IT & Cyber Security, DRDO HQ Delhi. Winners of each problem statement were announced during the ceremony based on the evaluation done by the 5-7 member combined team from DRDO and Chitkara University.

- The first problem statement was CK107 titled Video based dynamic human authentication system for access control from the technology bucket Security & Surveillance. Jury members for CK107 were Mr. Padma Lochan Bora, Mr. Rohin Koduri, Mrs. Shalbha Shahi and Mr. Vaddi Chandra Shekhar from DRDO and Dr. K R Ramkumar, Dr. Ashok Kumar and Dr. Kalpna Guleria from Chitkara University, Punjab. The winning team for CK107 was Team Houston and their team leader Mr. Vikash Garg.
- The second problem statement was CK108 titled Clustering of air objects based on trajectory from the technology bucket Security & Surveillance. The jury members for CK108 were Mr. K. Suchender Mr. Manoj Kumar Sonkar, Mr. Darla Ranjith, Mr. Mukesh Singh from DRDO and Dr. Jaiteg Singh, Dr. Shalli Rani and Dr. Rakesh Ahuja from Chitkara University, Punjab. The winning team for CK108 was Team Bits n Bytes and their team leader was Mr. Jay Mehta.
- The third problem statement was CK116 titled Tool to recover flash memory data from Miscellaneous technology bucket. The jury members for CK116 were Mr. Devesh Kumar, Mr. Manoj Malik from DRDO and Dr. Manoj Manuja, Dr. Sudesh Kumar Mittal and Dr. Rajesh Kaushal from Chitkara University, Punjab. The winning team for CK116 was Team Flash Unveiled and their team leader was Mr. Rohit Pratap Singh.
- The fourth problem statement was CK139 titled Indoor navigation app from Software - Web App Development technology bucket. The jury members for CK139 were Mr. C P Kulkarni, Mr. Rakesh Yadav, Mr. Vivek Sharma, Mr. Anshuman from DRDO and Dr. Harjeet Singh, Dr. Amandeep Kaur and Dr. Luxmi Sapra from Chitkara University, Punjab. The winning team for CK139 was Team ORCA and their team leader was Mr. Rohan.
- The last problem statement was CK146 titled CAPTCHA/alternative solution for visually impaired from Miscellaneous technology bucket. The jury members for CK146 were Mr. C P Kulkarni, Mr. Mukesh Kumar and Mr. Prashant Tiwari from DRDO and Dr. Junedul Haque, Dr. Muthukumaran and Dr. Naveen Sharma from Chitkara University, Punjab. The winning team for CK1146 was Team TECHNOGEEKS and their team leader was Ms. Nupur Kulkarni.

The ceremony was concluded after a vote of thanks by the master of the ceremony Dr. Sachin Ahuja who was also the SPOC for SIH2020 at Chitkara University, Punjab.

Patents Granted to Chitkara University

Till September 2020, 29 patents have been granted to Chitkara University, out of which 3 have been granted during July – September 2020.

Many more patent applications from Chitkara University are under advance stage of examination by the India Patent Office. We hope that more patents will be granted in the next quarter.

Over 550 patent applications have been filed by Chitkara University till September 2020!

78 Patents have been Filed

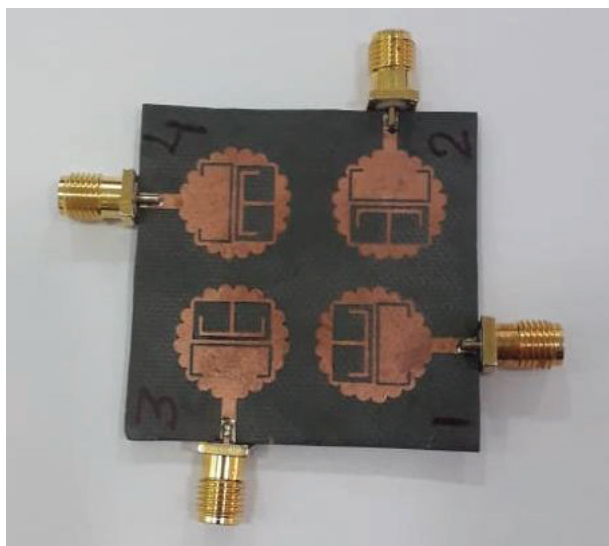
By CURIN Faculty Members and Scholars During July - September 2020

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

A 4x4 FRACTAL MIMO ANTENNA INCLUDING HIGH DIVERSITY PERFORMANCE FOR HIGH-SPEED WIDEBAND WIRELESS APPLICATIONS AND ELIMINATING TWO INTERFERING BANDS

By - Manish Sharma, Rakesh Ahuja

Application No. - 330680



ADJUSTABLE LADDER

By - Huma Naz, Sachin Ahuja, Rishabh Sharma

Application No. - 202011035132

An adjustable ladder capable of moving between two positions includes sets of elongated members having holes for coupling those with the rungs and include extended portions at both ends. The adjustable ladder has a switch and a control unit to facilitate the movement of the ladder. The adjustable ladder has a diaphragm to control pressure associated with the control unit and switch when the weight on the ladder exceeds a pre-defined safety limit.

AERIAL SYSTEM FOR EXTINGUISHING FIRE

By - Bhanu Sharma, Ashwani Singh, Shweta Lamba, S N Panda, Archana Mantri

Application No. - 202011040138

An unmanned aerial vehicle designed to function as fire extinguisher is equipped with sensors to detect heat parameters and airborne particulates of the target area. The processing unit actuates its sound wave generator and the cooling system to extinguish fire, to actuate the on-board camera to capture images and to map the location of the target area using those images or dataset of the target area.

ALERTING AND DECONTAMINATING DEVICE

By - Ravneet Kaur, Ramandeep Singh

Application No. - 202011034484

An alerting and decontaminating device is equipped with sensors, storage for one or more liquids, and an image capturing unit. The processor generates unique signals on detecting a pre-registered person, the movement of his/her hand and when the distance of person's hands reach within a pre-determined limit.

ALERTING DEVICE FOR EXCESSIVE FLUID CONSUMPTION

By - Vaishali Bhatia, Ramkumar Ketti Ramachandran

Application No. - 202011036302

An alerting device receives and stores multiple fluids. The sensors detect the quantitative, analytical and chemical attributes of the fluids and send a unique signal to the device processor if the attributes of any fluid vary beyond its prescribed limits. On receiving the signals, the processing unit of the device generates an alert intimating the deviation of the fluid attributes.

AN AIR FILTRATION APPARATUS FOR FILTERING MICRO-ORGANISMS

By - Mohit Kapoor, Adish Singh, Neha Sardana

Application No. – 202011029313

An air-filtration apparatus designed to purify air from micro-organisms, comprises of a housing with air-inlet(s) to receive, filter and pass the air through a micro-organism trapping element. The trapping element is made up of a super fine wire mesh with unique quantum dots all over it to maximise trapping microorganisms and then release the air through the outlet(s). The apparatus can be adapted to prevent the spread of contagious diseases in closed premises.

AN APPARATUS FOR GRANTING ENTRY PERMISSION TO AN ENTITY

By - Ravi Gupta, Sandeep Kumar, Rubina Dutta, Archana Mantri, Mandeep Walia

Application No. - 202011035739

A robotic sentry equipped with a sensor to determine the body temperature of the person at the door scans the various bar code symbologies on his/her ID card to authenticate the person. The person with positive authentication can enter, only if the body temperature is detected to comply with the prescribed limit. An inbuilt sanitizer dispenser at the entrance is automatically activated for use before the entry of the person.

ANTI-MICROBIAL INCENSE COMPOSITION

By - Manpreet Kaur, Neha, Raj Rani

Application No. – 202011037716

The present disclosure relates generally to the field of anti-microbial incense composition comprising Azadirachta indica, Mangifera indica, Ficus religiosa, Commiphora mukul, Citrus limon, Cinnamomum camphora, Santalum album, and Abolmoschus moschatus.

APPARATUS AND METHOD FOR MONITORING BODY TEMPERATURE

By - Rajesh Kumar Kaushal, S. N. Panda, Naveen Kumar, Simranjeet Singh, Jyoti Sharma, Priyanka Datta, Shanu Bhardwaj

Application No. - 202011033979

A self-check apparatus comprising a face-shield containing a display unit, when worn on the head by the user, it displays user's body temperature detected by an inbuilt sensor. The processor of the apparatus also converts the value of the body temperature and converts it into audio for the user to hear his/her temperature.

APPARATUS AND METHOD FOR MONITORING WEIGHT OF OBJECTS

By – S. N. Panda, Priyanaka Datta, Shanu Bhardwaj

Application No. – 202011039703

This novel weight detector, can be worn on a hand by the user to detect the object's weight in that hand. The microcontroller displays the weight in the display of the apparatus. This device would prove very handy to frequent fliers fond of shopping and relieve them about excess baggage-weight apprehensions.

APPARATUS AND SYSTEM FOR DISPENSING MEDICAL ITEMS

By - Anshuman Lal, Charu Khosla, Sachin Ahuja

Application No. - 202011034088

An apparatus for dispensing medical items comprise a housing with compartments for storing items to be dispensed. Each compartment has an operable door for items stored. The processor, coupled with the housing, operates the door corresponding to the selected items to facilitate accessing that compartment.

APPARATUS FOR REMOVING UNDESIRE PARTICLES

By - Shalili Rani, Himanshi Babbar

Application No. - 202011039702

This invention is about a simple, manually operated, hand-held apparatus similar to a groundwater hand-pump, conveniently removing undesired particles from objects. The air pumped inside the chamber containing the object, force strips the undesired particles resting from the object surface and ejects them out of the chamber into a disposable filter bag.

APPARATUS FOR SANITIZING AND STERILIZING ONE OR MORE OBJECTS

By - Varinder Singh, Nitin Saluja, Vilas Chikara, Gagan Malik, Satya Tapas

Application No. - 202011037185

This is an intelligent object steriliser. Its housing has in-built sensors to detect the presence and load of one or more objects in the chamber. Post detection, the apparatus processor actuates the sanitiser dispenser to release its required quantity, deploy the necessary set of magnetron assemblies, and select the stirrer's suitable speed to commence the sterilisation of the objects.

ASSEMBLY FOR VETERINARY SURGERY

By - Gurjeet Thakur, Onkar Bedi, Manveer Singh, Chanpreet Singh

Application No. - 202011037296

This movement setup enables the safe movement of the veterinary surgeon. The veterinarian can move the platform with its heating pads between 2 positions. One of the positions allows tilting of the platform at a predefined angle and predefined height. A mobile tray coupled with the platform can accommodate and secure tools required by the surgeon.

AUTOMATED APPARATUS AND METHOD FOR DISPENSING LIQUID SANITIZER

By - Mudita, Deepali Gupta, Ramneet, Sheifali Gupta, Sachin Ahuja, Kamali Singla, Rupesh Gupta, Raman Gupta, Jotesh Gupta, Rakesh Ahuja

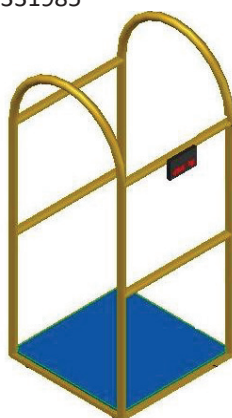
Application No. - 202011033978

This auto-sensing dispenser optimises sanitizer use. Its sensor captures the images of a user's hand under the dispenser's light(s). On receiving the image, the inbuilt microprocessor determines the hand's size and operates a mini motor to dispense the sanitizer according to the size of the hand.

BAGGAGE CART WITH WEIGHING MECHANISM FOR HOTELS

By - Kuldeep Kumar Thakur, Vishal Verma

Application No. - 331985



BATTERY MONITORING SYSTEM

By - Ramneet, Deepali Gupta, Mani Madhukar, Mudita, Sheifali Gupta, Kamali Singla, Sachin Ahuja, Rupesh Gupta, Pankaj Garg

Application No. – 202011033980

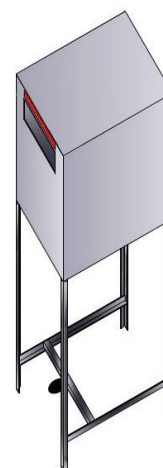
The battery monitoring system comprises of a set of batteries to supply electric power to the system. Its sensor monitors the battery health and signals the

processor on detecting fall in the battery power. The processor generates and transmits alert signals through its communication unit to the auxiliary electrical power source attached to the system, which commences supplying power to the system when the batteries get drained.

BOOK DISINFECT TROLLEY USING UV LIGHT

By - Jyoti Sharma, Naveen Kumar, S. N. Panda, Rajesh Kumar Kaushal, Kuldeep Singh, Simranjeet Singh, Jaspreet Singh Bajaj

Application No. – 331764



CASING TO FACILITATE IMAGE CAPTURING

By - Sagar Juneja

Application No. - 202011028229

This unique casing of a mobile computing device to facilitate image capturing includes a grip member holding the user's finger(s), a cable and 2 actuators. The first actuator sends signals to the casing's inbuilt controller to capture the image. The controller then extracts signals on resistance parameters to generate actuating signals for the second actuator to trigger the mobile computing device to capture the image.

DEVICE FOR CLEANING AND SANITIZING EDIBLE PRODUCTS

By - Vishal Verma, Harsha Chauhan, Deepali Gupta, Sheifali Gupta, Kamali Gupta, Rupesh Gupta, Rahul Singla, Raman Gupta, Huma Naz, Prabhnoor Bachhal

Application No. - 202011041200

This raw food sanitizer houses a casing with an inlet and outlet valves for the sanitizing liquid and holds vegetables and fruits. The device has a motor to rotate the edible products and the fluid to clean and sanitize the products. The inbuilt heater enables heating the liquid if required.

The sensor senses the product weight, and accordingly, the control unit controls the speed and duration of the sanitizing process.

DEVICE FOR CLEANING, SANITIZING AND DRYING OBJECTS

By - Deepam Goyal, Prateek Srivastav, Jasminder Kaur Sandhu, Luxmi Sapra

Application No. - 202011032974

This is a device with two chambers in its wooden housing for cleaning, sanitizing and drying objects. One of the chambers contains a brush assembly to scrub and clean the products. The humidifier's parameters can be set to sanitize and that of the drying element to remove moisture and kill microbes in the object.

DEVICE FOR CURRENCY IDENTIFICATION AND NOTIFICATION USING BRAILLE CELLS

By - Puneet Bawa, Virender Kadyan, Pranav Garg

Application No. - 202011039541

This currency-identifying device notifies the user using Braille cells. During the currency identification mode, its image acquisition unit captures the currency images. The control unit identifies the currencies and moves the Braille cells suitably corresponding to the recognised currencies to enable users to touch the pattern and know about the currencies. The device's timing unit similarly notifies time when using the device in a time notification mode. The device can be configured and worn like a wristwatch.

DEVICE FOR INDICATING LOW LEVEL OF A LIQUID IN A BATTERY ASSEMBLY

By - Ramneet, Deepali Gupta, Mudita, Sheifali Gupta, Sachin Ahuja, Madhukar Mani, Raman Gupta, Praveen Ailawalia, Rupesh Gupta, Kamali Gupta

Application No. - 202011033365

This battery fluid-level indicator comprises a cable inserted in the battery cell through the battery lid. The length of the cable is set to keep it immersed in the battery fluid. So when the fluid level falls below the safe limit, such that it does not touch the inserted cable's tip, the alarm circuit activates an alarm to the user prompting to top up the battery fluid.

DEVICE TO FACILITATE SCREENING OF ENTITY

By - Shiva Sharma, Manish Sharma, Shivani Malhotra, Sachin Ahuja

Application No. - 202011039040

This auto body-temperature detection device screens people for entry. The temperature sensors send

temperature signals to the inbuilt processing unit, which determine and sets the first and second temperature limit of the person. If the temperature of the person exceeds the second temperature limit then the device activates an alarm, displays the temperature on the display unit and authenticates the adhaar identity of the person.

DIGITAL LEARNING SYSTEM

By - Rubina Dutta, Amit Kumar, Shivani Malhotra, Bhanu Sharma, Gurjinder Singh, Archana Mantri

Application No. - 202011040548

This digital learning system is based on augmented reality (AR) simulation of a predefined matrix, accommodating a set of binary digits to generate signals. AR engine extracts and authenticates the equations from these signals and displays the corresponding component image associated with the pre-registered circuit. The processing unit verifies the said component with the actual requirement in the circuit and signals through an alarm if it is wrong.

DISINFECTING AND COOLING DEVICE

By - Prateek Srivastav, Jasminder Kaur Sandhu, Deepam Goyal, Luxmi Sapra

Application No. - 202011033366

This device for disinfecting and cooling edibles comprises of 2 compartments for holding edibles and fluids. A vibration generator coupled with the compartments generates vibrations in the liquid to facilitate disinfection of the edibles. The device also has a cooling sheath around the compartments to circulate cooling fluid around the compartments to facilitate quick cooling of the edibles.

EAR GUARD FOR WEARING MASK

By - Pawan Kumar, Chanpreet Singh

Application No. - 331106



EAR TIP

By - Rakesh Ahuja, Yash Kumar, Akash Kakran

Application No. – 202011039190

This unique ear tip has a funnel-shaped inner support member and an outer cover coupled to the inner member such that a gap is created between the outer cover and the inner support member. The ear tip includes flexible scales between the inner support member's outer surface and an inner surface of the outer cover. The ear tip has holes at the outer cover to allow passage of air.

ENERGY AND IMMUNITY BOOSTING NUTRACEUTICAL COMPOSITION

By - Rupesh Gupta, Manpreet Singh, Ramgopal, Varsha Singh, Amit Wadehra, Sheifali Gupta, Deepali Gupta, Anoop Kumar Singh, Meenu Garg, Gurjinder Kaur, Deepika Puri, Neelam Dahiya, Kulwinder Singh, Rakesh Goyal, Kamaljeet Singh

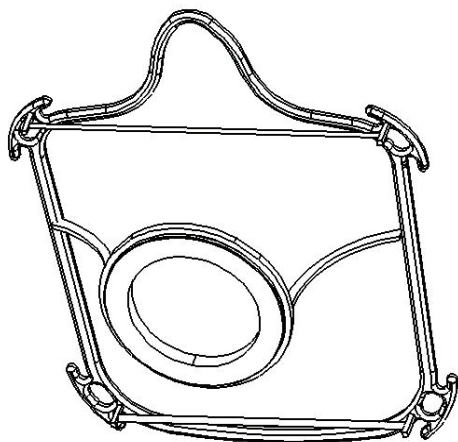
Application No. - 202011040350

This super nutraceutical composition is specifically directed to boost energy and enhance the immunity of the user. It comprises of *Phyllanthus emblica*, *Morus rubra*, *Ocimum tenuiflorum*, *Cinnamomum verum*, *Piper nigrum*, *Elettaria cardamomum*, *Psidium guajava*, and *Mentha arvensis* L. A specific process needs to be followed for preparing this composition to derive the desired benefits.

FACE MASK FRAME

By – S. N. Panda, Sachin Ahuja, Prasenjit Das, Simranjeet Singh, Shanu Bhardwaj, Huma Naz

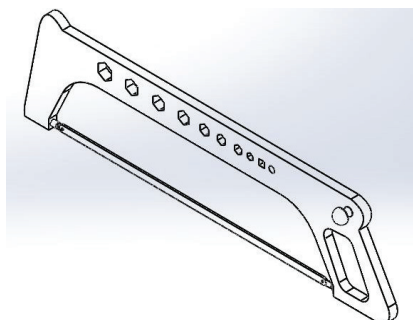
Application No. – 331107



HACKSAW FRAME

By - Shalom Akhai, Prateek Srivastav, Venktesh Sharma, Amit Bhatia

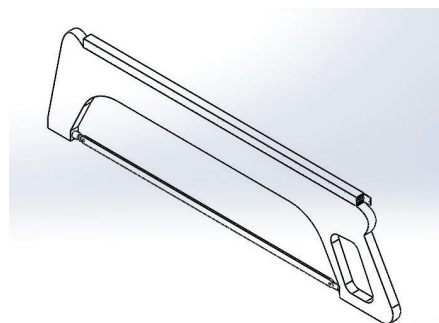
Application No. - 330795



HAND HACKSAW

By - Shalom Akhai, Prateek Srivastav, Venktesh Sharma, Amit Bhatia

Application No. – 330719



HAND RELIEF SMART THREADER

By - Charu Khosla, Pranav, Pranav Garg, Sukhdev Singh

Application No. - 202011031196

The hand relief smart threading tool has a housing with its one end open to receive a needle with a conduit as a thread engaging means. The conduit facilitates insertion of a thread inside the housing. A sensor positioned at other end of the housing detects the alignment of the second opening of the conduit. The alert unit sends a signal if the alignment is correct for threading.

HANDHELD CONTROLLER FOR AUGMENTED REALITY BASED SHOOTING TUTOR

By - Amanpreet Kaur, Archana Mantri, Narinder Pal Singh

Application No. – 331613



HEALTH MONITORING SYSTEM AND DEVICE

By - Prateek Srivastav, Jasminder Kaur Sandhu, Deepam Goyal, Luxmi Sapra

Application No. – 202011034666

This health monitoring system includes devices and sensors to detect the patients' temperature and pulse. Another set of sensors detect cough, cold associated with patients. The processing unit extracts and compares the set of signals based on the detected temperature, pulse, cold, and cough parameters. The system server creates training and testing dataset, where the training and testing dataset facilitates the system to predetermine health of the patients.

HEALTH MONITORING SYSTEM FOR PREGNANT WOMEN AND FETUS

By - Shalli Rani, Harmeet Kaur, K. R. Ramkumar

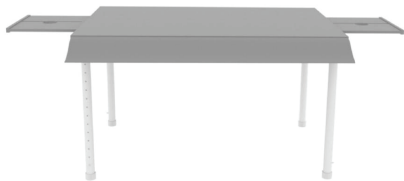
Application No. - 202011030405

This health monitoring system registers pregnant women with her fetus for authentication/tracking in future. The system examines the physiological health parameters of the women and her fetus. The inbuilt processor, extracts, verifies, compares the data from the monitoring system and is equipped to connect with emergency services to provide medical assistance to the pregnant women, if needed.

HEIGHT ADJUSTABLE FOLDING ARM REST TABLE WITH SLIDABLE HOLDERS

By - Punnet Bawa, Pranav Garg, Virender Kadyan, Pranav Kumar

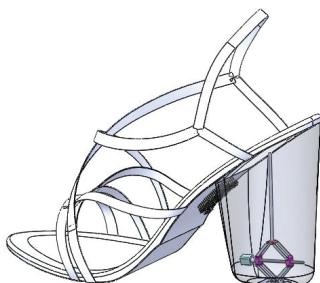
Application No. – 332371



HIGH HEEL SHOE WITH ADJUSTABLE HEIGHT

By – S. N. Panda, Naveen Kumar, Rajesh Kumar Kaushal, Prasant Kumar Pattnaik, Simranjeet Singh, Jyoti Sharma

Application No. – 331765



IMMUNITY BOOSTER NUTRACEUTICAL COMPOSITION

By - Jyotsna Kaushal, Sushil Kalra, Sachin Bhogal, Gaurav Jain

Application No. - 202011041197

The research outcome pertains to the formulation and its process for a nutraceutical composition for boosting immunity in a diabetic patient. It comprises of Morus Rubra, Stevia Rebaudiana, Phyllanthus Emblica, and Syzygium Cumini, and unripe fruit of Syzygium Cumini. The composition is suitable for diabetic patients and does not cause side effects.

IMMUNITY BOOSTER NUTRACEUTICAL TEA COMPOSITION

By - Jyotsna Kaushal, Sushil Kalra, Sachin Bhogal

Application No. - 202011036975

The research outcome pertains to the formulation and its process for a nutraceutical tea composition to boost immunity. It comprises Phyllanthus Emblica, Tinospora Cordifolia, Curcuma Longa, Citrus Limon, Piper Nigrum, Cinnamomum Verum, Syzygium Aromaticum, and Zingiber Officinale.

INTELIGHTS

By - Gaurav Goyal, Vinay Kukreja

Application No. - 330721



MONITORING SYSTEM FOR SUBJECT

By - Gurwinder Singh, Shivam Sharma, Neha Tuli, Archana Mantri

Application No. - 202011036603

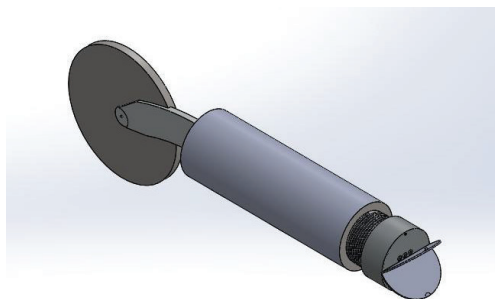
This system monitors a subject, using a Virtual Reality (VR) headset. The assessment pertains to simulated questionnaire associated with the subject. Based on the

questionnaires, the monitoring unit in the VR headset monitors the subject's physiological attributes, provides inputs to the processing unit connected with the VR headset, and accordingly facilitates the simulation of the VR headset.

MULTIFUNCTIONAL PIZZA CUTTER

By - Prateek Srivastav, Shalom Akhai, Amit Bhatia, Venktesh Sharma

Application No. – 333090



MULTIPURPOSE CLEANING DEVICE

By - Sonam Mittal, K. R. Ramkumar, Sudesh Mittal

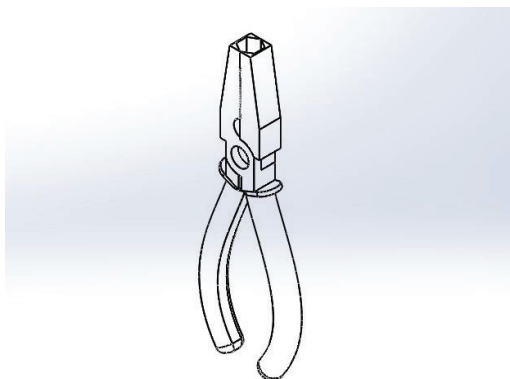
Application No. - 202011037948

This is a multipurpose, easily manoeuvrable, vacuum-cleaning device having its first member, hinged to another member to enable swivelling movement between two extreme predefined angles from 0 to 180 degrees. The handle length can be adjusted suitably to impart flexibility for cleaning between predetermined heights. The vacuum unit accumulates dust particles scrubbed by rolling brushes mounted on both the members during cleaning.

MULTI-PURPOSE PLIER WITH A HEXAGONAL NUT OPENING/CLOSING PROVISION

By - Shalom Akhai, Prateek Srivastav, Venktesh Sharma, Amit Bhatia, Jasmininder Kaur Sandhu

Application No. – 330796



NUTRACEUTICAL CONFECTIONARY COMPOSITION

By - Ramgopal, Amit Wadhwa, Rupesh Gupta, Varsha Singh IHM, Manpreet Singh, Sheifali Gupta, Deepali Gupta, Kulwinder Singh, Rakesh Goyal, Kamaljeet Singh

Application No. - 202011035740

The research outcome pertains to the formulation and its process for a nutraceutical confectionary composition for boosting immunity of the user. It comprises of Cinnamomum Verum, Piper Nigrum, Elettaria Cardamomum, Amomum Subulatum, Zingiber Officinale and Ocimum Tenuiflorum. The composition is natural, safe and economical.

NUTRACEUTICAL TEA PRECURSOR COMPOSITION

By - Amit Wadehra, Ramgopal, Rupesh Gupta, Varsha Singh, Manpreet Singh, Sheifali Gupta, Deepali Gupta, Anoop Kumar Singh, Meenu Garg, Gurjinder Kaur, Deepika Puri, Neelam Dahiya, Kulwinder Singh, Rakesh Goyal, Kamaljeet Singh

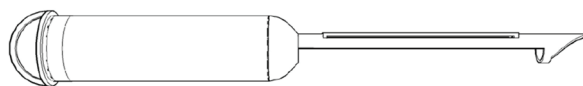
Application No. - 202011040351

The research outcome pertains to the formulation and its process for a nutraceutical tea precursor composition comprising Tea, Syzygium Aromaticum, Cinnamomum Verum, Glycyrrhiza Glabra, Zingiber Officinale, Ocimum Basilicum, Elettaria cardamomum, Pimpinella Anisum, and Piper Nigrum.

PINEAPPLE KNIFE

By - Sachin Ahuja, Ravi Kapila, Sushil Kalra, Sachin Bhogal, Prabhjot Singh, Gurjinder Singh

Application No. – 333072



PORTABLE BEVERAGE PREPARING DEVICE

By - Rishabh Sharma, Huma Naz, Sachin Ahuja

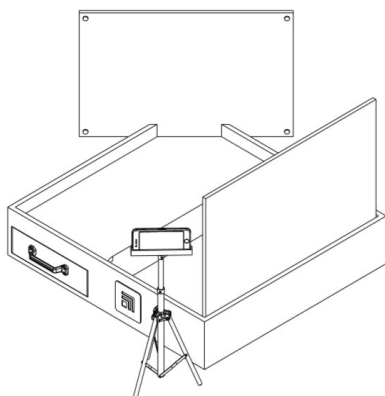
Application No. - 202011033977

The portability of this beverage device makes it unique. It has a detachable unit with sections for holding water and milk separately. This can be detached for cleaning. The device has chambers for storing sugar and tea leaves separately. Another tank below the milk and water tank has a brewing unit. All ingredients are dispensed through internal pipes into the brewing unit to prepare the beverage as per the pre-set recipe.

PORTABLE LIGHT BOARD SETS FOR INTERACTIVE ONLINE TEACHING

By - Jaya Madan, Rahul Pandey, Chanpreet Singh

Application No. – 330797



PORTABLE VENTILATED UNIVERSAL LAPTOP STAND

By - Punnet Bawa, Pranav Garg, Virender Kadyan, Pranav Kumar

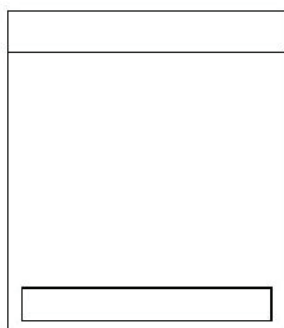
Application No. – 332372



PORTABLE THERMOELECTRIC LIPSTICK BOX

By - Aaishwarika Raj Sharma, Shabnam Choudhary, Vaishali Bhatia, Ramkumar Ketti Ramachandran

Application No. - 332930



PROCESS OF PREPARING THREE DIMENSIONAL CARBON FROM PROSOPIS JULIFLORA

By - Partha Khanra, Ramkumar Ketti Ramachandran, Pankaj Kumar, Sudesh Mittal

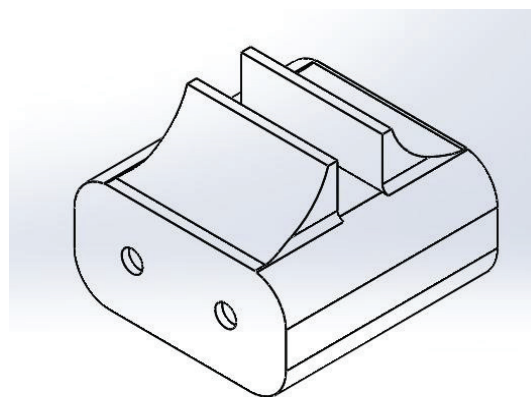
Application No. - 202011041260

This technique can form a three-dimensional carbon from Prosopis Juliflora using hydroxylation, carbonization, activation and deposition processes. The three-dimensional carbon may be used to fabricate a flow field plate that may be employed in a direct ethanol fuel cell (DEFC). The three-dimensional carbon of the present invention possesses high electrical and thermal conductivity.

PROTECTIVE COVER FOR CELL PHONE ADAPTER

By - Prateek Srivastav, Shalom Akhai, Venktesh Sharma, Amit Bhatia

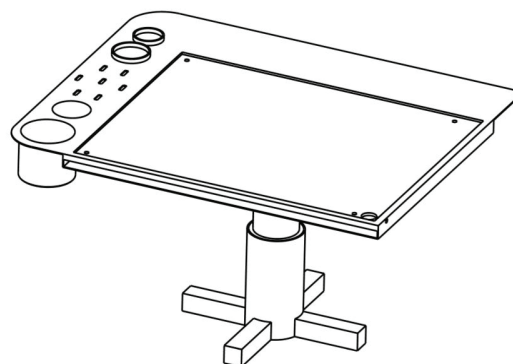
Application No. – 331280



RODENT SURGICAL TABLE

By - Thakur Gurjeet Singh, Onkar Bedi, Manveer Singh, Chanpreet Singh

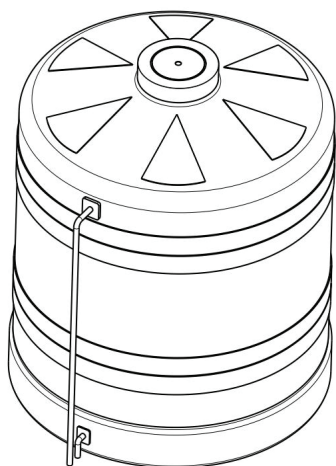
Application No. - 331265



SCREW THREAD BASED WATER TANK

By - Rahul Pandey, Jaya Madan, Sachin Ahuja

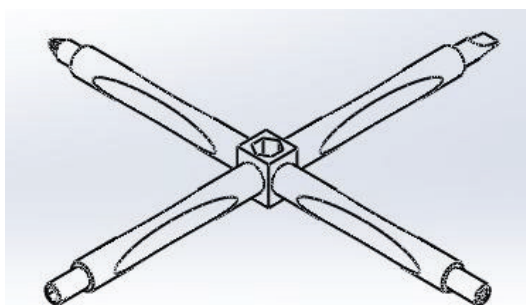
Application No. – 331986



STRUCTURE DESIGN FOR MULTI-SCREWDRIVERS AND BOLT OPENERS

By - Shalom Akhai, Prateek Srivastav, Venktesh Sharma, Amit Bhatia

Application No. – 331279



SYSTEM AND DEVICE FOR MONITORING ENTITIES

By - Harsha Chauhan, Deepali Gupta, Sheifali Gupta, Vishal Verma, Kamali Gupta, Gifty Gupta, Rupesh Gupta, Sachin Ahuja, Rakesh Ahuja

Application No. - 202011034884

This device attached to the cots in hospital or neo-natal care, monitors and protects babies. A sensor detects weight of the baby in the cot enabling the device system to generate an alarm on detecting baby removal from the cot in Non-parental mode. There is no alarm when set in parental mode. The system includes a thermal sensor to facilitate thermal screening, and a moisture sensor to detect moisture in clothes of the baby.

SYSTEM AND DEVICE FOR STRUCTURAL MONITORING OF SCULPTURES

By - Debarshi Ghosh, Nitin Saluja, Nitika Dhingra, Varinder S Kanwar, Chanpreet Singh

Application No. - 202011033544

This sculpture structure monitoring system has a computing device with a modelling module to design models of the sculptures based on its captured images and a network analyser (NA) to analyse the designed models' scattered parameters. The spectral device, coupled with the network analyser and the computing device, determines the sculptures' spectral components. Based on all inputs, the system processor then generates an alert on noticing any variation in the sculpture.

SYSTEM AND METHOD FOR AUGMENTED REALITY ASSISTED LEARNING

By - Amit Kumar, Archana Mantri, Shivani Malhotra, Rubina Dutta, Narinder Pal Singh

Application No. - 202011040829

This AR assisted learning system has an image recognition unit, an augmented reality (AR) engine, and a display unit. The image recognition unit scans the circuits and signals the AR engine, which identifies the scanned components from the circuits, matches those with its dataset and correspondingly signals the display unit to display an AR view of the components' function.

SYSTEM AND METHOD FOR AUGMENTED REALITY-BASED LEARNING

By - Shubham Gargrish, Bhanu Sharma, Narinder Pal Singh, Deeptiprit Kaur, Archana Mantri

Application No. - 202011033693

This AR assisted learning system has an image-capturing device to obtain images of a physical scene. The system processor receives and analyses these images to track the position of its elements. Upon detecting any two elements' interaction, the resultant attribute is rendered onto a rendering platform to create a three-dimensional virtual overlay corresponding to the images of the physical scene. The processor displays, an augmented image of the interaction of the elements.

SYSTEM AND METHOD FOR CONTROLLING EXOSKELETON

By - Sheifali Gupta, Harshit Sharma, Vishwas Saini, Aniket Nayak, Mohit Sharma, Jaskaran Singh, Rohan Sahni, Rupesh Gupta, Deepali Gupta, Manpreet Singh, Ramgopal, Varsha Singh, Amit Wadhera, Meenu Garg, Jaswinder Singh

Application No. - 202011041199

The imaging device and sensor in the eyewear of an exoskeleton controlling system monitor the user's eye

parameter and signals to its processor. The processing unit matches the extracted eye parameters with pre-defined parameters stored in its dataset. Accordingly, it generates control signals representing the movement of one or more limbs of the exoskeleton.

SYSTEM AND METHOD FOR CONTROLLING OPERATION OF A SWITCH IN A NETWORK

By - Sumit Badotra, Surya Narayan Panda, Priyanaka Datta

Application No. - 202011036303

This method and system for controlling the operation of a switch in a network comprise receiving a set of instructions at a switch about selecting one of its operations. The operations could be a combination of a firewall operation, a load balancer operation, and an intrusion detection operation. The switch's operation is adjusted to perform one of the selected functions for routing of data packets from a source location to a destination location in the network.

SYSTEM AND METHOD FOR DETECTING RETINOPATHY IN AN EYE OF A SUBJECT

By - Dimple Nagpal, Sumit Badotra, Surya Narayan Panda, Prasenjit Das

Application No. - 202011030406

This retinopathy detector's camera captures the image of the patient's eye and relays it to the inbuilt processor. The processor analyses the images to classify and extract relevant information and then assigns values to compare it with its database's reference values. Based on the deviation between the reference and the actual values, the detector diagnosis the patient's eye.

SYSTEM AND METHOD FOR FACILITATING SECURE ROUTING IN A WIRELESS SENSOR NETWORK

By - Meena Pundir, Jasmininder Kaur Sandhu, Luxmi Sapra, Prateek Srivastav

Application No. - 202011033543

This system's methodology facilitates secure routing of data packets in a wireless sensor network initially by assigning a trust value to each node based on its threshold value. The second trust value of each sensor node determined indicates its power requirement for maintaining a transmission rate of the data packets. Both the trust values corresponding to each node are compared to detect a negative deviation for declaring that node as a malicious sensor node.

SYSTEM AND METHOD FOR MONITORING PLANTS

By - Mudita, Deepali Gupta, Ramneet, Kanwalpreet Kaur, Sheifali Gupta, Raman Gupta, Praveen Ailawalia, Kamali Gupta, Rupesh Gupta, Pramod Kumar Yadav

Application No. - 202011040140

This system for monitoring plant in a garden has an image capturing device to obtain images of garden plants, and sensors located in the soil of each plant, detect and relay the physical condition of the soil to a transceiver. The system processor analyses the data and activates a motor to operate valves for a predetermined period to water predetermined quantity of the water, required by the specified plants.

SYSTEM AND METHOD FOR PREDICTING DIABETIC RETINOPATHY

By - Rakesh Ahuja, Sheifali Gupta, Manish Sharma, Junedul Haque

Application No. - 202011033546

This system for predicting diabetic retinopathy stores instructions executable by the processor, to receive the patient's health attributes and analyse it to extract the health parameters from it. The processor further categorises the health parameters, extracts its values to compare it with reference values in its data set, and then detects a deviation of the extracted health values to present the diagnose of the patient's eye.

SYSTEM AND METHOD FOR PROVIDING DRIVING ASSISTANCE TO USER

By - Vatsala Anand, Sakshi Sharma, Keshav Kumar, Mandeep Walia, Sheifali Gupta, Rupesh Gupta, Deepali Gupta

Application No. - 202011041262

Call it a navigator or a back seat driver, but it helps the driver. Two transceivers detect and monitor moving objects. The transceivers then signal to each other through a communication unit. A microcontroller receives the signals from the communication unit, and alerts on display device to assist the driver if either of the moving objects come close to the vehicle.

SYSTEM AND METHOD FOR REAL-TIME LOCATION TRACKING OF A VEHICLE

By - Harsha Chauhan, Vishal Verma, Deepali Gupta, Sheifali Gupta, Kamali Gupta, Rupesh Gupta, Sachin Ahuja, Narendra Kumar, Devashish Kumar, Raman Gupta

Application No. - 202011035371

This real-time vehicle location tracker assigns the vehicle with a set of RFID tags associated with a Global Positioning

System (GPS) of the vehicle to record its position in real-time. This vehicle's location information is stored in a digital ledger. The stored data is updated dynamically until the vehicle is in transit and reaches a predetermined destination.

SYSTEM AND METHOD FOR TRANSCRIPTION

By - Harjeet Singh, Muthukumaran Malarvel, Partha Khanra

Application No. - 202011031195

This transcription system converts speech of user into text document in the user's handwriting. Users need to register themselves to get a unique identity, and then load their attributes like image, voice and handwriting samples. When accessed by the user, the system can sense real-time acoustic signals of the speech to convert it into a text document in the user's handwriting.

SYSTEM AND METHOD TO CONTROL OPENING AND CLOSING OF DOOR

By - Chander Pratap Singh, Manisha

Application No. - 202011033545

The auto door opening-closing system has a marker attached at the door, for scanning by a scanning unit. The inbuilt control unit emulates an AR view of a questionnaire based on the scanning of the marker. An entity must enter key codes through his/ her device to answer the questionnaire. In case the entered key codes are correct, the control unit actuates the opening and closing of the door.

TEMPERATURE REGULATING DEVICE

By - Nikhil Sharma, Nitesh Kumar

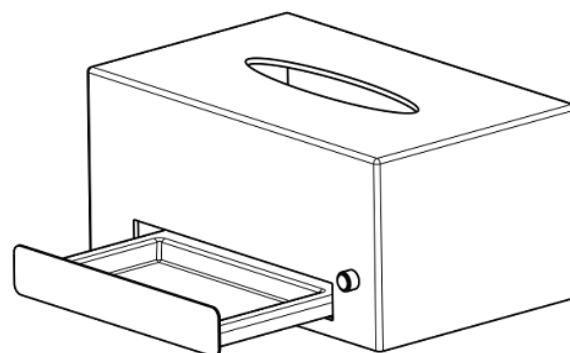
Application No. - 202011030173

This device regulates a region's temperature by blowing hot and cool air in that region. The device's airflow units circulate the air through pipes into metallic tubes installed and an underground tank. Air gets heated or cooled due to heat exchange taking place with the body of the metallic pipes and the tank, and when supplied in the region, it regulates its temperature.

TISSUE DISPENSER WITH AUTOMATED BIN

By - Sushil Kalra, Sachin Bhogal, Deepika Puri, Bharat Kapoor, Debarshi Ghosh, Anoop Aggarwal, Prabhjot Singh, Naveen Kumar

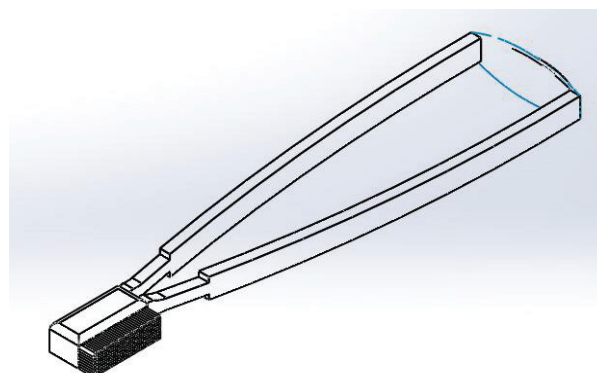
Application No. – 331103



TOOTHBRUSH WITH TONGUE CLEANER

By - Shalom Akhai, Prateek Srivastav, Venktesh Sharma, Simranjeet Singh, Shanu Bhardwaj, Amit Bhatia

Application No. – 331109



TWO-DIMENSIONAL PEROVSKITE JUNCTION-LESS HETEROJUNCTION TUNNEL FIELD EFFECT TRANSISTOR

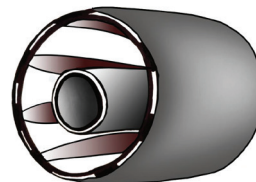
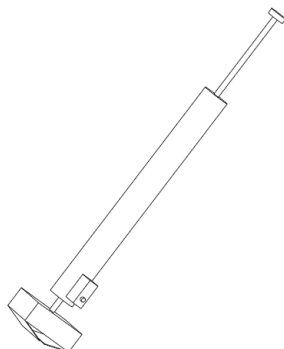
By - Preeti Sharma, Rajnish Sharma, Jaya Madan, Rahul Pandey

Application No. - 202011038743

This two-dimensional, perovskite, junction-less, heterojunction, tunnel field-effect transistor has induced charge carriers along with a source region, a drain region, and a channel region. The channel region facilitates the charge carriers' controlled flow between the source region and the drain region. The transistor's various regions are constituted by a set of layers having distinct functions to facilitate the flow of the charge carriers between the source region and the drain region.

VACUUM TUBE TRASH PICKER*By - Shalli Rani, Himanshi Babbar*

Application No. – 330937

**WEARABLE ASSISTANCE DEVICE FOR DEAF USER***By - Anchit Srivastava, Sheifali Gupta, Deepali Gupta, Rupesh Gupta, Vishal Verma, Kamali Gupta, Rakesh Goyal, Raman Gupta*

Application No. – 202011032976

This wearable assistance device for a deaf user facilitates receiving and classifying sounds near the deaf user using a microphone & a voice recognition module. Upon sound classification in a particular predefined classification category, one of the sounds is determined as a warning sound, which activates a vibrator of the device to alert the user. The device then translates the captured sound into a text for the user using a speech to text translator coupled with the device.

VENTILATED EARTIPS*By - Rakesh Ahuja, Yash Kumar, Akash Kakran*

Application No. – 331266

Radio-Talk on Dengue Fever, Symptoms and Precautions

Dr. Jyotsna Kausal – Head, Centre of Water Sciences (CURIN) was invited by Chitkara Radio for an interactive discussion on water borne disease, Dengue. The session was broadcasted on 107.8 FM. Dengue is an acute infectious disease caused by a flavivirus transmitted by Aedes mosquitoes and its symptoms are headache, severe joint pain, which are very common in monsoon season. The main focus of the discussion during the session was on various types of dengue fever, causes, symptoms and precautions of Dengue fever. Some ancient practices were also discussed that could enhance the immunity of body. The session was held on August 14, 2020 under STI Hub project and was moderated by Ms. Sakshi from Mass Media Department of the university.



Research@CURIN

Top 5 High Impact Research Papers Published by CURIN during July – September 2020

Following 5 articles have been written by our PhD scholars around top-five research papers published by CURIN researchers during July – September 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 July – September 2020 is presented in a separate section.

Cross-layer solution for IoT–QoS architecture for improving the performance of IoT network

By: Bhanu Sharma – PhD Scholar

This article is based on the research paper titled QoS Aware Cross-Layer Paradigm for Urban Development Applications in IoT published by Dr. Shalli Rani from Chitkara University along with her team comprising of members from different institutions in Springer Nature journal entitled Wireless Networks.

Quality of service (QoS) infrastructure and functionality include a combination of cloud, application systems, access networks, computers, mobility, communication and networking, database, and analytics to implement an effective IoT network for smart world! In IoT network many devices, users, and things are connected across heterogeneous networks in a single system. This multitude of services and heterogeneity of the objects make IoT a complex paradigm especially when a single system provides a large number of services. There is therefore a requirement of quality metrics for the IoT network for urban development.

Protocols developed for heterogeneous networks depend upon the QoS parameters like energy, delay, scalability, bandwidth, network coverage, etc. This paper proposes a service-oriented cross-layer solution for IoT–QoS architecture. Markov Chain model is used for success of IoT applications because it describes a sequence of possible events in which each event's probability depends on the state attained by the previous event. This paper clearly describes QoS attributes used for IoT network like delay, service cost, service load, network capacity, power optimisation techniques, reliability of the service, bandwidth, resource distribution rate, etc. This paper also proposes a scheme of QoS for IoT with energy and scalability as measures of the sensing networks. The network lifetime and throughput are additional performance assessment criterion.

IoT is the bridge between the real and cyber world. This study, therefore, also investigates the existing paradigms used in networks for supporting QoS framework. The proposed solution lies within the cross-layers such that the sensing layer, application layer, and networks can handle inter-operability among them.

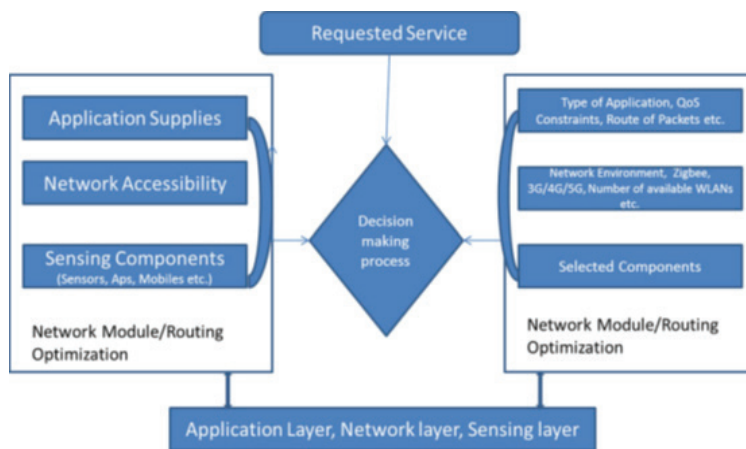


Illustration of IoT – QoS architecture borrowed from this paper

Effective ways of teaching programming to first year students

By: Shubham Gargish – PhD Scholar

This article is based on the research paper titled Influence of Analytical Approach in Logic Building for Freshman Computer Science Students: A Study published by Dr. Meenu Khurana and Dr. Archana Mantri from Chitkara University along with their industry partner Mr. Viney Khurana in Journal of Engineering Education Transformations (JEET).

Computer science engineering students' struggle with programming continues to be a significant factor for their failure in classrooms and later on in the industry. Therefore, the necessity for an innovative methodology for teaching depicted in quantitative analysis and research is very much agreed. Various logic-building techniques were put to practical use to study if the outcomes can be affected, and students' programming skills can be enhanced. A methodology used for this research enabled students to reach to a level where they are comfortable with logic building and are no longer wary of the solution finding.

This study by the team of researchers at Chitkara University adopted a research design in which the phases were divided according to the problems usually faced by students while learning to program. The phases are:

1. The problem-definition phase asserted the necessity to identify and possibly grade students' capabilities for providing solutions through problem-solving strategies and techniques. This phase provided a fair assessment of students' logical thinking and reasoning skill levels.
2. The procedure-design phase comprised of forming students' groups comprehensively. By transparently assessing their logical and reasoning skill levels, research team focuses on designing programs for them. These sessions were designed so as not to interfere with the students' regular academic schedules.
3. The observation phase was to conduct carefully designed tests every week for all batches. The tests aimed to ascertain students' logical reasoning and analytical skills to enhance their programming skills through the analytical approach of logic building.

The objective of this research, that was to ascertain if analytical approach to logic building could really help computer science engineering students overcome their fear of programming and thus equipping them to make coding easier, was successfully achieved. The study categorically highlighted difficulties in general to 'un-learn' half-learned things and then 're-learn' them with a different perspective. Therefore, novice computer science students should be trained on building their logical skills first, lest it is too late. This study also demonstrated the need for assessing students before enrolling them in such a guiding program so that appropriate duration of courses can be identified.

Novel highly linear pseudo-resistor designed for biomedical applications

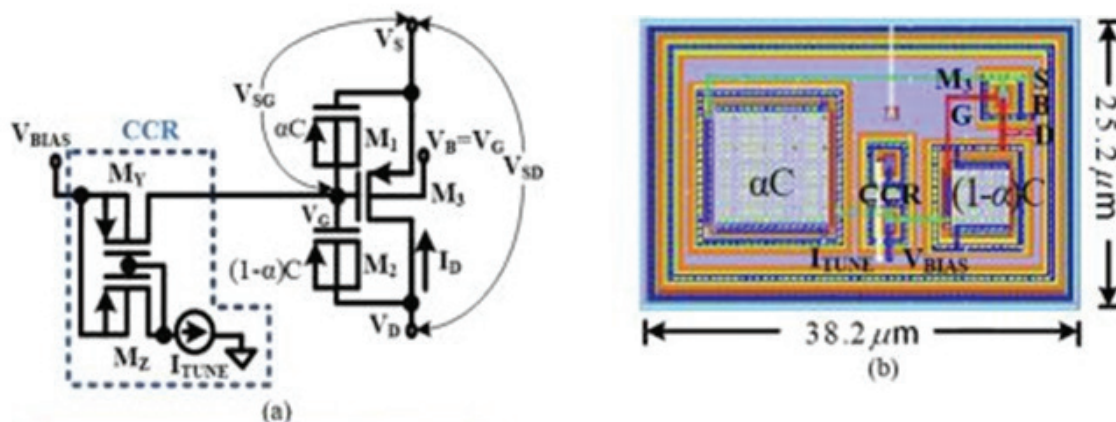
By: Savita - PhD Scholar and Junior Research Fellow (JRF)

This article is based on the research paper titled Design and Simulation of Pseudo-Resistor with Extremely High Linearity for an Improved Neural Signal Recording published by Dr. Kulbhushan Sharma, Dr. Rajnish Sharma from Chitkara University, Punjab and Dr. S. S. Jamuar from IIT, New Delhi, India in AIP Publishing Journal entitled as Review of Scientific Instruments.

Success of neural amplifier depends upon selecting high values of resistance ($T\Omega$) in the feedback path of a complete electronic circuit, designed to obtain a high value of the R–C time constant while limiting the lower cut-off frequencies to < 1 Hz. Such a high value of resistance cannot be obtained using conventional fabrication methodologies and therefore ought to be realized by alternative circuit design topologies in the form of pseudo-resistors.

A research team in VLSI Centre of Excellence, Chitkara University, Rajpura, Punjab, India comprising of Dr. Kulbhushan Sharma and Dr. Rajnish Sharma have proposed a design of pseudo-resistor (PR) using the Bulk Driven Quasi Floating (BDQFG) technique. Their design provides a high value of resistance ($\approx 1 T\Omega$) over a wider voltage swing of -1 V to 1 V and displays extremely high linearity. The same is useful for accurate amplification and recording of neural signals for better diagnosis of many chronic diseases. Their group has simulated this pseudo-resistor in $0.18 \mu\text{m}$ technology with BSIM3V3 MOS device models in the 6M1P standard process. Additionally, they succeeded to achieve a mean value of $\mu = 1 T\Omega$ with a standard deviation of $\sigma = 111.1 \text{ k}\Omega$ for Process Voltage–Temperature (PVT) variations. This pseudo-resistor was then used in the feedback path of a neural amplifier architecture to obtain a mid-band gain of 40 dB with a bandwidth of 0.5 Hz to 7.8 kHz . The architecture achieved Noise Efficiency Factor

(NEF) value of 4.79 and 4.99 in open loop and close loop modes, respectively. The Common Mode Rejection Ratio (CMRR) of 74.5 dB has been obtained with BDQFGPR for a neural amplifier. It is important to note that the highly linear and robust behaviour of BDQFG technique based pseudo-resistor design is ideal for many biomedical circuits applications.



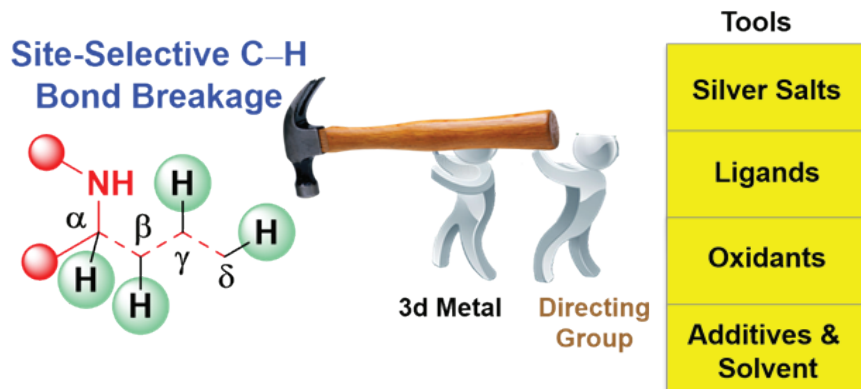
The illustration of pseudo-resistor circuit and its layout has been borrowed from this published paper

Site selective functionalization techniques of amines

By: Adhish Singh – PhD Scholar

This article is based on the research paper titled Site-Selective C(sp³)-H and C(sp²)-H Functionalization of Amines using a Directing-Group-Guided Strategy published by Dr. Mohit Kapoor and his team from Chitkara University, Punjab in collaboration with National Chang Hua University, Taiwan (Dr. Ming Hua Hsu) in Wiley Journal entitled Advanced Synthesis & Catalysis.

There is a wide range of amines on the shelves of many pharmaceutical, agrochemical and healthcare industries. Researchers are developing strategies for functionalization of amines in a site-selective manner with improved time efficiency.



The illustration has been borrowed from the paper

Site-selectivity is an area of keen research in C-H activation that motivated this research group at Chitkara University to study it further. This review article categorically discussed directing-group (DG)-guided site-selective C-H functionalization techniques at various position in the carbon chain of amines. Although it sounds interesting, the chemistry behind such transformation is often challenging due to the difference in reactivity. That being said, constant efforts are being put-in, worldwide to derive advantages of directing group-guided strategy to improve the efficiency of synthetic processes. The success is critical for achieving a sustainable and green industrial process. The article highlights the recent advances made in the C-H activation chemistry of amines at various carbon centres. The use of silver salts, oxidants, directing groups, and ligand screening are tools that are primary for the site-selective activation chemistry. Directing groups provide lewis basic sites that coordinate with the metal that guides it to the target carbon atom to undergo further functionalization.

The article is divided into four sections: (i) α -functionalization, (ii) β - functionalization, (iii) γ -functionalization,

and (iv) δ - functionalisation of amines. The metallocycles formed are four-membered, five-membered, or higher-membered depending on the target carbon atom's distance. However, few challenges remain associated with the activation distal C-H bonds in amines such as unfavorable thermodynamic and kinetic parameters, availability of multiple non-equivalent positions, and achieving high yields. In their previous work in 2019, the same group had presented that carbon dioxide could serve the dual purpose of protecting and directing group for the arylation of benzylamines under milder conditions. Following that, another paper from the same group was published in the Journal of American Chemical Society describing the one-pot synthesis of 7-membered lactam products using primary benzylamines ethyl-2-iodobenzulcarboxylate.

This review of recent citings in DG-guided C-H activation chemistry has attracted immense attention from the scientific community worldwide, thereby making C-H Activation and Sustainable Chemistry a hot topic!

Wireless sensor networks for exploring underwater world using computational intelligence techniques

By: Soni Singh - PhD Scholar

This article is based on the research paper titled Underwater Networked Wireless Sensor Data Collection for Computational Intelligence Techniques: Issues, Challenges, and Approaches published by Osho Gupta and Nitin Goyal from Chitkara University and their team in IEEE Access.

Underwater wireless sensor networks (UWSNs) have emerged as an advanced technology to monitor and control the underwater aquatic life. The technology determines the new underwater resources, and undiscovered marine flora-&-fauna through computational intelligence (CI) techniques. CI pertains to a system's capability to acquire a specific task from data or experimental surveillance below the water. Today, by virtue of its neutrality and factual basis, data is considered an acceptable identity for everything in nature, be it related to human beings, machines, or any device like the Internet of Underwater Things (IoUT).

The characteristics of underwater networks are different from the terrestrial ones. At the same time, their architecture is vulnerable to various natural challenges namely mobility of floating sensor nodes due to water drift @ 3 m/s, limited link capacity, multiple messages receptions due to reflections on the sea ground and sea surface, and considerable propagation delays. Additionally, a lot of data or packet-drop/loss also occurs due to underwater conditions that finally hinder the data collection process. Various techniques with varying efficiencies already exist for underwater data collection, but their comparative analysis has not been very well documented.

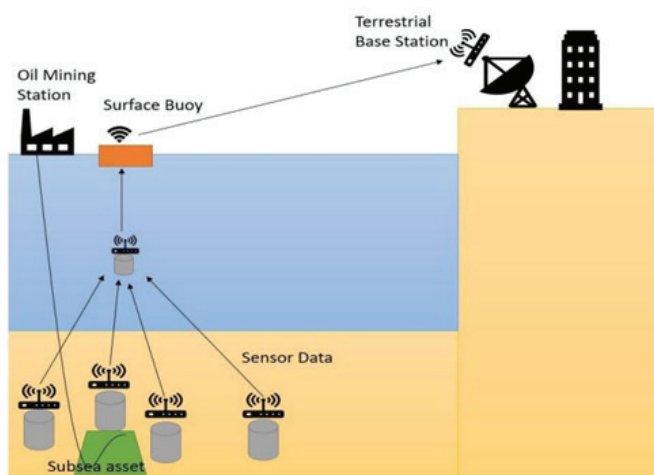


Illustration of UWSN borrowed from this paper

A team of researchers at Chitkara University led by Dr. Nitin Goyal, highlighted that oceans' harsh underwater conditions pose significant challenges to the researchers to collect data from the nodes. Therefore, authors of this work critically analysed efficient techniques being used for collecting data from the sink nodes and presented its comparative analysis based on various QoS parameters such as delay, packet drop ratio and energy consumption during communication. Their team has also analysed various data collection challenges from UWSNs and suggested possible approaches to overcome those. This article has summarised the concept of data collection in UWSNs along with its classification based on routing. Some data routing approaches based on the quality of service parameters

Team from Chitkara University has won a prestigious GYTI 2020 Award

For their Socially Relevant Innovation

A team from Chitkara University has won a prestigious Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI) - Gandhian Young Technological Innovation Award (GYTI) 2020 for their socially relevant innovation titled MOKSH – Convert Crop Waste Into Wealth. They have successfully commercialized a rice stubble management machine for eradicating the issue of rice stubble burning in the fields.

Chitkara University was the only private university among six other winners, mostly from IITs and IISc, to win GYTI2020 award. Infact this innovation from Chitkara University has already received appreciations and awards at multiple global forums like GIST initiative by American Association for Advancement of Sciences, DST-Lockheed Martin India Innovation Growth Program and Ingenuity 2020 that was held in China to name a few.

Team members of this project team are Varinder Singh, Amrinder Singh and Gurditt Singh from Department of Mechanical Engineering and Nitika Dhingra from CURIN and their mentor is Dr. Nitin K Saluja, Associate Director Research (CURIN).



CURIN's Interactive and Immersive Technology Lab Shines at International Level

Two Projects from the Labs won External Competitions

Immersive and Interactive Technology is an umbrella term that is used for research and development in Augmented Reality (AR), Virtual Reality (VR) and Mixed Reality (MR) technologies for educational research, training solutions and industry management fields. There has been a drastic growth in these technologies during the past few years.

Immersive and Interactive Technology Lab (IITL), CURIN, Chitkara University, Punjab is one of the first initiatives in North India that works in various AR/VR/MR projects in the field of education, training, healthcare and entertainment. IITL is headed by Dr. Archana Mantri, Vice Chancellor, Chitkara University, Punjab with her multidisciplinary team of researchers and developers. Recently following two projects from IITL have won external competitions -

A project titled Dhvani VR won third prize in 30 hours international hackathon entitled ReHack that was organized by inQ Innovation Global and T-hub under Australia India Innovation Bridge Program. The project competed against 360 teams from all over the world. Dhvani VR is an intelligent low-cost hearing loss-screening device that uses VR to perform early diagnosis of hearing loss. Its in-built decision support feature gives accurate results so that hearing loss can be treated at earliest. It is a simple and portable device that can be used by any hospital staff. This concept has been developed by Mr. Shivam Sharma and Dr. Neha Tuli from IITL, CURIN, Chitkara University. They have received a cash prize of AUD 2000 along with a cloud and software credits worth of AUD 3000. They will also get fast track entry into level 3 of 100 open global start-up programs.



The other project from the lab titled Mano-Aid won second position and a prize money of INR 50K along with a three-month incubation support in Technology Exposition organized by Biotechnology Industrial Innovation Centre (BIRAC) and IKP Knowledge Park (IKP). The theme of the exposition was Medical Devices and Digital Healthcare. This project team from Chitkara University comprising of Mr. Gurwinder Singh, Mr. Shivam Sharma and Dr. Neha Tuli presented their project idea which is a VR based solution to provide cognitive behavioral therapy to the mental health patients. They competed against 25 teams from all over the country in the competition.

Atul Sardana and 13 more 6:25 PM You

Technology/Process Solution

1. Environment for Therapy

Mobile Based Virtual Reality

2. Monitoring Patient's Response

Glove Monitoring System
(Pulse Sensor, Galvanic Skin Response Sensor, 3-Axis Accelerometer and Gyro Sensor)

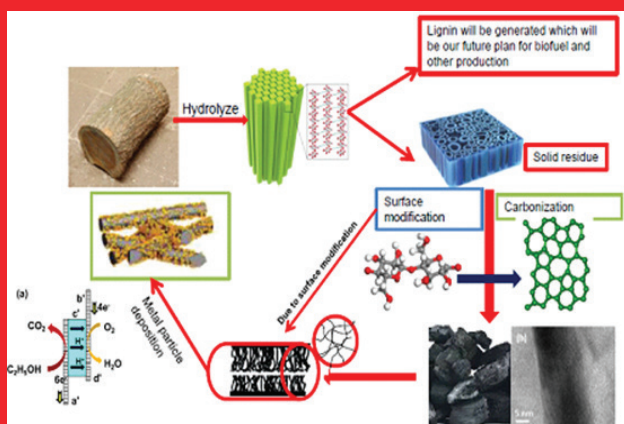
3. Social Distancing

Online CBT (Cognitive Behaviour Therapy)

Deepanwita Chattopadhyay

Ethanol Fuel Cell is being developed at Chitkara University

A research in our university headed by Dr. Partha Khanra is working on nano-materials synthesis and its applications for multiple domains. His group is currently focussing on harvesting and storing clean and green energy. They are developing direct ethanol fuel cell using invasive plants carbon that will be more economical for the transportation industry. In addition, the group is also working on making bio absorbent materials and waste material management solutions. Their research group comprise of Dr. Pankaj Kumar, Dr. Partha Khanra, Dr. K.R. Ramkumar and Dr. Mohit Kapoor.



Expert Talks Delivered at Multiple Forums

by Faculty Members from Doctoral Research Centre (DRC), Chitkara Business School (CBS)

Dr. Amit Mittal – Dean, DRC, CBS delivered two invited talks on the topics ‘Critically Reviewing the Literature and Defining the Problem’ and ‘Situational Leadership’ in two different events. The former was delivered during a one-week workshop that focussed on essentials of research and was organized by Centre for Professional Development in Higher Education, UGC-HRDC, University of Delhi, India on September 14, 2020. The latter was delivered during a faculty development program organized by Gurukul Kangri University, Haridwar, India on September 15, 2020 and was attended by close to 100 participants.

Dr. Mittal along with his two colleagues from DRC, CBS - Dr. Deepika Jhamb and Dr. Pawan Kumar Chand delivered a workshop titled Research Methods: A Skill Building Approach. The workshop was specially designed for the research scholars and the major emphasis of the workshop was to describe the relationship between the scientific and the pragmatic approaches of research. It was organized by Dr. Y S Parmar University of Horticulture and Forestry, Himachal Pradesh, India on September 8, 2020.

Dr. Pawan Kumar Chand and Dr. Deepika Jhamb were invited by Universal Group of Institutions, Punjab, India on August 1, 2020 to deliver a guest lecture. They delivered a guest lecture on the topic Importance of Ethics in Business Research with an objective to unveil the knowledge of research ethics in writing manuscripts for reputed journals. Basic concepts of research metric and publication process were also shared with the students and they were encouraged to write quality research papers.

Dr. Urvashi Tandon and Dr. Shashi were invited by PML SD Business School, Chandigarh, India on September 16, 2020 to deliver an expert lecture on the topic Analyzing Case Study for the Employability Perspective: A Job Interview. The session was attended by 41 students who got a lot of insight into how to confidently solve business cases at the time of job interviews.

CHITKARA UNIVERSITY

University of Delhi
Centre for Professional Development in Higher Education
Online 7 Day Workshop on

Research Methodology (RM-1) on the theme "Research for Resurgence"

Resource Person
Dr. Amit Mittal
Professor & Dean,
Doctoral Research Centre,
Chitkara University, Punjab, India

14th September
09:30 A.M. – 11:00 A.M.

CHITKARA UNIVERSITY

Doctoral Research Centre presents

Online One Day Workshop at
Dr. Yashwant Singh Parmar University of Horticulture & Forestry HP State University

**RESEARCH METHODS
A SKILL-BUILDING APPROACH**

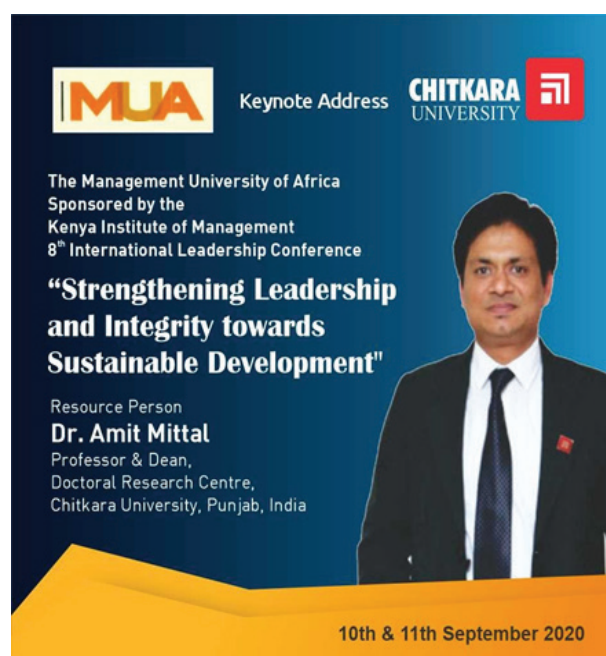
- Literature Review and Theoretical Framework
- Hypotheses Development, Measurement Scales, and Questionnaire Development
- Research Ethics and Publication Process

08th September 2020 - 11:15 A.M. - 03:30 P.M.

Resource Person Dr. AMIT MITTAL Dean & Professor, Doctoral Research Centre Chitkara University Punjab, India	Resource Person Dr. DEEPIKA JHAMB Associate Professor, Doctoral Research Centre Chitkara University Punjab, India	Resource Person Dr. PAWAN KUMAR CHAND Associate Professor, Doctoral Research Centre, Chitkara University Punjab, India	Guest Dr. RAHUL CHHMAN Associate Professor Department of Business Management Dr. Yashwant Singh Parmar University of Horticulture & Forestry Himachal Pradesh State University, Solan

Workshops and faculty development programs attended by members of DRC, CBS

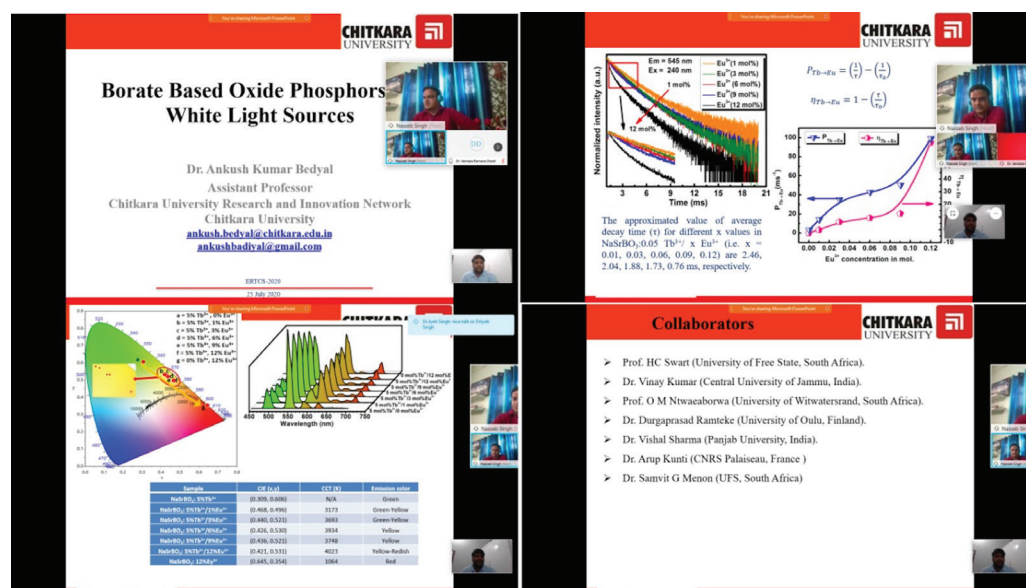
- Dr. Pawan Kumar Chand, Dr. Urvashi Tandon and Dr. Praveen Kumar attended a three-day workshop on Online Teaching and Learning Tools. The workshop was organized by Dr. Ambedkar Institute of Technology, Bengaluru, India during July 22-24, 2020. Dr. Pawan attended a workshop on Art of Writing Research Papers: Literature Review Perspectives on July 28, 2020 and it was organized by Sri Guru Gobind Singh College of Commerce, University of Delhi, India. He also attended a session on Waste to Energy Generation: Materials and Techniques that was organized by Partap University, Jaipur on August 29.
- Dr. Deepika Jhamb and Dr. Pawan attended a one-day program on Envisioning the Role of BFSI Sector in Sustenance of Indian Economy that was organized by Institute of Management Studies, Noida, India on August 8, 2020. Dr. Deepika also attended two webinars - SAP ERP Practices – India & Abroad for Management Professionals (on August 14 by Sree Vidyanikethan, Tirupati, India) and COVID-19 and its Impact on Global Economy (on September 13 by Lead India Foundation, Bengaluru, India).
- On August 19, 2020 Dr. Deepika, Dr. Pawan and Dr. Shashi attended a webinar on Early Internationalizing Firms during the Covid-19 Pandemic that was organized by Amity University, Noida. Dr. Pawan and Dr. Sashi attended an event on Role of Teachers in NEP that was organized by Jain University, Bengaluru on September 4, 2020.
- Faculty members from DRC, CBS attended a session on Ethics in Research and Publication that was organized by Chitkara School of Health Sciences on August 19. They also attended a session on Generation Z: Demystified that was organized by Partap University, Jaipur on August 21 with an objective to understand the thinking process of Generation Z. During August 24 – 29, members of DRC, CBS attended an AICTE faculty development program on Changing Paradigms in Management Education, which was organized by Guru Nanak Institute of Management & Technology, India.
- Dr. Pawan and Dr. Arun Aggarwal attended a webinar on Green Economy-Way Forward that was organized by Dr. DY Patil School of Management and MCA, Lohegaon, Pune on August 24. Dr. Arun Aggarwal attended a five-day workshop on Intellectual Property Rights and Entrepreneurship Development that was held on September 1-5, 2020 and was organized by Department of Management Studies (DoMS) in association with Institute Innovation Cell (IIC) at National Institute of Technology, Silchar, India.
- Dr. Urvashi Tandon and Dr. Praveen Kumar attended a two-day workshop on Digitise your Department that was organized by CURIN, Chitkara University during 26-27, August 2020. Dr. Urvashi also attended a faculty development program on ICT Enhanced Teaching, Learning and Creating MOOCs that was organized by Ramanujan College, New Delhi during August 18–25, 2020.
- P.K. Parthasarathy, Dr. Archana Mantri, Dr. Amit Mittal and Dr. Praveen Kumar participated in Congress on Intelligent Systems 2020 (CIS-2020)-Advances in Intelligent Systems and Computing during 5-6 September 2020 and presented their paper titled Digital Brain Building a Key to Improve Cognitive Functions by an EEG-Controlled Videogames as Interactive Learning Platform. The conference was organized by Soft Computing Society, New Delhi.
- Dr. Amit Mittal attended a two-day conference on Strengthening Leadership and Integrity towards Sustainable Development that was organized by Management University of Africa, Nairobi, Kenya during September 10 – 11, 2020. During this conference, he delivered a talk on leadership in the age of technological and environmental disruptions in this prestigious annual conference. He suggested solutions and coping strategies for specifically for small and medium enterprises operating in the emerging markets of Africa and Asia. His prior experience of working in Africa gave him a unique insight into the potential problems faced by African organizations especially in the times of the COVID-19 pandemic. Several scholars and industry representatives from different parts of Africa and other developing countries participated in the conference.



CURIN Researchers Invited as Speakers and Session Chairs in International Conferences

Also Paper Presentations in Conferences by Our Research Scholars and Faculty Members

- Dr. Ankush Kumar Bedyal was invited to deliver a talk at Virtual International Conference on Emerging Research Trends in Chemical Sciences (ERTCS-2020) organized by the PG Department of Chemistry, Govt. Post Graduate Degree College Rajouri during July 24 – 26. He delivered a talk on Borate Based Oxide Phosphors for White Light Sources. In his talk, Dr. Bedyal highlighted the potential of nanophosphor in light-emitting diode (LED) to generate white light. He explained the need of phosphors for white light production. He also highlighted the flaws in the presently available phosphor and what we need to do in order to rectify those flaws.





- Dr. Kulbhushan Sharma and Preeti Sharma – VLSI CoE, Chitkara University attended IEEE VLSI Device Circuit and System (VLSI DCS) 2020 conference held in Kolkata, India during 18-19, July 2020 and contributed two research papers. Nearly, 104 papers were virtually presented in this conference that got published later in IEEE. The plenary talks, keynote talks and technical talks in the field of device implementation, circuit designing, hardware descriptive languages and energy harvesting systems etc. were also conducted. The conference was attended by participants from different parts of the country and covered both analog and digital applications of devices and circuits.
- Three research scholars Latika Kakkar (PhD Scholar), Ms. Harsha Chauhan and Mr. Vishal Verma (M.E. Scholars) presented four research papers under the supervision of Dr. Deepali Gupta and Dr. Sheifali Gupta in the 2nd International Conference on Information Management & Machine Intelligence (ICIMMI-2020). The conference was organized by Poornima Institute of Engineering & Technology, Jaipur, India in collaboration with the publication partner Springer Nature during July 24 - 25, 2020.
- From the Centre for Liquid Crystal Research (CLCR), CURIN, Chitkara University, Punjab, six research papers were presented by the research scholars (Vandna Sharma, Ankit Rai Dogra, Adhish Singh and Ridhima Gahrotra) under the guidance of Dr. Pankaj Kumar - Professor (CURIN) in SCOPUS indexed National Conference on Advances in Applied Sciences and Mathematics (NCASM-2020) organized by Chitkara University, Punjab during September 24-25, 2020. This conference was the perfect forum for participants to express their innovative thoughts and showcase their novel research work virtually on a global platform. All the peer reviewed accepted papers will be published by the American Institute of Physics (AIP) Conference Proceedings having H-index: 64.

In the same conference two more research scholars - Mudita and Ramneet under the supervision of Dr. Deepali Gupta presented their work. Mudita also participated and presented her work in International E-Conference on Computational Intelligence and Data Engineering (ICCIDE-2020) held during 8-9 August 2020 and was organized by Vasavi College of Engineering, Hyderabad.

31 Consultancy Projects

during July – September 2020

CURIN facilitated 31 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 the prominent consultancy projects from this list are –

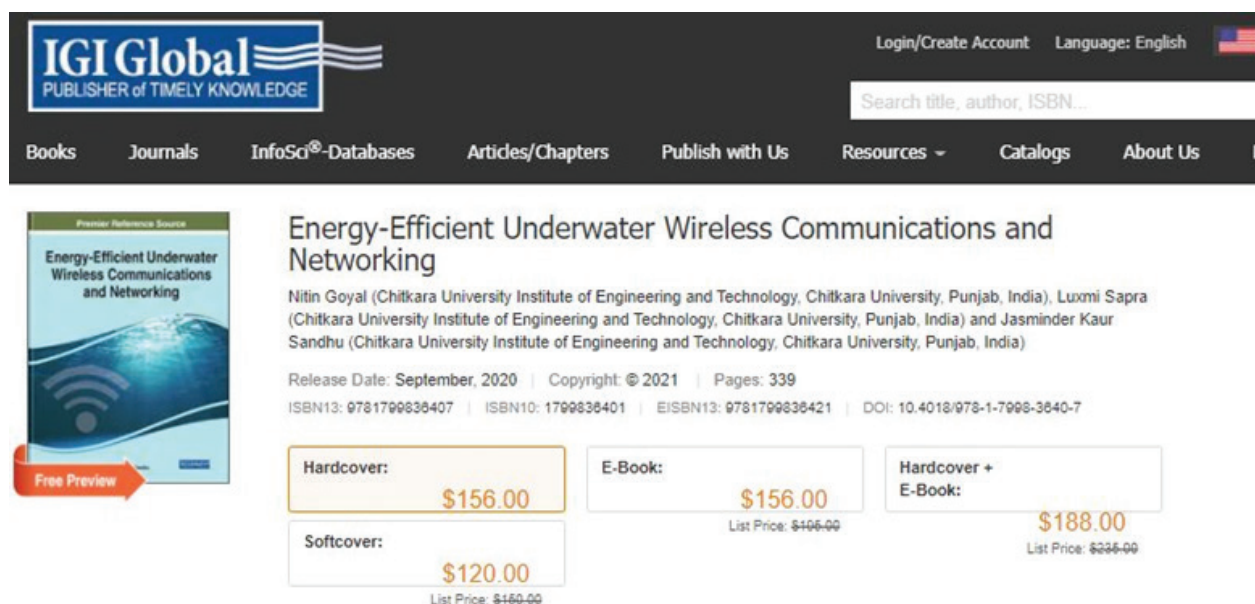
- Consultancy and Academic Support Services to International Students (sponsored by Agamline Edu Systems Pvt. Ltd., Mumbai)
- Managing Short Term Financing and Doing Market Research For Business Expansion (sponsored by Khadi Gramodyog Vatika, Muktsar, Punjab)
- COVID-19 UNICEF CRA Project (sponsored by Community Radio Association)
- Workshop on Enhancing the Count and Quality of Research Publications
- Managing Short Term Financing and Doing Market Research For Business Expansion (sponsored by Cotton Industries, Rajasthan)
- Architectural Drawing Proposal for Storage Facility (Global Green Solutions Consultants Pvt. Ltd., Bengaluru)

As per the consultancy policy of Chitkara University, 90% of the consultancy fee is retained by the project heads.

A Book Published by Three Faculty Members from CURIN

With IGI Global Academic Publisher, USA

Dr. Nitin Goyal, Dr. Luxmi Sapra, Dr. Jasminder Kaur Sandhu from CURIN, Chitkara University, Punjab published a book titled Energy-Efficient Underwater Wireless Communications and Networking with IGI Global Academic Publishers, USA. Underwater wireless sensor networks (UWSN) find applications in variety of areas including oceanographic data collection, disaster management or prevention, assisted navigation, attack protection, and pollution monitoring. Similar to terrestrial wireless sensor networks (WSNs), UWSNs consist of sensor nodes that collect information and pass it to a base station; however, researchers face many challenges in executing the network in aquatic medium.



IGI Global
PUBLISHER of TIMELY KNOWLEDGE

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Energy-Efficient Underwater Wireless Communications and Networking

Nitin Goyal (Chitkara University Institute of Engineering and Technology, Chitkara University, Punjab, India), Luxmi Sapra (Chitkara University Institute of Engineering and Technology, Chitkara University, Punjab, India) and Jasminder Kaur Sandhu (Chitkara University Institute of Engineering and Technology, Chitkara University, Punjab, India)

Release Date: September, 2020 | Copyright: © 2021 | Pages: 339

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Hardcover: \$156.00
Softcover: \$120.00
List Price: \$160.00

E-Book: \$156.00
List Price: \$166.00

Hardcover + E-Book: \$188.00
List Price: \$226.00

This book can serve as a crucial reference source that covers existing and future possibilities as well as challenges in the research area of UWSNs. While highlighting the topics such as digital signal processing, underwater localization, and acoustic channel modeling, the book is ideally designed for machine learning experts, IT specialists, government agencies, oceanic engineers, communication experts, researchers, academicians, students, and environmental agencies concerned with optimized data flow in communication network, securing assets, and mitigating security attacks. The research topics related to UWSNs covered in this book include:

- Acoustic Channel Modeling
- Autonomous Underwater Vehicles (AUVs)
- Bandwidth Efficiency
- Communication Architecture
- Communication Bandwidth
- Data Collection and Processing

- Digital Signal Processing
- Fault Management
- Machine Learning
- Oceanic Engineering

Dr. Luxmi Sapra won 3AI Pinnacle Award 2020 in category Women in AI and Analytics. The award was presented to her during 3AI Pinnacle Spectre Summit and Awards that was held on August 29, 2020. 3AI is one of the largest AI & Analytics Association for the aspirants and professionals in this domain.



Dr. Nitin and Dr. Luxmi were also part of following activities conducted during the quarter -

- Dr. Nitin participated in an online Faculty Development Program (FDP) on Emerging Trends in Computer Vision and IoT from 2 to 6 July 2020. It was organized by CURIN and attended by about 100 participants. Dr. Nitin also participated in TEQIP-III online Short Term Course (STC) on Applications of Machine Learning in the Advancements of Computer Science from 17 to 22 August 2020. It was organized by Department of Computer Science and Engineering, Dr. B. R. Ambedkar National Institute of Technology, Jalandhar, Punjab. More than 200 participants were there in this STC and experts from both India and abroad delivered their lectures in this program.
- Dr. Luxmi attended a five-day workshop on Computational Intelligence Systems and Security during 20 – 24, July 2020 that was organized by Shri Mata Vaisho Devi University, Katra, J & K. Dr. Luxmi successfully completed a three-day course on Fundamentals of Deep Learning organized by Indo-Taiwan Joint Research Centre on Artificial Intelligence and Machine Learning, IIT, Ropar during 15-17, August 2020. In addition, she attended two webinars organized by BVICAM, New Delhi on IOT-Industrial Perspective that was held on July 11 and Unleashing Data Science and AI that was held on August 8.

Individual Achievements and Contribution

In research & development and innovation by CURIN faculty members and scholars

Dr. S.N.Panda, Director Research (CURIN) was invited as Expert Speaker during National Web Conclave on Innovation and Intellectual Property Protection conducted by Dr. C.V. Raman University, Bilaspur, Chhatisgarh on July 13, 2020. More than 100 scholars across the country participated in this event where Dr. Panda narrated about many innovations and he discussed how these innovations get materialize and finally get ready for Intellectual Property Protection.

He was also invited to deliver an expert talk on “Transformation of Innovation to IPR” at UGC HRDC Staff Academic College, Punjabi University, Patiala in a refresher course of college and university cadre teachers of India.

Dr. Shalli Rani – CURIN, Chitkara University and Dr. Barry Sanders - Director IQST, University of Calgary, Canada have collaborated for research work on quantum computing. Dr. Shalli's Ph.D student Cherry Mangla has been invited to carry out her Ph.D. work in Dr. Barry's lab as visiting research student. Dr. Barry Sanders is well known in quantum computations field for the last 20 years now. Cherry is going to be a part of his current project that is funded by Government of Alberta, Canada on Quantum Network Security.

Dr. Harjeet Singh – Asst. Professor (CURIN) submitted a research project proposal titled Development of Speech to Writer's Own Handwriting Transformation System for Physically Impaired People for funding support of INR 22.94 lacs to Ministry of Electronics & Information Technology, Government of India, New Delhi, India.

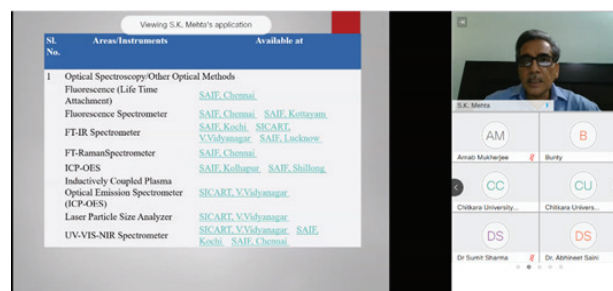
Dr. Pankaj Kumar – Professor and Head, Centre for Liquid Crystal Research, CURIN was invited to deliver a lecture in one week Short Term Course on Recent Trends in Advanced Materials and Devices, organized by Dr. B R Ambedkar National Institute of Technology, Jalandhar, Punjab, India during September 21-25, 2020. He delivered his lecture on the topic Analysis of Extinction Cum Absorption Coefficients Based on Beer's Law for CNTs and Dye Doped Polymer Dispersed Liquid Crystals.

Dr. Shalli Rani has been appointed Associate Editor of IEEE Future Direction Letters. This newsletter highlights activities across all IEEE Technical Communities as well as their initiatives. She is the lead guest editor of one of the special issues in Elsevier IoT Journal. The title of this special issue is Applications of IoT Technology in COVID-19 Pandemic Response: Challenges and Solutions. She is also serving as editor for Scopus indexed Springer book in EAI series. This book is titled WSN and IoT for Smart Cities: Machine Learning Perspectives.

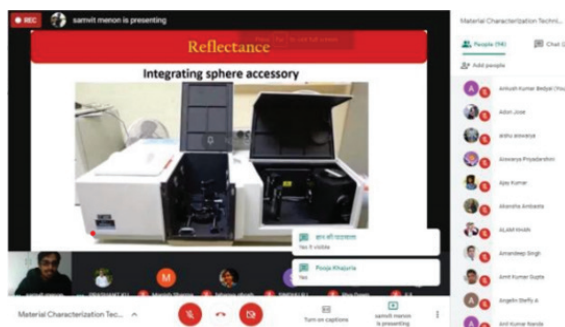
The poster is for a National Web Conclave organized by the Department of Information Technology and Computer Science with IQAC, Dr. C. V. Raman University, Bilaspur (C.G.). The event is titled "Innovation and Intellectual Property Protection" and is scheduled for 13 July 2020 at 2PM to 3PM. The featured speaker is Dr. S. N. Panda, Professor and Director (Research) at Chitkara University Research and Innovation Network, Chitkara University, Rajpura (Punjab). The poster includes a quote: "Intellectual Property Protection plays an important role in the economic growth and in today's modern world. Information Technology and Computer Science are one of the most innovative, dynamic and highly advanced segments that drive economic growth. Intellectual Property Protection thus plays an important role in value creation in these technologically advanced segments thereby fostering innovation." The contact email is panda.india@gmail.com, snpanda@chitakara.edu.in.

17 such sessions were conducted during July – September 2020

- A team from CURIN comprising of Dr. Deepali Gupta, Dr. Shalli Rani, Dr. Sheifali Gupta, Dr. Rakesh Ahuja and Dr. Manish Sharma organized a Faculty Development Program (FDP) on Emerging Trends in Computer Vision and IoT during July 2-6, 2020. The program was attended by 250+ participants from all over the country and the topics that were covered during the workshop included role of machine learning and deep learning in cyber security, medical image analysis using deep learning, IBM cloud and services, role of IoT on sustainable development and recent trends in digital image processing. The workshop was very comprehensive and was appreciated by the participants.

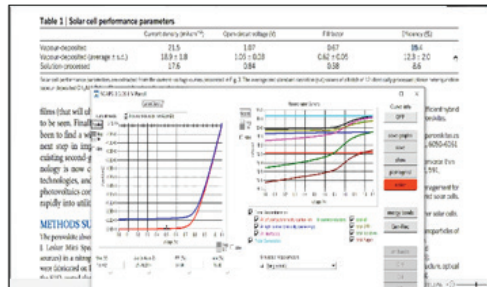


aspects and practical problems were also discussed during the workshop.



- Dr. Rahul Pandey and Dr. Jaya Madan from VLSI Centre of Excellence, CURIN, Chitkara University, Punjab conducted a four-day online hands-on workshop on Solar Cell Simulation using Open-Source TCAD Software (SCAPS) during July 22-25, 2020. A total of 41 faculty participants from all over India attended this workshop that covered the following topics basics of SCAPS-1D simulator, c-Si-based pn junction solar cell, how to create/add a new material in SCAPS-1D, calibration of state-of-the-art solar cell using SCAPS-1D and batch setup for PV parameter extraction.

A follow-up and advanced level workshop was conducted with a title Research Level Understanding and Hands-on Training on SCAPS-1D for the TCAD Designing of Solar Cells during Sep 22 – 25 that was attended by 25 participants from different institutions.

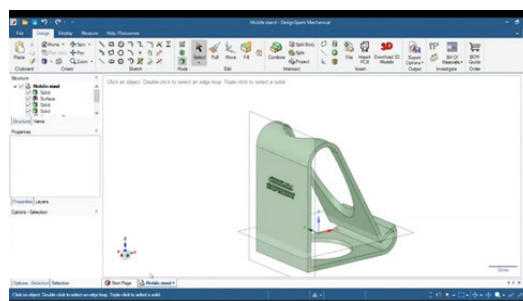


- A panel discussion session entitled How to Collaborate for International Research was conducted by CURIN on August 8, 2020. The panellists of this session were Dr. Varinder Kanwar - Vice Chancellor Chitkara University, Himachal Pradesh, Dr. S.N.Panda

- Director Research, Chitkara University, Punjab, Dr. Nitin Saluja - Associate Director Research, Chitkara University Punjab and Dr. K.R. Ramkumar, Associate Professor – Research, Chitkara University, Punjab, who discussed about their international exposure and how they collaborated with international organizations for research and innovation. The session was moderated by Dr. Shaili Rani - Associate Professor – Research, Chitkara University, Punjab.



- A five-day workshop on 3D Designing and 3D Printing was conducted by Chitkara University NewGen IEDC, CURIN to teach the fundamentals of rapid prototyping to the participants. This hands-on workshop was held during Aug 4-7 and Aug 10 wherein participants learnt to build 5 different 3D designs using a free CAD tool. These designs were later 3D printed in front of the participants to give them an exposure on 3D printing basics. The workshop was delivered by Mr. Chanpreet Singh and Ms. Aashwarika Sharma and was convened by Mr. Sagar Juneja.



- A workshop on Chemical Handling & Safety Awareness was conducted to train those personnel of the university who work in close proximity with chemicals. The workshop was designed in a way to provide practical knowledge of working safely in the conditions or situations that involve

the transportation, storage, use and disposal of chemicals as well as handling emergency situations. The workshop was held during August 27-28 and Dr. Jyotsna Kaushal and Dr. Pooja Mahajan - Centre for Water Sciences (CURIN), Chitkara University Punjab were the resource persons.



- A webinar on SDN and Openness in New Networking Ways was conducted by IoT and Cloud Computing Lab, CURIN that is headed by Dr. S.N. Panda. The objective of the webinar was to discuss effective utilization and flexibility of Software Defined Network technology that is an emerging technology. The session was well attended by a large number of students and research scholars from different parts of the country and it was held on September 12.
- Dr. Shalli Rani along with her PhD scholar Ms. Himanshi Babbar conducted a two-day workshop on Software Defined Networking using Ryu Controller during 16 – 17 September, 2020. Topics covered during the workshop included introduction to SDN, how to capture the openflow packets using the wireshark and install the python packages in Ryu, Ubuntu 18.04 LTS etc.
- CURIN organized a FDP in association with the University of Calgary, Canada, and Oak Ridge National Laboratory, USA on the topic Contribution of SMART Nanomaterials Towards Scientific Community. 26 participants from all over the country attended this FDP that was held during 21-25 September. The resource persons in the workshop were Dr. Jiadeng Zhu (Oak Ridge National Laboratory, USA), Dr. Poliraju (University of Calgary, Canada), Dr. Jyotsna Kaushal, Dr. Pankaj Kumar, Dr. Partha Khanra, and Dr. Mohit Kapoor from Chitkara University India. This FDP shed light on hot topics of sustainable energy materials and nanotools for cancer diagnostics, water

treatment, drug delivery, and optical applications. The workshop was convened by Dr. Mohit Kapoor and Dr. Partha Khanra.

CHITKARA UNIVERSITY **OAK RIDGE National Laboratory**

Faculty Development Program on

CONTRIBUTION OF SMART NANOMATERIALS TOWARDS SCIENTIFIC COMMUNITY

Fee = Rs. 300/-

Convenors:
Dr. Mohit Kapoor & Dr. Partha Khanra
Contact: mohit.kapoor@chitkara.edu.in

Organized by:
CURIN, Chitkara University
in Association with University of Calgary, Canada and Oak Ridge National Laboratory, USA

Schedule and Fee:

- Renewable Energy Resources: 21st Sept (6:00 – 7:00 pm)
- Biomedical Sciences: 22nd Sept (6:00 – 7:00 am)
- Optics and Liquid Crystals: 23rd Sept (10:00 – 11:30 am)
- Energy Storage and Nanomedicine: 24th Sept (10:00 – 11:30 am)
- Water Sciences: 25th Sept (10:00 – 11:00 am)

Who can attend:

- Researcher
- Academician
- Industrial Person

Payment and Registration Bill is given below.
<https://paym.chitkara.edu.in/mainmaterial-towards-scientific-community/>

Resource Persons:

- Dr. Jiadeng Zhu, Oak Ridge National Laboratory, USA
- Dr. Poliraju Kalluru, University of Calgary, Canada
- Dr. Pankaj Kumar, Chitkara University, India
- Dr. Partha Khanra, Chitkara University, India
- Dr. Mohit Kapoor, Chitkara University, India
- Dr. Jyotsna Kaushal, Chitkara University, India

- Dr. S.N. Panda and Dr. Sachin Ahuja - Directors Research (CURIN) conducted a workshop on Demystifying the Art of Writing Effective Research Funding Projects on September 22, 2020. They explained the proposal writing techniques, how to convert an innovation to project proposal, how to extract research contents etc. They also showcased and discussed examples of sample proposals.

Workshop on
Demystifying the Art of Writing Effective Research Funding Project

CHITKARA UNIVERSITY

CONCEPT

Whether participants are in the midst of a Master's or PhD fellowship application or Full Time Research Faculty and want feedback or they want to explore about writing proposals, this workshop provides a effective approach to the process. The workshop will start with ways to search for an open call for funding and keyword alignment of the project proposal with the funding call by taking participants through mock exercise. The participants will explore the favour of writing good research projects and understanding the do's and don'ts of effective proposal writing. Through a combination of exercises and discussions on a sample funding project, participants will gain first-hand experience in the grant writing and grant making process.

Date: 22nd September 2020 | **Time:** 10:00 am-12:00 pm
Registration Link: <https://paym.chitkara.edu.in/writing-effective-research-funding-project/> **Registration Fees INR 500**

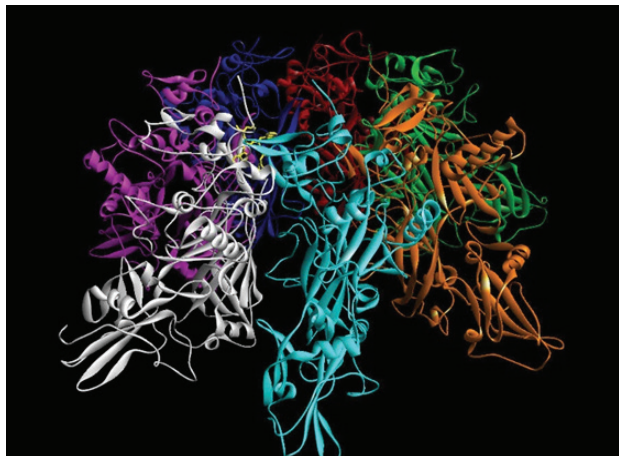
About the Resource Persons

Dr. S.N. Panda,
Professor & Director Research, Chitkara University
Dr. S.N. Panda has had a long career as accomplished academician and a thorough researcher with numerous patents, researcher papers, awards & funded projects. He is the founder member of Chitkara University Research and Innovation Network. Presently, serving as Director Research at Chitkara University, Punjab. He is interested in computer networks, cyber security and adhoc networks.

Dr. Sachin Ahuja
Professor & Director Research - OFFC, Chitkara University
Dr. Sachin Ahuja is Director Research and founder member of Chitkara University Research & Innovation Network at Chitkara University, Punjab. He is currently handling the office of patent facilitation licensing & consultancy. He is interested in data mining, machine learning and artificial intelligence.

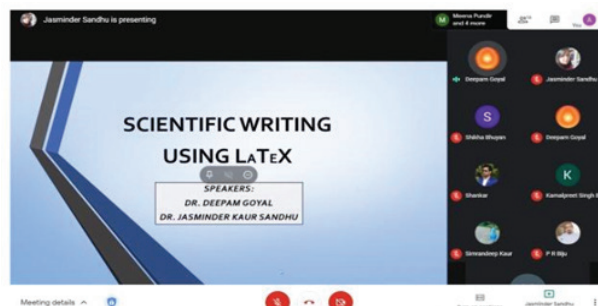
- Centre for Life Sciences, CURIN organized a three-day workshop on In Silico Methods and Analysis for Proteomic, Genomic and Metabolomic Data in Molecular Biology. The workshop focused on techniques and studies on signalling pathways and reactions of the living cells. The coordinated network analysis techniques in living bodies were discussed, covering how they generate patterns and their analysis becomes crucial for identifying the underlying causes of diseases. The workshop introduced various In silico methods relevant for

preliminary data analysis of living cells and it was held during September 24-26, 2020.

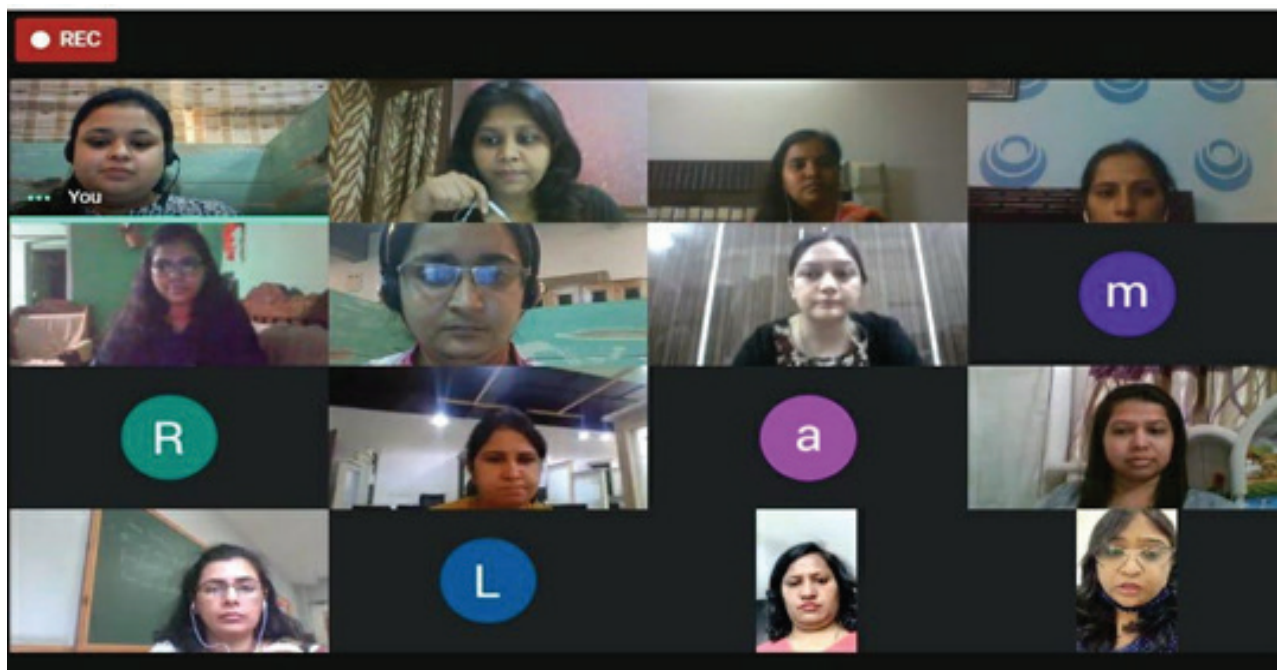


- Dr. Kulbhushan Sharma and Ms. Preeti Sharma from VLSI Centre of Excellence Chitkara University, Punjab organized a three-day workshop on Analog Circuit Modelling and Simulations during 28-30 Sep, 2020. The workshop focused on introduction to modelling, schematic and layout design techniques, technical knowhow of device sizing and methodology to perform various kind of analysis. Besides this circuit implementation and simulation in LT SPICE was also demonstrated in the workshop.
- Dr. Ankush Kumar Bedyal and Dr. Prateek Srivastava organized an online three-day workshop along with

Dr. Jasmininder Kaur Sandhu and Dr. Deepam Goyal as resource persons on Scientific Writing Using LaTeX during 28-30 September, 2020. Participants from different parts of the country expressed interest and registered for the workshop that covered basics as well as advanced concepts and guidelines about structuring and writing scientific papers using LaTeX.



- Dr. Deepali Gupta and Dr. Sheifali Gupta Organized a Faculty Development Program (FDP) on the topic Medical Image Analysis using Deep Learning during September 28-30, 2020. The program was attended by 100+ participants from all over the country and the topics that were covered during the session include getting started with TensorFlow, setting up python environment using Google Colab, CNN using Tensorflow, deploying transfer learning models on CT scan medical images.



Events Attended

By our faculty members and scholars during July – Sep 2020

- Dr. Deepali Gupta and her research scholars - Mudita, Ramneet, Harsha and Vishal attended various webinars and workshops including FDP on Emerging Trends in Computer Vision and IoT (July 2-6); Workshop on Cyber Security and FPGA: The Future Technology (July 7); Webinar on Software Development - Waterfall vs Agile Methodology (July 13); Workshop on Digitize your Department (August 13-14) and FDP on Medical Image Analysis using Deep Learning (Sep 28-30).
 - Dr. Mohd Junedul Haque - Assistant Professor (CURIN) participated in following webinars and FDPs that were organized by different departments of the university - Webinar on Maths is Everywhere: An Essential Part of our Lives (July 2), Emerging Trends in Computer Vision and IoT (July 2-6), Numerical Techniques: An Introduction with Applications (July 9), Fundamentals of Industrial Automation and Industry 4.0 (July 18) and Workshop on Digitize-your-Department (Aug 13-14)
 - Himanshi Babbar – PhD Scholar (CURIN) attended different workshops and webinars including Workshop on Cyber Security and FPGA: The Future Technology (July 7); Webinar on Effective and Efficient Writing of Research Papers for the Web of Science, Scopus Indexed Journal and Conference papers using typeset Research Studio (Aug 29); and completed a certification course on Software Defined Networking by Udemy.
 - Dr. Kulbhushan Sharma from VLSI Centre of Excellence (CURIN) attended three webinars namely Object Recognition YOLO\MOBILE NET\CLOUD (on July 10 and organized by Khalsa College for Women, Punjab); Computer Vision Application Design (on July 14 and organized by Atria institute of technology, Bengaluru) and Brain Computer Interface and Research Technologies (on July 21 and organized by AISSMS Institute of Information Technology, Pune).
 - Vandana Sharma from Centre for Liquid Crystal Research (CURIN) attended various program and workshops including Practical Aspects of Spectroscopic Tools in Chemical and Nano Sciences (July 6 -10); Mastering the Publishing Process (by DST on July 28); An Insight on Technology, Policy and Action in Solid Waste Management (By American Chemical Society and CSIR-CSIO during September 14-17); Recent Trends in Advanced Materials and Devices (by Dr. B. R. Ambedkar National Institute of Technology, Jalandhar during September 21-25) and Contribution of SMART Nanomaterials Towards Scientific Community (during September 21-25).
 - Cherry Mangla – PhD Scholar (CURIN) attended one-week international lecture series on Trends in Artificial Intelligence & Machine Learning during July 16 – 21. It was organized by Department of Computer Applications, North Orissa University, Odisha. She attended an expert talk on Natural Language Processing: The state of Punjabi Language Technology that was organized by Punjabi University, Patiala on July 28. She also attended a two day workshop on Grant Writing Process for Innovative & Entrepreneurial Ideas that was jointly organized by Chitkara University and Indira Gandhi Delhi Technical University for Women during July 30 and 31, 2020.
 - Dr. Harjeet Singh participated in one week FDP on Applied Artificial Intelligence in Engineering and Basic sciences that was held during 10 – 15 August 2020 and was organized by CURIN. He also delivered a session in this workshop. Dr. Harjeet also attended a FDP on Recent Trends in Data Science and its Tools for Researchers organized by AICTE Training and Learning Academy during September 28 – Oct 2, 2020.
 - A team of research scholars comprising of Vishal Verma, Harsha Chauhan, Ramneet, Mudita, and Kanwalpreet Kaur from CURIN participated in a hackathon titled Hack@BVP4.0 that was held on September 2 and was organized by Bharati Vidyapeeth's College of Engineering, New Delhi. They presented their idea on IoT based one stop solution for differently abled people keeping in mind the various precautions that need to be taken during COVID-19 pandemic. Dr. Deepali Gupta and Dr. Sheifali Gupta from CURIN mentored the team.
- Harsha Chauhan also successfully completed a course on Blockchain Essentials conducted by IBM Developer Skills Network.

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 July – Sep 2020.

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- A. Pathania, J. Madan, R. Pandey, and R. Sharma, "Effect of Structural and Temperature Variations on Perovskite/Mg₂Si Based Monolithic Tandem Solar Cell Structure," *Applied Physics A*, vol. 126, pp. 1-12, 2020.
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- M. Dassi, J. Madan, R. Pandey, and R. Sharma, "Effect of Temperature on Analog Performance of Mg₂Si Source Heterojunction Double Gate Tunnel Field Effect Transistor," *Materials Today: Proceedings*, vol. 28, pp. 1520-1524, 2020.
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 - M. Sharma, V. Dhasarathan, S. K. Patel, and T. K. Nguyen, "An Ultra-Compact Four-Port 4x4 Superwideband MIMO Antenna Including Mitigation of Dual Notched Bands Characteristics Designed for Wireless Network Applications," *AEU-International Journal of Electronics and Communications*, vol. 123, 2020, <https://doi.org/10.1016/j.aeue.2020.153332>.
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 - R. K. Dang, D. Goyal, A. Chauhan, and S. Dhami, "Effect of Non-Newtonian Lubricants on Static and Dynamic Characteristics of Journal Bearings," *Materials Today: Proceedings*, vol. 28, pp. 1345-1349, 2020.
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 - R. Pandey, J. Madan, R. Sharma, M. Dassi, and R. Chaujar, "Built-in Reliability Investigation of Gate-Drain Underlapped PNIN-GAA-TFET for Improved Linearity and Reduced Intermodulation Distortion," in *Energy Systems, Drives and Automations*, vol. 664, pp. 205-213, 2020.
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