



CURIN

Chitkara University
Research & Innovation
Network

RES NOVAE

CURIN Research and Development News

Vol. 2021, Issue 2
R&D Activities
During April - June 2021

CHITKARA
UNIVERSITY



विज्ञान एवं प्रौद्योगिकी विभाग
DEPARTMENT OF
SCIENCE & TECHNOLOGY
सत्यमेव जयते



CURIN
Chitkara University
Research & Innovation
Network

CHITKARA
UNIVERSITY
NewGen IEDC



**INSTITUTION'S
INNOVATION
COUNCIL**
(Ministry of HRD Initiative)

CHITKARA
UNIVERSITY
TEC
TECHNOLOGY ENABLING CENTRE

NOVATE⁺ 2021

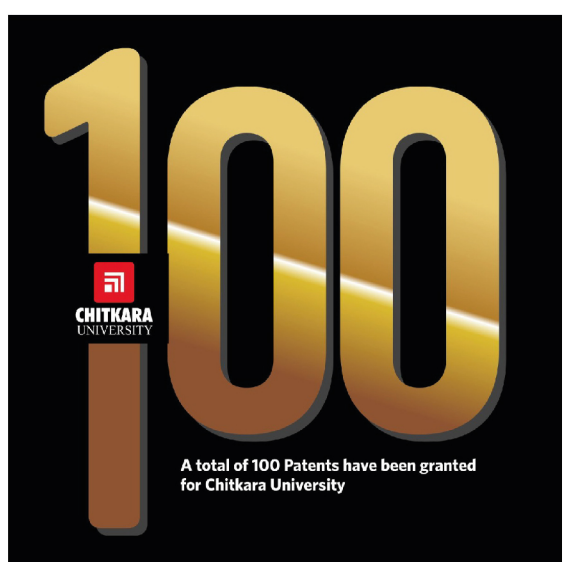
Confluence of Academia, MSMEs and
Start-ups to Address Real World Problems

Cover Story

Annual Flagship Event
NOVATE⁺ 2021 Organized

Jury Round

Chitkara University has been granted
its 100th patent, 19 of them have
come in this quarter



Highlights

- MoU with C-DAC Mohali to Promote Research and Innovation
- 8 Workshops by CURIN in CUARS 2021
- Hosted Grand Finale of Toycathon 2021
- One Research Grant and Two Awards Won by CURIN in the Quarter
- 52 Scopus Indexed Publications in a Quarter



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EDITORIAL TEAM

Consulting Editors

Dr. Rajnish Sharma – *Dean (Research)*

Dr. Sachin Ahuja – *Director (Research)*

Editor

Sagar Juneja – *Asst. Dean (CURIN)*

Joint Editor

Dr. Jasmininder Kaur Sandhu – *Asst. Professor*

Production In-charge

Neeraj Pandey – *Graphic Designer*

Annual Flagship Event NOVATE⁺ 2021 Organized

Funding of INR 25 Lacs to Top-10 projects awarded

By – Sagar Juneja, Editor, Res Novae

NOVATE⁺ is an annual competition organized by CURIN wherein innovative engineering ideas are awarded funding for developing advanced level prototypes. Over the period of time, this competition has become one of the biggest platforms in the region for showcasing innovative project ideas and for winning funding for developing project prototypes. In addition to funding support, this forum also provides a platform where participating teams receive mentoring, expert guidance and collaboration opportunities.

This year NOVATE⁺ 2021 was organized during January 2021 – May 2021 with a theme **Confluence of Academia, MSMEs and Start-ups to Address Real World Problems**. We encouraged students and faculty members to reach out to industry to understand their problems and try to submit joint projects in collaboration with the industry partners. We aimed at supporting only those projects where there was a possibility of developing solutions that could be deployed in the field with support from industry partners. In order to facilitate industry collaborations, we identified several MSMEs in the region and we connected them with people from academia for writing joint projects for NOVATE⁺ 2021.

This idea of industry-academia collaborations for submitting joint projects was appreciated by the prospective participants and we received 79 entries in the competition with as many as 39 industries including MSMEs and start-ups participating in it. A panel of reviewers critically analyzed each of these project proposals and it recommended 22 projects for jury round. The jury round of the competition was held during April 16-17, 2021 and we had invited two seasoned industry professionals to witness the live presentations made by these 22 teams. These industry professionals were Dr. Shivraj Dhaka – Counsellor, Indian Green Building Council and Mr. Sachin Bharadwaj – DGM, Sigma Electric Manufacturing Corporation. The jury panel comprised a total of four members, with Dr. Sachin Ahuja – Director, Research and Dr. Gurjinder Singh – Assistant Professor being the internal members from Chitkara University.



Live presentations – Jury round

The jury round began with the keynote address by Dr. Archana Mantri – Vice Chancellor, Chitkara University, Punjab. She discussed the importance of this year's theme and she laid emphasis on meaningful collaborations for doing good projects.

Each team made a very compelling presentation that was applauded by jury members and after every presentation, there were healthy and constructive discussions. On the basis of the independent scores given by all the jury members,

Top-10 teams were selected and results were declared on May 3, 2021. The list of Top-10 projects is given below. Funding has been sanctioned to Top-10 projects and prototyping work has already started.



Dr. Archana Mantri – Vice Chancellor, Chitkara University, Punjab delivering her keynote address



NOVATE+ 2021 was anchored by Chitkara University NewGen IEDC, Chitkara University TEC (both these entities have been set-up by DST, Govt. of India in Chitkara University), and Institution's Innovation Council (IIC). We also received support from the industry partners who endorsed NOVATE+ 2021. Eco Laboratories & Consultants Pvt. Ltd, Medhaavi Center for Automotive Research, Genesis Controls, Sapiens Labs and Aujus Technology were the industry partners. Thanks are due to all the patrons of NOVATE+ 2021.

The core team from CURIN, Chitkara University that organized NOVATE+ 2021 included Sagar Juneja – Asst. Dean, Dr. Sachin Ahuja – Director (Research), Dr. Gurjinder Singh – Asst. Professor and Dr. Prateek Srivastava – Associate Professor.

NOVATE+ 2021

Confluence of Academia, MSMEs and Start-ups to Address Real World Problems

Congratulations

Results

Top 10 projects

that will receive prototyping funding of upto INR 2.25 Lacs each

1. Automatic Coil Winding Machine	6. Fully Automated Timed Controlled Wireless Water Automation System
2. Bin Farming for Healthy Beings (Agronic Culture)	7. Fully Automatic Bottle Labelling Machine for Pharma Industries
3. Design of Nano-bubble Generator for STP	8. Home Composter
4. Development of a Novel, Low-cost TOC on Line Analyser with UV Oxidation & Conductivity as a parameter to measure Organic Content in Water	9. Rodent Surgical Table
5. Diesel Engine Injector Driver Circuit	10. Smart E - Education for All

Industry Partners

MoU with C-DAC Mohali to Promote Research and Innovation

CURIN to drive different activities under this MoU

Dr. Madhu Chitkara – Pro-Chancellor, Chitkara University and Dr. P. K. Khosla - Executive Director, Centre for Development of Advanced Computing (C-DAC), Mohali have signed a MoU to promote collaboration among the two institutions for joint research and innovation in the identified areas. This MoU signing ceremony was the part of 33rd Foundation Day Function of CDAC Mohali that was held in online mode on May 10, 2021. Dr. V.K. Saraswat – Member, NITI Aayog and Chancellor, Jawaharlal Nehru University was the Chief Guest of the Function.

C-DAC Mohali primarily works in the areas of Cyber Security, Healthcare Technologies, Agriculture Technologies, Artificial Intelligence and Embedded Systems. Thrust areas of research at Chitkara University are Agri-Tech, Health-Tech, Assistive, Edu-Tech, Next Generation Materials, and Civil & Environment Science. There are a lot of commonalities in the research focus of the two institutions which has led to this formal collaboration between Chitkara University and C-DAC, Mohali.



During the ceremony, Dr. P K Khosla applauded the research efforts of Chitkara University and he said “After visiting their campus and meeting the leadership team there, I was sure of the synergy that C-DAC and Chitkara University share. I also visited the research labs and other Centres of Excellence at the University and I was impressed with the work going on in the cutting-edge research areas especially in Immersive and Interactive Technology, VLSI Design, Cyber Security and IoT.”

The key objectives under this MoU include sharing of domain knowledge, expertise and facilities, working on joint research projects, promoting interaction among the scientists and research scholars of both the organizations etc. Dr. S.N. Panda – Director (Research), CURIN is the Nodal Officer from Chitkara University for this association.

According to Dr. Archana Mantri – Vice Chancellor, Chitkara University, Punjab, “The only way we can take giant steps forward is with collaboration. At Chitkara University, we want to contribute to the Nation’s intellectual worth and help the young generation to bring out innovations that can positively impact lives of people. This MoU is one step in that direction.”

Research@CURIN

High Impact Research Papers Published by CURIN
during April – June 2021

Faculty members and research scholars from CURIN publish high quality research articles in some of the top peer reviewed journals and conferences. For this section of the newsletter, we select five high impact research papers from CURIN and attempt to discuss them in the form of short summaries or articles.

The researcher papers that have been discussed in this issue are the ones that have been published during April – June 2021. A complete list of publications by CURIN faculty members and scholars during this period is available in a separate section.

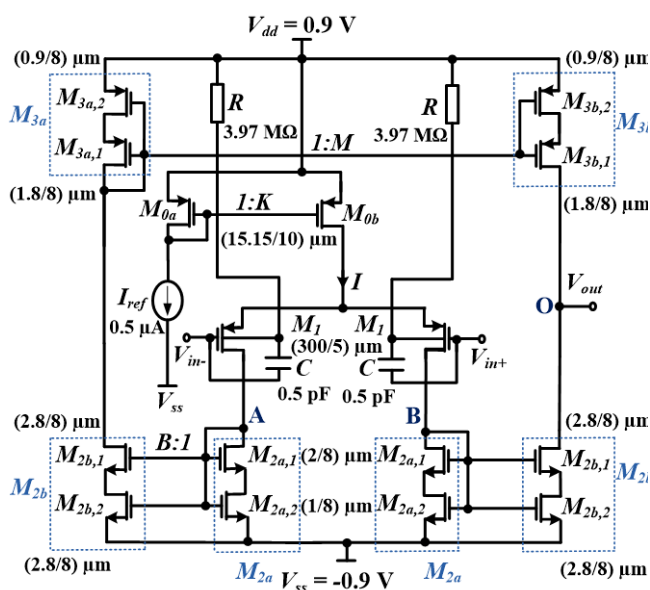
A novel operational transconductance amplifier (OTA) designed for a variety of analog and mixed signal applications

By: Savita – PhD Scholar and JRF, VLSI CoE, CURIN

This article is based on the research paper titled Low-voltage Low-noise Gate Driven Quasi-floating Bulk Self-cascode Current Mirror Operational Transconductance Amplifier published by Dr. Kulbhushan Sharma and Dr. Rajnish Sharma from Chitkara University, Punjab, India in journal entitled Review of Scientific Instruments that is published by American Institute of Physics.

A gate driven quasi-floating bulk self-cascode current mirror operational transconductance amplifier (OTA) operable at ± 0.9 V supply voltage with DC gain of 70 dB, having a gain bandwidth of 250 kHz, noise of only $2.8 \mu\text{V}/\sqrt{\text{Hz}}$ at 1 Hz and power consumption of just $2.96 \mu\text{W}$ designed using $0.18 \mu\text{m}$ technology has been introduced. Results obtained are superior in comparison to gate driven self-cascode current mirror and regular current mirror (CM) OTAs which can be utilized to improve the performance of analog-mixed signal circuits and systems.

A research team at VLSI Centre of Excellence, CURIN comprising of Dr. Kulbhushan Sharma and Dr. Rajnish Sharma have proposed a design of a low-voltage and low-noise gate driven quasi-floating bulk self-cascode current mirror OTA. Though MOS techniques like bulk driven, quasi-floating gate and bulk driven quasi-floating gate applied at differential pair of an OTA circuit offer low-power operation, but they suffer from high noise values in contrast to conventional gate driven (GD) MOS technique. On the other hand, GD MOS can achieve low-noise operation but at the expense of high supply voltage requirement. For this purpose, quasi-floating bulk (GDQ-FB) self-cascode current mirror (SCCM) OTA based on two important techniques namely self-cascode MOS and GDQ-FB has been proposed. While, the former offer advantages of low transconductance and high output resistance, the latter improves gain, gain bandwidth (GBW) and noise performance. Theoretical analysis and simulated results presented in this research effort clearly establishes the fact that GDQ-FB SCCM OTA exhibits greater gain, gain bandwidth and noise in comparison to SCCM and CM OTAs.



The illustration has been borrowed from the published paper

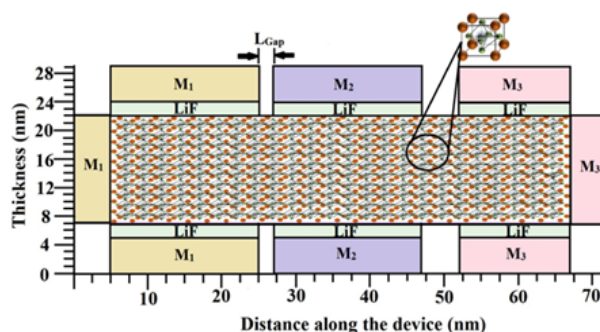
Better alternative to silicon technology for future applications – An organic-inorganic halide perovskite material based tunnel FET switch

By: Preeti Sharma - PhD Scholar, VLSI CoE, CURIN

This article is based on the research paper titled Numerical Simulations of a Novel $\text{CH}_3\text{NH}_3\text{PbI}_3$ based Double-Gate Doping-less Tunnel FET published by Preeti Sharma, Dr. Jaya Madan, Dr. Rahul Pandey and Dr. Rajnish Sharma from VLSI CoE, CURIN in IOP Science journal entitled Semiconductor Science and Technology.

Why there is a dire need to replace silicon-based computer chips with organic-inorganic halide perovskite-based computer chips? Let's try to understand.

Ever evolving technological requirements of newer electronics applications has been driving semiconductor industry into designing new devices and one of them is a Tunnel FET (TFET) with its steeper switching characteristics. There is a strong need to make abrupt junction profile in TFETs, but it requires expensive ion-implantation and annealing techniques. In this regard, silicon-based doping-less TFET pave way for the exponential growth of TFET technology due to its low thermal budget. However, a well-known problem with silicon-based doping-less TFET is the higher value of subthreshold swing (> 60 mV/decade) and as a result this structure does not fulfil the requirements of low-power electronics devices. In addition to this, with technological advancements, silicon-based chips are rapidly approaching their threshold limits and moreover their manufacturing processes are injurious to health and to the environment. Although, the research community have worked on low band-gap material TFET, like Ge-TFET and heterojunction based TFET but they have limitations like temperature-sensitivity and expensive fabrication processes.



The illustration has been borrowed from the published paper

Today research community is extensively exploring organic-inorganic halide perovskite materials that have potential of producing low-cost TFETs and solar cells. The research group at VLSI Centre of Excellence (CoE), CURIN, Chitkara University has proposed a novel design of an organic-inorganic halide perovskite - $\text{CH}_3\text{NH}_3\text{PbI}_3$ based dual-gate doping-less TFET and optimized the same with the help of an industry-standard device simulator (Silvaco TCAD tool) to be not only cost-effective but also to exhibit much better critical parameters like subthreshold swing (27.33 mV/decade), switching ratio (1.85×10^{11}), the cut-off frequency (0.268 THz), and intrinsic delay (1.26 nS) for low-power and high-speed logic applications. In this research article, the authors have also suggested ways such as the use of high-k dielectric material and low-bandgap perovskite material in the source region to boost the device performance.

IoT based smart and efficient building infrastructure

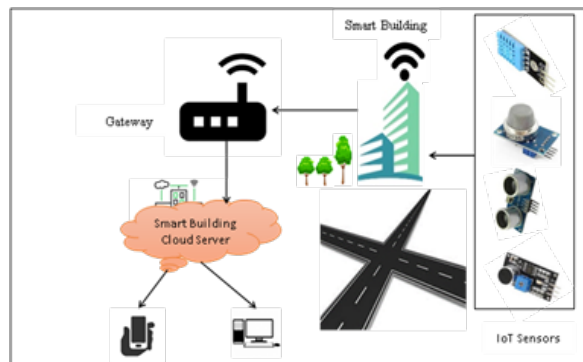
By: Dr. Nitin Goyal – Associate Professor, CURIN

This article is based on the research paper titled Secure and Energy-Efficient Internet of Things Analytics in Smart Infrastructure and Advanced Sensing published by Dr. Nitin Goyal from CURIN, Chitkara University, Punjab in Elsevier journal entitled Computer Communications.

Internet-of-Things (IoT) is proving to be one of the latest innovations that offer interesting opportunities for diverse verticals like smart building, smart grids, smart cities, smart houses, physical defence, e-health, asset, and transportation management etc. One of the most relevant IoT technology areas is smart construction of IoT enabled buildings. Today building infrastructure has major requirements in terms of comfort, accessibility, security, and energy management. As energy demands have risen, there has been a growing focus on energy usage in the buildings. The authors of this work have used IoT technology for a secure and energy-efficient smart building architecture where every device is known by its unique address, and where one of the key web transfer protocols is the Constrained Application Protocol (CoAP). It is an application layer protocol that does not use protected channels for data transfer. To achieve energy efficiency, a smart construction architecture is proposed that manages the performance of all technological systems through IoT. At network layer, a local gateway server device provides continuous monitoring of the smart building. Non-continuous awake state of the CoAP protocol helps in energy reduction in comparison to other existing schemes. Results of the simulation indicate that energy

consumption is lowered by about 30.86% with the use of the CoAP in the smart building, which is less than the Message Queuing Telemetry Transport (MQTT) case. This work also aims to observe how to integrate Datagram Transport Layer Protection (DTLS) protocol with the Secure Hash Algorithm (SHA-256) using optimizations from the Certificate Authority to improve security. Automatic key management, confidentiality, authentication, and data integrity are features of DTLS and it supports cipher suite based on Pre-shared Keys with SHA256, TLS PSK with SHA256 CCM 8.

A large numbers of sensors to be used for collecting data include sensors that track temperature, movement, light, and humidity, to enhance building maintenance and make buildings smart and effective. For improved security, surveillance cameras are connected to the network for better monitoring along with other security sensors. A cloud server to be used for collecting and storing sensors' data. The proposed system architecture has been illustrated in the figure.



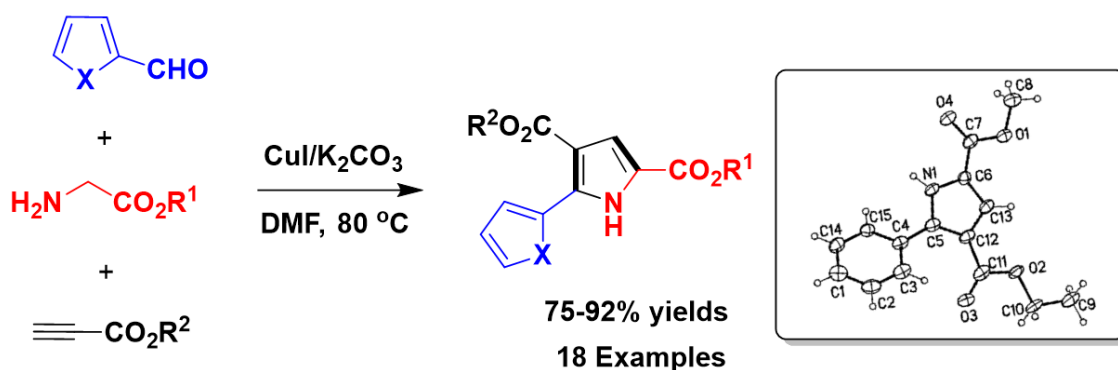
The illustration has been borrowed from the published paper

Novel pathway for the synthesis of tri-substituted Pyrroles

By: Shubam Sudan – PhD Scholar, CURIN, Chitkara University

This article is based on the research paper titled *Mild and Efficient Cu-Catalyzed Synthesis of Tri-substituted Pyrroles* published by Dr. Mohit Kapoor from CURIN, Chitkara University, Punjab in *Thieme journal* entitled *Synthesis*.

Pyrroles are considered to be one of the most sought after heterocyclic compound in pharmaceutical and agrochemical industry. Various different pathways have been explored in the past for the synthesis of this important heterocycle and most of them have utilized transition metal catalysts. The last decade has witnessed scores of methodologies published in top-tier journals on the synthesis of pyrroles and nitrogen-containing heterocycles. Earlier the pyrroles were synthesized using well-known techniques like Hantzsch, Paal-Knorr, and Knorr synthesis, but these methods suffer from problems like less substrate scope and harsh reaction conditions. Keeping the importance in mind, it is essential for the scientific community to develop a new sustainable pathway for the synthesis of poly-substituted pyrroles using commercially available low cost starting material.



The illustration has been borrowed from the published paper

Here in this article, we disclosed a novel pathway for the synthesis of poly-substituted pyrroles via cycloaddition of amine, aldehyde, and acetylene monocarboxylates with CuI as a catalyst. The starting materials used in this methodology are commercially available and good to high yields were achieved for pyrrole derivatives. The reaction was carried out under aerobic conditions at 80° C in dimethylformamide (DMF) and the required results were obtained in high yields (75%). The base and copper salts used were found to be significant for the outcome of the reaction. Best results were obtained when DMF was used as solvent with CuI (15 mol%), K2CO3 (1.05 eq.) at 80° C. Under similar reaction conditions, a wide variety of substrates were exposed to the optimized reaction conditions, and the products were obtained in high yields with aromatic aldehydes, glycine esters, and monocarboxylate alkynes. Aliphatic aldehydes such as acetaldehyde failed to give any desired product as the outcome of the reaction was very poor. Terminal alkynes gave the best results with good conversion and minimal to no side products. In

the case of internal alkynes, no product was obtained or side products were obtained which were unidentifiable. The substrates containing electron-donating groups gave lower yields as compared to substrates with electron-withdrawing groups which gave higher yields comparatively. Also, higher yields were obtained for aldehydes containing electronegative groups and no side products were obtained.

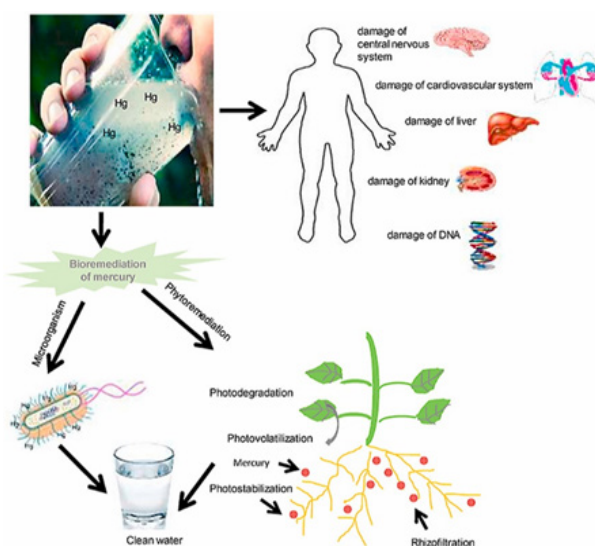
All of the newly synthesized compounds were identified by using $^1\text{H-NMR}$, $^{13}\text{C-NMR}$, XRD, and Mass. To carry out the mechanistic studies, the reaction mass was quenched twice at the interval of 20 minutes. After 10 minutes of the reaction, imine was isolated, and post 30 minutes Pyrrole was obtained as the main product. These results suggest that the reaction proceeds through the formation of imine followed by cyclization with monocarboxylate alkyne. Control experiments indicate that K_2CO_3 was essential for Pyrrole formation. The absence of metal catalysts resulted in no product formation. In conclusion, a sustainable and unique pathway was developed based on Cu-mediated catalysis for the synthesis of poly-substituted pyrroles. The reaction proceeds via Schiff base formation followed by the interaction with the Cu-coordinated alkyne moiety. The newly developed reaction was found to be well-suited for a number of substrates and functional groups. At present, we are evaluating their medicinal and biological properties by incorporating fluorine-based functionalities.

Removal of Mercury from aqueous solutions using Bioremediation

By: Lata Rani – PhD Scholar, CURIN, Chitkara University

This article is based on the research paper Bioremediation: An Effective Approach of Mercury Removal from the Aqueous Solutions published by Lata Rani, Dr. Arun Srivastav, and Dr. Jyotsna Kaushal from CURIN, Chitkara University, Punjab in Elsevier journal entitled Chemosphere.

Mercury - Hg(II) is 16th rarest element present in the earth's crust. Due to rapid industrialization and urban expansions, the mercury concentration has been elevated in the environment. Hg(II) contamination in aqueous environment has become a great challenge for human beings. The main source of Hg(II) in aqueous phase is untreated effluent industries (such as the paper industry). Hg(II) is non-biodegradable in nature and even its trace amount in aqueous environment can pose chronic threats in humans, animals, and aquatic creatures causing damage to the central nervous system, respiratory system, and cardiovascular system, mutation of DNA etc. Therefore, the removal of mercury from aqueous solutions is an urgent need of the modern era. The conventional techniques such as ion exchange, precipitation, membrane filtrations are costly and they also generate byproducts in the environment. After thorough literature review, bioremediation process is found better than other techniques for reducing mercury. Bioremediation is a sustainable, environment friendly, and cost-effective technique for removal of Hg(II) from aqueous solutions. Bioremediation is an approach in which toxic



The illustration has been borrowed from the published paper

contaminants can be either completely removed or changed into lesser toxic forms by using microorganisms and/or plants (both microphytes and macrophytes). Bioremediation techniques have been categorized in two types - in-situ and ex-situ bioremediation. For removal of mercury, only in-situ bioremediation is possible. Using this technique, water polluted with mercury is treated at local site wherein microorganisms present in nature are motivated to express their action against the mercury ions. This approach is cost-effective and does not produce any harmful by-products and it is achieved by using natural microorganisms. Mercury resistant bacteria (both gram-positive and gram-negative) can be used for cleaning of mercury or for conversion of highly toxic mercury into less toxic or non-toxic form. Depending upon the level of mercury present, various mechanisms have been observed for mercury resistant bacteria to eliminate/reduce mercury from the environment like for example, the thiol group that makes complexes with different oxidative states of mercury because a bacterial defense mechanism does not allow the mercury to go inside the body of it. Similarly several bacterial species have mer operon mechanism for mercury detoxification. Possible interaction between the microbes and target contaminants rely on the physicochemical characteristics of the contaminants and metabolic properties of the microbes. Moreover, this interaction can also be affected by environmental circumstances prevailing at the interaction sites.

IPR Ecosystem of Chitkara University at a Glance

Office of Patent Facilitation and Licensing (OPFL), CURIN caters to IPR related requirements of all the departments of the university. It is headed by Dr. Sachin Ahuja, Director (Research), CURIN. Very recently our university has been granted its 100th patent and it is a great achievement! Let us take this opportunity to understand the IPR Ecosystem of Chitkara University in words of Dr. Sachin Ahuja.

Introduction

Technological Innovations from most of the universities and academic institutes generally emerge out of chaos and generally there exist no support system for managing this innovations chaos! This occurs largely due to the fact that most of the academic institutions focus on academic excellence and job placement rather than to nurture innovations that promise long term benefits. There is usually a dearth of a well-defined process to help academic institutions to manage their intellectual property.



At Chitkara University, a clearly articulated method for translation of ideas into technological innovation is been meticulously followed to inculcate research in students and faculty and to help identify the best commercial applications of technological innovations. The system is robust and evolving as it embeds the innovation management along with existing academic teaching learning process.

Innovation Management System at Chitkara University

The need for innovation management system arises due to fact that research and development activities experience problems with cohesion when their function reaches a certain size. The adoption of formalized system with clear objectives helps in achieving the anticipated impact. The objectives of innovation management system at Chitkara University can be summed up as follows:

1. Building and sustaining a large pool of intellectual property
2. Creating self-sustainable entrepreneurial ventures and startups using the existing Intellectual Property
3. Finding and promoting innovations for nation building

To achieve the said objectives a well-defined system is rigorously followed as shown in the figure below:

The OPFL system at Chitkara University is in place since 2014 and has evolved as and when the need arises keeping the underlying objectives intact. The OPFL consists of one director and three members to coordinate the activities smoothly. All the patents are filed keeping the Chitkara University as applicant. The anticipated impact of OPFL is discussed in next section.

Anticipated Impact

OPFL since its inception has been successful in filing 880 patents till date out of which 253 are published and 103 are granted. More than 8000 ideas were vetted and 500+ inventors were benefitted. Chitkara University secured the place in top 10 patent filing universities in India thrice since inception of OPFL. 7 startups have been successfully formed for the patented ideas. More informed and judicious strategies and well targeted activities are required to be planned in future for keeping the pace in achieving the anticipated impact.



CURIN Organized Three Workshops to Promote STEAM Education

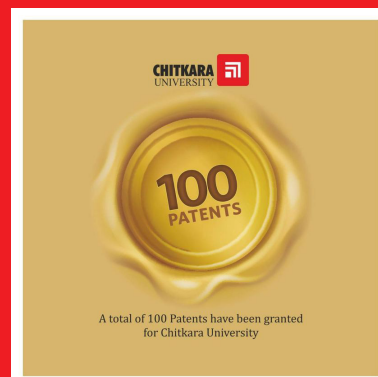
CURIN conducts STEAM School as a regular feature to promote Science, Technology, Engineering, and Mathematics (STEAM) education among students. In this quarter we conducted three workshops under STEAM school. One of the workshops was titled Make your first Android ChatBot held during May 10-15, 2021 and was delivered by Dr. Deepali Gupta and Dr. Sheifali Gupta – Professors, CURIN. They delivered another workshop titled Machine Learning and Deep Learning for Real-time Applications during May 24-28. The third one was held during June 8-11 and it was titled Make Your First AR Application. The workshop was delivered by Dr. Amanpreet Kaur, Dr. Bhanu Sharma, Dr. Neha Tuli – Assistant Professors, CURIN and Mr. Shivam Sharma – Game Developer, CURIN. Participants got to learn about tools like Unity 3D Software, Vuforia SDK, Google VR SDK and Google Cardboard.



Patents Filed by CURIN Faculty Members and Scholars

40 Patents Filed by CURIN during April - June 2021

Chitkara University has been granted its 100th patent, 19 of them have been granted in this quarter.



A total of 95 patents have been filed by different departments of the university during April – June 2021, out of which 40 have been filed by CURIN faculty members and researchers. Details of patents filed by CURIN are as follows -

Sr. No.	Title	Applicants	Application Number
1	APPARATUS AND ASSEMBLY FOR AUTOMATIC FEEDING	Isha Kansal, Renu Popli, Nitin Goyal, Singara Singh Kasana, Deepali Gupta, Kalpna Guleria, Ashok Kumar	202111026250
2	APPARATUS AND METHOD FOR ASSISTING VISUALLY IMPAIRED USER	Sandeep Kumar, Rubina Dutta, Ravi Gupta	202111023201
3	APPARATUS FOR COLLECTING TRASH	Shalli Rani, Himanshi Babbar	202111016783
4	AUTOMATED CASHLESS FARE DEDUCTION FOR PUBLIC TRANSPORT SYSTEMS	Kalpna Guleria, Sachin Ahuja, Nitin Goyal, Naresh Kumar Trivedi, Amandeep Sharma, Amandeep Kaur, Meena Rani	202111022922
5	AUTOMATED CLEANING ASSEMBLY AND METHOD	Amandeep Kaur, Bhanu Sharma, Naveen Kumar, Meenu Khurana, Geetanjali, Poonam Jindal, Sheifali Gupta, Anshu Singla, Shalli Rani, Vinay Kukreja, Rakesh Ahuja, Varun Malik, Ruchi Mittal, Deepika Sharma, Vikas Rattan	202111020943
6	AUTOMATIC VEHICLE TOWING NOTIFICATION SYSTEM	Deepali Gupta, Mani Madhukar, Ramneet, Mudita, Sheetal Sharma, Sheifali Gupta, Kamali Gupta, Rupesh Gupta, Naresh Kumar	202111027359
7	AUTOMATIC WEARABLE SAFETY DEVICE	Kalpna Guleria, Sachin Ahuja, Pinaki Ghosh, Pradeepta Kumar Sarangi	202111021845
8	AUTONOMOUS STRETCHER ASSEMBLY	Tarandeep Kaur Bhatia, Arshdeep Singh	202111017457
9	BALLISTIC PROTECTION DEVICE WITH PRECISION-GUIDED FIREARM AND TARGET DETECTION	Puneet Bawa, Sachin Ahuja, Virender Kadyan, Shishir Dhakar, Pulkit Bindlish	202111016782
10	CZTSSe BASED SOLAR CELL WITH TIN SULPHIDE (SnS ₃) BACK SURFACE FIELD LAYER	Shivani, Jaya Madan, Rahul Pandey, Rajnish Sharma	202111023463
11	ELECTROMAGNETIC CLEANING DEVICE AND METHOD	Meenakshi Dhiman, Partha Khanra	202111023202
12	FOOT ACTUATED TOILET FLUSHING APPARATUS	Ishita, Surya Narayan Panda, Kalpna Guleria	202111019535
13	INTERNET OF THING (IOT) BASED DIGITAL BANK LOCKERS	Chetan Sharma, Prasenjit Das, Shaily Jain, Shankar Shambhu, Sachin Ahuja	202111023461
14	LOCKING ASSEMBLY FOR ONE OR MORE ELECTRONIC DEVICES	Rajesh Kumar Kaushal, Naveen Kumar, Surya Narayan Panda, Simranjeet Singh	202111022920
15	MOVABLE PORT	Tarandeep Kaur Bhatia, Arshdeep Singh	202111022604
16	ORAL FORMULATION OF ANTI-INFLAMMATORY PROTEINS	Varsha Singh	202111022921

17	PEST DETECTION AND WARNING SYSTEM	Priyanka Datta, Dimple Nagpal, Shanu Bhardwaj, Surya Narayan Panda	202111024426
18	PROCESS AND SYSTEM FOR SILICA SEPARATION FROM BIOMASS USING CONTROLLED MICROWAVE	Nitin Kumar Saluja, Gurjinder Singh, Varinder Singh, Nikhil Dhull, Deepender Kant	202111024427
19	RECONFIGUREABLE AUDIO OUTPUT ASSEMBLY	Tarandeep Kaur Bhatia, Arshdeep Singh	202111024773
20	RECONFIGURABLE INPUT AND POINTING DEVICE	Tarandeep Kaur Bhatia, Arshdeep Singh	202111021670
21	RECONFIGURABLE INTERFACE DEVICE FOR AUDIO-VISUAL INTERACTION	Tarandeep Kaur Bhatia, Arshdeep Singh	202111021499
22	SHIELD FOR DRYING APPARATUS	Renu Popli, Isha Kansal, Nitin Goyal, Kanwal Garg, Shalli Rani, Rajeev Kumar, Geetanjali	202111018493
23	SHOWER APPARATUS FOR CLEANSING	Shalli Rani, Ankita, Himanshi Babbar	202111027360
24	SMART TOILET FOR PHYSICALLY IMPAIRED USER	Deepali Gupta, Kanwal Preet Kour, Kamali Gupta, Sheifali Gupta, Nitin Goyal, Rupesh Gupta, Malvinder Singh Bali, Rakesh Goyal, Raman Gupta, Parveen Ailawalia, Vishal Verma	202111027129
25	SYSTEM AND METHOD FOR AUTOMATED SCREENING AND DIAGNOSIS OF RETINAL VASCULAR DISEASES	Dimple Nagpal, Nayan Gupta, Surya Narayan Panda	202111018990
26	SYSTEM FOR AUTOMATIC DETECTION AND DISPLAY OF WATER AVAILABILITY IN RESTROOM	Shalli Rani, Himanshi Babbar, Ankita, Roopali Dogra	202111026427
27	WEARABLE DEVICE TO DETECT HIDDEN CAMERA	Deepali Gupta, Mani Madhukar, Ramneet, Mudita, Vishal, Sheifali Gupta, Rupesh Gupta, Kamali Singla, Naresh Kumar	202111021495

INDUSTRIAL DESIGN REGISTRATIONS

ADJUSTABLE MOBILE STAND

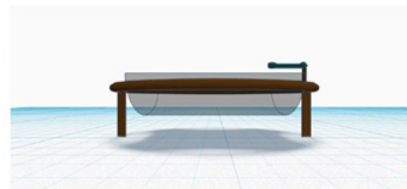
By- Deepali Gupta, Sheetal Sharma, Kamali Gupta, Sheifali Gupta, Mudita

Application No. - 343462



Sheifali Gupta, Raman Gupta, Praveen Ailawalia, Rupesh Gupta

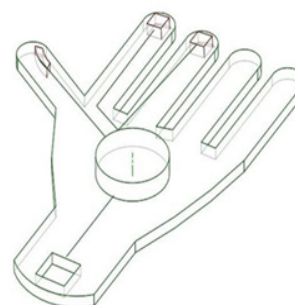
Application No. 342776



BIOMETRIC MOUSE GLOVE

By- Sakshi, Chetan Sharma, Prasenjit Das, Shaily Jain, Shankar Shambhu, Vinay Kukreja, Sachin Ahuja, Shamneesh Sharma

Application No. 342775



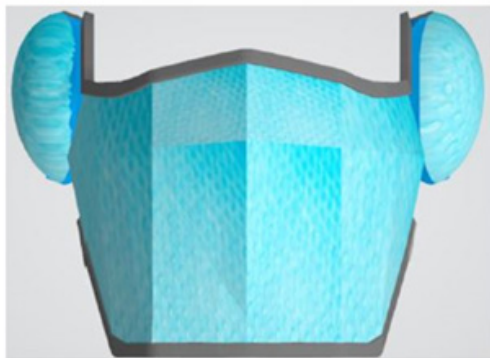
BABY CRADLE WITH CLOTH DRYER STAND

By- Deepali Gupta, Harsha Chauhan, Vishal Sharma,

EAR MASK

By- Ishita, Surya Narayan Panda, Kalpna Guleria

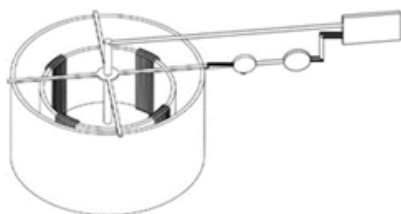
Application No. 344400



ELECTRO MAGNETIC DEVICE TO REMOVE TOXIC MATERIALS FROM WASTE WATER

By- Meenakshi Dhiman, Partha Khanra

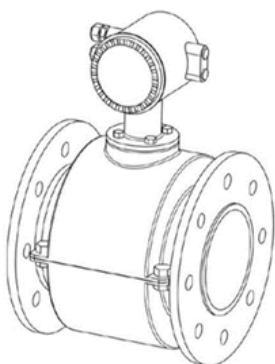
Application No. 342439



ELECTRO MAGNETIC FLOW METER

By- Sagar Juneja, Chanpreet Singh

Application No. 343560



ENERGY SAVER SMART SHOES

By- Deepali Gupta, Kanwalpreet Kaur, Kamali Gupta, Malvinder Singh Bali, Sheifali Gupta, Harsha Chauhan, Tripti Sharma, Raman Gupta, Rupesh Gupta, Rakesh Gupta

Application No. 343460



EXTRA SLIDING SEATS FOR BUS

By- Deepali Gupta, Harsha Chauhan, Vishali Sharma, Sheifali Gupta, Geeta Sharma, Neelam Oberoi, Gifty Gupta, Sakshi Sachdeva, Rupesh Gupta

Application No. 342872



MULTIPURPOSE TABLE

By- Deepali Gupta, Ramneet, Mani Madhukar, Mudita, Sheifali Gupta, Kamali Singhla, Jotesh Gupta, Naresh Kumar, Rupesh Gupta

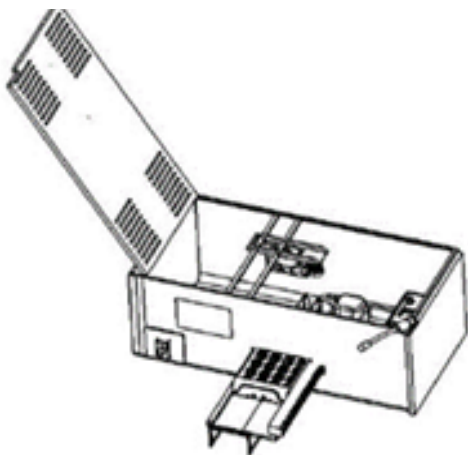
Application No. 342871



SEED ANALYZER DEVICE

By- Ashok Kumar, Sudesh Kumar Mittal, Surya Naryan Panda, Nitin Goyal, Kalpna Guleria, Muthu Kumaran, Simranjeet Singh

Application No. 342438



SEMI-AUTOMATIC ONION SAPLING TRANSPLANTING MACHINE

By- Pushpender Singh, Naveen Kumar, Varinder Singh,
Nitin Saluja

Application No. 344480

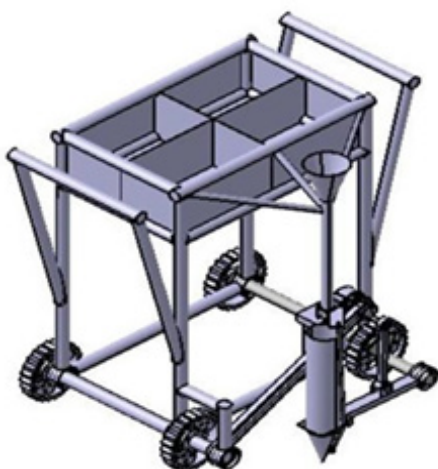


TABLE FOR HEAVY INSTRUMENTS

By- Gurjinder Singh, Nitin Kumar Saluja, Ayussh Jain,
Ashwani Singh, Jeevan Singh Dosad, Rouble Gupta,
Varinder Singh

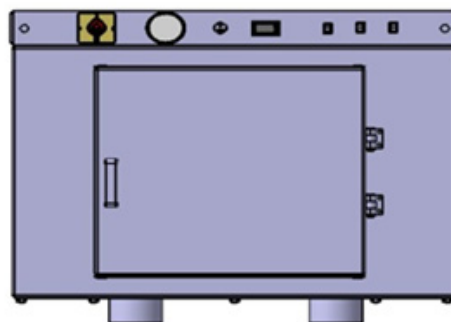
Application No. 343974



VACUUM ASSISTED DRYER

By- Varinder Singh, Nitin Saluja, Rouble Gupta, Pushpender
Singh, Gurjinder Singh

Application No. 344481



Grants and Awards Won

One research grant and two awards won by CURIN in the quarter



Grant

The Centre for High Frequency and High-Power (CHFHP) has bagged extramural research grant of INR 49.35 Lacs under the Device Development Programme (DDP) Scheme of Department of Science and Technology (DST), Government of India. Their project is titled BhuGoal: A Smart Weather Monitoring System. Dr. Nitin Kumar Saluja - Associate Director (Research), CURIN is the Principal Investigator (PI) of the project, Dr. Varinder S. Kanwar – Professor, Civil Engineering, Chitkara University and Debarshi Ghosh are the Co-PIs. The main objective of the project is to provide a location specific weather prediction service. The team of researchers at CHFHP, CURIN has developed a product BhuGoal (it has both hardware and software components) which continuously monitors satellite signal strength. The BhuGoal node is installed between the dish antenna and set-top box. It doesn't harm user's experience of watching the television. The signal hence received from several BhuGoal nodes installed at different places are analysed continuously at the server. The machine learning algorithm assesses the signals from different locations to retrieve information about the clouds.



Awards

Ms. Meena Pundir (Ph.D. Scholar, CURIN) won 1st prize for the idea titled Nano Bubbles for Improving Efficiency of Aeration in STP in an innovative project competition on the theme of Energy Conservation and Energy Efficiency organized by Punjab Energy Development Agency (PEDA). This project has been carried out under the guidance of Dr. Prateek Srivastava (Associate Professor, CURIN) and Dr. Jyotsana Kaushal (Professor, CURIN). In the same competition Ms. Shagun Sharma, Ms. Shabnam Choudhary, Ms. Vaishali Bhatia – M-Tech, Scholars won 2nd prize for their idea titled Ethanol Fuel Cell carried out under the guidance of Dr. K.R. Ramkumar (Associate Professor, CURIN) and Dr. Partha Khanra (Assistant Professor, CURIN). Winners have received cash awards from PEDA.



Dr. Neha Tuli - Assistant Professor, Immersive & Interactive Technology Laboratory (IITL), CURIN and Mr. Shivam Sharma - Game Developer, IITL, CURIN have now finalized the professional design of their product titled Learn -O- Little. It is an Augmented Reality based learning kit for kindergarten kids for learning basic English language skills. In their early stages, this team received prototyping grant of INR 250,000 for Chitkara University NewGen IEDC for developing a project. They have now registered a start-up in the name 6DOF Solutions Pvt. Ltd. and are now receiving support from CEED.



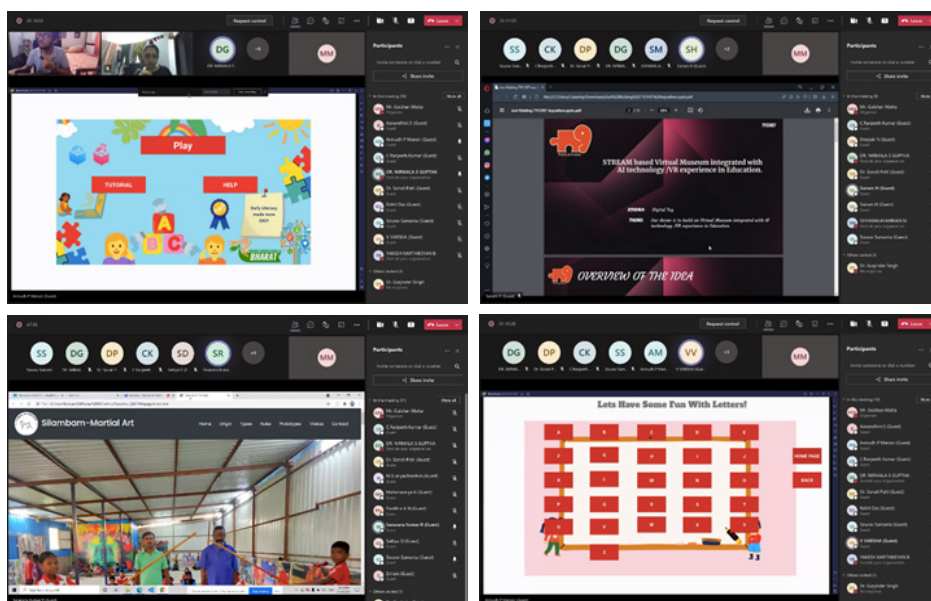
Grand Finale of Toycathon 2021 Hosted by Chitkara University

Toycathon 2021 – An Initiative of GoI under Aatma Nirbhar Bharat Abhiyan

Toycathon 2021 has been the initiative of Government of India to motivate and encourage creative and innovative minds of Indians to come up with novel designs of toys that represent our heritage, culture and value system. Currently, toy market of India stands at USD 1.5 Billion and there is a heavy reliance on import. This hackathon has also been a way to boost toy manufacturing in India under AatmaNirbhar Bharat Abhiyan. Ministry of Education's Innovation Cell has organized Toycathon 2021 with support from several other ministries and All India Council for Technical Education (AICTE).

Chitkara University had a proud privilege to organize the Grand-Finale of Toycathon 2021 that was held during June 22-24, 2021. Toycathon-2021 has been a unique opportunity for students, teachers, start-ups, and toy experts/professionals in India to showcase their innovative and creative toys/games designs and compete for prizes worth Rs. 50 lakhs.

Dr. Archana Mantri, Vice Chancellor, Chitkara University, Punjab, inaugurated the Grand Finale (Digital Edition) and welcomed the participants to the grand extravaganza. More than 20 teams from different parts of the country participated in this digital edition of the hackathon and presented their unique ideas, toys, and games to the judges. Dr. Gurjinder Singh – Assistant Professor, CURIN was the SPOC of the Nodal Centre of Toyathon 2021 at Chitkara University, Punjab.



Snapshots of different ideas of toys presented by different teams

Chitkara University Annual Research Symposium (CUARS) 2021

32 Workshops, Over 250 Research Papers Communicated | 8 of these workshops were organized by CURIN in CUARS 2021

Writing a good quality and interesting research article to report research findings is a challenge in itself. A good quality research paper has an optimized combination of scientific contribution and writing skills. On one hand it requires skills like time management and team management to improve the scientific contribution of the paper, experience and finesse in representing data and results are essential for improving the quality of writing. Chitkara University adopted a systematic and focused approach through Chitkara University Annual Research Symposium 2021 where it provided a platform to its research scholars and faculty members to spend quality time in preparing good research papers while working in small groups.

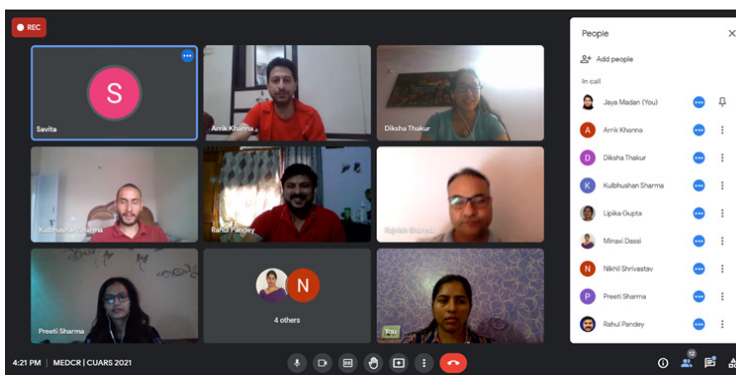
Chitkara University Annual Research Symposium (CUARS) 2021 was held during June 14, 2021 – July 2, 2021 with a theme Build an Effective Research Manuscript, and a large number of faculty members as well as research scholars of the university participated in it. As many as 32 different workshops were organized by several research groups from different schools of the university, and each participating faculty member as well as research scholar had a choice to attend any one of these workshops. Different research groups from CURIN also conducted workshops under CUARS 2021 and summaries on each of these CURIN workshops held as part of CUARS 2021 are presented in this article.

VLSI CoE, CURIN conducted a workshop titled Electronic Devices and Circuit Research and it was delivered by Dr. Rajnish Sharma – Dean (Research), CURIN and Dr. Rahul Pandey – Assistant Professor, VLSI, CoE, CURIN. The workshop offered state-of-the-art semiconductor devices and circuit simulation training using industry-standard TCAD tools and it was conducted with a two-fold objective i.e. to train the faculty members and students

to conduct high-quality research, and to convert the research into a full-fledged research article in the area of electronic devices and circuits. A total of 10 participants attended this workshop and as an outcome produced 14 quality research articles which were communicated in leading peer reviewed journals and prominent conferences soon after the conclusion of the program.

Dr. Sudesh Mittal (Professor), Dr. K. R. Ramkumar (Associate Professor) and Dr. Amanpreet Kaur (Assistant Professor) conducted a workshop titled Post Quantum Cryptography and Hardware Security during CUARS 2021. Their workshop focused on topics like cyber security, FPGA, quantum computing, post quantum cryptography, AR and VR security, homomorphic encryption standards etc. A total of 12 participants attended this workshop and produced 12 research papers.

A workshop titled Paradigms of Deep Learning and IoT was organized by Dr. Sheifali Gupta and Dr. Deepali Gupta – Professors, CURIN which was attended by 17 participants, and they produced 24 research papers as outcome of this workshop which were later communicated in several Scopus indexed forums – journals and conferences. Some of the important topics that were discussed in the workshop include image processing, artificial intelligence, internet of things, deep learning and blockchain.

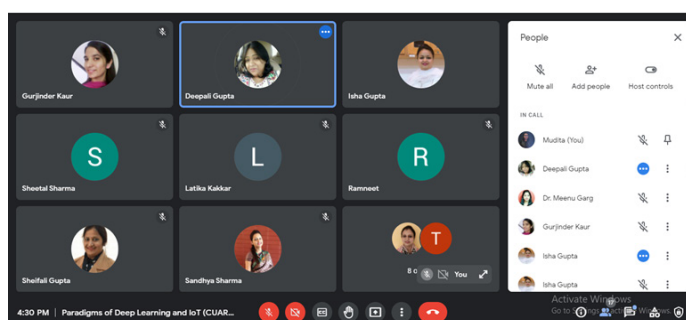




Dr. Sachin Ahuja - Director (Research), CURIN conducted a workshop titled Data Mining & Machine Learning in CUARS 2021 and 14 participant attended it with every participant producing one research paper each at the end of the workshop. Dr. Sachin believes that initiatives like CUARS 2021 are very important, CUARS 2021 provided a congenial environment to the faculty members to take out some time from routine academic load and work on research papers.

Dr. Nitin Saluja – Associate Director (Research), CURIN conducted a workshop on COMSOL Multiphysics and MATLAB to solve Thermodynamics, Electromagnetics, Antenna and Sensors during CUARS 2021.

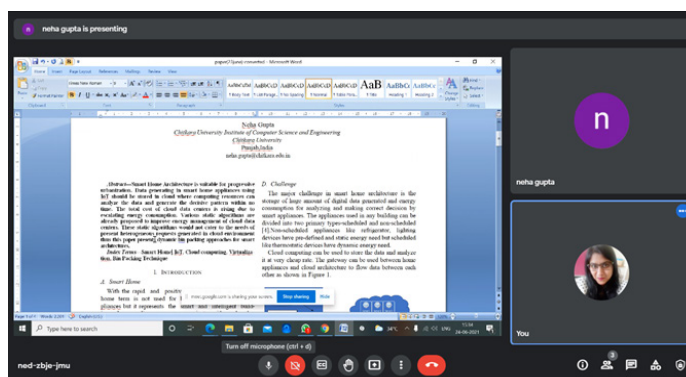
Dr. S.N. Panda – Director (Research), CURIN and Dr. Rajesh Kaushal – Associate Professor, CURIN conducted a workshop on IoT, Cloud Computing, and Blockchain during CUARS 2021. Apart from working on research papers writing, participants also learnt about a variety of tools including Zerato, Xmind, Origin, EndNote and Mendeley. 17 participants attended this workshop producing 19 good quality research papers.



Dr. Shalli Rani – Associate Professor, CURIN and Dr. Kamali Gupta – Associate Professor, CSE jointly conducted a workshop titled Communication Techniques and Models in WSN-IoT and AI during CUARS 2021. This workshop was designated towards exploring the existing techniques of WSN and writing of research papers on the latest developments in the domain. Other topics like how to structure the paper, how to use platforms like Overleaf and referencing tools like Mendeley and how to identify a journal for publication were also discussed. 17 participants attended the workshop with 21 manuscripts of research papers coming out of it.



Dr. Jyotsna Kaushal (Professor), Dr. Partha Khanra and Dr. Mohit Kapoor – Assistant Professors, CURIN conducted a workshop on Sciences during CUARS 2021 that was attended by five participants who produced research articles related to areas of water sciences, energy devices, antivirals, and pharmaceuticals.



A White Paper Co-Authored by Faculty Members from DRC, CBS

Title - A Study of the Impact of Covid-19 on Faculty and Staff of Chitkara University

A White Paper was issued by the Office of the Vice Chancellor, Chitkara University, Punjab, India on June 11, 2021 which was titled A Study of the Impact of Covid-19 on Faculty and Staff of Chitkara University. The objective of this paper was to unfold the impact of Covid-19 on the personal well-being of Chitkara University employees. Further, the study examines that what were the coping mechanisms adopted by the employees to tackle the effect of Covid-19. 1080 employees of Chitkara University and 53 employees of Chitkara International School were contacted through emails for collecting data for the study and with a 51 % response rate, 571 useable responses were used for the analysis. The paper has been authored by Dr. Archana Mantri - Vice Chancellor, Chitkara University, Punjab, India; Dr. Kulwant Kumar Sharma - Professor and Dean, Centre for Global Education, Chitkara University, Punjab, India; Dr. Amit Mittal – Professor and Dean, Doctoral Research Centre (DRC), Chitkara Business School (CBS); and Dr. Arun Aggarwal, Assistant Professor, DRC, CBS.



Keynote Talks Delivered

- Dr. Amit Mittal, Dean, DRC, CBS delivered an expert lecture on Literature Review and Research Problem Identification on 1st April, 2021 for 116 students and staff of Institute of Home Economics, University of Delhi. Research scholars from several Delhi University colleges attended the session.
- Dr. Amit Mittal was invited to deliver a keynote address on the topic Techno-Managerial: Business Analytics in the International Conference on Innovative Applications of Emerging Technologies and Management (ICIAETM) 2021 that was organized by Prestige Institute of Engineering, Management and Research, Indore during April 9-10, 2021.
- Dr. Amit Mittal was invited to deliver a session on Leadership Types on 18th May, 2021 in an online AICTE ATAL FDP on Academic Leadership and Management of Technical Education organized by Faculty of Engineering & Technology, Gurukul Kangri University, Haridwar. This five-day event (May 17-21) witnessed participation of over 100 hundred faculty members from all over the country.

Workshops Organized

- Considering the importance of data analysis in research, a five-day online workshop on Data Analysis using R was organized by Doctoral Research Centre, Chitkara Business School from 3rd to 7th May 2021. 42 participants comprising of research scholars, faculty members and industry professionals attended this workshop and it was delivered by Dr. Ajay Chauhan (Visiting Faculty, Chikara Business School). Dr. Urvashi Tandon - Associate Professor, DRC, CBS coordinated the event.

- On May 28, DRC, CBS organized an expert lecture on Mendeley tool in order to highlight the significance of references and citations management in writing research papers and thesis. Dr. Ritika Wason (Mendeley Expert) was the resource person and she explained about various features and capabilities of Mendeley including a mobile application for iOS and Android smartphones that allow remote access of documents and references. She also highlighted the importance of creating a Mendeley academic profile where the authors' publications can be placed, creating private groups for document sharing and creating public groups for sharing of references. Sixty one researchers from Chitkara University attended the session. Dr. Urvashi Tandon and Mr. Jaswinderpal Singh (Research Scholar) coordinated the event.
- DRC, CBS also organized one workshop in Chitkara University Annual Research Symposium (CUARS) 2021. The topic of this ten-day workshop was Management Research and it was delivered by Dr. Amit Mittal, Dr. K. K. Sharma, and Dr. Arun Aggarwal. 13 participants attended this workshop and produced 10 research papers on topics such as telecom bundling strategies, adoption of voice assistants, fiscal decentralization, and poverty alleviation, financial crime, consumption behavior, and prediction of continued usage of COVID-19 mhealth apps in India.

Workshop on Managing IP in Higher Education Institutions

Intellectual Property (IP) plays an essential role in the teaching and research functions of universities. It helps universities in improving their rankings, in establishing an innovative ecosystem, in generating revenues through licensing and spinoff start-ups.

Chitkara University Accreditation and Quality Assurance Cell and Office of Patent Facilitation, Licensing and Consultancy (OPFLC), CURIN in collaboration with Derwent Innovations, Clarivate Analytics organized a joint workshop on Managing IP in Higher Education Institutions: Context and Perspectives on

May 22, 2021. During the workshop, the resource persons shared their experience on managing and generating IP, discussed about the use of Derwent Databases and the ways of identifying, protecting, managing and commercializing their IPs. All registered participants were provided complimentary access to the Derwent Databases which includes the Derwent World Patents Index, Derwent Global Patent Data, the Derwent Patent Citation Index and the Derwent Chemical Patent Index.

The poster is for a workshop titled "Workshop on MANAGING IP IN HIGHER EDUCATION INSTITUTIONS: CONTEXT & PERSPECTIVES". It features a dark blue background with yellow and white text. At the top right, there is a decorative pattern of blue dots. The poster lists two resource persons: Ms. Anja Mehra (Regional Client Manager, E&M Asia) and Mr. Abhijeet Patil (Scholar Consultant, South Asia). Below them, it says "In conversation with" and lists two speakers: Dr. Sachin Ahuja (Executive Researcher) and Dr. K.K. Mishra (Associate Director, Patent Facilitation & Quality Assurance Cell). The date and time are given as "on 22nd May, 2021 | between 11:30 am & 01:30 pm". The organizers are listed as "Jointly organised by: Chitkara University Accreditation & Quality Assurance Cell, Office of Patent Facilitation, Licensing & Consultancy". At the bottom, there are logos for Chitkara University, Clarivate, and the Institution's Innovation Council (IIC).

Invited Talks, Experts Lectures Delivered

CURIN faculty members invited as experts in as many as 10 different external events

Expert Talk during ATAL Sponsored Five-Day Workshop

Dr. Jasmininder Kaur Sandhu, Dr. Deepam Goyal – Assistant Professors, CURIN, and Dr. Prateek Srivastava - Associate Professor, CURIN delivered an expert talk in an AICTE Training and Learning (ATAL) sponsored five-day workshop on Machine Learning and its Significance that was organized by Indian Institute of Information Technology (IIIT), Bhopal during April 5-9, 2021. A total of 85 participants attended the workshop from different academic institutions as well as industries.



Invited Talks by Experts from IITL, CURIN

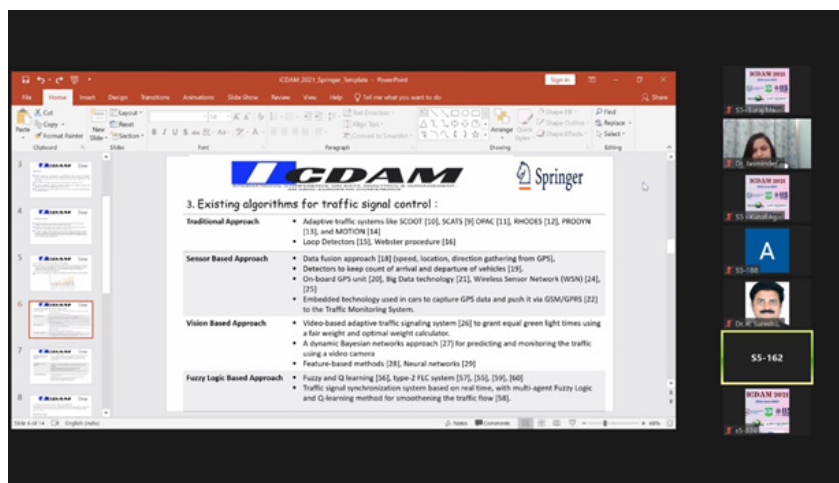
Dr. Neha Tuli - Assistant Professor, Immersive & Interactive Technology Laboratory (IITL), CURIN and Mr. Shivam Sharma - Game Developer, IITL were invited to deliver an expert talk on Role of Augmented Reality in Education in WAVR-2021 organised by IIT Bhubaneswar on April 10, 2021. They discussed about types of AR, role of AR in education, pitfalls of using AR, current market trends, applications and use cases of AR, VR, start-ups in education, basic roadmap for AR development in education.

Dr. Neha and Mr. Shivam were also invited as guest speakers in the five-day online workshop on Emerging IT Technologies and Innovation organised by Amity Institute of Information Technology on June 9, 2021. They delivered an expert talk on Augmented Reality and it was attended by close to 100 students.

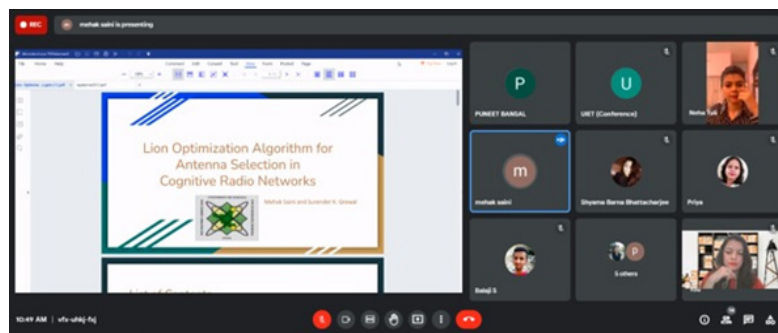


CURIN Faculty Members Chaired Sessions in International Conferences

Dr. Jasmininder Kaur Sandhu and Dr. Bhanu Sharma - Assistant Professors, CURIN chaired a session in a Springer, MHRD, and TEQIP sponsored International Conference on Emergent Converging Technologies and Biomedical Systems (ETBS - 2021) that was organized by University Institute of Engineering and Technology (UIET), Kurukshetra University, Kurukshetra on April 28-29, 2021. Dr. Jasmininder also chaired a session in International Conference on Data Analytics and Management (ICDAM-2021) organized by Panipat Institute of Engineering & Technology, IIS, Jaipur and IEC University, Bhopal, India in association with Jan Wyzykowski University, Poland on June 26, 2021.



Dr. Kalpna Guleria - Associate Professor, CURIN and Dr. Neha Tuli - Assistant Professor, CURIN chaired a paper presentation session in the International Conference on Mobile Radio Communications and 5G Networks (MRCN-2021) that was sponsored by Springer, MHRD, TEQIP-III and was organized by University Institute of Engineering and Technology (UIET), Kurukshetra University, Haryana on June 24, 2021. During this session, researchers presented their research papers on topics like optimization techniques in cognitive radio networks, predictive analysis using machine learning, and recent research trends in network and communication.



CURIN Faculty Members Participated as Panellists in a Panel Discussion

Dr. K. R. Ramkumar - Associate Professor, CURIN and Dr. Amanpreet Kaur - Assistant Professor, CURIN were invited as panellists in a panel discussion titled Design Innovation Framework which was organized by Department of Electronics and Communication Engineering, Chitkara University, Punjab on May 14, 2021. The discussions were centred on integration of cyber security and AR/VR applications to address global technological challenges. The duration of the program was 90 minutes and there were about 50 participants in the session.

In another event, student branch of IEEE, Chitkara University invited Dr. Amanpreet Kaur to deliver a session on Insights to the Immersive and Interactive Technologies. About 140 students attended this session.

Dr. Amanpreet Kaur was also invited to deliver an expert talk in a national webinar organized by the Women Study Cell of Mukand Lal National College, Yamuna Nagar on June 26, 2021. She delivered a talk on the topic Digital Manifestation in Women's Lives (A New Normal) where she discussed about the opportunities of increasing self-reliance in women due to

digitalization. More than 85 participants attended the program. Dr. Mohd Junedul Haque - Assistant Professor, CURIN attended this webinar.

Invited Talk on IPR

Dr. S.N. Panda – Director, Research, CURIN was invited to deliver an expert talk on Innovation and Intellectual Property Rights in a national webinar hosted by MDSD Girls College, Ambala on May 31, 2021 under the Paramarsh Scheme of University Grants Commission, New Delhi.

CURIN Representation in a Global Panel Discussion Organized on World Environment Day

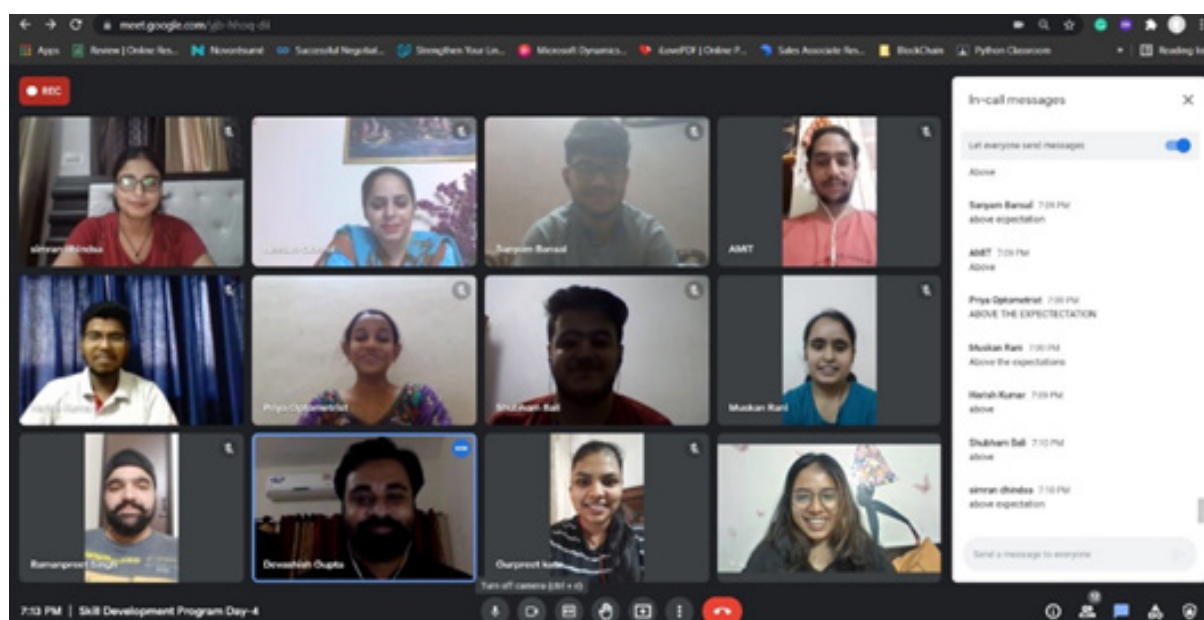
Dr. Jyotsna Kaushal, Professor and Head, Centre for Water Sciences, CURIN was invited to be one of the panellists in the Global Panel Discussion organized on the occasion of World Environment Day 2021 (June 05, 2021). The event was jointly organized by Chitkara University, Punjab and Western Sydney University, Australia with a theme Reimagine, Recreate and Restoration for all.

Expert Talk on Shaping the Future of Healthcare

Dr. S.N. Panda – Director, Research, CURIN and Founder, Ramanuj Technologies Pvt. Ltd. was invited to deliver an expert talk titled Shaping the Future of Healthcare in June 21, 2021 under Know Our Startup series launched by CEED, Chitkara University. This company was incubated at Chitkara University and has been mentored by Dr. S.N. Panda whose keen interest is in the domain of healthcare innovations for a better tomorrow.

M.E. Scholar from CURIN was invited for an Expert Session

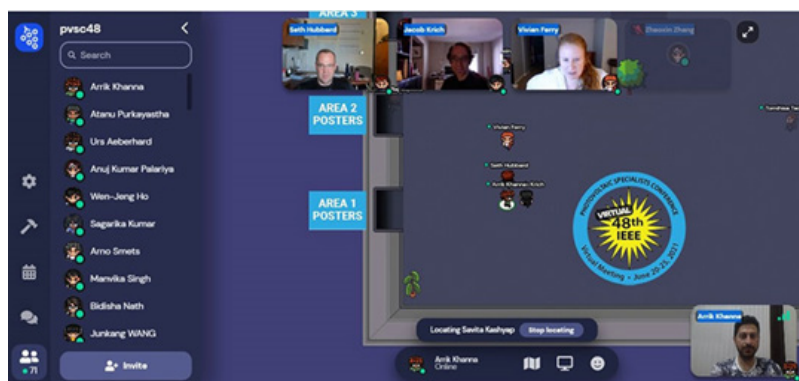
Ms. Harsha Chauhan - M.E. Scholar, CURIN was invited to deliver an expert session in four-day skill development program on Chatbot using Thunkable that was organized by CodroidHub Pvt. Ltd. during June 15-19, 2021. The event was attended by students as well as faculty members from different institutions.



External Events Attended

Workshops, conferences, webinars attended By
our faculty members and research scholars

- Harsha Chauhan (M.E. Scholar, CURIN) has successfully completed two courses from IBM Developer Skill Network in May 2021 namely R Programming Language and IBM Blockchain Foundation Developer. She has earned a certificate of Collegiate of Science in Blockchain Technology after successfully defending the capstone project entitled INCOIN-A Promotion Token for Local Business from Althash University, Chicago, USA.
- Dr. Amanpreet Kaur (Assistant Professor, CURIN) participated in an online webinar on National Education Policy - 2020: A Plethora of Opportunities organized by ASSOCHAM on May 4, 2021.
- Tarandeep Kaur Bhatia (Assistant Professor, CURIN) presented her research work at IEEE sponsored 29th Finnish-Russian University Cooperation in Telecommunications (FRUCT) Conference held at Tampere, Finland during May 12-14, 2021.
- Mudita (PhD Scholar, CURIN) participated in a two-day National E-Workshop on Outcome Based Education and Examination Reforms held during May 15-16, 2021 and was organized by Sri Sai College of Engineering and Technology, Punjab. She also participated in a workshop titled AI Application Development using IBM Cloud on June 9, 2021 that was conducted by Chalapthi Institute of Engineering and Technology (CIET), A.P. and IBM.
- Sonam Mittal (Ph.D. Scholar, CURIN) presented a research paper titled Data Privacy and System Security for Banking on Cloud using Homomorphic Encryption at IEEE sponsored International Conference of Emerging Technology. The conference was held on May 21-23, 2021 and was organized by Jain College of Engineering, Belagavi, Karnataka.
- Sonam Mittal (Ph.D. Scholar, CURIN) participated in a workshop on Cyber Security that was organized by the Department of Information Technology and Computer Science Engineering, Velalar College of Engineering and Technology, Erode, Tamil Nadu on May 24, 2021.
- Kanwal Preet (Ph.D. Scholar, CURIN) participated in a five-day National Level FDP on Intelligent Systems and Sustainable Development that was held at St. Peter's Engineering College, Hyderabad during June 8-15, 2021.
- Ramneet (Ph.D. Scholar - CURIN) attended two webinars titled Default is Digital – Trends and Opportunities and Communication in Crisis Management- How to do it Right? Both these webinars were conducted by Bharati Vidyapeeth's Institute of Computer Applications and Management, New Delhi on June 12, 2021 and June 19, 2021 respectively.
- Research scholars from the VLSI Centre of Excellence presented six articles in the prestigious 48th IEEE Photovoltaic Specialist Conference (PVSC) held virtually on June 20-25, 2021. In these research papers students reported advanced engineering schemes to improve silicon PERC's power conversion efficiency, PbS-CQD, Perovskite, and CZTSSe based solar cells.



List of Publications

CURIN faculty members and scholars have published research papers/book chapters in SCI and Scopus indexed journals, conferences, and books. This alphabetically sorted list contains all those publications that have been indexed in Scopus during April - June 2021.

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10 Consultancy Projects initiated during April - June 2021

CURIN facilitated 10 consultancy projects that have been initiated by various faculty experts from different departments of the university during April – June 2021. As per the consultancy policy of Chitkara University, 90% of the consultancy fee is retained by the project heads (faculty experts).



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