

Insight 15 RESEARCH SCHOLARS' DAY MARCH 25, 2015

RAJENDRA MISHRA SCHOOL OF ENGINEERING ENTREPRENEURSHIP | INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR

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Rajendra Mishra School of Engineering Entrepreneurship (RMSoEE) was established at Indian Institute of Technology Kharagpur in the year 2010. The school aims to encourage the entrepreneurial minds and imparts strong entrepreneurial culture and ecosystem for venture creation and early start- ups. It is a revolutionary step forward by integrating the academic and practice aspects of entrepreneurship education. The school offers a 5 year integrated dual degree with M.Tech in Engineering Entrepreneurship and B.Tech in engineering discipline. The students selected through JEE for B.Tech or dual degree M.Tech in any engineering department can opt for this program from their second year of study according to department change over rules. This unique school for the first time provides the opportunity for engineering undergraduate students to design product while pursuing their academic degree during entire period of study (5 years) for dual degree.

Students who major in entrepreneurship are exposed to new venture creation through which they gain understanding of process pertaining to skills, knowledge and experience required to become successful entrepreneur. The school offers unique curriculum which has been designed to give students an opportunity to develop their own creative skills thereby applying principles of engineering management, marketing and finance to the challenges of starting new business, growing and managing business towards scalability. The school is equipped with innovation lab for ideation and innovative thinking from second year onward. The students work on their innovative idea to convert it into product. The various funding structure available in the entrepreneurial ecosystem at IIT Kharagpur provides flexibility to students for building and testing their prototypes. The students are individually mentored by faculties and successful entrepreneurs in their endeavour. Spearheaded by number of fellows and doctorates from leading institutes and universities amongst its faculty, the school also runs a vibrant Doctoral/ MS Program aimed to bridge intellectual gaps in relevant interdisciplinary studies related to innovation and entrepreneurship literature. It enriches the value of knowledge, technology intervention and transfer, and overall ecosystem development for innovation and entrepreneurship.



आत्मज्ञानं समारम्भस्तितिक्षा धर्मनित्यता । यमर्थान्नापकर्षन्ति स वै पण्डित उच्यते ॥

It is very important to know oneself. be it spiritually, or practically. in real world's success, one must know oneself. likes, dislikes, strengths, weaknesses, abilities, skills, interests. this applies to start-up entrepreneurs or to large scale leaders of masses. we need to know what ticks us and what ticks us off.

> Rajendra Mishra School of Engineering Entrepreneurship Indian Institute of Technology Kharagpur, India – 721302

From Director's Desk



भारतीय प्रौद्योगिकी संस्थान खड़गपुर खड़गपुर-७२१ ३०२ Indian Institute of Technology Kharagpur Kharagpur – 721302

प्रोफेसर पार्थ पी. चक्तवर्ती एफएनए, एफएएससी, एफएनएई निदेशक Prof. Partha P. Chakrabarti, FNA, FASc, FNAE Director Professor. Department of Computer Science & Engineering



March 19, 2015

MESSAGE

I am pleased to know that Rajendra Mishra School of Engineering Entrepreneurship, IIT Kharagpur is celebrating its Research Scholars' Day. There is an immense need for innovative concepts and new knowledge to facilitate entrepreneurs in taking the benefits of technology development to the society. Our students must develop entrepreneurial mindset to recognize opportunities and take initiatives to translate them into viable businesses. The institute endeavors to infuse entrepreneurial and lateral thinking among the students. I am glad to see that the School is actively involved in promoting entrepreneurship and innovation.

Scholars are the saplings nurtured by the faculty members who always aspire to bring out the best in them. It is the prime responsibility of the scholars to strive for discovering productive knowledge. This event would provide great impetus for engaging discussions on academic and practical aspects of entrepreneurship. I am sure that such events will encourage research scholars for exploring new research frontiers on innovative technology applications and entrepreneurship.

I congratulate the faculty members and research scholars of the School for organizing the event and wish them a great success.

P. P. Chakrabarti

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From Patron's Heart



Devendra Mishra

Adjunct Professor, Decision Sciences & Marketing Graziadio School of Business & Management, California Founder of Media & Entertainment Alliance (MESA), Hollywood IT Society (HITS) and Biotech Supply Chain Management Alliance (BSMA)



MESSAGE

March 19, 2015

SEIZE THE DISRUPTIVE INNOVATION OPPORTUNITIES IN THE WORLD: YOU POSSESS WHAT IT TAKES!

It is a privilege to reach out to you on the **Research Scholars' Day 2015** being celebrated by the Rajendra Mishra School of Engineering Entrepreneurship. You are carrying the torch of Professor Rajendra Mishra, a pioneer of engineering and management education for three decades from the 50s. I commend you for your endeavors to unleash innovations required to drive the emerging economy of India and build an enriched and healthy society.

You are living in the most exhilarating period of human civilization where disruptive innovations have upended the status quo of a large number of industries and companies. The world is for you to change, and let there be no trepidations or hesitations, for you can. You have all the ingredients for success – entrepreneurial zeal, single-minded dedication and a support system of teachers, incubation lab, Technology Park, and, above all, each other. The mission and commitment of RMSoEE is to foster an environment for research where the entrepreneurial spirit produces products and services for the 21st Century. Your scholarship, supported by your teachers and mentors, will usher in Economic Growth and Individual Empowerment. In order to unleash creativity, begin by asking what will be true in five years and work backward.

What we have noticed over the last two decades in the Western World is a significantly different economy that has been turbocharged by innovations and is fundamentally different from the manufacturing and service companies of the previous 100 years. Enterprises of the New Info-driven Economy have assembled existing technology components in new ways to reimagine existing businesses. They have set up platforms for customers and partners to interact, and use those platforms to create highly differentiated products and services. The outcome is prosperity for all in an environment that is sustainable. This is the economic reality you have inherited.

Seize the triple advantages you have today to bring about innovation. The costs of product creation, information synthesis and experimentation have declined in a Draconian manner. As you have discovered, creating applications, embedding components, deploying cheap global sourcing and distribution, producing/marketing digitally and utilizing crowdsourcing have given you unprecedented powers. IIT is an extraordinary Gurukul for personal growth. Good luck on your journey of entrepreneurship!

From Dean's Desk





भारतीय प्रौद्योगिकी संस्थान खड़गपुर खड़गपुर-७२१ ३०२, भारत Indian Institute of Technology Kharagpur Kharagpur - 721 302, India

Prof. Amar Nath Samanta Dean of Postgraduate Studies and Research

March 20, 2015

<u>Message</u>

I am very happy to note that Rajendra Mishra School of Engineering Entrepreneurship, IIT Kharagpur is organizing its second Research Scholars' Day on 25th March, 2015 with great enthusiasm.

I am sure this occasion will provide a unique platform for mutual sharing of knowledge, expertise and experience amongst the research scholars and the faculty. I believe that such deliberations will help the research scholars to enrich their research potentials and will motivate them to take their research works to greater heights

I convey my greetings to faculty and research scholars and wish the event a grand success.

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A Step Forward

Prof. Satyahari Dey Professor, Department of Biotechnology PI-TIETS, IIT Kharagpur Managing Director, STEP



Message for Research Scholars' Day

I am very happy to know that Rajendra Mishra School of Engineering Entrepreneurship, IIT Kharagpur is celebrating its second Research Scholars' day on 25th March, 2015. This occasion will provide a great platform to researchers for mutual sharing of knowledge, research findings and expertise. Being in the first and most reputed IIT our Research Scholars must make an attempt to add new values in our R & D, with eventual goal of innovation and translation for societal benefit. Multi disciplinary approach is uniqueness in learning in IIT Kharagpur and Research Scholars should imbibe it from day one.

My very best wishes for the endeavour.





Science and Technology Entrepreneurs Park Indian Institute of Technology Kharagpur

From Head's Desk

Insight 15 REFERENCE OF A CHOLARS DAY

Prof. Partha Pratim Das

Head, RMSoEE



Last year we held our maiden Research Scholars' Day on the backdrop of several firsts for the school. We continue on the momentum and are proud to share the following milestones:

- Two senior faculty members have joined the School widening the team
- The School has floated a micro-specialization in *Entrepreneurship and Innovation* to provide opportunity to the students of IIT to pursue cross-disciplinary study of entrepreneurship and innovation along with their major in engineering or science. This was featured in a report in *The Economic Times* on 23rd September, 2014 on entrepreneurship education in IIT
- Our International Summer Winter Term (ISWT) course on *Big Data Analytics*, offered jointly with Taipei Medical University, received overwhelming response
- Hugely successful GES and EADs were held
- We have been in news and our entrepreneurs and scholars continue to win laurels -
 - *EcoFrost* was covered in a special news item in *The Economic Times* on 18th September, 2014 for their solar-powered cold storage with no running cost
 - Capillary Technology won the Best Innovator Award under TIDE scheme from Department of Electronic and Information Technology (DeitY), while Think Innovation & EcoFrost received Special Appreciation Certificates
 - News in Shorts became the fastest start-up to reach 100 Crore valuation and received 4M USD in investments from Tiger Global
 - Our research scholar Susmita Ghosh was awarded the Emerald Best Paper Award at the 2nd International Conference on Business Analytics and Intelligence (ICBAI, 2014)
- The School is set to start a *Post-Graduate Diploma in Business Analytics* with four other departments of IIT and IIM, Calcutta and ISI.
- The first *Product Analytics and Modelling Laboratory* of the Institute for the entrepreneurs and students is being setup at the School and will start operations by summer
- The plot is decided for our *iTower* building and building designs are at a final stage
- The maiden tower for the *Science and Research Park at Rajarhat*, envisaged to become a hub of entrepreneurial activities of the East, have been started
- And so on ...

In this backdrop we gear up for our second Research Scholars' Day. I am happy to see the enthusiastic participation of students in organizing the Day. It is poised to provide an ideal platform to showcase the ongoing research work through oral and poster presentations. Presence of our distinguished Chief Guest Rear Admiral Dr. V. K. Singh (Retd.), Director, Healthcare Asia at Simpler Consulting and Adjunct Research Professor, Ivey School of Business, University of Canada would highly motivate the research scholars in accomplishing their goals and a faculty-student debate on Entrepreneurship Education will charge up the atmosphere.

The day would be heading to its end by bidding a joyous farewell to the Second group of would-be alumni of this School. I take this opportunity to congratulate them all and remind them that entrepreneurship is not merely an academic pursuit or a business engagement—it is a way of life.

जय हिन्द!

From Research Coordinator's Desk

Prof. Ram Babu Roy Assistant Professor Research Coordinator, RMSoEE



Engineering Entrepreneurship is a multidisciplinary area of study that brings about a unique understanding and vigour required to recognize opportunities and convert them into a reality. It broadens the students' perspective about ways to pursue their career beyond the traditional science and engineering disciplines. Entrepreneurship is much more than the process of starting a company. The School inculcates the culture of pursuing innovative approaches for problem solving by involving students in experimentation, teamwork and experiential learning.

The research scholars are one of the key pillars of the School who actively contribute in academic activities. They participate in intensive discussions with the faculty members and the dual-degree students for generating ideas to engineer innovative products and services. They strive to achieve excellence through extensive research in developing pragmatic solutions to real world problems.

I am sure that they would gain sound theoretical knowledge to excel in academics through rigorous training and their zeal. Organizing Research Scholars' Day gives an opportunity to try their hand at multitasking, team building and experience to work under pressure. They would also develop strong oral and written communication skills to help them become excellent teachers and researchers.

I congratulate all the students for their accomplishments. I do believe that they would bring many glories to the School.





Guru

Basab Chakraborty
Bhaskar Bhowmick
Manoj Kumar Mondal
Partha Pratim Das
Prabha Bhola
Pranab Kumar Dan
Ram Babu Roy
Titas Bhattacharjee



Basab Chakraborty Assistant Professor



Brief Profile:

- For the last 14 years, he was involved in the development of new cost effective and energy efficient chemical process for the manufacturing of lead acid batteries
- Was instrumental in forming the Research centre and spearheaded basic research on the frontiers of electrochemistry and material science to evolve cost effective new materials suitable for the improvement of the bottom line
- Transformation of the research outputs into commercial products was the major achievement
- Introduced improved electrode and electrolyte technology in the organization thereby extending the warranty period of the products to an appreciable extent and has international patent to the effect
- Also developed batteries for European car manufacturers and Hybrid Electric vehicles with very stringent specifications
- Currently working under a Sponsored Project on Promoting Innovations in Individuals, Start-ups and MSMEs (PRISM)
- Support to TEPP Outreach cum Cluster Innovation Centre (TOCIC) At Indian Institute Of Technology, Kharagpur Under Promoting Innovations In Individuals, Start-Ups

Research Interests : Product Design and Development, Development of Entrepreneurs on Energy Platform, Development of Entrepreneurs on Nano-Technology & New Material, Quality Management.





Bhaskar Bhowmick Assistant Professor

Brief Profile:

- Reviewer of Strategic Entrepreneurship Journal.
- Member, Editor Advisory Board on Competitive Strategies for Academic Entrepreneurship: Commercialization of Research-Based Products.
- Has worked for 13 years in the industry for product development, marketing, and managing businesses.
- Has experience of entrepreneurship in launching small units within the multinational company folders.
- Has initiated launching personal care product division of Parle Products limited.
- Initiated establishing the business of synthetic threads of Lohia Group.
- Launched the consumer division of United Phosphorous limited in eastern India.
- Has published Book Chapters, Cases, and Research Papers in National and International journals and conferences.
- Currently working on a Sponsored Project on "Technology Incubation and Development of Entrepreneurs" (TIDE)

Research Interests: Innovation ecosystem, Innovation in firm environment relations, Dynamic capabilities of firms, Leadership and Succession strategy



Manoj Kumar Mondal Visiting Professor



Brief Profile:

- Received Gold Medal (2008) from Lockheed Martin through competition organized in association with University of Texas at Austin, Stanford University, FICCI, DST
- Member of the team receiving Gold Plaque and Cash award (2014) from the Ministry of Chemicals & Fertilizers for the best innovation that evolved out of a sponsored project executed at Materials Science Center, IIT Kharagpur
- Recently consulting projects from Frost & Sullivan on study of techno-economic feasibility and financial viability of new innovations evolved out of research projects sponsored by the National Jute Board, Ministry of Textiles, Government of India.
- Received financial award from the Department of Scientific and Industrial Research (DSIR) under the TechnoPreneur Promotion Program (TePP) for refinement of a technology (2009).
- Received financial award from the Technology Information, Forecasting and Assessment Council (TIFAC) under the program of Technology Refinement and Marketing Programme (TREMAP) (2011)
- Mentored several spinoff startups out of IIT Kharagpur, some of which are making global footprint and has been closely associated with (www.nucleodyne.com) for the last decade

Research Interests: Financial Economics, Banking, Product Development, Bio-Energy, Entrepreneurship.





Partha Pratim Das Professor, Head

Brief Profile:

- Worked as a Business Development Manager for Alumnus Software Ltd for two years
- He joined Interra Systems, Inc as a Senior Director and Center Head, Kolkata
- Also served as a Visiting Professor with Institute of Radio Physics & Electronics, Calcutta University
- Published international journals in areas of Digital Geometry, Image Processing, Parallel Computing and Knowledge-based Systems
- Active member of the VLSI community and has served as General Chair for International Conference on VLSI Design & Embedded Systems, 2005 and as Organizing Chair for International Symposium on VLSI Design & Test, 2007
- Also works as a Review Writer for ACM Computing Surveys and is a reviewer for Pattern Recognition Letters
- A member of Association of Computing Machinery and VLSI Society of India

Accolades

- UNESCO/ROSTSCA Young Scientist Award (1989),
- INSA Young Scientist Award (1990),
- Young Associate-ship of Indian Academy of Sciences (1992), UGC Young Teachers' Career Award (1993),
- INAE Young Engineer Award (1996),
- Interra 5 Years' Tenure Plaque (2007)
- Interra Special (Process) Recognition (2009)

Research Interest: Image Processing, Software Engineering, and Embedded Systems



P K Dan Associate Professor



Brief Profile:

- Member Organising committee of AIMTDR International Conference.
- Chaired technical sessions in seminar and workshop organised by the Production Engineering Department, Jadavpur University, and Confederation of Indian Industries (ER).
- Member of the Manufacturing, Technology and Innovation Committee.
- Fellow of The Association of Engineers, India.
- Senior Member of the Indian Institution of Industrial Engineering.
- Chairman, Entrepreneurship Cell at IIT Kharagpur.
- Member of Education & Skills Development committee of CII, Eastern Region
- Member on the Expert Committee on Education, Training and HR Initiatives of Indian Chamber of Commerce

Research Interests: Product Development and Manufacturing





Prabha Bhola Assistant Professor

- Priorly served as Assistant Professor in Indian School of Mines, Dhanbad
- Also served as a Guest Lecturer in Hyderabad Central University and Visiting Faculty in Narsee Monjee Institute of Management Studies, Hyderabad
- Her area of specialization is Economics with current research interests in the field of Entrepreneurship
- Has published a book, entitled 'Rural Poverty and its Determining Factors: An Empirical Analysis of Districts in Uttar Pradesh, India' by LAP AG & Co. KG, 2010
- Conducted training programmes such as faculty development and technology based entrepreneurship development programmes.
- For a brief tenure she also worked as OSD at STEP, IIT Kharagpur.
- She was entrusted with managing the technology and innovation related projects and working along with its network partners.
- Has strong analytical and quantitative aptitude with high exposure to application of statistical techniques and usage of statistical packages like STATA, SPSS, AMOS.

Research Interest ~ Venture creation, Quality Management and Performance Measurement, Business Analytics, SMEs Growth and Quality Management, Service management, Statistical Modelling, Impact assessment and Performance Measurement of Entrepreneurial Firms, Entrepreneurship & Poverty, Sustainable Development



Ram Babu Roy Assistant Professor



Brief Profile

- He is a Fellow of Indian Institute of Management Calcutta (IIMC), India
- His areas of specialization are Management Information Systems and Operations Management
- Masters of Technology in VLSI Design Tools and Technology from Indian Institute of Technology Delhi (IIT-D), India
- Master of Science in Physics from Indian Institute of Technology Kanpur, India
- Has served as a scientist in Aeronautical Development Establishment, Defence Research and Development Organization, Bangalore and was involved in the applied research towards the design and development of Micro Air Vehicles (MAV) and Radar Absorbing Materials (RAM)
- Delivers lectures in Executive MBA and Faculty Development Programmes.
- Associate Member of the Institution of Electronics and Telecommunication Engineers (IETE).
- Reviewer of European Journal of Operations Research
- Reviewer of International Conference on Information Systems & European Conference on Information Systems

Research Interest : Big Data and Business Analytics, Healthcare Operations Management, Complex Networks





Titas Bhattacharjee (Rudra) Assistant Professor

Brief Profile

- Active Member of Facuty Development programmes conducted by IIT Kharagpur.
- Professional trainer in accounting and related areas for taking Guest Lectures in Government organisations and private business schools.
- Has been awarded the Fellowship in Finance & Control area from Indian Institute of Management, Calcutta (IIMC) in 2012.
- Currently working on a sponsored project "Support of Entrepreneurial and Management Development of SMES through incubators (SEI)

Research Interest :Corporate Governance, Corporate Financial Reporting, Entrepreneurial Finance, Corporate Social Responsibility



School of Engineering Entrepreneurship Research Scholars





Sharad Kumar Supervisor: Prof. Ram Babu Roy Email: sharadmanit@gmail.com

Sharad Kumar has completed his Master of Technology in 2009 from Maulana Azad National Institute of Technology-Bhopal and B.E. in Computer Science and Engineering in 2006 from Sri Satya Sai Institute of Science and Technology-Schore affiliated to Rajiv Gandhi Proudyogiki Vishwavidyalaya-Bhopal. He worked as a Senior Research Fellow in project entitled "TBI" at IIT Kharagpur. His research interest lies in systems modeling and networks for healthcare systems. He joined the department in 2010.

Summary of Research

Area of Research: Modeling and Simulation of Healthcare Ecosystem

Healthcare delivery system (HDS) is a complex system having multiple dependencies and interactions among various sub-systems. The overall system behavior is emergent and dynamic in nature. The HDS has huge impact over social and economic status of a country. Healthcare is an ongoing capital intensive programme, which is facing huge challenges from both the demand and supply side. Growing population, rising disease burden, and slow rate of modernisation are making it even more challenging. Indian healthcare system consists of service providers from both the public and the private sectors. The public sector HDS is offering preventive, promotive, and curative services, whereas the private sector is focusing more over the curative services. The public financed healthcare system, which is available to all the Indian people, can accommodate only 20 and 40 percent of the total out-patients and inpatients respectively. Inadequately organized public healthcare system and uncontrolled growth of private sector lead to an out of pocket expenditure for 70 percent of the Indian masses.

Despite various constraints and challenges in Indian public healthcare system, it is the only system which is offering primary to tertiary care services across the country. With the cultural and geographical diversification, some parts of India have achieved the intended policy health outcomes. On the contrary, most of the regions are still lagging in achieving their healthcare objectives. Hence, it becomes crucial to investigate the healthcare delivery models that are adopted by these regions. Due to inherent complexity of healthcare system, we cannot understand its behavior by studying its individual components and their outputs. Therefore, we are considering a systems approach to study the healthcare delivery model. The systems modeling approach can facilitate the analysis of its strengths and weaknesses. It will also provide necessary insights to the administrators and policy makers to take strategic decisions for improving its performance. This eventually would result in improving the patient safety, satisfaction and health outcomes.



Susmita Ghosh Supervisor: Prof. Bhaskar Bhowmick Email: susmita.gh@gmail.com



Susmita Ghosh has received her Master of Science (by Research) in RF and Microwave from Dept. of Electrical and Electronics Communication Engineering (E&ECE), IIT Kharagpur in 2009 and B. Tech degree in Electronics & Telecommunication Engineering (ECE) from Biju Patnayak University of Technology in 2004. From August 2008 to October 2010 she worked as lecturer in colleges under WBUT and BPUT. She joined the department in 2011.

Achievements

• Emerald Best Paper Award at Second International Conference on Business Analytics and Intelligence 2014, December 18-20, IISc Bangalore.

Summary of Research

Area of Research: Entrepreneurship Environment and Uncertainty: Developing Scales

Start-ups play a major role in the growth, employment generation and economic development of the country. In-spite of their valuable contribution towards the country's economy, they are always exposed to the complex and dynamic business environment. The decision makers perceive the uncertainty related to the components of the environment according to their knowledge and background. The various components reflecting uncertainty are government, market, competitor, technology, etc. In this scenario of increasing perceived environmental uncertainty, some firms tend to fail and some tend to survive by taking some necessary entrepreneurial actions to respond back to the challenges posed by uncertainty. In this research, we focus on the relationship of uncertainty as perceived by the decision maker of start-ups in emerging country, within which the decision maker takes entrepreneurial action to achieve better performance.

Publications

- "Developing and Evaluating a New Scale for Product Positioning Uncertainty in India", Susmita Ghosh and Bhaskar Bhowmick, International Journal Scientific and Engineering Research, Vol. 5(1), 2014, [ISSN2229-5518; Impact Factor 1.4 and ICV Score 5.27 points]
- "Perceived Environmental Uncertainty for Start-ups: A Note on Entrepreneurship Research from an Indian Perspective", Susmita Ghosh, Bhaskar Bhowmick and KalyanGuin, Technology Innovation and Management Review, Vol.4 (8), 27-35
- "Uncertainties in Entrepreneurship Climate: A Study on Start-ups in India", Susmita Ghosh and Bhaskar Bhowmick, Procedia Social and Behavioral Sciences, Elsevier, 150 (2014) 46 – 55
- "Smart Healthcare Delivery System: An Innovation in Rural West Bengal", Susmita Ghosh and Bhaskar Bhowmick, Exploria 2014, 30th January, MIT-SOM, Pune, [ISSN 0976-8262]
- "Developing New Market Uncertainty Scale for Indian start-ups", Susmita Ghosh and Bhaskar Bhowmick, Second International Conference on Business Analytics and Intelligence 2014, December 18-20, IISc Bangalore





Amrita Supervisor: Prof. Ram Babu Roy Email: iamthealchemist@gmail.com

Amrita has completed her Master of Science (by Research) in 2011 and Post Graduate Diploma in Business Administration in 2008 from the department of Vinod Gupta School of Management, IIT Kharagpur. She has done B.E. in Computer Science in 2002 from Visvesvaraya Technological University, Karnataka. She has worked as a Senior Project Officer for Incubation and Entrepreneurship Programmes, SRIC, IIT Kharagpur for more than six years. Before this she worked as a lecturer for three years in West Bengal University of Technology and as junior programmer for two years in a software firm. Her research interest lies in systems modeling and networks for business environments. She joined the department in 2011.

Summary of Research

Area of Research: Knowledge Management Systems in Healthcare

Knowledge management has been studied for more than two decades now. Researchers have confirmed its effectiveness when utilized well in an organization. It has been proved to have a positive effect on operational and organizational performance.

Healthcare delivery being a knowledge driven process, provides ample opportunities to integrate the knowledge management practices for better healthcare outcomes. The healthcare outcomes are different from outputs and can be best measured by evaluating its efficacy, effectiveness and efficiency. However, these measures can be best-described and understood through knowledge management systems. Using systems modelling for knowledge management system for healthcare would help the development of unique healthcare system. Hence, creating a knowledge management system for improving healthcare processes may lead to a better and healthy community.



Pradipta Chandra

Supervisor: Prof. Titas Bhattacharjee Email: pradipta.chandra@gmail.com



Pradipta Chandra has completed Master of Science (MS) (by Research) from Materials Science Centre, IIT Kharagpur in 2011 and Post Graduate Diploma in Business Administration (PGDBA) from Vinod Gupta School of Management (VGSOM), IIT Kharagpur in 2008. He has done B.Sc. (Chemistry Hons) from Jhargram Raj College under Vidyasagar University and continued his post graduate engineering education in plastics engineering and technology from Central Institute of Plastics Engineering and Technology (CIPET). After this degree he entered into plastics and polymer industry. He has got sound knowledge on processing of thermoplastics, thermosetting plastics, rubber, engineering and commodity plastics, natural fiber composites, and versatile molding techniques leading to the products in telecom, auto, electronics, agriculture, medical, engineering spares, railways and commodity appliances. He joined the doctoral programme (Ph.D in Engineering Entrepreneurship) in School of Engineering Entrepreneurship (RMSoEE) in the year 2012. Mr. Chandra was associated with the projects sponsored by National Jute Board, Ministry of Textiles, TIFAC, DST, Govt. of India and working in innovation projects sponsored by Department of Electronics & Information Technology (DeitY). His present work is based on agriculture technology adoption lag issues in India.

Summary of Research

Area of Research: Capacity Development of Indian Farmers through Technology Transfer: Exploring Challenges and Redesigning Options

Agriculture sector is the fundamental platform for Indian economy because it contributes about 14% share to overall GDP. More than 60% employment generation happens by agriculture. About 80% contribution is in agriculture production by small and marginal farmers (<2 hectare land holding). Still there are some major issues such as the livelihood of farming community is in challenge and food crisis due to volatile market in agriculture produce. This is observed that there are some gaps or lags throughout the agriculture supply chain. One of the major lag in transfer of technology plays a vital role. During the initial work it was found that Krishi Vigyan Kendra (KVK)s (agriculture science centre) are the bottom level government organizations, under ICAR umbrella, working closely with the grassroot people in the Indian farming community on technology transfer. The initial motivation inspired to work on this area in a the close-study with Seva-Bharati KVK, the first KVK in West Bengal established by Prof. P.K. Sen, the distinguished agriculture scientist and a visionary person. Subsequently, the work is expanded with the exploratory research. The aim of this research are to confirm that there is some lag effect, the obstacles in capacity development of the farmers' due to lag and redesigning options to lower the lag effect.





Rana Basu Supervisor: Prof Prabha Bhola Email: rbasu004@gmail.com

Rana Basu has received M.Tech in Industrial Engineering & Management and B.Tech in Computer Science & Engineering from West Bengal University of Technology. He worked as Process Associate in Software Service Firm at Kolkata. He joined the department in 2012.

Summary of Research

Area of Research: Quality Management for IT Enabled Service SMEs

In India, small & medium enterprises (SMEs) play vital role towards the overall growth and development of emerging country. Present scenario shows that India's economic growth is driven by service sector particularly due to expansion of information technology (IT) and ITES and also IT sector itself contributes more than 20% of the overall service sector GDP rising at a steady rate. Considering the growing prominence of IT enabled digital SMEs and its contribution towards economic growth, India has targeted these organisations as highest priority area. Considering the dynamics of business milieu, organisations cannot disregard the deliberate concerns of quality for its competitive positions. Thus managing quality has become an imperative for digital enterprises in service sector to gain competitive advantage and to achieve long term business success. Therefore, the research aims to explore and identify contextual quality management (QM) practices by deploying multi stage qualitative and quantitative methodological approach in context to IT driven service SMEs. This study would further develop a concurrent framework to empirically investigate critical linkages of QM practices and its direct and indirect effect on performance.

Publications

- Rana Basu and Prabha Bhola (2014)"A framework to identify service quality determinants of IT enabled scalable ventures: A study from Indian context", Journal of information and knowledge management, Vol 13(4), pp. 1- 14 (World Scientific)
- Rana Basu and Prabha Bhola (2014) "An approach to prioritise quality management of IT enabled small service firms: A study of Indian SMEs", 11th IEEE International Conference on Service Systems and Service Management" (ICSSSM)
- Rana Basu and Prabha Bhola (2015) "Integrating fuzzy MCDM methodology to investigate quality management practices in Indian digital service SMEs", International Journal of Services and Operations Management (Inderscience) *Accepted*



Sreekanth VK. Supervisor: Prof. Ram Babu Roy Email: sreekanthvettikkadu@iitkgp.ac.in



Sreekanth is pursuing his doctoral program in Engineering Entrepreneurship from IIT Kharagpur. Prior to this endeavor, he has been working with M/s. Infosys Limited., India, for 5+ years. He completed his M.Tech in Systems Analysis and Computer Applications from NITK Suratkal, and B.Tech in Electrical and Electronics Engineering from Mahatma Gandhi University, Kerala. His tryst with *knowing the world* drives his career.

Summary of Research

Area of Research: Decision Modeling in Emergency Care

The research focus is on Emergency Medical Services (EMS), Emergency Departments (ED), and the co-ordination between them both under ordinary conditions and in situations of mass casualties. The purpose is to design and develop a model for emergency care to support system design and decision-making. The aim is to contribute to the development of high volume, low cost and optimally efficient systems to meet the health service needs of India. The research is intended to identify the weaker links in the emergency care delivery chain and to develop frugal and innovative practical solutions. Methodologies such as system dynamics, agent based modeling assisted with data analytics will be used to simulate and analyze various system solutions. The potential contributions include the design and development of a modeling and analysis technique for research and development, creation of new operational knowledge, and innovative models for emergency care services in India.





Arpita Das Supervisors: Prof. Basab Chakraborty & Prof. Partha Pratim Das Email: mail4arpitadas@gmail.com

Arpita Das has completed M.Tech in 2012 and B.Tech in 2010 in Applied Electronics & Instrumentation Engineering from West Bengal University of Technology. She is presently pursuing Ph.D. and joined the department in 2012.

Achievements

Arpita Das has secured First position in M.Tech (Applied Electronics & Instrumentation) Degree Examinations, 2012, West Bengal University of Technology.

Summary of Research

Area of Research: Electronic Waste Management

The continuous expansion of electronic industries and rapid advancement of Science and Technology, generate a batch of obsolesce electronics and electrical products which introduce a new waste stream called "Electronics Waste "or "e-waste". Today, e-waste is one of the major issues of the world not only for its ever increasing volume but also for its complex composition. Although the presence of hazardous elements as e-waste can be a nightmare to the civilization, the scope of recovery of precious metals can open up new business. But, in most of the countries the existing e-waste management practices are very spooky and policies are not implemented properly. In case of developing countries like India, in addition with internal waste generation, improper dumping of e-waste from developed countries is a concern in the process of waste treatment. Therefore, my present study aims to develop an ewaste management frame work at organization level in India considering IIT Kharagpur as a model. This research would also investigate the current ewaste status and management strategy and will predict the future e-waste projection at the organization level to evolve appropriate policies, schemes & directions for e-waste management.



Sonal Singh Supervisor: Prof. Bhaskar Bhowmick Email: sona.singh610@gmail.com



Sonal Singh is presently pursuing Ph.D and joined the department in 2012. She has competed B.Tech in Dairy Technology and M.B.A in Agribusiness Management from Anand Agriculture University. She has good exposure of cooperative sector and one and half year work experience in IDMC Limited (Subsidiary company of NDDB).

Summary of Research

Area of Research: Grassroots Innovation for Entrepreneurship Development

Innovation is recognized as one of the most important aspect for economic development of the developed as well as developing countries. The traditional approach of grassroots innovation is top-down one, in which the population at the BoP (Base of the Pyramid) could represent for business in the form of new potential consumers. However, these grassroots people can be a potential source of new ideas, knowledge and innovation. In this regard, grassroots innovation has been emerged as bottom-up approach to solve the problems of grassroots people. Grassroots innovation is also defined as innovation by individual or group of people, who often undertake innovative efforts to solve localized problems, and generally work outside the realm of formal organizations. The majority of grassroots people face the problem of poverty and unemployment. The promotion and development of entrepreneurship at grassroots level are a new and increasingly become a popular approach to economic development. On the other hand, all the grassroots innovation is not leading to entrepreneurship development. Thus, this research tries to conceptualize measures of grassroots innovation and develop a framework on grassroots innovation for entrepreneurship development in Indian context.

Publications

- A study on Evaluating Factors of Community Innovation in Rural Indian Context by Singh, S. and Bhowmick, B Eleventh Biennial Conference on Entrepreneurship, Bookwell, Vol. I (401-409), (2015).
- A study for conceptualization of technological innovation in rural Indian context by Singh, S. and Bhowmick, B International Conference on Innovation and Creativity at Grassroots, IIM Ahmadabad (2015).
- Research on Rural Innovation in India: Evaluating Factors of Micro-finance Innovation. by Singh, S. and Bhowmick, B 8th ISDSI International Conference, Pune, (2015).





Mohd. Zuhair

Supervisor: Prof. Ram Babu Roy

Email: md.zuhair.cs@gmail.com

Mohd. Zuhair did M.Tech in Computer Science & Engineering from Birla Institute of Technology, Meshra, Ranchi in 2011 and B.Tech in Computer Science & Engineering from Uttar Pradesh Technical University in 2008. He worked as an Asst. Professor for six months at Shambhunath Institute of Engineering & Technology, Allahabad and worked for WIPRO Technologies in SAP CRM module for about 11 months. He joined the department in 2012.

Summary of Research

Area of Research: Machine learning, Artificial Neural Network

'Patient classification systems' are used to assist healthcare service providers to provide the right care to each patients. Classification system optimizes the resources and thus help in scheduling the nurses to meet the daily needs of the patients. There is a need to provide affordable healthcare services to the patients, due to the continuous rise in labor cost. Hence the service providers are mainly focusing on increasing operational efficiencies. The ability to map a comprehensive picture of the patient and translate it into relevant action, would enable us to manage elaborate assessments more efficiently and accurately. This work aims to study the existing classification systems and to identify the methods to improve an existing classification system or to develop a news classification system.



Jagruti Thakur Supervisor: Prof. Basab Chakraborty Email: jagrutithakur.ec@gmail.com



Jagruti Thakur graduated from South Gujarat University with majors in Electronics and Communication. She completed her masters in Project Management from Charotar University of Science and Technology. She had worked as Projects Executive for Geographic Information System (GIS) based Urban Planning projects. She joined the Department in 2013.

Summary of Research

Area of Research: Smart Grid

Smart grid is the modernization of present day power grid. A number of issues lies with the present GTD (Generation, transmission and Distribution) of electricity and a need is created for the restructuring of the grid. Her research involves addressing the issues associated with implementation of smart grid in Indian context. The data generated from smart meters would be analyzed using various algorithms, so as to understand the level of impact smart grid that creates on improving energy efficiency, preventing electricity thefts and blackouts as well as meeting the requisite demands.

Selected Publications

• Thakur, Jagruti, and Basab Chakraborty. "Intelli-grid: Moving towards automation of electric grid in India." *Renewable and Sustainable Energy Re-views* 42 (2015): 16-25.





Partha Mukhopadhyay

Supervisor: Prof Dhrubes Biswas

Email: mukhopadhyay.partha@gmail.com

Partha Mukhopadhyay has received his Master of Science (By Research) in Microelectronics Devices from the department of Electrical and Electronics Communication Engineering (E&ECE), IIT Kharagpur in April, 2010 and B. Tech degree in Electronics & Communication Engineering (ECE) from Kalyani Government Engineering College in July, 2003. From August 2003 to October 2006 he worked with Chatterjee Technologies and later in Jadavpur University as research fellow where he completed his Diploma in Embedded System in 2005. From May 2010 he has been working as senior research fellow at IIT Kharagpur in the field of semiconductor. His research interests are epitaxial growth of compound semiconductor based heterostructure devices on silicon by molecular beam epitaxy.

Summary of Research

Area of Research: Development of Epitaxial Metamorphic Buffer for High Power RF Devices in Wireless Products

Over the last several decades, demand in mobile and other wireless communication application products have advanced in the compound semiconductor (CS) technologies. The material growth of CS heterostructure devices on silicon has challenges abounding in scalability, compatibility and cost effectiveness while extracting optimized device performances. In metamorphic scheme the active layers (e.g., III-Arsenide, III-Nitride) of the device are grown on top of a compositionally graded buffer layer (metamorphic buffer) which expands the lattice constant from that of the substrate (Si or GaAs) to the active layer (InGaAs or GaN).

This research is to employ series of product development processes to build up suitable compound semiconductor based heterostructure devices for particular applications. The development is in terms of introducing novel metamorphic buffer by epitaxial growth process to optimize the application specific RF devices for various wireless communication applications. The main focus is the power devices applicable for both high and low frequency wireless products. These studies of product developments will optimize the performance of power devices with lower cost. It will lead to high performance devices for radio frequency (RF) products on low cost Si substrate. This novel approach of extending the metamorphic technique has been used for the growth of GaAs as well as GaN on Si. Epitaxial growth of metamorphic buffer covers III-Arsenide and III-Nitride heterostructure devices on silicon by sophisticated epitaxial growth technology in Molecular Beam Epitaxy (MBE). III-Arsenide area involves growth, characterization & fabrication of different AlGaAs/InGaAs, InAlAs/InGaAs HEMT/MOSFET etc; whereas in III-Nitride field it is AlGaN/GaN HEMT on Sapphire and Si(111). The scholar has proficiency in epitaxial growth by SVTA made four-chamber Cluster-tool MBE, Perkin-Elmer made III-Phosphorus & III-Nitride MBE, and Riber made Epineat C-12 MBE.



Priyanka Laha

Supervisors: Prof. Basab Chakraborty & Prof. Bhaskar Bhowmick Email: priyankalaha@see.iitkgp.ernet.in



Priyanka Laha has done M.Tech in Electrical Engineering from IIT Roorkee and B.Tech in Electronics and Communications Engineering (ECE) from West Bengal University of Technology. She has worked as an Assistant Professor for 1.5 years. She has joined IIT Kharagpur in the PhD programme in December 2013. Presently she is working in the area of Energy Management in India.

Summary of Research

Area of Research: Energy Management in Indian context

All societies require energy services to meet basic human needs (e.g., lighting, cooking, space comfort, mobility, communication) and to serve productive processes. For development to be sustainable, delivery of energy services needs to be secure and have low environmental impacts. Sustainable social and economic development requires assured and affordable access to the energy resources necessary to provide essential and sustainable energy services. This may mean the application of different strategies at different stages of economic development. To be environmentally benign, energy services must be provided with low carbon footprint and low greenhouse gas (GHG) emissions. Renewable energy sources play a role in providing energy services in a sustainable manner. However changes in temperature, precipitation, sea level, and the frequency and severity of extreme events will likely affect how much energy is produced, delivered, and consumed in India. My present research work involves the feasibility of integrating different renewable energy resources keeping in view the climate of India.





Bipul Saha Supervisor: Prof. Basab Chakraborty

Email: 961985@gmail.com

Bipul Krishna Saha did M.Tech in Power System and B.Tech in Electrical Engineering (EE) from West Bengal University of Technology. He has worked as an Assistant Professor for 2 years. Before joining academics he worked as a Project Engineer for 2 years in First Esco India Pvt. Ltd. He joined IIT Kharag-pur in PhD programme in the year 2013. His interest lies in the area of Renewable Energy in the context of Indian Entrepreneur.

Summary of Research

Area of Research: Renewable Energy in the Context of Indian Entrepreneur

Low grade waste heat can be well-defined as heat contained in a substance rejected from a process at a temperature higher than the ambient levels of the plant. The latest technologies pertaining to different types of low grade waste heat recovery are being researched. With the increase in price of fossil fuels in the global scenario, many of the manufacturing companies have started looking for alternate power source for their low grade heat source. The research aims to develop a practical model for low grade waste heat recovery, which can be used as an alternative source of energy.



Sayani Mondal

Supervisors: Prof. Partha Pratim Das & Prof. Titas Bhattacharjee Email: sayani.mondal9@gmail.com



Sayani Mondal completed B.Tech degree in Computer Science and Engineering from BCET, Durgapur from West Bengal University of Technology in the year 2008. Then she worked as an Assistant Professor in the Department of Computer Science and Engineering at BCET, Durgapur, from January, 2009 to December, 2013.Completed her M.Tech from School of Information Technology, IIT Kharagpur, 2013. Sayani joined the Department in December 2013 as an Institute Research Scholar.

Summary of Research

Area of Research: A Study of Software Engineering Processes in Software Startups

A software engineering process is the model chosen for managing the creation of software from initial customer inception to the release of the finished product. The chosen process usually involves techniques such as Analysis, Design, Coding, Testing and Maintenance. Several different process models exist and vary mainly in the frequency, application and implementation of the above techniques. For software to be consistently well engineered, its development must be conducted in an orderly manner. It is sometimes possible for a small software product to be developed without a well -defined process. But for a software project of any substantial size, good processes are essential. The process can be viewed as a road map by which the project participants understand where they are going and how they are going to get there goal. Mass-market software companies have their own sets of development and maintenance issues. Startup companies play a significant role in the booming software economy. Startups (software) are typically small companies where resources are limited, following the software process models for the product development. The research includes finding effective processes and learning as which processes are best suited for startups and also finding the unidentified problems of startup project failures.





Jignesh Sindha

Supervisors: Prof. Basab Chakraborty & Prof. Debashish Chakravarty Email: sindha.jignesh@gmail.com

Jignesh Sindha graduated from South Gujarat University with majors in Mechanical Engineering. He completed his masters in Industrial Process Equipment Design from Sardar Vallabhbhai National Institute of Technology, Surat. He had worked as Assistant Professor for CHARUSAT University, Gujarat. He joined the Department in 2014. He is also involved in Autonomous Ground Vehicle research group of IIT Kharagpur.

Summary of Research

Area of Research: Electric Vehicles

The future of transportation industry lies in electric vehicles. Electrical three wheeler cars have potential to fill the gap between four wheelers and two wheelers. The work is associated with addressing the safety and stability related issues of three wheeler. Technology related to intelligent control systems for three wheeler vehicles would be explored in the research.



Piyush Kumar Dongre Supervisors: Prof. Ram Babu Roy & Prof. D. K Pratihar Email: piyushalbert@gmail.com



Piyush Dongre has completed his B.E in 2011 in Electronics & Telecommunication Engineering from Bhilai Institute of Technology (Durg) and M.Tech in 2014 in Visual Information Processing & Embedded Systems from dept. of ECE, I.I.T Kharagpur. He is pursuing PhD and has joined the dept. in 2015.

Achievements

- Full fee waiver for B.E for securing high rank in state entrance exam
- Secured 99.97 percentile in GATE 2012
- Started company Systron Technologies Pvt. Ltd in field on Robotics, Embedded Systems & Computer Vision.

Summary of Research

Area of Research: 3D Computer Vision with Soft Computing

Recent advances in the field of real time vision based navigation created many opportunities for real time applications from Google's autonomous car to autonomous aerial vehicles. This real time deployment can have various applications from rescue application in natural calamity to military services. In this field there is a wide scope to enhance the performance while maintaining feasibility of real time applications, which also depends on nature of application. Soft Computing is a technique to provide an inexact solution to computationally hard tasks such as NP-complete problems which do not have a fixed algorithm for computing solution in a polynomial time. Hence, combining these two fields can give us some real time operating performance within certain level of acceptable accuracy. This research aims to work on various computer vision algorithms and to apply soft computing techniques to various stages of image processing, and to make them applicable for real time .





Manali Chatterjee

Supervisor: Prof. Titas Bhattacharjee Email: mana.chatt@gmail.com

Manali completed her graduation and post graduation in Computer Science & Engineering from West Bengal University of Technology, Kolkata. She has work experience of 3 years as assistant professor in engineering college affiliated under WBUT. She joined this department in December 2014.

Summary of Research

Area of Research: Corporate governance and firm performance

Evidence of the competitive value of business intelligence (BI) and analytics solutions is growing. Fact-based decision making is spreading throughout commercial, nonprofit, and public sector organizations. An increasing number of organizations are making BI and analytics functionality more broadly available to all decision makers inside and outside the organization. So, over the long term, BI solutions will continue to be applied to optimize a wide array of processes in an effort to improve performance management and organizational competitiveness. Broadly to speak of about my research, it will mainly revolve around corporate governance practices in technological startups , whether its effect is good or bad in organizational performance measuring.



Aashish Kumar Supervisors : Prof. P.K.Dan & Prof. M.K.Mondal Email : aashishkumar15@gmail.com



Aashish Kumar has completed his B.Tech in 2010 in Electrical & Electronics Engineering from Uttar Pradesh Technical University (Lucknow) and M.E. in 2014 in Power Electronics from Electrical and Electronics Engineering Department, B.I.T Mesra. He is currently pursuing his Ph.D and has joined RMSoEE in December 2014.

Achievements

He has always played a significant role in organizing the cultural and technical events organized in the universities he was associated with. He joined as a Pro-Term Lecturer in Uttarakhand Technical University in 2010 and served there for two years followed by his M.E. after that. On completion of his master's, he joined Cognizant Technology Solutions as a Programmer Analyst and completed his training in Mainframe Technology.

Summary of Research

Area of Research : Heat Dissipation from Electrical and Electronics Devices using Thermoelectricity.

Although thermoelectric (TE) phenomena were discovered more than 150 years ago, thermoelectric devices (TE modules) have only been applied commercially during recent decades.

Cooling and dissipation of heat, especially around the main components in a heat generating system, is always a cause for concern as the temperature of the interiors increase due to the amount of heat generated. Excess heat that is not removed by sufficient cooling can negatively impact the normal functioning of the system and can cause circuits and components to become unstable causing serious malfunctions and hence resulting damage. Overheating can reduce the lifespan of components as well.

Therefore, a thermal management cooling system is being designed using Thermoelectric phenomenon. Recent advancements in the field of heat dissipation have opened many doors for one to go beyond rated temperature and conventional cooling methods. So, this research will be focused on working on various methods which can be devised to remove the heat from the components.





Bishnu Pada Bose Supervisors : Prof. P.K.Dan & Prof. M.K.Mondal Email : bosebishnu@gmail.com

Bishnu Pada Bose has completed his B.Tech in 2007 in Civil Engineering from Rajasthan University and M.Tech in Civil Engineering from NIT Rourkela in 2013.

Achievements

He has gained experiences from varied industries like Larsen & Toubro Limited as a Project Engineer for 10 years and ITC Limited as an Assistant Project Manager for 5 years.

Summary of Research

Area of Research : Brick made from waste material

The research aims to develop value-added construction resources out of waste materials that are presently causing serious nuisance. The core waste materials which are being explored are over-burdened dump or mines-spoils, waste plastic materials, and biological waste matters. The mine spoils is an enormous cause for environmental, water, and geographical concerns and substantial research have been done to highlight its diverse negative impact. However, very little research is found in scholarly publications on its meaningful use. On the flip side, there is growing scarcity of construction materials originating from nature such as soil for manufacturing bricks. Topsoil that is used for making brick is the most precious for healthy botanical growth. Increasing use of top soil is dangerous for food security of the world population. Finding an alternative to soil for making brick is highly imperative and timely. The present research work is directed to evolve technology for using waste materials to replace soil in making bricks and other construction materials. Another focus of the research is to reduce the weight of construction materials using waste materials such as waste plastic or organic matters.



Sireesha Tamada Supervisor: Prof. P.K.Dan Email: mail2sireeshatamada@gmail.com



Sireesha Tamada has completed her B.Tech in 2011 in Electrical Engineering from Biju Patnaik University of Technology(BPUT) and M.E. in 2014 in Power Electronics from Electrical and Electronics Engineering Department, B.I.T Mesra. She is currently pursuing her Ph.D and has joined RMSoEE in December 2014.

Summary of Research

Area of Research : Optimisation in Product Design and Realisation Process

To maintain and enhance the level of profitability in an increasingly competitive and transparent market place, a firm must continuously reposition and redesign its existing products or introduce new products to specific market segments. Product design is the creation of objects of utilitarian value to people. A company has to establish its market and subsequently subdivide this market so that it can address the needs, posed by a particular market segment, with specific products to sustain the market competition. Hence, commercial organizations are continuously monitoring their target market segments by gathering data from both consumers and competitors. This data forms the basis for market segmentation, product positioning and design. As a consequence, there is an urgent need for efficient access to and information extraction from this data, as well as the prediction of future trends. An optimization-based approach for the design of a product forms the perfect platform for addressing the different types of uncertainties in the design and redesign of a product.

Analytics is the key research subject for future data driven decision making applications. They form a data-centric style of decision making to provide an efficient way for querying big data clusters. They consist of measurements that generate data and the transformation of these data into indicators for decision-support. This form of optimization and realization process using product analytics is used for informing usability, reliability, and quality of service engineering decisions.





Manish Chandra

Supervisor: Prof. P.K.Dan Email: manish.cusat999@gmail.com

Manish Chandra has completed his B.Tech in 2011 in Mechanical Engineering from Cochin University of Science and Technology (Cochin, Kerala) and M.Tech in 2014 in Industrial and Management Engineering from Manufacturing Engineering Department NIT Jamshedpur. He also worked as Assistant Professor, Mechanical Engineering Department, at MVN University, Palwal Haryana. He is pursuing PhD and has joined the dept. in Jan 2015.

Achievements

• Secured 101 rank in CSIR-Net Examination held in December 2014.

Summary of Research

Area of Research : Development of a Framework for Product Design and Realisation

Product development is one of the major concerns of any manufacturing company. Especially, when the market requirements varying continuously and at the same time quality and cost goes hand in hand. And hence the Product design plays the deciding role in order to achieve cost reduction and improvement in quality and simultaneously it plays pivotal role in minimizing the product development time. Framework is a real or conceptual structure intended to serve as a support or guide for the building a product. In this field there is a wide scope of enhancing the design procedures in order to achieve improved quality and cost reduction. So the research would focus broadly on developing a new framework for product design using current edge technologies.



School of Engineering Entrepreneurship Dual Degree Students





Pavitjot Singh Radha Krishnan Hall of Residence pavitjot@gmail.com B.Tech - Electrical Engineering M.Tech - Engineering Entrepreneurship.

Achievements & Interests

- A co-founder of Sencillo technology solutions which aimed to provide online presence to offline retailers of Kolkata to compete with big players and adapt to changing consumer habits of shopping.
- Filed a provisional patent on Product Development of Automicrowave which tries to simulate the process of cooking and which can be controlled by a smartphone, without any supervision and prerequisite knowledge of recipe.
- Offered PPO as City Manager (Operations) in a Startup called House Joy, based out of Bangalore. Started Running Club, IIT Kharagpur. Selected in "Jenesys 2.0" to represent India in Japan.
- Runner up in Intel Ideation Workshop conducted by FICE. Electrical department representative, performing bhangra, mess secretary, organizing departmental fest and acting as placement coordinator of RMSoEE.

Projects

• Smart Auto-Cooker



Nishant Koul

Lala Lajpat Rai Hall of Residence nishantkoul2010@gmail.com B.Tech ~ Agricultural Engineering. M.Tech ~ Engineering Entrepreneurship.

Achievements & Interests

- Placed in HSBC Ltd. as an Analyst.
- Have done internships in Escorts Ltd., where he mapped out the dealer side supply chain in the state of Haryana. Click Labs, an internet products company, where he helped design the user experience of social interaction products for brands.
- Proficient in data analysis techniques and has good organizational and team management skills.
- Member of Entrepreneurship Cell, IIT Kharagpur

Projects

• Developing a holistic valuation model for E-Commerce companies in a growing market, in the absence of reliable financial data. It quantifies customer and investor perception of the company to develop a benchmark for the value proposition offered by a company by using conjoint analysis and regression techniques.





Ashish Kumar

Rajendra Prasad Hall of Residence ashishtbm@gmail.com B.Tech - Aerospace. Engineering M.Tech - Engineering Entrepreneurship



Saurav Das Nehru Hall of Residence sauravdas.iitkøp@ømail.com B.Tech ~ Aerospace Engineering M.Tech ~ Engineering Entrepreneurship

Achievement & Interests

- Has been awarded with TODAI scholarship by University of Tokyo Boeing scholarship, two times where he is also involved in Boeing sponsored project.
- Developed a microcontroller based fully automatic water level controller, keeping Indian customers in mind.

Projects

- Analysis and Determination of control parameter for a Quad copter
- VTOL UAV having capability to fly in a fixed wing configuration.
- Design of a lab scale solid rocket test facility.

Achievement & Interests

- Research intern at IISC Bangalore
- Martial arts, Meditation and Yoga, and also has a sound knowledge of Ayurveda.
- Has a deep interest in Finance and Economics especially Corporate finance and Macroeconomics.

Projects

• Computational Fluid Dynamics related to the fluid flow.





Pratik Bansal

Lala Lajpat Rai Hall of Residence bnsl.pratik@gmail.com B,Tech -Mining Engineering M.Tech - Engineering Entrepreneurship



Kumar Sourav

Lala Lajpat Rai Hall of Residence

ksourav16@gmail.com

B.Tech - Electronics & Electrical Communication Engineering

M.Tech ~ Engineering Entrepreneurship

Achievements & Interests

• Member of the Football team of Lala Lajpat Rai Hall of Residence participated in the Inter-Hall Competition at IIT Kharagpur.

Projects

• To manufacture construction bricks using waste plastic as a raw material. This product will help in minimizing the waste plastic which is piling up in our neighborhoods as well as it aims at reducing the weight of the bricks used in construction so that there is minimum load on a building's foundation.

Achievements & Interests

- Worked as an intern under the guidance of Dr. Dhrubes Biswas, on "Increasing the Efficiency of GaN/InGaN based solar cells"
- Analytical skils and proficient in data analysis techniques

Projects

• Project on "RFID in Vehicle Traffic Control and Security" under the guidance of Dr. Bhaskar Bhowmick





Rakesh Krishna Megnad Saha Hall of Residence rakeshkrishnaj@gmail.com B.Tech – Mechanical Engineering M.Tech – Engineering Entrepreneurship



Anish Kumar Sinha Rajendra Prasad Hall of Residence rakeshkrishnaj@gmail.com B.Tech ~ Mechanical Engineering M.Tech ~ Engineering Entrepreneurship

Achievements & Interests

• He cofounded Instano, a virtual shopping platform for Shoppers and retailers

Achievements & Interests

- Electric vehicle project selected for the Green Initiative Project by IIT Kharagpur.
- Member of the Kharagpur Robotics and Artificial Intelligence Group (KRAIG).
- Good organizing skills, strategy making skills and a very good team player.
- Programming skills in C, C++ and MATLAB

Projects

Mtech- MATLAB modelling of electric vehicle motor efficiency





Bipradip Das Rajendra Prasad Hall of REsidence dasbipradip@gmail.com B.Tech ~ Civil Engineering



Kunal Mathuria

Radha Krishnan Hall of Residence 91kunalm@gmail.com B.Tech – Agricultural and Food Engineering M.Tech – Engineering Entrepreneurship

Achievements & Interests

- Co-Founder of Mrittica Infotech Pvt. Ltd. ~ A social startup focusing on providing technical support and infrastructure on Organic Farm-ing to the farmers.
- Started a food delivery service in the IIT Campus named Splinx.
- Expertise on Solid works, Abaqus, Autocad, Revit Architechture, Staad.Pro, Matlab.

Projects

- Increasing efficiency of Internal Combustion engine: Worked on Gasoline direct Injection (GDI) Technology to increase overall efficiency of the engine
- Developing a Continuous Positive Airway Pressure (CPAP) Machine for the patients who Obstructive Sleep Apnea (OSA) mainly Snoring problem.

Achievements & Interests

- Ekal Vidyalaya, an NGO in the field of education and vocational training, in order to spot social entrepreneurial opportunities in Rural India.
- Worked with Mother Dairy Calcutta on improving the efficiency of milk homogenizer.
- Active member of Entrepreneurship Cell, IIT Kharagpur
- Sponsorship manager of E-cell

Projects

Currently working on a project to study the impact of corporate governance in small, high-tech companies on their innovation and financial performance.





Abhishek Krishna Nehru Hall of Residence 786.kkrishnaa@gmail.com B.Tech in Civil Engineering M.Tech in Engineering Entrepreneurship

Achievements & Interests

- Placed in ZS Associates.
- Awarded Excellent Memento by Regional Director Kanpur Region during fourth year.
- Mechanical Head of Kharagpur Robo Soccer Students' Group Represented India at FIRA Microsoft League held at Malaysia.
- Captained Product Design, an Inter Hall event comprising 25 members and in Inter IIT Technology Meet of 2014-2015 and led his team to won Silver among 9 participating IIT's.
- Won best fresher's award in Kshitij, annual tech fest of IIT Kharagpur.

Internships:

- Frost & Sullivan as Research Analyst
- Smart analyst India Pvt. Ltd as Analyst
- Reserve bank of India as Research Associate
- Won Gold Medal for idealizing Automated Diagnosing KIOSK to stop recurrence of epidemics like Malaria, Dengue & Typhoid.

Projects

M.Tech - Developed a Smart Card based Energy Meter



Neelesh Shekhar

Azad Hall of Residence inform.neelesh@gmail.com B.Tech – Biotechnology M-Tech – Engineering Entrepreneurship

Achievements & Interests

- Placed in Snapdeal.com, New Delhi
- Served as President, Business Club, IIT Kharagpur
- Certified as Lead Auditor by International Register of Certificated Auditors, United Kingdom
- Secured within 100 ranks in various National level Math & Science Olympiads
- Business Plan on Electronic Waste recycling along with Mr P.S Mukherjee, Scientist G, IIMT Bhubaneswar.

Internships:

- Ernst & Young, Singapore
- Flipkart.com, Bangalore (Secured a PPO)
- Arcelor Mittal, New Delhi & Mumbai

Projects

• M.Tech- Devising a Valuation Model for E-Commerce companies in India, Under Prof Praha Bhola & Prof Manoj Mandal.





T.N.V.D. Prasad Rajendra Prasad Hall of Residence prasadtummapala@gmail.com B.Tech in Agriculture and Food Engineering M.Tech in Engineering Entrepreneurship

Achievements & Interests

• Designed a C++ based application to overall heat transfer coefficient and surface area of a custom designed finned tube heat exchanger.

Internships

• SSP Pvt. Ltd. Faridabad

Projects

- B.Tech ~ Study and design of links of Rice Transplanter to modify the fluctuations in its turning moment
- M.Tech ~ Designing Solar Based Mini Rice Harvester .



Ravindra Kumar Poonia

Nehru Hall of Residence | ravindra.09poonia@gmail.com B.Tech – Chemical Engineering M.Tech – Engineering Entrepreneurship

Achievements & Interests

- **Placed** in Patent Analyst at IPpro, a brainchild of the world renowned technocrat & an entrepreneur, Sam Pitroda
- He served as a Core Team member of Kshitij 2012 (The annual techno-management fest of IIT Kharagpur), and held position of Finance Head in its subsequent edition.
- Cosmology and philosophy

Projects

- Designed an MNT chemical plant and presented strategy to- increase efficiency of related equipment of the plant.
- Urea Plant design
- Reducing Biasness in Startup Valuation.
- Currently working on "Smart Card based Energy Meter" and "RF based Smart metering solution" to reduce transmission and distribution losses in Electricity value chain.





Mukil Babu K R adha Krishnan Hall of Residence mukilbabuk@gmail.com B.Tech in Aerospace Engineering M.Tech in Engineering Entrepreneurship

Achievements & Interests

- Placed at Vizexperts India Pvt Ltd
- His passion towards aerospace engineering and flying from his childhood made him to pursue projects in the control domain of the same and made project on orbital mechanics for ISRO and DRDO. While interning at Vizexperts, he introduced new simulation software for ISRO which is based on orbital mechanics.
- Member of spAts (Space Technology Students' Society) where he worked on developing cheapest water rockets and other space related activities and in organizing committee of National Students' Space Challenge, India's first space engineering fest.
- General Secretary and vice president of Dept. of Aerospace Engineering society.

Internships

- Uni power transformer manufacturing Ltd
- Kerala Electricals Ltd
- Honeywell Technology Solutions Lab, where he did work for Boeing Dreamliner~787 Flight controls.

Projects

- B.Tech ~ Control system design for landing of UAV
- M.Tech Accident alerting system for vehicles.



Designing a Valuation Model for E-Commerce Industry in India

Students: Nishant Koul and Neelesh

Guide: Prof. Prabha Bhola and Prof. Manoj Mondal

RESEARCH SCHOL

The E-Commerce industry in India is a growing at the rate of 35% and is presently valued at \$ 17 billion. Mergers, acquisitions and large VC funding rounds are commonplace. However, the companies are pursuing a market capture based expansion rather than the typical organic growth, which leaves very few reliable alternatives, if any, for determining the actual values of the companies. Our project takes a more holistic look at how the companies create and maintain value taking into account the perceptions of the companies in the eyes of the customers and the investors, apart from the financial valuation, to arrive at a more reliable valuation of the company. From the customer perspective, we use conjoint analysis and regression techniques to see how customers perceive the service quality of the company. From the investors point of view, we see how investors perceive the value creation of the company in a unique scenario where loss-making companies still attract large valuation chasing the position of market leader. Combining different perspectives of the company valuation with the traditional financial methods would give us a holistic valuation of the major e -Commerce companies in the Indian market and parameters which affect customer choice, providing a competitive advantage which they can leverage in the future.

Automatic Accident Alerting System.

Student: Mukil Babu

Guide: Prof. Ram Babu Roy

The economical way of setting up of automatic accident alerting system in any vehicle to send the location and owner details of the car which has undergone accident to the emergency units automatically for immediate emergency response. This situation is more relevant when the driver gets into an accident and he won't be able to contact anyone for help.



MATLAB modelling of electric vehicle motor efficiency

Students: Anish Kumar Sinha

Guide: Prof. Basab Chakraborty & Prof. Manoj Kumar Mondal

The project is about designing a MATLAB Simulink model to simulate the electric vehicle motor and finding its most efficient working points. The model will take as input pre-defined speed values from a driving cycle constructed from real life data. The model will have vehicle specifications such as mass, frontal area, wheel diameter etc built in. Through these specifications and the speed data the model will calculate required torque values and construct a plot of speed torque values. It will then compare this plot with an existing speed torque curve of the electric motor to find its optimal working points. This will help in selecting an efficient motor for the vehicle which can potentially increase the range performance of the vehicle.

Smart Card based Energy Meter (SCEM)

Student: Abhishek Krishna

Guide: Prof. Basab Chakraborty

A Smart Card Based Energy Meter (SCEM) enables power utilities to collect electricity bills from the consumers without the involvement of any individual/agent. The card based meter is not only limited to Automated Meter Reading but is also attributed with information exchange with the utilities pertaining to customer's consumption details. The idea of card based metering will be very important for the new research fields of Micro-grid and Smart Grid and is an inevitable step in making any grid smarter than it is now. Literature has witnessed quite an amount of work in prepayment electric metering system area. The system designed in this project is quite different from existing prepaid metering system, here smart card is simply used as a device which stores the Units Consumed, the Amount of Bill generated, Last Payment Record, Usage Pattern and consumers can pay the bill using the same through a centralized machine using their Debit/Credit Card. It also provides dual option of Pre-paid and Postpaid payment system which is not offered in any meter till now. This particular meter takes the Consumer awareness to a whole new level as it continuously suggests the consumer regarding their usage pattern using Predictive Analytics. Electricity theft can also be checked using this meter through Pattern Recognition Technique.



Smart Auto-Cooker

Student: Pavitjot Singh

Guide: Prof. P.K Dan and Prof. Bhaskar Bhowmick

Imagine a situation where you are outside your home and you checked your smartphone, selected a recipe and gave a command which sets the microwave at home in action and it starts adding ingredients sequentially and by the time you reach home, the food would be ready to be served. My MTP project focuses on creating such a device which would be controlled by a smartphone. All one has to do is to put the ingredients in selected chambers and just operate everything at his /her own comfort. There is no existing product in the market which satisfies this need. It would provide customers a hassle free way to enjoy a multitude of cuisines without human supervision. Additionally, It will have a flat learning curve and will provide quick , convenient and healthy food as compared to ready to eat meals. Presently Product development process is underway and we have designed a basic solid works model and trying to make certain changes in the design which would make it more cost efficient and more user friendly. Every minute details is being studied and worked upon to build a proof concept model.

Impact of Corporate Governance on Firm Performance & Innovation: The case of Small, High-Tech, Indian Companies

Student: Kunal Mathuria

Guide: Prof. Titas Bhattacharjee & Prof. Bhaskar Bhowmick

The main purpose of this study is to examine the impact of the corporate governance mechanism on firm performance. The variables, employed in this study to measure firm performance, include return on assets, stock return and Tobin's Q. The proxies considered for governance are Promoter's holding, Institutional holding, board size and ratio of independent directors. 'Entrenchment hypothesis' and 'Convergence of Interest' hypothesis are tested.



Continuous Positive Airway Pressure (CPAP) Machine

Student: Bipradip Das

Guide: Prof. Basab Chakraborty & Prof. Manoj Kumar Mondal

One of the severe healthcare problems that the people are facing now days is Obstruction Sleep Apnea (OSA). While sleeping, there are some obstructions occurring in the body due to which one cannot take proper sleep. There are five stages in a sleep cycle which takes average 90 to 110 minutes to complete. For a human being to stay healthy at least one sleep cycle should be completed properly while sleeping. But the person having OSA is not able to have one which gives rise to many side effects. Some of them are – Heart problem, Liver Problem, Mental Disorder etc.

Snoring is one kind of OSA. Snoring is the result of tissues in the throat relaxing enough that they partially block the airway and vibrate, creating a sound. CPAP is used as a preventive measure for snoring. The main producers of CPAP machines are USA and Germany. There are no manufacturers available in India. Hence CPAP machines costs so much that it is generally unaffordable for middle class & lower class family in India to make use of. The machines in India will cost one Rs. 40000 and Up.

So the main objective of the project is to develop a CPAP machines within an affordable range for the masses. The project is in prototyping stage. Suppliers are being contacted for the procurement of centrifugal blower which is the key part of the CPAP machine.

Design and Development of VTOL UAV

Students: Ashish Kumar & Saurav Das

Guide: Prof. Ram Babu Roy

The MTP involves design and development of VTOL (Vertical Take-Off and Landing) UAV (Unmanned Aerial Vehicle) with the capability to fly in fixed wing configuration as well. This project involves the development of controls from scratch (without using any open source developed code) so that we can understand each and every aspect of control system and nothing should be like a black box to us. This involves interfacing the required sensors one by one then learn to use the gathered data from the sensors to control the UAV.



Designing Solar Based Mini Rice Harvester

Student: T.N.V.D. Prasad

Guide: Prof. Manoj Kumar Mondal

The existing models of mini rice harvesters are non-renewable resource based. They use either petrol or diesel as their fuel. There is an immense need for renewable resource based equipment for harvesting and other agricultural activities. The introduction of renewable energy based equipments in agricultural sector may help to reduce operational costs and it will be environmental friendly. The project is intended to design a mini rice harvester which will be using solar power for its operations.

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Global Entrepreneurship Summit

Global Entrepreneurship Summit (GES) is IIT Kharagpur's annual, international corporate summit conducted by Entrepreneurship Cell, IIT Kharagpur. It is the largest student-level entrepreneurial summit in India. Ever since its initiation in 2007, GES has always been a unique platform for academicians, new-age entrepreneurs, eminent business personalities, venture capitalists and the students to gather at one place and share their entrepreneurial endeavours and experiences, and to pledge to take entrepreneurship to greater scales.

GES plays host to a variety of events including guest lectures, workshops, Global Entrepreneurship Conference (GEC), Startup Camp, Connect the Dots (a conference with participants from E-Cells across the nation), Panel Discussions, Elevator Pitch in front of venture capitalists and investors, and the co -founder's meet.

GES 2015, heralded the new wave of innovation and entrepreneurship sweeping through the country. With India taking large strides on par with Silicon Valley, in terms of developing new age technologies, social initiatives and other unique ventures, GES 2015 was aptly themed **"The Future of Innovation is Now"**. With guest lectures by **Mr. Kanwal Rekhi** (Managing Director, Inventus Capital), **Mr. Sundar Pichai** (Senior Vice President, Google), **Mr. Mahesh Murthy** (Managing Partner, Seed Fund), **Mr. Amod Malviya** (Chief Technology Officer, Flipkart), and many more, participants were highly motivated by the experience and domain knowledge of these stalwarts. GES 2015 also witnessed numerous informative workshops by Innovaccer, BSE, Flipkart, NSEF and Calcutta Angels. In E-Cell's constant endeavour to assist startups and startup founders, there were also events including Startup Camp, Co-Founder's Meet, Innovation Exhibition and Elevator Pitch. GES also played host to the finale of Empresario, Entrepreneurship Cell's annual global business model competition. Other highlights of GES included Connect the Dots, Hackathon powered by IBM, Global Entrepreneurship Conference and panel discussions on currently relevant topics such as Self Sustainability of Social Startups, Early 20's, Opportunities in Mobile Industries and Womanpreneurship.

With an extensive footfall this year, GES has swept the country with its uncompromised quality and immense reach. It may be a tiny step on our part, but it is a giant leap for our ambitions to build an enterprising India!



School Gallery









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