



## Connecting Thinkers...

### Editors' Message



Dear Thinkers, September has been a month of achievements for the Jain University Research Community. Our University website is filled with a list of achievers. Our Vice Chancellor Dr.N.Sundararajan received the National Education Leadership Award for his contribution to the field of Education. Some of our research supervisors and scholars, who have earned a name for themselves in various global forums over the last few months, were felicitated by the University for their contributions. Another important milestone for our M.Phil Scholars is the completion of their dissertations, many of whom have submitted it in the past few days while others will be doing so in the coming weeks. The campus was bustling with activity and we saw some anxious faces waiting to fulfill the procedures linked to submission and some really happy ones who had completed all the required procedures. While the award of a prize or degree maybe considered a bigger achievement, landmarks such as submission of thesis or publication of a paper is by itself a unique milestone. These academic achievements are all important steps in the ladder of achievement and excellence. We are proud of each of our achievers and wish them continued success in their future endeavors.

#### JAIN UNIVERSITY HONOURS ITS ACHIEVERS

Seven doctoral supervisors and three doctoral students of Jain University were recognized and honoured for their achievement at a function held at the University on 29th September 2015. The University has announced that every quarter it would hold an Award Function to recognize its achievers from different fields.

A few of our Doctoral Supervisors were recognized for their achievements in the last quarter. Dr. Swati Rout, Dr K N Varalakshmi, Dr Vani, Dr Bindhu, Dr Kathyayini, Dr Ranjith Krishna Pai and Dr Ramamurthy were honoured for their contribution to research and/or their research publications.

Ms Ashwini N V Ganig, a Doctoral Student in Psychology was honoured for participating as a 'Leader of Tomorrow' in the St Gallen Symposium and her idea was voted as the 'Best Idea' at the Conference. Ms Deepti Swamy, another Doctoral Student in Psychology was recognized as one of the top 10 in the Global Peter Drucker Essay Writing Competition and has been invited to Vienna to participate in the Conference. Ms Ashwini Appaji, a doctoral student in Biotechnology, was recognized for a record number of publications in the trimester under consideration.

As the University plans to have a Honours Day every quarter, Doctoral Students are requested to mail to [cersse@jainuniversity.ac.in](mailto:cersse@jainuniversity.ac.in) any of their special achievements in terms of awards and recognitions.

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## GUIDE'S COLUMN

### Unraveling the Hidden Wealth: From Waste to Valuable Materials

It is presumed that the agricultural crops we grow are mainly intended for their produce. However, it is rarely realized that the produce is often only a portion whilst a major part of the crop is treated as waste and is either discarded or used for low value applications. For instance, the amount of sugar produced is only a fraction of the weight of the whole plant. Similarly, rice obtained is much less than the weight of the straw produced. Traditionally in countries like India, the residue from the crops has been used as fodder, fuel or fertilizers which are low value applications. These agricultural wastes contain highly valuable polymers such as cellulose, hemicellulose and lignin which are suitable for various industrial applications. Polymers in the agricultural residues can be used for textiles, composites, thermoplastics, construction and automotive applications. Such applications will not only add value but will also provide a sustainable and an environment friendly source without the need for additional land, energy or other resources. Products developed from these sources will be biodegradable and have the potential to replace similar products manufactured from petroleum-based sources that are non-biodegradable and are a major cause of environmental pollution.

Decreasing the consumption of fossil fuels and increasing share of renewable energy is a major goal for countries across the globe. One of the major areas related to renewable energy is to generate biofuels using food grains. Ethanol produced primarily from sugar or from starch is being commercially used in many countries. Although the ethics of using food crops for fuel is debatable, oil crops such as soybeans and canola are also exclusively cultivated for eventual biodiesel production. In India, considerable efforts are being made to promote the use of non-edible oil seeds such as jathropa, neem, pongamia for biodiesel production. The generation of biofuels from these oil seeds inevitably generates coproducts termed oil-meals which are non-edible and mainly used as fertilizers.

*Satisfying the food and fuel needs of future generations and/or making agriculture more profitable and tenable is only possible if the wastes (residues) are used for high value applications*

Currently, biodiesel production is uneconomical compared to regular diesel due to the poor conversion and high output of coproducts that have limited use. Up to 80% of the seed is generated as meal and it is therefore inevitable that these coproducts be used for high value applications. Fortunately, the coproducts contain (up to 50%) proteins, carbohydrates and other valuable polymers. Proteins in the coproducts could be made into fibers, films, 2D and 3D scaffolds for tissue engineering and controlled drug delivery. Furthermore, the carbohydrates can be fermented to derive ethanol or converted to bioplastics. These applications have the potential to add considerable value and consequently make biodiesel economically competitive. Yet another neglected waste is poultry feathers (8-10% by weight of the bird) which contain 90% protein (keratin). Keratin has a specific amino acid sequence (RGD) that makes it preferable for tissue engineering applications. Films, hydrogels, composites and many other products can be developed from feathers.

Satisfying the food and fuel needs of future generations and/or making agriculture more profitable and tenable is only possible if the wastes (residues) are used for high value applications. Developing products from agricultural wastes will also help to generate jobs in rural areas, increase income and reduce migration to urban areas. Our team is working on developing various biopolymeric materials (films, fibers, hydrogels, micro and nanoparticles, 3D scaffolds etc) for medical, composites, electrical, automotive, construction and other applications.

*Dr. Narendra Reddy*

*Professor and Ramalingaswami Fellow, Center for Emerging Technologies*

*Email: nreddy3@outlook.com*

## Financial Literacy and Women Empowerment

Financial literacy is the ability to understand how money works in the world: how someone manages to earn or make it, how that person manages it and invests it to make more money. Rural Indian women are the backbone of our economic progress and designing appropriate financial products for her will strengthen her role in shaping her empowerment quotient, which looks at enhancing women's productive capacity in financial terms. Making a woman financially literate can make her more efficient in allocating financial resources which will lead to her improved health and nutrition, and enable her to educate her family.

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In this regard, Buzz India a mobile academy consisting of a customized, fully-equipped mini-bus with two trainers, is empowering rural women by offering tailor-made tools and powerful solutions for personal, business and financial growth in their environment. Buzz India gives space for women to awaken their dreams and initiate ways to achieve them.

Their aim is to bring about attitudinal change from 'day to day living' to 'thinking for the future' and visualizing the financial goals in life. It further aims to encourage healthy financial behavior both in their business and personal finances to grow and also to meet the needs and risks of life. BUZZ is making education mobile and localized. It has made the rural women's life meaningful for community development.

*Hema Srinivasan*

*Doctoral Scholar in Management studies*

*Email: shema14@yahoo.co.in*

## Platelets and Dengue Fever

Platelets (thrombocytes) are small discoid shaped cells in blood. Their concentration in blood varies between 150,000 - 400,000 cells/mm<sup>3</sup>. They play an important role in haemostasis and wound healing. Hence, any abnormalities in platelets can lead to various bleeding disorders. Dengue is an endemic disease that occurs throughout the world, especially in the tropical or subtropical areas. It is a common arbovirus infection, responsible for thousands of deaths every year. It is an acute disease caused by dengue fever virus of the family *Flaviviridae* and transmitted by *Aedes aegypti* mosquito. Clinical manifestations include fever, headache, arthralgia, myalgia and skin rash; and hemorrhage, shock and death in severe circumstances. One predominant feature of dengue is thrombocytopenia. Immune mediated thrombocytopenia and viral mediated plasma leakage can lead to the development of dengue haemorrhagic fever.

*Dengue virus directly interacts with platelets and activates them physiologically, leading to increased platelet destruction.*

Management of this disease is essentially supportive and symptomatic as there is no specific treatment available for dengue fever. There are no vaccines for protection and the vector control measures are inadequate. Various plant extracts are being tested for their platelet increasing effect. Extracts from papaya and *Euphorbia hirta* leaves have been proven to have platelet augmenting activity in dengue patients. But, they are not recommended as treatment for dengue fever. Dengue virus directly interacts with platelets and activates them physiologically, leading to increased platelet destruction. Therefore, detailed understanding of cellular and molecular basis of interaction between the virus and platelets might be helpful in the development of therapeutic agents for management of dengue-associated thrombocytopenia.

*Manasa K*

*Doctoral Scholar in Biotechnology*

*Email: kmanasagowda@gmail.com*

## Accelerating Bioinformatics Applications Using Graphical Processing

Bioinformatics applications spread over several advanced research areas including medicine, human genomics, microbial genome applications, environmental studies, etc. The field of *bioinformatics* gained significant visibility after the event of full human genome sequencing at the beginning of the 21<sup>st</sup> century. Bioinformatics applications require huge computing resources both in terms of storage and processing. Across the globe, most of the supercomputing resources are utilized for bioinformatics research like protein folding studies, mapping the blood stream, modelling viruses, and building brains. Researchers have re-targeted widely used bioinformatics applications to heterogeneous computing platforms. Heterogeneous computing community became vibrant when the industry adopted Apple's OpenCL framework for parallel programming. Now, OpenCL is the de facto standard for parallel programming especially for GPU computing.

*The relentless performance improvements demanded by software developers to provide better functionality drove the computer industry to build more powerful computers.*

The relentless performance improvements demanded by software developers to provide better functionality drove the computer industry to build more powerful computers. This drive has reduced since 2003 due to energy consumption and heat dissipation issues that limited the increase of clock frequency and the level of productive activities that can be performed in each clock period within a single CPU. This fuelled the industry to develop multi-core processors to provide improved processing power. Multi-core computing helped sequential programs while many-threads computing helped the floating point performance. A large performance gap due to the differences in the fundamental design philosophy between the two types of processors i.e. the design of a CPU is optimized for sequential code performance while the design of GPUs is shaped by the fast-growing video game industry; has motivated many application developers to move the computationally intensive parts of their software to GPUs for execution. Not surprisingly, these parts are also the prime target of parallel programming. Bioinformatics applications are all compute bound thus making them amenable for acceleration by parallel processing on heterogeneous computing platforms.

*Dr.S.Balaji*

*Professor, Centre for Emerging Technologies*

*E-mail: drsbalaji@gmail.com*

## My Research Journey

Research is a journey that one leads to increase knowledge, empower one's character and learn skills. It is a compilation of many steps ranging from choosing one's research topic to completing all the objectives towards a worthwhile thesis. I am currently a Research Scholar pursuing my Ph.D. in the field of Biotechnology at Jain University. As I reach the end of my fourth year, I have found that there has been endless guidance and a perpetual support system to back me in my work. An indispensable requirement in research is the availability and opportunity to receive positive and constructive suggestions from fellow researchers. Attending conferences organized by other institutes, Research Retreats and the recent Research Conclave has fulfilled this requirement.

*I have found that there has been endless guidance and a perpetual support system to back me in my work.*

This is further boosted by the INSPIRE-DST Fellowship that I have acquired since 2012. The possession of any financial assistance is extremely valuable in research, especially in the field of life sciences, as it provides an incentive to drive the researcher to pursue better quality work. In my research journey, being a Fellowship student has allowed me to focus more on carrying out better experimentation and feeling a sense of independence and freedom in choosing sensitive and recent techniques to fulfill my research objectives. The financial support has permitted me to broaden my choices in being a part of excellent international conferences. As I approach the completion of my laboratory work and in due course of constructing my synopsis and thesis, I hope this progressive environment continues, thereby enabling me to successfully complete my doctoral research journey here at Jain University.

*Soumya Ravikumar*

*Doctoral Scholar in Biotechnology*

*E-mail: soumya1487@gmail.com*

## Research on Advanced Metering Infrastructure based Frequency Control

System frequency is a vital part for power system balance. As per India Electricity Grid code, frequency should be in the range of 49.5 Hz to 50.5 Hz. Deviation from the above-mentioned range is charged as Unscheduled Interchange charge. Grid management in India is carried out on a regional basis. To maintain discipline of grid, Central Electricity Regulatory Commission has introduced Availability Based Tariff (ABT) based on financial principles wherein, in all the central sections, generators and beneficiaries must declare a schedule for dispatch and drawl for every 15 minute time block one day in advance. Any deviation from the schedule is

*System frequency is a major indicator of the power balance in the system. Frequency instability leads to massive and cascade blackout in the power system.*

charged at Unscheduled Interchange rates, which are frequency dependent. System frequency is a major indicator of the power balance in the system. Frequency instability leads to massive and cascade blackout in the power system. There are three components of ABT: fixed cost, variable cost and unscheduled interchange charges. When there is a deviation from actual generation and deviation of fre-

quency the third component of ABT comes into the picture. Availability Based Tariff metering which is one of the components of Advanced Metering Infrastructure of Smart grid, gives real-time monitoring of control of frequency. Smart grid technology makes it possible to work traditional grid in a smarter way by better utilization of information and communication technology. Control of frequency can reduce unscheduled interchange charges penalties currently being paid by state utility to central utility.

*Avani Pujara*

*Doctoral Scholar in Electrical Engineering*

*Email: avanitanna@gmail.com*

## My Experience of Enrolling for Ph.D

**“Either write something worth reading or do something worth writing” -Benjamin Franklin**

I have always been deeply influenced by this one liner. While reflecting on the path taken and speculating where it might lead me, I suspect that my experience (like everyone else's) is unique. Certain precipitating events in life make us all action oriented. I was missing a sense of intellectual depth and flexibility at work and maybe it was time to strike the balance between teaching and research. The only way to energize my research activity was through enrolling for a Ph.D. Jain University Ph.D is a well-structured program with a fledgling yet bright research culture. The institutional frame, able leadership, a pool of excellent advisors and students across various disciplines adorn the program.

*The research course work classes, though being uncompromising in quality, gently lead us to new territories which were earlier considered 'scary'*

The classroom is a melting pot of multiple disciples that invigorate the thought process thus making the research process attractive to students. The research course work classes, though being uncompromising in quality, gently lead us to new territories which were earlier considered 'scary'. My perspective towards learning changed as I underwent the one-year coursework. The structure let me systematically acquire requisite skills of my field before starting work on my dissertation. I have started appreciating

the beauty of why things are the way they are. My classroom teaching has seen a sea change in the way I approach the subject. There is an element of scientific enquiry in the way I observe things. Above all, my satisfaction with the PhD program is a direct reflection of the fact that I approach this process as a holistic decision.

*Pranati Paheli*

*PhD Scholar, Management,*

*Email: pranatipaheli@gmail.com*

## CERSSE Activities

### Different Kinds of Learners I Encountered at the Summer School

All teachers or facilitators would agree that in a class, not all students are exactly the same: their personalities differ, their learning styles differ and their pace of learning differs. But over the years we realize that there are some similarities among the learners as well. Having been a resource person for the *Lokniti*- Jain University Summer School in Quantitative Methods for the last few years, I came across many participants and subconsciously started equating each new batch participant with another one from the previous batches until I could identify and draw parallels for (almost) the whole class, something like putting them in different slots. The slots are not in any hierarchical fashion and in no way a reflection of their competence and capacity. It merely made me understand that each learner needs to be understood differently. Here is a brief description of 6 types of learners that I have come across

1. **The 'Slow' Beginner** – These students take their time to settle in class: perhaps appear lost in the first few days/ sessions but eventually catch up with the rest of class by mid-session or so. It is a joy to see them open up.
2. **The 'Right-Paced' Learner**- A majority of the class would fall under this category (and thankfully so). They are tuned into the teaching – learning atmosphere right from the start, always giving the correct stimulus to carry class discussions forward. They are the backbone for a class.
3. **The 'Quiet' Learner**- They do not participate much during discussions nor interact with their classmates. However they always finish their work on time and leave the facilitators pleasantly surprised at how much they have learnt when they finally present their work. Their capacity is often underestimated.
4. **The 'Overenthusiastic' Learner**- Every class has at least one of them. They put up their hand to answer every question and try to dominate every discussion. Very often they do make valuable points though at the cost of jumping to a concept that may be part of the agenda for next class/ session. Sometimes it's a tough call to balance class discussion without intimidating or alienating the other students. These learners need to be handled with care.
5. **The 'Disinterested' Learner**- No matter what tactic you use, they remain disinterested in class. Their assignments are never on time and they don't answer the questions you ask. Whether it is a punishment threat or a heart-to-heart conversation after class, you just can't seem to motivate these students into learning beyond a point. The facilitators tend to have difficulties with these learners.
6. **The 'Surprising' Learner**- These are a combination of some of those already described above. They start slow, are quiet most of the time and may appear disinterested at times as well. But just when you give up all hope of salvaging them from the damage done, they surprise you with their effort, or innovative thoughts or unique way of doing things, and actually manage to finish with all the others. They are the ones who make your day.

Very often in the teaching profession a popular perception is that teaching is a one way process. But my experience has made me realize that there is always an element of learning taking place for the teacher as well, from the students' side. Understanding the students' learning styles and potential can help the teachers package the same lesson in different ways to cater to all individuals in the classroom.

*Dr. Reetika Syal*  
Assistant Professor, CERSSE, JU  
Email: reetika.syal@jainuniversity.ac.in

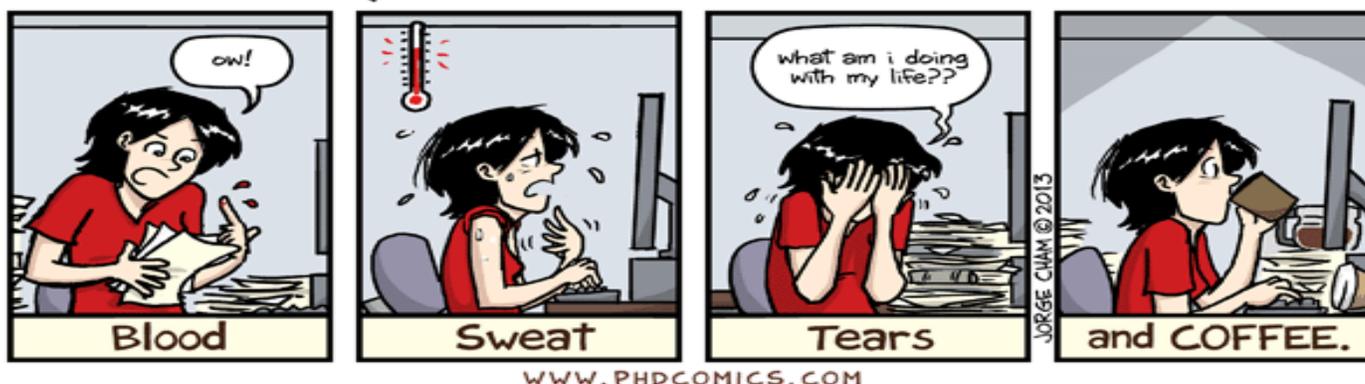
***“Many of life's failures are people who did not realize how close they were to success when they gave up.” -Thomas Alva Edison***

## Unique Achievement

Ms. Deepti Swamy, who is currently pursuing her Doctoral degree in Psychology from Jain University, has secured the 10<sup>th</sup> rank in the Students category in the Global Peter Drucker Challenge 2015. This is an essay competition and the top 10 essays secured an invitation to attend the annual symposium conducted in Vienna, Austria which is held each year. This year, 220 candidates from 56 countries participated in the competition. The theme on which the essay had been written was-‘Managing Humanity in the Digital World’. Deepti’s essay titled ‘Left:Technocrat, Right: Digital Pariah, Humanity in the Middle’ projected the viewpoint that one should not be completely cut off from technology and neither should they be completely immersed in it. Rather it advocated that humanity lay somewhere in the middle of the two options. In the essay, she goes on to explain with special reference to the Indian context. She explains that technology is making us lose opportunities to prove ourselves. Technology is also somewhere making us lose opportunities to communicate and improve our relationships. The essay also propagated how technology helped in enhancing human capabilities like creativity, learning and so on.

Along with the invitation to attend the 7<sup>th</sup> Peter Drucker Forum, to be held in Vienna from the 4<sup>th</sup>-6<sup>th</sup> of November, she is getting a waiver of 2100 Euros in registration fees along with a year’s free membership to the Peter Drucker Society in Europe. Team Thinklet congratulates Ms. Deepti on her achievement and wishes her success in her research journey.

### My thesis is written in



ARTICLES FOR NEXT ISSUE SHOULD BE  
SENT BY  
**October 20, 2015 WITH NOT MORE THAN  
250 WORDS**

### *Team Thinklet*

**Chief Editors:** Dr. Mythili Rao and Dr. Reetika Syal  
**Editorial Team:** Prerna Radhakrishna and Aparna Ramaswamy

**Phone:** 080 23545246/48  
**Mail articles to:** thinklet@jainuniversity.ac.in