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## Acknowledgements

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# ELIXIR REDIVIVUS

If you're reading this ditty, you've likely assumed
That the remains of The Elixir are being exhumed.

Indeed you'd be right, big plans are ahead
To assemble the pieces and bring back the dead.

We're hoping that this time it's spared the same fate
As those earlier volumes that are now real estate.

But the fact is The Elixir's like Schrodinger's feline:

Not fully alive, nor fatally supine.

So its continued existence is somewhat in doubt;
For the moment it seems to be up and about.

And to keep it this way, bells, whistles and all,
We'll need your assistance and some wherewithal,
Like a poem or two, perhaps an ACS discard,
We'll take what you have, just send us a post-card.
In the meantime, we invite you to see what we've got;

There's quite a bit here, and much food for thought.

That'll do it for now, there's no more to say

'Cept Potentia Vobiscum and Have a Good Day.

Prof. B. J. Cherayil

# From the desk of the Chairman



It's been nigh on two decades since The Elixir, the unofficial mouthpiece of The Al(l)Chemists' Club, last hit the newsstands, and two decades more may well have gone by before it did so again, but the efforts of our present chairman, Prof. S. Umapathy, have ensured that the reading public need no longer be deprived of the magazine's special brand of yellow journalism. Here is a message from the man himself.

I am very pleased that we have been able to revive the departmental magazine after a 20-year

hiatus. One of my objectives as Chairman is to help the Department further its national and international reputation, and to improve its visibility, performance and efficiency. (Editor's note: And what better way to do this than by bringing out a sleazy tabloid that will accept without peer review all those papers that failed to make it into JACS?) I hope that the magazine will promote camaraderie not only among the members of the department but also among our alumni. (Editor's note: We hope so too, but you can never tell, given that the magazine in question is chronically prone to self-destruction.) We hope to keep all the alumni, students and faculty of the department informed of the department's activities, and to showcase the creative attributes of our community.

I must thank Prof. Binny Cherayil and the large number of volunteers who enthusiastically agreed to participate in this venture. We are always open to new ideas, suggestions and comments from everyone. (*Editor's note: Yes, that's one sentiment we heartily endorse; now that you've seen or will soon see how low the bar is for acceptance in the magazine, feel free to send us those literary musings that you've always wanted to see in print but that you didn't quite know where to send to – this is the place.)* 

With best wishes, Prof. S. Umapathy

# Contents

Our Newly Minted Doctorates

		3	Transitions
<b>o</b>		4	Bienvenue Geetharani!
		6	From The Literary/Cinematic Frontlines
		8	From Across The Seas
		10	Almost There
		12	Breaking Them In: Welcome Freshers!
Auf Wiedersehen, Prof. Sebastian!	16	14	News About Town
Cut-Short	19		
Special Seminars	20		
News From The World of Science	22		
Writer's Block	24		
IPC in the News	25		
Among The Malayalis: An Allapuzha Journey	26		

Women's Day @ IPC 26

# OUR NEWLY MINTED DOCTORATES WELL DONE!

TRANSITIONS (OH, THE PLACES YOU'LL GO)

Over the last year, from August 2015 to July 2016, the following students were awarded Ph.D. degrees:

Uttara Basu

Sep. 19, 2015 (Chakravarty Lab)

Koushik Acharyya

Sep. 19, 2015 (Mukherjee Lab)

Surender Kumar

Dec. 19, 2015 (Munichandraiah Lab)

Pagidi Sudhakar

Mar. 12, 2016 (Thilagar Lab)

Sanjoy Mukherjee

Mar. 12, 2016 (Thilagar Lab)

Anindita Das

Mar. 12, 2016 (Das Lab)

**Shubhadip Chakraborty** 

Mar. 12, 2016 (Das Lab)

**Anil Kumar** 

Jun. 25, 2016 (Vasudevan Lab)

Suresh Kukunuri

Jun. 25, 2016 (Sampath Lab)

Koushambi Mitra

Jun. 28, 2016 (Chakravarty Lab)

Following the completion of their Ph.D.s, these students have moved or are moving to new assignments as post-doctoral fellows:

#### Uttara Basu

Prof. Shanta Dhar's group at the University of Miami, Florida, U.S.A.

#### Koushambi Mitra

Prof. Matthew Hartman's group at the Virginia Commonwealth University,

Congratulations! Virginia, U.S.A.

Today is your day.

You're off to Great Places!

You're off and away!

You have brains in your head.

You have feet in your shoes.

You can steer yourself any direction you choose.

You're on your own.

And you know what you <mark>know.</mark>

And YOU are the guy who'll de<mark>cide where to go.</mark>

Dr. Seuss

Surender Kumar

Prof. Ru-Shi Liu's group at the National Taiwan University,

Taipei, Taiwan.

#### Sanjoy Mukherjee

Prof. Bryan W. Boudouris's group at Purdue University,

Indiana, U.S.A.

#### **Shubhadip Chakraborty**

Dr. Christine Joblin's group at the Research Institute of

Astrophysics and Planetology, Toulouse, France.

#### **Koushik Acharyya**

Dr. Chunyan's group at the National University of

Singapore, Singapore.

#### Santanu Mondal

Prof. Paul R Thompson's group at the University

of Massachusetts Medical School, Worcester, USA.

#### Anindita Das

Dr. Manabendra Chandra's group at IIT Kanpur, India.

#### **Anil Kumar T**

Dr. Hajime Hirao's group at NTU, Singapore.

Some of the Institute's undergraduates who have had an IPC connection are heading to distant shores too (for their own Ph.D.s):

#### **Tanmoy Pal**

(from Prof. Jemmis's lab) to the University of Wisconsin at Madison, U.S.A.

#### Tandrila Das

(from Prof. Mugesh's lab) to a tri-institutional program offered jointly by the Weill Cornell Medical School, the Memorial Sloan-Kettering Cancer Center and the Rockefeller University, all in New York, U.S.A.

Geetha Rani: Born and brought up in Madurai. All my schooling was done in Madurai. I was there until my Masters. I have 2 siblings, an elder sister and brother, I am the voungest. I used to fight a lot with my brother.

> TE: What did you aspire to be as a child?

**GR:** I wanted to learn dance and become a professional dancer. even joined a Bharatanatyam class and practiced until class 2. I do not remember why I stopped but I like dance.

**TE:** Now that you are in IISc, what do you feel about the institute? Would you like to see any change here? **GR:** It was dream come true for me. I am quite new to this place. May be few years later I can comment on this issue. So far it has been nice for me. Only thing I would say is that everything here needs a little push.

> **TE:** What was the turning point in your life? Why did you choose to do science, more specifically chemistry, over anything

GR: I have had many instances which have shaped my life. One of the most important was not getting an admission into IISc, Bangalore for a PhD. I did my Masters from American College which had a very good library and I used to read a lot with my friends. There were 7 of us in the class who wanted to do a PhD either in IISc or the IITs. We wrote the entrance exams together. 4 of them got an admission in the IPC department and 2 others joined as project students. Only I was left out and eventually got an admission in IIT, Chennai. But my mother was supportive back then and I joined IIT, Chennai. I think if had got an admission here then I would not have joined the faculty of

**TE:** The medium of instruction was Tamil until class 12 and then you had to switch over to English medium. Was the transition easy for you? GR: I really did not feel very tough to pick up the language and the subjects taught in English, even though science was taught in Tamil until class 12.

TE: You are the only lady faculty in the Chemical Sciences division. How do you feel about it? GR: I feel very happy and proud. also feel I am lucky to be here. I was wondering while I applied here for a position as to why there are no ladies on the faculty. I did not realize back then that I will

TE: You have recently become the President of the Al(l) Chemists' Club. What are your priorties as a President?

TE: Tell us some-

**GR:** I enjoyed my days in school. I

studied in a Sister's convent until 10th

and moved to another school for 11th and

12th. Until 12th I studied in a Tamil medi-

um school. Later I, did my Bachelor's in

Fathima College and Masters in Ameri-

can College, both in Madurai. I was a

very good student and was always

ranked among the top three

students of my class.

TE: What is In-

organic chemistry in

GR: Khanima Vedial.

Khanima means metal

and vedial is chem-

thing about your school.

GR: I think we should conduct some lectures on research methodologies. These lectures will include talks on how to do research, how to write papers, time and money management etc. I believe it will be helpful for students and it can be arranged through Al(l) Chemists' Club.

**TE:** Gender bias?

GR: No, not so far. I have not been subject to any kind of gender discrimination, neither at home nor at work. My father and husband have always been supportive to me. Even in professional life I did not face any such challenges. Generally speaking, women face problems because of personal commitment towards family. I think that this has to do with the mindset of people. We, including the ladies, treat women as the weaker gender and do not provide them as many opportunities as are available. But this kind of thinking does not exist in the west.

# BIENVENUE GEETHARANI!

H.C. Sudeeksha and Ria Mukherjee caught up with our newest faculty member and quizzed her on Life, The Universe and E thing. This is what they learnt:

experience in IIT, Chennai? How different is it from IISc? **GR:** There is no difference in the life of a PhD student in both the institutes. In IITs there are lot of B.Tech. students so PhD students are not given lot of importance, but IISc is different in that sense. I worked very hard in my PhD and had to sacrifice lot of things. I used to work from 9:00 a.m. to almost midnight. I very rarely went home and even skipped many festivals.

**TE:** What was your

TE: Tell us something about your life in Ger-

**GR:** People are self-reliant and disciplined. They have the required resources for research and everything is systematic. But I missed the emotions, interaction and love we have here. One mportant aspect of their research is lab safety. They nave lab insurance and you cannot work alone in the lab. I would like to implement those safety measures here. The usual lab hour in Germany was from 8 am to 5 pm, but I could not do as much work in a day as much I did here as a PhD student.

Books? I do not read books, but I read magazines.

If not a scientist then what would you want to do? I would have been a doctor.

What do you like to do in your spare Sleeping and shopping!!

Which subject you

dreaded the most?

English.

Please tell us a line in Bengali? Line in Bengali, Oh! that I can say: "Apni kemon acho?", "Ami Bangla jani"!

much. I will probably just let my work do the talking.

**TE:** Now that you

are in IISc, what would

you like to be doing ten years

don't want to say anything

down the line?

the happiest moment of your life? My marriage was the happiest moment and also the funniest moment. My husband is a Bengali and it took very little convincing. It was a hap-

py wedding.

**TE:** What was

Favourite subject? Mathematics.

> Favourite actor? Vijay (Tamil) and Shah Rukh Khan (Bollywood).

Favourite actress? Deepika Padukone.

Favourite movies? Nayakan.



**GR**: Do not expect anything

rom others. Work hard, be

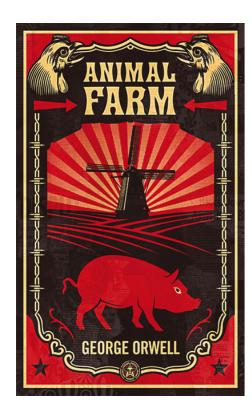
sincere and honest and ev-

erything will fall in place.

I did that and I am

#### FROM THE LITERARY/CINEMATIC FRONTLINES

India seems to be lurching dangerously towards government control of civil life, so this is a good time to revisit Animal Farm, George Orwell's fable of totalitarianism. Here is what Nandini Mukherjee from Prof. Chakravarty's lab thinks of the book.



"Animal Farm" by George Orwell is one of the finest literary creations I have ever come across. Although impossible to say which was which." the book was recommended to me a long time ago, when I was still in school, I managed to read it only a This allegory of the Russian revolution (which began few months ago (something I'm actually happy about; in 1917) is beautifully rendered, with credible charif I had read it back then I might have thought it acters whom was really about animals!).

This political satire disguised as a work of historical fiction tells the story of Manor Farm in England. The farm is owned by Mr. Jones, who ill-treats his animals. The story starts with a prize boar, Old Major, telling his fellow animals about his dream of freedom from mankind. He inspires them to prepare for a rebellion, and teaches them a revolutionary song, Beast of England. The life of slavery and limited food that the animals lead eventually unites them against die (so it's been said!) It's a slim book, with a lucid their master and against humankind. The motto "Four legs good, two legs bad" and the song, Beast of England, become the fuel for their revolutionary journey as well as the source of their comfort in times of hardship. They succeed in throwing Mr. Jones out

of the farm during The Battle of the Cowshed, and install a form of democracy in his place. In the new arrangement, dubbed Animal Farm, all animals are equal, and they adhere to some self-established rules of government, learning to read and write in the process, and becoming free and happy. But this state of affairs does not last; slowly the pigs Napoleon, Squealer and Snowball, being more intelligent than the others, emerge as leaders, and soon the healthy, prosperous air of the farm begins to sour. Snowball goes missing and Napoleon becomes dictatorial. The pigs and dogs become the 'higher animals' and gradually start deceiving and manipulating the animals of the 'working class'. Animal Farm descends into totalitarianism, and the 'lower animals' become as deprived as they were earlier, if not more. They suffer from hunger, cold, heavy workloads and brutal punishments when found guilty of infractions against the established order. The ruling class lives a life of luxury and reflected hypocrisy. The story ends with the line "...from pig to man, and from man to pig, and from pig to man again; but already it was

we can relate to. It shows us how common people can be manipulated and exploited by the systems they are a part of.

It surely wasn't oversight, but for some reason we're never told in the course of these events what happened to Snowball, and we're

left wondering about his fate. I found this a little disappointing.

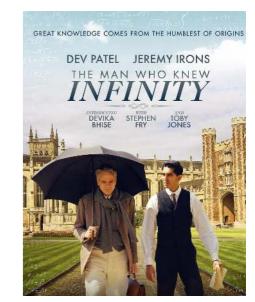
But everone should read this book before they writing style, and yet deeply enlightening.



Nearly a century after his death, Ramanujan still exerts a spell. A new movie based on the best-selling book, The Man Who Knew Infinity, was released with the same title earlier this year. Koushambi Mitra reviews it here.

"The Man Who Knew Infinity" is a biopic of the great Indian math wizard Srinivasa Ramanujan, whose incredible range of mathematical learning did indeed seem to put him in touch with the infinite. The movie, based on the book of the same name by Robert Kanigel, begins with depictions of the young Ramanujan's passion for numbers, a single-minded interest that leads him to utterly disregard all his other school subjects. Unfortunately, the educational system being what it was, this ultimately renders him degree-less, and as the sole bread winner of his poor family, he then has to hunt relentlessly for a job. But where there is a will, there is a way, and after strenuous efforts, he finally earns admittance to prestigious Cambridge University, and embarks on a voyage to become an unforgettable pioneer of mathematical theories.

Dev Patel, the lead actor in the Oscar-winning but controversial "Slumdog Millionaire" plays the role of Ramanujan, but he fails to deliver a riveting performance. Throughout the two hours of the movie, his face is contorted into strange and unusual expressions, and I searched desperately for signs that he was growing into his character. The sameness of the end, the movie makes a strong impact, a sense his portrayal eventually becomes disappointingly soporific. Ramanujan's true nature, his troubled genius, frustrated by frequent illness, his eccentricities and his occasional arrogance, is never satisfactorily captured. Dev Patel gets credit for undertaking a



challenging role, but he is not entirely equal to it. The film also fails to do justice to the profound emotional bond between Ramanujan and his supervisor G. H. Hardy. Nonetheless, with World War I as a backdrop, the film is competent in capturing Indian cultural stigmas, the racism the young Indian experiences at the hands of white society, and the subtle romance between Ramanujan and his beloved wife Janaki. In of divine inspiration and the feeling that passion can prevail against all odds and overcome all prejudices. It is a movie to be watched by the jaded to revive their motivation.

#### **OVERHEARD IN THE CORRIDOR**

Chairman: Akhil, you're close to retirement, aren't you?

Prof. ARC: What do you mean, I'm not even tired, how I can be retired? \*\*\*\*\*\*\*\*\*\*\*\*\*

Student 1: Someone's dropped the instrument room key in the Drop Box, and I need it for the weekend to run an experiment. How will I get into the room now, and what will I tell my boss on Monday when I don't have results to show him?

Student 2: Don't worry. We've designed a hook to fish keys out of the box. But don't tell anyone! \*\*\*\*\*\*\*\*\*\*\*\*

Faculty 1: Do you know that under a new MHRD regulation we have to declare all our immoveable assets - property, jewellery, land?

Faculty 2: What about my wife – is she a moveable or immoveable asset? \*\*\*\*\*\*\*\*\*\*

Rati Sharma, a former student of IPC and now a post-doc in the U.S., offers some sage career advice.

### Changing track with a new post-doc position - a personal account

have a plethora of concerns about your next job. looking at my CV. In such a scenario, it always makes sense to plan or move to another place.

I faced similar dilemmas last year when I knew my match him. He also went so far as to say that even if term at Hopkins would end in 2016. I still had the proposal fell through, he would consider me for about a year to plan and prepare for my next move. a position in his lab. This was a relief as I now had a So the first step I took was to register for a small solid connection. conference where most of the speakers were those whose work interested me. This, I thought, would But my PhD advisor warned me against give me a good opportunity to gather information complacency until I had something concrete. So firsthand about what was out there, who was hiring, I set about writing custom emails to several other and how the PI was in general. I chose a small labs. I got an interview with a professor at a school conference for this as it is better suited for personal in New York, but this fell through, as he probably interaction than large annual conventions.

biology, which is one of the few fields that holds a work out, as I got more interview calls from even perfect balance between theory and experiment. And better places, one of them from Harvard. coming from a theoretical background myself, I was work in a related topic. Since my expertise lay only took a chance, and emailed him. I wrote that in

on the theoretical side of things and most PIs were Post-doc life is tough. It is the life of a nomad, looking for someone who could do experiments as where you are forced to change base every couple well, it wasn't an easy nut to crack. But it was during of years, sometimes every year. Add to it further the conference that I met a Professor (from the UK) considerations of visas and work permits (because who himself was a theorist but also had very strong like others before you, you too want to go abroad, experimental collaborations. This was exactly what I mostly, of course, to Europe or the US) and you wanted. I spoke to him and he showed interest after

ahead, to know at least 6-8 months in advance if In about a week's time after the conference, I your contract is going to get extended, if your PI followed up with him and proposed that we apply has enough funding, and if you do want to stay on for a Marie Curie fellowship. This led to a back and forth discussion of project ideas, and at the end of it all he was clearly satisfied with my dedication to

wanted someone more familiar with virus pathways and such. Like I said, post-doc positions are very My research interests lie within the realm of systems specific. In retrospect though, I am glad it didn't

keen on working in close contact with experiments, Incidentally, I had already casually met the Harvard even better if I could do them myself. With these PI at the q-bio conference, and I knew he was a specifics in mind, I set about preparing for the friendly person. His lab used both experimental q-bio conference, which was to be held in August and theoretical tools for research on C. elegans, a 2015. This is just what I wanted, though reality model organism in biology. Additionally, with some could be totally different. In fact, advertised post- Google search into his background, I found that he doc positions have very specific requirements, and was actually a theoretical physicist who had started it is possible that you do not fit the bill even if you doing experiments only during his post-doc. So I



About the author: Rati Sharma is a post-doctoral fellow at Harvard University. She is trained as a theoretical physicist, applying the tools of statistical mechanics to model stochastic gene networks, but is now also setting forth into the experimental world on the same subject.

In her spare time, she likes to write (http://ratisharma.blogspot.com/) and try every sport that catches her fancy. You can also connect with her here https://www.linkedin.com/in/rati-sharma-15b68726.

to theoretical modeling I wanted to learn how to email to write. But I was glad to be in a position for the interview process over Skype, and then in

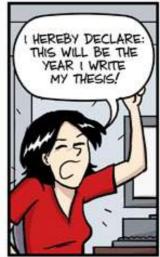
through, but the professor from the UK had asked taking the first steps toward experimental research me to apply for a position in his lab after he put up on C. elegans. an official advertisement. He too made a formal offer, but I politely declined it. This was a really tough

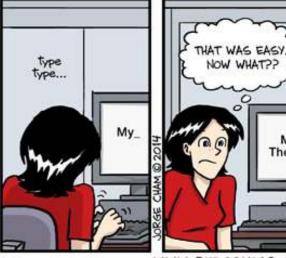
carry out my own experiments.. This set the tone where I could choose between two very good offers.

person, during which he asked me to design an ex- From my experience I now know for sure that preperiment or propose a hypothesis to either test or paring ahead is always better. I started planning my confirm the results of some ongoing research in his next move sometime around May 2015, when I first lab. Even though the in-person lasted 1.5 days and submitted an abstract for the conference. And, it was I had to think on my feet the whole time, the PI in Feb. 2016 that I finally got a formal offer. This somehow made it seem easy, like he was churning took many many emails, some interviews, a confermy brain to get the right answers. It was a very ful- ence, a proposal and a few turn downs. But in the filling discussion, at the end of which I was certain end, if you plan it the right way in advance and keep that I wanted to join his lab the most. Ten days lat- at it unrelentingly you can get what you want. This er, I got my job offer. This was in February 2016. stands true at least for a post-doc position. (Getting a permanent job is a different ballgame altogether.) During this time, my Marie Curie proposal fell I joined Harvard this June, and am excited to be

-Rati Sharma







WWW. PHDCOMICS. COM

# 10 ALMOST THERE....

For research students the departmental colloquium is the last but one milestone on their road to a Ph.D. The following students reached this milestone in the past year, and the titles of their presentations and the dates they were given can be found here.

Santanu Mondal Mar. 23, 2016 (Mugesh Lab)

Halogen bonding in the structure and biomimetic dehalogenation of thyroid hormones and halogenated nucleosides.

Anup Kumar Pramanik Apr. 11, 2016 (Samuelson Lab)

Cytotoxicity of metal-based anticancer active complexes and their targeted delivery using nanoparticles.

Srilakshmi P. Bhaskar May 6, 2016 (Jagirdar Lab)

A study on digestive ripening mediated size and structure control in nanoparticles prepared by solvated metal atom dispersion method

Emmanuel Edet Etim May 23, 2016 (Arunan Lab)

Computational studies on interstellar molecular species: From formation to detection.

G. Rajendra Kumar Dec. 30, 2015 (Thilagar Lab)

Triarylborance-functionalized dicyanovinyl and acetylacetone based molecular platforms: Building blocks for multiple anion sensors and efficient phosphorescence emitters.

Ravi Kumar Mar. 30, 2016 (Umapathy Lab)

Solvent effect on photophysics and photochemistry of aromatic carbonyls: A Raman and computational study.

Aditya Garai Apr. 22, 2016 (Chakravarty Lab)

Studies on iron and cobalt complexes showing photo-induced anticancer activity.

Ahmed Irshad May 20, 2016 (Munichandariah Lab)

Electrochemical and photo-electrochemical investigations of Co, Mn and Ir-based catalysts for water splitting.

N. Sivakrishna May 27, 2016 (Netaji Lab)

Synthesis, structural elucidation and anticancer activity studies on metal complexes of nucleic acid constituents and their derivatives.

Himangshu P. Goswami Jun. 7, 2016 (Harbola Lab)

Nonequilibrium fluctuations, quantum optical responses and thermodynamics of molecular junctions.

Deep Mala Jun. 20, 2016 (Jagirdar Lab)

Chemistry of ruthenium (II) complexes bearing NHC, hydride, and dihydrogen ligands: Synthesis, mechanistic insights, and applications.

Raja K. Jul. 1, 2016 (Mugesh Lab)

The effect of substituents and solvents on the deiodination reactions of thyroid hormones by iodothyromine deiodinase mimics

Sourav Ghosh Jul. 15, 2016 (Jagirdar Lab)

Synthesis of metal and metal oxide nanosponges for hydrogen storage and catalytic applications.

Khokhan Roy Jul. 25, 2016 (Umapathy Lab)

Investigation of solution phase structural dynamics using femtosecond transient absorption and ultrafast Raman loss spectroscopy.

Aniket Chowdhury Jun. 3, 2016 (Mukherjee Lab)

Vinylanthracene and triphenylamine based luminescent molecular systems: From aggregation-induced emission to efficient explosive detection.

Bijan Roy Jun. 17, 2016 (Mukherjee Lab)

An architectural exploration in coordination-driven self-assembly and fluorescent imidazolium salts as picric acid receptors.

Sananda Chanda Jun. 24, 2016 (Ramakrishnan Lab)

Itaconate-based periodically grafted polyesters.

Rohit Jain Jul. 5, 2016 (Sebastian Lab)

Diffusion in changing environments.

Anju V.G.
Jul. 22, 2016 (Sampath Lab)

Electrocatalysis using cermaic nitride and oxide nanostructures.

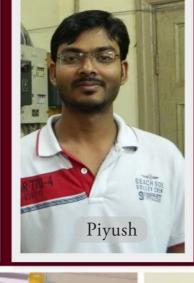
Pinaki Bhattacharya Aug. 26, 2016 (Cherayil Lab)

Theoretical studies of polymer dynamics in confined spaces.





















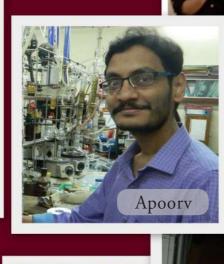








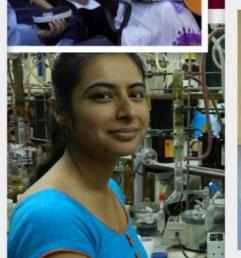
















Debabrata

#### **NEWS ABOUT TOWN**

## 6th International Conference on Metals in Genetics, Chemical Biology and Therapeutics (ICMG 2016)

Nandini Mukherjee filed this report on an international conference organized at the I.I.Sc. earlier this year by Prof. Mugesh



The 6th International Conference on "Metals in tion, Genetics, Chemical Biology and Therapeutics (ICMG-2016)" was held in the J.N.Tata Auditorium at the I.I.Sc. from Feb. 17, 2016 to Feb. 20, 2016. The broad fields covered by the conference included bioinorganic chemistry, imaging in biosciences,

metalloproteins, metalloenzymes and metals in nutrition. More specifically, and among other topics, the conference discussed recent advances in metal-mediated genetic and neurological disorders, synthenewly sized metal-based drugs,



health hazards from water-polluplications,

and chemical remediation processes. Dr. Bibudhendra Sarkar from the University of Toronto, Canada, opened the conference with the lecture 'ICMG - Past, Present and Future'. This was followed by 10 keynote lectures by eminent researchers from across the globe. There were 38 other invited lectures and 7

> student presentations, making for an interesting and eclectic mix of scientific talks.

> Among the many excellent lectures at the conference, especially notable were those on the subject of drinking water contamination in India, Bangladesh, Myanmar and Nepal and the need for efficient

biological and biomedical ap- decontamination technologies in these countries.

### Recent Advances in Theoretical Chemistry (RATC 2016)

A symposium in honour of Prof. K. L. Sebastian on the occasion of his retirement from the Institute was held at the Faculty Hall on the 8th and 9th of July, 2016. H. C. Sudeeksha filed this report:



chemistry in the Department of Inorganic and Physical Chemistry for close to 20 years, formally retired from service on July 30, 2016. A symposium to mark the occasion was organized by Dr. Upendra Harbola and Prof. S. Sampath on the theme Recent his career, reminisce about his time in IPC, first as Advances in Theoretical Chemistry (RATC). The sym- a student and then as a member of the faculty, and posium was held on the 8th and 9th of July, 2016, in talk about some of the notable milestones in his life. the Faculty Hall of the Institute. It was inaugurated by Prof. S. Umapathy, Chairman of IPC, whose opening address was followed by a keynote lecture delivered by Prof. Debashis Mukherjee of IACS, Kolkata. Several other distinguished colleagues of Prof. Sebastian contributed invited talks, including Prof. Rama Kant (University of Delhi), Prof. A. K. Mishra (IMSc, Chennai), Prof. N. Satyamurthy (IISER, Mohali), Prof. Sridhar R. Gadre (IIT, Kanpur) and Prof. Satrajit Adhikari (IACS, Kolkata). These talks and many others, on various aspects of theoretical chemistry, reflected Prof. Sebastian's wide-ranging interests, and covered topics in density functional theory, molecular dynamics simulations, electrochemistry, surface science, polymer dynamics, reaction kinetics, and theoretical spectroscopy. The symposium also featured an extended poster session, with contributions from students of the Department.

A felicitation function was also held at the

rof. K. L. Sebastian, a professor of theoretical conclusion of the symposium in which friends, colleagues, students and well-wishers of Prof. Sebastian recalled their association with him, and discussed his many and varied scientific contributions. Prof. Sebastian himself took to the podium to look back on

15



## auf Wiedersehen, Prof. Σεβαστιαν!

Our two intrepid reporters, H.C. Sudeeksha and Ria Mukherjee, were on the job again, as they conducted this interview with Prof. K. L. Sebastian, who retired from office on July 31, 2016.

Kottayam District, Kerala. My family owned a transport business, and my grandfather ran a provision store. I am in my family, though well educated, were not academicalbecome an academician!

#### **TE:** How different were the times back then? What was going to school like?

KLS: I was very quick in learning. I went to a "Kalari", which was more like the modern day kindergartens. There would be one "Asan" (guru) who wrote on palm leaves and then you take it to your home and write on sand. That is how I learnt initially. I was learning only alphabets and mathematics. Then I was admitted to 1st standard, but I was very hesitant to sit in class, so my grandmother used to sit with me. I was very comfortable with mathematics and started studying science later. Whenever a new topic was taught I would make models at home to study. As a young boy, may be in 8th or 9th standard, I made a telescope, kaleidoscope, microscope and also periscope. I also grew crystals of copper sulphate and sodium chloride.

#### **TE:** Were your parents supportive of these experiments?

KLS: They were not aware of it! But when I showed some of them to my father, he was very happy. Yes, my family was supportive.

#### **TE:** Did you always want to be a scientist, or did certain Rs. 300, and the mess bill was about Rs.150. But now the incidents in your life lead you down this path?

KLS: My father wanted me to study medicine, so I was put into the medical stream after 10th standard. But at has grown a lot. As students we used to go for walks to the end of 2nd year, I read an article published in Manorama on E. C. G. Sudrashan, who is from Kottayam. He possible now. challenged Einstein's theory. This is one of the motivations that I remember.

#### **TE:** Where did you do your Bachelors and Masters?

KLS: I did my B.Sc. from St. Thomas College, Palai, and M.Sc. in chemistry from Calicut University

**TE:** Why did you choose to do your Ph.D. from IISc? Tel us something about your time here as a PhD student.

The Elixir: Let's start with some of your childhood mem- KLS: After my Masters, I was selected for a PhD in IISc, Bangalore, and IIT, Chennai. My teachers at the Universi-**Prof. Sebastian:** I was born in the small town of Palai, in ty knew about IISc, and they asked me to join IISc. Otherwise there is no specific reason for choosing for IISc over IIT. Being a student in IISc was the nicest time of my life. the only person who got into science. Surprisingly, others I liked one of the courses offered by Prof. A. K. N. Reddy on statistical thermodynamics, and quantum chemistry ly oriented, or rather, I must say that, surprisingly, I have courses offered by Prof. A. K. Chandra and N. Kumar. I

> Who is your favorite actor? Nivin Pauly and Dulquer Salman.

If you were the prime minister, what would be the first point on your agenda?

I would not want to be the prime minister! But if I were the prime minister then I would want to solve the problem in Kashmir.

Who were your childhood heroes? Prof. E. C. G. Sudarshan.

Your fondest memory from college. When I had no money to pay the college fee in my Masters, my teacher, Prof. Rama Varma, paid the fee, and he did not let me know.

If not science, what else would you have done? Electrical engineering.

attended any course that I felt was interesting.

#### TE: How much has the life of a PhD student changed since your time?

KLS: In general, it is not very different. I think the students are very affluent now. I was getting a fellowship of situation is different, and if you save enough, you may buy a scooter! Major difference I see is outside the campus; it Malleswaram, drink coffee and come back, but it is not

#### TE: What was the most appealing aspect of theoretical chemistry that led you to take it up as a topic of research?

KLS: I thought it was very logical, but most subjects are logical, as a matter of fact. I liked mathematics very much, and theoretical chemistry was the area of chemistry which involved mathematics.

TE: How did you learn the mathematics that you needed for your work?

KLS: Immediately after my 12th standard I had made up my mind that I will not study biology, so I went to a local tutor in my hometown to learn mathematics. Then I had mathematics in B.Sc., so it was not difficult at all.

#### **TE:** Can you tell us something about your mentors.

KLS: I had many mentors right from my college. In B.Sc., they were Prof. Devasia and Prof. P. K. Mani. When I won the Bhatnagar award, Prof. Mani, who was 83 years old then, went to my home to congratulate my father. In had to travel by bus. One evening when I was returning M.Sc., they were Prof. Rama Varma and Prof. Moosath, who did his Ph.D. from IPC. In IISc, Prof. A. K. Chandra and Prof. S. K. Rangarajan. Prof. S. K. Rangarajan was

> What is the most important quality a researcher must have to succeed? Perseverance.

**TE:** What was your most joyous moment as a researcher

KLS: Whenever I find something new I am very happy.

There have been many such occasions. One of them was a problem I solved when I was a postdoc in Prof. Thom-

as Grimley's group, in University of Liverpool. When I

joined there the problem that I was put on was the in-

elastic scattering of electrons from a surface. During this

time I had to stay in one of the halls of residence, and

to my place of stay I was constantly thinking about this

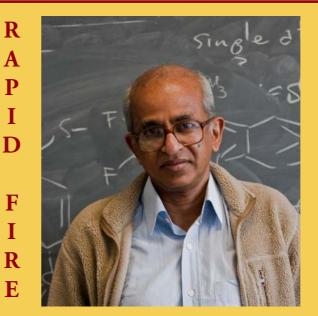
problem and suddenly arrived at the solution! I solved the

problem in 2 months, whereas time allotted for the prob-

What were the subjects you liked the most? And which one did you dread reading? Mathematics and physics, I did not like reading classical biology.

What books do you read for fun? I have always liked doing puzzles, so puzzle books.

What genre of music do you like to listen to? I don't have particular liking for classical music, but I like any melodious song, old movie songs.



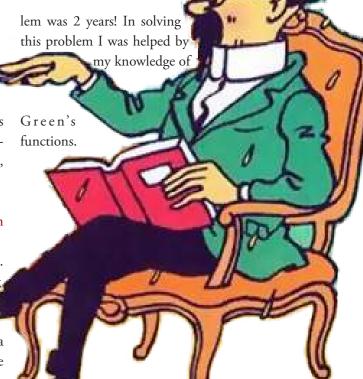
the most influential person in my life.

### **TE:** What was the first research problem you took up as an independent researcher?

KLS: When I was in appointed as a lecturer in University of Calicut the first problem I took up was on Green's Green's functions, which I had read in IISc out of my own interest. Also because of my association with Prof. Rangarajan, I did some work on theoretical electrochemistry.

#### **TE:** What were the problems you faced in your research in the University?

KLS: The major problem I faced was access to journals. The problem was that if the money allotted for buying journals increased by 5%, then the price of the journal would go up by 10%. Every year there was a problem. I had to adjust my of research, there was no other way. Sometimes I came to IISc to get the journals, or I wrote to the authors for reprints.



#### TE: How do you choose a research problem? How should one choose a research problem?

KLS: I am always on the look out for something new. In my case, I do not do lot of computation, so the range of TE: How is retired life? problems I work on are very small. My work is mostly analytical. Probably this is one reason why I do not now!! stick to one area. When I started my work there were many problems in surface chemistry, and they had simple analytical solutions. As time passed, with the advent of computing power, people started doing computation. If I had stuck to surface science, then I would have had to do lot of computation, so you must look out for new problems.

TE: You were a faculty in the Department of Chemistry at the University of Calicut. How different is the university from IISc? KLS: University was very difficult, IISc is heaven! The situation was that, if you wrote a letter to the University then you had to go meet the clerk personally to get the job done. In IISc it is far better.

#### **TE:** What do you like the most – teaching or research?

KLS: Both! There is no bias between the two. My policy towards teaching was always to teach a new subject every 3 or 4 years, essentially because I wanted to learn something new. Given the opportunity, I will teach a new course. I believe that teaching is a way to learn the subject, and this will also help me in my research.

#### **TE:** Are there any unanswered fundamental problems in chemistry? If there are, then what are they?

KLS: Glass transition temperature and protein folding TE: What is the biggest achievement in your life yet? are the two problems in physical chemistry which I think are not completely understood. People claim that protein folding problem has been solved, but it is debatable. Most biological phenomena have lot of physical chemistry in it which is interesting.

TE: In your long career you must have collaborated with many other eminent scientists all around the world and colleagues from the IPC department. Whom did you enjoy working with the most?

**KLS:** Prof. S. K. Rangarajan and Prof. Thomas Grimley

TE: Tell us something about your family. How has your family played a role throughout your illustrious career?

KLS: My wife has been very supportive; else I would not have been able to do so much. I don't do anything at home. She takes care of everything.

KLS: Well, my life has not changed! In fact I am busier

# **TE**: Can you share a funny experience that you've had

KLS: When I teach the UG students I am always excited, and they have surprised me few times. I can narrate one incident with the UG students. They presented me a drawing of a person with half the face being mine

> and the other half was of Prof. Calculus! Below the drawing was written "we believe in you sir". This is because when I teach Quantum Chemistry, I teach the postulates and tell them that there is no proof, so they will have to believe me! Sometimes even before I complete the sentence they say "we believe you"!

#### TE: If you were given a chance to go back in time, what would you want to do?

**KLS:** I would like to be a UG student here!

#### **TE:** What do you think about the future of science in India? Is it heading in the right direction?

KLS: In general, it is doing well, but there is more emphasis on publishing. One must do science to understand and do important things in science. The faculty is under pressure to publish, but I don't see any solution to it.

**KLS:** The most interesting thing from a personal point of view which made me very happy was solving the Kramer's problem for polymers.

#### TE: Do you have any advice for our current crop of students?

KLS: Students, at least those who do theory, must not restrict themselves to one particular area of research. They must explore different areas of science. But this may have some ill effects as well; if you keep doing many things at a time then you cannot focus long enough on one problem.

# A quiet meditation by Prof. Jemmis



## **CU**T-SHORT

In this world of pace Poems and Poets have no place Yet these words do I trace In search of solace Yet again a mirage?

Words that never part my lips Tears that never leave my eyes Thoughts that ever fill the cells I keep in my heart – an abode of peace Not yet a pace-maker?

# Special Seminars

Name of the speaker	Affiliation	Topic	Date
Prof. Shiki Yagai	Department of Applied Chemistry and Biotechnology, Chiba University	Design of metastable molecular assemblies towards dynamic function	06/01/2016
Dr. Bhargava Ram	ETH, Zurich	Spectroscopy of chiral molecules with femtosecond UV/VUV pulses	13/01/2016
Prof. Stefan Haacke	Institute of Physical Chemistry and Materials, University of Strasbourg	Ultrafast molecular biophotonics: New solutions for old twists	21/01/2016
Prof. Sreehari	Department of Chemistry, IIT Kanpur	Intramolecular vibrational energy flow versus quantum control	28/01/2016
Prof. Arun Chattopadhyay	Department of Chemisrty, IIT Guwahati	Chemical reactions involving quantum dots and atomic clusters	26/02/2016
Dr. Krista Rule Wellington	Civil and Environmental Engineering, University of Michigan	The fact of biomolecule pollutants during water disinfection	04/03/2016
Prof. M. S. Valiathan	Manipal University	Modern biology and ayurveda	18/03/2016
Prof. Frieder Jakle	Department of Chemistry, Rutgers Unversity	New functional polymeric materials based on organoboron building blocks	28/03/2016
Dr. Abhay Shastry	Department of Physics, Arizona University	Do physicists know how to measure temperature and voltage	29/04/2016
Dr. Parbati Biswas	Department of Chemistry, University of Delhi	Designing energy landscapes of misfolded proteins	07/07/2016
Prof. Freek Ariese	Department of Physics and Astronomy, Vrije University	Fluorescence spectroscopy: Basics and experimental aspects	20/07/2016 & 27/06/2016

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Dr. Robert Pal	Department of Chemistry, Durham University	Principles of optical microscopy and confocal microscopy and principles of 2D image analysis	29/07/2016
Dr. Robert Pal	Department of Chemistry, Durham University	Bright lanthanide complexes for cancer detection and cell biology	29/07/2016
Prof. Rama Kant	Department of Chemistry, University of Delhi	Electrochemical process on disoriented electrodes and their governing length scales.	12/09/2016
Mr. Suhas Mahesh	UG Student, Indian Institute of Science	Pattern Poetry – Stretching language to its limits	20/09/2016
Dr. Ashish Verma	Department of Civil Engineering, Indian Institute of Science	The Kumbh mela experiment (KME): Measuring and understanding the dynam- ics of mankind's largest crowd – Experiences from Kumbh mela 2016 in Ujjain	28/09/2016
Dr. Sabyasachi Rakshit	Department of Chemistry, Indian Institute of Science Education and Research, Mohali	Role of mechanical force in hearing	5/10/2016
Prof. Todd B. Marder	Institute of Inorganic Chemistry, University of Würzburg	Building bridges – International co-operations in chemistry for young and old	21/10/2016
Prof. Todd B. Marder	Institute of Inorganic Chemistry, University of Würzburg	Synthesis, linear and nonlinear optical properties and applications of new 3-coordinate organoboron compounds	26/10/2016
Prof. Satrajit Adhikari	Department of Physical Chemistry, Indian Association for the Cultivation of Science	Series of lectures on conical intersection	24/10/2016 to 28/10/2016
Ms. Nicolette van Dijk	Physical and Theoretical Chemistry Portfolio, Elsevier, Amsterdam	Navigating the world of scholarly publishing: A guide to the history of scholarly publishing and practical advice on how to get published	17/11/2016

Prof. Arunan believes he may have discovered the laws of human attraction. In the article below he discusses his revolutionary new theory.

#### Gravitons and Lovons

led me to think about gravity and love. I am almost convinced that many would have compared gravity and love, and I started writing this article without doing a Google search on these words together, or a search in science or philosophical journals. So these are my views, not influenced by others as yet. I started thinking about this analogy when I read an authoritative article on pseudo-profound BS. (You can guess what BS means.) I am reproducing one statement from the abstract of that article: "Across multiple studies, the propensity to judge BS statements as profound was associated with a variety of conceptually relevant variables (e.g., intuitive cognitive style, supernatural belief)". Now you see why I thought of religion. This article appears to be an empirical study to understand why some people believe in statements that clearly appear to be 'BS' to a scientist or perhaps, to a rationalist. Such empirical studies are accepted as good scientific procedures! The authors point out that "Despite these seemingly commonplace observations, we know of no psychological research on BS." Such justifications are important for a scientific investigation

Recent happenings in particle physics

Though all of us know gravity, we still do not know how gravity works. For example, if we want to pluck a mango from a tree, we use a long rod with a scythe at the end to cut it off from the branch. Once the mango is cut off from the branch, it falls down. Gravity has helped us now.

on any problem.

The mango was bound to the branch physically

and a scythe was used to cut off the link. Why does the mango fall down and not stay where it was or go up, when its link is cut off? Of course, we all know it is due to gravity now. We know of electric and magnetic fields and we know that opposite charges (poles) attract and like charges (poles) repel. Most students in physics may have done experiments to look at the line of forces acting on magnetic materials. How does the earth pull the mango down? There are some speculations about 'gravitons' which are hypothetical elementary particles that mediate the force of gravity. The wikipedia page on graviton looks reasonable (3). Basically we have a rope made of gravitons that we cannot see, and it has pulled the mango down. Beyond these invisible gravitons, we

know how gravity works. We can do experiments, make predictions, others can repeat our experiments and we all come to the same conclusions. Though 'gravitons' cannot be seen, gravity is science!

Now let us look at how

two people are attracted. We say they are in 'love' with each other. May be someone has done an empirical study, like the study on BS, and come to conclusions about which two individuals may fall in love. I am not aware of them. 'Love at first sight' is a phrase commonly used. It is there from our Ramayanam, where we learn that 'Rama looked at Sita and Sita looked at Rama at the same time'. They fell in love and we have an epic. Do we have 'lovons' that were mediating between Rama and Sita? Though they both fell in love, their marriage happens after Rama wins her in a contest and it was arranged.

I come from a background in which arranged One can think of this as the space required for marriage is still common and 'love' starts post the individuals to exist stably and independently. marriage and it has worked very well for the Without this space, 'love' would not be enough most part. From the day of marriage, husband to hold them together. and wife live together and 'love' or affinity develops over a period of time. As I knew this would The article on 'profound BS' concludes that those be the case in my life, and I really didn't want to who are religious tend to accept 'profound BS' challenge this practice, I have somehow ensured more readily than others. Every religion prothat I would not possess any 'lovons' or in case a motes love. I am not sure if scientists will ever girl were to send 'lovons' to me, I would be trans- be able to explain the forces of 'love'. That is which could operate through the 'imaginary par- ways to promote love, world will be a great place. ticle lovon' can be controlled by humans, who We may never be able to discover 'lovons' but have been conditioned to grow in a certain way. we know love is real, may be not scientific. We I do realize that irrespective of the surroundings, may or may not be able to discover 'gravitons' some individuals can transmit and receive 'lo- but we know gravity is real and scientific. Perhaps vons' and when they say they are in 'love', we we should stop comparing science and religion. cannot ask them to prove it. We have to accept Perhaps we should start giving equal emphasis it. I am not aware of any experiments that can be for science and social science in schools and coldone to measure the 'forces' operating between leges. Without a doubt, religion has been used

around themselves and also the sun, resulting in a in science is similar to love in human relation. stable orbit. Between two people who are attracted by love, there also has to be a 'repulsive force'.

23

parent. It seems like this attractive force of 'love' for philosophers, I suppose. If only we can find to exploit and kill people. However, every religion aims to promote love. Religion does not en-As with gravity, love is also attractive. If we have courage questioning and science does. Faith by only attractive forces, it will be fatal and I am definition cannot be questioned. Science starts sure many would have heard the term 'fatal at- by questioning what we observe. Ideally religion traction'. When the mango falls down due to should promote love and science could be ingravity, it will be crushed. We need to counter different to this. Did Einstein not say "Science it with some repulsive force, such as a cushioned without religion is lame and religion without scibag that can collect it without damaging it. Even ence is blind"? (4) I have also heard people saying as I write, my love for mango is kindling my emo- 'love is blind'. After writing this article, I did do tions and my mouth has started watering. The a Google search on love and gravity and found gravitational force between earth and moon is out that one blogger has actually equated the two balanced by the centrifugal force as they revolve (5). My view is slightly different. I think gravity

<sup>1.</sup>https://earunan.org/2016/09/20/borders-in-science-and-nation-the-need-for-them-and-theneed-to-have-a-healthy-disrespect-for-them/ Accessed on 24 September 2016.

<sup>2.</sup>http://journal.sjdm.org/15/15923a/jdm15923a.html Accessed 24 September 2016

<sup>3.</sup>https://en.wikipedia.org/wiki/Graviton Accessed 24 September 2016.

<sup>4.</sup>http://www.brainyquote.com/quotes/quotes/a/alberteins161289.html Accessed on 24 September 2016

<sup>5.</sup>http://movementfromwithin.net/gravity-love-force/ Accessed on 25 September 2016.

Another scientist's philosophical quest was less successful, but he did manage to get a paper out of his failure. Dr. Sai G. Ramesh shared the paper with us.

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NUMBER 3 (FALL 1974)

THE UNSUCCESSFUL SELF-TREATMENT OF A CASE OF "WRITER'S BLOCK"

DENNIS UPPER

VETERANS ADMINISTRATION HOSPITAL, BROCKTON, MASSACHUSETTS

#### REFERENCES

<sup>1</sup>Portions of this paper were not presented at the 81st Annual American Psychological Association Convention, Montreal, Canada, August 30, 1973. Reprints may be obtained from Dennis Upper, Behavior Therapy Unit, Veterans Administration Hospital, Brockton, Massachusetts 02401.

Received 25 October 1973. (Published without revision.)

#### COMMENTS BY REVIEWER A

I have studied this manuscript very carefully with lemon juice and X-rays and have not detected a single flaw in either design or writing style. I suggest it be published without revision. Clearly it is the most concise manuscript I have ever seen-yet it contains Journal-perhaps on the edge of a blank page.

sufficient detail to allow other investigators to replicate Dr. Upper's failure. In comparison with the other manuscripts I get from you containing all that complicated detail, this one was a pleasure to examine. Surely we can find a place for this paper in the



Prof. Sanford Ruhman from the Hebrew University, Jerusalem, and Prof. S. Umapathy from IISo's Department of Inorgani

and Physical Chemistry led the first seminar, which almed to strengthen the ties b

IPC in the ACUS

# AMONG THE MALAYALIS: AN ALLAPUZHA JOURNEY (WITH APOLOGIES TO V. S. NAIPAUL)

Ria Mukherjee fondly recalls the fun and high spirits of a trip to Allepey in Kerala that she took with the Al(l)Chemists Club.

A long-cherished dream of my fellow colleagues crystallized into reality earlier this year when the 2015 batch of the Al(l)Chemists' Club organized a 2-day 3-night trip to the town of Allepey (or Allapuzha to the locals) in God's Own Country. This was probably the first time that the Club had taken the unprecedented step of organizing an excursion that needed to cross two state borders to reach its destination. And as exhausting as the journey there was expected to be, a total of 38 of us, our excitement stuffed into our backpacks, signed up for it.

And when we finally hit the road early one morning, our excitement only increased, though the miles seemed to stretch on and on endlessly, and the twists and turns of the ghat roads began to take their toll on even the hardiest of stomachs. But when at last the journey was done, and the day's setting sun gave us our first views of houseboats sailing serenely in the backwaters, we felt as though we truly were in the Scotland of the East.

We were soon on a houseboat ourselves, but 38 people crammed into a space meant for 21, made for some crazy sleeping arrangements. But what were a few trampled toes when the waters of the Arabian Sea lay all before us, and we could watch the reddish-yellow dot of the rising sun grow bright over the horizon the next morning!? In that vast expanse of ocean, and under that immense canopy of sky, we realized how tiny and insignificant we really were.

From Allapuzha we moved to the beach at Kochi, where we rode the waves as though there were no tomorrow, and indulged our palates with some heavenly Malabar cuisine.

But all good things come to an end, and we finally had to return home. And as hard as that was, we brought back memories that we will cherish forever.

### Women's Day @ IPC - of the women, by the women, but for ALL

Ria (Lois Lane) Mukherjee was in the thick of things once more, this time as a participant in a Women's Day celebration in the department. This is her report from the frontlines.

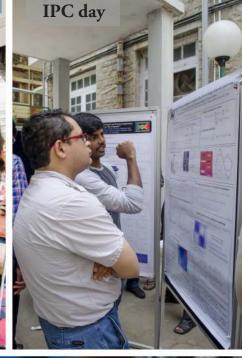
This year the IPC Department witnessed its first ever Women's Day celebration. Thanks to the Chairman for coming up with the idea, which Dr. Geetharani and the women staff of the department were very keen to translate into a day-long programme of gala activities.

But the female half of the student contingent was decidedly unenthusiastic: "We don't want a celebration just for us" was their unanimous reaction. And their logic was this: "On Women's Day, it should be the men who do something on our behalf! And anyway, if we're all equal, why have a Women's Day in the first place?" In the end, though, they all joined hands to plan a fitting festivity and make it a success. The organizing committee was appropriately all-women, but a few of the gents lent a helping hand.

Women's Day in the department was held on March 22nd, 2016, a little later than the day celebrated around the world. Women IPCians showed up for the event in gorgeous ethnic wear, transforming the department for that one evening into a kaleidoscope of colour. The chief guest for the day was Smt. T. K. Anuradha, Programme Director, GEOSAT, Bangalore, who in her short but inspiring talk suggested that the women in the gathering make small sacrifices for the sake of large achievements, and that they strive to become more career-oriented. The day also saw cultural performances by the women students of the department, as well as accounts by a few of the men of the important female influences in their lives ("mann-kibaat".) Also featured were a quiz and a dumb charades, mostly on the theme of successful and accomplished women. The day ended with a smorgasbord of tasty snacks and the message that a great deal still needs to be done to improve the profes-





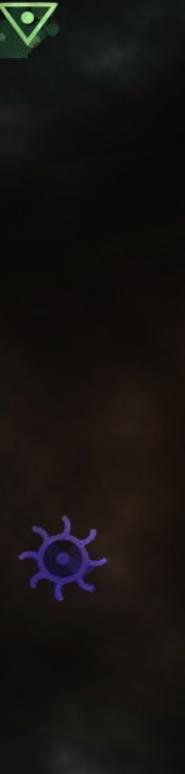






















Department of Inorganic and Physical Chemistry Indian Institute of Science, Bangalore-560012