The Journey of a Young Investigator

Compendium of articles from the JOYI series

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Journey of a Young Investigator

1st YIM to 10th YIM

Solving Grand Challenges by breaking global barriers

Adesh Saini

Adesh Saini is a Professor at Center of Research for Himalayan Sustainability and Development at Shoolini University, Solan, Himachal Pradesh. He participated as a PDF in YIM 2011. Here, he shares his views about the importance of collaboration in science.

Decades ago when I was a PhD student at CSIR-IGIB in Yogendra Singh's Laboratory, I routinely collaborated with experts outside of my niche area of research in mycobacteriology. My interactions with biophysicists and chemists, led to my fist paper which was co-authored by researchers from Indian Institute of Technology, Kanpur and University of Delhi apart from my parent institute IGIB. More recently, when I started my independent lab at Shoolini University, Solan (HP, India) my collaborations with Prof Christine Winterborn, Centre for Free Radical Research, Department of Pathology, University of Otago, Christchurch, New Zealand and Prof Venki Ramakrishnan, the Nobel Laureate at MRC, UK, helped me access resources that were vital in establishing my lab. Collaborations have repeatedly helped

me drive my career on a success trajectory. This is not only true for me but scientists across the globe.

World over, collaborations are making it possible for scientists to tackle scientific challenges that wouldn't have been possible otherwise. Collaborations are no longer limited to the lab next door or the college friend in another university. Multi-country consortia are being formed solve scientific puzzles. Such alliances lead to better resource utility, higher consistency, and most importantly they deliver a technology which has a global application and acceptance. They also help create high-quality regional research labour force which is instrumental in boosting the regional economy and development.

Tangible benefits for all members involved in a collaboration can be created by granting co-authorship to all involved. This trend is clearly on a rise. Take for example the International Rice Genome Project or Tomato Genome Consortium aiming to accelerate improvements in rice or tomato production where more than 100 researchers from various countries including India, Japan, USA, Philippines, China and Republic of Korea worked together. Similarly, in other areas of sciences–like in Physics– discovery of the Higgs Boson particle at the CERN's Large Hadron Collider, Switzerland bagged Nobel Prize in 2013. Clearly, researchers are shifting the landscape of collaboration from local to global.

Many research projects focusing on grand challenges are appreciably funded by various programs of United Nations, World Health Organisation, Bill & Melinda Gates Foundation, National Institutes of Health, regional Government agencies and others. Among Indian funding agencies, the Department of Biotechnology, Department of Science & Technology, Council of Scientific and Industrial Research and various Ministries in Government of India, promote joint international projects in various areas of energy, food security, societal development, technology and education. They also support the joint workshops, seminars, frontiers symposia, exhibitions, exploratory visits and lectures by eminent scientists. Because of these endeavours, India has bilateral science and cooperation agreement with more than 80 countries. Support from these agencies is helping Indian researchers to develop linkages with research groups outside India. This, in turn is helping improve

India's profile in global research rankings and foster meaningful alliances with industry.

Social media, especially the kind that caters exclusively to an academic audience, has fuelled this trend by making it easy to establish such connections. It is through websites like, ResearchGate, LinkedIn, Twitter and Facebook that researchers share their profile, research papers, discuss ideas and even solve specific problems. It's been reported that up to 2014 more than 4.5 million researchers have signed up for ResearchGate and around 10 thousand arrive every day. Besides this, academic activities like international conferences and workshops also help develop alliances. Advancements in the area of mass communication facilities including face-to-face interactions have enormously contributed in creating this shift from "lone" to "team" approach.

In India, where we need to manage our limited resources and funds in a way to provide solutions to a battery of challenges, ranging, from poverty to climate change, collaborations within the country and with the outside world can help us develop a sustainable model for developing novel technologies and doing better science.

Learning to lead from front

Prosenjit Mondal

Prosenjit Mondal is an Assistant Professor, from IIT Mandi, Himachal Pradesh. He attended YIM 2016. as a YI. In this guest post, he shares his tips for better personnel management in laboratories.

In the early, heady days of my becoming a PI, armed with some great training and a truck-load of motivation, I was always eager to start acting on new ideas and see them work. I think a lot PIs feel this way (excited and eager to start), but, with time get to know that some hurdles need to be crossed to bring their dreams to fruition.

Some of the hurdles that came my way were: creating a vision of my research group, figuring out staff recruitments for my lab (screening, interviewing, offering a position), learning to manage my time between teaching, administration, lab management, mentoring students, writing grants and of course, research, However, amongst all these the most challenging was learning to manage & motivate the people in my lab to have them on the same page as myself.

The first step in personnel management is to recruit the right person. I was looking for dynamic team members who would show great initiative for research and have a fair knowledge on the subject. I did some recruitments accordingly, however, I soon realised how difficult it is to bring all the members under one umbrella and keep them constantly motivated even if there are some initial failures. From my experience, I can say one should not accept someone only because you badly need to staff the lab, just to get the work done.

A PI may have many new ideas and his own thought process of how things should be carried out, but the new members in the lab will definitely not be able to anticipate everything at one go. Different members with different background & culture have their own views, own concepts to put forward.

Differences between members are also a very common problem that one has to come across. If all these issues are not taken care of at an early stage along with other aspects like project application, project management etc., it becomes very difficult for a new PI to execute his research work in a smooth manner. This happened to me as well.

I think, what finally helped me draw everyone together and bring some order in things is starting an open forum within the lab where I regularly interact with members and communicate about my expectations from each of them. The open forum is not a place for one-way communication. Not only do I give them feedback on their work but I also encourage my team members to give their feedback. I also started lab meetings, once a week and one to one meetings as required. This has helped me know my team members not only in terms of their capabilities but also develop a clear understanding of the person I am dealing with & how can I approach them to get a better outcome. Another thing that has helped me is continuing to carry out experiments on the bench with my lab members. This makes me more accessible to all the members & they also get a chance to learn the necessary skills from me.

I have realised that day-to -day operation of the lab requires strong leadership and management skills. Hence, along with these steps, I'm trying to collect as much information as possible on management and motivation

applicable to a lab setting, to become a better leader and improve productivity in the lab.

Teacher-student interactions: bridging the gap

Piyali Mukherjee

Piyali Mukherjee is an Assistant Professor at Presidency University, Kolkata. She attended YIM 2014 as a YI. She is also one of the organisers of YIM 2018. In this guest post she shares her thoughts on ways and means of bridging the gap between teachers and students. Needless to say, the process of building these bridges has been an extremely rewarding experience for her.

"A teacher can never really teach unless he is still learning himself"

In the age of the internet and emerging new technologies, the existence of classroom teaching is being questioned over and over again. I have very little doubt that the young minds are capable of learning on their own but after my five years' stint as a teacher, I feel that a teacher's role in the life of a student goes way beyond academics. Teachers play a tremendous role, not only in the academic achievement of students but in the skills, attitudes and abilities they carry with them beyond the classroom.

During the time I joined the Presidency University, it was transitioning – from being a100-year College to a University. A new generation of research minded people was stepping into the shoes of older experienced teachers and this was a time when my experience and role as a teacher was under a shadow of doubt. I was not alone in this journey; my colleagues who joined the University around the same time had the same apprehension. We realized that there was a huge gap in the understanding between the teacher and the student and the hierarchy still exists. As we buckled down to break the hierarchy, the first hurdle in the path was to help our students to start thinking beyond their text book. They were used to traditional teaching methods, such as, notes, steeped in science that was often out of times. We started using power point presentations that focused on understanding concepts, introduced recent advances in science and research methodologies.

One day, during the summer of 2014, as I was wrapping up the day's work three young students came to me and said they wanted to work in my lab. What they called my lab back then was a newly renovated room with a few simple instruments. I said an impulsive yes and felt as if for the first time I had succeeded in bridging a small part of the gap. This was the beginning of my real journey with my students where I understood and appreciated that the process of learning is actually two-way. It's been great to share my passion and instil in them the same excitement towards science that I have. They argue, they discuss and they sometimes fail, but it only brings us closer academically and every day becomes a new learning experience.

With the encouragement of my students, we have started team "Brain Matters", a student outreach program directed towards brain function and diseases. This is a platform where the students become teachers and it is always fascinating listening to them, how they motivate the younger minds and draw them into active participation. Besides this community outreach program, we also conduct Brain Awareness week at Presidency University each year with the undergraduate students. This not only helps in building team spirit among the students but also brings out their creative side.

Over the past five years, we have overhauled our entire teacher-student experience: we have open-door policies, classroom teaching is more interactive, and students are actively engaged in the design and dissemination of novel empirical research ideas. They challenge our ideas,

share their problems and sometimes even help us solve ours. They do not stand up or stop in their path as we meet but they walk alongside to discuss their latest shopping experience or how they are unable to manage time between the lab and their courses. Each day of my life as a teacher is filled with new challenges, gathering new knowledge from my students and ongoing attempts to inspire them not only in science but also help bring out their creative side and do the extraordinary. The foundation of the bridge has been laid, it will be a few more years before we cross over to the other side.

Self-doubt as a Principal Investigator

Roop Mallik

Roop Mallik is a Professor at Department of Biological Sciences, Tata Institute of Fundamental Research (TIFR), Mumbai. He attended YIM 2011 as a YI. In this invited piece, he writes about dealing with self-doubt as a young PI.

It's the fifth year of your postdoc. Your "big" paper just got accepted, and in a week you fly back to Swadesh. You will soon sit in your own office and lovingly survey the Lab outside. The best students will line up to join you, funds will flow and you will joyfully set sail on the path to success guided by wise colleagues. Capable technicians will float around fixing everything that needs to be fixed. You will sip coffee in the office and disseminate ideas to obedient students, who will produce data and figures that will get pasted into the papers you have already formatted in your mind.

Alternate, and a more likely scenario…

It's been six months since you joined. You finally found an office to park yourself, but you don't have a Lab yet. Everybody is friendly and nice, but nothing much actually seems to be happening. Forget data and papers, you

are still doing "L1/L2" to buy a computer. A student showed up yesterday. You charmed her with an hour-long monologue, but she eyed you suspiciously through the Nobel lecture and then asked – "Do I have to work on weekends"?

Those doubts will now creep in. This is not what it was supposed to be. Every day is worse than the one before. Why did I ever come back? Hang on … what I wrote is not India-specific. Some version of this will play out wherever you set up shop. What do you do when everything is out of your control, and now there is no "advisor" to show you the path? The easy way out is to become negative and blame the system, but is that useful? Perhaps a good start is to understand what resources are available to you. Can you do something that you never did before? Beg, borrow (don't steal), but do start something new. It may be small and not the primary focus of your Lab, but you need something positive to happen. I have found it quite remarkable what students are capable of with a bit of guidance and motivation. Build trust with them and respect them as equals. Use the carrot and the stick wisely. Come what may, you must appear to be in control.

What can you do to make things easier? It is always a good idea to anticipate what lies ahead and prepare during your postdoc years. Think of independent projects, learn something from the next lab and make friends with the postdoc there who could be a potential collaborator, develop a new model system … whatever it takes. Yes, I know that being a postdoc is hard – there is so much to do to get that paper in, I mean the one that will get you the PI position. But succeeding as a PI is probably much harder because now you depend on others to get the job done. This is not about you anymore. It is about everything else but you, and at the end of it you get blamed.

Perhaps your best friend at this time is your ability to think of new projects within the inevitable constraints. This will be much easier if you got into the habit early in your postdoc days, as I wrote earlier. Doing and thinking "new" is very important. I had to completely reboot myself when I started my postdoc because I had no knowledge or training in Biology. I did learn biology, but there is still so much that I had never heard of. There is no solution to this problem, but to get around this I try my best to recruit students who are smarter than me.

Good science is possible in India and indeed we are seeing it happening. As with traffic signals, many things here are left to interpretation. This flexibility can help us in unexpected ways, but we need to understand and adapt to this. But, finally it boils down to self-belief, ambition and originality. I am all in agreement with Oscar Wilde:- “Be yourself, everyone else is already taken…”.

Choosing a topic for your research career: a balance between flexibility and passion

ARAVINDHAN VIVEKANANDHAN

Aravindhan Vivekanandhan is an assistant professor at Department of Genetics, University of Madras. He attended YIM 2015 as a YI. In this guest post, he talks about his path to finding the right research question.

The transition from post-doc to PI is beset with a variety of challenges. The most crucial of all these challenges is identifying a niche area of research in which one will continue to work for the rest of their career. Given an option, most would like to continue in the same field as their PhD or postdoc tenure.

However, with biology becoming more inter-disciplinary one frequently needs to change the hat to fit the shoe, and in the process face the risk of losing his/her identity or focus. I faced the same problem when I first started my career at a diabetes research institute. Having been trained in immunology, and worked on infectious diseases all along, it was quite difficult for me to identify a niche to match my training.

I started with expanding my boundaries and quickly transformed myself into a clinical immunologist and began working on serum inflammatory markers in diabetes. Even though inflammatory markers are easy to work with and might offer some quick publications, I realised that the field might not be a suitable for long term research endeavours. This prompted another change in my trajectory and I shifted my gaze towards diabetes-tuberculosis. This proved to be a wise choice as I had worked extensively on TB all through my PhD tenure. It provided the perfect opportunity to combine the knowledge from my previous research with my current research on diabetes. I immediately wrote three grants and submitted them to funding agencies.

And thus began the excruciating wait for grant acceptance. Typically, in India, at least about a decade ago, the waiting period was quite long and would range anywhere between 6 months to 2 years. It was during this period that I started a collaboration with ICER, National Institute for Research in Tuberculosis, Chennai. While having a casual discussion with one of my friends there, an immunologist working on filariasis (elephantiasis), we decided to do a simple screening for this disease in diabetic subjects. The idea was to generate some data to write a simple paper to get things going. Contradictory to our expectations, when we analysed the data, we found that the prevalence of filariasis was much lower among diabetic subjects compared to non-diabetic controls. This took me to another interesting area of research, – "The Extended Hygiene Hypothesis". To cut the story short, what started as a simple epidemiological study, turned out to be a fertile virgin area to do research and yielded three good publications within a span of 2 years. The work gained immediate public attention and was highlighted in The Economic Times of India. To add to my surprise, I also received a fully funded invitation to deliver a talk at the 9th International Science and Maths Symposium at California State University, Fullerton, USA (Mar 20th, 2013).

By this time, I was awarded my first young investigator grant (DST-FASTTRACK) and a regular grant (DAE-BRNS) both on diabetes-tuberculosis. With two grants in hand and few research fellows working under my guidance, my research life became little easy. Even though the grant money was small, it gave me tremendous confidence and helped me establish my first lab in 2011. With time, more PhD students joined my lab

and we started publishing papers regularly. It was only then that I felt my transition from a PDF to PI was complete.

The transition was indeed difficult but at the same time it was interesting and full of learning opportunities. Not only has the experience helped me to become a better researcher but a better individual too.

The role of YIM in shaping my independent scientific career

Bilal Ahmad Mir

Bilal Ahmed Mir is an Assistant Professor at University of Kashmir- Kargil campus. He attended YIM 2015 as a PDF. In this invited post, he talks about the avenues that YIM 2015 opened for him.

It gives me immense pleasure to share with the readers that participating in

YIM2015 held at Gulmarg (Kashmir) as a postdoctoral fellow really helped me in developing some good collaborations, besides getting a permanent position in University of Kashmir as an Assistant Professor of Botany.

YIM brings together funding agency representatives, directors of almost all the laboratories and eminent scientists from across the globe, thus creating a platform that allows young scientists to access a number of opportunities and a chance to meet other scientists- both peers and eminent figures in a range of scientific fields.

During YIM 2015 besides meeting young investigators and postdoctoral fellows from across the globe, I got an opportunity to interact with a battery

of internationally acclaimed researchers like R. Uma Shaanker, Ram Vishwakarma, Dinakar Salunke, LS Shahidhara, Ron Vale, Tim Hunt, Satyajit Mayor and K VijayRaghavan.

I remember a few productive interactions such as the one with R. Uma Shaanker about research collaborations. It is quite likely that I would have never gotten an opportunity to meet him had I not participated in YIM. Thanks to YIM and IndiaBioscience that I got this excellent networking opportunity. We are still working on some joint programmes like studies on Himalayan Biodiversity, endophytes and on chemical ecology in collaboration with Shannon Olsson of NCBS. Recently, we even organised Science Academies' three-day lecture workshop on Biodiversity of Kashmir Himalaya in the remotest region of Kargil in J&K.

Again, it is because of YIM I got to know about NCBS and worked with Shannon Olsson for few months and also got a visiting fellowship to join her lab in coming November.

The other fruitful interaction was with Ram Vishwakarma, Director CSIR-IIIM,(Indian Institute of Integrative Medicine)Jammu, who extended his support for applying to various re-entry fellowships and also with regard to laboratory facilities that are lacking in my lab. I am hopeful to do some research with IIIM Jammu, soon.

My most memorable interaction was with K. VijayRaghavan who is still hopeful that I will take a lead in Kashmir Himalayan studies. Our campus is located in the remote region of Kargil, making it the ideal place to study Himalayan biodiversity and bioprospection. We have already initiated some joint research in the field of rock-associated microbiology and chemical ecology. In addition, we intend to study the effect of altitudinal gradients on VOCs and plant microbiome.

YIM 2015 was a turning point in my research career as it helped me get an academic position of Assistant Professor at the University of Kashmir and also the prestigious Energy Bioscience Overseas Fellowship of DBT. In short, YIM shaped my career from a postdoc to a young investigator.

It is an uphill task in India to develop an independent laboratory as a YI and to develop as an independent PI. I am still in the early phase of lab establishment but very happy to have gotten the opportunity to work as an independent researcher.

I recommend every postdoctoral fellow to attend this event at least once as it is sure to open up new avenues of taking your career further. I hope to attend this event as a YI again to bring in new dimensions and collaborations in my career.

Rooting for the open-laboratory system

N Rajendra Prasad

N Rajendra Prasad is an Assistant Professor at Department of Biochemistry & Biotechnology, Annamalai University. He attended YIM 2012 as a YI. In this guest post, he shares his thoughts on the open-laboratory system.

During my postdoctoral stint at the Laboratory of Cell Biology (LCB), National Cancer Institute, NIH, and at the Armed Forces Radiobiology Research Institute, USA, I got my first experience of an open lab. Having worked in Indian universities and research institutions, I had only seen laboratories that were independent and often closed to each other. So, this came as a pleasant surprise. The LCB of NCI was designed in a way to share its dark room facility, cold rooms, major equipment and biosafety cabinets with the adjacent Laboratory of Cell and Molecular Biology (LCMB). By pooling these facilities on each floor floor of building, the NCI was able to minimise the number of duplicated resources and reduce the cost of operation considerably. The researchers used common facilities without any overlap by planning their work schedule meticulously and booking a facility well in advance.

The concept of open-lab emerged in the mid-1990s in the Western countries, when funding levels fluctuated rapidly and several Principal Investigators

(PI) decided to freely share their equipment and facilities. Since then, an increasing number of research institutions have adopted "open" labs to support team-based work. The open lab concept is significantly different from that of the "closed" lab of the past, which was based on accommodating the individual PI. An open laboratory has a single unpartitioned laboratory space larger than the average size of a two-to-four module laboratory. The layout often consists of wet lab, biosafety cabinet, cell culture lab, cold room, major equipment room, autoclave room, conference room and a corridor with areas demarcated for gatherings and lunch. There can also be two or more open labs on a floor, encouraging multiple teams to focus on separate research projects. A wide variety of labs -from wet biology and chemistry labs, to engineering labs, to dry computer science facilities - are now being designed as open labs.

I strongly believe that the open lab system can, not only reduce the costs of running research facilities but also open avenues for collaboration among PIs. This is especially good for young PIs who are implementing new research projects. Getting researchers to talk to each other is the only truly effective way to transfer technical knowledge and advancing the process of information. I am pretty sure that the open lab concept within an organisation can create working communities, facilitate collaboration and may create tangible outcomes. It is obvious that closed research environments will not fulfil the PIs research requirements completely for long periods as their goals and priorities have to be updated regularly, in accordance with current trends, institutional vision and technological changes.

Further, running a research lab is a complex endeavour and it requires meticulous management skills. An open lab allows a young PI in his/her initial phase of career to concentrate more on doing science rather than on management aspects of running a research lab. Further, I have regularly seen young Indian PIs struggling to meet the cost of reagents and kits for their research needs. In India, most of the reagents and kits for cell and molecular biological experiments are imported and are almost double in cost when compared to the country from which they were imported. An Indian PI has to invest a lot for the consumable part of their project. In this scenario, the open-lab concept can considerably reduce the cost of their research projects

by avoiding huge investments in capital equipment. Moreover, the open-lab system gives a modern and stylish appearance to the research laboratories.

The open lab concept does have some drawbacks too, such as, its inability to provide researchers with a lab setting customised for their specific research needs. There are also concerns about confidentiality of the research and physical security of the facility. Also, some researchers find it hard to work in a lab that is open to everyone. They may require a dedicated space for their research in an individual closed lab. In such situations, individual closed labs that have a direct access to a larger, shared open lab, can be designed. When a researcher requires a separate space, an individual closed lab can meet his or her needs; when it is necessary and beneficial to work as a team, the main open lab is used.

Open labs will find more acceptance if researchers, policy makers, experienced lab managers and designers work together, right at the time of planning or renovating a research laboratory. This way we can design open-labs that give utmost importance to concerns about confidentiality and physical security. However, before starting to work in an open lab, PIs have to be mentally prepared for sharing their facilities, fostering trust, strengthening teamwork and resolving conflicts, if they arise.

Resuming a scientific career after a break

Sonam Mehrotra

Sonam Mehrotra is a Wellcome Trust/DBT India Alliance Intermediate Fellow at Tata Memorial Centre - ACTREC. She attended YIM 2017 as a YI. In this invited piece she talks about getting her research career back on track after a two-year break from work.

To succeed in academia is hard for anyone. It becomes even more challenging if one takes a career break to take care of family needs or due to any other personal circumstances. Is it possible to return to a research career after a prolonged break and still be successful? From my own experience, I can say, it is possible but is definitely not easy.

Unlike other Principal Investigators (PIs), I became one after a significant unintended but a circumstantial gap in my scientific journey. Though I did not go to the lab while on this so-called "break", I could not really keep myself away from science. I thought about alternate career options but did not find anything more interesting than a career in research. So, I tried to keep in touch with new developments in my field by regularly browsing

through new journal articles and talking to friends who were pursuing research.

During my PhD and post-doctoral studies in the U.S, not only did I gain extensive research experience, I also got a chance to involve myself in writing several grant applications with my mentors. This experience in grant writing proved to be a crucial factor in helping me resume my scientific journey after a break.

I constantly looked out for any re-entry schemes that could offer me a route to re-enter academia in India. Eventually, with the help and support from a senior Principal Investigator who sponsored my grant application and provided me space in his laboratory two of my applications were accepted. I was awarded fellowships, one each from Department of Biotechnology (DBT) and Department of Science and Technology (DST). As I could avail only one of these at a time, I chose the BioCARe fellowship sponsored by DBT.

I returned to research after a gap of almost two years as a Scientist-D at the Centre for Excellence (CoE) in epigenetics at IISER Pune. I started working on projects related to the CoE's objectives and also developed my own independent research project with support from my grant. There had been significant technical advancements in my field while I was away from the bench. Initially, I felt nervous and wondered if I would be able to execute and design successful experiments. After joining the IISER Pune, the first thing I tried to do was to interact with PhD students and postdocs in the lab and re-train myself in current technologies and research methods. My association with the CoE and IISER Pune helped me in a big way to update my existing research skills and regain confidence. My advisor and mentor at IISER Pune encouraged me to apply for the Wellcome Trust/DBT India Alliance (India Alliance) Intermediate Career Fellowship. Initially I was quite hesitant, but on realising that this exercise would at least help me prepare a good grant proposal, I applied for the fellowship. I was fortunate that the fellowship was awarded to me and I got this opportunity to begin independent research once again.

I moved to ACTREC a year ago and started working with a small research group comprising of a research fellow, a postdoc and a few trainees. The

Wellcome-DBT fellowship has given a great boost to my scientific career. I have managed to re-enter the academia, but I still have to pass the test of time, publish quality science and achieve my scientific goals. As I continue on my journey, I feel immensely grateful to my mentors, family and friends because of whom I did not give up and quit science.

Striking a balance between teaching and research

Ravi Vijayvargia

Ravi Vijayvargia is an Assistant Professor at the Department of Biochemistry, Maharaja Sayajirao University of Baroda, Vadodara. He attended YIM 2014 as a YI. In this invited piece he talks about his experiences as a teacher-researcher in an Indian University.

Choosing a career in a University setup has its own advantages and caveats.

The most important aspect being the ability to strike a balance between teaching and research. It is well understood that teaching is the mandate and priority for most University departments. Despite which, even in the universities one's career progression is often dependent on API (Academic Performance Indicator) score which is judged on the basis of an individual's research contribution. Thus, however, invested a person is in their teaching assignments, they must also conduct meaningful research. This means bringing in money by writing research grants as most universities do not have a concept of a start-up grant. Further, it takes almost 4-5 fold more time to setup a functional lab in a university setup compared to a research institute. But, there are ways to keep oneself interested in research until then. Dissertation students play a very important role in generating

preliminary data for a research grant. Additionally, few of them, who are motivated and well-trained, can continue with you for their PhD thus repaying the time invested in them.

When I started as an Assistant Professor in August 2013 at the Department of Biochemistry, Maharaja Sayajirao University of Baroda, I was fortunate to be asked to teach subjects of my interest and liking. On the other hand, however, there was hardly any start-up fund to initiate a research laboratory. A shared lab space and Rs. 50,000 for 3 years was all that I received. After about nine years of post-doctoral training at the best places, including MGH-Harvard Medical School, it was a difficult situation to be in. I felt as if I had a job but no work.

Gradually, things started to roll as I initiated an epidemiology project to determine the prevalence of Huntington's Disease (HD) in patients with motor abnormalities. This was an off-shoot of my Postdoctoral work but quite relevant to India, as no large-scale studies on the prevalence of HD were available for the Indian population. In next three years, much to our surprise, we got several HD positive samples and generated enough preliminary data to submit a research proposal for funding. Also, another proposal on targeting post-translational modifications of mutant huntingtin protein as potential therapeutic for HD got funded by DST-SERB in March 2017.

Here, I wish to justify my continuation of research in the area of my postdoctoral work. A lot of established researchers advise against continuing in the same area as one's PhD / postdoctoral research. Ironically, however, the chances of getting a research proposal funded is largely dependent on your contribution, expertise and publications in the area of proposed research. Thus, I believe that to get started in the University setup where there is minimum start-up support, it is justified to submit one research proposal as an extension of your PhD/ postdoctoral research.

Once the ball starts rolling, the University setup provides ample opportunities to pursue other research ideas mainly through M.Sc. dissertation projects. I have trained 7 dissertation students till now and through them have generated sufficient preliminary data to submit at least two grant proposals.

Therefore, in my experience, striking a balance between teaching and research depends a lot on whether you are offered or have the choice to teach subjects of your interest, assigned good dissertation students and have a good rapport with the senior colleagues in the department.

Being a young researcher, teacher, and clerk at the same time

Vijay Kothari

Vijay Kothari is a faculty member at Institute of Science, Nirma University. He attended YIM 2013 as a YI. In this invited piece, he writes about the challenges faced by university-based researchers.

During my journey of more than a decade, as a young teaching professional, I have had multiple occasions to realise how critical it is to strike a judicious balance between professional demands from three different fronts i.e. teaching, research, and administrative duties. I believe most young teaching professionals (who are also active researchers) will find it easy to connect their experiences with what I am going to narrate below.

After completion of PhD or postdoctoral training, most young fellows aim at becoming either a university faculty or a researcher with some institute/ industry. Those eyeing the former, apply for such positions bearing in mind that, as a university faculty they will be required to train students in theory and experiments in sciences and conduct research. Both these activities i.e. teaching and research are intellectual activities that any person with an

academic bend of mind can draw satisfaction from. When a young candidate sits through interviews for any such university position, interviewers also try to assess mainly his subject knowledge (and not any other non-academic personality attribute e.g. administrative efficiency). However, following recruitment when a candidate joins the university system, he soon realises that teaching and research are not the only activities he is supposed to engage in. There are a lot of administrative tasks too, that demand him to act as a clerk and not as an intellectual teacher or researcher.

In almost all Indian universities, faculty are required not only to teach but also to take on a variety of administrative responsibilities; and after that one needs to create time for research. These are the times when multiple ranking and accreditation systems for academic institutes are there in vogue. Educational institutes are made to apply for these assessment/ accreditation/ academic audit systems either by the government or they (particularly private institutes) just join the bandwagon out of the herd mentality. Most of such ranking/accreditation schemes involve a massive amount of paperwork to be done by the applying university, and a major chunk of this clerical work is to be done by the teaching staff. In addition to this, the teaching staff is also made to handle various non-academic portfolios like anti-ragging committee, anti-drug squad, extracurricular activities, convocation preparations, etc. Overall, this culminates in under-utilisation of the highly qualified intellectual faculty. Its demoralising impact on the teaching professional is obviously quite a lot.

A young faculty is required to undergo departmental evaluation procedures for his performance at regular intervals. The outcome of which influences his/her career growth. Such departmental procedures usually focus more on the research productivity (grants, publications, patents, etc.) and less on teaching/ administrative contribution, ignoring the fact that the administrative portfolios have already taken a toll on the research performance of the concerned faculty. While it is relatively straightforward to evaluate one's research productivity, teaching and administrative contribution are not so easy to evaluate. Though, recruitment and promotion screenings for YIs attach heavy importance to his role as a researcher, much time goes to teaching and clerical work.

There are quite a good number of young university teachers, who despite all odds maintain a reasonably impressive research performance by making extra efforts at individual level e.g. by extending their working hours beyond the regular office hours, attending office during vacations, generating publishable data from M.Tech./ M.Sc. student dissertations etc. In order to help recognise these extra tasks shouldered by the university faculty, I put forward two suggestions:

There should be a reasonable teaching/exam duty load and minimum administrative load on a university faculty, so that research is not forced to the back-foot. This will allow the investigators to draw significantly from their research experience into their teaching, and deliver better content to their students. This objective can be achieved by recruiting enough number of teaching assistants.

Basic remuneration for routine teaching and administrative contribution should be similar for all, but extra incentives/ higher remuneration linked to scientometric scores of individual faculty must be there. Linking the remuneration to scientometric scores like citation count, h-index, Publons reviewer merit, etc. will make the rewarding process largely transparent, as these scores are available from third-party sources (e.g. Google Scholar, ResearchGate, Publons, Scopus), and are easily verifiable.

Hopefully, in years to come, our universities will transform into spaces where faculty are engaged in tasks that make optimum use of their intellectual abilities and not force them into tasks where they feel under-utilised.

Patients to pipettes: A journey towards lab research

Sahadev Shankarappa

Sahadev Shankarappa is an Assistant Professor at Amrita Center for Nanoscience and Molecular Medicine, in Kochi, Kerala. He attended YIM 2017 as a YI. In this invited post, he talks about his journey from being a medical doctor to a full-time researcher.

"I always wanted you to be an engineer" my father reminded me again as we walked around the large room on the first floor of our house in Bangalore, where he wanted me to set up a clinic and examine patients. With an exceptionally gifted ability to screw-up math problems in school, I was actually quite happy when I had to disappoint my father 25 years ago, by choosing to go to a medical school instead. The world of medicine fascinated me. Even though I found sitting in classes, going through labs, and cramming for medical exams mind numbing at that time, the concepts of human physiology and the biochemical intricacies of cellular life were starting to make an impression on my then 19-year-old brain. Before I knew it, the clinical part of my medical education was almost complete, I was an intern seeing patients, and people were calling me 'doctor'!! I recall sitting

down with patients asking their history, and praying that I don't miss, or, worse, do anything that would harm them. Each patient interaction was fascinating and exciting in its own way. The clinical history, the subtle cues, the diagnostic tests, and finally putting them all together to form a diagnosis and suitable treatment plant was gratifying.

As my internship progressed, I began to realise that medical training in India was designed for just one thing – serve patients. Each time a patient left my examination cubicle, I would wonder about the beautiful biochemistry behind the malady, the fancy pharmacology, the magnificent molecular biology of the disease, and all the why's and how's of the condition. But sadly, before I could get into my cloud of biology-appreciation, the next patient would walk in. I had started to feel that I may not be cut-out for the pace and pressures of a clinical practice, but more suited to intellectually dissect problems, ponder and raise questions.

So, one fine day, without much of background or awareness about lab research, I naively travelled to the United States trying to find a professional niche that allowed me to raise questions and propose solutions. An unexpected, but fortunate opportunity at the University of North Carolina, to work as a part-time research assistant in a molecular biology laboratory, exposed me to bench research and, my first pipette! In the lab, there was no one waiting for me to finish or rush. I had all the time to think and to do all sorts of mental biology exercises that I could not do before. This experience opened up a whole new alternative reality, where I witnessed other like-minded physicians actively doing biomedical research. I had found my calling. I finished my masters, got myself a Ph.D., completed my post-doc, and jumped over to a faculty position in India and I haven't looked back since.

Now when I teach my students, many of whom are engineers and doctors, I am constantly reminded of how my quest to buy a bit of time to think about the biology behind the disease has taken me down this wonderful journey from medicine to research. My father has come to terms with his son neither being an engineer, nor being able to use the first-floor room for his son's clinic, but he still cannot figure out what his son actually does!

Mentoring the 'social' researcher

Aditi Bhattacharya

Aditi Bhattacharya is a Reader at Centre for Brain Development and Repair, inStem, Bangalore. She attended YIM 2014 as a PDF. In this invited piece she shares her experiences in mentoring young researchers in

her lab

Research mentoring is a key component of how academia works and trains its workforce. Each new researcher needs to acquire competence over a collection of scientific techniques including a sense of how to analyse data, a grasp on the literature in the field, and perhaps some basics of professional and management training. Most of these skills are intuitive enough to be taught in an organic way. In fact, to a large extent "learning on the job" is the order of the day. What is harder to achieve and is more elusive is to foster a habit of evidence-based thinking and decision-making in newbie researchers.

My doctoral and post-doctoral mentors were very particular to include mentoring junior researchers in my evolution as a scientist. Therefore, by the time I had to build my team, I had already worked with over 40 undergrads doing hands-on bench work, both in India and abroad. As a result, when I

accepted a research faculty position at the Center for Brain Development and Repair (CBDR) at InStem, building a team of focused (and happy) researchers did not feature on my list of challenges. However, I did forget to factor in the unexpected, which was to enable my colleagues to use technology effectively and not be a slave to it. For instance, my earliest surprise was when I was recruiting people to my team. I spent over 3 weeks sending out emails to all my connections requesting for JRFs and trainees to be recommended, however when I put out the same request on Facebook on a whim, I received 37 enquiry pings and then emails within the first eight hours. I eventually hired 2 people from this barrage. Surprise no.2: with my nascent team I found that the usual response time to email for experimental plans and follow-ups is a day. If the same question is asked on WhatsApp, I get a response in less than 5 minutes.

I was struck by how well-connected my team was on instant messaging and social media. I quickly realised that for any tangible team building and mentoring, I had to leverage these tools to connect with my 'people'. I soon started using instant messaging for disseminating logistical information about lab meets, Google docs for inventories, and cloud backups for data sharing and storage. The real challenge, however, was to enable my colleagues to utilise all these instruments effectively rather than adding to the redundant chaos and clutter

I also feel that young researchers need to be taught how to synthesise usable conclusions from the flood of information that is available so easily. These are the real 'skills' that today's mentors must impart to the younger lot. With the increasing awareness that permanent academia positions are the exception rather than the rule, it behoves us to make our people more "job-ready". This again requires the same common minimum skills that make any successful productive scientist.

At the YIM 2014 we had a discussion on mentoring where a very eminent, senior professor mentioned that in India, the PI needs be a friend, philosopher and guide but most importantly an agony aunt. This thought stayed with me since I had seen my PhD mentor on many occasions providing such services to hordes of students, within and outside the lab. I was expecting the same. However, in my two years here, relationship advice is not what my students come to me for. They usually want to talk about

work-life balance. On many occasions, I've had to recommend reading books like Lean In, The Color of your Parachute and Motherhood: the elephant in the laboratory. This may well be a reflection of the demographics of Bangalore Life Science cluster, but it does represent a shift in the kind of guidance being sought. Most of these chats have emanated from posts and pictures that I posted on Facebook etc. While we may not have to be agony aunts, we may sometimes by example demonstrate how to successfully or unsuccessfully navigate life's many challenges.

As I proceed in my journey as a YI, I'm slowly coming to the realisation that as mentors we form a link in the chain– passing on the time-tested parables of work and scientific ethics using crutches of new technology to explore the great unknowns in science. What we need to know to be productive and well-adjusted humans remains the same, just the manner in which lessons are imparted, changes with the times.

A biologist lost in translation eventually finds a common language

Madhulika Dixit

Madhulika Dixit is an Associate Professor at Bhupat and Jyoti Mehta School of Biosciences, Indian Institute of Technology Madras. She attended YIM 2010 as a YI. In this invited piece, she writes about her unique experience as a faculty at an institute where majority of researchers are from Engineering background and often unaware of requirements of biological research.

As I pen down this article, I am taken down the memory lane of a young, enthusiastic Assistant Professor in 2007, joining a newly formed School of Biosciences at IIT Madras. Having done my PhD in Molecular Biology from IIT Bombay, I was aware of the hardships of doing research in India, but little did I realise then as a student, that doing Biological research in an Engineering Institute is a different ball game. I guess as PhD students, we were oblivious to struggles that our faculty members had to put up with in establishing the Department of Biotechnology at IIT Bombay way back in late 1980s.

Being allotted a designated lab space, I was all ready to set-up my cell culture Lab in IIT Madras, thanks to generous IYBA funding from DBT. Here I was with my first two students ordering routine instruments and lab-ware when, one fine day I got an SOS call from the purchase section asking me to see the Dean urgently. So, I rushed to his office to find a concerned Dean worried about how can he authorise the order of a "Recombinant Human protein"? His concern was about the "Recombinant Human"! Well, I had placed an order for human recombinant vascular endothelial growth factor (hrVEGF) as a media supplement for my cell culture experiments. So an hour later, only after explaining to him what are engineered bacterial expression systems and by giving him the analogy of commercial insulin production, did I manage to get the purchase order made. I soon realised that I will be spending plenty of my time translating biology to my non-biologist colleagues at IITM, in a language of logics, by borrowing principles of Physics and Chemistry. These experiences and a pertinent advice from my senior colleague in the Department on "Do what is doable", made me re-invent the way I will be approaching my research in the coming years.

A few years later, I was having this animated discussion with a colleague of mine from Mechanical Engineering Department, about the use of small animals in medical research. Being an ardent animal lover, he was put off with the whole idea of using rodents for pre-clinical studies and insisted on simulating the entire human physiology in silico in order to do away with clinical trials. It was only upon highlighting the complexity of absorption of drug through gut, its clearance from the kidney, detoxification in the liver and the role of tissue perfusion and blood rheology, could I convince him about the multi-dimensionality required to even develop an in silico model, let alone its acceptability for replacing clinical trials in Pharma industry. By this time, I was a pro in understanding their language and conversing with them in terms of restrictive boundary conditions, dynamicity, degrees of freedom and the chaos of biological systems. It was the same colleague of mine who came to my rescue when I was trying to design a cone-plate based device to impart laminar shear forces on cultured endothelial cells. His expertise in fluid dynamics came in handy in designing, crafting and validating the instrument. Under his supervision not only did my students make a small portable device in the 'Institute Workshop', they also managed to get me a programmable controller to run the set-up non-stop for 72 hours.

We have come a long way since those days of being lost in translation. Now the 'Stores and Purchase' section is sensitised to handling perishable biological reagents. The same goes for our Engineering Unit which now ensures uninterrupted power supply to our freezers and our Workshop team which carries out minor repairs of our high end equipment every now and then. I now look forward to discussions with my colleagues, be it in Engineering, Physics, Chemistry or even Mathematics, a subject that I barely managed to clear in my high school.

Today, when I am dealing with large scale micro-array, NGS or proteomics data, I do not feel lost. All I need to do, is to walk to the offices of my colleagues working in machine learning, mathematical modelling, computational biology or metabolic flux analysis. A chat over a cup of coffee with them is always an enthralling prospect as I always leave with new ideas and solutions.

So friends, I would conclude by saying that instead of just making lemonade from lemons, in the interdisciplinary world of IIT, you can make a lemon tart, pie or even a meringue! All it needs from you is to see the glass as being full.

Re-search Re-sumed

Arpita Mukhopadhyay

Arpita Mukhopadhyay is an Associate Professor at the Division of Nutrition, St. John's Research Institute, Bangalore. She attended YIM 2017 as a YI. In this guest post, she writes about why she got back to a full-time research career after having quit it earlier.

I was curious enough in school to pluck off the primary shoot apex of the marigold plant in my garden, when we were taught about the suppressive action of auxin produced by the primary shoot apex on the growth of secondary axillary buds. Repeat action ensured an extremely bushy plant that later bloomed beautifully.

Despite my curiosity and interest in finding why things behave the way they do, my entry into biomedical research was not a straightforward one. My father had hoped for me to get into medicine. However, I did not qualify in the entrance exams owing to a lack of interest and ended up in the biomedical research track.

As the first PhD student of Maneesha Inamdar at Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bangalore, I learnt valuable lessons in not just designing, conducting and interpreting experiments but also in overcoming the obstacles involved in setting up of a lab. This entrepreneurial zeal also helped me in applying to the Council of Scientific and Industrial Research (CSIR), Govt. of India for a Foreign Travel Grant to attend the Mouse embryo microinjection workshop at Penn State University and the Society of Developmental Biology- Mid Atlantic regional meeting at University of Pennsylvania in 2003. During that trip, a chance encounter with a postdoctoral researcher in Boston introduced me to Zebrafish, a developmental model I got completely sold on. Therefore, I started applying exclusively to Zebrafish labs for my postdoctoral research. Since I had no previous experience in working with Zebrafish, it took me almost 9 months of search to finally get accepted in the lab of Prof. Randall T. Peterson at the Cardiovascular Research Center, Harvard Medical School/ Massachusetts General Hospital, Boston where I used small molecules to probe into cardiovascular development of Zebrafish.

Unfortunately, I had to prematurely resign from my position 2.5 years later to take care of my 8-month-old son. I moved back to Bangalore with my family with no intentions of getting back to research. I had made up my mind to focus on my family, quite like a large number of once would-be women scientists. Little did I know at that time how difficult it would be to be a stay-at-home mom after being in the lab forever. However, my daughter was born about a year later forcing me to extend my away-from-research break.

Though my in-laws were staying with us, I still assumed that balancing a research career with two young kids was beyond me. As a result, I started to look for so-called alternate/work-from-home careers and when my daughter turned two, I joined a Knowledge Process Outsourcing company in Bangalore that had the primary job of creating supplements (=question banks) on books they received from international publishers on subjects ranging from management to law to chemistry. When the management there finally let me start working from home about 9 months after joining, I realised within a week how difficult it can be for a mother of 2 young kids to extract ~7 hours' worth of work from home. With that realisation, I started

looking for teaching/industry R&D jobs. I hit a wall with both, due to lack of teaching experience and an accumulated gap of 3.5 years by then.

As I then started looking for ways to get back to research, I came to know that Dr. Anura V. Kurpad, Head of the Division of Nutrition, St. John's Research Institute, was looking for a developmental biologist to carry forward the human placental work that had been started as an off-shoot of the St. John's birth cohort established about a decade and half earlier. I joined as a lecturer in 2012 and have since then established the Molecular Physiology Lab, secured funding and started getting our findings published.

I started a modular course in Fundamentals of molecular and cellular biology for the first year medical undergraduate students during the academic year of 2015-2016 that I have continued every year since. I am also the co-coordinator of the Molecular biology course for postgraduate medical students started this academic year (2017-18).

Despite the successes, my stint at St. John's Hospital was peppered with challenges. My foremost challenge was to align my research interests with the division's on-going research themes. This balancing act has been a rewarding and enriching experience as the Division of Nutrition has an eclectic mix of physiologists, nutritionists and public health experts. Another equally daunting adaptation that I had to make was to learn to apply my training in developmental, cell and molecular biology to the model organism Homo sapiens, one I had never worked with before. A few lessons I learnt on the way: one, the art of explaining your research questions to subjects and clinicians for getting them enthused is perhaps the first step in being able to do human research; two, working with human subjects made me learn and appreciate the nuances in research ethics like never before; three, the variability involved in data from human subjects and the factors influencing that variability is something I am still coming to terms with and finally, the experimental limitations of the Homo sapiens model makes me appreciate the power of animal models, or better, the power of a complimentary approach.

In a society where research is falling behind in attracting the best students and talent, I continue to find my motivation for a research career in the clichéd yet relevant hope of being able to come up with original findings that

make a difference in the life of a patient. The other source of motivation is, of course, my long-time friend curiosity!

Finding my foothold in academia

ANINDITA BHADRA

Anindita Bhadra is an Assistant Professor in the Department of Biological Science, IISER, Kolkata. She attended YIM 2015 as a YI. In this invited post she writes about her long-drawn struggle to get a permanent faculty position at her institute.

The first thesis from the lab is always special for a researcher, just like the

first child is to a parent. When my student defended her thesis a couple of days back and the external examiner had only words of praise for the work, the feeling of fulfilment was very special. Listening to Manabi making her presentation, looking at the perfect graphs that spoke volumes, I was thinking of the time when we were struggling to find a scrap of ground to stand on.

In June 2009, I joined IISER Kolkata as an IISER Fellow – a contractual faculty position used by the early IISERs in order to hire young scientists who didn't have the required three years of post-PhD experience, but "showed promise". Life had been good to me during my PhD and the short postdoctoral stint in Raghavendra Gadagkar's lab at IISc. I had had a smooth

transition from MSc to PhD, PhD to a Research Associate and RA to a faculty position, without a day's break in my career. I had been promised a regular position in "about one year" from the time of joining, and I made the mistake of taking this statement at face value. I was naïve and young, and I have the bad habit of seeing the glass always a little more than half filled. My husband quit his career in industrial research to return to the academia after five years, and we left the city that we had begun to call home, for the city that had always been home. We left the secured shelter of a sedate and experienced IISc for the youthful IISER, with dreams of being part of building an institution and hopes of exploring the theatre scene of Bengal.

I had my research plan all chalked out, and quickly got down to working on a funding proposal. I was happy to have substantial teaching responsibilities, including a full undergraduate course, and the first semester flew by without any hitches. The students were great, we had nice colleagues, and the campus was just developing. We had issues with space and infrastructure, but most of us were young and enthusiastic, and we took it all in our stride. By the end of the semester, I had a student who joined for a year as an institute funded project fellow, with a promise of a PhD fellowship if she performed well. My first grant soon followed, and my lab was all set to work. Within a year, I had two project students and we started getting good data on my model system, the free-ranging dogs. However, as my research started to take shape, my career path became tortuous.

I realized that in order to find stable ground, simply working hard wasn't enough. I was a woman, and I had to handle flirtatious comments, politely reject invitations to dinners, lightly step over compliments on how I dressed, and eventually all this summed up to being ticked off from the good books of the Director. The ambience of camaraderie that had once existed on campus was changing fast, making way for an oppressive autocracy, and the likes of us, who protested were blacklisted very soon. We were a handful against the majority of neutral people and the ones who sidled up to authority. The negativity reached its zenith in September 2011, when four of us, all women IISER Fellows, were handed over letters of termination stating MHRD guidelines, after a set of completely farcical interviews. Suddenly, I was about to be jobless in the new year. I was 7 months pregnant, and had a lab running on a CSIR funded project. After a month of sheer mental torture, the tables turned to some extent. The Director did not get the second term he was

hoping for; the interim Director did not take long to revoke the termination orders. Apparently, no directive from MHRD regarding the discontinuation of contractual positions existed!

The new Director joined in February 2012, and we hoped that the institute will move forward. Everything had stagnated, work on our new campus had stalled due to various issues, we had no institutional support for research, no space for accommodating new faculty members and students, our students were crammed in the old hostels, and we were expanding every year, as per the MHRD directive. It was a period of crisis. Some things did move forward for the institute in the new regime, but the environment did not improve. Personally, I was at a critical stage, with my original contract for three years expiring in the middle of June. It turned out that the founding Director has hired many more faculty than the number of available posts, and so all hiring had been stalled, until the next sanction from the Ministry. We were also informed that contractual staff could not be regularised until new posts were sanctioned. The Director met each of the IISER Fellows. The memory of that meeting is still vivid in my mind.

He told me that the entire concept of contractual positions for faculty was faulty, and that he thought such positions were simply glorified postdocs. I reminded him that my responsibilities in the institute had been no less than any faculty member. I had taught in every semester (and had very good teaching feedback), had independent grants, had awards, and had published from IISER Kolkata, unlike some of my colleagues in permanent positions. He said he agreed that my CV was stronger than some of my colleagues, but he could not give me a regular position due to lack of sanctioned posts. He then told me, “you are a woman, you have a family, your husband is here and he has a permanent job. Why are you bothered about a career? I will make you a Scientific Officer, and you should be happy. You can teach if your HoD agrees, and even be a co-PI in grants. That way you can also do some research.” In my fury, I gave him a piece of my mind and left his office, throwing his offer of the permanent position at his face. That was the end of cordiality between us. Two of us had agreed to stay on as Fellows until new posts were sanctioned, and what followed was a period of immense mental torment for my family and my students. I faced selection committees every year. When new posts were sanctioned, we were “upgraded” to Assistant Professor (on contract), in complete violation of rules. In the next round of

interviews, my colleague was offered a regular position, while I was offered another six months on contract. When I refused to accept this, I was given one year on contract. Finally, in 2015, I was made an Assistant Professor. The members of the Selection Committee asked me why I was still on a contractual position, when I was eligible to be Associate Professor. I had my little moment of triumph, when I told them that the Director would not allow me to apply for the post of Associate Professor, and he blurted out something about rules, which clearly nobody bought.

Nearly nine years later, I am still an Assistant Professor at IISER Kolkata, but I am a survivor. My students and I have gone through terrible times, but that has only made us more determined to perform, and more resilient to the perturbations within the institute. The institute has a new leader, and the environment is changing fast, for the better. The Dog Lab has endured several storms, and now, we have arrived. What I consider my biggest achievement is not the publications or the grants, but the happiness that dwells in our lab. My friend, Sumana Annagiri and I have decided not to build walls between our labs in the new campus. The Behaviour and Ecology Lab is not just a laboratory where students work, but their second home. A student once told me that her friend, who is an ardent Harry Potter fan, calls our lab the "Room of Requirement" for IISER Kolkata students. From one HP fan to another, there couldn't have been a better compliment. Looking back, in spite of all the dark days that we have endured, the overall feeling I get is that of satisfaction – I still see the glass a little more than half full.

Funding Challenges in Research

GITANJALI YADAV

Gitanjali Yadav is a Scientist at the National Institute of Plant Genome Research, New Delhi. She is also a Lecturer at the Department of Plant Sciences, University of Cambridge, as one of the first appointees of a Joint Deputation Program between India and the U.K. She attended YIM 2016 as a Young Investigator. In this invited piece, she talks about the perennial hurdle of getting, and sustaining funds for research.

As a young scholar, I often imagined having my own lab someday. What I

didn't realize then, was that my vision of the perfect lab stemmed from already being part of a well-equipped lab with modern machines, constant flow of funds, uninterrupted staff payments, and regular avenues for PIs and students to attend global conventions. This perfect cycle of having funds for cutting-edge research, followed by recognition and awards, leading to newer grants, is quite literally the 'Neverland' for young investigators.

A more realistic scenario is where you might have a lab indeed, but it's still an empty room with or without furniture! You proposed a great research idea, but the funding agency disposed of it. Even when success appears 100% guaranteed, funding probability may remain zero. You have an approved proposal, but the task force felt certain that it could be done with a fraction of

your estimated budget. You agreed to take that fraction, but the sanction letter is yet to arrive. The sanction letter comes along eventually, but the funds haven't been transferred to your department. By the time you get the promised funds, you are about a month from the guillotine– 31st March is breathing down your neck. And then you're in the dreaded utilisation, justification, 'or else' cycle!

I choose to treat the challenges of funding in a lighter vein, to avoid a sense of dystopia, or the fear that with time, my concept of research may get distorted by what gets funded, rather than what I set out to do. Life as a young investigator can be stressful. You're expected to cut the supervisorial umbilical cord, and transform overnight from a promising scholar to a capable manager of a mid-size business enterprise, handling truckloads of administrative paperwork, setting up purchase pipelines, installing equipment, running experiments, paying staff, resolving crises arising out of thin air. All the time. I was at a conference recently where the former DBT Secretary M.K Bhan, explained very beautifully, the need for young scientists to find a sense of music in research and to strive towards a 'kinder' kind of science in order to avoid the stress and the noise that seeps into us from our environment.

Getting and sustaining funds is as critical as the science we publish, or the rigour of our methods, and the concept has to be internalised long before you become a PI. I'd never have landed my first job if it wasn't for DBT's newly initiated IYBA research grant. I'd never have had the confidence to apply for this grant if it wasn't for earlier, much smaller awards as a student– starting from CSIR's innovative 'Catch Them Young' award, devised by S.K. Brahmachari for post graduate students. During the past decade, I have been funded variously, often in minuscule amounts, by national and international grants, as well as the corporate sector. I have also had to let go of the best students for lack of funds to sustain them. The Indian system has several opportunities for each stage of the scientific career, from both public and private sector sources, but they won't come knocking at your door each morning. In a short but insightful conversation, Raghavendra Gadagkar, former INSA President, had said that ignorance is not bliss, and even less so, for young investigators. You've got to constantly work at reading, learning, writing and applying for grants, and make no mistake- you've also got to do first-class science alongside.

Instead of perceiving the funding agency as an unsurmountable opaque wall, find ways to get through this barrier, communicate your work in a way that compels their attention. This is another challenge altogether, learning to communicate effectively. Over lunch with Mary Williams, features editor at the American Society of Plant Biology, I discovered the immense potential of networking and social media for advancing science. Ironically, and quite unfortunately, many young academics in India are still averse to Facebook and Twitter, refusing to harness the infinite power available to them, almost like an Ostrich burying its head in the sand. We need to incorporate science communication and grant writing skills into the curriculum, with emphasis on how to convey science to funding agencies and the public in an engaging manner.

I am encouraged by the energy and commitment of the members of groups like IndiaBioscience and Living Science that work, both online and offline to educate researchers about new findings, thoughts, policies and funding opportunities. We are slowly but surely making way for a change in policies and habits to improve access to funding opportunities for all, especially young scientists and students, across international borders.

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