

# AMIA SCIENCE

VOLUME 1



AMITY INSTITUTE OF APPLIED SCIENCES



# Patrons



Hon'ble  
Founder-President

Dr. Ashok K.  
Chauhan



## Vision

Building the nation & the society through providing total, integrated & trans-cultural quality education & be the global front runner in value education & nurturing talent in which modernity blends with tradition.

To provide education at all levels in all disciplines of modern times & in the futuristic & emerging frontier areas of knowledge, learning & research and to develop the overall personality of students by making them not only excellent professionals but also good individuals, with understanding & regards for human values, pride in their heritage & culture, a sense of right and wrong & yearning for perfection & imbibe attributes of courage of conviction & action.

## Mission



Hon'ble  
Chancellor

Dr. Atul  
Chauhan

# Vice Chancellor



*AMISCIENCE, gives an insight into the range and scope of the imagination and creativity of our students and faculty members.*

## *From the Desk of the Vice Chancellor*

**A**MISCIENCE, E-magazine of Amity Institute of Applied Sciences provides an intersection of great challenge and great opportunity for the students to review their efforts and to analyse their achievements in research and development. The power of scientific thinking equips and empowers everyone towards a full participation in society and to handle so much more in life. The need of the hour is to introduce a kind of revolutionary scientific teaching. Amity institute of Applied Sciences consists of the following departments- Chemistry, Physics, Mathematics and Statistics. Each and every department is unique in their own way. Be it the faculty, the events or the enthusiasm with which everybody works.



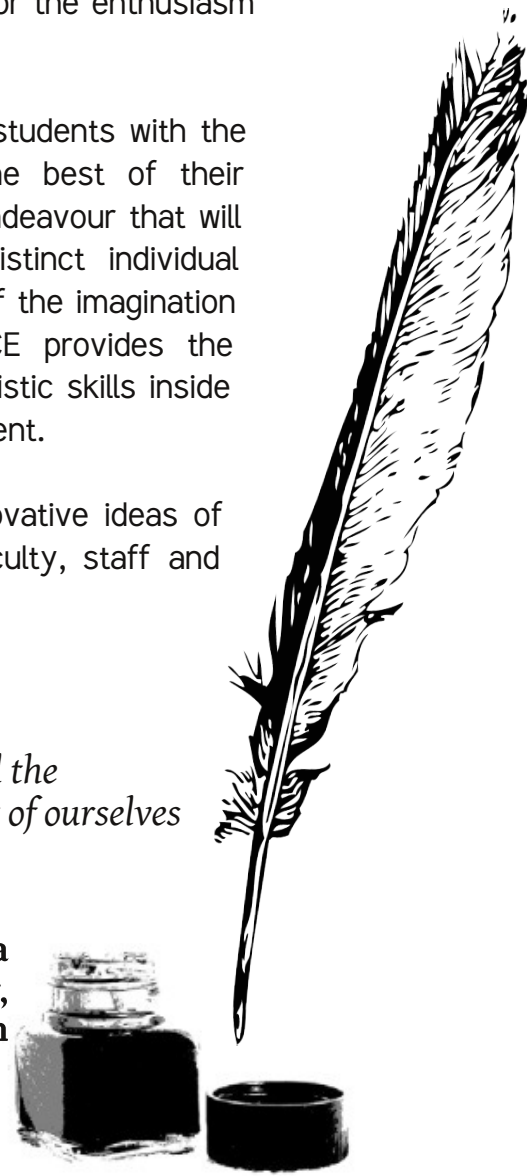
We at Amity University makes sure to develop the personalities of students with the knowledge of the world and ensure that everyone learns to the best of their capabilities. We not only focus on academics but also on creative endeavour that will bring out an array of artistic and scientific expressions with distinct individual signatures. AMISCIENCE, gives an insight into the range and scope of the imagination and creativity of our students and faculty members. AMISCIENCE provides the platform to the students of our university to unfold the colors of artistic skills inside oneself and give a chance to showcase an image of creativity and talent.

This magazine is a platform that exhibits the literary skills and innovative ideas of teachers and students. My considerable appreciation to all the faculty, staff and students for launching the first edition of the magazine.

I would like to conclude with a quote -

*"The price of success is hard work, dedication to the job at hand, and the determination that whether we win or lose, we have applied the best of ourselves to the task in hand."* - Vince Lombardi.

**- Prof. (Dr.) Balvinder Shukla  
Vice Chancellor,  
Amity University, Uttar Pradesh**





# Director



*AMISCIENCE, the newsletter, is a milestone that marks our growth, unfolds our imaginations, and give wings to our expressions.*



## Message from the Director's Desk

The Amity Institute of Applied Sciences (AIAS) is one of the premier Institutions of Amity University, Uttar Pradesh. The institute which had a humble beginning in 2008 with 8 students, today has more than 1000 students and around 85 faculty on roll. It has been created to promote and develop pure and applied sciences, undertake teaching, research and other development programmes in different areas, especially Physics, Chemistry, Mathematics and Statistics disciplines. From the inception, this Institute has planned its academic programmes, co-curricular and extra-curricular activities to inculcate skills, abilities and professional qualities to shape the budding youths into versatile scientists and promising innovators in their future career.

In Amity Institute of Applied Sciences, excellence begins with faculty members who inspire and challenge every student. AIAS faculty create an environment that encourages inquiry and rewards hard work. Students gain new insights by working with investigators on some of the most important but difficult questions of our time. AIAS continues to take dramatic steps forward, advancing the quality of research, education and engagement with the world.

Our achievements are made possible by the continued—and growing—involvement of students. Their support means the institute will continue to move forward and set new standards in research, teaching and engagement with the world. Through a robust relationship of classroom and experiential learning, our students develop a variety of skills that are foundational for virtually any profession. They gain the ability to think critically and independently, and they learn how to write, reason and communicate clearly. They develop a set of ethics, the ability to adapt and a desire for continued learning that will serve them well throughout their lives and careers.

AIAS is committed to developing students of high academic achievement, intellectual curiosity, and strong moral character. As a result, year after year, AIAS produces respectful, responsible, and compassionate young adults, who are well prepared to tackle the challenges that lay ahead.

Amiscience, the newsletter, is a milestone that marks our growth, unfolds our imaginations, and give wings to our expressions. It unleashes a wide spectrum of creative skills of our editorial team right from writing, editing and designing.

I congratulate all the members of editorial team for their sincere efforts and dedication which has resulted in publication of the first issue of Amiscience.



**- Prof. (Dr.) Sunita Rattan  
Director,  
Amity Institute of Applied Science,  
Amity University, Noida**



# Head of Departments



**Prof. (Dr.) Sangeeta Tiwari**  
Head of the Department,  
Chemistry



**Prof. (Dr.) R. S. Pandey**  
Head of the Department,  
Physics



**Dr. Prakriti Rai**  
Head of the Department,  
Mathematics



**Dr. Dheeraj Pawar**  
Head of the Department,  
Statistics



**Dr. Christine Jeyaseelan**  
Head of the Student Affairs,  
AIAS



# Editorial Team

Motivated, Engaged, Involved...

The Editorial Team of AIAS is proud to present the first volume of the AMISCIENCE E-Magazine. The Editorial Team had only one goal in mind and that is to engage the reader with the Happenings at Amity and the culture we have developed here at AIAS.



Riya Jain  
M.Sc. (AM)  
Student Editor



Aditya Sengupta  
B.Sc. (H) Physics  
Layout Artist



Aditya Mendiratta  
B.Sc. (H) Mathematics  
Layout Artist



Vikram Sharma  
B.Sc. (H) Physics  
Photographer



Eksha Guliani  
B.Sc. (H) Chemistry  
Student Editor



Anushka Khattar  
M.Sc. Statistics  
Student Editor



Dr. Sumit Kumar Bhatia  
Faculty Editor



Dr. Monika Bahl  
Faculty Editor



Dr. Jayanti T. Pandey  
Faculty Editor



# Acknowledgement

“ *Without Ambition one starts nothing. Without work one finishes nothing. The prize will not be send to you. You have to win it.* ”

The first edition of AMISCIENCE will walk you through the unexplored world of Science and its relation to varying fields like Chemistry, Physics, Mathematics and Statistics and its sub fields. The recreational elements of this magazine will enthrall you as you read along. Not only this, glimpses of the past year will surely bring sweet memories of the bond our institute shares.

We extend our heartfelt gratitude to our Head of Institution Prof. (Dr.) Sunita Rattan (Director, AIAS). We would also like to thank, Head, Department of Chemistry – Prof. (Dr.) Sangeeta Tiwari, Head, Department of Physics – Prof. (Dr.) R.S.Pandey, Head, Department of Mathematics – Dr.Prakriti Rai and Acting Head, Department Statistics – Dr.Dheeraj Pawar for providing us the support and guidance in successful launching of the magazine.

We would like to acknowledge and thank Dr. Christine Jeyaseelan (Head Student Affairs) and Dr. Vandani Verma for contributing a generous amount of time and efforts in making of the magazine. We would also like to thank Ms. Sreedevi, Ms. Nupur Singhal, Ms. Kanika Kumar, Ms. Beena Nair and Ms. Kavita for providing us with all the required details of the institute.

We would like to extend our sincere thanks to all the faculty and students who have contributed by writing wonderful and inspiring articles and research work.

**- Editorial Team**



## Overview

**A** **mity University, Noida** has India's first ISO certified Green University Campus, BSI certified and OHSAS (18001:2007) certified founded by Dr. Ashok K. Chauhan, located in Noida, Uttar Pradesh, India. It was established in 2005 by an Act of the State Legislature of Uttar Pradesh.

It is recognised by the University Grants Commission (UGC) under Section 22 of the UGC Act 1956 and accredited by the NAAC with grade 'A'. It is a member of the Association of Commonwealth Universities.

The campus is spread across 95 acres. Technology is evolving at a dizzying rate and our classrooms are designed to keep pace with it. The campus has Environmental Consciousness and Sustainability/Alternate Energy Initiatives such as Solar Power Plants and Rain Water harvesting techniques. The campus is differently abled friendly with physical facilities such as provision for lifts and Ramp/Rails.

**A** **mity Institute of Applied Science** was established under the aegis of Amity University Uttar Pradesh with a vision to be a center of excellence for physical and chemical sciences. The institute, ever since its inception,

continues to fulfill the dreams of our Honorable Founder President Dr. Atul Chauhan, that every student at Amity will be a Success story.

The excellent facilities at the Institute and the ardent support of the faculty and mentors at AIAS provides a pedestal for the students to flourish and fulfill their dreams as well as the vision of our Founder-President.

The philosophy behind the establishment is to promote in depth undergraduate and postgraduate education and conduct research in emerging fields of Applied Sciences that will be beneficial for the Nation and the World.

At AIAS, the goal is to create and maintain an environment that fosters the overall growth and development of students and budding researchers by focusing on the importance of values and ethics in our education.

*“Every student at Amity will be a Success Story.”*

-Dr. Ashok K. Chauhan

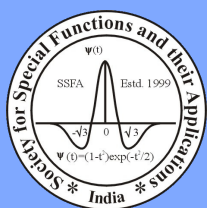




# Research & Innovation

In AIAS teaching and learning are integrated with state-of-the-art research wing nurturing both curiosity and creativity in an intellectually vibrant atmosphere of research. The faculty has a commitment to conducting research of high quality and practical value. Our research is underpinned by a strong set of values which give it a purpose and direction. Particular effort is directed towards the improvement of education with a central focus on teaching and learning, informed by principles of inclusiveness and social justice, and valuing the contribution of user groups, especially practitioners, in collaborative research partnerships. The research is facilitated by faculty, which has been very prolific in publishing books, articles and papers on topical issues in national and international journals. We have research collaboration with laboratories of Government of India (GOI) and many faculties are doing collaborative projects funded by GOI. Seminars and workshops are organized frequently with priority given to new interdisciplinary themes.

## Some of our Project Sponsors:

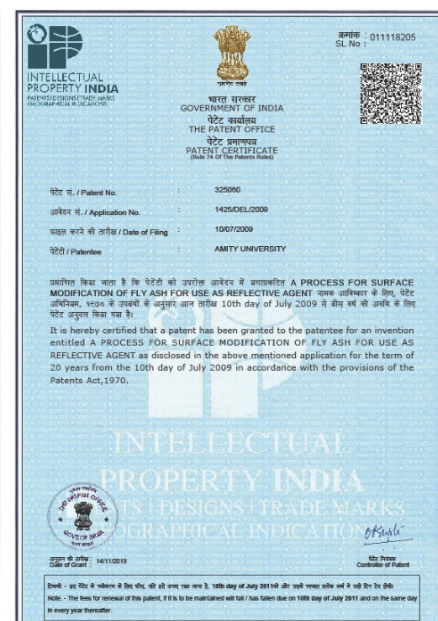
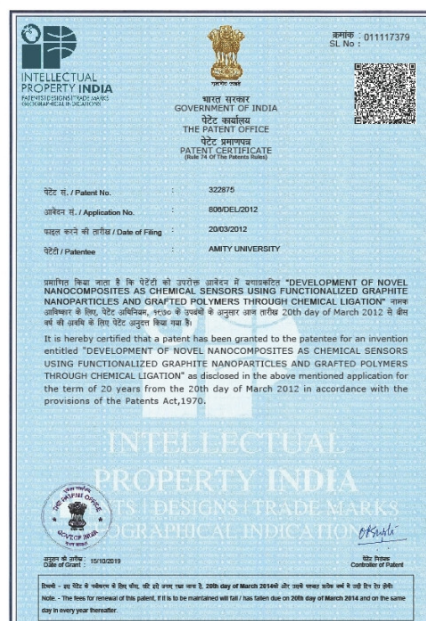


The faculty at AIAS has published a total of **367 Research Papers**, completed 13 Research projects, and filed **46 patents**. Moreover, a total of **38 books/chapters** have been published/edited and a number of **International Conferences** have been successfully organized and conducted by our faculty.

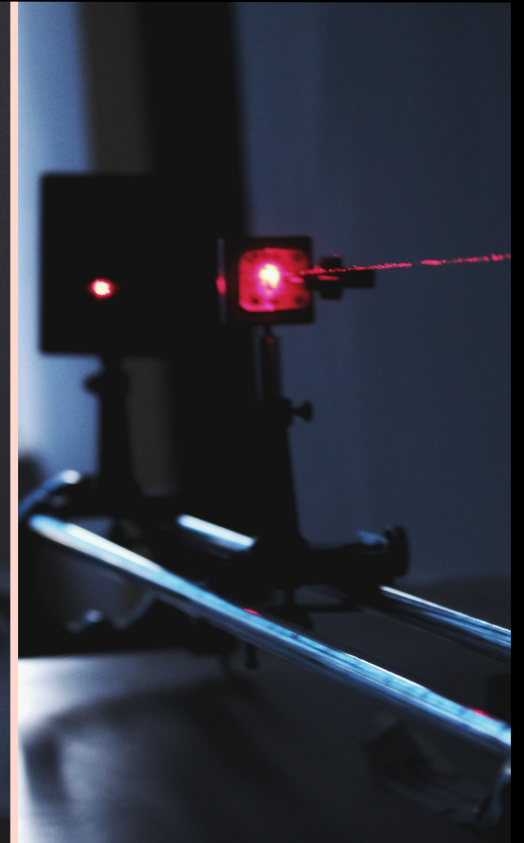
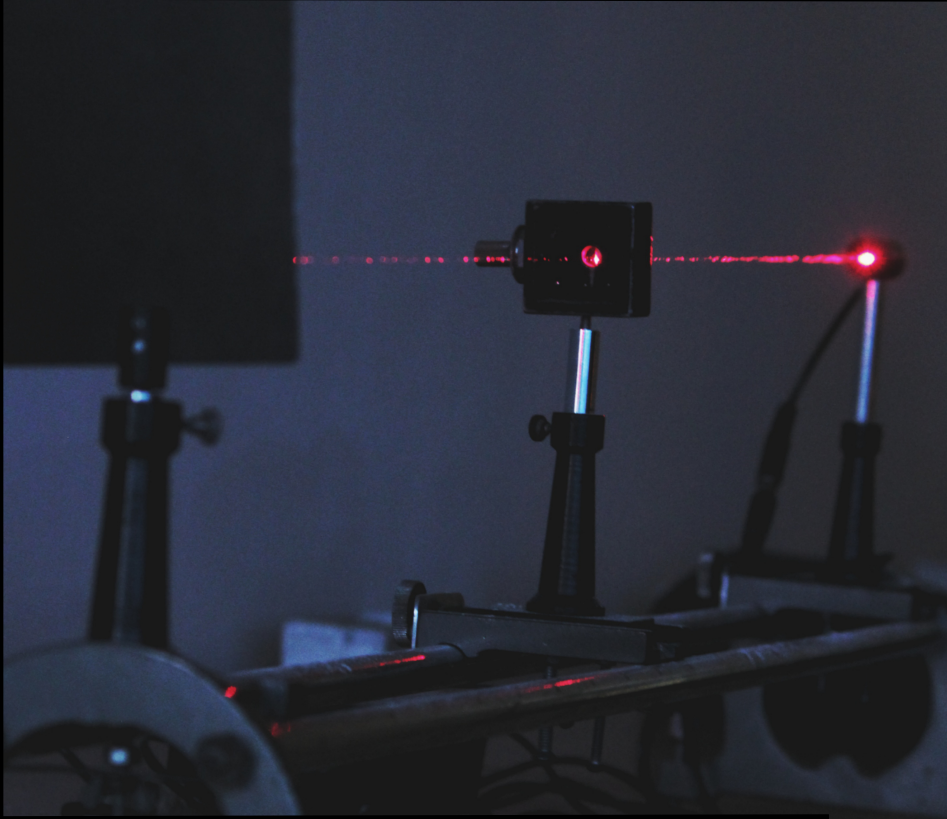
Our Faculty members are **currently engaged in 14 Research Projects** to the tune of **2 Crores** and the following **2 patents have been granted** with a few more in the pipeline.

1) Patent Number : 322875 :  
'Development Of Novel Nanocomposites As Chemical Sensors Using Functionalized Graphite Nanoparticles And Grafted Polymers Through Chemical Ligation'

2) Patent Number : 325060 :  
'A Process For Surface Modification Of Fly Ash For Use As Reflective Agent'





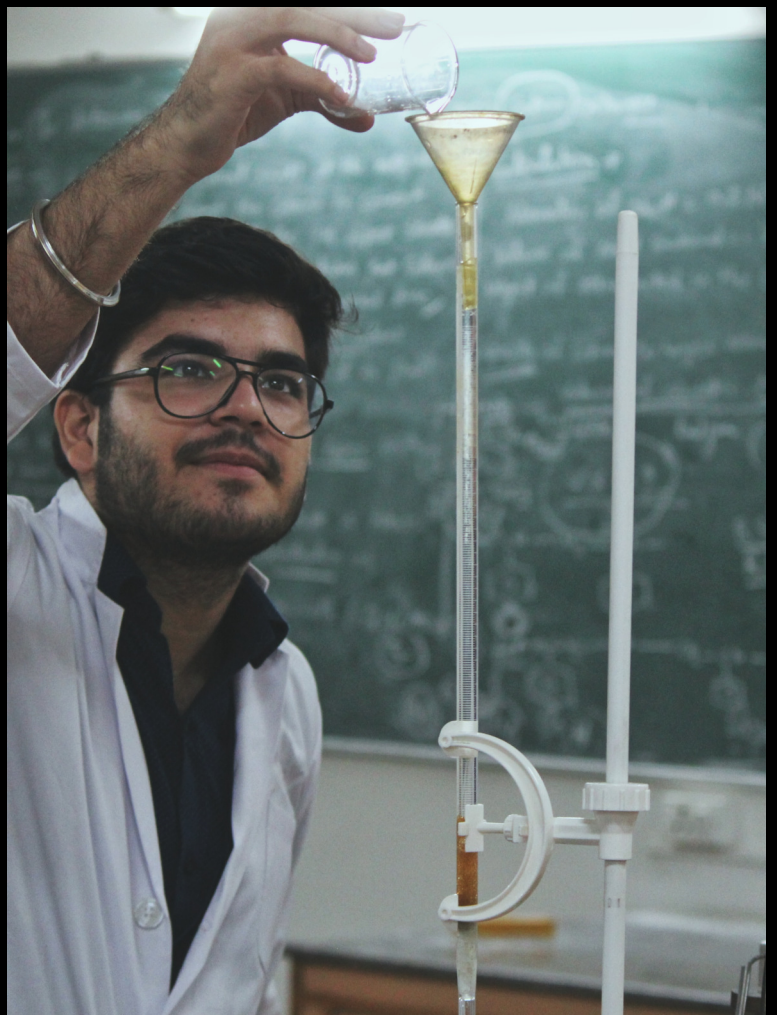


# Laboratories at AIAS

Performing experiments and testing out theoretical models is a crucial part of the scientific method and the labs at AIAS provide the students at AIAS the resources to discover the excitement of experimental science









# Alumni Around the World



**Durham  
University**

Students selected in  
Durham University for  
their Masters Programme



Bhavay Sarang Tyagi



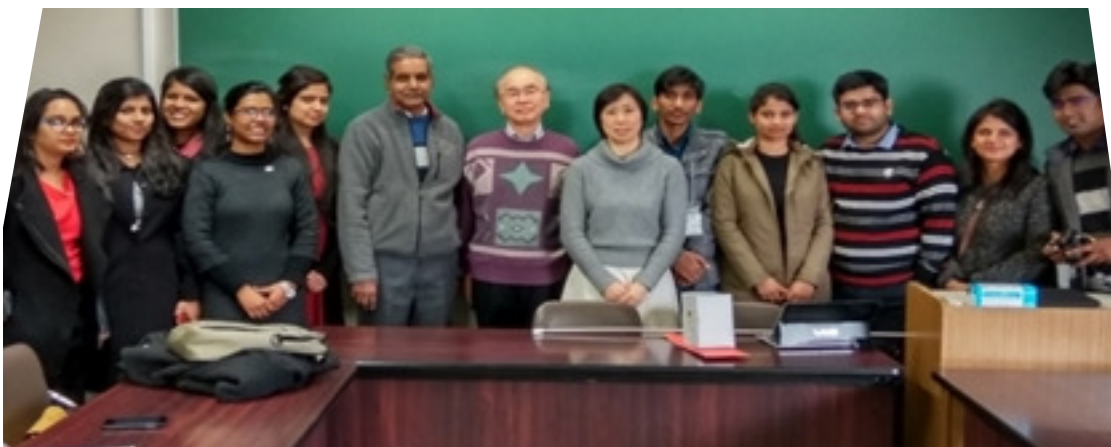
Prachi Garella



**University  
of Szeged**

Shashi Shekhar, Saurav  
Maiti and Abhimanyu  
Rampal

University of Szeged in May and  
June 2018 for their Summer  
Internship



1. Anoop Singh Rana, B.Sc. AP
2. Harshita Tripathi, B.Sc. AP
3. Kalyani, M.Sc. AP
4. Manas Ranjan Dash, M.Sc. AP
5. Tulika Sharma, M.Sc. AP
6. Priyanka Kumari, M.Sc. AC
7. Nishu Jain, M.Sc. AC
8. Neha Arora, M.Sc. AC
9. Jigyasa Jain, M.Sc. AC
10. Aman Bhatia, M.Sc. AC



**Jagiellonian  
University of  
Krakow**

**Fellowship from  
Jagiellonian  
University, Poland**



Sahil Upadhyay  
M.Sc. Applied Physics



Anjali Aggarwal  
M.Sc. Applied Physics



Udai Singh  
M.Sc. Applied Physics



Mahima Sachdeva  
(M.Sc. AP)

**Roy G Post Foundation  
Scholarship 2018 at  
the Graduate Student  
Level**





**KMU  
Taiwan**

**Short Term Research  
Internship (STRI) at  
KMU Taiwan**



**Safiya Nisar  
Ph.D. (Chemistry)  
Full Time Scholar**



**Sumita  
M.Sc. Applied Chemistry**



**Barkha Tyagi  
(M.Sc. AP)  
Internship at Mitsubishi  
Electronic Corporation,  
Advanced Technology  
R&D Centre, Japan**



**Nikita Sharma  
(M.Sc. AC)  
Ph.D. fellow at the  
University of Szeged,  
Hungary**

**Debdipto, B.Sc. (H) Physics [2016]**



University of Paris-Saclay with full fellowship carrying out research at IPN-CNRS (The French National Centre for Scientific Research, Institute of Nuclear Physics)

**Erasmus Mundus Fellowship**

In front of the large electron position collider detector (LEP) which his laboratory built for CERN in 1989



**Kamanashish  
M.Sc. (AC) 2016**  
Selected in PhD program (Research Scholar) EPFL Switzerland



**Nikita Sharma  
M.Sc. (AC) 2013**  
Ph.D. from University of Szeged with full stipend.



**Shikha Jain  
M.Sc. (AC) 2014**  
Assistant Director, Finance Dept. Govt. of Chattisgarh



**Payal Mazumdar  
M.Sc. (AC) 2012**  
at DESY-Germany funded by JNCASR, Bangalore

## ALL INDIA ASTEROID SEARCH CAMPAIGN



Khanak Bhargav and Prachi Garella of B.Sc. (H) Physics (Class of '18) participated in the All India Asteroid Search Campaign (AIASC). This is an annual project which is organised by

SPACE in collaboration with the International Astronomical Search Collaboration (IASC) and Panoramic Survey Telescope and Rapid Response System (Pan-STARRS) Hawaii, USA.





# Class of '19



## Master of Science

### Salvers and Citations

#### Best All Round Student

*Awarded to*

Ms Shubhi Madan (Applied Chemistry)

#### Baljit Shastri Award

*Awarded to*

Radhika Bansal (Applied Physics)

*And*

Ms Aditi Singh (Applied Mathematics)

*And*

Ms Arshi Gupta (Applied Chemistry)

#### Best Organizing Abilities

*Awarded to*

Ms Shivani Tyagi (Applied Mathematics)

*And*

Ms. Swapnil Gurrani (Applied Chemistry)

#### Best in Inter-Personal Skills and Team Spirit

*Awarded to*

Ms Akshita Chooramani (Applied Mathematics)

*And*

Ms. Bhawna Kumari (Applied Chemistry)

*And*

Ms. Swati Gaur (M. Stat.)

#### Best in Technical Innovation

*Awarded to*

Ashwani Bhat (Applied Physics)

*And*

Mr. Harshal Hans (M. Stat.)

#### Excellent in Knowledge Creation

*Awarded to*

V. Naren Kumar (Applied Physics)

### Co-Curricular Acitivity Awards

#### Cultural Activities

*Awarded to*

Ms Deeksha Singhal, Ms Prachi Tyagi (Applied Mathematics)

*And*

Mr. Yaman Shandilya, Ms. Kopal Shandilya (Applied Chemistry)

*And*

Mr. Vidit Grover, Ms. Vaidhervi Kansal (M. Stat.)

#### Sports Activities

*Awarded to*

Ashwani Bhat (Applied Physics)

*And*

Ms Kajal Goel, Ms Rupanshee Pasrija (Applied Mathematics)

*And*

Mr. Harshal Hans (M. Stat.)

#### Inter Institution Competitions

*Awarded to*

Mr Pankaj Attri, Mr Shobhit Sisodia (Applied Mathematics)

*And*

Mr. Tarun Kumar (M. Stat.)

#### Club Activities

*Awarded to*

Ms. Shalini (Applied Physics)

#### Placement Activities

*Awarded to*

Mr. Devansh Kaushik, Mr. Ashish Tathagat (Applied Physics)

*And*

Ms Ruhi Chauhan (Applied Mathematics)

*And*

Ms. Deeksha Khurana, Ms. Swapnil Gurrani (Applied Chemistry)



# Achievers



## Bachelor of Science

### Salvers and Citations

#### Baljit Shastri Award

*Awarded to*

Mr. Avi Jakhmola (Physics)

*And*

Mr. Saksham Gupta (Statistics)

#### Best Organizing Abilities

*Awarded to*

Ms Garima Jain (Mathematics)

*And*

Ms. Kanika Sharma (Chemistry)

#### Best in Leadership Quality

*Awarded to*

Ms. Aditi Saxena (Physics)

*And*

Mr. Hardeep Singh Chawla (Chemistry)

*And*

Mr. Kinley (Statistics)

#### Best in Personality Enhancement

*Awarded to*

Ms Ruchika Jaiswal (Mathematics)

### Best in Technical Innovation

*Awarded to*

Mr. Yash Agrawal (Physics)

*And*

Navdeep Singh (Chemistry)

### Best in Inter-Personal Skills and Team Spirit

*Awarded to*

Ms Warisha Abbasi (Mathematics)

### Co-Curricular Acitivity Awards

#### Cultural Activities

*Awarded to*

Ms. Priyamvada Sharma, Ms.  
Krishnendu Nair (Physics)

*And*

Ms Meghna Chakraborty (Mathematics)

*And*

Ms. Hanita Jain (Statistics)

#### Sports Activities

*Awarded to*

Mr. Mohit Issar, Ms. Nikita Parashar  
(Physics)

*And*

Mr Chirag Manuja (Mathematics)

*And*

Mr. Hardeep Singh Chawla (Chemistry)

*And*

Tripathi Ravi Rajesh (Statistics)

### Inter Institution Competitions

*Awarded to*

Mr. Saksham Gupta, Mr. Kinley  
(Statistics)

### Placement Activities

*Awarded to*

Ms Shazia Malik, Ms. Megha (Physics)

*And*

Ms. Deena A (Chemistry)

### Club Activities

*Awarded to*

Ms. Megha (Physics)

*And*

Ms. Deveena Bhalla (Statistics)



# Past Events

January 2018

National Students' Conclave and Seminar on Science, Technology and Innovation

February 2018

Lecture on "Dwarf galaxies" by Prof. Gerhard Hensler from the University of Vienna.

Lecture on "Rare Earth Photo-luminescence and Bio-imaging" by Dr. J Suresh Kumar from the University of Aveiro, Portugal

April 2018

Talk on "Manipulating atoms and a lot more in our own backyards" by Prof. Deshdeep Sahdev (Ex-IIT Kanpur), and CEO of Quazar Technology



1 Farewell batch of 2019

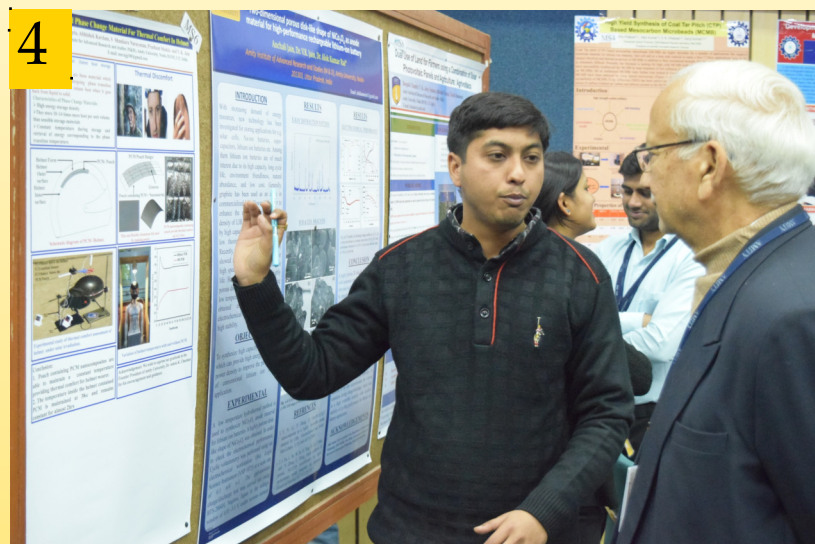
3 Guest Lecture at the International Conference on Recent Trends in Materials and Devices held at AIAS

4 Poster Presentation at the National Students' Conclave and Seminar on Science, Technology and Innovation.

5 Farewell batch of 2018



2 Director of AIAS, Dr. Sunita Rattan at the International Conference on Frontier Chemistry and Life Sciences



4



September 2018

December 2018

January 2019



Talk on "Problem Solving by Design Thinking- building "Creative Confidence to solve complex problems" to understand the five essential steps in Design Thinking

Guest Lecture on "Inventory Management Control" by Prof. Leopoldo Eduardo Cardenas, Professor at Tecnologico de Monterrey, Mexico

Scientific Activity of Research Group of Environmental Chemistry by Prof. Klara Hernadi, University of Szeged, Hungary

Guest Lecture on "Monte Carlo Simulation & Machine Learning" by Dr. D. Datta, Health Physics Division, BARC Bombay



6 Alumni Meet - The professors at AIAS meet up with our Alumni and share some nice memories



7 The professors at AIAS at the ICRTMD Conference along with the guest speakers.

8 MOU between the College of Life Sciences, KMU Taiwan and AIAS, Amity University

9 The students of Batch of 2018, excited before their Convocation Ceremony





# Club Activities

Departmental clubs focus on the academic discipline. These groups are led by students under the guidance of faculty members. They provide the opportunity to the students to express their creativity.



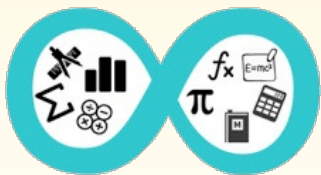
## *Kugelblitz*

The AIAS Physics Club

The AIAS Physics Club organised two events in the spring semester of 2019.

The first event titled "Philosophy and Science- Does philosophy still have a place in science age?" and the second, "A discussion on scientific temper- How do we approach science as a scientific community?"

The club 'Kugelblitz' always aspires to make physics fun and find new ways to learn outside the classroom.



## *Ins- $\pi$ -re*

The AIAS Mathematics Club

The AIAS Mathematics Club organised two events in the spring semester of 2019.

The first event titled "Funmatics" in which students participated in Mathematical Tambola and Crossword and the second, "Puzzle-O-Maths" to test the analytical skills of the students.

The club Ins $\pi$ re is constantly looking to innovate and find new ways to encourage students to learn maths.







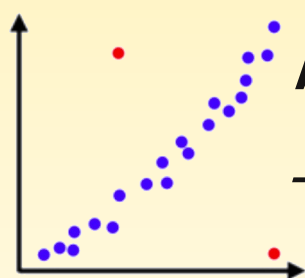
# Rasayan

The AIAS Chemistry Club

The AIAS Chemistry Club organised a Quiz in the spring semester of 2019.

The quiz consisted of variety of questions that provided sufficient knowledge to the new minds about central science.

The club 'Rasayan' aims to generate a sense of curiosity and the zeal to ask questions among students.



# The Outliers

The AIAS Statistics Club

The AIAS Statistics Club organised a Quiz in the spring semester of 2019 with the objective to enhance the knowledge of statistics and develop the interest of academic activity in the students.

The club 'The Outliers' like the name suggests is a group of unique individuals that have a desire to learn and succeed and think out of the box.



# Sutra

The AIAS Literary Club

The AIAS Literary Club organised a poetry event "Perception- Think, Create and Comprehend" in the spring semester of 2019.

The theme of the event was "Nature"

The club Rasayn aims to generate a sense of curiosity and the zeal to ask questions among students.

'Sutra' is a club that provides the students a platform to tap into their creativity and let their talent shine





# Amity Human Values Quarter

“ To inculcate and Nurture, Human Value and Passion for humanity



The students of AIAS along with Ms. Riju Chaudhary (Faculty Coordinator) at Central Park, Connaught Place, to understand the functioning of the Sankalp Humara NGO.

**H**uman values are the virtues that guide us to take into account the human element when we interact with other beings. It is with those human values that one becomes truly able to put into practice his/her ethical values. These are the values that permit us to live together in harmony and personally contribute to peace.



To commemorate the birthday of Dr (Mrs) Amita Chauhan, Chairperson-Amity International Schools, all the institutes of Amity University observe 'Amity Human Values

Quarter'. The aim of which is to inculcate and nurture human values and passion for humanity amongst the students.

This year 28th January 2019 marked the beginning of Amity Human Values Quarter with a panel discussion on 'Changing Dimensions of Value & Ethics in Contemporary Society' at the university level.

This was continued by various events and activities organised at the departmental level.

The students of Amity Institute of Applied



Sciences eagerly participated in this under the guidance and leadership of Ms Riju Chaudhary, the teacher coordinator for the AHVQ in AIAS. She appointed Jaison Thomas and Priyal Bhargava, both of B.Sc (H) Mathematics, as the student coordinators for the quarter. Students from Physics, Chemistry, Mathematics and Statistics equally participated in AHVQ.



volunteers visit these areas to share the gift of knowledge they possess. The volunteers focus on academics, arts, dance, moral values and sanitation and hygiene for the all-round development of the children.

During the 'Hygiene and Sanitation Drive' the children were shown videos on the importance of sanitation and hygiene. Praveen Shahani, the incharge of the sanitation drive, demonstrated the correct way of washing hands to the children. The children enthusiastically participated in the sanitation drive. The volunteers are regularly monitoring the children's hygiene and sanitation habits and will continue to do so, in order to make sure that they imbibe such habits in themselves. The volunteers assigned as the centre coordinators

Values Quarter volunteers in association with Sankalp Humara NGO are working in the slums of Delhi and Noida for the upliftment of the underprivileged children. On 31st January 2019, all the Amity Human Values Quarter volunteers chaperoned by Ms Riju Chaudhary went to the Central Park, Connaught Place, to understand the functioning of the NGO. Mr Somik Kalkal, the founder of Sankalp briefed them about the aim and motto of the NGO. Following the briefing, all the volunteers went to a nearby slum in Connaught Place to conduct a survey on the number of children residing there and their educational qualification.



are:  
 Mayur Vihar  
 Phase-I: Aashi Shrivastava  
 Sector- 44: Akash Kapoor  
 Sector- 126: Manish Sharma

Sanitation and Hygiene Incharge: Praveen Shahani

**The students of the Amity University are privileged to have the opportunity to improve their human values and simultaneously work for the betterment of our society.**

With a zeal to bring change surveys were conducted by the AIAS students in Mayur Vihar Phase-I, Sector- 44 Noida and Sector- 126 Noida. They were able to gather approximately thirty to forty children in each of these localities. On every Thursday and Saturday starting from the month of February the



*“A good deed is not just a duty, but above all, a privilege.”*

-Shari Arison



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Students'  
Articles  
&  
Poems

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# Mathematics and the History of Religion

We consider religion to be the place where a culture establishes a contact with the transcendent reality. Nevertheless, the objects of mathematics such as numbers or geometrical figures also transcend the physical world. This means mathematics is also based on transcendence of physical reality. We try to show that this common basis, namely the transcendence of physical world give rise to some common patterns in the development of religion and of mathematics. In my opinion religion creates the basic means and ways of transcendence which are used in the whole culture, including mathematics. So, the common patterns in the development of religion and mathematics are not accidental. They belong to the very nature of these objects.

Religion is mostly not paralleled with mathematics because a principle difference is evident at first sight and this complicates similar parallels. Religion is based on faith, which can rarely be justified by the believer who is often not even able to explain it. By contrast mathematics is knowledge justified on a rational basis which is strictly proved by deductions, the faith being thus irrelevant to its acceptance.

In spite of these differences there are certain points of contact between religion and mathematics. One of them is the Pythagorean School, which stands at the beginnings of what is currently named Mathematics. Pythagoras is the author of the term mathematics itself (it originally meant knowledge, teaching, science, art) with the meaning as used till today, namely as a detonation of arithmetic, geometry, and other exact disciplines together. Pythagoras was one to discover the idea of a proof. On the other hand, Pythagoras is also a great figure from the perspective of the development of religion. The character of Pythagorean School was that of a religious sect with strict moral regulations, believing in reincarnation and dealing with esoteric disciplines. Pythagoreanism is of course not only point of contact between mathematics and sacred. There is another teaching, where we can find relation between mathematics and religion, namely Kabbalah. Kabbalah is a Jewish doctrine seeking numbers hidden in the sacred Torah trying to uncover the concealed message of the Scripture by various mathematical calculations. Similarly, in some sacred literature of the ancient Indians, we can find different kinds of mathematical knowledge.

These examples open a possible route of investigating

relationship between mathematics and religion. This might be denoted as Hidden Mathematics, the mathematics that we find in sacred texts or sacred buildings. It is the mathematical knowledge concealed in the Torah, The Veda and the Koran or in the pyramids, temples and cathedrals.

The second route, which opens up for the investigation of the relationship between mathematics and religion, is the exploration of the process of mathematical creation. We approach here the very centre of mathematics, the milestones in its history. The parallel between mathematics and religion is in this case based on the fact that

many renowned mathematicians describe the process of mathematical creation as a contact with the mystery, a contact with something that transcends humanity. The point is to analyze such moments, when prominent mathematicians face the radical crossing of boundary of knowledge and when they face the mystery directly. Many of them, for example Albert Einstein, describe this moment as the moment of contact with higher harmony of the universe and often speak about this experience directly in the religious terminology. In his lecture on "Some tendencies in the development of Mathematics", Igor Shafarevitch, the outstanding Russian mathematician, pointed to the similar aspect in connection with the discovery of non-Euclidean geometry: "After Lobachevski and Bolayi laid the foundation of non-Euclidean geometry independently of one another, it became known that two other men, Gauss and Schweikart, also working independently, had both come to same results ten years before. One is overwhelmed by a curious feeling when one seems the same designs as if drawn by the single hand in the work done by four scientists quite independently of one another."

Shafarevitch did not speak about any marginal current of mathematics. He described one of the central events in the development of mathematics in the nineteenth century. He had showed that in the very centre of the main stream of mathematics, we face the phenomena which according to him points to the higher aim and deeper mission of mathematics.

~ Amrita Kumar  
M.Sc. Applied Mathematics  
2018-2020

"A supreme religious goal of the spiritual activity of mankind".



# The Recipe For Friendship

All of us have friends, no one wants to be left alone that too without a friend!!! Also some have a great number of friends, others have a small group of friends; but the best part is that we all have friends. Now friends are of various types and categories, isn't it? Some are our church friend, some are college and school fellas, others are our neighborhood buddies and so on and on. Wherever we may be we try to be close to our friends. Friends can be elder than you or even younger than you. So then what is really nbehind this sweet friendship recipe.....

Well I think the recipe lies on various factors and they are as follows:-

## RESONANCE

"Just as children are the mirror image of their parents, similarly we see our reflection in our friends." There is something common in them which attracts us. We make some people our friends because we feel some resemblance with them. May be their smile, their frolicsome nature, their frankness and it goes on ranging widely from people to people.

## FIREBRIGADE OF LIFE

Ups and Downs come in everyone's life or I should say 'everyone comes across a day when he/she has to face an eye of the storm'. Sometimes we ourselves overcome it but many a times we feel that somebody might have been there to support us. And that is when the fire brigadiers of our life come in to action. Our friends have always got some or the other idea for that particular problem. Well the best incident in life we all have come across is .....when we had to submit our school projects and suddenly we forgot to bring our project on that day then the fear that surmounts you has got no limitations and at that time friends used to say we also won't be giving our projects that day. Ah..AH..What a relief we used to find because someone was there with us to share our burden....But then late that afternoon we had to give them a treat....

## CRYPTEX OF LIFE

There are things which we can't open up to our family members or to our kin or even with our brothers and sisters but with friends there is nothing to hide. Our friends know us better than we know ourselves. And just like a cryptex is kept coded; friends keep our fears, our golden memories, our weaknesses and our strengths inside their hearts.

**"For Men may come and Men may go but I go on forever"**

the above lines are from the poem 'THE BROOK' OF Lord Alfred Tennyson".

## FRIENDS CAN NEVER BE FIENDS

Fiends means the one who is unfriend or precisely. I say it means an enemy, but when that long 'R' enters fiends with 'a great regard for someone else whom they love or prefer to be close to heart' then unknowingly that enemy becomes a dear friend to us. Though the writer describes about the river in this poem but I feel it to relate to the feeling of our friends. Though there are fights and quarrels in a good friendship but still our friends do care for us.

I believe that a good friendship always runs a long race even after death of that beloved friend because even the sands of time cannot overcome the power of love. But before concluding my words I would say choose your friends wisely because having good friends always benefits not only you or that person but also affects your surroundings. Because your parents have molded you with lot of pained efforts sacrificing their wills and wants for your dreams and for your successful life as I strongly say that...

**"Do not let your routes get deviated from righteousness; For one single time your foundation gets rooted in bad company; Your beautiful life nurtured in the garden of God will get uprooted."**

~ Jaison Thomas

B.Sc. (Hons.) Mathematics

2018-2021

**"A smile of a good friend is like a ray of sunshine that makes you happy even in times of darkness."**



# THE FUTURE OF FUNDAMENTAL PHYSICS

*“Nothing in life is to be feared, it is only to be understood.  
Now is the time to understand more, so that we may fear less.”*

Physics is the field of understanding the basic laws of nature. And in this journey early 20th century taught us about 2 principles quantum mechanics and relativity, the rest of the 20th century was concerned about the consequences of these laws and how they fit together to simulate everything around us. Some set of laws were found, which work in accordance with special relativity and quantum mechanics known as quantum field theories. Quantum field theories together with general relativity explain 99.9% of the phenomenon around us. The era of the 20th century ended with the discovery of the Higgs particle which was the last missing piece of the standard model of particle physics on 4th July 2012. So, the questions left for physicists of the 21st century are more structural in nature. All these questions could be summarised in two points:

1. There is a strong theoretical basis that space-time has to come from more primitive building blocks. The problem is famously known as space-time is doomed.
2. Why there is a big universe made up of big things.

These questions might not seem very profound at the time but let us explore the reasons why these questions arise in the first place. Let's start with the question which is nearer to home why the universe is big.

We have all heard of the famous uncertainty principle. Due to which even vacuum is an exciting place. This leads up to having enormous quantum mechanical disturbances at shorter and shorter distances. So, the contradiction arises why the universe is the same in all directions even with the presence of these fluctuations. And the more profound reason is that according to the current laws there is a large probability that these fluctuations should have curled up the universe into minuscule size. But that's not the case with our universe. Our universe is big. This could be explained by fine-tuning parameters of the universe like mass of the electron and gravitational force to 120th decimal place.

Which will be like seeing a pencil standing against its sharp tip which is possible but very unlikely. Now looking at the more ambitious question that why space-time is doomed, we need to understand how we explore shorter and shorter distances.

## Quantum Fluctuations

Well if we want to observe vacuum at shorter and shorter distances, we need to concentrate more and more energy in shorter and shorter areas. That's what these colliders like LHC do by smashing particles and taking snapshots of the vacuum. But with enough energy it may create pairs of particles and anti-particles (consequences of QFT and by famous ). Now to explore even shorter distances we concentrate more and more energy and at some time so much energy is concentrated in such a small region that we create a black hole. Which happens around the distance of cm famously known as plank length. So, what if we get frustrated and decided to explore even shorter distances by adding more energy, well we will simply create a bigger black hole.

## Large Hadron Collider

The history of physics suggests that when even in principle we cannot measure a concept. Then our concept is an approximation. The more popular reason for the dooming of space-time is when we put quantum mechanics and general relativity together for short distances the maths breaks down and gives all sorts of infinities in answer. Infinities don't exist physically. Which is a signal that space-time is doomed and something has to replace it.

Just a friendly remark to reduce misconceptions quantum mechanics and relativity could be combined together at long distances and the size of the universe could be accommodated by fine-tuning some parameters.

*~ Armaan Singh  
B.Sc. (Hons.) Physics  
2018-2021*



# MALALA YOUSAFZAI

"I am always looking for a new challenge. There are a lot of mountains to climb out there. When I run out of mountains, I'll build a new one" - **Sylvester Stallone**

Today, we live in an era of opportunities and a highly competitive world. Life is indeed a struggle and we need to brace up for it.

**Woodrow Wilson**, former US President once said, "The only use of an obstacle is to be overcome. All that an obstacle does with brave men is, not to frighten them, but to challenge them."

Not everything in life always goes according to the plan. One can face hardship and failures at any point in life. The brave, unspoken and unheard heroes are the ones who put their lives at stake for others and humanity when they could have easily moved on with their lives without facing any hard times, but as it is rightly said, "Cowards die many times in their life but the valiant never taste of death but once."

One such brave example is of my inspiration, my ideal **MALALA YOUSAFZAI**.

The girl had two options in her life, first to remain silent and wait to be killed and second, to speak up and then be killed. She chose the latter.

The girl's early childhood was one of happiness and peace. He loved learning and going to school and dreamt of being a doctor one day. While she was 10, the Taliban began to take over the region where she lived and banned girls from attending school.

Outraged and furious, she decided to write a blog about the same, '**Diary of a Pakistani Schoolgirl**'. Her blog had such an impact that it encouraged the government to fight back the Taliban and girls were now allowed to go back to school.

On October 9, 2012 a gunman shot her in the face when she was travelling home from school. But the girl had never learnt to give up! She survived!

And went on to become first Pashtoon, first Pakistani and the youngest person to receive Nobel Peace Prize along with an Indian (Kailash Satyarthi).

Her story needs to be told not because it is unique but because it is not.

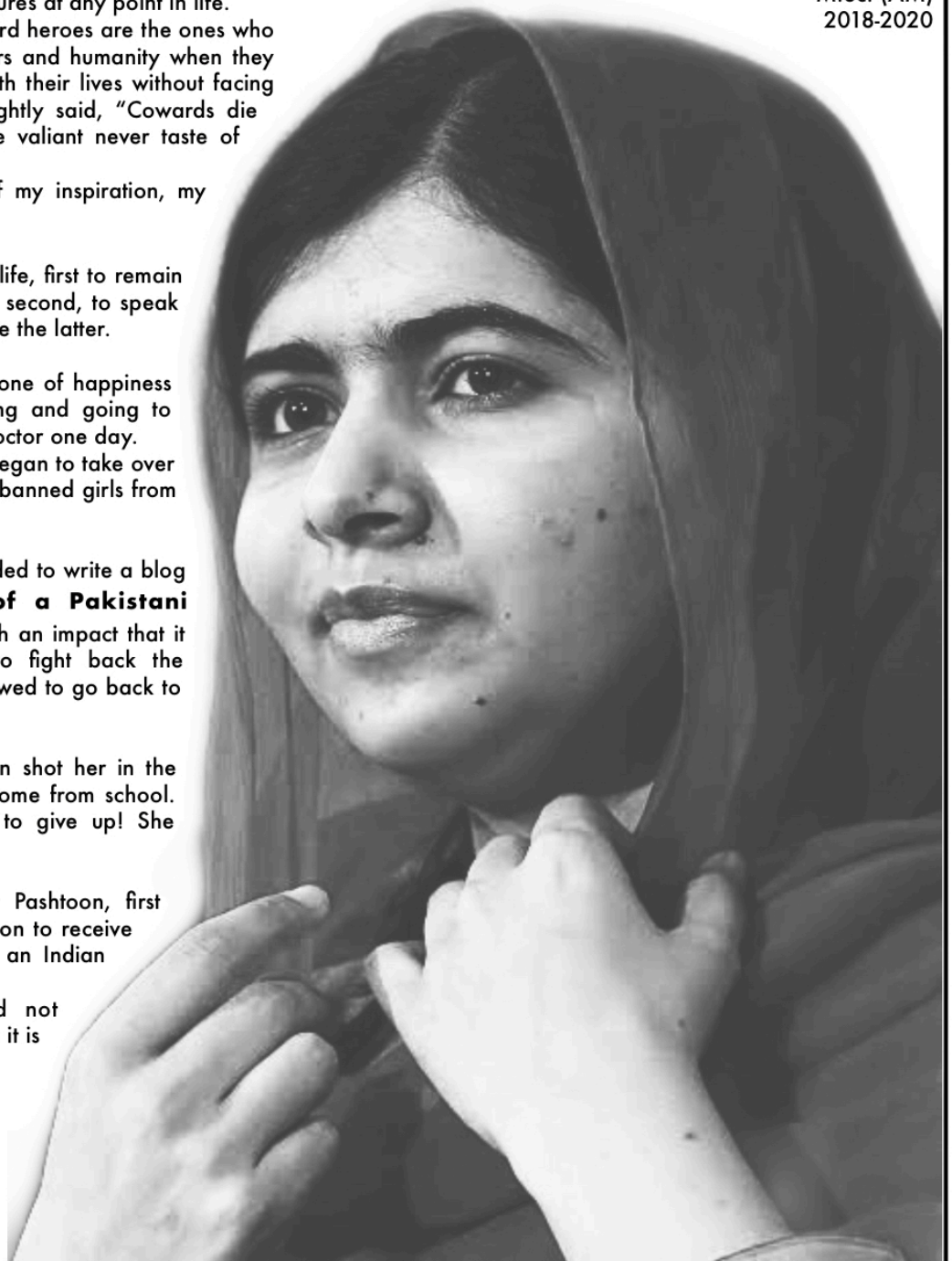
She claimed, "I had not met a single Prime Minister who would not send their children to school" and so world leaders should not be told how

important education is, they already know it! Instead, they should be told to take action for the children of their country so that they can also get education.

Malala's vision is that we become the 1st generation to decide to be the last to see empty classrooms, lost childhood and wasted potential.

Her tremendous courage and will power is something we all must look forward to imbibe in our lives and thus, even when life puts us down we must never give up and stand against all odds to fulfill our dreams.

~Kritika Kohli  
M.Sc. (AM)  
2018-2020



*"When the going gets tough, the tough gets the going."*

# THE EXCITING TECH BEHIND THE BLACK-HOLE CHIRP

Most of the Scientific Community is familiar with the cool Science behind the LIGO Hanford and Livingston discovery of the Black Hole merger in 2012. Albert Einstein discovered Gravitational-waves using the final formulation of the field equations of General Relativity in the year 1916, exactly 100 years before the LIGO experiment.

This is what most people already know but what very few people are aware of the sheer precision and brilliance that went behind the development of the equipment and the technology that were utilised during the experiment designed in the early 1970s. This precision was extraordinary indeed, but also incredibly necessary to measure something very, very small. At LIGO, they had the right idea, so by shooting LASERS (COOL!!), they were able to get an accuracy of 1 over 10000th of the diameter of a proton. It got them the Nobel Prize for physics and they fulfilled a dream Einstein saw a 100 years ago.

Well lets dive into the tech, In 1972, Rainer Weiss introduced the idea to use an Interferometer to detect Gravitational-waves. The idea was to pass a LASER beam through a beam-splitter down two 4km long tubes and at the end of each tube would be a mirror which would reflect these beams back. The beams would recombine due to the beam-splitter and detected at the photo-detector. If no Gravitational waves passed through the detector the recombination would be destructive in nature, but if a gravitational wave were to pass the Interferometer then it would stretch space in one direction and squeeze it in the other to produce variation in the length of the two arms that would change the interference of the two beams, thereby changing the data obtained at the Photo detector.

Another interesting characteristic was that although the power of the source LASER beam was only 20W, they were still able to get a higher output power because the LASER beam was trapped inside as a standing wave, thereby amplifying the laser to up to 100kW after about 300 bounces. Due to such a high power output, even a tiny speck of dust on the mirrors and in the tunnel could absorb or scatter enough heat to damage them. So ultra-high vacuum was generated in the interior of the 4km long arms. To reduce optical-phase fluctuations caused by Rayleigh scattering, the pressure in the 1.2-m diameter tubes (containing 3mm thick stainless steel arm-cavity beams) was maintained below  $1\mu\text{Pa}$ . The tube protected the arm from environmental damage.

To remove contaminants they utilised the resistance of the metal to turn the tubes into a heater (by passing electric current) and maintained the temperature at a 170 degrees centigrade for a Month!! and used vacuum tubes to remove the contaminants.

All that just for the arms, but what about the mirrors at the end of the arms. Well this is where a lot of COOL stuff occurred the mirrors had to keep stable and immune to

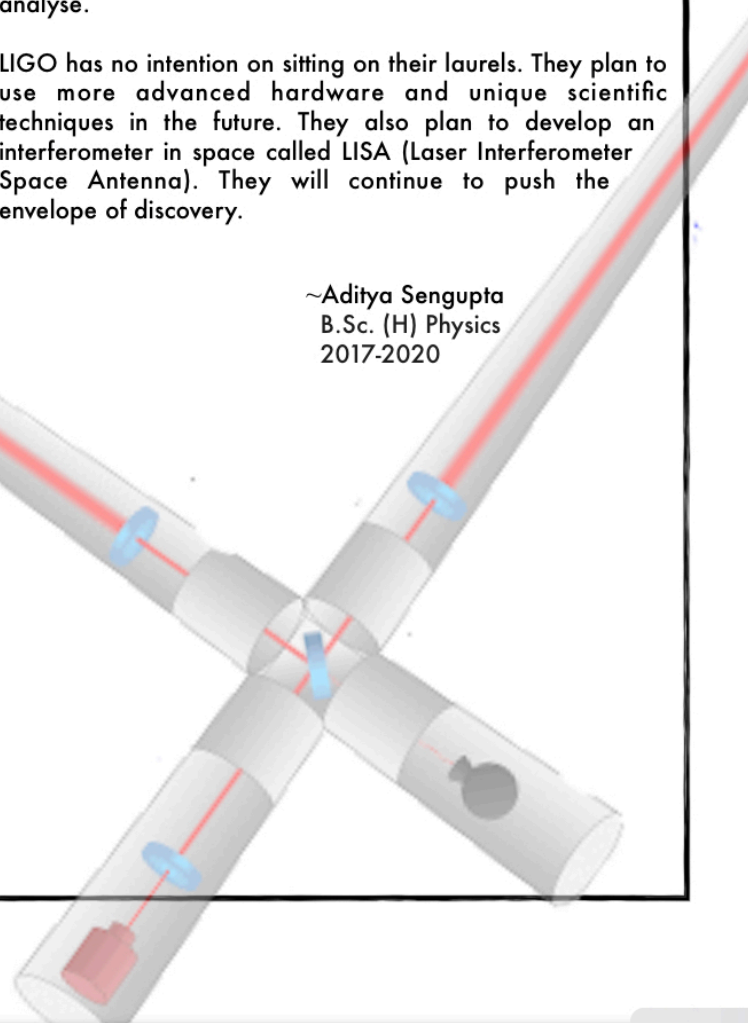
unnecessary vibrations. To reduce the high frequency vibrations the mirrors hung like a pendulum by steel wires (but now they use glass fibres). To reduce low frequency vibrations, the mirrors were mounted on springs at the lower base. Moreover the lower base was a 'Seismic Isolation Platform' that actively detected vibrations from the ground and used the information to manipulate voice coils and static electricity to cancel out the vibrations from the ground.

Moreover the Quantum noise (produced by the Heisenberg's Uncertainty Principle) was removed using squeezed states. Basically they were able to improve the accuracy of the phase measurements by applying a quantum squeeze on the amplitude measurements (which were less important for this experiment. The data generated at the detector was collected through 250,000 channels simultaneously. The most important part of the data collection process was the timing of the data. The processors in the data collection rooms (One near the photo-detector and one at each end of the arms) were synchronised with one another and the processing time was precisely known to calculate the time of the events in the interferometer. Moreover in both the LIGO - Hanford and Livingston were also synchronised with one another.

The Processing itself was a behemoth task. The data was processed in 1000s of processing cores, with 4TB of RAM, and close to 5 petabytes of data stored on SSDs. The data was copied from these server rooms to the Cal-tech servers and made available to physicists and students worldwide to analyse.

LIGO has no intention on sitting on their laurels. They plan to use more advanced hardware and unique scientific techniques in the future. They also plan to develop an interferometer in space called LISA (Laser Interferometer Space Antenna). They will continue to push the envelope of discovery.

~Aditya Sengupta  
B.Sc. (H) Physics  
2017-2020





# SHOULD I PURSUE A DEGREE IN ACTUARIAL SCIENCE OR STATISTICS?

If you have recently completed your high school and pursuing Actuarial Science, then you can easily relate to the above question.

The key skills required by both the courses are:

- Strong foundation in Mathematics
- Logical thinking and the ability to comprehend key facts
- Ability to interact with people from various fields
- Versatility in problem-solving

## Minimum Eligibility

Basically, students from Science background having Physics, Chemistry and Mathematics can pursue a Statistics degree, with a minimum of 50% marks (in aggregate) in high school examination. Students from Commerce or Arts background can also pursue a degree in Statistics, but that will depend on the institute providing graduation in Statistics. Whereas, the minimum eligibility for Actuarial Science degree is qualifying a high school examination with minimum of 60% in aggregate and minimum 70% in Mathematics.

## Study Requirements

To become an Actuary, one should be good at Mathematics, Statistics and possess good modelling skills. While pursuing a Statistics degree, you'll learn about programming, modelling and will acquire good analytical skills. Also, you'll learn to work with large data sets and use statistical tools in analysing data. So, if you pursue Actuarial Science with a Statistics degree, you'll get a lot of help as you'll be having a good modelling and analytical skills, which are some of the requirements of Actuarial Science. Whereas, during Actuarial Science degree, you'll learn basic concepts of Actuarial Science - economics, financial mathematics, risk management and analysis and many more along with some of the statistical concepts. Thus, in Statistics degree, you'll learn each topic of Statistics in deep as compared to Actuarial Science degree.

## Career Prospects

Career prospects are ever increasing in both the courses. The prospects of Actuarial Science are majorly in the Insurance sector in India, followed by consultancies. Being a graduate in Statistics, if in future, you think of switching from Actuarial Science, then you can work in industries like agriculture, computer science, health science, automobile, computer software companies and many more. In fact, one can also opt for finance, analytics and software development, to name a few. Whereas with a Statistics degree, you are not only restricted to the actuarial work, instead you can work as a statistician, business analyst, professor, data analyst, data scientist, consultant, risk analyst and many more. Also, if you pursue a Statistics degree, then you have to study actuarial subjects on your own. Whereas during your graduation in Actuarial Science, you get pertinent training for qualifying actuarial examinations.

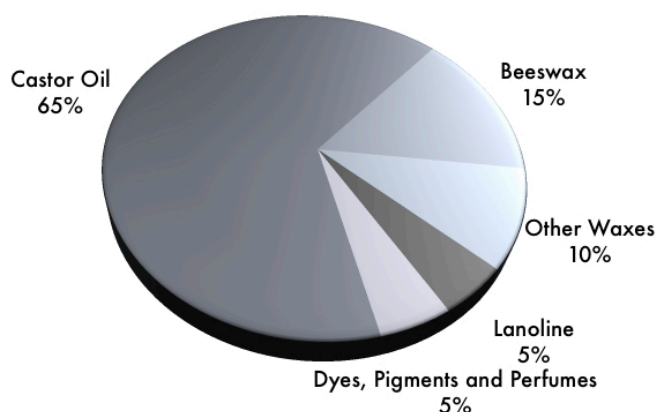
~Anushka Khattar  
M. Stat.  
2018-2020

# RED LIPSTICK

Do you know that Lipstick that makes you look gorgeous contains so many chemicals? Let's find it out.

Approximately 284 chemical compounds make up the beeswax. Waxes provide a particular structure to the lipstick. They must have a suitable melting point as it prevents them from melting even at high temperatures usually in summers.

Lipstick is one of the most commonly used cosmetic products - and a range of chemicals are required for its production. A single stick of lipstick will contain several hundred different chemical compounds, but there are a few substances and compounds whose inclusion is essential.



## Dye in red lipstick

Another common colour-imparting component is a compound called eosin.

This is a dye that actually subtly changes its colour when applied. In the lipstick, it is red, with a slightly blue tinge when it is applied, however, it reacts with the amine groups found in proteins in the skin, and this reaction causes its colour to intensify to become a deeper red.

Another benefit of this reaction is that it makes the dye indelible, or long-lasting.

## Chillies in lipstick?

Several other compounds can be added in small quantities to provide moisturising qualities, or to provide a pleasant fragrance that also masks the smells of the other compounds that make up the lipstick.

Interestingly, capsaicin compound in chillies which is largely responsible for spiciness can also sometimes be found in lipsticks. Its presence act as a minor skin irritant, which cause lip to appear plumper.

~Eksha Guliani  
B.Sc. (H) Chemistry  
2017-2020

# नज़्म - मां

दिन बीत गया, शाम अधूरी सी हैं..  
मां के खाने के बेगैर यह भूकक कुछ अधूरी सी हैं..  
काम-काज कुछ ज़रूरी सा है,  
पर घर जल्दी आने की एक हठ सी है,  
क्योंकि घर पर मेरी मा तन्हा अकेली सी है..  
दुनिया कुछ बुरी सी है, पर साथ मेरे मेरी प्यारी मा बुढ़ी सी है..  
उसकी नम आंखों में एक मंजूरी सी है..  
कि साथ मेरे हर कदम पर वो पूरी सी है..  
पास तो है, फिर नाजाने क्यों यह दूरी सी है?  
मैं दूर रहता हूं, शायद इसीलिए वोह रूठी सी है..  
दिन बीत गया, मगर ये शाम अधूरी सी हैं..  
बातों में उसकी एक जादू सा है  
मुझ बेकाबू पर उसका काबू सा है  
हुई थी जो अकेली अधेड़ उम्र में कभी  
शायद यही बच्चा उसका एकमात्र दिलासा सा है  
बेरंग जो हो उठी थी ज़िन्दगी जिसकी खुद  
मेरी ज़िन्दगी रंगों से उसने हमेशा भरी है  
वोह टूट चुकी है अर्सों पहले  
पर साथ खड़ी है डटकर मेरे  
अपनी खुशियां को दफन कर उसने  
पाला है गमो को मेरे  
मेरी आस से जुड़ी कड़ी है वोह  
मेरे भीतर छिपा हुआ विश्वास है वोह  
वोह कुछ दिन और है इस जाहा मैं संग मेरे  
खुशकिस्मत हु मैं शायद अच्छे होंगे पिछले जनम के कर्म मेरे  
हा, यह दिन बीत गया, पर कुछ शाम अधूरी सी है  
साथ उसके ज़िन्दगी यह मेरी पूरी सी है



## चिड़िया और इंसान

चिड़िया अरी ओ चिड़िया बड़ी समझदार है तू  
क्या तूने कभी सोचा कि जिन अंडे को तू  
दिन रात सेती है  
सहेजती है संभालती है  
इक दिन तेरा सहारा बनेंगे तेरे बुढ़ापे में तेरी सेवा करेंगे  
नहीं ना। हां! तू समझदार जो है।  
पर....  
ये इंसान है निरा पगला  
बच्चा गोद में आते ही हजारों सपने देखता है  
उस पर एक पैसा लगाते  
लाखों पाने की बात सोचता है।  
अरे....  
थोड़ी सीख तो ले तुझसे  
अंडे सेकर बच्चे पाकर उड़ना सिखाकर  
छोड़ देती है उन्हें अपनी दुनिया में  
कोई चिंता नहीं क्या होगा? तेरा या उनका?  
आसरे भगवान के चलना है सबको  
तू क्यूं आशा करता है इंसान

~Kajal Malhotra  
M.Sc. (AM) 2018-2019



# अलविदा कहना क्या इतना आसान है?

अलविदा कहना क्या इतना आसान है?

आगे बढ़ जाना क्या इतना सरल है?

वो बिताए जीवन के कुछ बेहतरीन चंद पल  
क्या फिर इन यादों के छोटे से जजीरे के इर्दगिर्द  
घुमा सकूँगा मैं अपनी नौका।

क्या फिर मुझे मिलेगा इन पहलुओं में डूब  
ऐसी जिंदगी जीने का मौका। जो सिखाया गया है मुझे  
यहाँ के तजुर्बेकार पंछियों द्वारा गगन में ऊँचा उड़ने का नायाब हुनर  
क्या उड़ सकूँगा उतने शिर्ष पर कि चमकूँगा बन के एक सितारा।  
पर वहाँ तक पहुँचने का सफर क्या इतना सरल होगा?

क्यों, अलविदा कहना क्या इतना आसान है?

आगे बढ़ जाना क्या इतना सरल है?

आज इस दहलीज़ को पार करते बकत मन मे एक अजीब सी दुविधा है।

जैसे तालीम लेने को छोड़ा था अपना घर

आज फिर इस गुरुशाला से निकल

क्या होगी ऐसी ही कोई दुनिया जो करेगी मेरा बखूबी स्वागत।

क्या फिर मिल सकेंगे मुझे ऐसे ही अपने

जो मेरी लिए कुछ भी करने को होंगे मुस्तैद।

क्या फिर कोई अपना कर लेगा मुझे मुठ्ठी में कैदा।

कि अब न जाओ हमारे इस अपने से घर को

छोड़ बाहर के बेज़ार हवाओं में, कही उड़ा न ले जाए तुम्हें हमसे कई दूर,

आगे खुशियों के होने का एक छलावा दे

तत्कालीन खुशियों को त्याग देने का दावा ठोका

क्या उन सब को एक पल के लिए थाम

बढ़ पाऊँगा मैं आगे उस वेग में बहने को? सच बताओ,

अलविदा कहना क्या इतना आसान है?

आगे बढ़ जाना क्या इतना सरल है?

~Kundan Sharma

M.Sc. (AM) 2018-2020





# *The Chameleon*

*Poured down the heavy rain,  
falling upon the lush greens  
A blessing in disguise  
But misery for another.*

*Deep inside the vast and appalling forest  
Stood a lone chameleon*

*Invisible to those, whose eyes only lay upon its apparent figure  
It had nestled there for ages*

*Waiting for someone who never knew it had even existed  
Cataclysmic for the little world*

*Days gone and Years passed by*

*But that lone chameleon stood there on the same spot*

*Changing its colour; adjusting in wilderness*

*A place not meant for the faint heart.*

*Because it trusted;*

*but never knew that trust is the mother of deceit*

*And perhaps will never know*

*~Pema Dendup*

*B. Stat. 2017-2020*

# *A planet called Maths*

*There is land, there is sun, there do exist ecological cycles  
And all creatures together have fun, just like any other planet*

*It ties to history and astrology, it ties to religion,*

*It ties to science and mythology.*

*Even the surface of planet maths consists of various landscapes,*

*There are planes, There are 3D mountains.*

*There is space, There is a sky,*

*Where numbers walk and lines fly.*

*Where  $y$  is the man &  $x$  is the woman.*

*Relationships between them are defined by operations,*

*Believe me, together they make amazing equations.*

*Sun is the energy giving sphere.*

*Water and air are fluid units of survival.*

*Functions play the role of ecological cycles,*

*and support the planet's survival.*

*You know even creatures if this planet like to travel.*

*Traffic converges if there is a red light,*

*Splits if people have different paths to take,*

*If LHS traveller meets the RHS destination,*

*then it's alright.*

*Otherwise, it definitely asks for a retake.*

*There are so many elements, still gravity holds them together.*

*You know why? Because they promise to*

*Add peace and harmony to their world,*

*Multiply happiness, subtract their woes,*

*divide moments of distress,*

*That makes the planet maths beautiful,*

*believe me, maths is just beautiful.*

*~Palak Mig*

*M.Sc (AM) 2017-2019*





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