# Science First

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"An insight to current Science and Technology."


## From the Editor

*As a species, we are blessed with the abilities to read, listen and sense; to think,comprehend; and to express our thoughts and emotions. These primary, but critical abilities have helped us to learn, to articulate, to pass and to build on the knowledge and wisdom that we have acquired from generations to generations.*

*We are glad to relaunch the FIRST newsletter series! This initiative aims to provide a platform for exchange of ideas and know how. We believe that such an exchange will spark new ideas and will help us all to embark on initiatives which can make positive changes in the world that we live in. FIRST and its newsletter are open to all curious and passionate minds who would like to discover and harness the power of science and technology for the betterment of fellow beings.*

*In this issue of the newsletter, we are delighted to bring to you an excellent article on the History of Light written by Dr. Samlan C.T, an expert in the field of physics and optics. In another well written feature, Mr. Abi Afthab, a Master's graduate in Energy and Environmental Management in Germany, shares his experiences and know how on pursuing higher studies in Germany, this is a must read for anyone who wishes to come to Germany for higher studies. Dr. Muhsin, an expert in the area of physics and atmospheric processes, invites our attention to a scientific assessment of the future of earth in the warming climate scenario. A topic which is undoubtedly relevant for each and everyone of us. We would also like to use this "newsletter" space to share with you a few recent activities of FIRST.*

*I would like to thank the authors for their contributions to the newsletter, for taking the time and effort to bring out these thought provoking and useful articles. I would also like to thank Dr. Najath and Mr. Basiludheen Azad for their efforts in composing this newsletter in a nice and appealing layout.*

*We hope that you will enjoy and benefit from this read and will support us wholeheartedly in this journey for a better world!!*

Eng. Haneef Mohamed
President,
FIRST Working Committee.

**About FIRST**:

FIRST, at the moment, focuses on empowering students and young professionals in the domain of science, medicine and technology to excel in their studies, research and career through interactions with scientists and professionals who have already walked the way. To facilitate this, we conduct meet-ups, webinars, workshops and one to one mentoring sessions. Our global network of researchers and professionals enable us to offer these services to the needy. We have also taken a few baby steps to find solutions for some of the challenges that life and environment faces now.

To know more about FIRST please feel free to visit our website www.first.org.in or email us at info@first.org.in.

We would like to invite you to join and support this noble cause, for your own personal growth and also for the benefit of the world and its inhabitants.

## The Light Science: A Brief Historic Note

Modern scientific studies on light have its origin during the Islamic golden age of civilization, exemplified in the works of *Abu Ali al-Hassan ibn al-Haytham* (later Latinized to *Alhazen*), born in Basra, Iraq in AD 965. His greatest work, the seven-volume *Kitāb al-Manāẓir* (The Book of Optics) of 1015 revolutionized the understanding of vision, based on the Greek theories such as the intromission and extramission theories, respectively proposed by Epicurus (BC 3rd century) and Empedocles (BC 5th century). The extramission theory was 'polished' by Plato, his student Aristotle (BC 4th century), Euclid (BC 3rd century) who added necessary mathematical basis and Ptolemy (AD 2nd century) who improvised the theory with the law of reflection in his book Optics. After that, there was no significant development until the Islamic civilization flourished during 8th to 13th century, and *Al-Kindi* and *Hunayn ibn Ishaq* (9th century) who combined the extramission and intromission theories.

It took a few more centuries to establish the modern theory of vision by *Ibn al-Haytham* (presented in the first three volumes of his *Kitāb al-Manāẓir*), where he had highlighted several scientific methods to investigate the phenomenon. This enabled acquiring of new knowledge and improving previous knowledge based on reproducible experiments. He had realized early on that there is no vision unless there is light around: either from an object that emits light or from an object that reflects light, and so the nature of light need to be explored first to understand the phenomenon of vision. For which he made a pinhole camera called "*Albeit Almuzlim*" (Latin translation: *camera obscura*) and experimentally proved the basic properties of light such as rectilinear propagation, reflection from flat and curved mirrors, and refraction. He also followed the mathematics, in particular, geometry and implanted 'Optics' in the framework of Physics and Mathematics from a philosophical shell. From further investigation on the physiology of eye using dissection and from the previous knowledge such as the law of refraction by *Ibn Sahl* (10th century), he was able to correctly explain how light from the object is focused and imaged on the back of the eye (retina). *Ibn al-Haytham* uniquely created the new theory of vision using Physics, Mathematics, and Physiology, where his investigations are not only based on abstract theories, but on systematic and repeatable experiments. In short, with his book *Kitāb al-Manāẓir*, he reformed Optics and established experiments as the norm of proof.

However, the *Kitāb al-Manāẓir* was largely ignored until *Kamāl al-Dīn al-Fārisī* (12th century), who critically analysed, popularized and commented extensively in his book *Kitāb Tanqīh al-Manāẓir* (The Revision of the Optics) where many *Ibn al-Haytham*'s theories were improvised. In late 12th century, the first translation of *Kitāb al-Manāẓir* appeared in Latin under the title of *De Aspectibus*, which missed several important opening chapters. However, the Latin version of *Kitāb al-Manāẓir* lighted Europe from its dark ages, through *Opus Majus* and *Perspectiva* respectively authored by Roger Bacon (1267) and his Polish contemporary Witelo, who considered as the originators of early European renaissance in the 13th century. *Kitāb al-Manāẓir* also influenced many other great minds like Leonardo da Vinci, Johannes Kepler, René Descartes, Willebrord Snellius, and Christiaan Huygens during the European Renaissance and the scientific revolution across the disciplines from the theory of vision and optics to the physical nature of perspective in medieval art for more than 600 years.

Optics had been greatly revolutionized during the European scientific revolution in the 17th century. It was Kepler who initiated the 'second revolution' of optics in his work 'The Optical Part of Astronomy' of 1604. He described the light reflection from the flat and curved mirror, principles of *camera obscura*, and functions of pupil, cornea and retina. Then, in 1621 Snellius rediscovered the law of refraction, and in 1637 René Descartes published three essays on meteorology, geometry and optics, alongside his *Discours de la méthode* (with its remarkable quote, "I think. Therefore I am"). He described the light as a pressure variation which instantaneously propagates through an elastic medium, and attributed the colours to different velocities, while Fermat introduced the principle of least time in 1662. Robert Hooke triggered the wave theory of light in 1665, who considered light as a longitudinal wave propagating in a homogeneous medium. He studied the presence of light at geometrical shadows, the diffraction effect, refraction and interference in thin films. Meanwhile, Rasmus Bartholin discovered the double refraction of light by Iceland spar, (popularly known as calcite) in 1669, the first-ever anticipation of light's polarization degree of freedom. However, he was unable to explain the remarkable phenomenon due to the lack of strong wave theory of light. Subsequently, Christiaan Huygens developed the well-known wavelet theory of light in his *Traité de la lumière* of 1690. He treated light as longitudinal waves in an elastic medium by considering the envelope of secondary wavelets, from which he derived a simple and convincing explanation of reflection, refraction and double refraction from spherically and ellipsoidally shaped wavelets.

However, Huygens' work did not explain the notion of colour, and it was Isaac Newton who recognized that colour should correspond to the mass or velocity of the light particles (corpuscles) and explained it in his *Opticks* of 1704 along with the dispersion effect of light. He explored the spectrum of colours in white light using a prism, and invented the reflecting telescope to bypass the chromatic aberration of light from the refractive lenses. He rejected the wave theory

of light, and his corpuscular theory was dominated for rest of the eighteenth century.

The 19th century started with one of the ever most beautiful experiments in physics: the two-slit experiment (1801) by Thomas Young, which proved the transverse wave nature of light by introducing the principle of interference, and challenged the particle nature of light. Young could explain Newton's rings along with the determination of light's wavelengths theoretically. Louis Malus' discovery of polarization due to reflection in 1809 further supports the wave theory of light, and it took a couple of decades again to establish the traverse nature of light until Augustin Fresnel's precise calculation on wave theory of diffraction, interference, polarization in 1821. Exact formulas were derived, not only for the reflection and the refraction of light, but also for the propagation in anisotropic crystals. Fresnel's contemporary Joseph von Fraunhofer, who investigated the diffraction at optical gratings further strengthened the wave theory of light. However, the discovery of magneto-optic effect in 1845 by Michael Faraday anticipated the electromagnetic (EM) nature of light, and his other experiments lead to the fundamental equations of electro-dynamics derived by James C. Maxwell in 1865. Maxwell's calculations showed the electromagnetic nature of light and its free space propagation with exact velocity of light. The experiments of Heinrich Hertz on EM waves in 1888 verified Maxwell's predictions, but more importantly, he also observed unusual electric sparks when an ultraviolet light illuminates the electrodes- the photoelectric effect, the first ever anticipation of quantum nature of light.

The 20th century optics advanced with the groundbreaking hypothesis of Planck: the quantum nature of light. He was explaining the spectral energy distribution of a black body radiation, and made the revolutionary statement in December 1900, "light was emitted and absorbed in discrete packets of energy - quanta", and subsequently, Einstein appropriated the concept of energy quantization into the unexplained photoelectric effect in 1905. However, the word 'photon' was introduced only in 1926 by a chemist Gilbert Lewis. Further expansion of the theoretical formalism on light's energy and momentum (John Henry Poynting-1884 and others), and phase and polarization (Pancharatnam-1956 and others) as well as the rapid developments on diffractive optics and holography (Dennis Gabor-1947), the discovery of laser (Maiman- 1960) and the development of non-linear and metamaterials lead to a gigantic revolution of Optics during the 21st century.

[1] R Rashed, "A Polymath in the 10th Century", Science 297, pp773-773 (2002)
[2] J. Al-Khalili. "Pathfinders: the golden age of Arabic science", Penguin Books, UK (2010)
[3] J. Al-Khalili, "Advances in optics in the medieval Islamic world", Contemp. Phys. 56, pp109-122 (2015)
[4] J. Al-Khalili, "In retrospect: book of optics", Nature 518, pp164-165 (2015)

*About the Author:*

**Dr. Samlan C T** received the BSc Physics at MAMO College Mukkam, Kozhikode, and the MSc and PhD degrees from University of Hyderabad in Physics and Optics respectively. Presently he is a Post doctoral fellow at the University of Electro-Communications, Tokyo. He won the Marie-Curie individual fellowship, and will be moving to The university of Bordeaux, France in the beginning of 2020

## Higher Education in Germany

I am a master's student in Germany and following is an account on higher education in Germany. The opinions expressed here are majorly based on my experiences in Germany. However, some information has been taken from relevant websites and YouTube channels on higher education in Germany. The information provided here are more inclined towards undertaking a master's degree in Germany. I have also included some information on pursuing bachelor's degree.

Known for its excellent quality and outstanding reputation, German education is one of the most popular destinations for higher education across the globe. All the three degrees from Germany - bachelor's, master's and doctoral, are highly recognized worldwide. Mostly international students come for doing engineering courses in Germany. Law, economics, social sciences, medicine, pharmacy, physics, and chemistry are some other popular fields of study. In my opin-

ion, studying in Germany has following major advantages:

• Personally, the most attractive aspect of studying in Germany is that the majority of the German Universities do not charge tuition fees. Students only need to pay a meagre amount of 100-500 Euro per semester as a semester fee, which will also include the expenses of the local commuting in and around the University City.

• Although the students have to bear the living expenses on their own, there are numerous part-time job (or mini-job) opportunities for students. Part-time jobs could be university jobs, restaurant jobs, and packing jobs. However, this list is not exhaustive. In big cities, there are opportunities to work in companies as 'Working Student (Werk Student)' in the students' areas of study itself. As per the student's visa, students are allowed to work a maximum of 20 hours a week. From my experience, working 2 or 3 days a week and during vacations can easily cover the living expenses in Germany (this also depends on the city). It is important to remember though that the tax would be levied if the income exceeds 450 Euros per month. So, it is better to plan your mini-jobs accordingly.

• Education in Germany opens several job opportunities for the students, not only in Germany, but also in entire Europe. Students who wish to pursue doctoral studies after master's degree have several opportunities in universities and research organizations across Europe. PhDs offered by most of the research organizations and universities usually provide a decent monthly salary (1000-2500 Euro per month). However, the salary has to be always confirmed with the respective organizations. Also, the salaried PhD positions will demand you to work on a predetermined topic which is decided by these organizations. You can also do a PhD at a university on a topic decided by you after discussing with a professor who accepts to be your supervisor. In this case, you will have to find funding for yourself by applying for scholarships from various funding organizations. Also, while pursuing PhD in a University, you have the opportunity to earn additional income by doing teaching assistant jobs.

• After master's degree, Germany allows the students to stay 18 months after their completion of studies with a job seeker visa. During this time of permanent job search, students are also allowed to do part-time job by which they can cover their living expenses. It is important to convert your existing student visa within two months of defending your thesis to avoid any further problems with the immigration office.

• Bachelor's degree in Germany gives lot of importance to practical knowledge as well. Students are mandated to do practical internships during the course and they are also encouraged to do several internships in addition to the mandatory internships. Therefore, the courses are flexible with their duration and students can take more than 4 years to complete the degree.

• Studying in Germany gives the students opportunities to travel across Europe. The students can travel to other Schengen countries using their German residence permit.

• Many master's courses allow the students to finish their course with an extended period. This means a student could finish a 2-year course within 4 years. Usually, students take breaks during their studies for doing internships, studying German language or earning some income by working part-time.

• There are a few courses which offers complete or partial scholarship to the students. Website of DAAD should be visited to find more details on such courses in Germany. Also, there are opportunities for other scholarships which are usually mentioned in the university websites.

Having said about the advantages, the following aspects have to be kept in mind before coming to Germany and while staying in Germany.

• Although there is no tuition fee in most of the universities, it is mandatory for every student to keep a certain sum of money in their blocked bank account. A blocked bank account means a German bank account with a certain monthly cap on withdrawal. This is to ensure that students do not live in Germany without sufficient money to meet their living expenses. This money will not be used by anyone else other than the student. From my experience, the expenses will vary according to cities. Since I am in a small city (Flensburg) in Germany, I have a maximum expense of 500 to 550 Euro per month including my accommodation and health insurance. However, living in an expensive city like Münich would need an expense of more than 800 Euro per month.

• The student needs to maintain blocked account money even when he or she is applying for a job seeker visa after the studies. If the student has a salaried internship which could pay a certain amount, then only remaining amount need to be shown in the blocked account.

• In order to obtain a job in Germany, learning German is very important. Although most of the international students enroll in English courses which do not have a requirement to learn German, the German job market is a bit hard to crack without German knowledge. This does not mean that there are no jobs without German requirement. However, it is highly recommended to learn German up to a certain level (at least till A2 or B1 level) before joining the course. Knowing some German while arriving in Germany will help to read signboards and to make small conversations with locals and shop keepers. Further German learning could be pursued after reaching Germany. The studies in Germany are usually bit time consuming, which may make it difficult to find time to focus on German language. From my experiences, it is very easy to avoid speaking German in the university because most of the students speak English. Therefore, one should be more proactive to learn German by voluntarily practising the language with native German speakers. There is a program called 'Tandem Partner' in German Universities. Under this program, you could find a tandem partner who needs to learn a language from you (usually your mother tongue or it could be some other languages you know very well) and he/she is willing to teach German language to you. Students could make use of these kind of opportunities to improve their German language.

• Most of the bachelor's degree courses in Germany are in taught in German language. Therefore, knowing German language is mandatory to enroll in the pro-

gram. The procedure for joining a bachelor's degree course will be explained later in this article.

### How to find a course and how to apply

Now let's discuss how to find a suitable course to study and how to apply for a course. The DAAD website (https://www.daad.de/en/) is sufficient to get detailed information about all the courses in Germany. Therefore, if you have time and energy, it could be easily done on your own instead of paying a consultant to find courses for you. Also, the admissions in German universities are purely based on merit. Therefore, any consultant organizations cannot buy admissions for you. DAAD website will also lists the basic requirements in order to apply for each course. It is important to mention that each course in a university has different requirements and deadlines.

### Master's Degree

For a master's degree course, usually, the documents required by German universities are motivation letter (also known as statement of purpose or SOP), an academic resume, previous study transcripts, English language certificate (TOEFL, IELTS and Cambridge Language Certificates) and finally the reference letters from previous employers or lecturers. Except a few universities (such as RWTH Aachen or TU München), most of the universities do not require GRE for admissions.

I have experienced that the universities give more importance to the grades of the previous studies. Previous research and work experience is also taken into consideration. In my opinion, German universities give more importance to the grades than the motivation letter or statement of purpose (SOP). However, a very good motivation letter is also important to secure an admission. A motivation letter should at least state why you need to do the course, what motivates you to apply for it, what are the relevant previous experiences, why are you particularly interested to do this course and your future plans after completion of the studies.

The required documents are usually asked to be sent by post to the university. However, the DAAD website or the university website should be looked at for the course-specific requirements. The mode of application varies among different universities.

### Bachelor's Degree

The procedure for doing bachelors is a little different from that of master's degree. Since the majority of the bachelor degree courses are in German, a student has to learn a certain level of German as a pre-requisite for the course. Then, the student has to apply for a bachelor's degree by going to the website of the universities. Refer to the university and DAAD websites for the German language requirements.

The student will be admitted based on the previous school records. However, the university will mandate the student to do a one-year 'Studienkolleg' course before joining the course. This is because the school studies in India is of 12 years duration and that of Germany is 13 years. This course will teach technical German and mathematics for 1 year. The student can come to Germany with the bachelor degree offer from the university. Then, the student can start doing the 'Studienkolleg' course in Germany. Also, the student has to pass an exam called 'Aufnamerprüfung' which is basically an exam of German and Maths before starting the bachelor's degree. This exam could be taken while doing the 'Studienkolleg' course.

The student could avoid doing a 'Studienkolleg' course (not the Aufnamerprüfung) if he or she is applying for a Bachelor's degree after finishing one year of bachelor's degree in India. However, the university where the student did first-year bachelor's is to be recognized in Germany. This could be checked at anabin.kmk.org. I have found that most of the prominent universities in India are recognized in Germany. But it is highly recommended to do 'Studienkolleg' course since the technical German is taught in this course.

### Visa Application

Once you apply for a course, you will be notified about your admission status by email or post. If you secure an admission, then it is time to get ready for your visit to Germany. You need to apply for a German national visa (not the Schengen Visa) in order to travel to Germany as a student. For a visa, the students have to schedule an appointment with the embassy or consulate or the VFS applicable for their region (india.diplo.de).

In India, the German embassy is located in New Delhi and there are German consulates in Bengaluru, Chennai, Kolkata and Mumbai. A resident of Kerala should only visit the German consulate in Bengaluru in order to get the visa for Germany. However, if this person has been residing in Chennai or Hyderabad (maybe the person was working there) just before the visa interview date, then the Chennai consulate is the place for visa application. For all these kind of information, the website of German missions in India should be visited (Information on the applicable consulate for your region). Dropping an email to the German consulates will give you the latest information.

It is advised to immediately schedule an appointment as soon as you secure an admission. Sometimes getting an appointment in time would be very challenging.

Once the student gets an appointment, he or she should visit the embassy or consulate with the mandated documents. It is advised to take additional documents which you feel is also important to prove your credibility. The student has to submit his or her passport there. Usually, it takes 3-4 weeks to get the status of your visa application. The embassy or consulate will send you an email stating that a decision has been taken on your visa application. You will get to see the approval of the visa only if you visit the embassy or consulate. After getting a German national visa, you are ready to fly to Germany.

All the best for your application! I hope you found this information helpful.

For more information, you could check out following YouTube channels could be visited to obtain very good information on studies in Germany. I have personally found these channels very useful. These channels are run by Indian students studying in Germany.

*About the Author:*
**Abi Afthab** is a Master's graduate in Energy and Environmental Management from Europa Universität Flensburg, Germany. After a bachelor's in mechanical engineering from NIT Calicut, he joined Amec Foster Wheeler where he worked as Piping Engineer in the Oil and gas sector for 4 years. He was primarily responsible for designing piping systems for refineries and power plants. Later, he joined Europa Universität Flensburg for his master's degree. He is a strong advocate of mitigation of climate change. Currently, his areas of interest are future energy systems analysis and energy markets.

[1] MensPRO (https://www.youtube.com/channel/UCgZqY6QG3BanMYQaE_arNGA/featured)
[2] Bharat in Germany (https://www.youtube.com/user/himolikd)

## Future of earth in the warming climate scenario

For last two years, Kerala experienced major flood events like never before. Hundreds of lives were lost and human life and property suffered huge damages due to river flooding and landslides because of extreme rains. Scientists are warning that this may happen in coming years also, due to climate change. This is a typical example for the consequences of climate change experiencing even in the tropical region. We know that climate of a particular geographical region is the long term average of day-to-day weather in that region. There are climate variables that is used to describe the mean weather of a location. The most important climate variable is the surface temperature and the global mean surface temperature is 15°C. One should have in mind that this is the mean temperature of entire globe including deserts and poles. It is established that this global mean temperature is increasing due to anthropogenic (human) activity and generally it is termed as Global warming.

It will be interesting to know how this warming is occurring. We know that sun light (incoming short wave radiation with peak wave length at 0.5 $\mu$m) is the source of our energy. Also, depending on the earth's surface temperature, earth emits back a radiation with peak of the wave length at 10 $\mu$m (outgoing long wave radiation). Some of this outgoing radiation will be absorbed (thereby trapped) by some of the atmospheric constituents like water vapor, carbon dioxide ($CO_2$), methane ($CH_4$), Nitrous oxide ($N_2O$) and ozone ($O_3$), resulting in the warming of the atmosphere. This process is known as green house effect and the responsible gases for this are known as the green house gases. Some of the green house gases are in natural origin and some are anthropogenic. These gases in correct proportions are very essential for keeping mean atmospheric temperature at 15°C.

According to an ongoing temperature analysis conducted by scientists at NASA's Goddard Institute for Space Studies (GISS), the average global temperature on Earth has increased by about 0.8°C since 1850 with two-thirds of the warming occurred since 1975. This is happened because of the huge emission of anthropogenic green house gases originated mostly from fossil fuel and biomass burning. These burnings emit Carbon dioxide, Methane, Nitrous oxide which are the main culprits for the human induced climate change. Percentage contribution of the Carbon dioxide to the global warming is 82% and for Methane and Nitrous oxides are 10% and 6% respectively. Gases like Fluorinated gases (eg. CFC), Carbon monoxide, NOx, ect are also green house gases with low contribution to the global warming. It is clear that the major cause of the global warming is $CO_2$. The concentration of $CO_2$ has been increased to 412 ppm (in August 2019) from a value of 280 ppm (pre-industrial period) which results a radiative forcing (a measure to quantify a radiative imbalance in Earth's atmosphere) of 1.8 W/m2.

One might think that why does an increase of atmospheric temperature by 0.8°C matter so much. This increase in temperature represents an average over the entire surface of the planet. Also, the global temperature mainly depends on how much energy the planet receives from the Sun and how much it radiates back into space—quantities

that change very little. Nearly one-degree global change is significant because it takes a huge quantity of heat to warm-up all the oceans, atmosphere, and land by one degree Celsius. This also does not mean temperatures rose everywhere by one degree.

Studies about the climate change conducted around the world have documented changes in surface, atmospheric, and oceanic temperatures; melting glaciers; disappearing snow cover; shrinking sea ice; rising sea level; and an increase in atmospheric water vapor. Rainfall patterns and storms are changing, and the occurrence of droughts is shifting. One of the most important consequences of a warming climate is the change in the frequency, duration, and/or magnitude of extreme weather events. It can be extremes in the heat, precipitation and cyclone or tornadoes. Even in Kerala, we have experienced these three extremes in the recent past. It is reported that the frequency of multi-day heat waves and extreme high temperatures at both daytime and nighttime hours is increasing over many of the land areas globally. As a consequence of warming climate, water holding capacity of the atmosphere increases. Therefore, atmosphere holds comparatively more water vapor which results down pouring of water during rain events. This results more frequent extreme precipitation events. On a global scale, the observational annual-maximum daily precipitation has increased by 8.5% over the last 110 years. This causes associated calamities like river flooding and land sliding. Studies are pointing that the extreme precipitation associated with cyclones or tornadoes is expected to increase in near future. This means that cyclones are intensifying its strength.

There is an international agency for monitoring the climate change known as the Intergovernmental Panel on Climate Change (IPCC). They regularly publish comprehensive assessment reports about knowledge on climate change, its causes, potential impacts and response options. IPCC have concluded that it is extremely likely that human influence has been the dominant cause of the observed warming since the mid-20th century. This warming situation is increasing every year with a rate of 0.2°C/decade. A few years before, an agreement (Paris agreement) has been signed by 196 countries over the globe to keep the increase in global average temperature to well below 2°C above pre-industrial levels and to limit the increase to 1.5°C. This will be achieved by reducing the carbon emission by each country. In 2018 IPCC published a report on what will be the consequences, if the warming is 1.5°C. This report is pointing that future will not be smooth and easy unless we act to reduce the warming well below 1.5°C. The versus of Quran "Corruption appears on land and sea because of (the evil) that man's hands have done, so that He may make them taste a part of what they have done, in order that they may return." (Quran 30:41) is a good reminder for the man kind to act now for a better future.

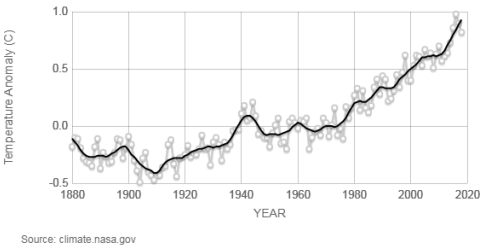


*Figure indicating the warming of global mean surface temperature by 0.8°C. A sharp increase of temperature is observed after 1980.*

*About the Author:*

**Dr. Muhsin** completed his post graduation from department of Physics, Kannur university and doctoral work at Space Physics Laboratory, Vikram Sarabhai Space Centre, Trivandrum. His area of research is the dynamical processes in the lower atmosphere. He published 12 research papers in internationally reputed journals and also presented papers in more than 10 international/national conferences. Currently he is working as National Post Doctoral Feloow, Department of Physics, National Institute of Technology Calicut.

## News and Upates

### Calicut Chapter Formation

The first local chapter of FIRST (Forum for Innovation and Research in Science and Technology) was formed in Kozhikode on September 12, 2019. The launch meeting was held at ICA Engineering Academy Office, Link Road, and chaired by FIRST Charitable Trust President Dr. Badeuzzaman. Dr. Yusuf Ameen was selected as the coordinator of the Calicut Chapter for a period of one year. Mr. Shameem and Mr. Basiludheen were selected to assist the coordinator. The newly formed chapter is planning to organize multiple events in prominent higher learning institutions in the Malabar region.

### FIRST Webinar Series

A webinar on "Quantum Mechanical Origin of Periodic Table" was presented on 28th September 2019 by Dr. Satyanarayana, Dept. of Physics, Pondicherry University. It was hosted in Zoom, and the maximum capacity of 100 participants was filled well before the scheduled starting time. In addition, it was viewed live on our Facebook page by over 50 people. The topic was presented for 40 min, followed by a Q&A session of 20 min. The recording of the webinar is available on-demand.