

Vijnana Vahini

KARNATAKA SCIENCE AND TECHNOLOGY ACADEMY (KSTA)
DEPARTMENT OF SCIENCE AND TECHNOLOGY, GOVERNMENT OF KARNATAKA

FROM CHAIRMAN'S DESK

INSIDE THIS ISSUE:	
CREATIVITY — PROF. J. R. TONANNAVAR & PROF. B. G. MULIMANI	2 - 5
KSTA MEETINGS	5
MOU AND COLLABORATIONS	5
CURRENT SCIENCE AND TECHNOLOGY - Dr ANAND R	6-7
PROGRAMS CARRIED OUT DURING SECOND QUARTER OF FY 2021-'22	7-9
UPCOMING PROGRAMS IN FY 2021-22	10
INSTITUTIONAL MEMBERS	11
CONTACT	11

Commemorating the 75th Indian Independence Day, the KSTA organized a series of talks by the Lifetime Achievement Awardees of the Academy, eleven in all. Paying rich tributes to the country in the Bharat Swatantra Amruta Mahotsava lectures, the science celebrities presented the S&T developments over the decades as also the path ahead. I would like to place our gratitude on record to the speakers as also appreciation to the participants.

At a time when the schools and colleges are yet to reopen during the Covid-19 pandemic, webinars organized by the Academy on various science subjects, in collaboration with different organisations were received well by a large number of stakeholders. Awards for a number of competitions were announced. The feedback in terms of visits to the Academy's website and responses to the publications was overwhelming. These



Prof. S. Ayyappan

were also appreciated by the Hon'ble Minister of Higher Education, Electronics, IT BT and S&T, Livelihoods and Skill Development, Govt. of Karnataka, Dr Ashwath Narayan. C.N., on the twitter.

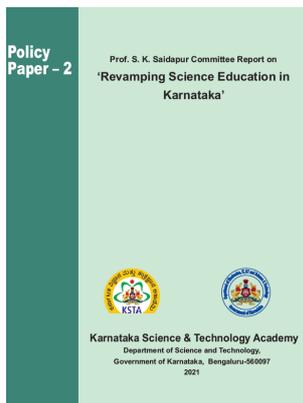
Both the General Body and the Executive Committee of the KSTA met during the quarter. The guidance and inputs received from the Members are gratefully acknowledged.

- S. Ayyappan

REVAMPING SCIENCE EDUCATION IN KARNATAKA



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KSTA has brought out second policy paper. The committee constituted under the Chairmanship of renowned Academician Prof. S K Saidapur, Former Vice Chancellor, Karnatak

University, Dharwad and Member, KSTA has prepared a policy paper titled "Revamping Science Education in Karnataka". This policy paper traces the history of science education in India, challenges of the digital revolution and problems in job sector and

clearly stated the need of revamping science education. It is an 'action-oriented' document with a high potential for meaningfully revamping/repurposing science education in Karnataka. It has made several specific recommendations on 'infrastructural needs, empowering faculty, curriculum development, teaching learning processes and assessment, promotion of research and innovations, science communication and practice of ethics' with respect to modernizing science education at UG and PG levels to global standards. The policy paper has been circulated to the Department of Higher Education, Universities and other institutes of higher learning

CREATIVITY



Prof. J. R. Tonannavar



Prof. B. G. Mulimani

It is said we must owe an undying debt of gratitude to the Man who first invented 'the wheel' because the invention, as it were, imparted a momentum to the creation of civilizations. The modern Man as *Homo sapiens* is 100,000 years old and yet his evolution through the years is a testimony to creative traits acquired by him. Were it not for the evolution, the modern Man might not have split off from his nearest cousins - Chimpanzees. The wheel may be the first manifestation of the man's urge to self-express, a trait induced by evolution, sharpened and fashioned in time, which he handed down to his successors. The 'fittest species', according to Darwinian theory of evolution, are those who acquire traits to continue to evolve while others fall by the way-side. If birds have built nests, men have built civilizations, created art, religion and culture. So, for Man, creativity must have been both the survival tactics and fundamental impulse of joy and value. According to the Cambridge dictionary, creativity is 'the ability to produce or use original and unusual ideas'. *Creativity can be nurtured or cultivated; it can lead to discoveries, inventions and innovations.* Is it the sole prerogative of talented people? Mark Twain says, 'Really great people make you feel that you, too, can become great'. Scholars, artists, politicians, writers, scientists, technologists and even lay-persons are creative though the nature, intensity and influence of creativity vary widely: what the technologist creates could impact the society more widely than the lay-person's but still the lay-person's creativity, however small, is still of value. While the technologist invents to meet a greater challenge, the artist creates a painting of enduring value, the farmer, say, solves a problem he

faces on farm. While what all these three vocations create are of value, they differ in their impact. *It is, of course, also true that geniuses have great and revolutionary minds, the stamp of being genius is uniqueness in creativity or creative thinking.* For example, Mahatma Gandhiji and social reformer Basaveshwara were spiritual geniuses; the Greek scholar Plato enhanced Man's love of wisdom; the Catholic canon and Renaissance astronomer Copernicus' notion of the Sun-centered solar system changed our world-view; Shakespeare's narratives in his plays touched our emotional intelligence; and naturalist Darwin showed what profundity as to the descent of Man can be unraveled from nature by the keen observation. In the present essay, we look at how creativity has influenced Man to satisfy his urge, to create civilizations and to advance his knowledge. The expanse of creativity is vast; therefore, we restrict ourselves to arbitrarily selected areas of Man's endeavors to analyze our essay.

Art in all of its forms created cultures; Man's urge to know his origin and destiny created religion; Science, as we all know, is a recent human endeavor to understand nature in an impersonal way. At the deepest level, nature is beautiful and has a strong intellectual appeal; at the practical level, Man is overwhelmed and empowered by the scientific knowledge he has acquired. At the core of what Man has achieved in art, religion and science, we assume, lies his 'creativity'. Today the scientist and technologist have a fair understanding of nature's processes, and as a result, they have become, among others, drivers of the modern civilization. 'Scientific research' says an American scientist E. Bright Wilson, 'not being a

routine process but requiring originality and creative thought, is very sensitive to the psychological state of the scientist'. German polymath Hermann von Helmholtz describes three stages of creativity, '*saturation, incubation, illumination*'. To this French scientist Henry Poincare adds, '*verification*', for new ideas need to be verified. Given these four stages, scientists still differ by the form and effectiveness of their creativity. Thus we broadly identify some aspects we believe are involved in creativity: *vision, formulation, solution and unified picture*. In what follows we will examine these aspects by illustrations.

During the 19th century, the laws underlining electricity and magnetism were discovered by different scientists without 'seeing' common threads running through them. It was James Maxwell, the most distinguished scientist at the University of Cambridge, who imagined *a larger and unified picture* of all these phenomena and showed all the laws are derivable from his electromagnetic theory. Further, he showed light radiations are electromagnetic waves originating in the oscillations of electric and magnetic fields. Although he did not discover any of the laws, Maxwell *envisioned* seemingly different electric and magnetic phenomena as a single unified manifestation of the electromagnetism. This is arguably the highest form of creativity in science. Modern communication technologies, among others, emanate from the electromagnetic theory. Another of the 19th century British naturalist Charles Darwin, who was no prodigy in any sense, made observations of animals and plants, collecting and sifting a large body of their fossils, remained pensive for a number of years, and finally arrived at a profound theory underlying the myriad forms of life on planet Earth. From simple forms of life from the earliest times, he argues, both animal and plants have evolved into complex patterns, driven by the natural selection in which those adapted to change survive while others go extinct. Darwin's grand vision summarized in his classic book the *Origin of Species*, exacted subtleties from nature's handiwork spread over millennia.

As Chemistry became scientific during the 19th century with the advent of successive atomic theories, the Periodic Table of Elements became its precursor. It was the Russian chemist Dmitri Mendeleev whose *dream* created the Periodic Table. He reminisced about the incidence, 'I saw in a dream a table where all elements fell into place as required.

Awakening, I immediately wrote it down on a piece of paper, only in one place did a correction later seem necessary'. As he put all the known elements into unique positions based on chemical properties in the Table, Mendeleev was led to the prediction of the new elements, germanium, gallium and scandium. In the Mendeleev story, all the four stages mentioned above, have occurred: after the saturation of his mind with the idea, the incubation followed resulting in illumination as a dream and finally the Periodic Table was born and verified. The Periodic Table today is the bedrock of modern Chemistry. It is not necessary for creativity to be always a means to an end; it may be an end in itself. This may be seen in the great work of the 20th century mathematicians A.N.Whitehead and Bertrand Russell who demonstrated that all mathematical statements are reducible to symbolic logic and their joint work produced three-volume books called *Principia Mathematica*. Later another eminent mathematician Kurt Godel showed by way of his famous discovery 'Incompleteness Theorems' that such a reduction of all mathematics to a consistent system of symbolic logic is not provable because the system entails unprovable statements. While the *Principia Mathematica* was hailed as a magnum opus by many, after Godel, it was also described as a monumental failure! Purists, however, argue that the Whitehead-Russell duo's work inspired advances in symbolic logic and philosophy of mathematics. At any rate, their creative work remains of value, so to speak, just like the pure form of art.

If we deviate from science and look at other dimensions of creativity, literature affords a very good example. Many scholars through the generations have rewritten the stories of Ramayana and Mahabharata, adding form and substance while keeping the spirit intact, yet all of it constitutes a creative work. While creativity runs through all societies, its pursuit to promote new political or religious thought leads to upheavals, reforms and more often meets with resistance from the corridors of power. Mahatma Gandhiji's spiritual genius led a political movement with non-violence as its core principle. As Gandhiji struck the right chord in the hearts of millions of fellow Indians, the British Empire had to quit India. While he is described as 'the prophet of non-violence since Lord Buddha'; in the political history of the world, Gandhiji is a greatest statesman and a genius; in moral philosophy, he remains exemplary.

The old adage, 'Necessity is the mother of invention' promotes creativity as the successive Industrial revolutions are testimony to it. Western societies are prosperous because they are highly creative, enabling them to make newer technologies and sell them. Secondly, their liberal political system is favorable to creative pursuits in all spheres of human endeavors. However, where creativity is suppressed by the authoritarian regimes, societies tend to numb intellectual progress as evident in histories. The greatest Italian scientist of the 17th century, Galileo, dared the authority of Roman Catholic Church, laying down scientific method for testing observations and hypotheses. He made many fundamental discoveries in physics and astronomy and finally he said, 'the Earth moves around the Sun' which challenged the Aristotelian world-view. The pro-Aristotelian Pope of the Church jailed Galileo for his bold assertion with a warning to other men not to indulge in such advocacies. The Church was successful because for a long time, Italy did not see men of Galileo's eminence.

One creative idea can produce another one with potential impact. At the time of inventing an electron microscope in the early 1930s, a young German engineer Ernst Ruska learnt that the electrons have a wavy motion just like light waves. The idea came from the French physicist Louis de Broglie who had put forth that electrons also behave as waves whose wavelength varies inversely as their velocities. By lowering the velocities of the electrons, Ruska attained wavelengths by five orders of magnitude shorter than light waves. This led him to the invention of the electron microscope with an ability that surpassed the conventional optical microscope. Forty years later Ruska was honored with a Nobel Prize in physics! Interestingly, Louis de Broglie's concept too was an extended concept due to Einstein who put forth that light wave behaves as a stream of moving particles. If light wave has particle behavior, de Broglie's argued that electrons as particles have wavy behavior. Both concepts are so fundamental that they are integral to our understanding of matter and energy. The two concepts, among others, advanced 20th century physics. Both Einstein and Louis de Broglie were honored with the Nobel Prize.

All through the human history, the kings and queens patronized creative people with state honors and entitlements, being equivalent of today's

academies and societies. There is flipside too, which is, creative works especially in arts, theology, political theories, economic policies produced against the establishment become the object of scorn or worst, they are suppressed. Prof. Wendy Doniger's book, *The Hindus: An Alternative History*, was banned, much to the delight of some fringe groups. If a modern painting, however creative, has images even corresponding to the most respected ancient works, it is still rejected.

In the evolution of Indian civilization and culture, the discriminatory social system based on status, caste and gender was handed down to us through centuries. To remove the centuries old discrimination was by no means an easy task in those days since it was accepted as irreversible but normal being of the social structure. The task thus required a creative approach radically different from the prevailing system of beliefs deeply entrenched both in people's psyche and practice. In the 12th century, the poet-philosopher-statesman Basaveshwara hailing from Basavan Bagewdi, a northern tip of Karnataka, propounded a new religious philosophy that broke away from the orthodox Vedic system. He replaced institutionalized religious practices with individual-centric ones in which the human body is equivalent of the temple, wearing and worshipping *istalinga* as deity. This can be practiced by all men and women regardless of their social status. Basaveshwara created an *Anubhava Mantapa*, the 'Parliament of Spiritual Experience', arguably unique in the human history, where he assembled men and women of all diverse socio-economic background for discussion on spirituality culled from their life, profession and intuitional experience. All of this movement inspired the men and women at the *Anubhava Mantapa* to create a *Vachana* literature rich in its principles churned from a profound understanding of man's spiritual dimensions, his relation to God and Nature. All this culminated in the birth of *Linagayat* religion. He equated vocation with the attainment of a spiritual bliss, which he expressed by way of his famous line, *Kayakave Kailas*, being roughly translates into 'Work is Worship'. While Basaveshwara's benevolent but creative deed stirred up the social conscience leading to 'a social revolution' and making him 'a forerunner' of social reformation, he suffered a religious persecution at the hands of the state. Whatever, since then many men and women have been inspired by his thought,

and we as a nation still strive for an inclusive society.

We ask the same questions again: can creativity be taught? Or is it innate trait or influenced by environment? While these questions can be debated, if we put them in the context of the prevailing education system we see its undue emphasis on knowledge acquisition through formal instruction which by its design cannot inspire creativity in children. Creativity outside the formal system should also be recognized and mentored. Mathematical genius Srinivasa Ramanujan as a student had no interest whatsoever in studying subjects other than mathematics and therefore failed to earn a degree. It was the eminent mathematician G.H.Hardy of Cambridge University, who recognized Ramanujan's genius and mentored him. What is more, brushing aside systemic hurdles, Hardy got Ramanujan elected as a Fellow of the Royal Society, a great professional honor at the age of 31. While this example cannot be extended to all situations but there is a lesson to follow: if creativity is to be nurtured, it must remain free and informal since formal education systems meet the needs of an egalitarian society and thus

cannot effectively nurture it. Unfettered creativity as a value of the human culture is to be respected since it is inherently spiritual; in so far as it is worldly, it is to be nurtured for the advancement of civilization.

In this essay we have shown by way of instances how 'creativity' advances knowledge, produces technology and enhances human culture. However, there are many questions which, in a forthcoming article, we propose to discuss including 'how to think like a genius'; how creativity unfolds in the backdrop of history, cultural milieu, the influence of knowledge domain and gene-gift paradigm association.

Prof. J. R. Tonannavar

Former Chairman, Dept of Physics
Karnatak University, Dharwad-580 003
email: jtonannavar.kud.phys@gmail.com
And

Prof. B. G. Mulimani

Member, KSTA and Former Vice Chancellor,
Gulbarga University, Kalaburgi
email: bgmulimani70@gmail.com

KSTA MEETINGS

Executive Committee (EC): The 13th EC meeting of KSTA was held on August 06, 2021 under the Chairmanship of Prof. S. Ayyappan, Chairman, KSTA from 2.30 pm to 4.15 pm

General Body (GB): The 11th GB meeting of KSTA was held on August 26, 2021 under the Chairmanship of Prof. S. Ayyappan, Chairman, KSTA from 2.30 pm to 3.30 pm

MOU AND COLLABORATIONS

During July—September 2021, MOU with 04 organisations/institutions were signed and till date 32 MOUs with organisations/institutions were signed with the following purpose and scope:

- Inculcating scientific temper across civil society through science communication
- Facilitating technology dissemination through Academia-Farm-Industry interface, with a focus on rural areas
- Fostering innovations and entrepreneurship for societal benefits
- Organising conferences & outreach programmes
- Capacity building in frontier areas of Science & Technology
- Any other aspects with mutual consent

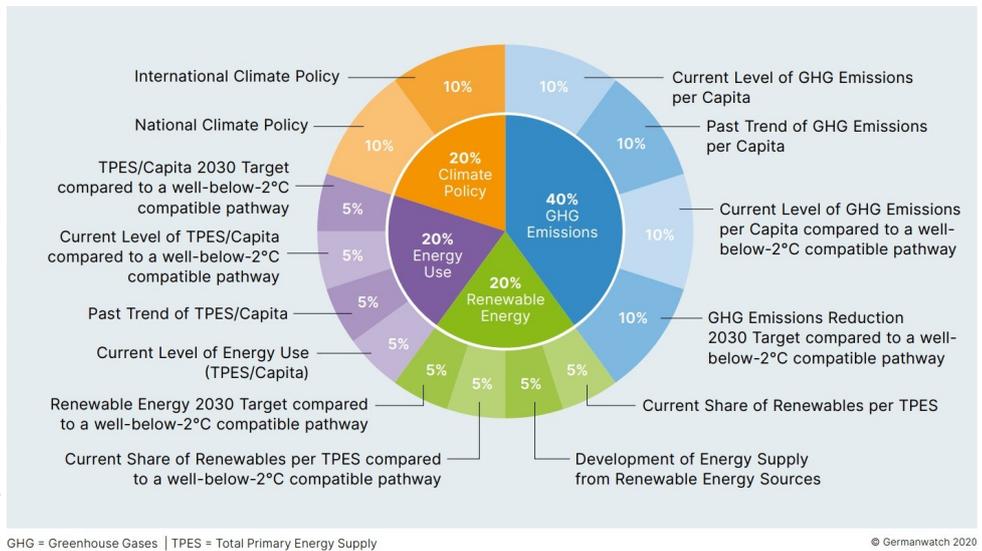
Sl. No.	Organisations/Institutions	Date of MOU
1	REVA University, Bengaluru	16.07.2021
2	Gulbarga University, kalaburgi	30.07.2021
3	Swadeshi Vijnana Andolana- Karnataka	09.08.2021
4	Tumkur Univesity, Tumakuru	28.09.2021

CURRENT SCIENCE AND TECHNOLOGY

Dr Anand R., Senior Scientific Officer, KSTA

Climate Change Performance Index (CCPI) 2021

Climate Change Performance Index (CCPI) is an independent monitoring tool for tracking countries' climate protection performance. It aims to enhance transparency in international climate protection efforts and enables comparison of climate protection efforts and progress made by individual countries. It covers 58 economies (57 Countries + the European Union) which together responsible for 90% of the Global Greenhouse Gas Emissions.



The CCPI's climate policy section evaluates countries' progress in implementing policies working towards achieving the Paris Agreement goals. The CCPI assesses countries' performance in four categories: "GHG Emissions" (40% of overall score), "Renewable Energy" (20% of overall score), "Energy Use" (20% of overall score) and "Climate Policy" (20% of overall score) with 14 indicators.

India's Performance:

- ⇒ Overall Performance: India with a score of 63.98 ranked 10th among 58 countries
- ⇒ Renewable Energy Category: ranked 27th
- ⇒ GHG Emissions: ranked 12th
- ⇒ Energy Use: ranked 10th
- ⇒ Climate Policy: ranked 13th

Sustainable Development Goals (SDG) Index 2021

The SDG Index is an assessment of each country's overall performance on the 17 SDGs, giving equal weight to each Goal. The score signifies a country's position between the worst possible outcome (0) and the best, or target outcome (100). For the first time since the adoption of the SDGs in 2015, the global average SDG Index score has decreased. The decrease is mainly due to the impact of COVID-19 on key SDG indicators.

OVERALL PERFORMANCE

COUNTRY RANKING

India
120 / 165

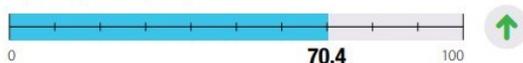
COUNTRY SCORE



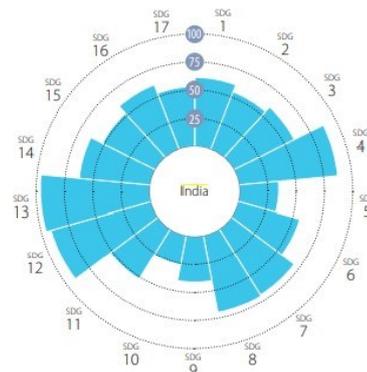
REGIONAL AVERAGE: 65.7

STATISTICAL PERFORMANCE INDEX

0 (WORST) TO 100 (BEST)



AVERAGE PERFORMANCE BY SDG





■ Major challenges
 ■ Significant challenges
 ■ Challenges remain
 ■ SDG achieved
 Information unavailable
↓ Decreasing
 → Stagnating
 ↗ Moderately improving
 ↑ On track or maintaining SDG achievement
 ● Information unavailable

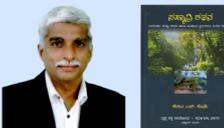
Notes: The full title of Goal 2 "Zero Hunger" is "End hunger, achieve food security and improved nutrition and promote sustainable agriculture".
 The full title of each SDG is available here: <https://sustainabledevelopment.un.org/topics/sustainabledevelopmentgoals>

India's Performance:

- ⇒ At 120th position among 165 countries with a score of 60.1
- ⇒ Achieved Statistical Performance Index of 70.4 for 100
- ⇒ Out of 17 SDGs, 11 are 'Major Challenges', 03 are 'Significant Challenges' and 01 'Challenge remain' and 01 'SDG achieved'
- ⇒ 06 SDGs are Moderately improving; 05 are Stagnating; 02 are Decreasing

PROGRAMS CARRIED OUT DURING SECOND QUARTER (JULY–SEPTEMBER) OF FY 2021–'22

Best Book Award 2020-21

<p>Agriculture Section Book: <i>Krishi Lokadolage</i> Author: Dr Vasanth Kumar Thimakapura</p> 	<p>S&T Section Book: <i>Sahyadri Katana</i> Author: Dr Keshav H. Korse</p> 	<p>Medical Section Book: <i>Serendipity</i> Author: Dr Kiran V. S.</p> 
<p>Book: <i>Totada Lokada Paatagalu</i> Author: Dr. B. Revati Nandan</p> 		

Prize distribution to winners of various competitions conducted by KSTA

Prizes for winners of competition viz., 'Essay Writing', 'Video Lecture Competition' and the Innovation Awards' conducted by KSTA were distributed. Continued in page 8

Innovation Award

Prof. U R Rao Award for PG Students

Sl.No	Name		Prize Amount (Rs.)
1	Vinayaka	Dept. of FMPE, College of Agricultural Engineering, University of Agricultural Science, Raichur	10,000/-

Dr S. K. Shivakumar Award for UG Students

Sl.No	Name		Prize Amount (Rs.)
1	Vikas C	Dept. of Civil Engineering, BMS Institute of Technology & Management,	10,000/-
2	Hitesh Gowda R S	Dept. of Civil Engineering, BMS Institute of Technology & Management,	10,000/-
3	Mushahira	RBYME College, Ballari	10,000/-
4	M C Sohan & Akanksh A Manjunath	RVCollege of Engineering, Bengaluru	10,000/-

KSTA Award for General Public – Consolation Prize

Sl.No	Name		Prize Amount (Rs.)
1	Anagha R	Canara High School, URVA, Mangalore	5,000/-
2	Vignesh	Mechanic, Dept. of Mechanical Engineering, Shri Madwa Vadiraja Institute of Technology & Management, Bantakal, Udupi	5,000/-
3	Rakesh Channabasa-sayya Mathad	Asst. Professor, Seed Science & Technology Directorate Office, Lingasugur Road, University of Agricultural Science, Raichur	5,000/-

Essay Competition

Under Graduate Level (Kannada)

Sl.No	Name	Place	Prize Amount (Rs.)
1	Deepika N, University College, Tumkur University, Tumakuru	1	10,000/-
2	Chaithra N, St. Philomina College, Putturu	2	7,500/-
3	Muttamma, Govindadas College, Sooratkal	2	7,500/-
4	Yashodha M, SDM Degree College of Arts, Science and Commerce, Honnavara	3	5,000/-

Under Graduate Level (English)

Sl.No	Name	Place	Prize Amount (Rs.)
1	Aysha Shifa N, St. Philomina College	1	10,000/-
2	Meghana, Sri Sharada College, Basrur, Udupi	2	7,500/-
3	Deepika N, NMKRV College for Women, Jayanagar, Bengaluru	3	5,000/-

Post Graduate Level (Kannada)

No Prize as all the applicants score less than 60%

Post Graduate Level (English)

Sl.No	Name	Place	Prize Amount (Rs.)
1	Nanditha T K, St. Aloysius College, Magaluru	1	10,000/-
2	Rakheeb Khan J R, Shivgangotri campus Davanagere university Davanagere	2	7,500/-
3	Dhanashree R Naik, Karnatak University, Dharwad	3	5,000/-

General Public (English)

Sl.No	Name	Place	Prize Amount (Rs.)
1	Prabha D	1	10,000/-
2	Cinthiliya Menezes	2	7,500/-
3	Neetu S Nair	3	5,000/-

General Public (Kannada)

Sl.No	Name	Place	Prize Amount (Rs.)
1	Kavitha R, Malleshwaram, Bengaluru	1	10,000/-
2	T P Sharadhi, Yelahanka, Bengaluru	1	10,000/-
3	Preeti V Kamat, Karavara, Uttarakannada	2	7,500/-
4	Sulochanakumari B K, Narikombu Village, Bantwala	3	5,000/-

Video Lecture Competition (Encouragement Award)

Sl.No	Name	Place	Prize Amount (Rs.)
1	Rohit V. Sagar	Encouragement	12,500/-
2	Umar Faruk J Meeranayak	Encouragement	12,500/-

Webinar Programs

During July - September 2021, thirteen programs related to frontier areas of science and technology were conducted through Video Conference (VC) mode in association with research institutes/ science forum/ educational organizations. The response from the participants is very encouraging.

Sl. No	Date	Program Title	Beneficiaries (No.)
1	July 3, 2021	Overview of Brain Tumor by Dr. Vani Santosh	107
2	July 07, 2021	Bharat Swatantra Amruta Mahotsava Science Lecture Series – 07 Indian Space Programme: Contribution to Independent India by Dr A S Kiran Kumar	477
3	July 8, 2021	Parkinson's Disease by Dr. Phalguni Anand Alladi, Scientist-F NIMHANS, Bengaluru	161
4	July 12, 2021	Careers Beyond Medicine and Engineering by Dr Katre Shakuntala and Dr S M Shiva Prakash	272
5	July 14, 2020	Bharat Swatantra Amruta Mahotsava Science Lecture Series – 08 Why is it Rocket Science? by Dr B N Suresh	136
6	July 15, 2020	The Aging Brain by Dr. Sarada Subramanian Senior Professor, NIMHANS, Bengaluru	61
7	July 16, 2020	Kutuhali Kannada Webinar– Covid 19 and Children : Dr G. S. Kumar	
8	July 17, 2021	Nanotechnology in Medicine by Dr. Rugmani Meenambal, DST-Inspire Faculty, NIMHANS, Bengaluru	87
9	July 20, 2021	Commemoration of Int. Year of Fruits and Vegetables: Expert Talk – I by Dr Sunil Archak	67
10	July 28, 2021	Bharat Swatantra Amruta Mahotsava Science Lecture Series – 09 Societal Implications of the National Space Endeavour by Prof. K Kasturirangan	216
11	July 30, 2021	Towards Smart Farming - Prof. S Ayyappan, Chairman, KSTA; in association with Gravity Science Foundation	198
12	August 20, 2021	Expert Talk Series in Commemoration of Int. Year of Fruits and Vegetables: Expert Talk – II by Dr Santosh Attavar	134
13	September 20, 2021	Expert Talk Series in Commemoration of Int. Year of Fruits and Vegetables: Expert Talk – III by Dr Sudha Mysore	63



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Upcoming programs in FY 2021-22

Science and Technology Annual Conference : On the occasion of International Year of Fruits and Vegetables 2021, a national web conference is scheduled during November 08-10, 2021 in association with ICAR– Indian Institute of Horticultural Research, Vijnanaprasar, Government of India and University of Horticultural Sciences, Bagalkot. Please visit kstacademy.in for details and nomination format.

Science and Technology Conference in Kannada: Fourth Science and Technology Conference in Kannada will be held in the month of November 2021.

KSTA Awards :

- ◆ **Life time Achievement award:** A distinguished scientist of the State who has made an outstanding contribution in the field of science and technology as well as for the development of the Country will be bestowed with KSTA Life Time Achievement Award. The selected scientist will be felicitated with a gold medal, cash award of Rs. 2.0 lakh along with a citation.
- ◆ **Lifetime Achievement Award in Science Communication:** In order to recognize the outstanding contribution in the field of science popularisation and communication in Kannada, Lifetime Achievement Award is being given every year during S&T conference in Kannada.
- ◆ **Innovation Award for UG, PG and General Public:** Prof. U. R. Rao award for PG students and Dr. S. K. Shivakumar award for UG students. The award comprises of cash prize of Rs. 10,000/- along with a certificate.

Vijnana Loka - Bimonthly Magazine: During FY 2021-'22, six issues will be published and will be sent to pre-university and science degree colleges, science centres, libraries and other organizations across the state. The subscription rates: Individual - Rs. 300 (yearly), Rs. 4000/- (lifetime) & Institutional - Rs. 500 (yearly), Rs. 5000/- (lifetime). A special issue on 'Climate Change' is being brought out comprising articles by eminent science writers.

Science Communication, Interlocution and Science Popularization: Science communication workshops, interfacing science writers and publishers, media communication and programs. for science popularisation in Kannada will be organised.

Innovation Platform and Promote Indigenous Talents in Frontline S&T Areas, with a focus on Entrepreneurship development: The program aims to bring the innovations by the general public in the state, especially the rural population to the mainstream.

Digital Content Generation, Production of Science Capsules, Short Feature Films /Clippings : Development of digital information in frontier areas of science and technology and knowledge base. Production of talk by expert, short films and feature films in KSTA and distribution of the same to educational institutions in the backward areas through DVD/CD.

Short Study and Small Grants: to encourage organization of science promotional programs by educational institutions, universities and other associations across the state.

Other Programs

Policy, Strategy, Approach and Status Papers

Membership and Fellowship

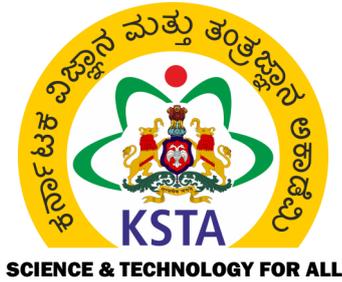
Collaborative R&D with Corporate Institutions and MOU

Note: Depending upon the availability of funds and decisions of EC, above programs will be implemented.

KSTA INSTITUTIONAL MEMBERS

Institutions involved in Education, Research and related activities, including Corporate and interested in programs of KSTA are eligible to enroll as institutional members. Institutions who are desirous of becoming Institutional Member of KSTA, may do so by paying a fee of Rs. 1,00,000/- (Rupees One lakh only), and submitting a letter of interest throughout the year. Following 03 educational institutions have become members during July to September 2021 and in total 07 institutions have taken institutional membership.

Sl. No.	Institutions
1	REVA University, Bengaluru
2	Gulbarga University, Kalaburgi
3	Vijayanagar Sri Krishnadevaraya University, Ballary



KSTA, a Unit of the Department of Science and Technology, Government of Karnataka, established on 5th September, 2005, has been mandated for science promotion and popularisation in the State. KSTA has the Vision of 'Nurturing and Enabling Science & Technology for All' and Mission of 'Playing a pivotal role in Science promotion, Technology dissemination and fostering Innovations for Societal welfare'. The Objectives of the KSTA are to inculcate scientific temper across the civil society through science communication, particularly in Kannada; facilitate technology dissemination through Academia-Farm-Industry interface, with a focus on rural areas; foster Innovations & Entrepreneurship for Societal benefits; recognise talents and contributions through Awards; organise Conferences & Outreach programmes; serve as Resource Centre for Capacity building in frontier areas of Science & Technology; and act as a Science, Technology & Innovation Policy (STI) Advisory Body for the State.

CONTACT

Chief Executive Officer

Karnataka Science and Technology Academy (KSTA)
Prof. U. R. Rao Vijnana Bhavana, Major Sandeep Unnikrishnan Road,
Horticulture College Entrance, GKVK Campus Doddabettahalli Layout,
Vidyaranyapura Post, Bengaluru- 560 097

Phone: 080- 29721549/50

Chief Patron

Prof. S Ayyappan, Chairman, KSTA

Patrons

Shri A. B. Basavaraju KAS, Member Secretary, KSTA
Dr. A.M. Ramesh, CEO, KSTA

Editor

Dr Anand R, Senior Scientific Officer, KSTA

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