



2014

ACADEMICS

INTEGRAL  
EDUCATION

RESEARCH

# The Underlying Philosophy

The Sai educational institutions have been established not merely to enable students to earn a living but to make them acquire good traits, lead ideal lives, and give them ethical, moral and spiritual strength. I have established them with a view to inculcate love and teach good qualities to students. They will learn here humility, discipline and faith.

I have established these institutions to impart spiritual education as a main component and worldly education as a secondary one. Education should enable one to cultivate good qualities, character and devotion. The teaching of the university curricula is only the means employed for the end, namely, spiritual uplift, self-discovery and social service through love and detachment.

This will be a *gurukula* - a place where teachers and taught will grow together in love and wisdom - and like the ancient system of education, it will develop in its students a broad outlook and promote virtues and morals, which serve to foster noble ideals in society.

This institute will be a temple of learning where youth are shaped into self-reliant, contented and enterprising heroes of action and self-sacrifice, for the purpose of serving humanity.







# Vice-Chancellor's Foreword

The Revered Founder Chancellor, Bhagawan Sri Sathya Sai Baba defined *Educare* as 'drawing out from within'. The idea is to draw out what is already latent within human beings. The Sri Sathya Sai System of Values-based Integral Education, with equal stress on academics and inculcation of human values, has been envisaged by Bhagawan Baba.

The entire system is based on the *Gurukula* system, where a good number of teachers stay with the students in the hostel and guide them. Participation in *suprabhatam*, games, yoga, cultural activities, awareness classes, *Grama Seva* (village service), self reliance activities, Annual Sports and Cultural Meet and daily prayers are mandatory for all students and teachers. In addition, Bhagawan Baba expected both the students and teachers to wear a saree or a white dress- symbolizing purity, and also practice simple living.

Many a time these guidelines may appear archaic to people who are not well tuned to this system of education. I would like to stress that the Sri Sathya Sai System of Values-based Integral Education has been operational for more than three decades. It has stood the test of time and the quality of the students, who have passed out from this hallowed Institution—founded by the Divine Himself—are testimony to the success of this education system, which is the only one of its kind.

The teachers, students and the administrators have consciously made

efforts to sustain this unique system of education as a loving tribute to the Divine Master, even after He left His mortal coil.

This does not in any way imply that the secular academic activities are at stake. According to the latest statistics of National Assessment and Accreditation Council (NAAC)— a government watchdog that monitors and evaluates the quality of Higher Education in India—Sri Sathya Sai Institute of Higher Learning is ranked number 8 among over 250 universities accredited to date. The student-teacher ratio, student-computer ratio and the pass percentage in all the courses continue to be far above the national average. The major recommendations of several High Power Commissions on the higher education system—and in particular Deemed to be Universities—have been implemented in letter and spirit at Sri Sathya Sai Institute of Higher Learning. The students of the university represent twenty-five states of India.

One of the expectations of Swami was to strengthen socially relevant research activities at the university. This required an interdisciplinary approach to research. This was achieved by academically integrating the university with the free high tech hospitals founded by Bhagawan. It is with His Grace that the faculty of the university and the doctors of the hospitals are undertaking research in tandem, resulting in a number of significant results.

The number of research scholars has increased by 53 percent over the last three years. Research and teaching grants have tripled. The pass percentage of our students in GATE and CSIR-UGC/NET examinations continues to be much above the national average. Research grants from funding agencies have more than doubled over these three years. Research publications in reputed journals have more than doubled during the same period. A good number of workshops and conferences have been conducted (as in previous years) and laboratories have been strengthened.

The Annexe of the Prasanthi Nilayam campus has been inaugurated and will take care of the required additional space for the expanding laboratories and increased requirement of classrooms. As per the vision of Baba, the construction of a building to house the Sri Sathya Sai Centre for Advanced Studies is underway.

I am sure with the Grace and Blessings of our beloved Swami, His Institution will continue to grow in stature in the realm of higher education and serve the purpose for which it was founded. Let us pray to Him to bless all of us to enable us to carry forward His vision and mission.



**PROF. J SHASHIDHARA PRASAD**  
VICE-CHANCELLOR

**SRI SATHYA SAI INSTITUTE OF HIGHER LEARNING**  
ANNUAL REPORT 2013/14

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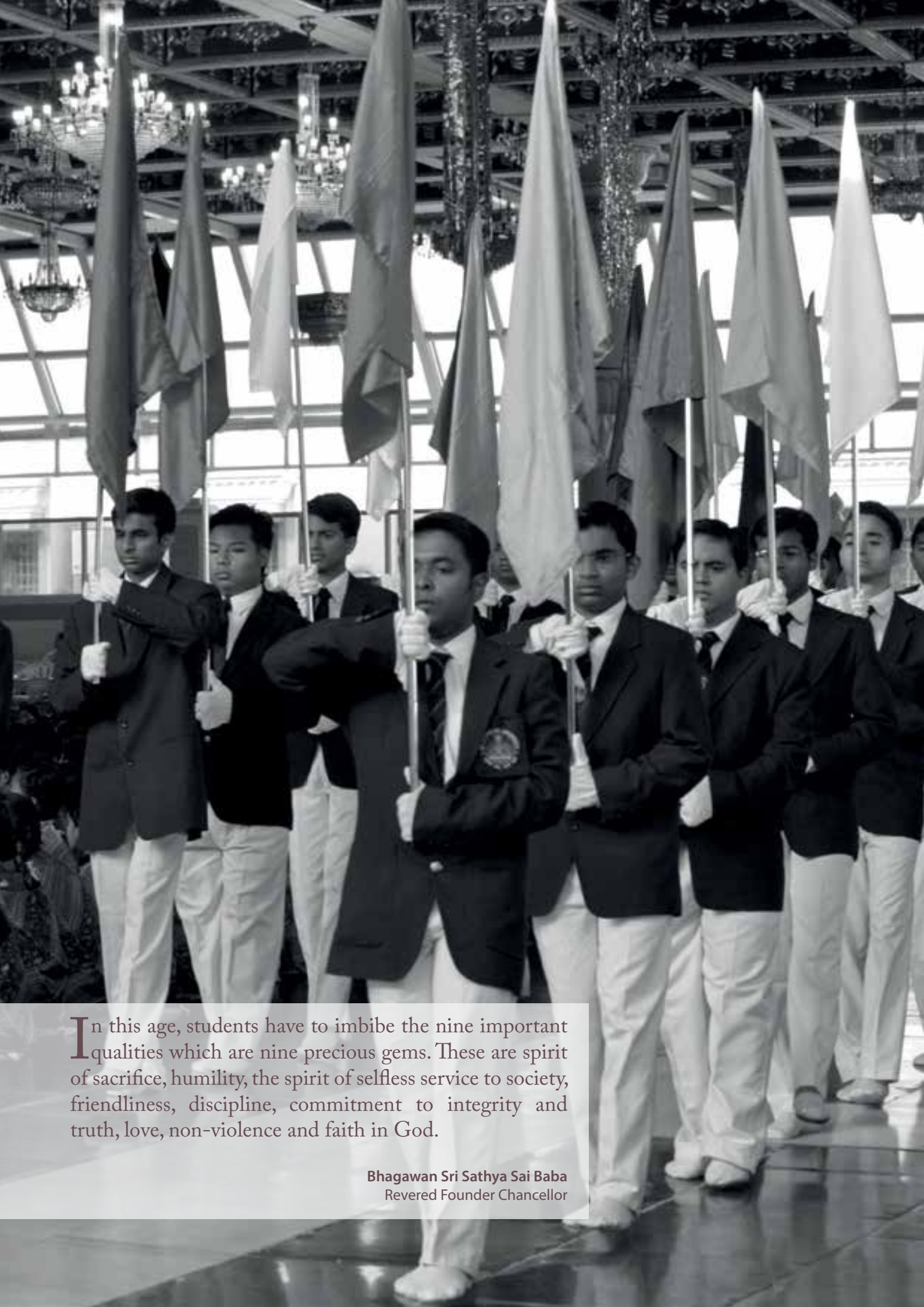
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**I**n this age, students have to imbibe the nine important qualities which are nine precious gems. These are spirit of sacrifice, humility, the spirit of selfless service to society, friendliness, discipline, commitment to integrity and truth, love, non-violence and faith in God.

**Bhagawan Sri Sathya Sai Baba**  
Revered Founder Chancellor



# INTEGRAL EDUCATION

2013/14

1

# Overview

## INTRODUCTION

Sri Sathya Sai Institute of Higher Learning (SSSIHL), with its headquarters in Prasanthi Nilayam (Andhra Pradesh) in India, is a visible manifestation of Bhagawan Sri Sathya Sai Baba's vision of education for human transformation. The National Assessment and Accreditation Council (NAAC) currently ranks SSSIHL amongst the top ten universities in India.

The university hosts over 1300 students across four campuses:

### For Women students:

- > Anantapur Campus at Anantapur, Andhra Pradesh

### For Men students:

- > Prasanthi Nilayam Campus, at Puttaparthi, Andhra Pradesh
- > Brindavan Campus, at Whitefield, Bangalore, Karnataka
- > Muddenahalli Campus at Muddenahalli, near Chickaballapur, Karnataka

The university has a merit-based open admissions policy for all, irrespective of income, religion or region.

SSSIHL provides free education to all programmes of study. This includes waiver of all fees- including tuition, examination, laboratory, library, sports and medical.

Programmes offered include undergraduate, postgraduate, professional and research.

## A MODERN GURUKULA

Sri Sathya Sai Institute of Higher Learning was founded on the basis that ethics and values must form the undercurrent of every subject taught to students. Here, the development of a student's character is just as important as earning degrees.

This holistic development of students can only be possible in an environment that develops the student's mind, body and spirit simultaneously.

To facilitate this, the university has a compulsory residential policy for all students, including those pursuing research. The environment is similar to the ancient Indian 'gurukula' system of education, in a modern context. Teachers and students live and grow together in an atmosphere of mutual

trust and unity in the spirit of sacrifice.

Most students typically spend between two to five years pursuing an education at SSSIHL. However, what differentiates them from graduates of other universities is the transformation of their hearts, not just the training of their minds.

An impact survey in 2010\* of over thirty years of SSSIHL alumni (women and men) highlighted the following facts:

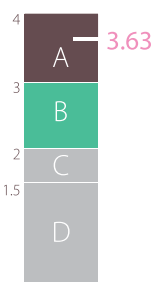
- > **Impact on the Workplace:** Over 50% of alumni are middle or senior managers, with over 80% of companies interviewed reporting 'high contribution' of SSSIHL alumni.
- > **Impact on Society:** Alumni (both in India and abroad) spend considerable amounts of their weekly time on service activities in the community.
- > **Impact on Personal Transformation:** Over 80% of alumni spend time on spiritual activities on a daily basis.

In this manner, the university achieves its objectives of enabling students to be professionally sound, socially responsible and spiritually aware.

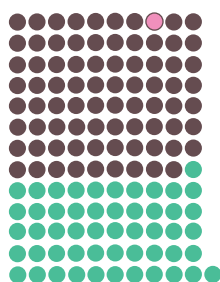
\*See page 16 for more details

## ACCREDITATION

'A' Grade Re-accreditation by NAAC



Cumulative Grade Point Average



SSSIHL ranks amongst the **top 10** universities re-accredited by NAAC under the new methodology

The National Assessment and Accreditation Council (NAAC) is an organization that assesses and accredits institutions of higher education in India. It is an autonomous body funded by the University Grants Commission, Government of India.

The assessment criteria include: Curricular aspects, Teaching-learning and Evaluation, Research, Consultancy and Extension, Infrastructure and Learning Resources, Student support and Progression, Governance and Leadership and Innovative practices.

The top ranking of an 'A' grade institution was awarded to SSSIHL on 8 Jan 2011.

Source: National Assessment and Accreditation Council (NAAC), 24 Sep 2014

# Facilities & Infrastructure

## OPTIMAL RESOURCES

The university continues to invest in providing the best infrastructure and resources to students- for academic, research and integral education activities.

During the past three academic years, ₹22 crores have been spent on equipment and infrastructure.

The expenditure ensures that students have access to the most modern infrastructure which will give them a high quality university education. This includes cutting-edge research laboratories, digital classrooms, high speed broadband connectivity, superb IT equipment, well-equipped libraries and world-class sports facilities.

## NEW INFRASTRUCTURE

### SRI SATHYA SAI CENTRE FOR ADVANCED STUDIES (SSSCAS)

The *Bhumi Pooja* for a new, modern 43,000 sq ft (4000 m<sup>2</sup>) centre at the Prasanthi Nilayam Campus, SSSIHL was performed on 17 February 2014.

The centre's major focus will be on interdisciplinary research in the field of Computer Sciences, Nanoscience, Medicinal Chemistry, Cell Biology and Structural Biology. It will also encompass advanced studies in Management, Economics, Leadership & Human Values, Philosophy and Indian Culture. The centre will have a service-based attitude in line with the Founder Chancellor's vision. It will undertake research that helps people and benefits humanity.



View of proposed Research Centre

## THE ANNEXE

The increase in student strength and a 50% increase in the number of researchers in the past three years has led the university to sanction an extension building - The Annexe - adjacent to the main building (at Prasanthi Nilayam Campus). The inauguration ceremony for the Annexe took place on site on 12 March 2014.

The 44,809 sq ft, beautifully lighted building spans over three floors. It hosts a number of classrooms, a conference hall, offices and an atrium that will be used for morning assembly and prayers.



## EXPENDITURE ON EQUIPMENT & INFRASTRUCTURE

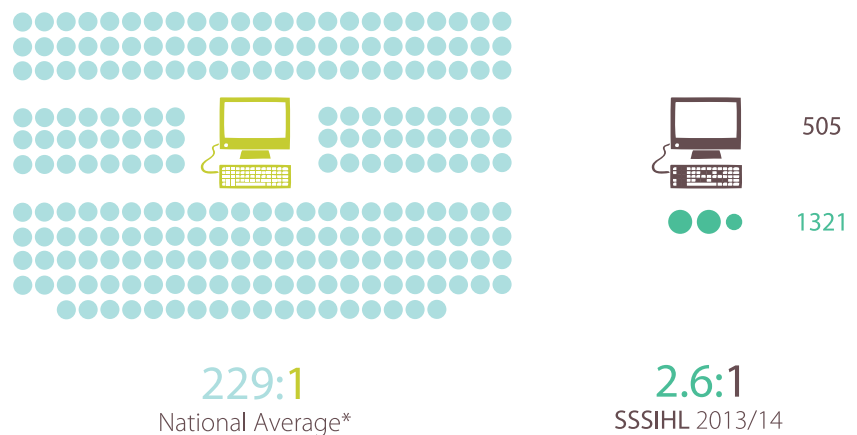


## HOSTEL FOR TEACHERS & QUARTERS FOR WORKERS

The inauguration ceremony for new buildings—a hostel building for teachers and clusters of quarters for contingent staff—at SSSIHL, Anantapur Campus took place on site on 14 March 2014.

The buildings accommodate the growing needs of the biggest and only women's campus of the university.

## STUDENT-COMPUTER RATIO



\*Source: UGC Report, Strategies and Schemes during Eleventh Plan Period (2007-2012) for Universities and Colleges, 2011

# University Governance

Sri Sathya Sai Institute of Higher Learning (Deemed to be University) is an independent and self-governing institution. It was established by the Sri Sathya Sai Institute of Higher Learning (Public Charitable Trust), which in turn has been established by the Sri Sathya Sai Central Trust. Bhagawan Sri Sathya Sai Baba is the founder of these Trusts.

## THE TRUST

The Sri Sathya Sai Institute of Higher Learning (Public Charitable Trust) was founded to foster the composite culture of India and promote in the students and teachers, an awareness and understanding of the social needs of the country; with special awareness to the needs of the rural population. It is aimed to inculcate in students a world perspective; an international outlook imbuing human values along with a spiritual and scientific education. Its members for 2013/14 were:

- > Sri Indulal H Shah, Former Chairman, SSS Seva Organisation
- > Sri V Srinivasan, All India President, SSS Seva Organisation
- > Justice A P Misra, Former Judge, Supreme Court of India
- > Prof. S P Thyagarajan, Former Vice-Chancellor, University of Madras
- > Sri S S Naganand, Member, Sri Sathya Sai Central Trust
- > Sri R J Rathnakar, Member, Sri Sathya Sai Central Trust

The Trust met on 22 November 2013.

## THE PRINCIPAL BODIES

Sri Sathya Sai Institute of Higher Learning (Deemed to be University) is an independent and self-governing institution.

The administrative and academic functioning of the university is carried out by the following two principal bodies:

1. The Board of Management
2. The Academic Council

## BOARD OF MANAGEMENT

The Board of Management is the principal authority of the university, responsible for its general management and administration. This includes: framing of rules, creation of posts (teaching and non-teaching), appointment and suspension/dismissal of members, constitution of committees, review and evaluation of teaching and research. It also has the power to constitute and lay down the functions and powers of the Selection Committees for the purpose of employing teaching and non-teaching staff, and other such committees as it may deem necessary. It meets four times a year. Its external members for 2013/14 were:

- > Sri S S Naganand, Member, Sri Sathya Sai Central Trust Nominee, SSSIHL (Public Charitable Trust)
- > Prof. K S Rangappa, Vice-Chancellor, University of Mysore, Mysore
- > Sujata Ramadorai, Professor of Mathematics, Tata Institute of Fundamental Research
- > Prof. D Swaminadhan, Chairman, Dr. D Swaminadhan Research Foundation (DSRF)
- > Sri Mohan Kanda, Former Chief Secretary, Govt. of Andhra Pradesh (Nominee, MHRD, Govt. of India)

The 2013/14 meetings took place on 20 July 2013, 19 September 2013, 22 November 2013 and 15 February 2014.

## THE ACADEMIC COUNCIL

The Academic Council is the principal academic body of the university. It has general control over and is responsible for the maintenance of standards of teaching, research and training, approval of syllabus, coordination of research activities, examinations and tests within the university. Its external members for 2013/14 were:

- > Prof. G K Karanth, Professor of Sociology, Institute for Social and Economic Change, Bangalore
- > Prof. V Nagaraja, Dept. of Molecular and Cell Biology, Indian Institute of Science, Bangalore
- > Prof. K A Suresh, Director, Centre for Nano

and Soft Matter Sciences, Bangalore

- > Prof. M P Vithal, Professor of Finance and Strategy, Indian Institute of Plantation Management, Bangalore
- > Prof. N S Nagaraj, Head, Dept. of Computer Science & Engineering, Don Bosco Institute of Technology, Bangalore
- > Prof. M Madhusudhana Rao, Dept. of English, Acharya Nagarjuna University, Andhra Pradesh

The Academic Council met on 15 October 2013.

## THE BOARDS OF STUDIES

The Boards of Studies are responsible for framing, initiating, or revising courses of studies and teaching methods at the university. They also makes suggestions regarding evaluation procedures and other academic matters concerning their subjects. Suggestions and recommendations of the departments are deliberated upon in the Boards of Studies meetings. The recommendations and suggestions of the Boards of Studies need to be approved by the Academic Council.

In 2013/14, the proposals of the Board of Studies were presented to the Academic Council on 15 October 2013.

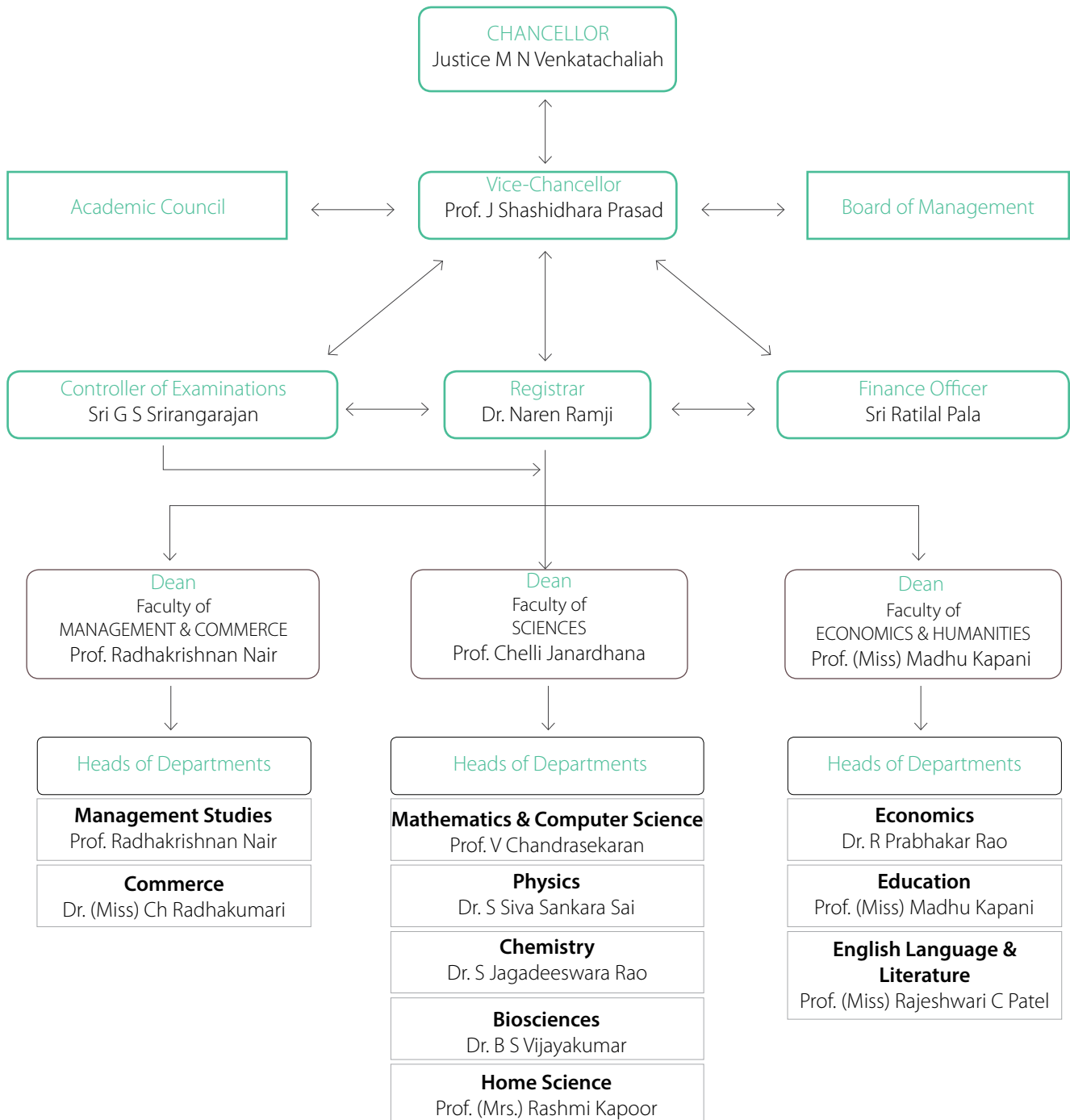
## IMPORTANT COMMITTEES

In addition to the principal bodies that govern the university, there are various committees that have been set up to ensure that the areas of academics and administration such as research and qualitative aspects, and buildings and library maintenance are in accordance to the highest standard that SSSIHL has striven to consistently maintain. Some of these include:

- > Finance Committee
- > Planning and Monitoring Board
- > Internal Quality Assurance Cell
- > Research Advisory Board
- > Departmental Committee
- > Examinations Committee
- > Institutional Ethics Committee
- > Institutional Biosafety Committee
- > Library Management Committee

# University Structure

REVERED FOUNDER CHANCELLOR  
BHAGAWAN SRI SATHYA SAI BABA



Sri Sathya Sai Institute of Higher Learning (Deemed to be University) is established by Sri Sathya Sai Institute of Higher Learning (Public Charitable Trust), which in turn has been established by the Sri Sathya Sai Central Trust. Bhagawan Sri Sathya Sai Baba is the Founder of these Trusts.

# Sri Sathya Sai Values-based Integral Education

## INTEGRAL EDUCATION

In the words of the Revered Founder Chancellor, Bhagawan Sri Sathya Sai Baba:

*In this university the medium of instruction is discipline. The first, second and third languages are love, service and sadhana (spiritual discipline)...*

*...Do you know why you have such a tight schedule in the hostel? This schedule is not structured by the Trust. Swami has personally structured this schedule. I have ordered the syllabus to be tight. Why is it so?*

*The minds of today's children, if given time, will turn into a devil's workshop. When the daily routine is tight, your mind cannot wander here and there.*

At Sri Sathya Sai Institute of Higher Learning, the development of a student's character is just as important as earning degrees.

Bhagawan Baba has designed the Sri Sathya Sai Values-based Integral Education in such a manner that between the time an 18-year old student joins the university and the time when she or he graduates (at the age of 21 or 23) there is an inner transformation that takes place deep in the student's being. This concept is very unique at the university level.

Therefore, while SSSIHL is one of the top ranked universities in India (see page 10), its compulsory residential character with the system of Values-based Integral Education makes it a modern *Gurukula*—a place where teachers and students live and grow together in love and wisdom.

This teacher-student interaction that occurs in the backdrop of the system of Integral Education includes five dimensions: Intellectual, Devotional, Cultural, Physical, and Service.

Adherence to discipline and appropriate behaviour are two important aspects that encompass these interactions. The five human values of Truth, Right Conduct, Peace, Love and Non-violence form the undercurrent of all the dimensions of integral education.

The objective of Sri Sathya Sai Values-based Integral Education is to bring to the fore the human values latent in both students and teachers. This is what Bhagawan Baba calls Educare.

## PROCESS

So, what does the process of Sri Sathya Sai Values-based Integral Education entail? What do the students really do over these years at SSSIHL that brings about this transformation within them?

The diagram on the opposite page summarizes the process of Sri Sathya Sai Values-based Integral Education. An introduction to all the dimensions and the key activities in each, is given below.

## DEVOTIONAL DIMENSION

- > Daily Bhajans (*Sankeertan*)
- > Daily Vedic chants
- > *Stotrams*
- > Daily Meditation & Silent sitting
- > Daily *Suprabhatam* (prayer at dawn)
- > Daily Assembly (college prayer)
- > *Brahmarpanam* (food prayer)
- > Daily *Kshama Prarthana* (prayer before sleep)

The activities of the devotional dimension enable a student to connect to his/her Divine inner Self. This inner connection opens the heart and brings forth the feeling of love, compassion and empathy for fellow human beings. Over a period of time, this results in a calm, focused and intuitive mind which benefits students, both in their academics and other pursuits.

## CULTURAL DIMENSION

- > Celebration of festivals
- > Brass Band
- > *Nadaswaram* & *Panchavadyam* ensemble
- > Annual Sports & Cultural Meet
- > Performing Arts: Music programmes, Drama & Dance
- > Fine Arts: *Rangoli*, Card making, Photography, Altar making
- > Public Speaking
- > Debates
- > Elocution

From the performing arts to public speaking to the fine arts – the cultural dimension is designed to give students wide opportunities to find an avenue to their individual artistic expression.

The university makes every effort to provide the best possible resources—both material and human—so that students excel at their chosen activity.

Festivals of major world religions are celebrated, reinforcing the unity among all faiths. Every student is involved in one way or another in the celebration of these festivals.

## PHYSICAL DIMENSION

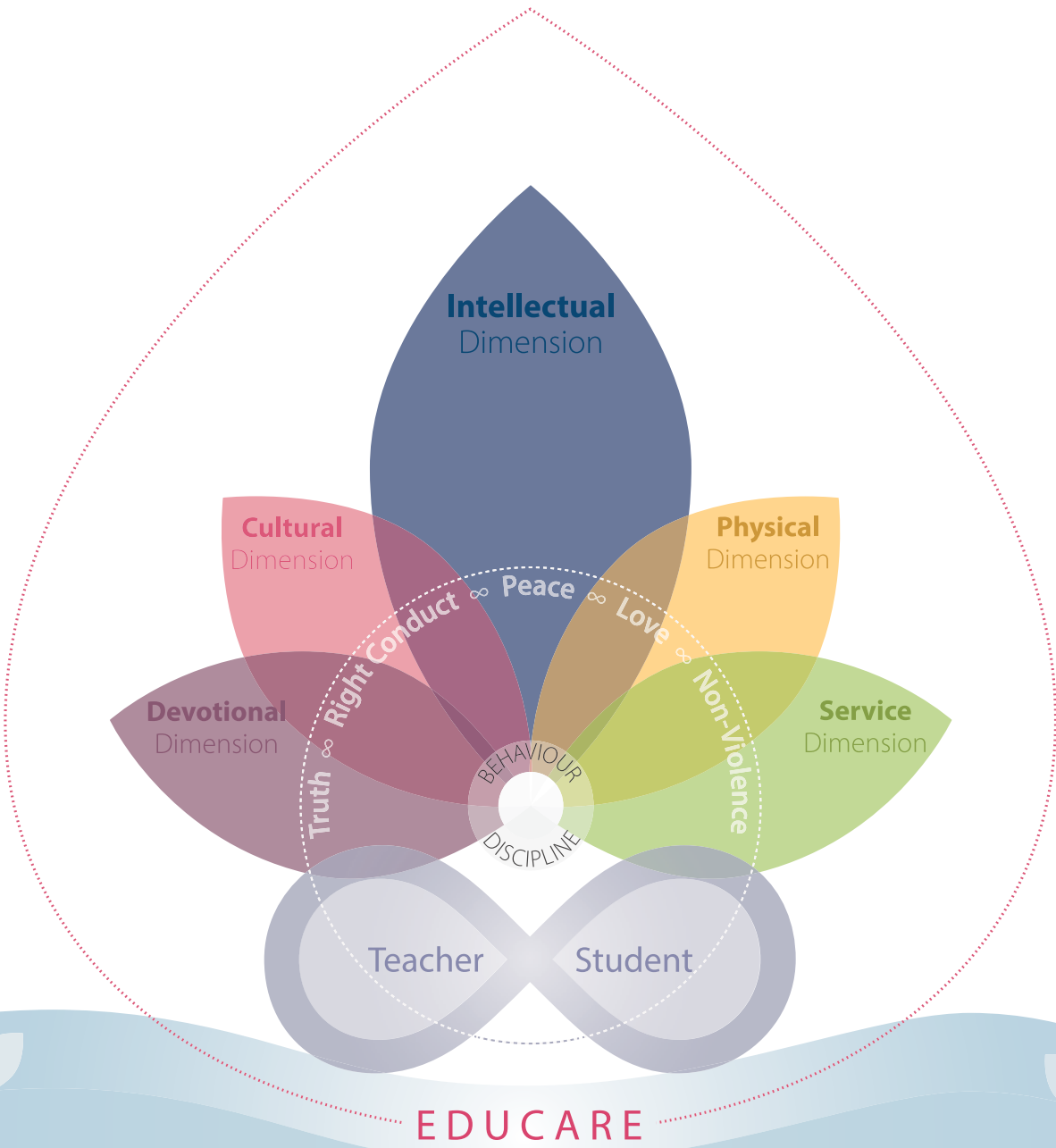
- > Sports
- > Games
- > Jogging
- > Exercises
- > *Yogasanas*
- > Annual Sports & Cultural Meet

Sports and games are a part of the daily routine of all students. From yoga classes to fitness training, from team sports to individual sports, students are encouraged to overcome their limitations and excel in these activities.

All campuses of the university are well equipped with sports facilities. These include cricket grounds, playing fields and basketball courts.

A multi-purpose outdoor stadium, the Sri Sathya Sai Hill View Stadium (with

Spiritually Aware  
Socially Responsible  
Professionally Sound



Modern Gurukula

a viewing gallery that accommodates 25,000 spectators) is used on many occasions, especially during the Annual Sports & Cultural Meet on 11 January.

The university also has an outstanding multi-discipline indoor stadium with a spectator capacity of 4,000. Facilities include basketball, volleyball, tennis, squash, table-tennis, badminton, gymnastics, yoga and a well-equipped gymnasium for aerobics and strength training.

## SERVICE DIMENSION

- > Self-Reliance departments:
  - Electricals
  - Plumbing (water supply)
  - Audiovisual
  - General store
  - Dispensary
  - Dietary services
  - Hostel Mess
  - Arts & Crafts
  - Costumes & props
- > Community living
- > Social Work
- > Voluntary work
- > Grama Seva (Annual Village Service)
- > Prasadam Distribution

The philosophy of service at SSSIHL is based on the concept that divinity pervades all of humanity, and hence when you serve others, you are serving the Divine. Students learn to serve without expecting anything in return, other than the deep inner satisfaction of giving joy to others.

The compulsory residential system, where students live in dormitory-styled accommodation with other students from totally different backgrounds (for a minimum of two years and up to five or more years), provides an excellent foundation for the service dimension.

For information on hostel life and the concept of Self Reliance at SSSIHL, see page 20.

## INTELLECTUAL DIMENSION

- > Academic studies
- > Research
- > Workshops & Conferences
- > Colloquia
- > Symposia
- > Talks and Discussions during Assembly
- > Awareness Class
- > Moral Class
- > Study Circles
- > Summer Course in Indian Culture & Spirituality

The university provides five-year integrated programmes combining undergraduate and postgraduate studies. Students receive their bachelor's degree after three years, and those who choose to pursue their master's degree are awarded one at the end of five years of study. This helps teachers to orient their teaching in a manner that inspires young students to get much more out of their chosen field of study than a conventional undergraduate programme.

In line with the vision of the Revered Founder Chancellor, all research at the university leads to societal benefit. Thus, the topics for doctoral research across all departments are chosen with great diligence, leading to directed basic research or translational research.

## OUTCOMES

It is the hope of the Revered Founder Chancellor that alumni of SSSIHL lead a life of sacrifice and conduct themselves as befits a member of Sri Sathya Sai Institute of Higher Learning.

One often asks the valid question that with so much effort and emphasis on integral education at SSSIHL, what *real* impact has it had on the daily lives of its alumni? The SSSIHL alumni impact survey in 2010 highlighted the following:

### Professionally Sound

SSSIHL alumni are employed in a wide range of industries: Banking, Finance, Insurance, Consulting, Manufacturing, IT, Education, Research, Health care and Telecommunications. Over 50% of them are in middle management or above in various corporations and organizations across the world.

### Socially Responsible

Almost 80% of all alumni are voluntarily involved in some service activity or community development programme on a regular basis, many of them in leadership positions. They are also known to take time out and support relief efforts - in times of natural disasters, for example.

### Spiritually Aware

A majority of alumni say that love of and faith in God, positive thinking, contentment, forbearance, love for fellow beings, discrimination, patience and adaptability were among the main qualities they acquired while at the university. They expressed that the lessons learnt at SSSIHL permeated all aspects of their lives and in turn touched all those with whom they came in contact.



# Residential Character

## HOSTEL

The compulsory residential system is an essential ingredient for Sri Sathya Sai Values-based Integral Education to achieve its stated outcomes. This is where the concept of the modern *Gurukula* really comes to the fore. In fact, Bhagawan Baba Himself designed the entire system and its activities, right down to the daily routine of students! It is being implemented exactly as per His vision.

For a detailed overview of hostel life at SSSIHL, see page 20.

## DAILY ROUTINE

All students stay in the hostel located in the campus. The daily routine at the Hostel is designed to keep students engaged in constructive and productive activities—academic and extracurricular—throughout the day.

The day typically starts at 5:00 a.m. with a couple of hours spent in prayer, exercise and other co-curricular pursuits (such as practice sessions for music, band, traditional Indian instrumental music and the likes). Classes commence at 9:00 a.m.

After college ends at around 4:00 p.m., students move to the *Mandir*/Prayer

hall for participation in congregational chanting (*veda*), devotional singing (*bhajans*) and other spiritual activities. These also include talks by eminent speakers on a variety of spiritual topics. Post dinner, students usually spend time on their studies.

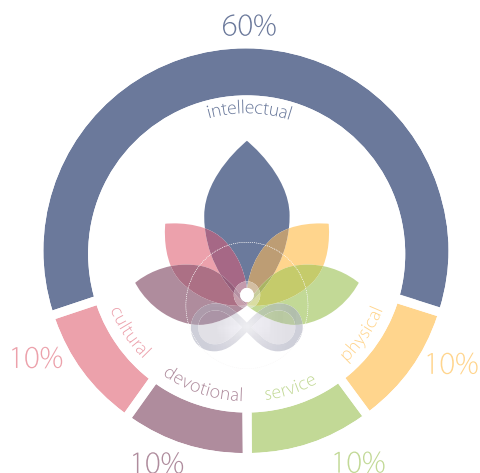
## TIME ON DIMENSIONS

There are extended periods during each semester when a significant amount of time is devoted to a particular dimension of Sri Sathya Sai Integral Education. The following pages will highlight some of these activities and their dimensions. Examples include:

- > Festivals (**Cultural & Devotional**)
- > Cultural presentations (**Cultural & Devotional**)
- > Summer Course in Indian Culture & Spirituality (**Intellectual, Cultural & Devotional**)
- > Annual Sports & Cultural Meet (**Physical & Cultural**)
- > *Grama Seva* & Community Service (**Service**)

The diagram below depicts the broad distribution of time students spend on different dimensions of Sri Sathya Sai Values-based Integral Education during the year.

## AVERAGE TIME SPENT ANNUALLY ON DIMENSIONS OF INTEGRAL EDUCATION



49

106



1 in 3 teachers are residential

(Stay with students in the hostel)

## RESIDENTIAL TEACHERS

Residential teachers voluntarily stay with students in the hostel. They choose this responsibility in addition to their academic and administrative workload. Like students, they also share rooms with typically three or more teachers in a single room.

They perform three fundamental tasks:

- > Ensure the all-round welfare of students
- > Discharge specific duties for the upkeep of the hostel daily routine and general discipline
- > Facilitate the smooth functioning of the hostel Self Reliance departments (see page 20 for details)

## MENTORING

Unlike other universities, where access to teachers is restricted to designated office hours, at SSSIHL the environment is such that students can approach teachers at various times during the day and can freely discuss both academic issues and personal matters with them—ranging from spirituality to family issues back home—in confidence.

As facilitators and mentors, teachers set an example by following the Sri Sathya Sai Values-based Integral Education as laid out by the Revered Founder Chancellor.



# Multi-faith Festivals

The Revered Founder Chancellor, Bhagawan Sri Sathya Sai Baba always highlighted the essence and unity of all religions. Hence, at SSSIHL, the celebration of festivals from major religions every year helps build a unique awareness in the mind and heart of each Sai student.

It is a significant part of the integral education model, and every student is involved in one way or another in the celebration of these festivals.

In 2013/14, some of the festivals celebrated include:

- > Eid-al-Fitr
- > Independence Day
- > Sri Krishna Janamashtami (cow procession)
- > Ganesh Chaturthi
- > Ganesh Immersion
- > Christmas
- > Ugadi
- > Sri Ramanavami

## UNIVERSITY BRASS BANDS

The story of the university brass bands, highlights the dedication, effort and graceful manner behind all integral education activities.

In the formative years, Sri Sathya Sai Baba spent a considerable amount of His time to initiate the brass bands and sent celebrated trumpeters like Maynard Ferguson and other instrumentalists to teach students how to play these instruments.

With the hard work and effort that goes into the practice sessions around the year, it is no surprise that the university today has three of the most versatile and complete brass bands.

They perform during ceremonial occasions, campus functions and during major events such as the Annual Convocation and the Annual Sports & Cultural Meet of the University- often to an audience of tens of thousands of people.

The senior students teach their juniors as they gain expertise in their own instruments. In this manner, the finesse and expertise passes on to each generation of students.



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- 1 Republic Day
- 2 Eid-al-Fitr drama
- 3 Avatar declaration day
- 4 Krishna Janmashtami pot breaking
- 5 Ganesh Chaturthi immersion
- 6 Christmas Day orchestra
- 7 Maha Shivaratri card offering
- 8 Ganesh Chaturthi procession
- 9 Krishna Janmashtami cow procession
- 10 Global Akhanda Bhajan prasadam
- 11 Laksharchana



# Cultural Presentations & Gratitude Programmes

Bhagawan Sri Sathya Sai Baba says:

*The end of culture is perfection.*

Throughout the academic year, at each campus of SSSIHL, students participate in a host of cultural activities. Examples of these include:

- > Music, devotional singing, dance, drama, quiz, panel discussion and elocution
- > Competitions in veda chanting, stotram recitation, teachings of the Bhagavad Gita (to promote among students a deep understanding and appreciation of India's rich and ancient culture and spiritual heritage)
- > Painting, sketching/drawing, card-making, bookmark-making and preparation of useful articles out of waste

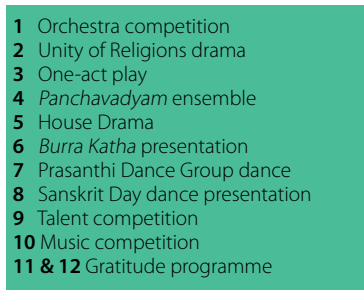
Participation by students is dependent on a student's level of skill or interest. With so many cultural activities throughout the year, everyone gets a chance to get involved.

For example, during dramas and the preparation leading to dramas, a number of students are involved in music, sets, lighting, costumes, makeup, etc. - all of which hone their team-building and leadership skills in organizing such functions.

Students are also encouraged to come forward and speak in front of the university community on topics ranging from science to metaphysics, thus giving them an appropriate platform to develop their public speaking skills and to refine their thought process.

## GRATITUDE PROGRAMMES

Each year, graduating students express their love and gratitude to the Revered Founder Chancellor for lovingly moulding them into worthy citizens and better human beings through speeches, skits, dance and musical presentations.



- 1 Orchestra competition
- 2 Unity of Religions drama
- 3 One-act play
- 4 Panchavadyam ensemble
- 5 House Drama
- 6 Burra Katha presentation
- 7 Prasanthi Dance Group dance
- 8 Sanskrit Day dance presentation
- 9 Talent competition
- 10 Music competition
- 11 & 12 Gratitude programme



# Hostel Life & Self Reliance

The philosophy of hostel life is based on the approach of community living wherein each one lives for the other and all live together for a common higher cause.

Students hailing from different states of India, diverse cultures and varied economic and financial backgrounds live in dormitory-styled accommodation with 10-14 students staying together in a room. The pan-Indian character of the university comes alive in the hostel. The hostel buildings are also aesthetically pleasing, thus creating a noble ambience for students to live in.

As a result, the hostel is a miniature model of the world outside with people of different habits, temperaments, lifestyles, language and outlook staying together and working. This develops the qualities of understanding, adjustment, sharing and caring amongst the students. It nurtures virtues like adaptability, tolerance and sacrifice; developing students into noble and responsible citizens.

The ambience in the hostel is suffused with both discipline and loving care. All doctoral research scholars and one

of every three teaching faculty reside with the students in the hostel. The relationship between the students and teachers is very cordial and warm, and the teachers pay personal attention to the problems of each and every student. The teachers are chosen with extreme care to play an important role in this process. Many of them are alumni of the Institute, dedicated and well versed in integral education. They serve as facilitators and are available at all times for mentoring the students on personal and academic matters.

Personal cleanliness, punctuality and regularity, behaviour, personal etiquette and room cleanliness- these are the major components of the discipline that is followed at SSSIHL hostels.

## SELF RELIANCE

A major portion of the functioning of the hostel is taken care of by the students and resident staff members. The guiding principles of the hostel are a simple life coupled with self reliance. Students do their work with least dependence on external agencies. To inculcate the dignity of labour and respect for work, most functions and departments of the hostel are run by

students under the able guidance of resident faculty.

The self reliance departments include:

- > Electricals
- > Plumbing (water supply)
- > Audiovisual
- > General store
- > Dispensary
- > Dietary services
- > Hostel Mess
- > Arts & Crafts
- > Costumes & props

These self reliance activities enable students to become self-confident and independent. They also contribute to leadership and entrepreneurial development. To maintain continuity and effective succession planning, senior students train the junior students in all aspects of each self reliance department before graduating.





# Community Service

On their own volition, students and teachers of the university work with local communities around the campuses. Example of these from 2013/14 include:

## RIVER CLEANUP

1

*Prasanthi Nilayam & Brindavan Campus*

The sacred Chitravati river in Prasanthi Nilayam has a litter problem today.

A river cleanup program initiated in September 2013 by employees and alumni of Sai institutions (including SSSIHL students) has gained momentum and scores of people on Sundays (including local youth), pick up litter, bag it and place it in newly created garbage cans along the river front. They also helped plant about 50 flowering trees and level the riverbed and surrounding areas.

## LET THERE BE LIGHT

2

*Brindavan Campus*

Students visited homes of village folk without electricity in the nearby Tarabahalli village to install solar bottle bulbs - an ecologically sustainable and free-of-cost source of interior light to rooms in simple dwellings with a thin roof using plastic bottles filled with

water plus a little bleach (to inhibit algal growth), fitted through the roof.

During daytime, the water inside the bottle refracts sunlight, delivering as much light as a 40- to 60-watt incandescent bulb to the interior. The 'bulb' can last up to 5 years.

Other activities included building and installing smokeless *chulas* (firewood saving stoves for healthy indoor coking) in villagers' homes and taking part in *Narayan Seva* activities.

## ADOPTING A LEPER COLONY

3

*Anantapur Campus*

The campus warden, with the help of students and alumni, has adopted a leper colony since 1986.

Aptly named *Love Stream*, the project has helped transform the lives of 25 socially marginalized families through dedicated love and care.

The colony that consisted of 10-12 huts in 1986 now has 20 neat little houses. The creatively raised capital has funded water pumps, stationery items, food supplies and even 50 trees so that they can sell their own fruits and earn an income. As a result, almost every family now has its own bank account.

Practicing human values, bhajan singing, educating them in various ways - these are some of the issues that the warden and students have taken the time to help the lepers with.

The long-term objective is to make the families self-sufficient in every way.

## SERVING VILLAGERS' NEEDS

4

*Muddenahalli Campus*

Students and teachers have taken up activities such as village cleaning after liaising regularly with the *panchayats* of surrounding villages, in an effort to better serve the needs of villagers.





# Summer Course in Indian Culture & Spirituality

The **Special Annual Events** comprise five marquee events at SSSIHL which cover all the five dimensions of Sri Sathya Sai Integral Education. A tremendous amount of hard work and effort is put into them every year.

We will cover them briefly in the following pages.

The Summer Course in Indian Culture & Spirituality serves as an induction programme to all students and teachers of the university with an objective to expose students of the university to the rich cultural and spiritual heritage of *Bharath*. It orients students into Bhagawan Baba's educational philosophy and gives them deep, first hand insights into how they can directly benefit from this unique institution.

morning, afternoon and evening sessions.

The morning sessions consist of talks by teachers and research scholars of the university. Typically, they entail key insights and lessons from the ancient Indian scriptures, spiritual personalities and concepts. The sessions also feature a short video show on Bhagawan Baba.

In the afternoons, students and teachers from all four campuses have breakout sessions where they discuss teachings and lessons from Bhagawan Baba's discourses. Key moral messages from these are creatively presented on the final day before the valediction.

The evening sessions on the first two days of the event consist of a music programme by students of individual campuses, along with veda chanting and bhajans in the Sai Kulwant Hall.



## FORMAT

Each day is typically split into the



1



2

- 1 Vice-Chancellor's inaugural address
- 2 Bhajan Antakshari
- 3 Alumni panel discussion
- 4 & 5 Quiz
- 6 Music presentation
- 7 Veda chanting
- 8 & 9 Global presentations based on study circle



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## SUMMER COURSE 2013

### Theme for Study Circle:

#### Mastery of the mind

(Based on the 1990 Summer Course discourses by Bhagawan Baba)

#### Day 1 – Saturday, 8 June 2013

- > Welcome Note & Inaugural Address
- > Two talks on Lessons from the Ramayana and Mahabharata for Modern Society
- > Darshan Video of Bhagawan
- > Bhajan *Antakshari*
- > Study Circle
- > Veda and Talks by students
- > Music Programme by Muddenahalli Campus

#### Day 2 – Sunday, 9 June 2013

- > Panel discussion on Ideal Sai Students and their Role in Society
- > Short video film - The Message of the Avatar
- > Talk on Lessons from the *Bhagavatam* for Modern Society
- > Quiz on the 'The lives of all Avatars' as narrated by Bhagawan Sri Sathya Sai Baba
- > Study Circle
- > Veda and Talks by Students
- > Music Programme by Anantapur Campus

#### Day 3 – Monday, 10 June 2013

- > Situational analysis exercise
- > Darshan Video of Bhagawan
- > Global presentations on the collective learning of the key

moral and life lessons from Swami's discourses deliberated upon during the study circle sessions

- > Valedictory Session

#### Parayanam Sessions

Sharing of experiences with Bhagawan Baba by senior teachers and alumni of SSSIHL with students of respective campuses take place in the evenings after dinner.





# Sri Sathya Sai Grama Seva (Village Service)

For over 1300 young university students (and their teachers), nine days of their academic year is spent in the service of almost 300,000 village folk from over 150 villages. This includes distribution of food, clothes and other items, along with devotional singing, thus converting the food into *prasadam*.

The university students, research scholars and teachers largely manage the entire project—the planning, resourcing, organizing and implementation—from start to finish. See the opposite page for details.

## IMPACT OF GRAMA SEVA

The Revered Founder Chancellor, when initiating this project in the year 2000, stressed that the greatest beneficiaries of this are not the villagers, but the students. What impact does *Grama Seva* have on students and villagers?

### ON STUDENTS

- > It inspires students to live their lives along a higher ideal.
- > It sensitizes them to the problems of our society, to rural life and needs of the lesser privileged sections of the community.
- > It trains students to work in teams and groups under constraints of time and resources.
- > It enables the students to appreciate the joy associated with service.

### ON VILLAGE FOLK

- > It kindles hope in their hearts, reinforcing their faith in the truth that God will take care of them.
- > The *prasadam* distributed after *nagar sankirtan* and bhajans is symbolic of Bhagawan Baba's Divine love, compassion and grace, and of His assurance of protection.
- > They receive food and clothes at the physical level, but hope and faith at the mental level and bliss at the spiritual level.



- 1 Preparation - Ladoos
- 2 Preparation - Rice
- 3 Packing - clothes
- 4 & 5 Packing - Food packets
- 6 Loading food crates into trucks
- 7 Circumambulating the *Mandir*
- 8 Loading refreshments
- 9 Leaving for villages
- 10 Unloading at the village
- 11 Sanctifying the village with prayers
- 12 Serving each person at their doorstep





## PLANNING



### Procurement of clothes for distribution

#### Recce

A month in advance, a team of staff and research scholars survey 150 villages in 3 mandals.

They check for:

- Condition of roads
- Accessibility levels for various vehicles post the rains
- Demographics
- Transportation & Logistics Requirements

1 month in advance

## PREPARATION



**Kitchen:** responsible for preparing food for 33,000 people everyday, including:

**Rice:** This involves four steps: Cooking the rice, making the tamarind mix, cooling the rice and then the mixing process. *Sevadals* and volunteers assist in this process.

**Ladoo:** A few weeks in advance, women *sevadals* and volunteers make around 3,00,000 *laddos*.

## PACKING



### Ladoo packing

Students pack the *laddos* in small paper bags to prevent breakage.

### Rice packing

Starting at 2:00 a.m., for all the nine days, women students and staff pack rice into packets of around 350g each.

### Clothes packing

*Sarees* and *dhotis* are bundled for convenient handling and distribution.

## LOGISTICS



### Logistics

Depending on the number of people each vehicle will serve that particular day, the logistics team decides the amount of food to be loaded per vehicle.

### Loading

Starting at 5:00 a.m., students load these crates of food and clothes into the vehicles as per the lists prepared.

### Vehicle Maintenance & Logistics

Students take care of the maintenance and fuel requirements of the vehicles going for distribution, including food and other needs of the drivers

## SERVING



Students are organised into teams of 30 members with a teacher in-charge of each team.

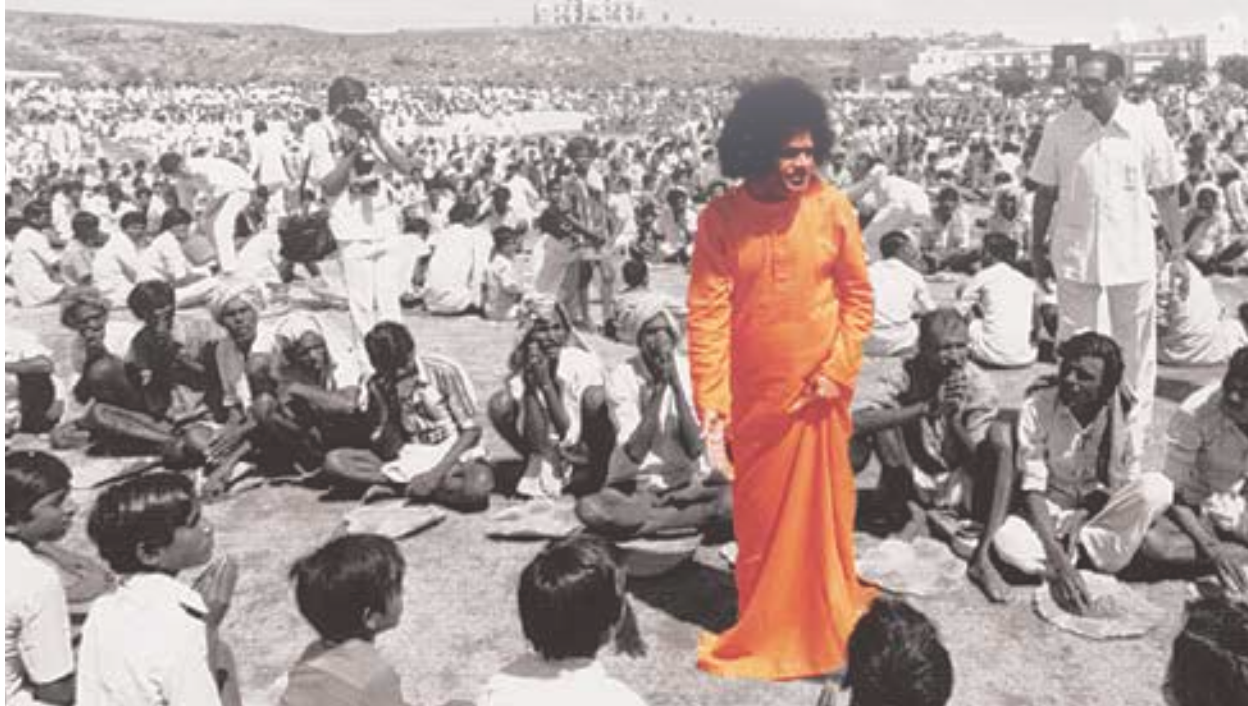
### Serving

After prayerfully circumambulating the *Mandir*, students go to their respective vehicles and head to the villages. After sanctifying the atmosphere with bhajans, they serve the *prasadam* at every doorstep as a token of Bhagawan's love.

The students too partake of the same *prasadam* as lunch.

EVERY DAY FOR ALL NINE DAYS

Manava Seva is Madhava Seva  
Sri Sathya Sai Baba



## GRAMA SEVA 2013

153

Villages Served

285,250

People served

285,250

Food packets distributed

46,885

Sarees distributed

44,255

Dhotis distributed

ALL STUDENTS AND  
STAFF PARTICIPATE



# Dasara Celebrations & Prasanthi Vidwan Mahasabha

## VEDA PURUSHA SAPTAHA JNANA YAGNA

Since the early sixties, the festival of Dasara in Prasanthi Nilayam has been closely associated with the Veda Purusha Saptaha Jnana Yagna- a week-long worship conducted in the Divine



Presence for the welfare of the whole world. The *Yagnam* commences on the fourth day of Dasara and concludes with the *Poornahuti* – the final oblation that is offered on *Vijayadasami*, the tenth day.

The most important component this worship is the *Rudra Yagam* where the oblations are made in the *Yagna Kunda* to Lord Shiva while chanting hymns from the *Sri Rudram*. In addition to this, other rituals like *Surya Namaskara*, worship of *Devi*, *Sahasralinga Archana*, *Srimad Bhagavatha Parayana*, *Ramayana Parayana* and the *Devi Mahatmyam* are simultaneously performed.



The students of Sri Sathya Sai Institute of Higher Learning take active part in the *Yagnam* by chanting the vedas, reading the scriptures and performing other parts of the worship along with the learned pundits.

## PRASANTHI VIDWAN MAHASABHA

The evening programmes during the seven days of the *Yagnam* are held in Sai Kulwant Hall, under the auspices of the Prasanthi Vidwan Mahasabha, where many speakers—primarily students and functionaries of Bhagawan's institutions—address the gathering on topics concerning spirituality and philosophy, Bhagawan's teachings and experiences of devotees.



**Topics Covered:**  
**Prasanthi Vidwan Mahasabha**

- > Glory of Bhagawan's Mission
- > Path of Service
- > Steps to Happiness
- > Thy will be Done
- > Attuning to God
- > Pathway to Sai Sannidhi
- > Glory of Divine Mother
- > Glory of Bhagawan's Love



# Convocation

## XXXII CONVOCATION

The Annual Convocation of the Sri Sathya Sai Institute of Higher Learning (SSSIHL) was held in the Divine presence at the Sai Kulwant Hall, Prasanthi Nilayam on 22 November 2013. The evening programme began with a ceremony to give away the Sai Krishna Awards for Excellence in Research (for further details, see page 53) just before the Convocation drama.

This year, the ceremonial procession entered Sai Kulwant Hall at 10.00 a.m. It included the chief guest, Sri Sam Pitroda, Former Advisor to the Prime Minister on Public Information Infrastructure and Innovations; Honourable Chancellor of SSSIHL, Honourable Justice M N Venkatachaliah, Former Chief Justice of India; Prof. J Shashidhara Prasad, Vice-Chancellor; former Vice-Chancellors of the university; members of the Board of Trustees; members of the Board

of Management and the Academic Council. The procession was led by the university brass band followed by two students carrying the University Standards on either side of the Registrar, who carried the ceremonial mace.

The Vice-Chancellor sought the blessings of the Revered Founder Chancellor, Bhagawan Sri Sathya Sai Baba. The Registrar, Dr. Naren Ramji then formally welcomed the chief guest by garlanding him. The proceedings of the convocation began with chanting of Vedic hymns by a group of students. The Vice-Chancellor then prayed to the Revered Founder

**I hereby solemnly declare and promise that, if admitted to the degree for which I have been duly recommended, I will in my daily life and conversation, and in thought, word and deed, conduct myself as befits a member of the Sri Sathya Sai Institute of Higher Learning; that I will to the utmost of my capacity and opportunity, support the cause of sound learning, humanity, morality and spirituality; and that as far as lies in me, I shall uphold and advance the social and indeed all round welfare of my countrymen and fellowmen.**

### CONVOCATION PLEDGE, SSSIHL



Chancellor, Bhagawan Sri Sathya Sai Baba to declare the Convocation open. The convocation was declared open in Bhagawan's voice.

Sri G S Srirangarajan, Controller of Examinations, SSSIHL presented the graduands of the year to the Honourable Chancellor, Justice M N Venkatachaliah for admitting them to their respective degrees. The Vice-Chancellor then administered the convocation pledge to the graduands.

This year, 391 students attended the convocation to receive their degrees. Twenty-four students were awarded

gold medals and five research scholars were awarded doctoral degrees.

This was followed by convocation addresses by The Honourable Chancellor, Vice-Chancellor and the Chief Guest, after which an excerpt of one of the Revered Founder Chancellor's previous benedictory address was broadcast.

In His benedictory address, Bhagawan Baba described a man of knowledge as the one who understands the five aspects of education, i.e. what is education, what type of education should be acquired, what is the standard/yardstick of education, what is the type of education to uplift humanity and what is the use of present day education. He emphasized that character and culture are essential for students, which can be achieved through practical knowledge and not by superficial knowledge. He stressed that practical knowledge can be

acquired by education- bringing to the fore the human values latent within us. This education has to be used for social welfare.

The Divine Benediction was followed by the national anthem and aarti, marking the end of the 32<sup>nd</sup> Annual Convocation ceremony.

## CONVOCATION DRAMA

A drama presented by students of SSSIHL on the occasion of the 32<sup>nd</sup> Annual Convocation, entitled *Sai Kathamrutham- Stepping Stone to God* was a fitting finale to the day.

The drama conveyed that to establish a connection with God, one has to first detach oneself from the world. One must then cultivate a persevering faith in God and lastly, one must take up but a single step towards Him and God will take a hundred steps closer to the devotee, leading to the merging of man with God.



## GOLD MEDAL AWARDEES 2013/14

### Dinesh Majeti

Distinction in M.Tech. in Computer Science

### K N Kartheek

Distinction in M.Tech. in Applied Optics

### Chintakayala Krishna Das

Distinction in M.B.A.

### Rashmi Ranjan Jena

Distinction in M.B.A. in Finance

### Goturu Sai Sudheer

Distinction in M.Sc. in Mathematics

### Sanathana K V

Distinction in M.Sc. in Physics

### Sai Shiv Narayan

Distinction in M.Sc. in Nanoscience & Nanotechnology

### Vernekar Dnyanesh Vinayak

Distinction in M.Sc. in Chemistry

### Ranjan Devkota

Distinction in M.Sc. in Biosciences

### Akash Krishnan

Distinction in M.A. in Economics

### Srimalla Srikanth

Distinction in B.Sc. (Hons.) in Mathematics

### Ramakrishnan A R

Distinction in B.Com. (Hons.)

### Rajesh Siwakoti

Distinction in B.A. (Hons.) in Economics

### R Divya

Distinction in B.Ed.

### Sunandini C Haldipur

Distinction in M.A. in English Language & Literature

### Balabadruni Shantipriya

Distinction in M.Sc. in Food Science and Nutrition

### Varkekar Namrata Jagdeo

Distinction in M.Sc. in Food Technology

### V M M Saipavitra

Distinction in B.Sc. (Hons.) in Physics

### K R Sai Kiran

Distinction in B.Sc. (Hons.) in Chemistry

### A B Aishwarya

Distinction in B.Sc. (Hons.) in Biosciences

### Channa Sripadmavalli

Distinction in B.Sc. in Home Science

### Latika Kalyan

Distinction in B.A.

### Akriti Pradhan

Distinction in M.Phil. in Food Science and Technology (Sciences)

### Manisha Thakuri

Distinction in M.Phil. in English Language & Literature (Humanities)

## PH.D. AWARDEES 2013/14

### Sri A Sunil

Doctor of Philosophy in Chemistry

Fluorometric and Photometric Methods for Determination of Transition Metals in Trace Levels

### Sri Vennel Raj

Doctor of Philosophy in Biosciences

Studies in Biodiversity of *Aegle marmelos* (Linn.) Correa Using Morphological Traits and Molecular Markers

### Sri V N S Malleswar D Kota

Doctor of Philosophy in Biosciences

*Pila globosa* (Indian Apple Snail) a Sentinel Organism to Monitor Climatic Stress in the Ecosystem: Mechanisms of Adaptation

### Devi Sudheer Kumar Chunduri

Doctor of Philosophy in Computer Science

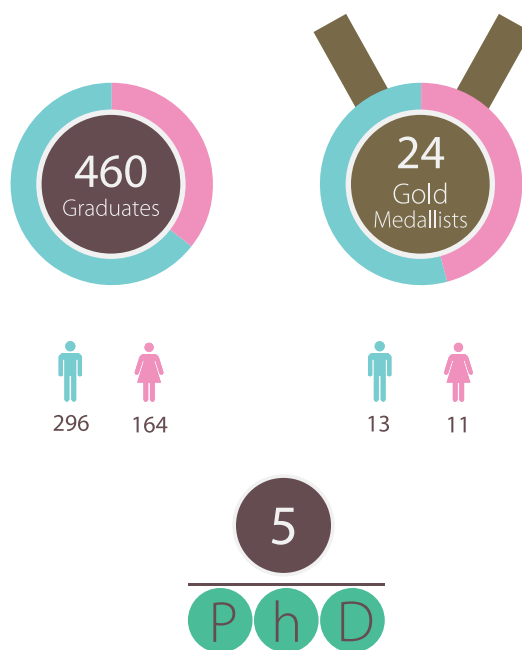
Topology and Routing Aware Mapping on Parallel Processors

### Sri D Hanumantha Rao Naidu

Doctor of Philosophy in Computer Science

Context-Based Speech Enhancement

## GRADUATES 2013/14





# Sports & Cultural Meet

**W**e, the children of Sai, swear that, we shall take part in the Annual Sports & Games of Sri Sathya Sai Institutions, in fair competition; respecting and abiding by the rules which govern them and with a desire to participate in the true spirit of sportsmanship, for the honour of our country, the glory of sport and our beloved Mother Sai.

**SPORTS MEET OATH, SRI SATHYA SAI EDUCATIONAL INSTITUTIONS**

The preparations begin a month in advance of the grand display at the Sri Sathya Sai Hill View Stadium on 11 January every year. The performance routines are perfected, the skills are honed, the band and march past practice attains perfection, the props are finished, and final touches to each presentation are made.

This culmination of the enormous effort by students, their coaches and teachers is not in their personal glory, but in the deep sense of satisfaction that they make the Revered Founder Chancellor happy and proud.

The grand display of physical items on 11 January is followed by cultural programmes in Sai Kulwant Hall. Each campus of the university performs a drama or musical presentation. This five-day Sports & Cultural Meet culminates with the Prize Distribution ceremony for sports and cultural events.



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1 Welcoming Sai  
2 Anantapur Campus presentation  
3 Prasanthi Nilayam Campus  
4 Brindavan Campus presentation  
6 Prasanthi Nilayam Campus  
7 University Brass Band  
8 Muddenahalli Campus presentation



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## SPORTS & CULTURAL MEET 2014

The Sports & Cultural Meet was held over five days from 11 to 15 January 2014 at Prasanthi Nilayam.

## CAMPUS PRESENTATIONS

### Prasanthi Nilayam Campus

#### SPORTS

- > Transcenders Ropes and Rings: Gravitons
- > Giant Wheel: Wheel Wizards
- > Trampoline Trampsters
- > LED: Let Everybody Dance

#### CULTURAL

- > Drama titled Jaya, based on selected episodes from the Mahabharata.

### Anantapur Campus

#### SPORTS

- > Russian Folk Dance
- > Display on Bikes
- > Mystic Whites

#### CULTURAL

- > Drama based on the Chinna Kathas told by Bhagawan Baba on various occasions in His Discourses. The drama was an exhibition of skilled puppetry.

### Brindavan Campus

#### SPORTS

- > Celestial Rhythms
- > Master Strokes
- > Disaster Management

#### CULTURAL

- > A musical drama based on the life of Saint Thyagaraja highlighting the beauty of devotion to God through *kirthanam* (music).

### Muddenahalli Campus

#### SPORTS

- > Bicycle Formations and Stunts, Art in Motion

Prasanthi Nilayam. The order of the day was as follows:

- > Grand procession comprising the university brass band, veda chanting students and a flag-bearing squad
- > Introductory speeches and talks by students
- > Awarding of the Founder Chancellor's trophies to all the Sai educational institutions
- > List of winners presented to Bhagawan
- > Championship trophies awarded
- > Divine Message & aarati

## PRIZE DISTRIBUTION CEREMONY

The Prize Distribution Ceremony of the Sports and Cultural Meet was held on the auspicious day of Makarasankranti, 14 January 2014 in Sai Kulwant Hall,



- 1 Prasanthi Nilayam Campus drama on selected episodes from the Mahabharata
- 2 Anantapur Campus puppet drama on Chinna Kathas told by Bhagawan Baba
- 3 Brindavan Campus musical drama on the life of Saint Thyagaraja



### Athletics Champions 2013/14

<b>Pratima Barrailly</b>	Postgraduate <i>Anantapur Campus</i>
<b>Apoorva Awasthi</b>	Undergraduate <i>Anantapur Campus</i>
<b>Gunaranjan K S</b>	Postgraduate <i>Prasanthi Nilayam Campus</i>
<b>Anirudh Pavithran</b>	Undergraduate <i>Prasanthi Nilayam Campus</i>
<b>Menon Sai Aditya Anilkumar</b>	Undergraduate <i>Brindavan Campus</i>
<b>Sudheendra N R</b>	<i>Muddenahalli Campus</i>

### Cultural Champions 2013/14

<b>Sharanya Gopalakrishnan</b>	Postgraduate <i>Anantapur Campus</i>
<b>Priya Gurumoorthy</b>	Undergraduate <i>Anantapur Campus</i>
<b>Aditya Moktan Tamang</b>	Postgraduate <i>Prasanthi Nilayam Campus</i>
<b>Devjeet Auddy</b>	Undergraduate <i>Prasanthi Nilayam Campus</i>
<b>Satya Prakash Mohanty</b>	Postgraduate <i>Brindavan Campus</i>
<b>Sai Sankar Sarangi</b>	<i>Muddenahalli Campus</i>

### Fine Arts Champions 2013/14

<b>Ashasmita Subhadarshine Mishra</b>	Postgraduate <i>Anantapur Campus</i>
<b>Gayathri S</b>	Undergraduate <i>Anantapur Campus</i>

Champions with their trophies



Prize Distribution Ceremony







# Awareness Course, Moral Class & Prayer Talks

Bhagawan Sri Sathya Sai Baba set up the curriculum in a manner that helped students develop broad-mindedness and compassion. He said:

*Education must broaden the heart; it must expand one's love. Fortitude and equanimity belong to the Reality in man. One must reveal this fact in every act.*

To help achieve this, along with their academic courses, students are exposed to the following Intellectual Dimension activities:

## AWARENESS COURSE

The Awareness Courses are designed for both undergraduate and postgraduate programmes, and aim at cultivating a broad view of the human condition in students. This holistic view includes the contributions of all cultures. It reveals the unity of all great world religions and provides an understanding of their underlying spirituality. It fosters a yearning in students to alleviate human misery and distress.

The course content helps trigger self-reflection and enquiry in students. It sensitises them to the concerns of society and gets them to think about practical solutions to these problems.

At the undergraduate level, classes cover topics such as:

- > Philosophy of Education
- > Unity of Religions and Faiths
- > Ethos and Values and their Relevance in the Current Milieu
- > Life and its Quest
- > Study of Indian Classics Such as Ramayana and Bhagavatam.

A lot of the course content is from Sai literature- books written by Bhagawan Baba Himself, such as the *Vahinis*.

For postgraduate students, the focus is on introducing students to the practical aspects of spirituality, enabling them to apply the spiritual principles from the ancient scriptures to the problems of modern society.

## THURSDAY MORAL CLASS

At each campus, Thursday mornings begin with an hour of inspiring and ennobling talks by eminent speakers stressing on their personal spiritual experiences, messages from sacred scriptures and other elevated and socially relevant themes (such as patriotism, societal service, professional values, Indian culture and heritage and the like). It is also used to highlight students' talents in music, dramatics, elocution, debates, quizzes, etc.

2013/14 topics included:

Experiences with Bhagawan Baba, classical music competition, mono acting, drama on Vivekananda, skits, Swami, Values and Cricket: Interview with Sri V V S Laxman, etc.

## PRAYER TALKS

Every morning before classes commence at the college, all students and teachers gather for the morning assembly. Prayers/veda chanting/ bhajans and a few minutes of silent sitting are sometimes followed by a talk by students, faculty members or invited guests on topics related to morals and values.

2013/14 topics included:

- > The Power of Giving
- > When the Mind is without Fear
- > Power of *Namasmarana*
- > Patience is all the Strength Man Needs
- > Swami's Love as a Father
- > Power of Prayers
- > Duty of a Sai Student
- > Service: Solutions for Social Problems
- > Motivation
- > The Rama Principle
- > Devotion & Friendship

Moral Class in progress





**T**he real sign of an educated person is his attitude of sameness towards all. He sees in society the manifestation of divinity. Every student should observe the three principles of equality, unity and cooperation. Education has to aim at ensuring peace and stability in each country by continuous precept and practice of the basic unity.

**Bhagawan Sri Sathya Sai Baba**  
Revered Founder Chancellor

# ACADEMICS

2013/14



2



# Academics Overview

## HOLISTIC EDUCATION

At SSSIHL, academics and co-curricular activities go hand-in-hand. So much so, that each graduand's degree certificate has two final grades - one for cumulative academic performance, and the other for cumulative performance in Integral items (activities in the sports, culture, service and devotional dimensions.)

This holistic evaluation system at the university is designed to foster unity, teamwork and a spirit of sacrifice amongst both faculty members and students. Students are consistently provided with opportunities to develop their potential for leadership, teamwork, ethical and moral behaviour. A disciplined routine (both academic and residential), which the teachers themselves follow, sets a precedent for students to emulate.

## INNOVATIVE EVALUATION SYSTEM

The examination system constitutes the continuous internal evaluation (CIE) which spreads across the entire semester and End of Semester Examination (ESE) which is conducted at the conclusion of a semester.

CIE enables graded learning as students are evaluated on a monthly basis through tests/assignments/case studies, etc. It therefore ensures that students have a sound conceptual understanding of the subject. It also promotes discipline and punctuality.

This continuous feedback from the CIE assists students in improving their academic performance. It also allows teachers to take timely action in helping students improve/maintain their academic performance.

## SMALLER CLASS SIZE

With less than 9 pupils per class on average, the student-to-teacher ratio at SSSIHL is amongst the best in India.

This means that teachers give more individual attention to students and have more time to work one-on-one with them.

Since teachers have fewer students to monitor, they tend to spend less time on classroom management issues, such as discipline.

A lower student-to-teacher ratio also encourages greater student participation in class. In smaller groups,

students feel more accountable and comfortable participating in class discussions- and this greater degree of accountability leads to better grades and higher levels of achievement.

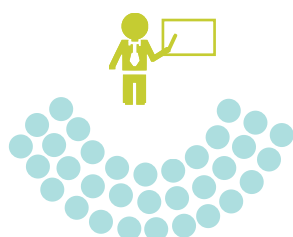
As a result, SSSIHL students have consistently performed very well- both in internal and external/national tests and examinations. See page 41 for further details.

## EXCELLENT FACILITIES

The university provides students with high quality infrastructure to maximise their learning experience and excel at their academics and research.

Laboratories house modern, sophisticated instruments and resources, and the classrooms have computer-aided teaching equipment. Each campus also has video conferencing facilities. Libraries across campuses stock over 1,60,000 volumes and the computer centres boast high speed broadband internet connectivity. The student-to-computer ratio is 2.6 students per computer. During use, only one student uses a computer.

### STUDENT-TEACHER RATIO 2013/14



33:1

National Average\*



8.5:1

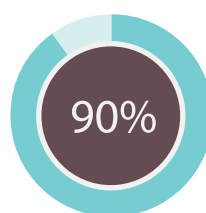
SSSIHL 2013/14

The above reflects full-time Faculty

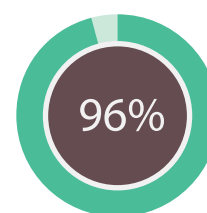
155

1321

### EXAMINATION PASS PERCENTAGE



Undergraduate  
Programmes 2013/14



Postgraduate & Professional  
Programmes 2013/14

\*Source: UGC Report, Strategies and Schemes during Eleventh Plan Period(2007-2012) for Universities and Colleges, 2011

# Admissions

## OPEN ADMISSIONS POLICY

SSSIHL has a merit-based, open admissions policy which provides an equal and fair chance for all suitable candidates to secure admission. It also implements the Government of India's reservation policy to all students from the Scheduled Castes (SCs), and the Scheduled Tribes (STs) for all programmes of study.

SSSIHL provides education free of cost for all programmes of study.

## NEW PROGRAMMES

Two new programmes were introduced during the academic year 2013/14:

- > M.Tech. in Nuclear Medicine  
Duration: 2 years  
Department: Physics
- > Master of Education (M.Ed.)  
Duration: 1 year  
Department: Education

## INCREASE IN APPLICATIONS

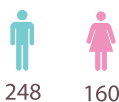
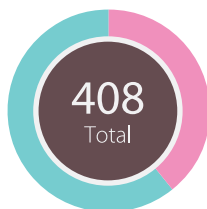
Admissions for the academic year commencing in June 2013 saw a record number of applications.

Undergraduate applications were up 52% from 1063 to 1611. Postgraduate and professional applications increased 39% year-on-year from 392 to 545.

These numbers represent eligible applicants who met the minimum requirements for admissions. The actual number of applicants was much higher.

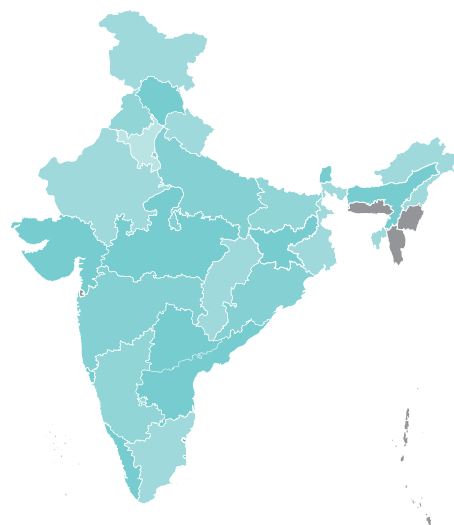
## ACCEPTANCE RATES

As a result, the acceptance rates in 2013/14 were less than 20% for all programmes.



## STUDENT DIVERSITY

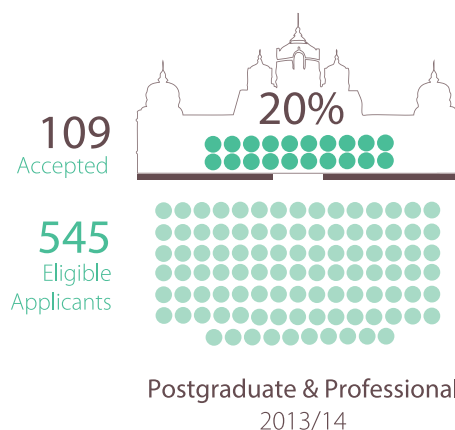
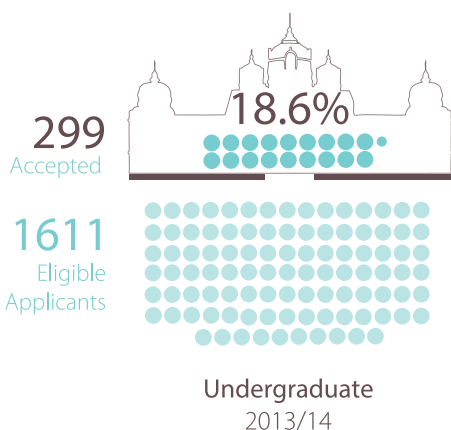
Students admitted to SSSIHL come from all parts of the country. This is a conscious effort made by university as this diversity contributes to a rich and stimulating learning environment that brings out the best in students.



SSSIHL students represent

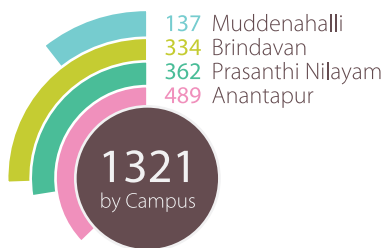


## ACCEPTANCE RATES 2013/14



# Student & Staff Profiles

## STUDENT PROFILE 2013/14



### RECENT TRENDS

The student strength has steadily increased from 1159 in 2010 to 1321 in 2013. Although this represents a 14% increase in three years, the student-teacher ratio has improved from 10:1 to 8.5:1 during the same period.

### NEW FACULTY

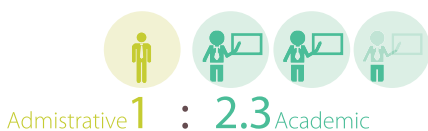
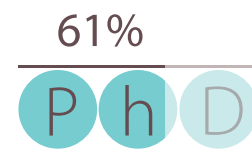
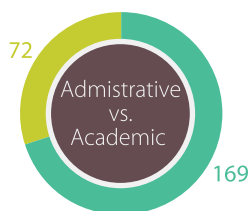
The university continues to attract high quality teachers. In 2013/14, nine new faculty members joined the SSSIHL family. This brought the total number

of teachers to 155, of which 61% have a Ph.D. Additionally, 24 teachers are currently pursuing a Ph.D.

New faculty members welcomed in 2013/14 were:

- > Sri Radhakrishnan Nair, Professor, Dept. of Management Studies
- > Dr. (Ms.) Chaitanya Mulakayala, Asst. Professor, Dept of Biosciences
- > Dr. (Ms.) Tapasya Anand, Asst. Professor, Dept of Home Science
- > Miss Akanksha Aggarwal, Asst. Professor, Dept. of Management Studies
- > Sri S Sai Manohar, Asst. Professor, Dept of Management Studies
- > Sri L K Prasad Rayaprolu, Asst. Professor, Dept of Management Studies
- > Sri P Bhargaw, Asst. Professor, Dept of Commerce
- > Dr. Krishna Chaitanya V, Asst. Professor, Dept. of Physics
- > Dr. (Mrs.) Pallavi Krishnamoorthi, Teaching Assistant, Dept. of Physics
- > Mrs. Vedavathi Aluri, Teaching Assistant, Dept. of Physics

## STAFF PROFILE 2013/14



- 25 Professor
- 33 Associate Professor
- 81 Asst. Professor
- 16 Others

94/155 teachers have Ph.Ds. (additionally, 24 teachers are currently pursuing a Ph.D.)

# Visiting & Guest Faculty

Inspired by the unique philosophy and vision of the Revered Founder Chancellor, Bhagawan Sri Sathya Sai Baba, eminent academicians and senior corporate executives volunteer to visit the university on an on-going basis to share their knowledge and experience

with students and faculty. They add a unique perspective to the courses taught and provide students exposure to wider academic and real world scenarios. Quite a few taught syllabi spanning an entire semester.

During the academic year 2013/14, 162 Visiting & Guest Faculty visited our campuses. Given below is a partial list of the institutions and organizations they came from.

162  
Visiting  
Faculty

<b>Mathematics &amp; Computer Science</b> 21	Indian Institute of Technology, Kanpur	Siemens
	Microsoft	Old Dominion University
	Cornell University	Arizona State University
	Indian Institute of Technology, Chennai	University of New Haven
	University of Cincinnati	SAP Labs
<b>Physics</b> 27	EMC Data Storage Systems	Indian Statistical Institute
	Indian Institute of Technology, Chennai	University of Massachusetts
	Lucent Technologies	University of Western Ontario
	AT&T Bell Labs	Carleton University
	GE Global Research	Defence Research and Development Laboratory
<b>Chemistry</b> 8	Indian Institute of Astrophysics	Bank of America
	Bayer Health Care	Analog Devices India Pvt Ltd., (ADI)
	National Institute of Science and Technology	New Jersey Institute of Technology
<b>Biosciences</b> 8	Kansas State University	Indian Institute of Technology, Kanpur
	University of Canterbury	Bayer Health Care
<b>Management Studies</b> 38	Baylor College of Medicine	University of Illinois College of Medicine
	University of Allahabad	University of Colorado Health Sciences Centre
	University of Maryland (Baltimore)	University of Wollongong
<b>Commerce</b> 53	University of Sussex	Copenhagen Business School
	National Dairy Development Board (NDDB)	University of Sonthampson
	Deloitte	TVS Motor Company Ltd.
	IBM Global Business Services	Barclays Capital
	Kotak Mahindra Bank Ltd.	Nokia India Pvt. Ltd.
<b>Economics</b> 7	Toyota Kirloskar Motors Ltd.	IDFC (Infrastructure Development Finance Company)
	TCS (Tata Consultancy Services)	Birla SunLife Asset Management Co.
	Deloit Haskins and Sells	Myrian Capital
	Siemens	Mahindra Insurance Brokers
	Ashok Leyland	Future Generali India Insurance Company
<b>English Lang. &amp; Literature</b>	Memorial University	Delhi School of Economics
	California State University	DRDO
	The Economic Times	

# Student Activities & Achievements

## BEST ALL-ROUND STUDENT AWARD

The Best All-Round Student Award recognises a final year student who excels in all five dimensions of the Sri Sathya Sai System of Values-based Integral Education - Intellectual, Cultural, Physical, Devotional and Service.

The award recognises one student from each of the four campuses of the university who secures an 'O' grade (Distinction) or above in academics and who also consistently excels in all co-curricular activities that include sports and games, cultural activities, self reliance, service activities, spiritual activities; and who exemplifies the high standard of conduct and behaviour expected of a student of the Sri Sathya Sai Institute of Higher Learning.

## FELLOWSHIP

### PHYSICS

#### K V Sanathana

M.Sc. in Physics (specialization in Photonics) graduate was awarded the prestigious Marie-Curie Fellowship to pursue Doctoral research at Instituto Italiano di Tecnologia (IIT), Genova, Italy, Oct 2013.

## ACTIVITIES

### PHYSICS

#### All final year M.Tech. (Applied Optics) students

Attended the IEEE ANTS (Advanced Networks and Telecommunication Systems) Conference, SRM University, Chennai, 15-18 Dec 2013. They presented two demonstration experiments indigenously set-up by them, which were accepted by the peer review committee of the conference to be exhibited during the 4-day International conference.

## FIELD TRIPS

### MATHEMATICS & COMPUTER SCIENCE AND PHYSICS

I M.Tech in Computer Science (Dept. of Mathematics & Computer Science) students and I M.Tech in Optoelectronics & Communications (Dept. of Physics) students, along with select faculty went on an annual four-day visit to Bangalore from 16-19 April 2014 to interact with technical experts at various organizations and companies who assisted them in choosing their final year projects in relevant areas. Organizations visited included: TVS

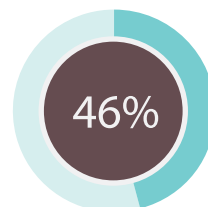
Motors, SAP Labs, Honeywell Aerospace Division, CISCO, Sri Sathya Sai Institute of Higher Medical Sciences (SSSIHMS), Whitefield, Bangalore, Akshaya Patra Foundation, Laboratory for Electro Optics Systems (LEOS), Tejas Networks and Honeywell Technology Solutions Lab (HTSL).

## MANAGEMENT STUDIES

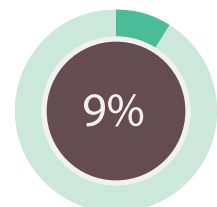
II M.B.A. and M.B.A. in Finance students visited a few industrial organizations in Bangalore from 16-20 April 2014 in an effort to help them connect the dots from the classroom to the workplace. These visits involved detailed plant tours followed by interaction with company management. Organizations included: TAFE, TVS Motor Company, Sundaram Fasteners, Harita seatings, Yuken India and Akshaya Patra Foundation.



## PERFORMANCE IN NATIONAL EXAMS



GATE/JEST 2013/14



CSIR-UGC/NET 2013/14

This data pertains to final year postgraduate students who are eligible to write these tests

GATE: Graduate Aptitude Test in Engineering  
JEST: Joint Entrance Screening Test

CSIR: Council of Scientific & Industrial Research  
UGC: University Grants Commission  
NET: National Eligibility Test



## PERFORMANCE IN NATIONAL EXAMS

A high percentage of SSSIHL postgraduate students qualify in national exams such as the GATE/ JEST or the CSIR-UGC NET. The list of qualifying students in 2013/14 is included here.

\***CSIR** (Council of Scientific & Industrial Research) | **JRF** (Junior Research Fellowship)

\***NET** (National Eligibility Test) | **LS** (Lectureship)

\*\***GATE** (Graduate Aptitude Test in Engineering)

All the above ranks are national (All India Rank)

\*\*\***AP-SLET** (Andhra Pradesh State Level Eligibility Test in Education)

**Total No. of Exam Takers:**

CSIR JRF/NET: **120,546**

GATE: **307,007**

## CSIR JRF/NET\* RANK

## GATE\*\* RANK

### MATHEMATICS & COMPUTER SCIENCE

Srinivas K	79	32
Pinak Panigrahi		1207
BNSK Chaitanya		1666
Sai Prasanna		3837
Sai Sameer		3380
B Guru Swaroop		3890
Rohit Dhandhaniya		4341
Pediredla Appala Naidu		7810

### PHYSICS

Sadhu Pavan Prasanth	37 (JRF)	22
Vinod Kumar Reddy		31
Abhishek H	122 (LS)	42
Lachit Saikia		48
Vinay Hegde		65
Bipin Sharma		82
Aditya Kurdekar		157
Ashish K Dora		275
Prateek Bhojanne		353
Vibhav Bharadwaj	86 (LS)	409

### CHEMISTRY

N S P Chakravarthy		600
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### BIOSCIENCES

Aiyer Kartik Satyanarayan		1710
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### HOME SCIENCE

Kritika	UGC- NET* LS
Yamini Iyer	UGC- NET* LS   DRDO Research Fellowship
Lakshmi Iyer	UGC- NET* LS

### EDUCATION

Hari Priya V	NET*
R Divya	AP-SLET***

### ENGLISH LANGUAGE & LITERATURE

Ms. Lalitha Sarma	UGC NET* (eligibility for Asst. Professor)
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# Projects & Dissertations

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<b>Mathematics &amp; Computer Science</b> 22	<b>M.Tech. in Computer Science and M.Sc. in Mathematics</b>  <b>Key Areas:</b> Computer Vision, Image/Video Processing & Machine Learning, Data Mining, Differential Equations, Computer Networks, High Performance Computing
<b>Physics</b> 46	<b>III B.Sc. (Hons.) in Physics, M.Sc. in Physics, M.Sc. in Nanoscience and Nanotechnology and M.Tech. in Optoelectronics &amp; Communications</b>  <b>Key Areas:</b> Electronics, Micro Processors, Nuclear Physics, Optics, Nano Science, Classical Physics, Optical Image Processing, Non-linear Optics, Biophotonics, Photovoltaics, Optical Networks, Plasmonics, Digital Image Processing, Fiber Optics, DWDM, LTE
<b>Chemistry</b> 11	<b>M.Sc. in Chemistry, M.Tech. in Analytical Methods and Chemical Instrumentation</b>  <b>Key Areas:</b> Plasmonic Sensors, Electrochemical sensors, Environmental Monitoring, Photonics, Bioactive molecules, Bio-processing, Molecular modelling & Drug design
<b>Biosciences</b> 7	<b>M.Sc. in Biosciences</b>  <b>Key Areas:</b> Microbial Electrochemical Systems, Systems Biology of Diseases, Environmental Biology
<b>Home Science</b> 7	<b>M.Sc. in Food Technology and M.Sc. in Food Nutrition</b>  <b>Key Areas:</b> Novel Food Processing Technologies, Nutraceuticals, Biopreservation, Designer Foods
<b>Management Studies</b> 43	<b>M.B.A. and M.B.A. in Finance</b>  <b>Key Areas:</b> Analytics in Business, Business and Internet, Business Ethics, Business Strategy, Consumer Behaviour, Entrepreneurship, Financial Markets, Financial Planning, Financial Strategies, Green Business, Insurance, International Business, Management of Not-for-profit organisations, Organisation Development, Organisational Behaviour, Stakeholder Management
<b>Commerce</b> 20	<b>Master of Financial Management (M.F.M.)</b>  <b>Key Areas:</b> Bank Management, International Financial Reporting Standards (IFRS), Security Analysis and Portfolio Management, Financial Management and Analysis, Insurance, Financial Markets Analysis
<b>Economics</b> 7	<b>M.A. in Economics</b>  <b>Key Areas:</b> Macroeconomic Modelling, Development Economics, Financial Econometrics
<b>Education</b> 9	<b>Master of Education (M.Ed.)</b>  <b>Main Theme:</b> Values-based Education <b>Key Areas:</b> Importance of Educare – Sri Sathya Sai Philosophy of Education, Integration of Values through School Subjects, Peace Education – Ceiling on Desires, Importance of Women Education, Role of Dharma in Shaping Personality, Fundamental Duties – Its implications
<b>English Lang. &amp; Literature</b> 2	<b>M.A. in English Language &amp; Literature</b>  <b>Key Areas:</b> Exploring the Phoneme-Grapheme Link: The Clue to Spelling and Pronunciation, The 'Becket Theme' Re-invented: A Comparative Study of Eliot's Murder in the Cathedral, Fry's Curtmantle, and Anouilh's Becket

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# Faculty Activities & Achievements

Listed below are the key academic activities and achievements for individual SSSIHL faculty during the academic year 2013/14.

## ANNUAL FACULTY WORKSHOP

28-29 May 2013

Prior to the start of each academic year, all academic staff and doctoral research scholars of the university come together for a two-day workshop. The workshop encourages everyone to participate and share ideas, experiences and best practices with respect to the process of character building, which is the cornerstone of the distinctive Sri Sathya Sai Values-based Integral Education.

The core objective of the workshop was to deliberate on the domains of the system of Values-based Integral Education of the university—its components, its critical success factors, the role of teachers and the like—as envisioned by the Revered Founder Chancellor, Bhagawan Sri Sathya Sai Baba.

This year, the major focus of the workshop was on Bhagawan Baba's guidelines for teachers/doctoral research scholars and a session on how to keep students focused on Bhagawan Baba.

## FACULTY ACTIVITIES & ACHIEVEMENTS

### MATHEMATICS & COMPUTER SCIENCE

#### Sri Ajith Padyana

- > Delivered an Invited Talk on Big Data and Cloud Computing, NIT, Warangal, ABCD-2014, Mar 2014.
- > Delivered an Invited Talk on Memory Performance Optimization in GPUs in Hyderabad Central University. HyPack 2013, Oct 2013.

#### Dr. Pallav Kumar Baruah

- > Attended Precision Medicine Congress, London on 19-20 May 2014. (organized by Global Engage Ltd.).
- > Delivered an Invited Talks on GPUs: an enabling force for Real Time Computing at National Centre for Supercomputing Applications, University of Illinois, Urbana-Champagne, USA, 28 Mar 2014.
- > Delivered Invited Talks on 'MPI Collective Calls on Xeon Phi' and 'Dynamic Data Management and Communication Optimization in a Multi GPU Environment' in National Workshop on Hybrid Computing-Coprocessors & Accelerators, Power-aware Computing & Performance of Application Kernels (hyPACK 2013), 16 Oct 2013, jointly organized by CDAC and CMSD University of Hyderabad, Gouchibowli Campus, Hyderabad.
- > Member of Technical Program committee for the following Conferences:
  - > Third International Workshop on Recent Advances in Medical Informatics (RAMI-2014), Delhi, INDIA, 24-27 Sep 2014.
  - > International Conference on Networks & Soft Computing, IEEE Computer Intelligence Society, IEEE Hyderabad Section, Vignan University.
  - > ICACCI 2014 – IEEE 3<sup>rd</sup> International Conference on Advances in Computing, Communications and Informatics, Delhi, 24-27 Sep 2014
  - > ICCS 2014, International Conference of Computational Science, Cairns, Australia, 10-12 Jun 2014
  - > ICACCI 2013 – IEEE 2<sup>nd</sup> International Conference on Advances in Computing, Communications and Informatics, Mysore, 22-25 Aug 2013.
  - > ICCS 2013, International Conference of Computational

Science, Barcelona, Spain, 5-7 Jun 2013.

Reviewer of the following Journals:

- > Mathematical Reviews: Mathematical Archives - American Mathematical Society, Journal of Applied Mathematics and Computing (Springer Publication), Journal of Super Computing (Springer Publication).

#### Dr. S Balasubramanian

- > Invited to present a talk on Machine Learning for Refresher Course on Computer Science, Goa Academic College, 28 Jan 2014.

#### Dr. S Balasubramanian and Dr. R Raghunatha Sarma

- > Poster Presentation – Improved Eigen Vector Selection for Spectral Clustering in Image Segmentation. National conference on Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG-2013), Jodhpur, Rajasthan, 18-21 Dec 2013.

## PHYSICS

#### Dr. Krishna Chaitanya V

- > Presented an Invited Talk at a workshop on Non-linear Optics and Materials, at the DST-SERC School, SSN College of Engineering, Chennai, 3-21 Feb 2014.
- > Delivered an Invited Talk at Recent Advances in Optical Sciences (RAOS), University of Hyderabad, Hyderabad, 26-27 Apr 2014.

#### Dr. V Sai Muthukumar

- > Received Best Paper Award at the International Conference on Advanced Nanomaterials and Emerging Engineering Technologies (ICANMEET), 2013 for a paper on Enhanced optical limiting of solubilized carbon nanotubes decorated with Pt/Pd nanoparticles, Satyabhama University, Chennai, 24-26 July 2013.

#### Dr. Gowrishankar R

- > Guest lecturer for Fiber Optics and Optical Fiber Communications in the ECE, Bearys Institute of Technology, Mangalore, 27-29 Sep 2013.

#### Dr. (Miss) Deepa Seetharaman

- > Presented a talk on Nuclear Structure Studies at the Awareness Workshop on Research Opportunities using the Facilities at VECC, DAE, Kolkata (organized with UGC-DAE Consortium for Scientific Research and Variable Energy Cyclotron Centre (VECC), Kolkata), SSSIHL, Prasanthi Nilayam, Andhra Pradesh, 28-29 Jun 2013.
- > Selected to participate in the 6<sup>th</sup> Science Conclave, a congregation of Nobel Laureates and INSPIRE Internship Program, conducted at IIT, Allahabad, 8-16 Dec 2013 and gave a report of the proceedings at the Science Colloquium, SSSIHL, 21 Dec 2013.

#### Dr. (Miss) Deepa Seetharaman, Dr. R Gowrishankar and Dr. K Vijay Sai

- > Selected to participate in the Workshop on Evaluation of Nuclear Structure and Decay Data, Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy, 22-26 Mar 2014. Of the total of twenty participants selected for the workshop across various countries, eight were from India, of which three were from SSSIHL. A data evaluation team has been formed by these three faculty members in collaboration with VECC, Kolkata for Nuclear Data Evaluation.

### CHEMISTRY

#### Dr. R Sai Sathish

- > Winner of the Sai Krishna Award for Excellence in Research in Sciences (2012/13), SSSIHL, Prasanthi Nilayam, 22 Nov 2013.
- > Delivered an Invited Talk at Recent Advances in Optical Sciences

(RAOS), University of Hyderabad, Hyderabad, 26-27 Apr 2014.

- > Attended the DBT-Ramalingaswami Fellows conclave, National Centre for Cell Science (NCCS), Pune, Sep 2013.

#### Dr. S Prathap Chandran

- > Awarded the INSPIRE Faculty Award (Research Grant) a sum of ₹35 lakhs over a five-year period for research in the area of Colloids (synthesis, surface modification and assembly in to long-range structures or colloidal molecules) and colloid-LC composites.

### BIOSCIENCES

#### Dr. B S Vijayakumar

- > Delivered a talk on Fungal Technology in the National Conference on Fungi in Centre for Marine Biotechnology, Annamalai University, Chidambaram, 27-28 Feb 2014.

#### Sri Sai Murali R S

- > Received the best oral presentation award – First Prize, for the paper entitled Variation in vasicine content of *Adhatoda vasica* Nees as a function of ecomorphometric parameters from the topo-geographically distinct regions of South Eastern Malabar area of Western Ghats of India at the *National Conference on Conservation, Characterization and Cultivation of Medicinal Plants for Sustainable Utilization and Community Welfare*, Pondicherry, 23-25 Feb 2014.

### HOME SCIENCE

#### Prof. (Mrs.) Rashmi Kapoor

- > Talk delivered on Management of Lifestyle Diseases in a workshop entitled Nutraceuticals for Disease Management, DFRL, Mysore, 25-28 Sep 2013.

### MANAGEMENT STUDIES

#### Prof. A Sudhir Bhaskar

- > Invited to give a talk on Diagnostics, Motivation and Leadership topics at the week-long Management Development Programme, Managerial Effectiveness, for Middle and Senior level Managers of M/s JSW Steel Ltd." organised by Sona School of Management, Salem, Dec 2013.

#### Dr. Sayee Manohar K

- > Chaired Conference Sessions during the 2<sup>nd</sup> National Conference on Business Challenges and Opportunities for Transformation Excellence, organized by Vysya Institute of Management Studies, Salem, 26 Feb 2014.

### COMMERCE

#### Dr. (Miss) Ch Radhakumari

- > Chaired the inaugural session for the International Conference on Finance, Banking and Insurance (ICFBI 2013), Melbourne, Australia, 16-17 Dec 2013.

#### Dr. (Miss) N Niranjana

- > Spoke on the Role of Women in Society, JSS College of Arts & Commerce, Mysore, 10 Apr 2014.

#### Dr. (Miss) T R Rajeswari

- > Invited as chief guest and resource person and delivered a talk on 'Educare for Life' at the UGC-sponsored National Seminar on Values oriented Education - Status and Direction, Sri Sathya Sai College, Bhopal, 24-25 Oct 2013.

#### Dr. N Siva Kumar

- > Delivered a talk on 'Gandhian Economics' to the Postgraduate students of Media Studies at the University of San Francisco, USA, 29 Apr 2014.

## ECONOMICS

### Dr. R Prabhakar Rao

- > Winner of the Sai Krishna Award for Excellence in Research in Management, Commerce, Economics and Education (2012/13), SSSIHL, Prasanthi Nilayam, 22 Nov 2013.

### Sri G Raghavender Raju

- > Invited by the Vivekananda Degree College, Vempalli, Kadapa to deliver a set of lectures to their undergraduate students on National Income, Trade Cycles and International Trade Theories, 27-29 Jan 2014.
- > Invited as Resource Person to chair two sessions for the two-day National Level workshop on 'Econometrics with Computer Applications – III', Chhatrapati Shahu Institute of Business Education & Research, Shivaji University, Kolhapur, 26-27 Feb 2014.
- > Invited by the Dept. of Economics, Shivaji University, Kolhapur, to deliver a lecture to their faculty and students on Econometrics Applications, 27 Feb 2014.

## EDUCATION

### Prof. (Miss) Madhu Kapani

- > Invited as a Resource person and delivered talks on Excellence in Education, Fostering Creativity and Guidance and Counseling at a School Leadership Workshop, Institute of Sathya Sai Education (India), Hyderabad, 23-27 Oct 2013.
- > Invited as an expert for M.Ed. course material preparation, Dr. B R Ambedkar Open University, 10 Dec 2013.
- > Attended the 4<sup>th</sup> Convention of Sathya Sai Schools (India) as member of the National Council of Sri Sathya Sai Schools, India. Acted as Panel member for the theme 'Developing School Leadership for Excellence' held at Sri Sathya Sai

Vidya Vihar, Indore, 7-9 Feb 2014.

- > Appointed editor and panel of lesson writers for the M.Ed. degree programme by Centre for Distance Education, Acharya Nagarjuna University, Apr 2014.
- > Invited as Resource Person to the International Seminar on 'Alternatives in School System and Teacher Education' organised by the Dept. of Education, University of Allahabad in collaboration with Indian Association of Teacher Educators and National Institute of Open Schooling (NIOS), 8-9 Mar 2014. Chaired a session on Research in Alternative Schooling and Teacher Education: Issues and priorities, and delivered a special talk on 'Sri Sathya Sai System of Integral Education'.
- > Reviewer for Rayat Bahra Journal of Education.

## ENGLISH LANGUAGE & LITERATURE

### Prof. (Miss) Rajeshwari C Patel

- > Winner of the Sai Krishna Award for Excellence in Research in Language and Philosophy (2012/13), SSSIHL, Prasanthi Nilayam, 22 Nov 2013.

## SANSKRIT LANGUAGE

### Dr. N Venkatesha Rao

- > Invited as a resource person to speak on the topic Gita Bhasya and Gita Tatparya: A comparative analysis, at the *Poorna Prajna Samshodha Samsthan*, Bangalore, 19-23 Apr 2014.

# Academic Workshops & Conferences

## MATHEMATICS & COMPUTER SCIENCE

### Systems Software

24 Jul 2013

A hands-on workshop organized by SSSIHL alumni for B.C.A. students.

**Areas included:** Learning assemblers, compilers and linkers, thus helping students improve their programming and Java skills.

### Distributed Parallel Programming on a cluster using Map Reduce and Hadoop

30 Nov and 14 Dec 2013

The workshop helped participants get started with implementing algorithms that need to work on large data sets. Such algorithms typically need to be distributed, parallel and capable of being deployed on a large Cluster built using commodity hardware. The best solution available



today for such algorithms is the Hadoop framework originally developed by Yahoo. The workshop was designed around hands-on labs. The labs focused on implementing basic algorithms for a set of problems and the problems can be extended in its scope for student research projects.

#### External Experts / Invited guests from:

Impetus Infotech India Pvt. Ltd.  
HP India Software Operations

## PHYSICS

### Research Opportunities using the Facilities at Variable Energy Cyclotron Centre (VECC), DAE, Kolkata

28-29 Jun 2013

The Variable Energy Cyclotron Centre (VECC) at Kolkata, has been the seat for accelerator based research in the country for over three decades now. The room temperature cyclotron built at VECC has undergone extensive modernization and has been delivering light ion beams in the energy domain of 7-15 MeV/nucleon. Heavy ion beams in the similar energy domain is scheduled to be available soon. Further, the upcoming Superconducting Cyclotron facility is soon expected to deliver energetic ion beams in the Fermi energy domain (up to ~ 60 MeV/nucleon). In addition, an ECR based low energy highly charged intense (~ 30 - 40  $\mu$ A) ion beam facility (10-300 keV) is also operational. These ion beams cater to a variety of research in basic and applied sciences.

Several experimental facilities centered around these major ion beam facilities have been developed by the in-house VECC research groups. The efficient utilization of such advanced facilities requires collaboration between the in-house groups and the user community.

The workshop facilitated the use of the facilities available at VECC, for multidisciplinary research, by research communities in universities, colleges and institutes. It was intended for research scholars and faculty members



from universities and academic institutions - to help solve research problems using these facilities. It has addressed the possible research problems and methodology that can be pursued for the use of such facilities. Topics covered during the workshop comprised of invited and contributory presentations on Nuclear Physics; Nuclear Detectors and Instrumentation; Material Science, Radiation Biology and Chemistry.

#### External Experts / Invited guests from:

VECC | Homi Bhabha National Institute | UGC DAE CSR

## Web Technologies

27 Jul 2013

A workshop aimed at making the participants familiar with current and emerging web-based technologies. The prominent innovations in various fields of modern technology are those which represent progressive developments within a field for competitive advantage. A thorough overview of web browsers was given. The use of HTML Editor and Writing Code with the Text Editor along with the rules of HTML were demonstrated and hands on training was given to all the participants.

## Recent Trends in Networking Technologies

17 Aug 2013

### External Experts / Invited guests from:

Indian Institute of Technology (IIT), Madras  
CISCO  
BSNL  
Qualcom

## Faculty Development Program on Quantum Mechanics

28 Feb-1Mar 2014

Quantum mechanics (QM) is a most difficult subject to learn and also to teach. In other areas of physics such as classical mechanics or electrodynamics, one can start with well laid-out postulates and principles, since the foundations of these subjects are well established. This is not the case with QM. We have a one-semester course on QM at the undergraduate level. At the postgraduate level, we have QM spread over two semesters. A workshop on the teaching methodology of QM at the undergraduate level was organized for the benefit of all faculty members. The level of mathematics needed for QM is little more abstract than that required for other areas. Hence the workshop stressed on concepts like vectors that need to be 'upgraded' to 'elements' belonging to a linear space. Familiarity with delta function and Fourier series and integrals were also highlighted. The concept of probability amplitude (which can even be a complex number) was also elaborated in detail.

## CHEMISTRY

### Integrated Chemistry Conference – ICCON 2013

14-15 Dec 2013

The primary objective of this conference was to expose postgraduate students and research scholars of the department to an integrated approach in understanding and solving scientific problems with practical insights. The conference covered the frontier fields of Surface Chemistry, Coordination Chemistry, Biochemistry, Computational Chemistry, Environmental Chemistry, Nano Biotechnology and Spectroscopy.

### External Experts / Invited guests from:

VECC  
Homi Bhabha National Institute  
UGC DAE CSR  
Indian Institute of Science  
Raman Research Institute  
Sri Krishnadevaraya University  
Indian Institute of Science Education & Research (IISER)  
Tata Chemicals Ltd.  
National Institute of Pharmaceutical Education and Research (NIPER)  
Syngene International Ltd.  
Geological Survey of India



## BIOSCIENCES

### Hands-on Training in Immunology and Developmental Biology

1-2 Mar 2014

A hands-on training that helped equip postgraduate students with advanced techniques in immunology and developmental biology.

## MANAGEMENT STUDIES

### Business Analytics & Big Data

23-24 Aug 2013

The advent of data analytics has given businesses additional value and flexibility to view their relationships and patterns through data captured in a variety of forms - including text, images, and digital sensors.

Big Data is changing our view of the value of information. It is also providing a hint at what's next: the ability to expertly contextualize and analyze oceans of data. In computer science circles, this approach is known as Cognitive Computing. It is the underlying technology that allows a search engine such as Google to anticipate what you mean by the question you ask and adjust their rules and results on the fly. The commercialization of cognitive computing will require a new digital ecosystem. Companies like Google, Apple and Facebook are already using cognitive computing behind the scenes in services like Siri (an intelligent personal assistant available on Apple's mobile devices that helps you get things done just by asking).

The combination of big data and advanced analytics offers companies countless opportunities across the value chain. In portfolio strategy and product development, for example, companies can get a more detailed understanding of consumer needs and attitudes and more precisely identify consumer segments, thus improving their ability to target the highest-value opportunities. They can measure the return on investment (ROI) for marketing spend across both traditional and newer marketing vehicles (such as social media), allowing them to shift marketing dollars to the most effective channels.

#### External Experts / Invited guests from:

Rural Shores India | Wipro Technologies | Hansa CE Equity  
SKS Microfinance | Nanobi Analytics | Hewlett-Packard  
Chrysler India

### Women Executives & Managers – Opportunities & Challenges

14 Dec 2013

A workshop that brought together experts from academia and industry from various fields to engage in a deliberation on the state of play of women executives, their role in the workspace, the challenges & opportunities, etc.

#### External Experts / Invited guests from:

Airworks | Nmore | ING Vysya | MMC Infotech  
Sai Seva Business Solutions



### Man Management – A Management Development Program

15-16 Feb 2014

A thematic, two-day Management Development Programme that focused on individual and team development, and transformation. Experts from industry elaborated on topics ranging from empowering people to customer and cost focus, from managing results to handling difficult situations.

#### External Experts / Invited guests from:

HCL Technologies | Tata Consultancy Services  
Valcon Management Consultants | Symrise Pvt. Ltd.  
Virtusa India Pvt. Ltd. | InSAI Consultants  
Times Centre for Learning Ltd.

### Indian Ethos & Values: Man Management Based on Discourses of Bhagawan Baba

22 Mar 2014

A half-day orientation for students, research scholars and faculty to the message and guidelines of Bhagawan Sri Sathya Sai Baba with reference to Man Management – a collection of His Divine Discourses on the same subject. It included a panel discussion led by SSSIHL alumni, based on a video presentation of Baba speaking on Indian ethos and values, and their significance in management.

#### External Experts / Invited guests from:

TCS | Famy Care Ltd. | SSSIHL alumni



## COMMERCE

### Trends in Financial Services

17 Aug 2013

A symposium focused on the emerging trends in Insurance, Mutual Funds, Banking and Financial Services. The latest trends, along with their ethical implications were discussed.

#### External Experts / Invited guests from:

Future Generali Insurance Co.  
Birla Sun Life Asset Management Co.  
Airworks | L&T Financial Holdings | Barclays Bank

### Ethics and the Challenges of Business

22 Feb 2014

The symposium discussed ethical challenges faced by executives in Industry. The sub-themes included Ethics and Financial Services, Ethics and Business Strategy and Ethics and Business Operations.

#### External Experts / Invited guests from:

Grant Thornton India Ltd. | State Bank of India (SBI)  
Insurance Regulatory and Development Authority (IRDA)  
UBS | Barclays Bank | HDFC | Arvind Brands



Indira Gandhi Institute of Development Research (IGIDR)  
National University of Educational Planning & Administration (NUEPA) | Jadavpur University | Acharya N G Ranga Agricultural University | Indian Institute of Technology, Kanpur

## ECONOMICS

### Indian Economy: Perspectives and Challenges

21-22 Feb 2014

A two-day national conference that discussed perspectives on the Indian economy with the sub-themes of Agriculture, Industry and Services, Trade and Balance of Payments, Economic Growth and Development, Fiscal and Monetary Policies, Financial Markets, Rural Uplift and Inclusive Growth, Ethical Perspectives, etc.

#### External Experts / Invited guests from:

Delhi School of Economics | Indian Institute of Technology (IIT), Mumbai | GITAM University | Andhra University



## EDUCATION

### Imbining Teaching Abilities/Skills and their Components

4-9 July 2013

A workshop that helped young faculty members to improve their teaching abilities and skills. It also helped them understand better the evaluation system at SSSIHL. The themes discussed were preparation and planning of lessons by keeping the educational objectives in view; integrating values through different teaching subjects; and the feedback and evaluation of Viva-voce and Practicals.

### Models of Teaching

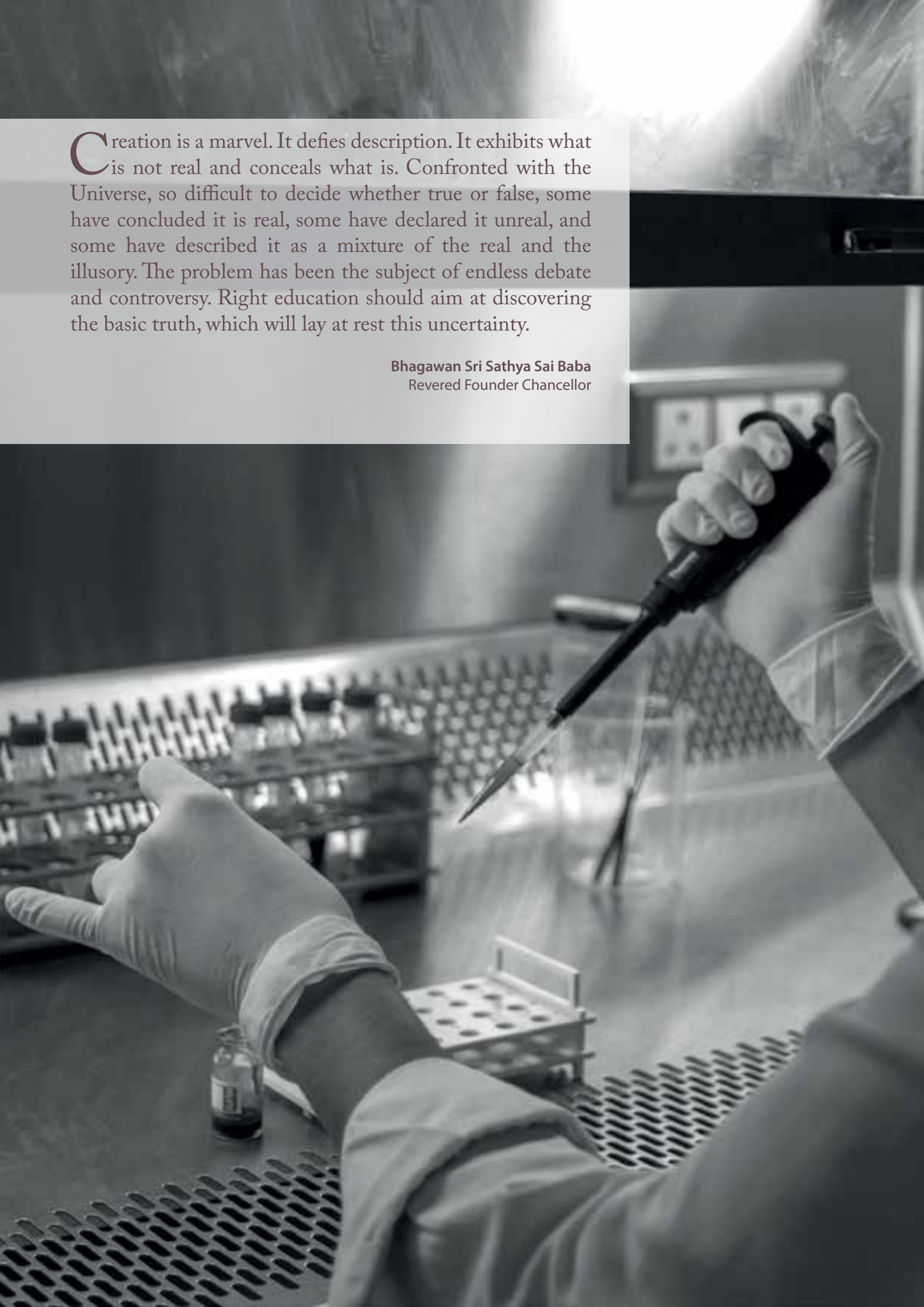
5 Sep 2013

A workshop conducted by a senior expert from Vasanta College of Education, Varanasi for all staff and students of the department.



Creation is a marvel. It defies description. It exhibits what is not real and conceals what is. Confronted with the Universe, so difficult to decide whether true or false, some have concluded it is real, some have declared it unreal, and some have described it as a mixture of the real and the illusory. The problem has been the subject of endless debate and controversy. Right education should aim at discovering the basic truth, which will lay at rest this uncertainty.

**Bhagawan Sri Sathya Sai Baba**  
Revered Founder Chancellor



# RESEARCH

2013/14



3



# Research Overview

## RESEARCH GROWTH

The research output at the university has seen a significant rise in the past few years. The number of doctoral research scholars has seen a 53% increase in three years from fifty-one in 2011 to seventy-eight in 2014. Research Scholars represent almost 8% of the current student population at SSSIHL, a figure far above the national average. New research collaborations in the sciences between the university and external institutions like the FDA (USA), as well as collaborations on multiple research projects with the Sri Sathya Sai Institute of Higher Medical Sciences (SSSIHMS) are testimonial to the rise in the quality of research at the university.

Grants for ongoing research projects across departments total upwards of ₹956 lakhs, of which ₹447 lakhs is from projects sanctioned in 2013/14.

## BENEFIT TO SOCIETY

In line with the vision of the Revered Founder Chancellor, all research at SSSIHL ultimately leads to societal benefit. Thus, the topics for doctoral research across all departments are chosen with great diligence.

This extends to the research projects chosen by researchers in each department, so that all the research done leads to translational research or directed basic research.

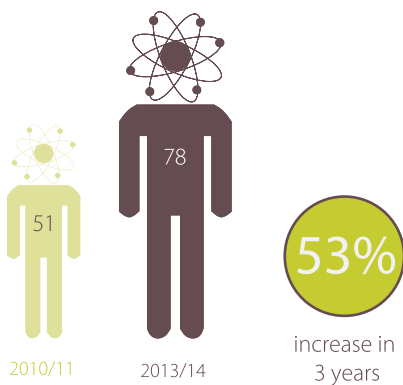
## INTERDISCIPLINARY APPROACH

The university has taken many steps in the past few years in bringing the various disciplines at the university and SSSIHMS together to discuss issues from various perspectives and identify

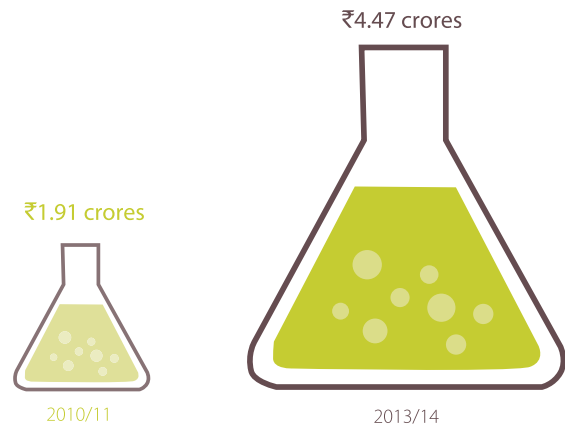
projects that will benefit society.

This has led to interdisciplinary collaborations of SSSIHL with SSSIHMS and external agencies in areas such as the rapid detection of endemic diseases, diabetic retinopathy, development of a cost effective multi-modal microscope, regenerative medicine and tissue engineering, etc.

## DOCTORAL RESEARCH SCHOLARS



## RESEARCH GRANTS



# Interdisciplinary Science Colloquium

The Interdisciplinary Science Colloquium—conducted every Saturday afternoon—provides an opportunity for doctoral research scholars, teaching faculty and visiting experts to share their research experiences with one another. All the science departments (across campuses) of the university participate, using the video conference facility.

As a result, the colloquium has helped break down the barriers between the various science disciplines and directed the university's research thrust towards the merging of traditionally distinct scientific disciplines and creating new opportunities.

## TOPICS OF SCIENCE COLLOQUIUM 2013/14

- > Bioanalysis Using Tetrakis (4-sulphonatophenyl) Porphyrin
- > The joy of doing Basic Research
- > Material considerations underlying Power Plant (Thermal/ Nuclear) Design and Operation
- > Nanodielectronics for energy storage applications - Role of Interface
- > Time Frequency transforms for Radar Image Enhancement
- > Statistics, Science and Society
- > Nutrigenomics and Nutrigenetics: An Emerging Paradigm in Molecular Nutrition
- > Aptamers: Revolutionising Diagnostics and Therapy
- > Avascular Necrosis of Femoral Head: Molecular Genetics and Biophysical Characterization
- > Impedance Analysis of Dielectric Nanoparticles Enabled Via a Self-assembled Monolayer
- > Chitosan Biopolymer: Antimicrobial Activity and Postharvest Applications
- > On Water
- > Functional implications of SNPs in Spliceosomal Network: A Structural Systems Biology Approach
- > Are we Eating Food or the Food is Eating Us? A Brief Review of Good Fat Vs Bad Fat.
- > Saponins as Nutraceutical Agents
- > Chitosan Biopolymer: Antimicrobial Activity and Post Harvest Applications
- > Stability of Nanoparticles: From the Perspective of Drug Formulations
- > Targeting Cancer with Resveratrol Analogues
- > Development of Small Organ Imaging Gamma Camera
- > Life and Works of Sir C V Raman
- > Methods for Extraction of Phytochemicals: A Journey from Plant to Bioactive Compounds
- > New Insights on Emission and Chemistry of Voccs from High Time Resolution *in-situ* Measurements in the Himalayan Foothills
- > Sharing of Experiences during the Sixth Science Conclave: A Congregation of Nobel Laureates, Indian Institute of Information Technology, Allahabad, Uttar Pradesh, 8-14 Dec 2013
- > Opto-fluidics: A New River of Light
- > Single Frame Image Super-Resolution Using Exemplar Based Approaches
- > Comparative Study on the Production of Low-Cost Cellulolytic Enzyme System from Groundnut Shell (GNS) with the use of Solid State and Submerged Liquid Fermentation Techniques
- > Methods for Extraction of Phytochemicals: A Journey from Plant to Bioactive Compounds
- > Plasmonic and Electrochemical Applications of Gold Nanoparticles
- > How to be Safe on the Internet?
- > Introduction to Femtosecond Laser-based Fabrication Technology: Micro Fluidic Devices and Applications
- > Generation of Novel Andrographolide and Ethionamide Analogues of Pharmaceutical Promise.
- > Understanding the Immune System – How it Works
- > Introduction to Mathematical Modelling
- > 100 years of X-Ray Diffraction

## Sai Krishna Award for Excellence in Research

The Sai Krishna Award for Research and Teaching has been instituted to honour the top researchers and teachers of SSSIHL each year. The awards alternate between top researchers and top teachers every year. The winners in the three categories are selected based on evaluation of the research work of the applicants by external experts. The winners for 2013/14 were:

- > Excellence in Research in Sciences: Dr. Sai Sathish, Asst. Professor, Dept. of Chemistry, SSSIHL
- > Excellence in Research in Management, Commerce, Economics and Education: Dr. R Prabhakar Rao, Associate Professor and Head, Dept. of Economics, SSSIHL
- > Excellence in Research in Languages and Philosophy: Prof. (Miss) Rajeshwari C Patel, Professor and Head, Dept. of English Language & Literature, SSSIHL








# Doctoral Research Scholars Activities & Achievements

		Activity / Achievement
<b>Mathematics &amp; Computer Science</b>	Sri Sai Hareesh A	> Reviewer for Journal of Visual Communication and Image Representation, Elsevier.
		> Received Travel Grant from Microsoft Research Bangalore for presenting the paper in IEEE International Winter Conference on Applications of Computer Vision, (WACV 2014), Steamboat Springs, Colorado, USA, 24-27 Mar 2014.
		> Received the Best Poster Award in the Section of Mathematical Sciences including Statistics at 101 <sup>st</sup> Indian Science Congress (ISCA), Jammu, Feb 2014.
<b>Physics</b>	Sri Pradyumna Mulpur	> Received the Young Scientist Award, 2 <sup>nd</sup> Prize in the Category of Physics (2013/14) for his paper, Graphene as a Smart Spacer Material on Engineered Thin Film Hybrids for the Amplification of Surface Plasmon Coupled Emission Towards Sensing, conferred by the KV Rao Scientific Society (a prestigious non-profit organization that promotes science in numerous ways), Birla Science Centre, Hyderabad, 31 May 2014.
		> Received a Certificate of Completion with Distinction for a 9-week online course entitled, Nanotechnology: The Basics, authorized by Rice University, Texas, 3 Feb 2014.
	Sri Murali Ravi	> Selected to attend a UGC DAE-CSR Summer School on Detector simulations using GEANT 4, Kolkata, 15-30 Jun 2014.
<b>Biosciences</b>	Sri K N Naresh	> Received Second Prize for the Oral Presentation at the International Conference on Biotechnology and Bioinformatics (ICBB) 2014, International Centre for Stem Cells, Cancer and Biotechnology (ICSCCB), Pune, Maharashtra, 1-2 Feb 2014, for the paper 'Enhancement of Phenoloxidase Activity of Molluscan Hemocyanin by SDS: a Study Using Enzyme Kinetics and Molecular Dynamics'.
<b>Management Studies</b>	Dr. Shashank Shah (Post-Doc Fellow)	<ul style="list-style-type: none"> <li>&gt; Invited as Resource Faculty at the four-day Executive Development Programme jointly organised by Harvard University's South Asia Institute (SAI) in collaboration with the World Bank and the Dept. of Public Enterprises, Government of India on the theme Non-State Players in Human Development: Achieving India's Goals, Mumbai, 3-6 Feb 2014.</li> <li>&gt; Co-authored book with Prof. V E Ramamoorthy entitled 'Soulful Corporations: A Values-based Perspective on Corporate Social Responsibility', released at a special function by Dr. Indu Shahani, Member, University Grants Commission; and Former Sheriff of Mumbai, 31 Oct 2013. Dr. Shashank Shah addressed the gathering on the theme entitled 'Emerging Role of Corporations in Society'.</li> <li>&gt; Reviewer, Journal of Human Values, Indian Institute of Management, Calcutta, Sage Publications, for the academic year 2013/14.</li> <li>&gt; International Advisory and Editorial Board Member, Journal of Values-based Leadership, Valparaiso University, USA, for the academic year 2013/14.</li> </ul>



# Research Grants & Projects

	Granting Agency	Project
<b>Mathematics &amp; Computer Science</b> 	DRDO ER & IP, Delhi, India	Near-Real-Time Super Resolution of Aerial Video (Visual and IR) Sequences for Defence Applications
	Zentron Labs Bangalore	Diabetic Retinopathy Screening Tool
	DRDO (ER and IPR)	Real-Time Motion Compensation, Image Enhancement, and Feature Extraction of Moving Targets in ISAR
	ISRO-RESPOND	Elliptic Curve Cryptography
	NBHM/DAE	Qualitative Study of Coupled Ordinary Differential Equations
	DRDO	An Ensemble of Image Segmentation Algorithms for Medical and Aerial Images
<b>Physics</b> 	UGC	UGC Basic Science Research (BSR) project
	DST	FIST (Fund for Improvement of Science & Teaching Infrastructure)
	DST	Postgraduate Teaching Programme – M.Sc. in Nanoscience and Nanotechnology
	DAE-BRNS	Modification of a Planar Gamma Camera and its Upgradation for Supporting Education, Training and Research in Medical Imaging
	VGST, DST, Govt. Karnataka	Research-based Reforms in Physics Instruction: Classroom and Laboratory
	DST	Design and Development of Multi-modal Optical Microscope Using Fourier Optical Image Processing
<b>Chemistry</b> 	DRDO	Real Time Motion Compensation, Image Enhancement and Feature Extraction of Moving Targets in ISAR
	DAE-BRNS	Studies on Semiconductor-metal Nano Composites as High Performance Thermoelectric Materials
	DST Faculty Award	INSPIRE - Regiospecific Functionalisation of Anisotropic Nanoparticles and Implications Towards Generation of Plasmonic Metal Nanoclusters
	DBT	Development and Validation of an Indigenous Assay for Lp-PLA2 for Early Detection of Heart Disease in Young Indians
	DBT	Application of Plasmonic Technologies and Microbes-fortified Biosorbents for Efficient Integrated Bioprocessing
<b>Biosciences</b> 	DST	Application of Plasmonic Technologies and Microbes-fortified Biosorbents for a Low-cost Integrated Approach to Water Treatment
	UGC	Start up grant - Modulation of TNF Alpha and Homocysteube-induced Inflammation by HDAC and Hsp90 Inhibitors
	UGC	SAP DRS LEVEL II - Special Assistance Programme: Plant Cell, Tissue Culture and its Applications. Immunogenetics
	DST-SERB	Evaluation and Characterization of ESBL Producing Pathogenic Gram Negative Enterobacteriaceae
<b>Home Science</b> 	UGC	Food and Nutraceutical Application of Aloe Vera Gel

# Research Scholars

## POST-DOCTORAL

	Dr. S Prathap Chandran	Colloids and colloid-LC composites
<b>Chemistry</b>	Dr. A Sunil	Novel Chemical Methods for Metal Responsive Fluorescent Sensing, Corrosion Inhibition and Bio-medical Applications
	Dr. Sasidhar Siddabattuni	Organic - Inorganic Nanocomposites; Interfacial Chemistry; Polymers
<b>Management Studies</b>	Dr. Shashank Shah	Leadership Perceptions on Business Management and Stakeholder Welfare: A Qualitative Study of Corporate India

## DOCTORAL

	Sri Srikanth Khanna	Image Processing
	Sri N Uday Kiran	Microlocal Analysis of Operators with Multiple Characteristics
	Sri D Hanumantha R Naidu	Context-based Speech Enhancement
<b>Mathematics &amp; Computer Science (DMACS)</b>	Sri B V K Bharadwaj	Ordinary Differential Equations and Differential Analysis
	Sri. Ajith Padyana	High Performance Computing
	Sri Srinath M S	Cryptography
	Sri Sai Hareesh A	Real-Time Video Super-Resolution
	Sri Sai Shyam	Digital Watermarking
	Sri Lalit Srikanth C	Spectral Clustering Techniques with Application to Image Segmentation
	Sri Muralikrishna Molli	Nanomaterials for Thermoelectric Applications
	Sri Benoy Anand	Non-linear Optical Properties of Nanostructured Materials
	Sri Suresh Penamati	Radar Signal Processing
	Sri Sai Kiran Aditha	Nanomaterials for Photovoltaic Applications
	Sri Sandeep Patnaik	Pharmaceutical Nanotechnology
<b>Physics</b>	Sri L A Avinash Chunduri	Nano Medicine
	Sri Pradyumna Mulpur	Plasmonics, Photonics & Nanomaterial Sensors
	Mrs. C Prathibha	Novel Nano Materials for Deflouridation Studies
	Sri Murali Ravi	Nuclear Medicine Instrumentation
	Sri Sumukh Nandan R	Optofluidic Resonators
	Dr. V Sivasubramaniyan	Nuclear Medicine
	Sri Ramakrishna Motamarri	Natural Products
	Sri Sai Giridhar S	Clinical Biochemistry
	Sri Abilash Gangula	Early Detection of Heart Disease in Young Indians
	Sri K M Ganesh	Ground Water Quality Assessment and Defloridation
<b>Chemistry</b>	Sri K Naga Sai Visweswar	Biosynthesis and Applications of Bacterial Cyclic Glucans
	Sri R S Sai Siddhardha	Electro-catalysis, Electrochemical Sensors, Energy Devices, Nanocatalysis
	Sri Sai Giridhar S Kandanur	Synthetic Organic and Medicinal Chemistry
	Sri Manne Anupam Kumar	Electrochemical Sensing of Biological & Chemical Molecules using Graphene Based Nanocomposites
	Sri Pradeep Kumar Badiya	Bioprocessing and Solid State Fermentation
	Sri S Venkatesh	Plasmonics, Nanophotonics
	Sri Vennel Raj	Studies in Biodiversity of <i>Aegle marmelos</i> (Linn.) Corea Morphological Traits and Molecular Markers
<b>Biosciences</b>	Sri V N S Malleswara D Kota	Studies on the Stress Related Adaptability in an Amphibious Snail (Indian Apple Snail)
	Sri K N Naresh	Protein Structure and Function



<b>Biosciences</b>	Sri A S Vishwanathan	Microbial Biotechnology
	Sri Robin Sharma	Antioxidant Capacity of Endophytic Fungi from Medicinal Plants
	Sri Sai Murali R S	Plant Biotechnology and Phytochemistry
	Sri Aswath Narayanan S	Disease Biology of Bone
	Sri P Sujith Kumar	Glaucoma - Disease Biology
	Sri Prasanth Ghanta	Plant Biotechnology
	Sri Sai Krishna S B	Biomarkers in Rheumatoid Arthritis
	Miss Isha Sai	Bioactive Compounds of Mushrooms
	Sri Mukul Anand	Plant Biotechnology
	Mrs. Niranjana Mahalingam	Molecular Microbiology
Mrs. Bhavani M	Molecular Microbiology	
Miss B Anusha	Bioactive Principles and Medicinal Properties of Spices	
<b>Home Science</b>	Miss Pushkala R	Functional Foods and Nutraceuticals, Postharvest Technology
	Miss Rajeshwari C U	Phytochemicals and Therapeutic Potential of Spices
	Miss Iyer Shobha R	Phytochemicals and Therapeutic Potential of Spices
<b>Management Studies</b>	Sri G S Srirangarajan	Spirit at Work in Business Organizations in India
	Sri Amey Deshpande	Corporate Strategy
	Sri S Sai Manohar	A Study of Innovation Culture of Leading Innovative Organizations
	Sri B Chandrasekhar	A Study on Microsavings and Saving Behaviour of the Poor: Hurdles and Opportunities
	Sri Bhabani Shankar Padhy	Social Entrepreneurship
	Sri V N Prakash Sharma	Corporate Governance and Firm Performance
Sri Jhaveri Aman Sunil Priti	Organizational Strategies for Inclusive Growth	
<b>Commerce</b>	Miss U Suma	Top Women Executives in India: An Exploratory and Descriptive Study
	Sri C Srinivas Yadav	Study of Health Insurance in India with Special Reference to Standalone Health Insurance Companies
	Sri G Ragahvender Raju	An Analysis of India's External Sector Under the New Economic Policy Regime
	Sri Rajabushan J Nayak	Public Debt
	Sri Siva Kiran Gupta K	Analysis & Modelling of Capital Markets & Economic Growth of Emerging Economies (esp. BRICS)
Sri Gopakumar K U	Food Inflation in India: A Policy Oriented Analysis	
<b>English Language &amp; Literature</b>	Miss Dibba Bhargavi	Modern British Novel
	Miss Maitali Verma	Modern and Post-Modern Poetry
	Miss Divya Goyal	Modern European Drama
	Sri Prashant Luthra	A Study of Selected Novels of R K Narayan
	Miss Lalitha Sarma R	Feminism and Gender Studies
Sri Siddhartha R	Witness Literature	

## M.PHIL.

<b>DMACS</b>	Sri Ivaturi Aditya	Mathematical Ecology
	Sri Gannavarapu K Prasad	Synthetic Organic Chemistry (Supramolecular Chemistry)
<b>Chemistry</b>	Sri Chelli Sai Manohar	Molecular Modelling and Drug Design
	Sri Thota Sai Manohar	Chaperone Biology
<b>Biosciences</b>	Sri Girish T N	Ecological Genetics
	Kum. Nelli Vani Sri	Anton Chekhov: A Critical Study of Four Select Plays
<b>Eng. Lang. &amp; Literature</b>	Kum. Sunandini C Haldipur	Fyodor Dostoevsky and the Psychological Delineation of Character: A Study of Three Select Novels

# Research Focus Areas

## Department of Mathematics & Computer Science



### COMPUTER VISION, IMAGE/VIDEO PROCESSING AND MACHINE LEARNING

Computer Vision is to enable the machines to see and interpret the real-world scenes imitating human perception and understanding and then to act upon derived understanding. Image and Video Processing is the area where captured images and videos are processed to enhance its quality, to segment regions of interest, to extract useful features and to perform detailed analysis in offline and real-time modes to enable higher level tasks in Computer Vision. Machine Learning area is a sub-field of computer science in which the machines are enabled with the ability to learn from data, an important tool for building intelligent machines that can improve the quality of our lives.

#### RESEARCH SUMMARY

- > Over two decades, the Department of Mathematics and Computer Science (DMACS), has pioneered work on Image Processing, Computer Vision and Machine Learning domains of research. Healthcare and Defence have been the two major focus areas on which the department had gained considerable expertise. DRDO awarded ₹22.00 lakhs for Aerial Image Mosaicing project, followed by ₹41.4 lakhs for Image Segmentation for Defence and Medical Applications, and recently, DRDO has also awarded ₹48.76 lakhs for Near-real time Super Resolution of IR and Visual Video Sequences.
- > DMACS has acquired skills in the areas of image pre-processing, image denoising, image restoration, image enhancement, image super resolution, image segmentation, image inpainting, image mosaicing, image feature extraction, image descriptors, image classification, and image analysis. Similarly, DMACS has also acquired skills in the area of video pre-processing, video 2D/3D motion estimation, video stabilization, video super resolution, object detection, recognition, and tracking in video sequences.
- > DMACS has applied this capability to screen patients with Diabetic Retinopathy and also Children with Acute Lymphoblastic Leukemia. Currently, a research project to provide an online tool for screening Diabetic Retinopathy patients is being pursued to assist doctors/clinicians. Work is underway to identify best-of-breed algorithms for breast

cancer detection.

- > DMACS has to its credit a number of publications in reputed international journals, international and national conferences and book chapters.

#### MAJOR RESEARCH ACTIVITIES 2013/14

##### Research Projects

- > Image Segmentation for Defence and Medical Applications for DRDO
- > Near Real-time Video Super Resolution of Visual and IR Sequences for DRDO for aerial surveillance

##### Collaborations

- > DRDO ER & IP Delhi and ADE Aerial Image Exploitation Centre
- > Sri Sathya Sai Institute of Higher Medical Sciences (SSSIHMS) at Whitefield and Prasanthigram
- > A number of eye research institutes such as Sankara Nethralaya, Agarwal Eye Hospital, Narayana Nethralaya, and SSSIHMS
- > Zentron labs, Bangalore

##### Other Activities

- > We have also embarked on a health-informatics project on data pertaining to patients having Rheumatoid Heart Disease using machine learning, data mining and natural language processing.



### CRYPTOGRAPHY

Cryptography is a field that focuses on providing safe, and secure communications and exchange of sensitive information between parties. It attempts to develop systems that will make the time to decode the encrypted messages unimaginably large to thwart all possible attacks.

## RESEARCH SUMMARY

- > Over the last five years, DMACS has pioneered work on Encryption using Chaotic Dynamical Systems such as Lorentz attractors, Elliptic Curve Cryptography and Number Theoretic Encryption Techniques.
- > DMACS has acquired reasonable skills in the areas of image encryption, multi-linear maps, digital signatures and non-commutative algebraic cryptography. It has also acquired detailed mathematical background for conducting research in use of elliptic curves in cryptography.
- > Currently DMACS is being supported under the ISRO/RESPOND scheme for research work on Elliptic Curve Cryptography.

## MAJOR RESEARCH ACTIVITIES 2013/14

### Research Projects

- > ISRO/RESPOND Project on Elliptic Curve Cryptography

### Collaborations

- > Advanced Data Research Institute (ADRIN), Dept. of Space, Hyderabad
- > IIT, Bangalore, Dr. Vijay Patankar

### Other Activities

- > The department has also worked on Digital Watermarking to increase the payload capability. It has also researched the possibility of using heterogeneous watermarks such as audio file in an image file.

## HIGH PERFORMANCE COMPUTING (HPC)

HPC is a branch of computer science that concentrates on developing supercomputers and software to run on supercomputers. A main area of this discipline is developing parallel processing algorithms and software programs that can be divided into little pieces so that each piece can be executed simultaneously by separate processors. Finding solutions to the challenges in designing supercomputers and large-scale computer clusters to solve advanced computation problems forms part of the core research area of HPC. HPC has the capacity to handle and analyze massive amounts of data at very high speeds. Tasks that can take months using normal computers can be done in days or even minutes. It can be used to model and solve highly complex problems across a range of high-value sectors.



## RESEARCH SUMMARY

- > Over the last ten years, DMACS has acquired satisfactory skills in understanding the super-scalar architectures, high performance computing-related bottlenecks, parallel algorithms, and has enhanced skill sets in CUDA programming and research.
- > DMACS has been recognized by NVIDIA as their recognized teaching and research centres in CUDA programming. They have signed a Professor-in-Partnership Program with DMACS providing adequate support in terms of GPGPU hardware. DMACS has been receiving latest versions of GPGPU for research and teaching as part of the CTC CUDA Teaching Centre and CRC CUDA Research Centre.
- > A doctoral research work has been completed in the area of "Topology and Routing Aware Mapping on Parallel Processors". Another doctoral research work is in progress and it focuses on finding solutions to the problem of I/O bottleneck in HPC applications.
- > DMACS has also been active in Hadoop/Spark platform and is in the process of building an 8 node Hadoop cluster.

- > DMACS has established an 8-node cluster to study various architectures and to support scientific computing across all departments.
- > A number of publications by students of DMACS have won prizes and awards in the International Conference on High Performance Computing being held every year in India.

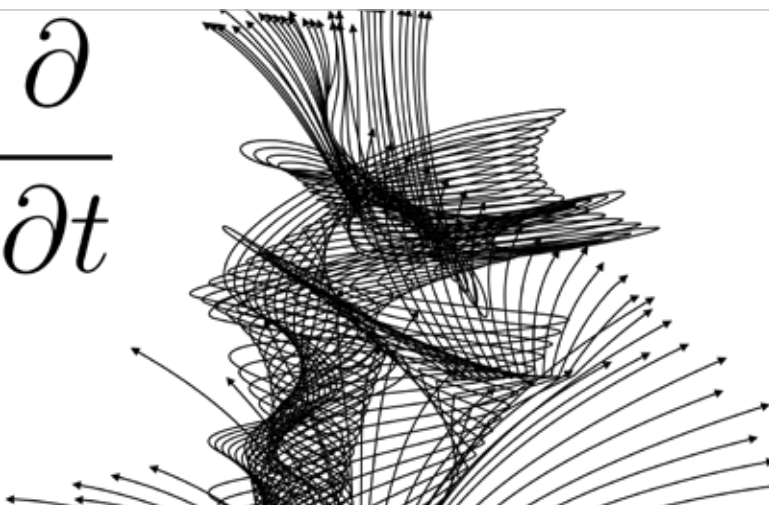
## MAJOR RESEARCH ACTIVITIES 2013/14

### Collaborations

- > Prof. Ashok Srinivasan, University of Florida, USA
- > Prof. Sadayappan, Ohio State University, USA

### Other Activities

- > A number of papers showcasing the performance enhancement of applications when they are parallelized have been published



### DIFFERENTIAL EQUATIONS

- > Differential Equations is a branch of Analysis which uses analytic or numerical methods to address questions on existence, uniqueness and stability of solutions.
- > Singular Interface Problems are problems with a differential equation defined on a domain with singularity that can be viewed as 'holes' or 'gaps' in the domain. The conditions imposed usually indicate the interaction of the boundaries of the singularities.
- > Fractional Calculus or the non-integer order calculus is an extension of traditional calculus. With the flexibility of a non-integer order derivative, fractional calculus has been found to be useful in describing the dynamical behaviour of materials and processes over vast time and frequency scales with very concise and computable models.
- > Pseudo-differential Operators are generalization of differential equations using tools of Fourier analysis. These operators due to their geometric and algebraic treatment played a major role in the understanding theoretical questions of Partial Differential Equations.

### RESEARCH SUMMARY

- > Singular Interface Problems: Over the last two decades, DMACS has established the area of Singular Interface Problems with both analytic and numerical studies of general  $n^{\text{th}}$ -order non-linear singular interface problems. Two doctoral research works have been completed in these areas. Further research work is being undertaken in the context of boundary value problems. A proposal to DST to further this research work has been submitted for consideration.
- > Fractional Calculus and Applications to Image Processing: Fractional Differentiation, Fractional Order Derivative and its applications in signal and image processing is now assuming importance for the international scientific community. The present work in DMACS aims to contribute to the area of image processing by studying the filters, transforms and other conventional techniques and their fractional or rather generalized counterparts. A doctoral research is in progress in this area.
- > Pseudo-Differential Operators: A doctoral research work is being carried out on the development and extension of tools required for the local and global well-posedness problems of hyperbolic operators using the pseudo-differential calculus. The main aim of this work is a complete resolution of the Ivrii-Petkov conjecture and to extend the theory of pseudo-differential operators of type S.
- > Mathematical Modelling: In Ecological and Epidemic modelling, the department has worked on the provision of additional food as a tool for biological control of predator-prey systems. The preliminary study of neglected tropical diseases is in progress.

### MAJOR RESEARCH ACTIVITIES 2013/14

#### Research Projects

- > Under SSSIHL with University of Torino: Theory of Pseudo-Differential operators of type S and Global well-posedness of strictly hyperbolic operators
- > Analytical and numerical studies of general  $n^{\text{th}}$  order non-linear singular interface problems on time scales submitted to DST

#### Collaborations

- > Dr. Sandro Coriasco, Dr. Marco Cappiallo and Prof. Luigi Rodino, University of Torino, Italy
- > Prof. P D N Srinivas, Head, Dept. of Mathematics, Andhra University

# Department of Physics

## PHOTONICS

The generation, emission, modulation, transmission, amplification and detection of light are studied under the science of photonics, covering all technical aspects over the entire spectrum of electromagnetic radiations. The science is closely related to classical and modern optics giving the scope to study practical application of optics like optical fiber communications, optoelectronics, microscopy, astronomy and so on.



### RESEARCH SUMMARY

- > Research work in photonics is being undertaken in the sub areas of non-linear optics, nanophotonics, biophotonics, fiber optics and photonic sensors. Non-linear optical properties of varied materials including novel nano materials are being studied using high power pulsed Nd:YAG laser and associated systems. The department has an automated Z-scan setup for such studies. Non-linear effects in fibers, surface Plasmon resonance studies, switching and power limiting properties of Bacteriorhodopsin, design and construction of multi-modal microscope, nanomaterial synthesis by laser ablation, multi-parameter sensing using optofluidic ring resonators and fiber gyroscope sensors are the various research activities carried out in this area.

- > Design and characterization of optofluidic resonator geometries for biomedical sensing applications funded by UGC-DAE-CSR, Kalpakkam Node

### Collaborations

- > UGC DAE CSR – Kalpakkam Node; Dr. B K Panigrahi, Indira Gandhi Centre for Atomic Research, Kalpakkam
- > Dr. Sai Siva G, Dept. of Instrumentation & Applied Physics, Indian Institute of Science, Bangalore
- > Prof. A M Rao, Clemson University, USA
- > Dr. Shivakiran Bhaktha B N, Indian Institute of Technology, Kharagpur
- > Dr. V Lakshminarayana, Dr. Reji Philip, Raman Research Institute, Bangalore
- > Photonics lab, Indian Institute of Astrophysics, Koramangala, Bangalore

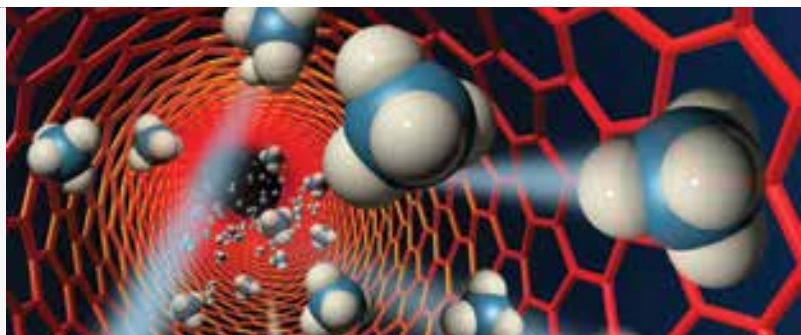
### MAJOR RESEARCH ACTIVITIES 2013/14

#### Research Projects sanctioned

- > Design and Development of Multimodal Optical Microscope using Fourier Optical Image Processing funded by DST

## NANOSCIENCE AND NANOTECHNOLOGY

Nanoscience and Nanotechnology deals with the study and control of matter at atomic and molecular scale. This highly interdisciplinary and versatile field brings together scientists and engineers from applied physics, materials science, chemistry, biology, medicine and so on to produce, characterize and effectively use materials of such low dimensions for variety of applications, ranging from energy production and drug delivery to cosmetics and clothing.



### RESEARCH SUMMARY

- > Research activity in Nanoscience has now grown as a full-fledged thrust area of research of the department. The work done in this area can be broadly divided into energy and healthcare applications. Research is being carried out to study novel nanomaterials and nanocomposites for efficient thermoelectric power generation, synthesis of nanomaterials for water purification and fluoride removal, as well as new materials for efficient photovoltaic applications,

Pharmaceutical Nanotechnology – Nano formulations for Improved Therapeutic Efficacy, Fluorescent Nanomaterials for Biomedical applications and nanomaterials for sensing applications.

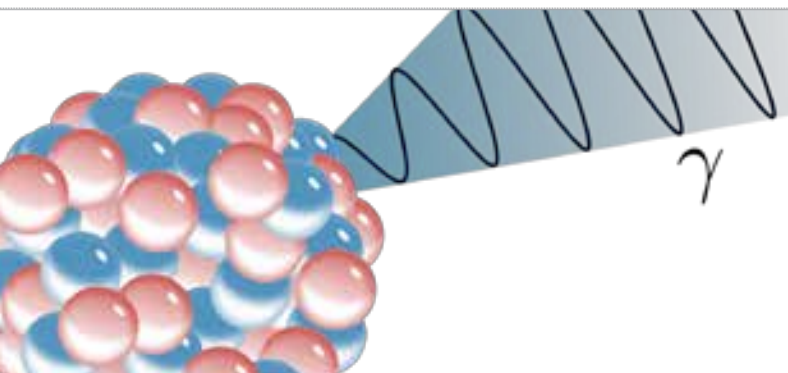
## MAJOR RESEARCH ACTIVITIES 2013/14

### Research Projects

- > Studies on Metal-Semiconductor nanocomposites as high performance thermoelectric materials, funded by DAE-BRNS
- > Studies on thermoelectric performance of nanostructured Bismuth Telluride and Lead Telluride Nanocomposites grown via novel solvothermal nanoplateing technique, funded by UGC-DAE-CSR Kalpakkam Node

### Collaborations

- > UGC-DAE-CSR Kalpakkam Node; Dr. B K Panigrahi, Indira Gandhi Centre for Atomic Research, Kalpakkam
- > Dr. Sai Siva G, Dept. of Instrumentation & Applied Physics, Indian Institute of Science, Bangalore
- > Prof. A M Rao, Clemson University, USA
- > Prof. S Mitra, New Jersey Institute of Technology, USA
- > SSSIHMS, Prasanthigram
- > Raman Research Institute, Bangalore



## NUCLEAR SPECTROSCOPY

The field of science dedicated to the study and understanding of the atomic nuclei is called Nuclear Physics. It is concerned with the nucleus of the atom and the interaction of different nuclei. Nuclear Spectroscopy is a branch of Nuclear Physics that is concerned with the study of the discrete spectrum of nuclear states. Research in Nuclear Physics reaches out to various applications like nuclear power production, nuclear medicine, nuclear magnetic resonance imaging, geology and archaeology.

### RESEARCH SUMMARY

- > Low energy nuclear spectroscopy research facility was established in the department in early 1990's. With the available research facilities, electron-gamma spectroscopy studies on level structures of odd-odd deformed nuclei of interest are carried out. Conversion electron studies, singles and co-incidence gamma studies and X-ray spectra studies are carried out off-line using liquid nitrogen cooled, HPGe and Si(Li) detectors coupled to PC based multi-channel analyzers. Indigenously built mini-orange electron transporter coupled to Si(Li) detectors are often used for conversion electron studies. Theoretical studies and model based predictions of isomers and levels structures in odd-odd deformed nuclei are also being undertaken.

## MAJOR RESEARCH ACTIVITIES 2013/14

### Collaborations

- > BARC, Mumbai
- > VECC, Kolkata
- > NNDC, BNL, USA
- > GSI, Germany

### Other Activities

- > Evaluation of Nuclear Structure and Decay Data for mass chain A=215, A=219 and A=227
- > Three faculty members attended workshop on Evaluation of Nuclear Structure and Decay Data, Abdus Salam International Centre for Theoretical Physics, Italy
- > Atomic Mass evaluation – in collaboration with GSI, Germany
- > Organized awareness workshop of the Nuclear Physics research facilities in India in collaboration with VECC and UGC-DAE-CSR at SSSIHL, Prasanthi Nilayam, Jun 2013

## SIGNAL PROCESSING

Signals can be of different kinds, such as sound, electromagnetic radiation, electrocardiograms, telecommunication, images and sensor readings that carry information. Signal processing is the enabling technology for the generation, transformation, extraction, and interpretation of information carried by these signals. The origin of these signals is varied, right from a human vocal cord to the signals sent by radars and satellites.



### RESEARCH SUMMARY

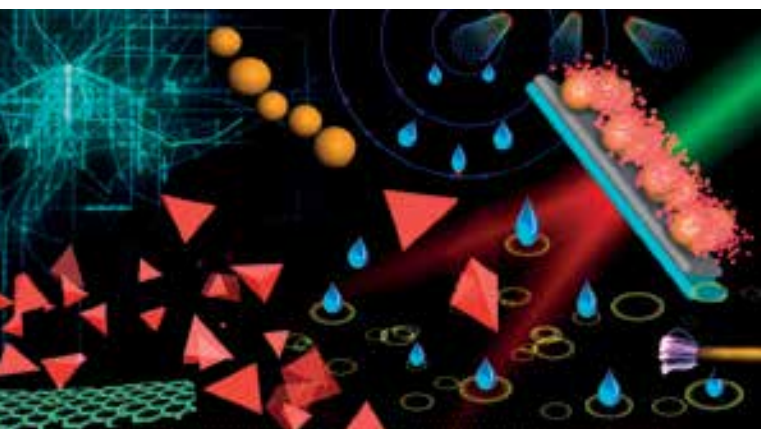
- > Inverse Synthetic Aperture Radar (ISAR) imaging is an effective way to acquire high resolution images of targets of interest at long range. It is an irreplaceable tool in the task of Non-Cooperative Target recognition (NCTR) of both aircraft and ships. Therefore, effective ISAR imaging will facilitate improved target detection and target identification strategies for NCTR. Experimental results have shown that ISAR image of a target can be distorted severely as a result of a time-varying and perturbing rotational motion possessed by the target. In many of the measured ISAR images from moving targets—such as those from in-flight aircraft or manoeuvring ship—the distortion can be quite severe. The department's research work will add insight into the distortion mechanisms that affect the ISAR images of a target in motion. For ISAR to realize the operational goal of NCTR, methods are being

developed to compensate for the quadratic and higher order terms in the Doppler motion. Furthermore, novel algorithms such as adaptive S-method, Hermite S-method, and adaptive local polynomial Fourier transform are being developed to compensate for the quadratic and higher order motions to improve performances of the Fourier transform and the standard S-method in radar imaging.

### MAJOR RESEARCH ACTIVITIES 2013/14

#### Research Projects

- > Real time Image enhancement and feature extraction of moving targets in ISAR



## SENSORS & NANOTECHNOLOGY

Observation has always been the key component in scientific discoveries and advancements. In the previous century, discoveries were limited to the micro scale on account of the non-availability of electron microscopy and other tools to explore smaller dimensions. The modern era has seen nano-world applications embrace man's life in different forms, starting from mobile phone technology to cancer treatment. In this context, sensors help us in observing the changes of a particular parameter of a system. In other words, sensors translate the message from science to a common language. In this broad framework, we intend to explore the possibilities of next generation sensors.

### Research Sub-Focus Areas

- > Plasmonic Sensors
- > Biosensors
- > Electrochemical Sensors
- > Environmental Monitoring
- > Photonics
- > Enhanced Energy Storage Devices

### PLASMONIC SENSORS

- > The ongoing research in the department is in the broad field of template assisted nanoparticle assembly. Research is directed towards the well-defined assembly of nanoparticle clusters with control over the aggregation number and aggregate structure. This is being done in order to exploit the interesting optical properties that metal nanoparticle clusters exhibit like plasmonic enhancements and hybridized resonances as predicted by theory and other experiments. The use of such nanoclusters in the development of plasmonic nanosensors based on surface plasmon resonance and surface plasmon-coupled emission is envisaged. Currently, the department working on applications related to biomedical diagnostics and point-of-care devices. A new 'Plasmonics Lab' has been established to augment future research in nanoplasmonic applications.

### MAJOR RESEARCH ACTIVITIES 2013/14

#### Research Projects

- > Regiospecific functionalization of anisotropic nanoparticles and implications towards generation of plasmonic metal nanoclusters
- > Application of plasmonic technologies and microbes-fortified biosorbents for a low-cost integrated approach to water treatment

#### Collaborations

- > Dr. Indira Hewlett, CBER/FDA, USA
- > Prof. Govind Rao, University of Maryland Baltimore County
- > Prof. Appa Rao, Clemson University
- > Dr. Shivakiran Bhaktha BN, Indian Institute of Technology, Kharagpur
- > Dr. Dinesh Jagadeesan, National Chemical Laboratory, Pune

### BIOSENSORS

- > Despite significant advances in medical and surgical therapies, morbidity and mortality due to coronary artery disease (CAD) remains high. In India, the burden of CAD is particularly severe, as the disease occurs 1-2 decades earlier and has a 2-4 fold increased mortality rate compared to more European and North American populations. Early onset of CAD (< age 45 years) is particularly common within the Indian population and carries considerable morbidity and economic costs. Lipoprotein associated phospholipase A2 (Lp-PLA2, a pro inflammatory marker) is a potent pro-inflammatory mediator which plays an important role in the development of coronary atherosclerosis. Lp-PLA2 has significant potential to become an important marker for the early onset of atherosclerosis in Indians. The department's hypothesis is that the elevated levels of Lp-PLA2 are associated with the early onset CAD in Asian Indians and that evaluating Lp-PLA2 levels will add incremental value to contemporary CAD risk assessment, particularly for the early onset of the disease. This work is in its final phase and the results are being communicated to international peer reviewed journals and conferences.

### MAJOR RESEARCH ACTIVITIES 2013/14

#### Research Projects

- > Development and validation of an indigenous assay for Lp-PLA2 for early detection of heart disease in young Indians

#### Collaborations

- > Dr. Vijayalakshmi V, National Institute of Nutrition, Hyderabad
- > Dr. Srikanth Sola, SSSIHMS, Whitefield, Bangalore
- > Dr. Carani B Sanjeevi, Karolinska Institute, Sweden

### ELECTROCHEMICAL SENSORS

- > Nanomaterials are widely used in the design and fabrication of sensors because of their facile synthesis, sensitivity, specificity and multiplexing capability. They also exhibit excellent conducting behaviour that makes them potential candidates for electrochemical detection and fuel cell application. Electrochemical deposition of nanoparticles is the predominant synthetic approach apart from various



other routes such as pulsed laser ablation and bottom up solution synthesis. In the recent past, the department has synthesized Gold, Platinum and Palladium nanoparticles over graphene and carbon nanotube frameworks. These materials exhibit enhanced electrochemical behaviour in terms of electrocatalysis of alcohols and selective determination of the neurotransmitter dopamine. The department is also working towards the development of a rapid, low-cost electrochemical assay for quantification of HIV p24 levels in clinical specimens by sensitive detection of the HIV p-24 antigen.

#### MAJOR RESEARCH ACTIVITIES 2013/14

##### Collaborations

- > Prof. Lakshminarayanan, Raman Research Institute, Bangalore
- > Prof. S Mitra, New Jersey Institute of Technology, USA

#### ENVIRONMENTAL MONITORING

- > Analytical sampling and upcoming laboratory analyses of biological and chemical analytes of interest are the gold standard for environmental and biological monitoring. However, unabated demand for more data and faster acquisition at lower cost, size, and power continue to drive research in all major classes of biological and chemical sensors in environmental monitoring applications. Unlike many sensor arenas, where a dominant technology has taken hold for decades, the best choice for chemical and biological environmental monitoring remains unclear. As a result, research continues across a broad range of sensor classes to find footholds in application-specific tasks.

#### MAJOR RESEARCH ACTIVITIES 2013/14

##### Collaborations

- > Dr. J S Bhargav, Geological Survey of India, Hyderabad
- > Prof. Ram Prabhu, Indian Institute of Technology Madras, Chennai

#### PHOTONICS

- > The development of NLO molecules has attracted the spotlight of modern research in view of their impending applications in photonic technologies. Chalcones, a class of organic materials, are attractive for their large second harmonic generation (SHG) efficiencies. The research focuses on the synthesis, characterization, SHG and third order non-linear properties of chalcone and bis-chalcone derivatives for varied photonic applications.

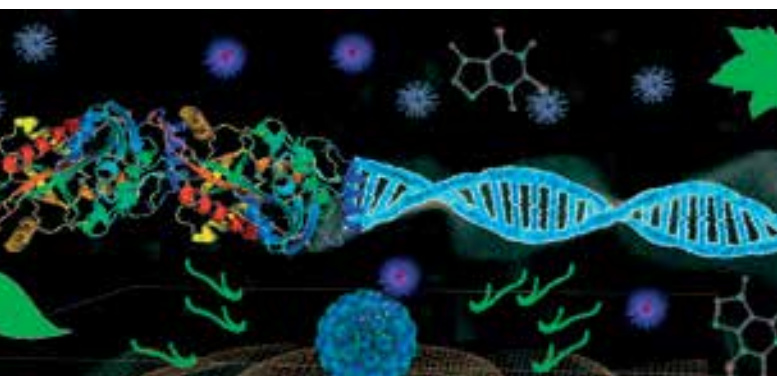
#### ENHANCED ENERGY STORAGE DEVICES

- > Self-assembled monolayers (SAMs) on metal oxide nanoparticles like titania (TiO<sub>2</sub>) aids in the reduction of surface conductivity of nanoparticles and allows reliable dielectric characterization like dielectric permittivity determination of nanoparticles. Impedance characterization results using slurry methodology in host liquid, butoxyethanol (BOE) illustrates the differences in the electrical resistances of nanoTiO<sub>2</sub> with and without SAMs. Various organophosphates (MDDP – monododecyl phosphate; PP – phenyl phosphate; NP – Naphthyl phosphate) are employed for obtaining SAMs on nanoTiO<sub>2</sub>. The SAM treated nanoparticles will be dispersed in polymer matrix for designing high energy density polymer nanocomposite dielectrics.

#### MAJOR RESEARCH ACTIVITIES 2013/14

##### Research Projects

- > Develop Interfacial Chemistry Based Structure-Property Relationship in Nanodielectric Composites for Enhanced Energy Storage Applications



## BIO-INSPIRED APPLICATIONS

The dawn and progress of human civilization across ages was deeply inspired by the interplay of living systems in nature. In particular, the role that biomolecules played in the evolution of various organisms with increasing complexities is something that needs to be studied and applied for a sustainable world. Our concentrated and integrated focus is to study at a fundamental level, the generation of these biomolecules via living systems and understand the mechanisms using modelling and structured design and find applications in health, chemical, fuels and polymer industries.

### Research Sub-Focus Areas

- > Bioactive molecules
- > Biocomposite based tissue engineering
- > Bioprocessing
- > Molecular modelling & Drug design

### BIOACTIVE MOLECULES

- > Extensive utilization of definite fossil fuels and associated environmental problems, such as air, land and water pollution and global warming, has paved the way for research and development on renewable fuels. The department's current research has been focused on the replacement of the non-renewable fossil fuels such as gasoline and diesel, with biofuels and bio-based products. Towards this direction, the research on biofuels production has been governed by the choice of microbes, substrate and the technique, that play an important role in the biological conversion of lignocellulosic biomass (LCBs). An innovative and first of its kind study has focused towards enriched cellulolytic enzyme production using a combination of endophytic, epiphytic, micro and macro fungal cultures. A novel optical quantification technique to measure fungal growth on agar plates has also been developed. A new Molecular Bioprocessing Lab has been established to boost future research in integrated bioprocessing and bio-based materials.

### MAJOR RESEARCH ACTIVITIES 2013/14

#### Research Projects

- > Application of plasmonic technologies and microbes-fortified biosorbents for efficient integrated bioprocessing

#### Collaborations

- > Dr. Praveen V Vadlani, Kansas State University, USA

### BIOCOMPOSITE BASED TISSUE ENGINEERING

- > Polymeric scaffolds using biopolymers have been synthesized by the department for tissue engineering applications. We have synthesized cross-linked homogeneous blends by employing Alginate (Alg) and Chitosan (CS) (6:1). The scaffolds are being investigated for use in chondrocyte cell culture.

Effect of chondrocyte cell culture on the biopolymers with and without curcumin is also under investigation.

### BIOPROCESSING

- > Many of the modern drugs being used at present are derived from natural sources. Identification of bioactive molecules from natural sources involve the steps of extraction, separation, purification, evaluation of their medicinal efficacy and structural characterization. The search for new drugs, especially from natural sources such as plants, algae, fungi and also semi-synthetic ones are being explored.

### MAJOR RESEARCH ACTIVITIES 2013/14

#### Collaborations

- > Dr. Nanduri Srinivas, National Institute of Pharmaceutical Education and Research, Hyderabad
- > Dr. Meera Pandey, Indian Institute of Horticultural Research, Bangalore

### MOLECULAR MODELLING & DRUG DESIGN

#### RESEARCH SUMMARY

- > The increased potential of advanced computational technology helps the development of drug design. Exploiting the quantized fundamental parameterization of atomic/molecular properties, this modern area of research has optimized the economy of time, effort and resources. The department's research effectively and innovatively explores this tool unto *in silico* drug design of various synthetic and semi-synthetic analogs of medicinal extracts. Further, this tool is also used to understand the thermodynamics and kinetics of various reactions therein.

### MAJOR RESEARCH ACTIVITIES 2013/14

#### Collaborations

- > Dr. Sreedhara R Voleti, INDRAS Pvt. Ltd., Hyderabad
- > Dr. Ramesh Sistla, Syngene International Ltd, Bangalore

# Department of Biosciences

## PLANT BIOTECHNOLOGY AND PHYTOCHEMISTRY

Medicinal and aromatic plants have been used since time immemorial as panacea for a plethora of illnesses. Given the vulnerability of many of these plants to over-exploitation by the industry, the establishment of tissue culture protocols for these plants is urgently needed. The characterization of their major phytochemical constituents from tissue cultures and natural samples provide insights on their anti oxidant, anti microbial and cytotoxic properties for effective therapeutic regimens.



### RESEARCH SUMMARY

- > *Adhatoda vasica* Nees (Malabar Nut) is a perennial shrub of the Indian subcontinent that is routinely used in codified and non-codified systems of medicine. Based on the inputs on the efficacy of drugs from *Adhatoda vasica* in traditional medicine, the department has:

Pioneered the development of *in vitro* tissue culture methods for propagation of this plant under laboratory conditions  
Made an attempt to define the morphological markers that reflect metabolite content  
Nominated potential binding partners for the alkaloids using *in silico* methods  
Acquired insights on the binding modes of the alkaloids using

spectroscopic, thermodynamic and functional methods  
The current body of work is directed towards characterizing all the major alkaloids from *Adhatoda vasica* and studying their functional aspects.

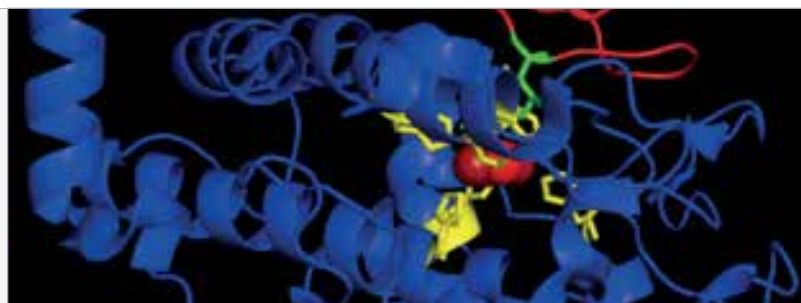
### MAJOR RESEARCH ACTIVITIES 2013/14

#### Collaborations

- > Dr. Arun Sreekumar, Dept. of Molecular and Cellular Biology, Baylor College of Medicine, Houston, Texas, USA

## PROTEIN STRUCTURE AND FUNCTION

Proteins are extremely tiny molecular machines of sub-nano dimensions that occur in myriad shapes and sizes in a typical living organism. They are the workhorses which carry out numerous biological functions within the organism. Understanding their intricate structure and highly specific function constitutes an intriguing area of research.



### RESEARCH SUMMARY

- > Structural and functional aspects of proteins are studied using hemocyanin purified from endemic snails as a model protein. Hemocyanins—through their various levels of structural organization—exhibit one of the largest protein assemblies found in nature. Ease of purification from the source and its availability in large quantities make hemocyanin a tangible model for study. Apart from the study of its structure using various biochemical and biophysical techniques, the research is focused on activation and enhancement of phenoloxidase-like enzyme activity in hemocyanins which are well known only as oxygen carrier proteins. This is attempted by exposing the protein to certain chemical agents which might bring about subtle structural modifications that are responsible to elicit enzyme activity in the protein. Phenoloxidase-like function of hemocyanins is studied *in vitro* using enzyme kinetics and the structural modifications underlying the

elicitation of the activity is studied *in silico* using molecular dynamics simulations.

### MAJOR RESEARCH ACTIVITIES 2013/14

#### Research Projects

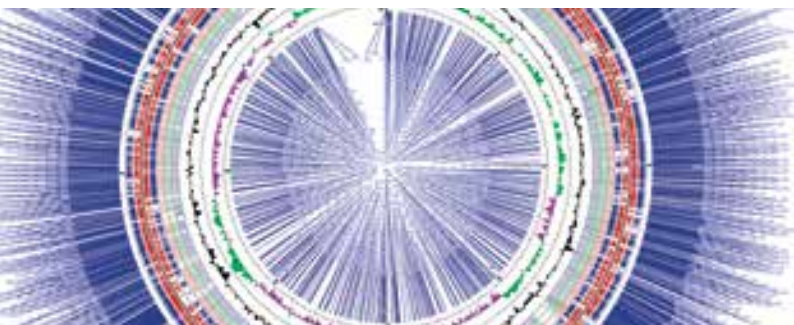
- > Doctoral thesis work to study the structure, function and biotechnological application of hemocyanin purified from endemic snails is nearing completion.

#### Collaborations

- > Dr. J S Bhargav , Geological Survey of India, Hyderabad
- > Prof. Ram Prabhu, Indian Institute of Technology Madras, Chennai

#### Other activities

- > A hemocyanin-based prototypic first generation sensor to detect phenols in aqueous solutions has been developed.



## MOLECULAR MICROBIOLOGY

Prevention and treatment of increasingly prevalent multidrug resistant bacterial infections is dependent on the availability of effective antibiotics. There is an urgent need to understand molecular mechanisms by which human pathogenic bacteria are evolving to attain multidrug resistance. This would greatly enhance the current knowledge of their ability to adapt to, invade and thrive in human tissues.

### RESEARCH SUMMARY

- > The focus of research in Molecular Microbiology is on how human pathogenic bacteria evolve to attain multi-drug resistance. The department's expertise includes bacteriological analysis, antibiotic susceptibility testing and molecular epidemiology. New testing methods pioneered here include tests for susceptibility *in vitro*, PCR diagnostics, bacterial gene sequencing and whole genome sequencing of select bacterial pathogens.

### MAJOR RESEARCH ACTIVITIES 2013/14

#### Research Projects

- > Evaluation of clinically isolated Enterobacteriaceae producing

Extended Spectrum  $\beta$ -Lactamases (ESBL).

- > Evaluation of clinically isolated *Pseudomonas* producing VIM and IMP Metallo- $\beta$ -Lactamases

#### Collaborations

- > Dept. of Microbiology, Sri Sathya Sai Institute of Higher Medical Sciences, Prasanthigram
- > Prof. V Nagaraja, Dept. of Microbiology and Cell Biology, Indian Institute of Sciences, Bangalore
- > Dr. S Shivakumara Swamy, Faculty Scientist, Institute of Bioinformatics and Applied Biotechnology, Bangalore



## REGENERATIVE MEDICINE AND TISSUE ENGINEERING

Regenerative Medicine and Tissue engineering is one of the frontier areas of research that aims to *in vitro* synthesize tissue equivalents of bone, heart muscle, nerve, cartilage, blood vessels and other organs for repair or replacement of damaged tissue through disease or trauma. This transdisciplinary research area encompasses principles from chemical, physical, biological, nano materials science and mechanical engineering. It brings together basic scientists and clinicians onto a single platform to develop bench to bedside solutions.

### RESEARCH SUMMARY

- > Autologous Chondrocyte Implantation (ACI) - comprises of a series of procedures. First, a cartilage sample is harvested arthroscopically from a non-weight bearing area of the affected knee joint. The chondrocyte cells extracted from the harvested cartilage are cultured for four to six weeks to expand the cell population (by a factor of about 50). Then, in a second open surgical procedure, the cultured chondrocytes are implanted into areas denuded of cartilage by disease or injury. Each damaged area is carefully debrided and covered with a periosteal tissue flap, beneath which the autologous chondrocytes are injected. In a modification of the treatment, extracted chondrocytes are cultured within a collagen matrix, which is then implanted (matrix-guided ACI). The implantation is followed by a specific rehabilitation protocol following the procedure.

### MAJOR RESEARCH ACTIVITIES 2013/14

#### Research Projects

- > Role of Autologous Chondrocyte Implantation in Chondral Defects of Knee Joint.

#### Collaborations

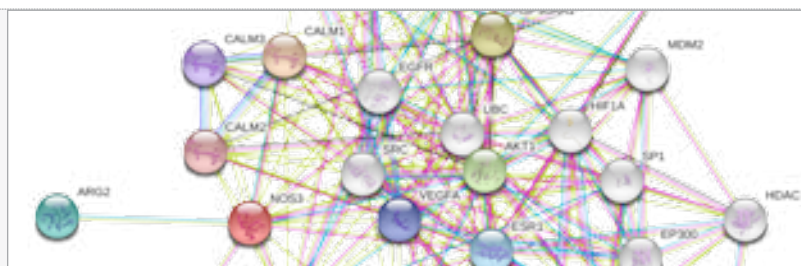
- > Dept. of Orthopaedics, Sri Sathya Sai Institute of Higher Medical Sciences, Prasanthigram, India

#### Other Activities

- > Technical support from Prof. Anders Lindahl and Prof. Lars Peterson, Sahlgrenska University, Hospital, Gothenburg, Sweden

## SYSTEMS BIOLOGY OF DISEASES

Homocysteine is a toxic, non-essential amino acid that is an unavoidable intermediate in many synthetic reactions of cells. It is a common risk factor in many diseases such as eye, cancer, bone, cardiovascular and neurodegenerative diseases. The focus is to explore unifying mechanisms for homocysteine induced diseases.



### RESEARCH SUMMARY

The department is primarily interested in understanding the mechanism by which homocysteine (also cytokines, hypoxia and adenosine deaminase) causes inflammation, leading to manifestation of disease and the role of chaperones and HDACs in modulating inflammation. It employs multidisciplinary and multifaceted approaches like genomic, metabolomic, bioinformatic/systems biology, clinical, biophysical, biochemical, molecular biology, cell culture techniques, animal models and patient samples to answer specific questions in an effort to understand the mechanisms of diseases.

Analyses have provided evidence for the lead role of homocysteine in promoting inflammation. It has been elucidated that purinergic signalling is one of the components of inflammation. Genomic tools are being used to elucidate the functional implications of SNPs. Yeast knock-out model expressing human genes or their variants will be employed to understand role of SNPs. Mice models of disease are being used to understand multiple sclerosis.

### MAJOR RESEARCH ACTIVITIES 2013/14

#### Research Projects

- > A homocysteine network behind human diseases - Unifying mechanisms, emerging therapeutic targets:
  - > Bone Disease: Avascular Necrosis of Femoral Head,

Rheumatoid Arthritis

- > Eye Disease: Glaucoma
- > Neurodegenerative Diseases: Multiple Sclerosis
- > Cancer: Glioma
- > Mechanisms of ATP secretion and the role of ATP activated P2 receptors in inflammation: Implications for Multiple Sclerosis.
- > HDAC inhibitors inhibit inflammation by interfering with purinergic signaling.

#### Collaborations

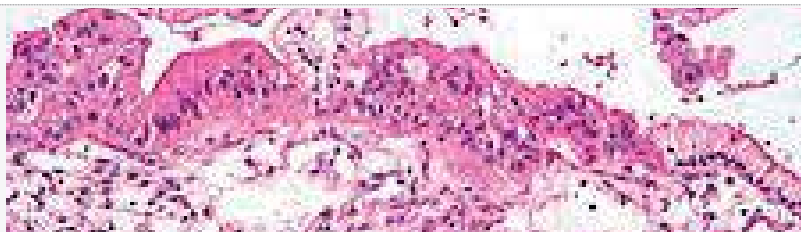
- > Dr. Arun Sreekumar, Baylor College of Medicine, USA
- > Dr. Prakash Khanchandani, Sri Sathya Sai Institute of Higher Medical Sciences, Prasanthigram
- > Prof. Lakshminarayanan, Raman Research Institute, Bangalore.
- > Prof. Seshagiri, Indian Institute of Science, Bangalore
- > Dr. Arun Roy, Raman Research Institute, Bangalore
- > Dr. Vijayalakshmi Venkatesan, National Institute of Nutrition, Hyderabad
- > Dr. V R Rao, Dept. of Anthropology, University of Delhi

#### Other Activities

- > Developing a diagnostic kit for homocysteine.
- > Developing diagnostic kits using Q-PCR (multiplexing) conjugated to a nanoparticle based fluorescent-quencher system.

## CANCER BIOLOGY

*In silico* tools provide ample scope for understanding mechanisms of drug-receptor interactions and enzyme activity. The research presently focuses on investigating these interactions with specific reference to ovarian and prostate cancer.



### RESEARCH SUMMARY

- > Ovarian cancer is the fifth most common cancer. It accounts for 5% of all cancer deaths in women. An attempt is being made to identify the key signaling pathways leading to the development of ovarian cancer and metastasis. Following identification of the most significant signal transduction pathway, a couple of proteins/enzymes involved in that pathway will be shortlisted. *In silico* tools would then be used to study the interaction of these proteins with specific drugs being used to treat ovarian cancer.
- > Prostate cancer is the second leading cause of cancer death in adult men. Prostate is an androgen dependent organ which needs testosterone or its active form dihydrotestosterone for growth. Androgen binds to its receptor to transduce the signal in normal cells. However, in prostate cancer, the

prostate gland becomes androgen independent and grows even in the absence of androgen. The interaction between the androgen receptor and flutamide (a drug used widely in treatment of prostate cancer) is being investigated using *in silico* techniques.

### MAJOR RESEARCH ACTIVITIES 2013/14

#### Research Projects (Dissertation Projects)

- > A comprehensive study of ovarian cancer and mechanism of drug therapy - A bioinformatics study.
- > A comprehensive study of prostate cancer and mechanism of drug therapy - A bioinformatics study

# Department of Home Science



## NUTRACEUTICALS

Nutraceuticals are a diverse product category that provides health benefits in addition to its basic nutritional value. The term is applied to a range of including: isolated nutrients, dietary supplements and herbal products, specific diets and processed foods such as cereals, soups and beverages.

### RESEARCH SUMMARY

- > The research in the area is being directed towards screening of a variety of conventional and unconventional foods for a wide spectrum of phytochemicals viz., total polyphenols, flavonoids, terpenoids, alkaloids, ergosterols, anthocyanins, phenolic acids, fiber components, glycosides, tannins, vitamin C,  $\beta$ -Carotene and saponins. The identified foods as well as its isolates are tested for their bioefficacy as antidiabetic, anti-oxidant, anti-microbial, anti-cancer, anti-hypertensive and anti-inflammatory agents using *in vitro* models. In the current year, bioactive component screening as well as *in vitro* therapeutic assessment was undertaken for certain beans such as *Phaseolus lunatus*, *Glycine max*, *Macrotyloma*

*uniflorum*; banana varieties, *Aloe vera* gel, *Piper cubeba* *Trachyspermum ammi* and flax seeds.

### MAJOR RESEARCH ACTIVITIES 2013/14

#### Research Projects

- > Nutraceutical potential of selected banana varieties
- > Nutritional and nutraceutical profile of selected beans and their sprouts
- > Functional and nutraceutical quality of developed tomato and papaya based instant dry mix formulation
- > Influence of thermal treatments on the nutraceutical properties of kapok buds (*Piper cubeba*)



## BIOPRESERVATION

Biopreservation technologies involve the use of natural compounds and methods to preserve and extend the shelf life of perishable foods. Edible coating is emerging as an eco-friendly biopreservation technology particularly for extending shelf life of horticultural produce. Edible films are thin layers of material which can be consumed and provide a barrier to moisture, oxygen and solute movement.

### RESEARCH SUMMARY

- > Natural biopolymer from *Aloe vera* gel is being explored as a novel edible coating. The study has investigated and identified *Aloe vera* edible coating as a simple low-cost environmentally friendly postharvest technology for reducing postharvest losses in whole fruits and vegetables. *Aloe gel* powder coating was identified as a cost effective non-chemical biopreservative with multiple benefits for extending shelf life and enhancing the health potential of fresh cut vegetables. The gel coating also enhances the nutritional and therapeutic properties of the product. The developed

technology would be explored for shelf life extension of other fruits and vegetables.

### MAJOR RESEARCH ACTIVITIES 2013/14

#### Research Projects

- > Food and nutraceutical application of *Aloe vera* gel.

## DESIGNER FOODS

Designer foods are normal foods fortified with health promoting ingredients. Food ingredients used to formulate designer foods are those which are known to modulate human health and cure or prevent diseases. These foods can be produced by either adding, removing, concentrating or modifying one or more components of a food, or by modifying their bioavailability.



### RESEARCH SUMMARY

- > The research work in this area covers the development of a wide variety of therapeutic foods for clinical application in diseases such as diabetes, cancer, anemia, obesity, hyperlipidemia and liver disorders. Emphasis is provided for the development of convenience foods which are designed using pre-preparation processing and require minimum preparation by the consumer. The work in the current year was directed for formulation of probiotic enriched flax seed based products - legume-based cauliflower and garden cress enriched soup powders, bean sprouts enriched wheat based instant *khichdi* mix, *Aloe vera* enriched papaya spread, *Aloe*

gel enriched tomato chutney mix, *Aloe* gel enriched tomato-based fruit beverages and soya bean enriched pizza bases.

### MAJOR RESEARCH ACTIVITIES 2013/14

#### Research Projects

- > Quality characteristics of wheat-pulse flours and their utilization in baked food formulation.
- > Formulation, development and popularization of dehydrated products.
- > Nutraceutical potential of flaxseed (*Linum usitatissimum*) and flaxseed based probiotic enriched product

## NOVEL FOOD PROCESSING TECHNOLOGIES

Novel food processing technologies improve the quality and process efficiencies of the food chain. The aim of developing novel processing techniques is to improve microbial safety and nutritional quality, to improve physical-chemical properties of foods by minimizing the process intensities, to reduce energy requirements, to reduce waste load and to increase production and process efficiency.



### RESEARCH SUMMARY

- > The work centres around low-cost dehydration technology – osmo-air dehydration. The technology involves the removal of water by immersing fruits or vegetables in a concentrated salt or sugar solution. The process has several advantages, including quality improvement in terms of colour, flavour, texture, energy efficiency, reduction in packaging and distribution cost, elimination of chemical treatment, enhanced product stability and retention of nutrients during storage. The technology is being exploited on a variety of fruits like pineapples, bananas, blueberries, pears, apples, mangoes, apricots, berries, plums, cherries and vegetables such as onions, carrots, tomatoes, potatoes, *agar* gel and pumpkins. In the current year, the technology was used to investigate the quality and stability of Sapodilla (*Manilkara zapota*) flakes.

### MAJOR RESEARCH ACTIVITIES 2013/14

#### Research Projects

- > A study on the effect of osmo-air dehydration treatments on quality and stability of Sapodilla (*Manilkara zapota*) flakes.

# Department of Management Studies



## LEADERSHIP, SPIRITUALITY AND ORGANIZATION CULTURE

Leadership in emerging nations will tend to be different from that of the west as it gets rooted more in the cultural and ethnic context of each nation. Besides, innovation which flourishes within the constraints of developing nations, will not only be path-breaking but will also further the trend of indigenous solutions in organizational thought and managerial activities. This trend offers exciting paradigms for research.

## RESEARCH AREAS 2013/14

### INNOVATION IN ORGANIZATIONS

Innovation has been widely regarded as a powerful tool for stimulating economic growth and changing the quality of human life. The important objectives of the study on innovative companies were to: investigate the influence of organization culture on innovation, to identify common innovation culture characteristics of successful innovative companies and to identify the unique attributes and practices of innovative organizations.

This doctoral research investigated the role of innovation culture in bringing out innovations in India and abroad. Six parameters were identified to study the innovation culture of organizations. These were: Organization Climate, Leadership, Core Values, Customer Focus, Creativity and Envisioning the Future. Based on their innovation capabilities, the companies were grouped into three categories: product, process and business model innovation organizations. Fifteen organizations that have consistently ranked among the top 20 companies on global innovation survey studies were selected for the study. The study revealed common practices widely shared and practiced by these organizations, which helped them to emerge as leaders in their industries.

### SPIRIT AT WORK IN BUSINESS ORGANIZATIONS IN INDIA

There are several factors that have led to the need to manifest Spirit at Work. The foremost among them is a sense of insecurity in people: both economic and job insecurity arising on account of post globalization trends such as business re-engineering, downsizing, outsourcing and off-shoring, cut throat competition, etc. The resulting work environment is a high stress work space with focus on short-term financial gains. The thirst for manifesting Spirit at Work that is being felt across organizations on one hand and the lack of recognition of the same as part of mainstream management literature on the other; establishes the need and importance for the current study.

The objective of this doctoral research is to develop a better understanding of Spirit at Work through an individual-centric

approach, as a function of individual values/attitude coupled with an organization-centric approach, as a function of organizational culture and corporate philosophy. The study aims to evaluate the performance of Spirit at Work in business organizations and compare with expectations that executives have about the same. It proposes to develop an enriched description of Spirit at Work using the Karma Yoga model framework.

### WOMEN EXECUTIVES IN INDIA

The status and role of Indian women in society, organizations, and in homes is undergoing change because of the influence of globalization.

This doctoral research focuses on two areas – work life balance and gender bias. It endeavours to know the ways in which women executives actually manage their work life balance issues and it seeks to identify the organizational and social factors which help them to achieve work life balance. In terms of gender bias, it seeks to examine the prevalence of subtle biases, which were identified in the scoping studies. It also studies the structure and agency dynamics of women executives in the area of work life balance and gender bias. Further, it examines how women executives who have a greater agency, negotiate their structural constraints, and how these actions contribute to social production. It is found that there are enduring structures in Indian society which resist change, and are unquestioningly absorbed by women executives. The study thus provides insights into work life balance and gender bias faced by women executives in particular, and in a general sense it describes the correlation between structure and agency of women executives in a developing, globalized context.



## BUSINESS & SOCIETY ECOSYSTEM

Business as a catalytic part of the social ecosystem has great relevance in the present times of globalization and high interconnectivity. The need to integrate and include various sections of society into main stream has become the imperative of progress. As a consequence, the relationship of business with society in terms of stakeholders, green procedures, social entrepreneurship or financial inclusion through microfinancing becomes important. An exploration of the symbiotic relationship between business and society has been the focus of a number of doctoral research studies at the department.



## RESEARCH AREAS 2013/14

### STAKEHOLDER MANAGEMENT

This doctoral research focused on Stakeholders Management practices at the industry and firm levels. For the industry-level study, the Banking and Financial Services Industry (BFSI) in India was identified. This included public, private and foreign banks as well as financial services companies in India. Demographic, economic, technological and political changes in contemporary India carved a very important role for this industry, which is closely linked with the future growth story of India. The Tata Group of companies were selected for the firm-level study. Rich qualitative and anecdotal data gained in the course of interactions with 38 senior and highly experienced executives from diverse Tata Group companies contributed immensely to the study and provided a valuable addition to the existing body of knowledge.

### SOCIAL ENTREPRENEURSHIP

The evolution of Social Entrepreneurship in the past few decades has captured the imagination and attention of the academia and the industry as well. Due to the apparent dichotomy that exists between the twin goals of profitability and social mission, the novelty of the concept itself merits a closer examination in terms of leadership along with its interesting socio-economic impact.

This doctoral research strives to accomplish a holistic understanding of Social Entrepreneurship at a conceptual level, gaining insights into social entrepreneurs, various stakeholders and the environment that becomes their operational canvas. The proposed conceptual model for social entrepreneurial development elaborates the three stage development of a social entrepreneurial leadership as Initiation, Implementation and Expansion. The third stage of Expansion tends to facilitate a Social Entrepreneurial Ecosystem that comprises different stakeholders, who are mutually interdependent, and who as an organism bring stability and authenticity to both the financial and social goals.

### GREEN SUPPLY CHAIN MANAGEMENT

The pace of industrial development in the last two decades has led to tremendous technological innovation and globalization. This growth has however negatively impacted the environment.

Businesses recognized that sustainability is possible only by adopting green practices within their own companies. They started to realize that the benefits derived by them will be more significant and meaningful when green initiatives are spread to their partners - upstream and downstream, rather than in isolation. This led to the emergence of the Green supply chain concept- using environmental friendly practices in a traditional supply chain setup. Literature shows that the research done to date has focused mainly on South-East Asian nations, especially China, Philippines and Thailand. India is set to play a key role in world economy in years to come. Hence, the role of Indian industries needs to be researched in the area of Green Supply Chain.

The three potential areas which have been identified for this doctoral research include:

- > Awareness among Indian consumers about green practices
- > Maturity among Indian industries to practice green methods
- > Policies and decision making abilities of the Indian Government to drive the country into the green path

### MICROFINANCE IN INDIA

Amidst growing awareness and realization that the world's poor are excluded from formal financial systems, Microfinance— amongst many other initiatives—has come in to bridge this wide gap. Although Microfinance refers to the entire range of financial services such as savings, money transfers, insurance and production and investment credit, in most of these cases, the focus has been on Microcredit, i.e., the extension of very small, frequent loans to a large number of poor clients. Other aspects of financial inclusion like savings, insurance etc., are largely unattended.

This doctoral research focuses on this aspect of Microfinance, and the extent to which it has taken root in the Indian context of financial inclusion. It attempts to understand the saving patterns of the Indian poor and the preferences and features that they look for in a saving instrument. It also studies the hurdles which are to be removed to act as facilitators to regular savings. In the Indian context, the heterogeneity of people's poverty levels, the varying natures of employment and incomes, family situations, the availability of financial services (or the lack of it), creates a platform for region-specific exploratory studies to understand the neglected pillar of Microsavings.

# Department of Commerce



## VALUES IN COMMERCE AND MANAGEMENT

The research area deals with understanding and analyzing the importance of human values and ethical principles in various aspects of commerce and management.

The work done in this area includes theoretical and empirical studies on Values-centred Leadership, Corporate Governance and the impact of ethical values on economic development.

This is an ongoing research area of the department with regular research publications. Apart from research publications in International Journals, the department organized a Workshop on 'Ethics and Challenges of Business' in February 2014 involving well-known experts from Industry.

## MUTUAL FUNDS

Mutual funds are dynamic financial institutions that play a crucial role in an economy by mobilising savings and investing them in capital markets. As a result, they establish links between savings and the capital markets.

The doctoral research undertaken in this area attempts to evaluate the performance of UTI and ICICI Prudential mutual funds during the pre-recession, recession; and post-recession periods (spanning 2001-2013) by application of different risk and return measures. The research further analyses investor perception based performance of mutual funds relating to the current status of performance and the problems faced.

## FINANCIAL MANAGEMENT AND SERVICES

Financial Management and Services focus on advisory and administrative functions in financial enterprises. They cover areas of Economics, Business Law, Consulting and various areas of Corporate Finance.

Several postgraduate dissertations have been completed in this area of research. Work has been done on IFRS, Bank management, Capital structure analysis and Working Capital management.

## FINANCIAL INCLUSION

Financial inclusion is the process of ensuring access to appropriate financial products and services needed by vulnerable groups such as weaker sections and low-income groups at an affordable cost. It has become one of the most critical aspects in the context of inclusive growth and development.

This is an ongoing research area of the department with periodical publications related to different areas of financial inclusion. The strategies adopted by various banks in reaching out to the rural citizens in villages, changes in the customers' perceptions relating to opening of no-frill accounts over different time intervals, and technology acceptance levels of rural citizens are some of the areas covered under the research.

## FINANCIAL MARKETS AND PORTFOLIO MANAGEMENT

Financial Markets deal with different markets like Capital Markets, Foreign Exchange Markets and Markets for derivative instruments. Portfolio Management deals with analysis of Financial securities and investments.

Several postgraduate dissertations have their focus on Portfolio optimization, Value at Risk, Derivatives and Capital Market efficiency.

## INSURANCE

Research studies in Insurance involve understanding various nuances of Insurance including health insurance.

Doctoral research is being undertaken in the area of Health Insurance. Postgraduate dissertations have been done in the areas of FDI and Innovation in the insurance sector.



# Department of Economics

## MACROECONOMIC POLICY MODELLING

The macroeconomic model specifies the statistical relationship of economic phenomenon under study, in order to capture complex and dynamic interrelationships among the various economic variables. It provides a suitable analytical vehicle for analyzing contemporary issues like tackling inflation, growth prospects in the medium to long term, trade and capital flows, impact of monetary, fiscal and exchange rate policies.



### MAJOR RESEARCH ACTIVITIES 2013/14

- > Two faculty members and one research scholar are pursuing their Ph.D. in this area on the topics modelling India's external sector, Public debt management and modelling India's Food inflation. One research paper was published in a

refereed international journal and two research papers have been published in refereed national journals. Three M.A. in Economics dissertations have been done in this area. About six research papers have been presented in various national conferences.

## FINANCIAL ECONOMETRICS

Financial Econometric modelling is the mathematical and statistical representation of the behaviour of financial variables in explaining/influencing economic growth. The thrust is to analyze the financial system which includes financial markets, institutions and financial services in relation to the long run growth of the economy.



### MAJOR RESEARCH ACTIVITIES 2013/14

- > One faculty member is pursuing his doctoral research in the area of Financial Economics with an emphasis on Analysis and Modelling of Capital Markets and Economic Growth in Emerging Economies. One theoretical econometric

research paper was published in a refereed international journal and four research papers were published in refereed national journals. Two topics in this area were selected for M.A. in Economics dissertations during the academic year. Five research papers were presented in various national conferences.

## DEVELOPMENT ECONOMICS

Development economics focuses on how to promote economic growth in an economy by improving the conditions in the areas of health, education, infrastructure, etc. The emphasis is on analyzing the growth of various sectors of the economy such as agriculture, industry, services and trade, in promoting economic development.



### MAJOR RESEARCH ACTIVITIES 2013/14

- > About four research papers were published in this thrust area of research during the last academic year. Two M.A. in Economics students have done their dissertations in the areas of growth of the agriculture sector in India and the Development of the Education Sector over the last four decades.

### Collaborations

- > Prof. B C Sutradhar, Memorial University of Newfoundland, Canada
- > Dr. Vandana Jowheer, University of Mauritius, Mauritius
- > Prof. Madhusudhan Mohanty, California State University, USA

# Department of English Language & Literature

## MAJOR RESEARCH AREAS

Indian Writing in English, European Literature, Women's Studies, Modern and Post-Modern British Literature, Witness Literature

### A STUDY OF SHIFT IN PERSPECTIVE IN SELECT NOVELS OF IRIS MURDOCH

The concept of 'purpose' is studied both according to Eastern and Western philosophy, and applied in the analysis of select novels of Iris Murdoch, a modern British writer and philosopher. The project identifies and traces the journey of life from apparent purposelessness to the realisation of the latent meaning in life. It makes a sincere effort to highlight 'purpose' in absurdity and therefore fragmentation, which are the predominant characteristics of the Modern and Postmodern psyche.

### 'INTER- AND INTRA- PERSONAL UNITIES' IN 'POETRY AS A PROCESS': A STUDY OF SELECT MODERN AND POST-MODERN POETS

The project studies two kinds of unities – intra- and inter-personal – in the triad of poet, critic and reader, effected by 'poetry as a process'. Keeping in view the 'aesthetic wisdom' and the capacity of poetry to uplift humanity, a theoretical model has been conceived, named the dual unities in a deuce-ace model (d-u-d model). This model highlights the metaphysical function of poetry. It assays a study of how a definitive Unity can be achieved through poetry. This model attempts to highlight the problem of the divided psyche in the contemporary world, and the remedy for its unification through the poetic process. The d-u-d model is studied and explained in the light of relevant post-modern critical, philosophical and psychological theories. The project focuses on a selection of Modern and Postmodern poets in the light of this model, with a detailed analysis of two Postmodern poets, Philip Larkin and Ted Hughes.

criticism, are psychoanalysis, structuralism, deconstruction and identity studies. The research aims to explore the inevitability of spiritual growth as a necessary and primary step towards 'emancipation' of the feminine self to confront newer frontiers of identity, ripping apart the various masks of conventional role-playing.



### EUROPEAN DRAMA: HENRIK IBSEN

This project studies the broad area of European Drama, with specific reference to the works of the nineteenth-century Norwegian dramatist, Henrik Ibsen. It attempts to define his oeuvre as a continual and complex growth of the self through the evolution of his heroes, and seeks to relate his works to the philosophical ideas of Heidegger and Nietzsche, critical concepts in literary theory like phenomenology, postmodernism, etc. It also reflects on the Eastern and Western views on the concepts like awareness, realisation, dignity, the metaphysical self, suffering, hope, etc., and relates the same with the characters, motifs and symbols used in Ibsen's plays. The research project studies Ibsen's plays, both from the point of view of the ideas they embody, and the technical innovations he introduced in the theatre.



### FEMINISM AND GENDER STUDIES

The project is envisioned as an intensive study of femininity and woman's identity using select plays of Shakespeare as medium for discussion. It is an extension of similar work done in the genre of Fiction in the postgraduate and M.Phil. programmes. The study is both thematic and critical in its approach. The major themes under focus are patriarchal subjugation, feminine subjectivity, androgyny, and scrutiny of myths employed in the plot. The various critical schools that find place in this research, apart from feminist literary



### INDIAN WRITING IN ENGLISH: R K NARAYAN

This project is a study of the comic/ ironic vision of R K Narayan. The work stands on the assumption that all literature embodies or contains values in some form or the other, even when the writer is not consciously didactic. Therefore, an attempt is being made to look for a moral message that can be culled out of the ironic vision of Narayan. Hence, the research work focuses on thematic and character/ situation study that may, perhaps, highlight the values that could be garnered from a close examination of select novels of R K Narayan.

# Research Publications 2013/14

## DEPT. OF MATHEMATICS & COMPUTER SCIENCE

### JOURNAL PAPERS

- > Sai Hareesh A and Chandrasekaran V (May 2014) Exemplar-based Color Image inpainting: A Fractional Gradient Function Approach. *Pattern Analysis and Applications*, 17(2), 389-399.
- > Padyana A, Baruah P K, Devi Sudheer K and Srinivasan A (2014) Reducing the Disk IO Bandwidth Bottleneck through Fast Floating Point Compression using Accelerators. *IJACR-International Journal of Advanced Computer Research*, 4(14), 134-144.
- > Vamsi D K K, Dwarakanath K N V S D, Aditya I, and Baruah P K (2014) Existential and Uniqueness Results for Initial Value Problems associated with Non-linear Singular Interface Problems on Time Scales using Fixed Point Theorems. *International Journal of Mathematical Trends and Technology (IJMTT)*, 5, 7-35.
- > Nageshwara Rao V, Sai Hareesh A and Srinath M S (26-31 Jan 2014) Set Difference and Symmetric Difference of Fuzzy Sets. In *FSTA 2014: 12<sup>th</sup> International Conference On Fuzzy Sets Theory And Applications*, Liptovský Ján, Slovak Republic, FSTA.
- > Tripathi R and Sai Hareesh A (3-7 Feb 2014) Application of Technique using T-Norm and T-Co-Norm with Reference to the Disease Diarrhoea. *101<sup>st</sup> Indian Science Congress (ISCA)*, Jammu, India.

### CONFERENCE PAPERS

- > Sai Hareesh A and Chandrasekaran V (24-27 Mar 2014) Color Child: A Robust and Computationally Efficient Color Image Local Descriptor. *IEEE International Winter conference on Applications of Computer Vision, WACV 2014*, Steamboat Springs, Colorado, USA.
- > Satyanvesh D, Kali Uday B, Padyana A and Baruah P K (24-27 Mar 2014) Adaptive Gen Codex: A Novel algorithm for compressing DNA sequences on Multi core and Graphical Processing Units. *GTC 2014: GPU Technology Conference*, San Jose, USA.
- > Sai Prasanna A N, Iyer Chandrasekhar, Naidu H R and Baruah P K (24-27 Mar 2014) Real-time codebook-based speech enhancement now possible with nVIDIA GPUs. *GTC 2014: GPU Technology Conference*, San Jose, CA, USA.
- > Sai Hemanth S V, Sarma B and Baruah P K (24-27 Mar 2014) GPU Accelerated PrefixSpan Algorithm For Sequential Pattern Mining. In *GTC 2014: GPU Technology Conference*, San Jose, USA.
- > Kanchiraju S, Panigrahi P, Srinivasan A and Baruah P K (24-27 Mar 2014) Performance Prediction Model For Applications on GPUs. *GTC 2014: GPU Technology Conference*, San Jose, USA.
- > Uday Kiran N and Nagaraj B R (2013) A note on a class of Fuchsian operators. *Journal of Pseudo-Differential Operators and Applications*, 4(4), 479-493.
- > Sampath Kumar N V S S P and Baruah P K (Oct 2013) Communication Optimization for Multi GPU Implementation of Smith-Waterman Algorithm. *International Journal of Computer Applications (0975-8887)*, 80(12), Oct 2013. (Digital

Library URL: <http://www.ijcaonline.org/archives/volume80/number12/13910-1121>, ISBN: 973-93-80878-32-4), 1-7.

- > Kali Uday B, Satyanvesh D and Baruah P K (Jun 2013) GenSeek: A Novel Parallel Multiple Pattern Recognition Algorithm for DNA Sequences. *Advances in Intelligent Systems and Computing*, 1001-1006. (Print ISBN: 978-81-322-1664-3, Online: ISBN978-81-322-1665-0).
- > Vamsi D K K, Dwarakanath K N V S D, Aditya I and Baruah P K (2013) Existential and Uniqueness Results for Initial Value Problems associated with n<sup>th</sup> Non-linear Singular Interface Problems on Time Scales using Fixed Point Theorems. *Advances in Fixed Point Theory*, 3(4), 608-628.
- > Sai Hareesh A and Akella P (2013) Relation between neutral element and annihilator in absorption equation. *Fuzzy Sets and Systems, Elsevier*, 228 (Special issue on AGOP 2011 and EUSFLAT/LFA 2011), 145-151.
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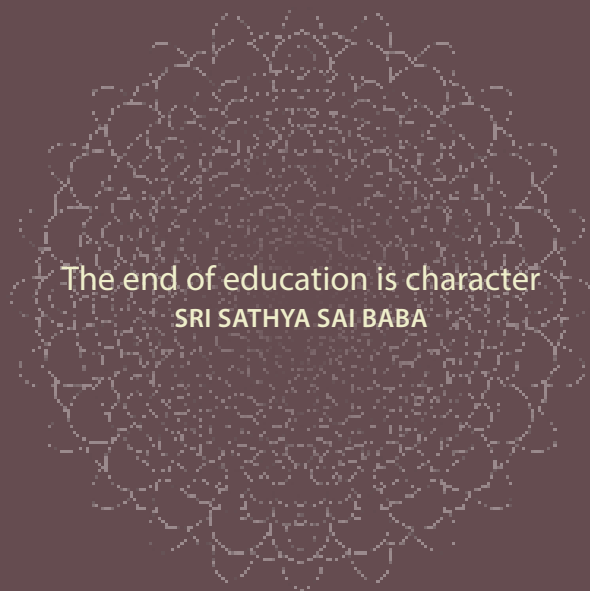
Be like the star which never wavers from the crescent but is fixed in steady faith.

When the sun is over your head there will be no shadow; so too when faith is steady in your heart, it should not cast any shadow of doubt.

Do not talk ill of others; talk only of the good in them; all are good; if you see bad in them, it is because there is bad in you; if you do not like someone, do not mix with him.

Grace is the sunlight which will ripen the fruit; Sadhana is the sap which rises from earth. Both are needed by the tree in order that it may yield fruit.

With Blessings  
Baba.



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