SCIENCE AND EDUCATION IN INDIA POSSIBILITIES OF INDO-RUSSIAN SCIENTIFIC COOPERATION

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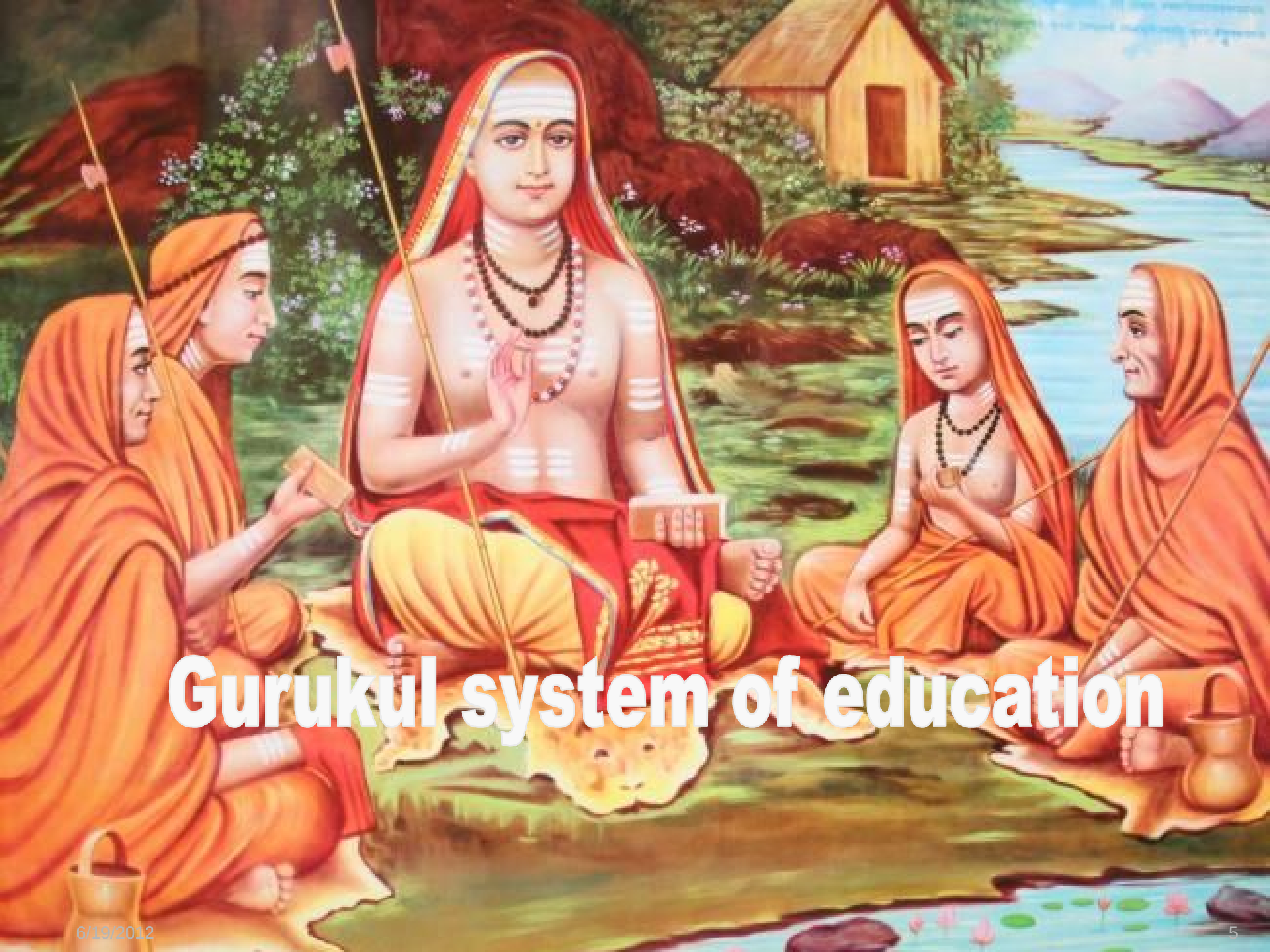
SARASWATI
THE GODDESS OF WISDOM

- In India the Guru or the teacher is held in high esteem.
- Indeed, there is an understanding that if the devotee were presented with the guru and God, first he would pay respect to the guru, since the guru had been instrumental in leading him to God.

The Vedas are a large body of texts originating in ancient India. Composed in Vedic Sanskrit, the texts constitutes the oldest layer of Sanskrit literature and the oldest scriptures of Hinduism.

Scholars have determined that the Rig Veda, the oldest of the four Vedas, was composed about 1500 B.C.


Gurukul system of education

THE GURUKUL SYSTEM

Gurukul was a type of school in India, residential in nature, with *pupils* living in proximity to the guru.

In a gurukul, *students* resided together as equals, irrespective of their social standing, learnt from the guru and helped the guru in his day-to-day life.

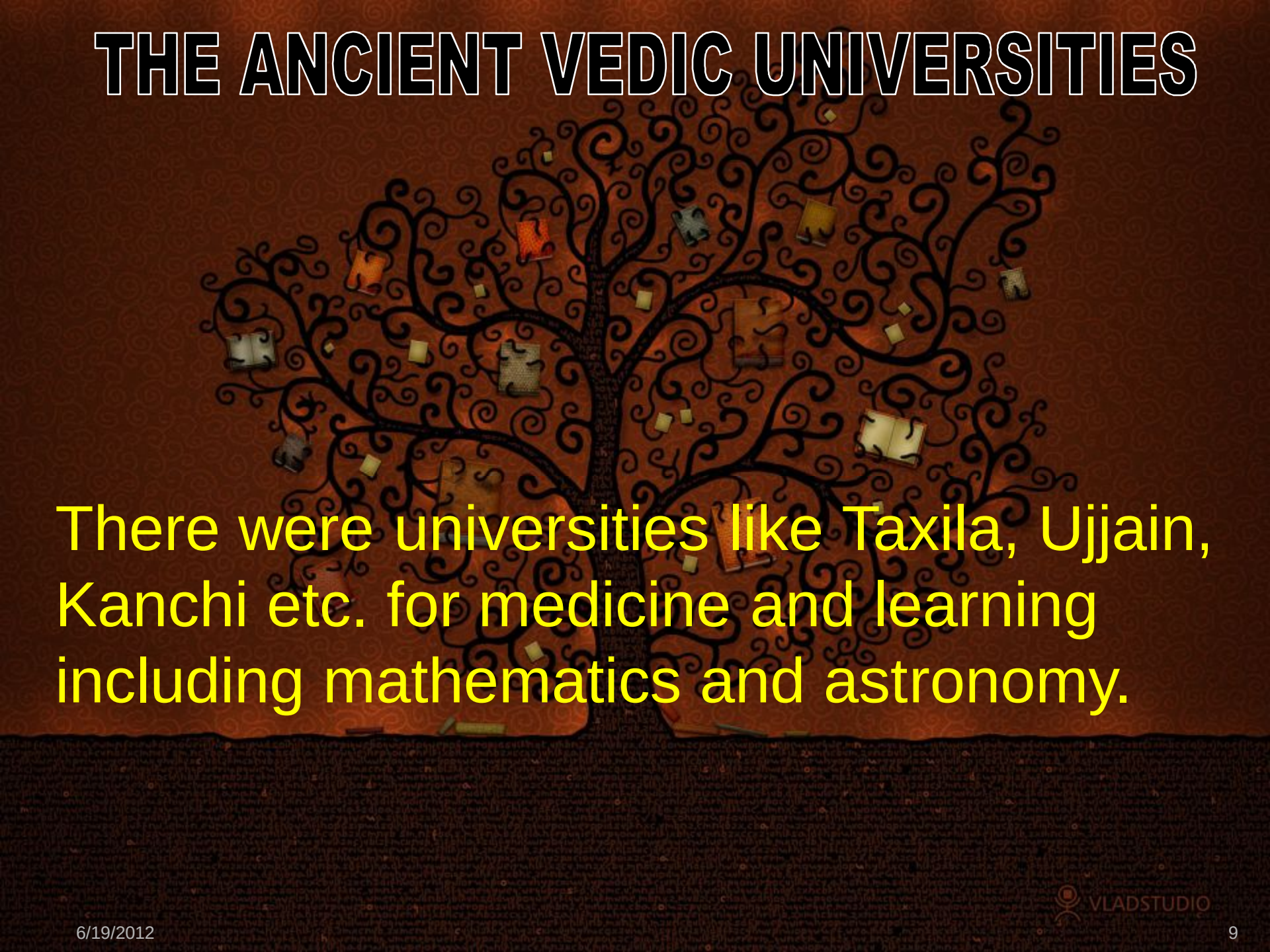
At the end of his studies, the pupil offered dakshina (fees) to the guru. The *gurudakshina* is a traditional gesture of acknowledgment, respect and thanks.

THE ANCIENT VEDIC UNIVERSITIES

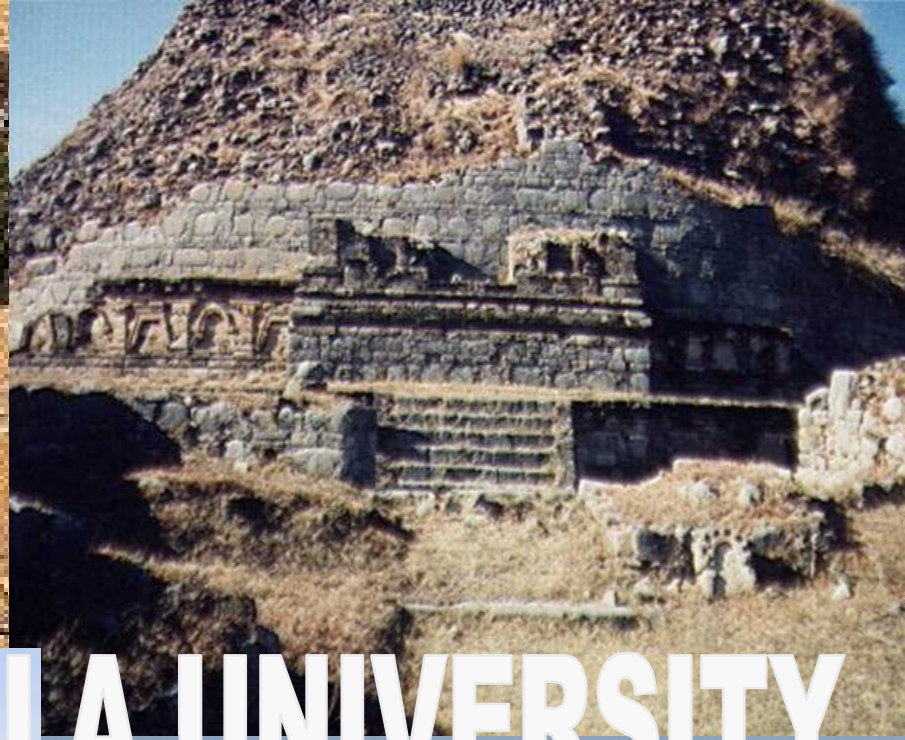
NALANDA UNIVERSITY

Nālandā is the name of an ancient university in Bihar, India and was a Buddhist center of learning from 427 CE to 1197 CE. It has been called "one of the first great universities in recorded history.

THE ANCIENT VEDIC UNIVERSITIES



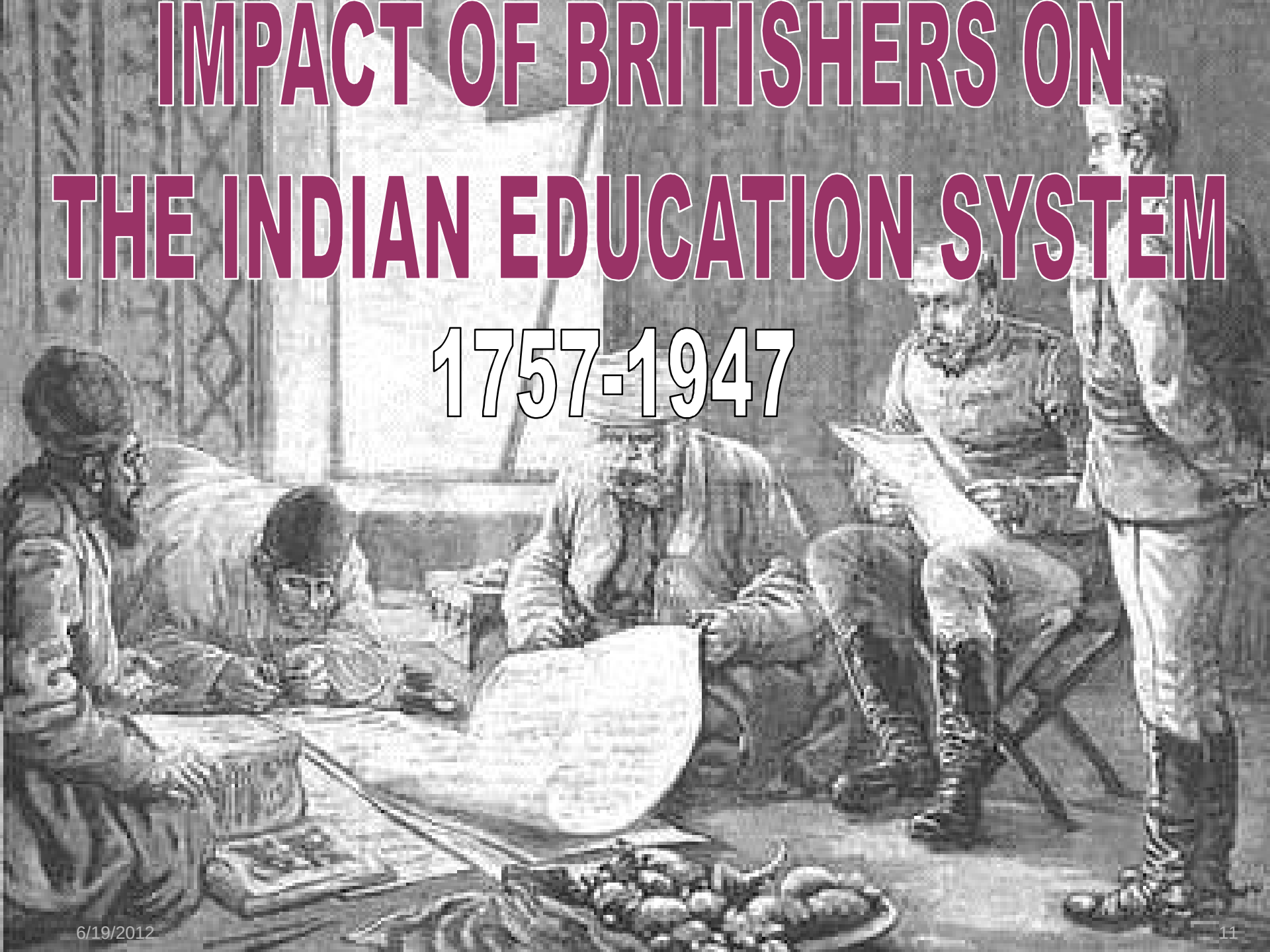
There were universities like Taxila, Ujjain, Kanchi etc. for medicine and learning including mathematics and astronomy.



REMAINS OF TAXILA UNIVERSITY

IMPACT OF BRITISHERS ON THE INDIAN EDUCATION SYSTEM

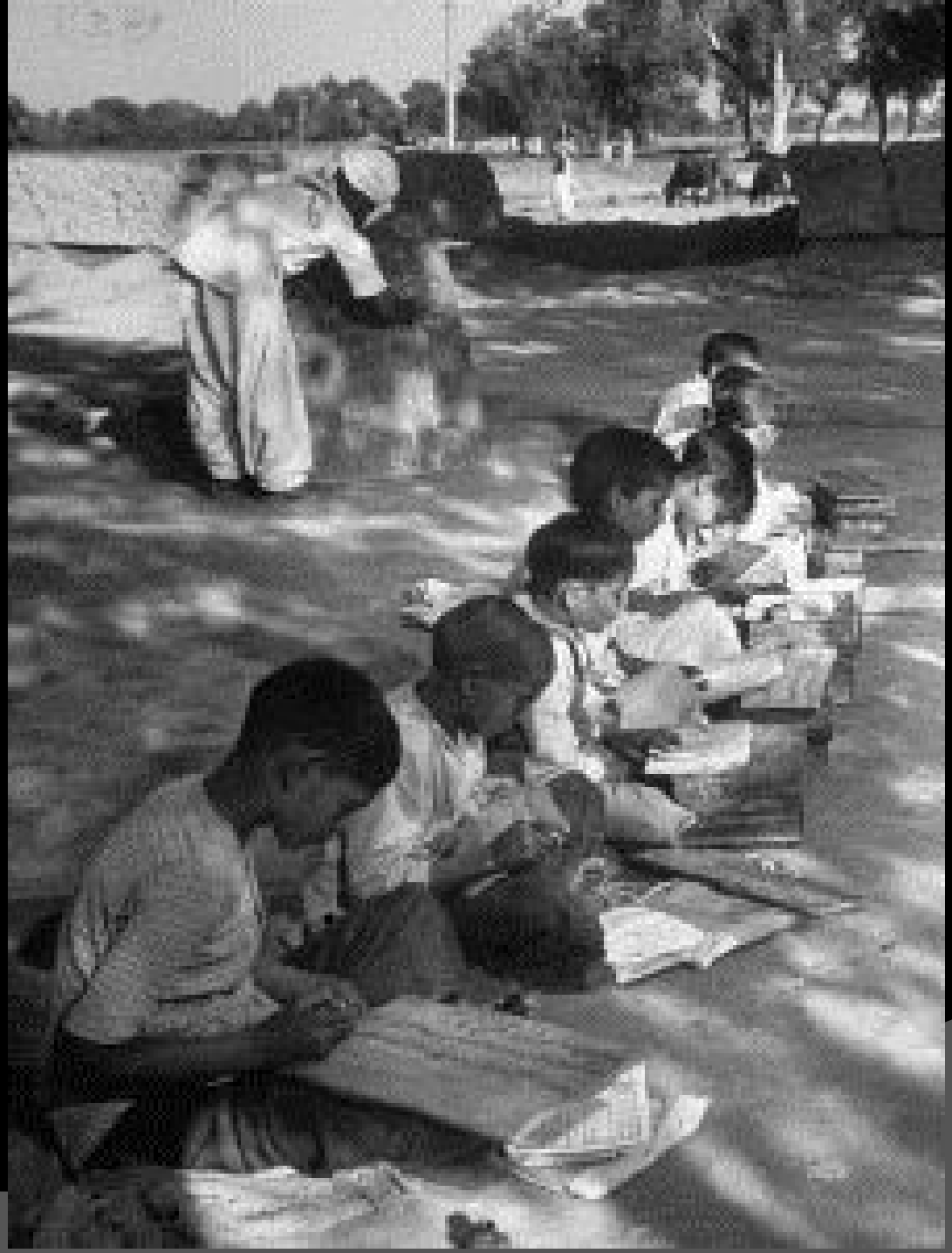
1757-1947



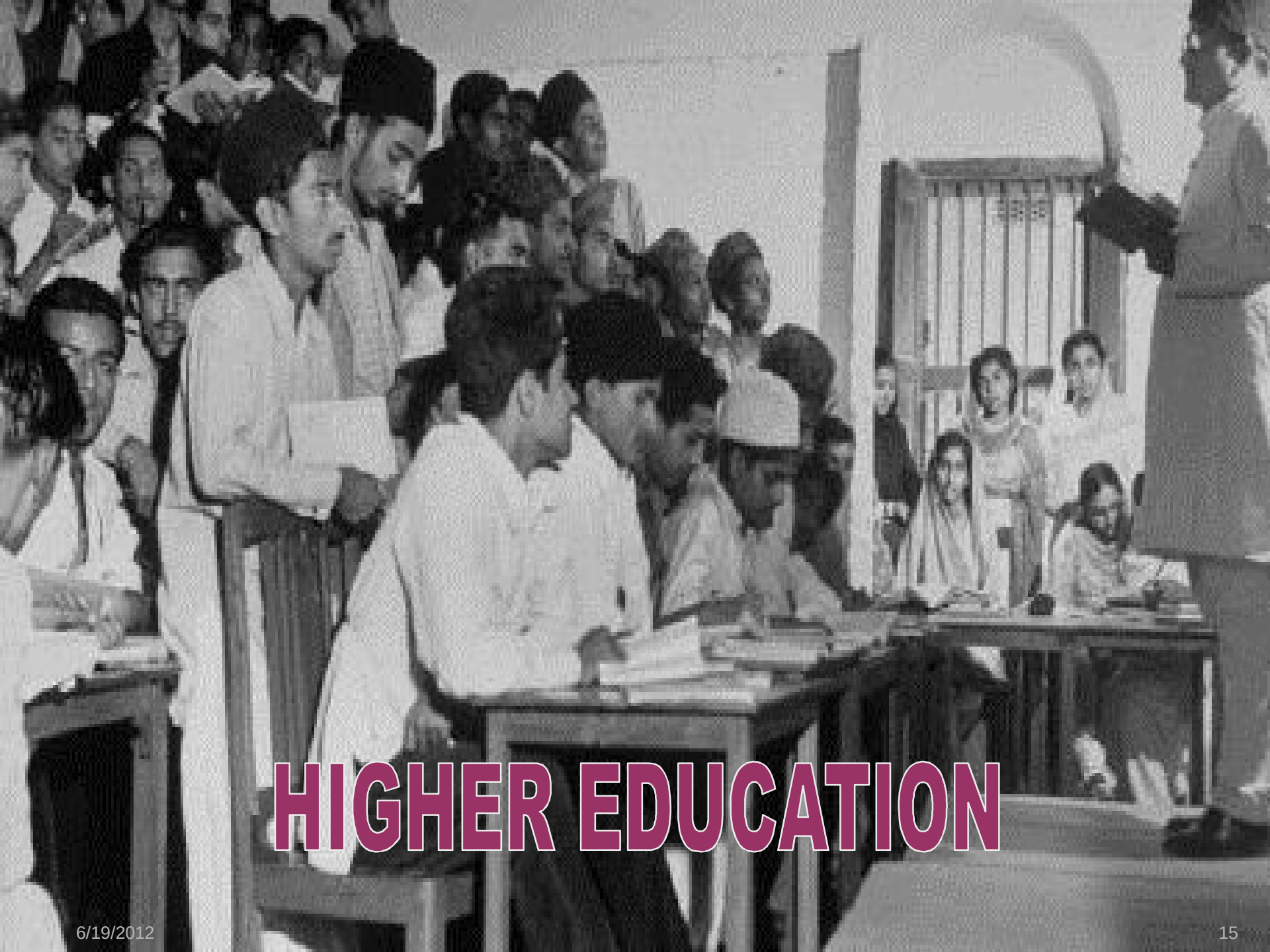
Education of Indians had become a topic of interest among East India Company officials. The policy's goal was

- **to advance knowledge of Indians and**
- **to employ that knowledge in the East India Company**

PRE INDEPENDENCE DAYS



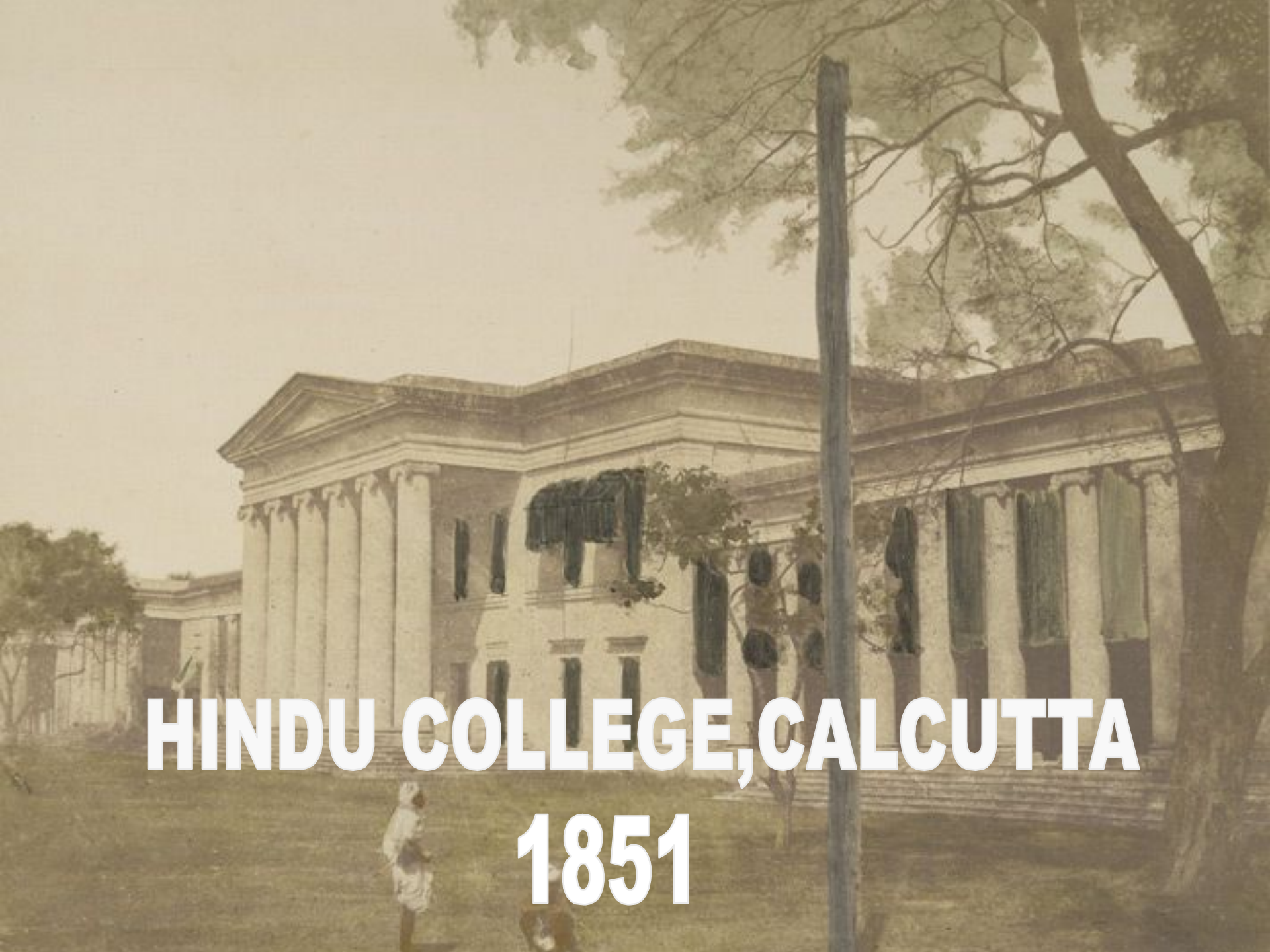
- *Since English was increasingly being employed as the language of instruction, during 1852–1853 petitions were sent to the British Parliament in support of both establishing and adequately funding university education in India which resulted in the Education Dispatch of July 1854 which helped in shaping the education system of India.*

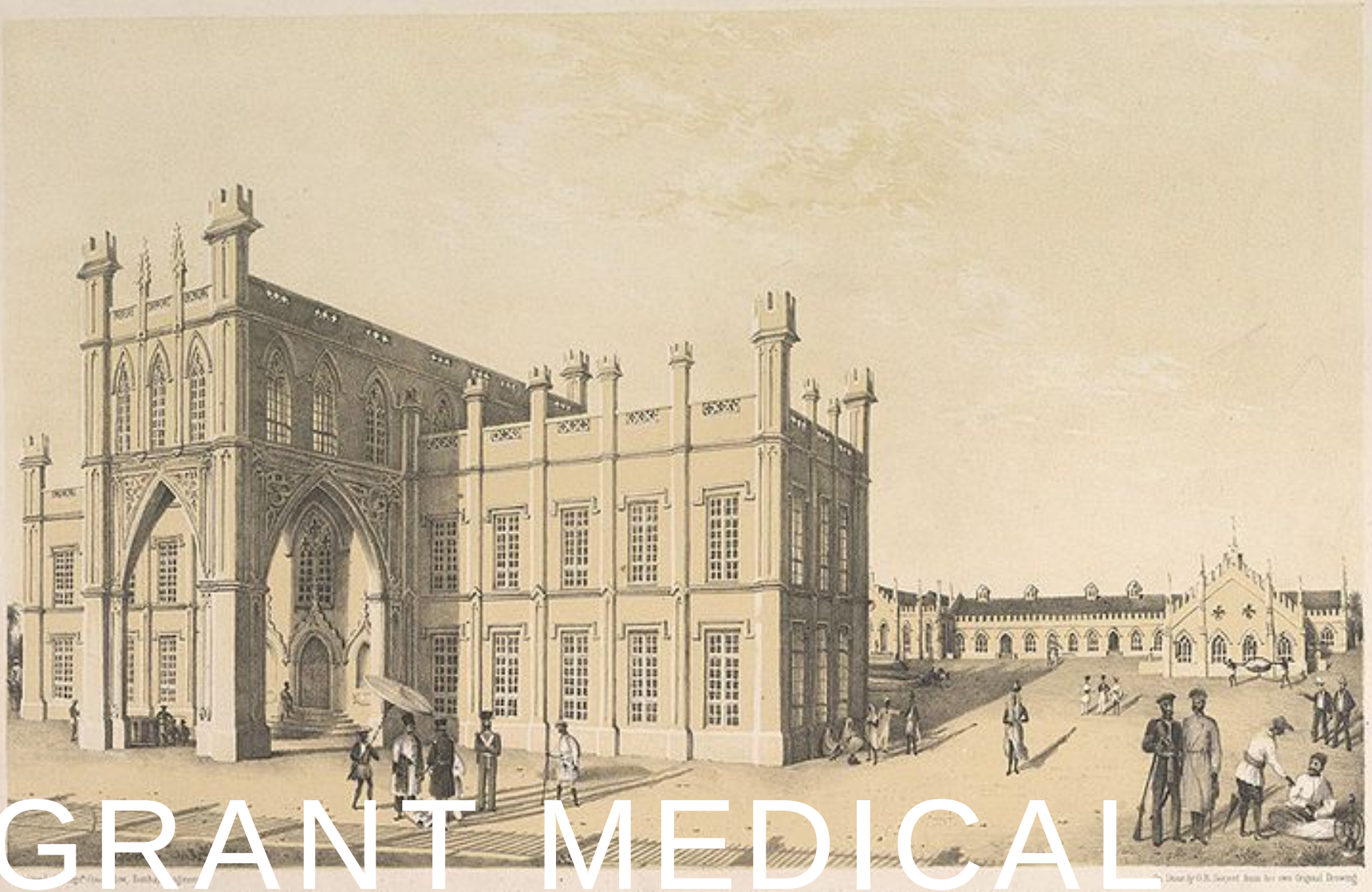

HIGHER EDUCATION

THE BRITISHERS

- *Established a Department of Public Instruction in each province of British India.*
- *Established teacher-training schools for all levels of instruction.*
- *Increased the number of Government colleges ,vernacular schools and high-schools .*
- *The Department of Public Instruction was in place by 1855. By 1857 a number of universities were established modeled on the University of London.*

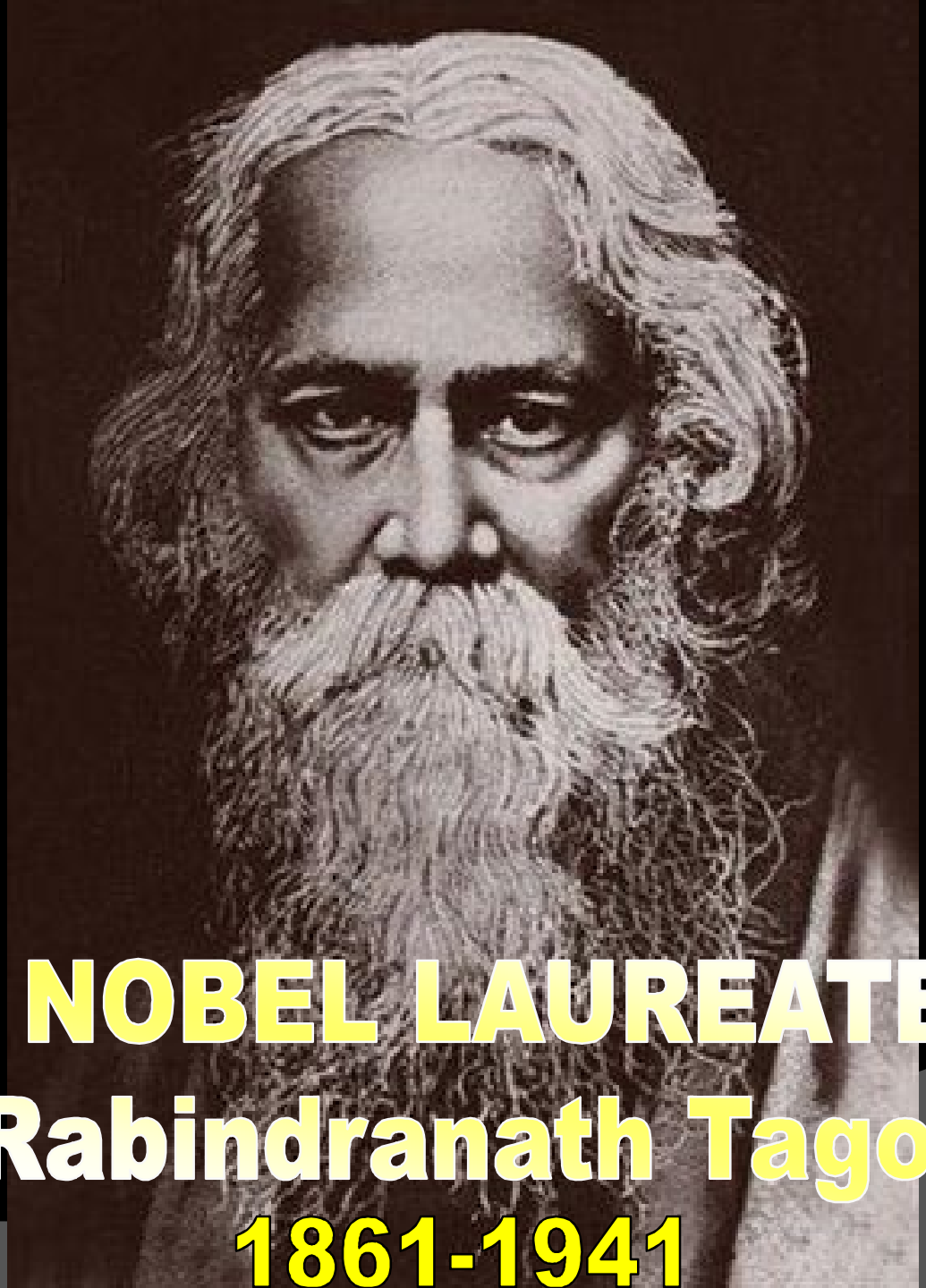
Educational reforms in the early 20th century led towards the nationalisation of many universities.


HINDU COLLEGE,CALCUTTA
1851



GRANT MEDICAL COLLEGE,1844


UNIVERSITY OF BOMBAY

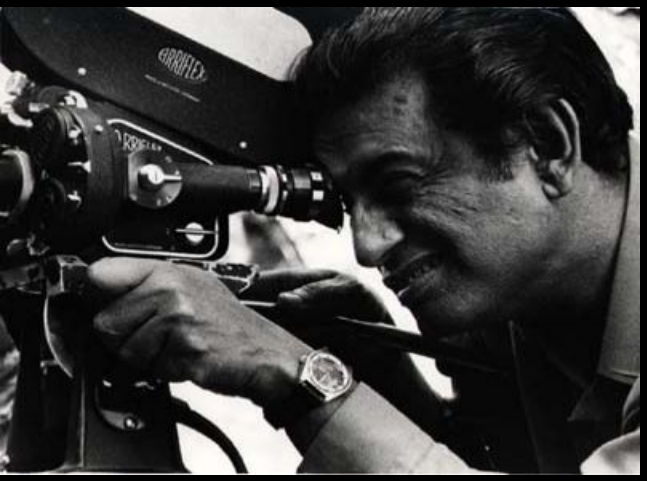


NOBEL LAUREATE-
Rabindranath Tagore
1861-1941

- Rabindranath started an open-air school **known as the Patha Bhavan** at Shantiniketan that gradually developed into an international university named Visva Bharati where the cultures of the East and the West met in common fellowship and thereby strengthening the fundamental condition of world peace.

SHANTINIKETAN-The Abode of Peace

INDIRA GANDHI



SATYAJIT RAY

AMARTYA SEN

Sen.

THE INDIAN EDUCATION SYSTEM

(POST INDEPENDENCE)

- *Following independence in 1947, MAULANA AZAD, India's first education minister recommended strong central government control over education throughout the country, with a uniform educational system.*

PRIMARY EDUCATION

The Indian government lays great emphasis to primary education up to the age of fourteen years (referred to as Elementary Education in India.) The Indian government has also banned child labour in order to ensure that the children do not enter unsafe working conditions.

Education has also been made free for children for six to 16 years of age.

The District Primary Education Programme (DPEP) was launched in 1994 with an aim to universalize primary education in India by reforming and vitalizing the existing primary education system

EDUCATION FOR ALL

The current scheme for universalization of Education for All is the SARVA SHIKSHA ABHIYAN which is one of the largest education initiatives in the world.

RIGHT TO EDUCATION

Every child between the ages of 6 to 14 years has the right to free and compulsory education. The government schools shall provide free education to all the children. Private schools shall admit at least 25% of the children in their schools without any fee.

In our national perception

Education refines sensitivities and perceptions that contribute to national cohesion, a scientific temper and independence of mind and spirit

–

thus furthering the goals of socialism, secularism and democracy enshrined in our Constitution.

There is a common educational structure(10+2+3) followed all over the country.

School education 10+2

Pre primary (FOR 1 YEAR)
Primary (GRADE 1-5)
Middle (GRADE 6-8)
Secondary (GRADE 9-10)
Senior Secondary (GRADE11-12)

HIGHER EDUCATION SYSTEM IN INDIA

India's higher education system is the third largest in the world, after China and the United States.

Main players in the higher education system in India

- University Grants Commission (UGC) is responsible for coordination, determination and maintenance of standards, release of grants.
- Professional Councils are responsible for recognition of courses, promotion of professional institutions and providing grants to undergraduate programs and various awards.

The statutory professional councils

- All India Council for Technical Education (AICTE),
- Distance Education Council (DEC)
- Indian Council for Agriculture Research (ICAR),
- Bar Council of India (BCI),
- National Council for Teacher Education (NCTE) Rehabilitation Council of India (RCI)
- Medical Council of India (MCI),
- Pharmacy Council of India (PCI)
- Indian Nursing Council (INC)
- Dentist Council of India (DCI)
- Central Council of Homeopathy (CCH)
- Central Council of Indian Medicine (CCIM)

National Assessment and Accreditation Council (NAAC)

- National Assessment and Accreditation Council (NAAC) is an autonomous institutions established by the University Grants Commission in 1994 NAAC's responsibility is to assess and accredit institutions of higher education that volunteer for the process, based on prescribed certain criteria.
- NAAC's process of assessment and accreditation involves the preparation of a self -study report by the institution, its validation by the peers and final decision by the Council.
- 122 universities and 2486 colleges/ institutions have been accredited by NAAC so far.

System of Governance of Higher Education Institutions:

- The Universities are various kinds:
  - with a single faculty, or multi-faculties;
  - teaching or affiliating, or teaching cum affiliating,
  - single campus or multiple campus.
- Most of the Universities are affiliating universities
- Autonomous Colleges:
  - In the autonomous colleges, the degree continues to be awarded by the University, the name of the college is also included. The colleges develop and propose new courses of study to the university for approval. They are also fully responsible for conduct of examination.
  - There are at present 138 autonomous colleges in the country.

Role of Central Government in Education

- **Central Government** is responsible for major policy relating to higher education in the country.
- It provides grants to the UGC and establishes central universities in the country.
- Presently there are 20 Central Universities in the country.
- The Central Government is also responsible for declaration of Educational Institutions as 'Deemed to be University' on the recommendation of the UGC.
- There are 99 Institutions which have been declared as Deemed to be Universities by the Govt. of India as per Section of the UGC Act, 1956.

Role of State Governments in Education

- **State Governments** are responsible for establishment of State Universities and colleges, and provide plan grants for their development and non-plan grants for their maintenance.
- The Central Advisory Board of Education (CABE) is created for coordination and cooperation between the Union and the States
- Special Constitutional responsibility of the Central Government: The Constitution gives exclusive Legislative Power to the Central Govt. for co-ordination and determination of standards in Institutions of higher education or research and scientific and technical institutions.

Inter University Centers (IUCs)

- Nuclear Science Centre, New Delhi - Accelerator oriented research
- IUC for Astronomy and Astrophysics, Pune -State-of-the-art instrumentation for Astrophysics
- Inter – University Consortium for DAE facilities, Indore -Use of facilities of Department of Atomic Energy
- Information and Library Network (INFLIBNET) Ahmedabad - Networking of libraries through electronic media
- Consortium for Educational Communication (CEC) New Delhi -To disseminate Countrywide program through television
- National Assessment & Accreditation Council (NACC) Bangalore - To assess and accredit public & Private institutions of higher learning

Academic Qualification Framework - Degree Structure

- Main levels of qualifications are:
  - Bachelor / Undergraduate level
  - Master's / Post-graduate level
  - Doctoral / Pre-doctoral level
- Diploma courses at the undergraduate and postgraduate level.
- Bachelor's degree in arts, commerce and sciences is three years of education
- Bachelor degree in professional field of study such as engineering is of 4 years while architecture and medicine, is five and five and a half years respectively
- Bachelor's degree in law can either be taken as an integrated degree for five years or three-year course as a second degree.

Academic Qualification Framework - Degree Structure

- There are other bachelor degrees in education, journalism and librarian-ship that are second degrees.
- Master's degree is normally of two-year duration.
- Admission to postgraduate program in engineering and technology is done on the basis of Graduate Aptitude Test in Engineering or Combined Medical Test respectively.
- A pre-doctoral program - Master of Philosophy (M. Phil.) is taken after completion of the Master's Degree.
- Ph.D. is awarded two year after the M. Phil. or three years after the Master's degree.

Fake Universities/institutions

- According to the University Grants Commission Act 1956, the right of conferring or granting degrees shall be exercised only by a University established or incorporated by or under a Central Act, or a State Act, or an Institution deemed to be University or an institution specially empowered by an Act of the Parliament to confer or grant degrees.
- Thus, any institution which has not been created by an enactment of Parliament or a State Legislature or has not been granted the status of a Deemed to be University, is not entitled to award a degree.
- A list of fake Universities/Institutions identified by University Grants Commission is published through a press release at the beginning of each academic session.

Indian Institutes of Management

- The Indian Institutes of Management (IIMs), established by the Government of India, are the ace business schools in the country
- The IIMs located at Ahmedabad, Calcutta, Bangalore, Lucknow, Indore and Kozhikode (Calicut) are institutions of excellence.
- The IIM, Calicut commenced its academic session from 1997-98, the IIM, Indore began its academic programme from 1998-99, a new one is coming up at Shillong soon.
- The IIMs conduct Post-Graduate Diploma Programmes in Management (equivalent to MBA), Fellowship Programmes in Management Development and Organisation-based Programmes as well as carry out research and consultancy for the industry.

Indian Institutes of Technology

- The Indian Institutes of Technology (IITs) need no introduction either in India or abroad.
- The Institutes were set up by the Government of India as `Institutions of National Importance' and almost all reputed international academic benchmarks have given them high rating.
- They teach technology at UG, PG and doctoral level and carry out basic and applied research in pure and applied sciences.
- The IITs are funded by the Ministry of Human Resource Development and their policy matters are decided by a nodal monitoring body headed by the Minister for Human Resource Development.
- There are 7 IITs located at Bombay, Delhi, Kanpur, Kharagpur, Madras, Guwahati --- and Roorkee.

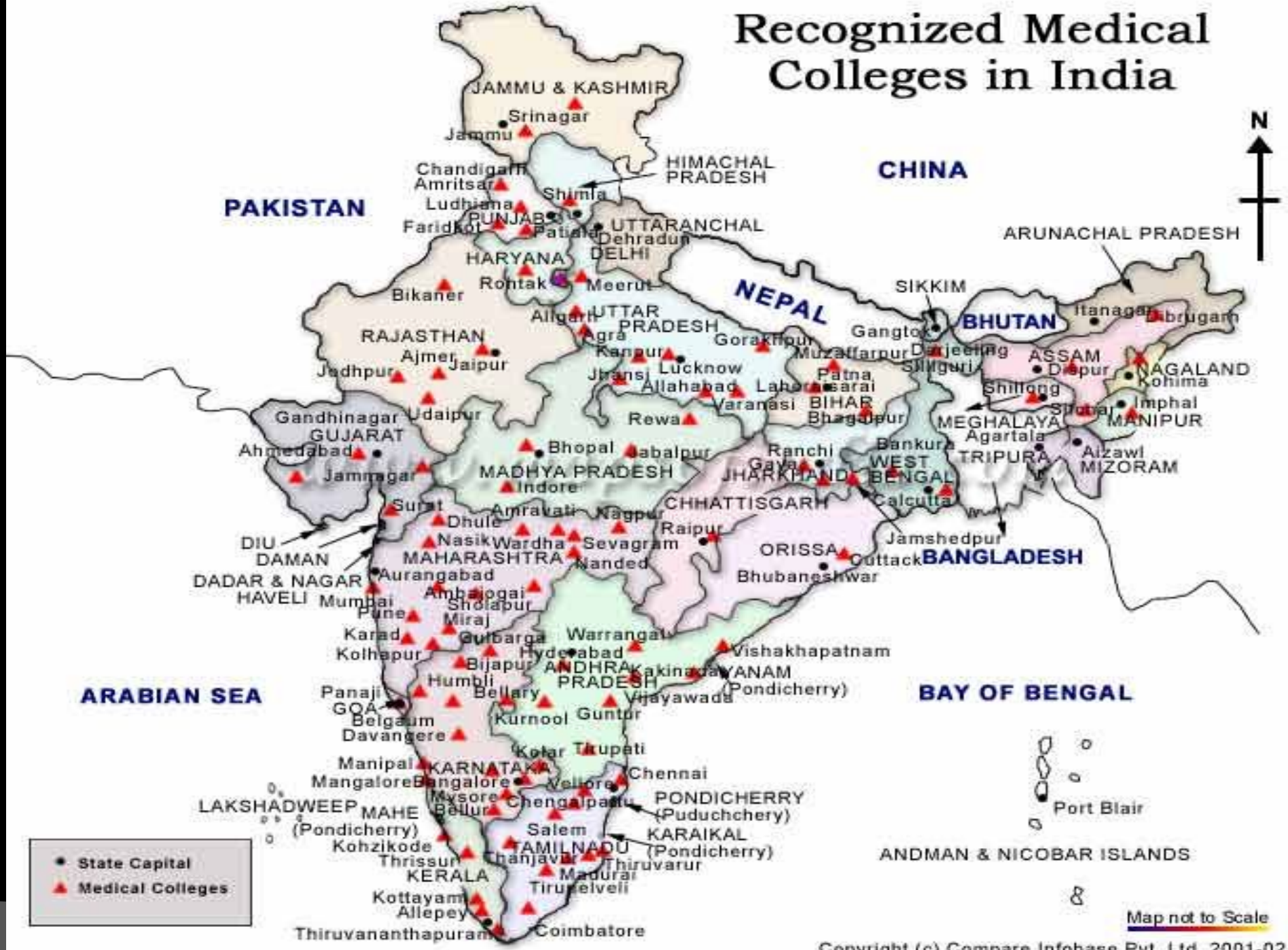
National Institutes of Technology

- 17 Regional Engineering Colleges (RECs)were established from 1959 onwards in each of the major states with Center-State co-operation with major Central govt. funding
- While all the 17 colleges offer degree courses in various branches of engineering and technology, 14 have facilities for postgraduate and doctoral programs.
- The Ministry of Human Resource Development (MHRD) has converted the RECs (13 out of 17) into NITs by changing their administrative structure and granting them Deem University status.

Summary of universities in India by state and type

State	Central universities	State universities	Deemed universities	Private universities	Total
Andhra Pradesh (list)	3	32	7	0	42
Arunachal Pradesh (list)	1	0	1	0	2
Assam (list)	2	4	0	2	8
Bihar (list)	1	14	2	0	17
Chandigarh (list)	0	1	1	0	2
Chhattisgarh (list)	1	10	0	4	15
Delhi (list)	6	5	11%	0	22%
Goa (list)	0	1	0	0	1
Gujarat (list)	1	18	2	10	31
Haryana (list)	1	10	5	6	22
Himachal Pradesh (list)	1	4	0	12	17
Jammu and Kashmir (list)	1	6	0	0	7
Jharkhand (list)	1	7	2	1	11
Karnataka (list)	1	22	15	2	40
Kerala (list)	1	11	2	0	14
Madhya Pradesh (list)	2	15	3	7	27
Maharashtra (list)	1	19	21	0	41
Manipur (list)	2	0	0	0	2
Meghalaya (list)	1	0	0	8	9
Mizoram (list)	1	0	0	1	2
Nagaland (list)	1	0	0	2	3
Orissa (list)	1	12	2	1	16
Pondicherry (list)	1	0	1	0	2
Punjab (list)	1	7	2	3	13
Rajasthan (list)	1	14	8	24	47
Sikkim (list)	1	0	0	4	5
Tamil Nadu (list)	2	24	29	0	55
Tripura (list)	1	0	0	1	2
Uttar Pradesh (list)	4	23	10	16	53
Uttarakhand (list)	1	6	4	6	17
West Bengal (list)	1	20	1	0	22
Total	**43**	**285**	**129%**	**110**	**567**

Recognized Medical Colleges in India



NIPERs

- **First National Institute of Pharmaceutical Education and Research**, India was established by the Government of India to cater to the long-standing demand for setting up a dedicated nodal for quality higher education and advanced research in the pharmaceutical sciences.
- Till date seven NIPERs have been established
- Mohali Punjab
- Rai bareli UP
- Ahemedabad Gujrat
- Hyderabad AP
- Guwahati Assam
- Hajipur Bihar
- Kolkata

Offering Master and doctral courses in

- Pharmaceutics
- Pharmaceutical Technology (Formulations)
- Pharmacology and Toxicology
- Medicinal Chemistry
- Pharmaceutical Technology (Bulk Drugs)
- Natural Products
- Pharmaceutical Analysis
- Biotechnology
- Pharmaceutical Technology (Biotechnology)
- Pharmacy Practice
- Pharmaco-informatics
- Traditional Medicine
- Regulatory Toxicology
- Pharmaceutical Management (**MBA**)
- Medicinal Chemistry
- Pharmacology & Toxicology
- Pharmaceutical Analysis

FUNDING FOR RESEARCH and EDUCATION IN INDIA

Research Needs….

- **Interest**
- **Motivation**
- **Academic support**
- **Administrative Support**
- **Financial Support**
- **Subordinates' support**
- **Family level support**
- **Health, Age,**

Funds for Research:

- **Institutional**
- **Local level bodies**
- **State Government level bodies**
- **Central government bodies**
- **International Bodies**
- **Company based R&D**
- **NGOs**

Government of India

- **Building Material & Technology Promotion Council (BMTPC)**
- **Ministry of Education**
- **Ministry of Environment**
- **Ministry of Human Resource Development**
- **Ministry of Non-conventional Energy Sources**
- **Ministry of Rural Development**
- **Ministry of Science and Technology**
- **Housing and Urban Development Corporation (HUDCO)**
- **Indian Council of Philosophical Research (ICPR)**
- **Indian Navy**
- **Indian Renewable Energy Development Agency (IREDA)**
- **National Wasteland Development Board (NWDB)**

Arts Teachers:

- **ICSSR- New Delhi- Provides funds for Major Research Projects**
- **CIIL- Language Research**
- **Indira Gandhi National Centre for Arts**
- **International Bodies**
- **Concerned Govt. Departments & industries, UGC**

Science Teachers:

- University Grants Commission
- Indian Council of Medical Research
- Council of Scientific Industrial Research
- Department of science and technology
- Department of Biotechnology
- Indian Council of Agriculture Research

INDIAN COUNCIL OF AGRICULTURAL RESEARCH (ICAR)

- **Problems limiting production in agriculture, animal husbandry and fisheries.**
- **The schemes may involve work on the fundamental or applied aspects of the problem and may be of single or multi-disciplinary nature**

INDIAN COUNCIL OF MEDICAL RESEARCH (ICMR)

- **Ad-hoc Research Scheme**
- **Research Fellowships/Associateships**
- **Emeritus Medical Scientist Scheme**
- **Other Research Related Activities**

Council of Scientific and Industrial Research (CSIR)

- **Research Schemes /Sponsored Schemes**
- **Emeritus Scientist Scheme**
- **Research Fellowships/Associateships**
- **Other Science and Technology Promotion Programmes**
- **Areas of research support: Science and Technology including agriculture, engineering and medicine.**
- **Items not allowed out of grant**
  -International travel, furniture/office equipment.

CSIR

- **Emeritus Scientist Scheme-To provide support to superannuated outstanding scientists to pursue research in their respective field of specialization and having relevance to the programmes of CSIR.**

CSIR

- **Junior Research Fellowships (JRF) provides opportunities to bright young men and women through an all India examination, for research and training under experienced researchers/ investigators of repute in the various fields of science.**
- **The selected research scholars are appointed initially as Junior Research Fellows for a period of two years and subject to satisfactory performance on assessment at the end of this period, they can be given higher stipend for the remaining period in the form of Senior Research Fellowship.**

CSIR- SRF:

- **The Council has also a Scheme for the award of Senior Research Fellowship [SRF/Associateship (RA)] to encourage young research workers having good quality published work to their credit to pursue research work in science, engineering, technology, and medicine on specific research programmes.**

CSIR- Shyama Prasad Mukherjee Fellowship:

- **to nurture budding scientific talent towards pursuit of scientific research.**
- **Who can submit a proposal- The scheme is open to top 20 per cent CSIR/UGC JRF, NET Scholars along with top 100 GATE qualified candidates with percentile 99 and above.**
- **Areas of research support- Basic sciences (5 fellowships each in Life Sciences, Chemical Sciences, Earth Sciences, Physical Sciences & Mathematical Sciences).**

CSIR: Senior Research Associateship

- Ph.D, M.Tech, MD/MS with two years research/teaching experience and publication(s).
- The application in the prescribed format can be submitted any time of the year.
- Science and Technology including agriculture, engineering and medicine.

CSIR- Shanti Swarup Bhatnagar Prize

- **Over the years, SSB Prize has become the most coveted National recognition for scientists and engineers.**
- **The Prize is given to outstanding scientists in seven disciplines of science and technology.**
- **It is open to any Indian citizen below 45 years of age with proven R&D track record of achieving excellence in S&T.**

CSIR Young Scientist Award

- **This award is meant for CSIR scientists below the age of 35 years for outstanding work done in the country.**
- **The YSA is given in five disciplines of science & technology.**

CSIR Programme on Youth Leadership in Science

- **The CPYLS is a unique ‘hand holding’ programme for school children at secondary level.**
- **The objective of the scheme is to attract the meritorious young school children towards science.**
- **The top 100 science students of CBSE, ICSE and State Boards in Class X examination are contacted by the CSIR laboratories.**
- **A traveling allowance to visit the CSIR laboratory and facilities to carry out project work at the CSIR laboratory is provided.**
- **This scheme is tenable till graduation.**

CSIR Diamond Jubilee Research Interns Award Scheme

- **The CSIR Diamond Jubilee Research Interns Awards Scheme is a preparative scheme through which young interns are being trained for two years in the tools and techniques of research under supervision of experienced CSIR scientists.**
- **A student who is a 1st Class BE/B.Tech/B.Arch/B.Pharma/M.Sc/MBBS is eligible. The age limit is 25 years. Applications to be made against advertisement of the concerned CSIR laboratory.**

Visiting Associateship Scheme

- **The scheme enables guest scientists from outside CSIR laboratories to make use of advanced R&D facilities available in the CSIR setup.**
- **Under this programme the scientist is provided to and fro traveling expenses and daily allowance at CSIR rates for a period of maximum 60 days for two visits in a year.**
- **The associateship is tenable for 3 years. Selection is made on the basis of recommendation of the Director of the concerned CSIR laboratory.**

CSIR- Partial Financial Assistance for holding National/ International Conferences/ Symposium/ Seminar/Workshops in India

Partial Travel Grants to Research Scholars

- **The HRDG, CSIR has a scheme of providing partial foreign travel grants to research scholars (not in regular employment), whose papers are accepted for oral or poster presentation at the International Conference abroad on recommendations of the Expert Committee.**
- **For this HRDG, CSIR receives applications on prescribed format at least three months before the event.**

Entrepreneurship Support to Research Scholars

- **This programme is for Research Scholars working in CSIR laboratories.**
- **The objective of this programme is to broad base the perspective of the research scholars so that they can make linkages of their scientific and technical knowledge to the buoyant world of business and industry.**

All India Council for Technical Education (AICTE)

- **Research & Institutional Development Schemes**
  - **Modernization & Removal of Obsolescence Scheme (MODROBS)**
  - **Research Promotion Schemes (RPS)**
- **Industry-Institute Interaction Schemes**
  - **Industry Institute Partnership Cell (IIPC)**
  - **Entrepreneurship Development Cells (EDC)**
  - **National Facilities in Engineering & Technology with Industrial Collaboration (NAFETIC)**
  - **Nationally Coordinated Project (NCP)**

AICTE:

Areas of research support

- Engineering and Technology
- Architecture
- Town Planning
- Management
- Pharmacy
- Hotel Management and Catering Technology
- Applied Arts and Crafts etc.

Defence Research and Development Organisation (DRDO)

- Extramural Research Scheme
- Aeronautics Research & Development Board

Department of Atomic Energy (DAE)

- **The Department of Atomic Energy supports research programmes in Nuclear Science and Technology through the Board of Research in Nuclear Sciences (BRNS). BRNS support the following schemes.**
- **Name of scheme(s)**
- **R&D Project**
- **Symposium/Conference/Workshop**
- **DAE Young Scientists Research Award**
- **Dr. K.S. Krishnan Research Associateship**
- **Raja Ramanna Fellowship**
- **Visiting Scientists**
- **Homi Bhabha Chair Professorship**
- **DAE Graduate Fellowships**
- **DAE Graduate Fellowships for Ph.D.**
- **DAE-SRC Award**

DAE -Areas of research support

- Basic Sciences (Physics and Chemistry)
- Life and Medical Sciences
- Engineering Sciences
- Material Science
- Electronics and Instrumentation
- Isotopes Applications in Industry
- Food and Agricultural Sciences
- Radiation and Environmental Sciences

Raja Ramanna Fellowship Scheme (RRFS)

- **Objective(s)**
- **To utilize the services of active retired scientists/engineers and technologists, who have been involved in high quality research in their specialized discipline in the units of the DAE or any National Laboratory or University/Institute.**

Visiting Scientists

- **To promote close interactions on specialized scientific and technical topics between the scientists and technologists from DAE and Universities/IITs/IISc/ National Labs.**
- **Who can be a Visiting Scientist**
- **Faculty members of Universities/Institutes interacting with DAE can be invited to visit a DAE unit as a visiting scientist to work on a problem of relevance to DAE in collaboration with a research group in the DAE Unit.**

DAE Graduate Fellowships Scheme (DGFS)

- **To provide excellent career opportunity to students qualifying for admission to the M.Tech Course in Indian Institute of Technology at Mumbai, New Delhi, Kanpur, Kharagpur, Chennai or Roorkee.**
- **Mechanical Engineering , Cryogenic ,Chemical Engineering , Applied Mechanics**
- **Civil Engineering , Earthquake Engineering , Nuclear Hydrology**

DAE Graduate Fellowships Scheme (DGFS)

- **Metallurgical Engg, Materials Sc/Engg**
- **Electrical Engineering , Reliability Engineering, Systems & Control Engineering, Energy Systems , Power/Communication/Control Engg, Integrated Electronics & Circuits , Instrumentation**
- **Computer Science, Engg & Technology ,Applied Optics, Lasers & Optoelectronics , Nuclear Engg & Technology**
- **Solid State Materials/Electronic Materials**

DAE Graduate Fellowships Scheme(Ph.D.) [DGFS(Ph.D.)]

- **DAE Graduate Fellowships Scheme(Ph.D.) [DGFS(Ph.D.)]**
- **DAE-SRC Awards-The core objective is to augment support to individual research workers with highly innovative ideas and with proven abilities to pursue advanced research in frontier areas of science and engineering at an accelerated pace.**

Department of Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homoepathy (AYUSH)

- **Extra-mural Research (EMR) project Scheme of AYUSH Systems of medicine and Accreditation of Organizations for Research & Development in the fields of AYUSH.**
- **Golden Triangle Partnership (GTP) Scheme for validation of traditional Ayurvedic Drugs and development of new drugs.**

University Grants Commission:

- **UGC ASSISTANCE TO COLLEGES:**
  - **(UNDERGRADUATE EDUCATION)**
  - **(POSTGRADUATE EDUCATION)**
- **Research Projects for individuals**
- **Research projects for institutions**
- **Planned grants for Universities**
- **Fellowships for students joining research**
  - **JRF; SRF, RA**

UGC Schemes:

- **VISITING FELLOWS ; upto 70 yrs, 3 months = Rs. 300 per day for 1 month +TA**
- **VISITING PROFESSORS: 2 yrs -not in same dept. – eligible upto 70 yrs**

FELLOWSHIPS:-

- **Commonwealth Fellowships (through UGC)**
- **Fulbright Fellowships (USEFI) UGC Visiting Fellowship**
- **INSA Visiting Fellowship**
- **BOYSCAST (Young Scientist) Fellowship (DST)**
- **Cultural Exchange Programmes (UGC)**

INTERNATIONAL FUNDING AGENCIES-

- European Economic Commission./WHO, WMO, FAO, UNICEF, UNDP,UNEP, USEPA, UNESCO. Earth Watch - Massachusetts./ National Science Foundation./ Bilateral Science and Technology Programmes with Japan. France, Germany, Australia, etc/ Mastume International Foundation./ German Academic Exchange Service

DST Schemes:

- **Science and Engineering Research Council (SERC)**
- **Intensification of Research in High Priority Areas (IRHPA)**
- **Deep Continental Studies (DCS)**
- **- Himalayan Seismicity Programme (HSP)**
- **Monsoon and Tropical Climate (MONTCLIM)**
- **- Agrometeorology**
- **Science and Technology application for Rural Development (STARD)**
- **Science and Technology for Women**
- **Science and Technology for Weaker Sections (STAWS)**

DST Schemes:

- **Scheme for Young Scientists (SYS)**
- **- Tribal Sub-Plan (TSP)**
- **- Special Component Plan for SC Population (SCP)**
- **Natural Resources Data Management System (NRDMS)**
- **Instrument Development Programme (IDP)**
- **- Opportunities for Young Scientists (YS)**

DST:

- **- Application of Science and Technology for Conservation of Cultural Property/ Heritage (ASTECH)**
- **- Critical Technology Programme (CTP)**
- **Grants-in-aid Programme of India Meteorological Department**

DEPARTMENT- OF BIOTECHNOLOGY (DBT)

- **Animal Biotechnology**
- **Aquaculture and Marine biotechnology**
- **Basic research in biotechnology**
- **Bioinformatics**
- **Biological control of plant pests, diseases and weeds**
- **Biotech process engineering and industrial biotechnology**
- **Biotechnology of medicinal and aromatic plants**
- **Biotechnology of silkworms and host-plants**
- **Crop biotechnology**
- **Environment and conservation biotechnology**
- **Food biotechnology**
- **Human genetics**
- **Integrated manpower planning**
- **Medical biotechnology**
- **Microbial biotechnology**
- **Plant tissue culture**

DEPARTMENT OF ELECTRONICS (DOE)

- **Technology Development Council (TDC) - - National Radar Council (NRC)**
- **Electronic Materials Development Council (EMDC) - - National Microelectronics Council (NMC)- Technology Development for Indian Languages (TDIL)**
- **Technology Development Council (TDC)-**

DOE…….

- **Supports Research and Development projects in the area of**
- **computer and computer communication, control and instrumentation,**
- **broadcasting and telecommunication, electronic components,**
- **consumer electronics and**
- **rural electronics.**

DEPARTMENT OF OCEAN DEVELOPMENT (DOD)

- **Subjects considered for support under the fund include physical and chemical oceanography, ocean engineering, marine ecology, marine meteorology, marine instrumentation etc.**
- **Assistance is also extended to projects which have Politico-geographic or Social Dimensions of the Indian Ocean and Antarctica.**

ISRO Sponsored Research Programme (RESPOND)

- **ISRO Sponsored Research Programme (RESPOND)**
- **To conduct research and developmental activities in the relevant areas of space science, application and technology at the universities and academic institutions in the country. Also, to establish interactions between scientists working at ISRO and academic institutions to carry out joint research and educational activities of interest to the Indian space programme.**

MINISTRY OF ENVIRONMENT AND FORESTS

- **National Natural Resources Management System (NNRMS) --- Man and Biosphere Research Scheme (MAB)**
- **- Environment Research Scheme (ERS)**
- **Action Oriented Research Programme for Eastern and Western Ghats**
- **Biosphere Reserves (BR)**
- **National Natural Resources Management System (NNRMS)**

MINISTRY OF URBAN AFFAIRS AND EMPLOYMENT

- **Pesticides in potable water - development of removal technology**
- **Waste water recycling and groundwater recharge by natural methods**
- **Rapid evaluation of performance of waste water treatment by Dip slide technique**

MINISTRY OF WELFARE (MOW)

- **S&T Project in Mission Mode**
- **Suitable and cost-effective aids and appliances**
- **Methods of education and skill development leading to enhancement of opportunities for employment, easier living and mobility, communication, recreation and integration in society.**

OPPURTUNITIES FOR INDO-RUSSIAN CO-OPERATION

Collaboration

- Needs and expertise of both the countries drive themes for collaboration
- Areas for collaboration
  - Health
  - Education
  - Environment

Science and Technology cooperation between India and Russia

- Working Group on Science & Technology (DST and RMES)
- Integrated Long Term Programme (DST and RAS)
- Basic Science cooperation programme (DST-RFBR)
- Inter-Academy Exchange Programme (INSA-RAS)

Working Group on Science & Technology

- The fourth meeting of the Working Group was held at Moscow on November 17, 2011.
- The Working Group reviewed and recommended new cooperation in
  - Industrial R&D
  - Biotechnology
  - Medical Sciences
  - Nanotechnology and Meteorology.

Integrated Long Term Programme

- The time tested ties between India and Russia led to cooperation in multifarious areas. Integrated Long Term Programme of Cooperation in Science & Technology, popularly known as ILTP, was jointly initiated at the apex level by the then Prime Minister Shri Rajiv Gandhi and the then Soviet Primer Mr. Mikhail Gorbachev in 1987.
- ILTP became one of the most exhaustive S&T collaborative programmes that India ever entered into with another country. ILTP has remained a flagship programe amongst international programmes in the scientific and strategic, which became a platform for collaboration, both in the areas of basic and applied sciences and has resulted in
  - setting up of 9 joint research centers (7 in India in the areas of Powder Metallurgy, Biomedicals, Biotechnology, Gas Hydrates, Earthquake Research, Vaccine Development, non-ferrous materials, and two in Russia on Super Computing and Ayurveda),
  - setting up of Indo-Russian S&T Centre with branches both in India and Russia to promote two-way technology transfer, and several high techn products and processes through successful completion of over **500** joint R&D projects and hundreds of bilateral workshops, exhibitions, visits.

Integrated Long Term Programme

- Realizing the success of the programme, two governments have renewed the Programme for further ten years with new mandate – Innovation Led Technology Programme. The ILTP Agreement in Science, Technology & Innovation was concluded on 21st December 2010 by the two Science Ministers in presence of the Hon'ble Prime Minister of India and the Russian President.
- Under renewed Agreement, while the two countries will continue their cooperation in Basic Sciences, more emphasis would be given to the joint research in the promising areas of innovative research and development to resolve urgent scientific and technological problems of mutual interest; industrial application of the fruits of scientific and technological cooperation; promotion of economic and industrial cooperation. Under the new Agreement, both sides have agreed to provide dedicated funds to each identified programmes. The two countries have also agreed to implement joint mega projects in mutually agreed socially and economically important areas, including the themes: Sustainable energy, Affordable Health, Informatics and Informatization.
- The 17th Session of the ILTP Joint Council was held at New Delhi during April 24-25, 2012. The Session was Co-chaired by Dr T Ramasami, Secretary DST and Acad AO Gliko, Director General, RAS Institute of Physics of the Earth, wherein an 18-member Russian delegation participated.

Basic Science Cooperation programme

- A new MOU for development of bilateral scientific cooperation programme in Basic sciences was concluded in 2007 between DST and Russian Foundation for Basic Research (RFBR).
- Presently 42 joint R&D projects are under implementation.
- 7 joint bilateral workshops are being supported by the two sides during this year.
- Around 70 proposals for workshops and 8 proposals for bilateral workshops have been received in the last call for proposals, which was closed on November 30th, 2011.
- In addition to this an initiative to support inter-disciplinary joint research projects in the priority areas of the two countries by launching Inter-disciplinary thematic call is currently being discussed. This would help in applying top down approach in funding multidisciplinary joint research.
- The new initiative is expected to support about 15 projects annually in 6-7 research themes with funding of Rubles 800,000 per project.

Our project is an example of DST-RFBR Grant

- Story of our collaboration
- “Computer Aided Study of Hidden Potential of Traditional Indian Medicinal Plants And Their Pharmacological Validation”

INDIAN-RUSSIAN JOINT RESEARCH PROJECT

COMPUTER-AIDED STUDY OF HIDDEN POTENTIAL IN TRADITIONAL INDIAN MEDICINE AND ITS PHARMACOLOGICAL VALIDATION

- HOME
- WHO WE ARE
- ADD/EDIT PHYTOCHEMISTRY
- MAKE/EDIT MIXTURE
- ADD/EDIT NEW SUBSTANCE
- VIEW/EDIT EXISTING ACTIVITY LIST
- FEEDBACK

Ayurveda

or ayurvedic medicine is a system of traditional medicine native to India and a form of alternative medicine.

Natural compounds are used in folk medicine for thousands of years, now occupying over 30% of the world pharmaceutical market. They have a high chemical diversity in comparison with substances obtained by synthesis, but only a small part of their pharmacological potential is used by medicine. The vast amount of empirical data on the pharmacological properties of natural compounds accumulated in traditional Indian medicine (TIM) Ayurveda.

What is the purpose of this project?

The purpose of this project is to analyze the mechanisms of action and pharmacological effects of individual components and combinations of the medicinal plants used in Ayurveda, based on computer prediction of biological activity spectra of individual compounds using the program PASS, and to assess their drug-drug interactions using PharmaExpert. The information will be used to identify the hidden potential of traditional Indian medicine, and to validate some computer-aided predictions in biological assays.

SUPPORTED BY: RFBR IBMC Department of Science & Technology, Ministry of Science & Technology

E-mail: pass@ibmc.msk.ru

Inter-Academy Exchange Programme

- An inter-Academy agreement between Indian National Science Academy (INSA) and Russian Academy of Sciences (RAS) was concluded in 2001.
- Under this agreement, both Academies are nominating scientists to visit each other's' countries.

New Initiatives being undertaken

- Fellowships for Russian Scientists
- Indo-Russian Science & Technology Centre
- Fly Ash Utilization
- Saras Certification & further development
- Joint manufacturing of chips for solar energy
- Nanotechnology cooperation
- Joint research Programme on Glyco Sciences
- Development of Linear Accelerator
- Future Focus: promote joint development and commercialization of technologies capable of making major societal and economic impact, especially in the emerging areas of Biotechnology, Healthcare, New Materials for Energy, Nanotechnology and Oceanography, Bio-medical Technologies and Information & Communication Technologies.

OPEN SOURCE DRUG DISCOVERY

Team India Consortium with Global Partnership

A CSIR-led initiative for affordable healthcare

Under the dynamic leadership of

Prof. Samir K. Brahmachari

DG

Council of Scientific and Industrial Research

INDIA

And Others

Open Source Drug Discovery Programme for Infectious Disease: An Indian Initiative

"Open Source Drug Discovery Movement" is a new concept and has major advantage of reducing the cost of development by bringing like-minded scientists with complementary diverse skill set together under a single umbrella.

- The cost of development of a new drug is nearly US$ 1 billion.
- Few Pharma Companies are interested to invest in development of drug for infectious diseases as half the populations of the world including 50% of Indians do not have the paying capacity although they need it most.
- Two other issues are responsible for poor development of drug leads in area of infectious disease

  The prohibitive cost of IPR protection and

  Confidentiality of drug development

- The remarkable success of the open source movement in IT Sector like development of Linux operating system and World Wide Web has given enormous benefit to the developing world.

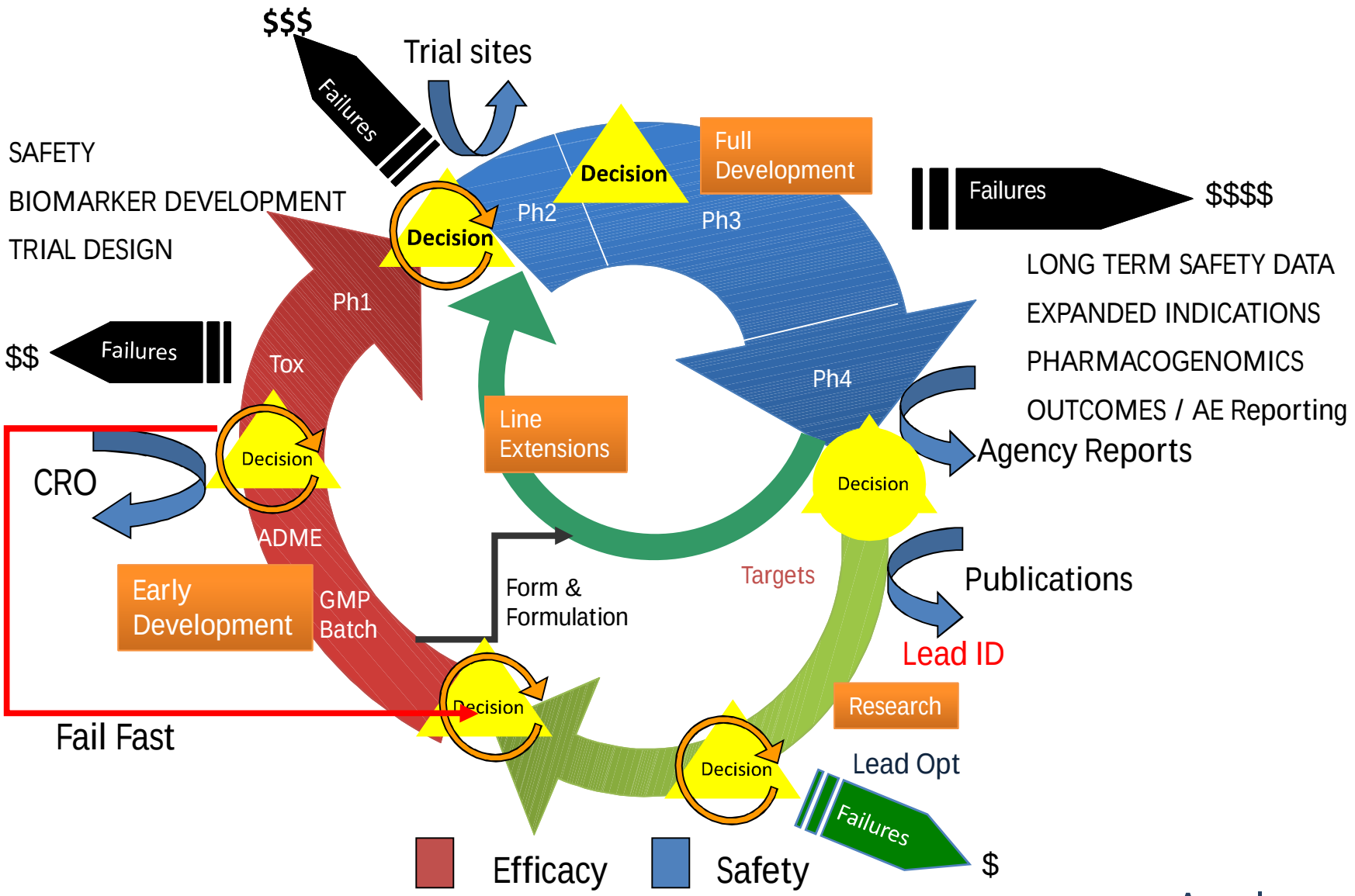
Why Open Source Drug discovery ?

- Drug at affordable cost is the right of all.
- Present drug discovery is driven by market size.
- For infectious diseases like TB market size is only US$ ~300m and are not profitable for major Pharma Companies to invest.
- Successful Open Source Models
  - Human Genome Sequencing Initiative
  - Open Source Software Initiative (eg: Linux OS)
  - The WWW
- Confidentiality and IPR Protection increases cost and decreases free knowledge sharing for drug discovery.

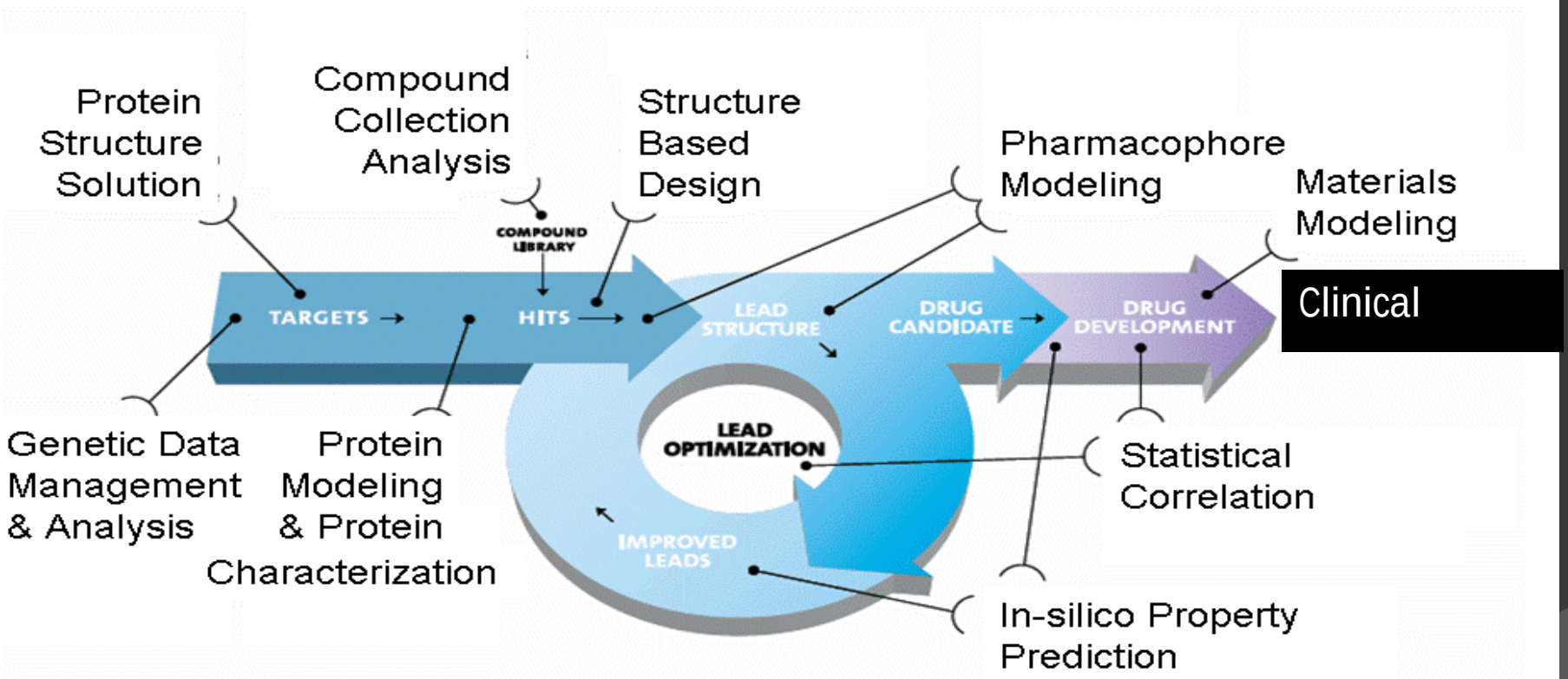
Why Open Source Drug discovery ?

- **“Drug Discovery” is not easily reproducible.**
- **Drug Discovery need to move out of indoors of Pharma Companies to Open Sky for young generation globally to participate.**
- **Present IT infrastructure, connectivity and high throughput analysis capability makes OSDD possible.**
- **The work can be done by Academia, University students and CRO’s at much lower cost.**
- **NCE will become Generic as soon as it is discovered.**
- **Protection of IPR (only through copyright of database) least required as major Pharmas will not work on Generic products.**

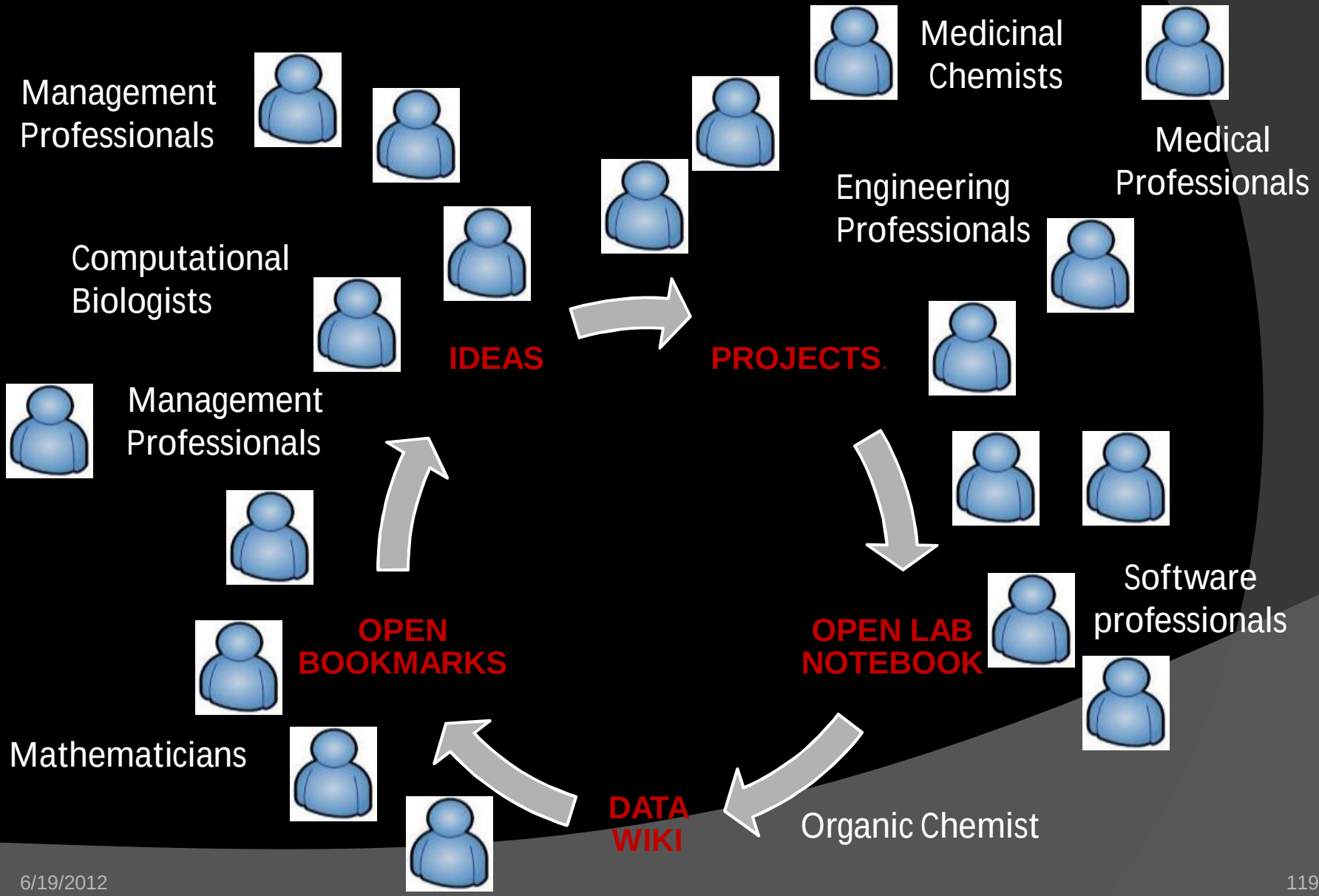
Life Cycle of Drug Discovery



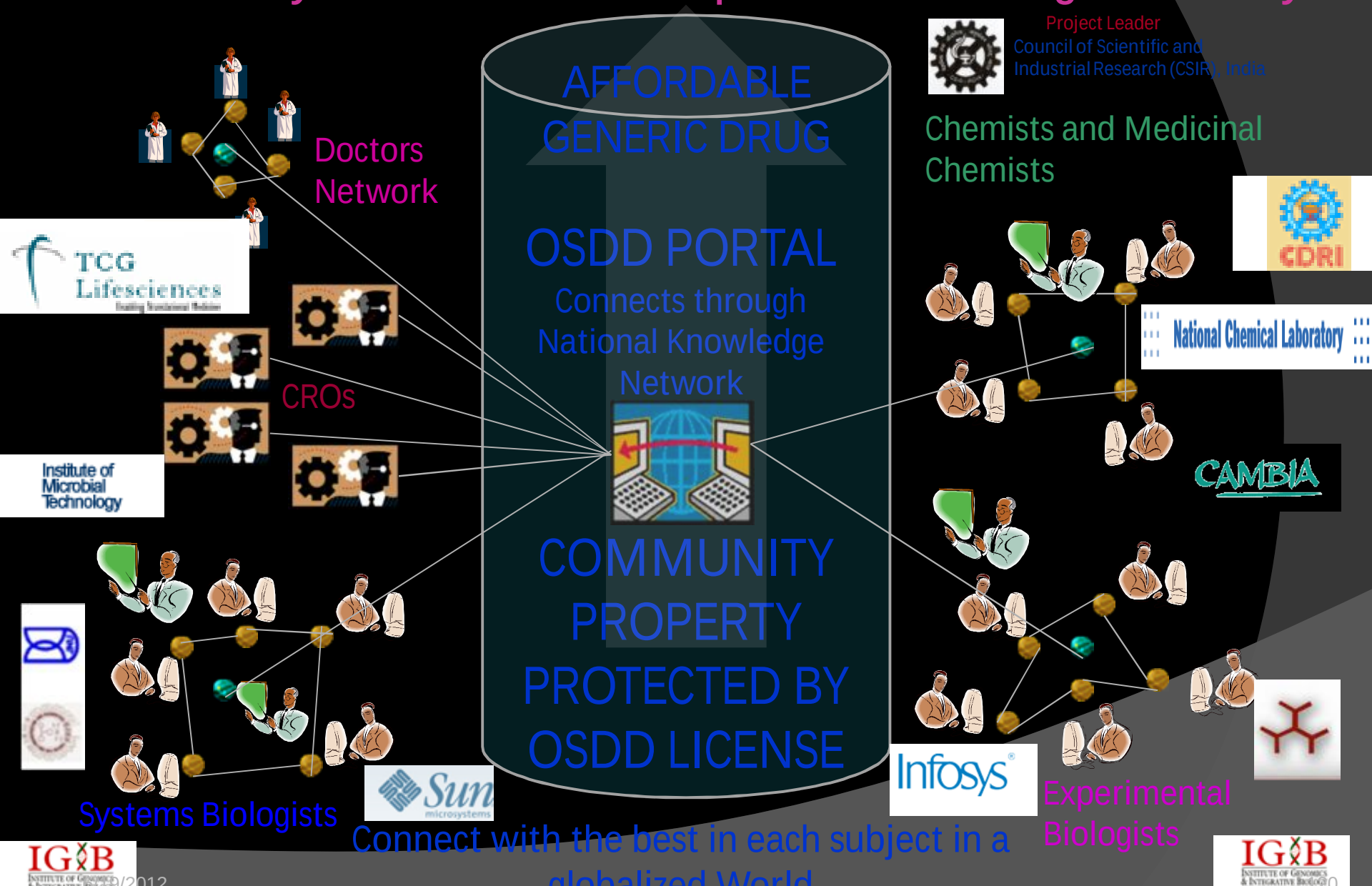
Drug Targets to Drug Candidates



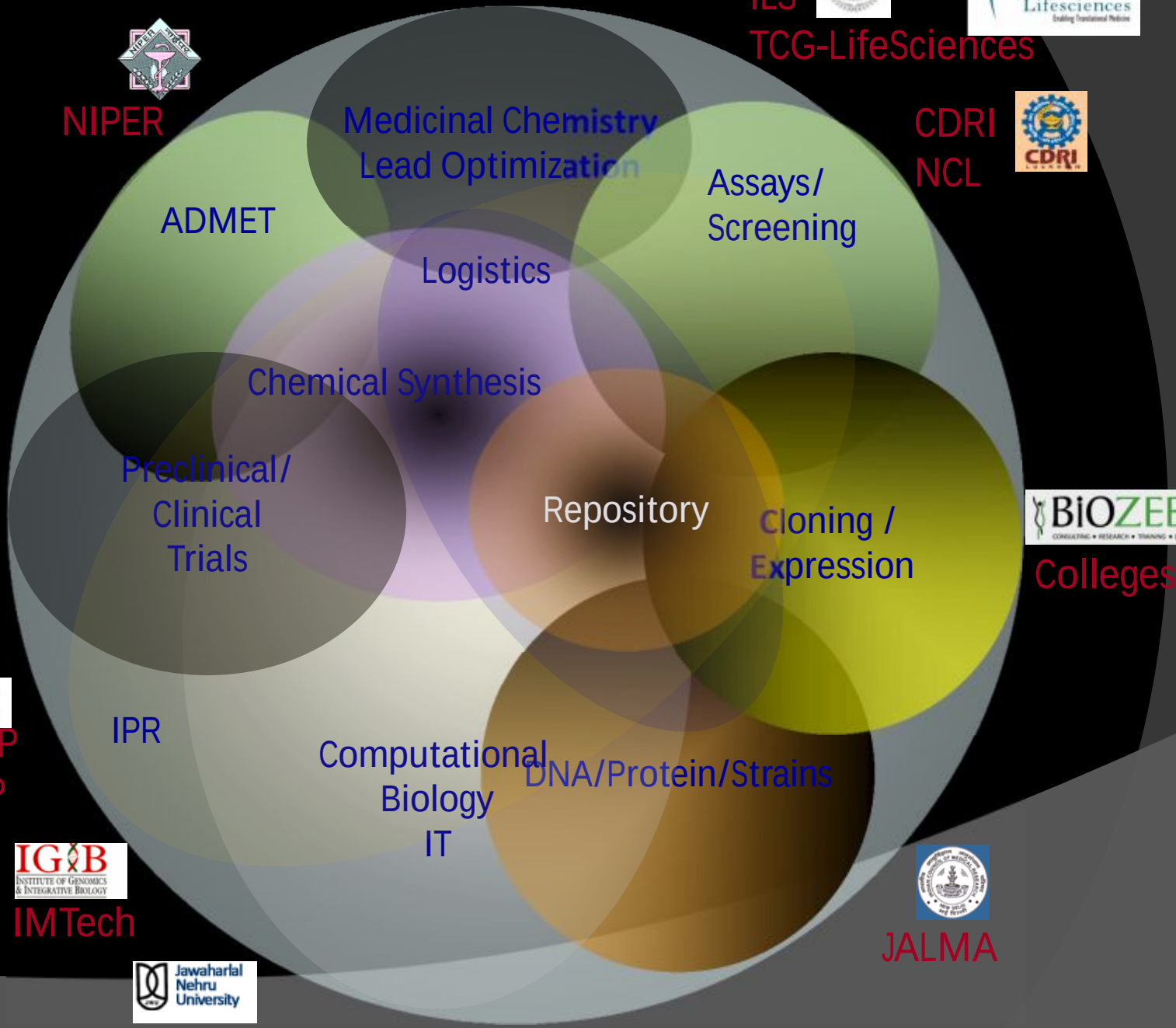
Unconventional Collaborative Networks



Moving from Networked Task Force Projects to Community Driven Science: Open Source Drug Discovery



OSDD Activity Map



Work Packages

Phase- I

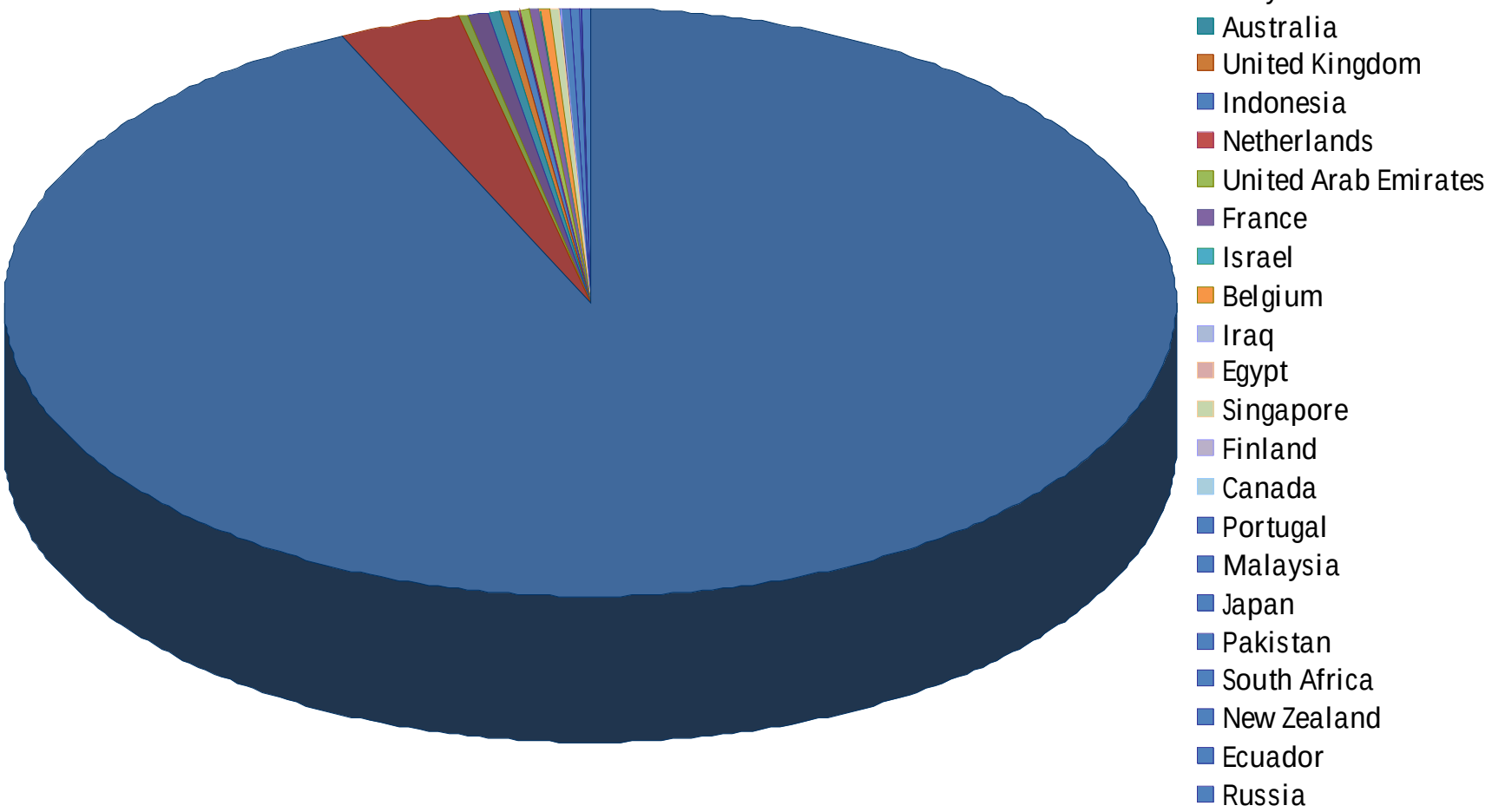
WP-1 Identification of Targets *(in Silico)*
WP-2 Expression of Targets
WP-3 Validation of targets and Screen Development
WP-4 Identification of Chemical library
WP-5 Microarray gene expression
WP-6 Lead optimization on the non-toxic Hits
WP-7 Synthesis of analogues
WP-8 Identify non specific binding using Proteomics

Phase-2

WP-9 Preclinical toxicity
WP-10 Clinical Trials

1417

Registered Participants



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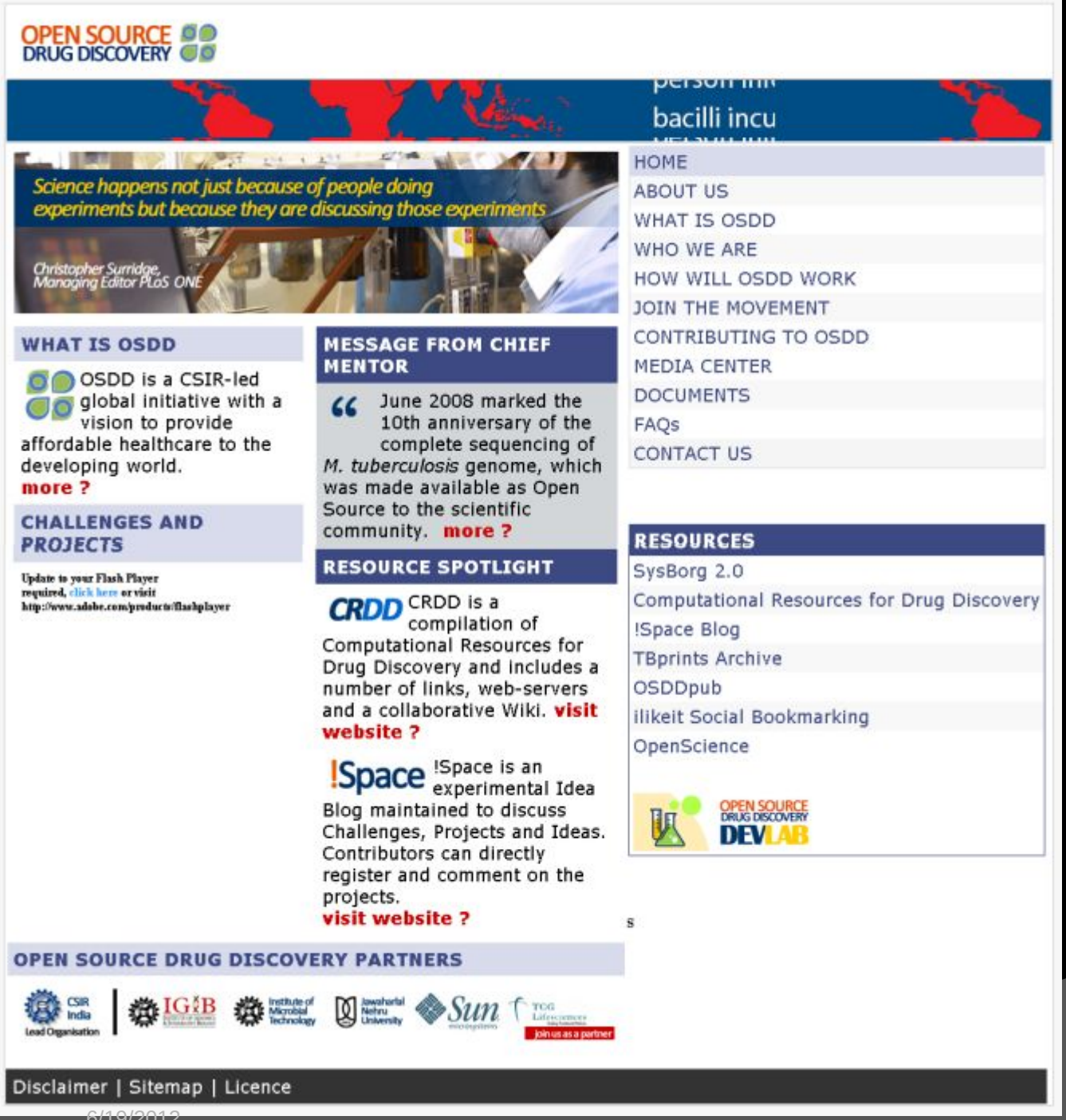
OPEN SOURCE DRUG DISCOVERY
bacilli incu
Science happens not just because of people doing experiments but because they are discussing those experiments
Christopher Surridge, Managing Editor PLoS ONE
HOME
ABOUT US
WHAT IS OSDD
WHO WE ARE
HOW WILL OSDD WORK
JOIN THE MOVEMENT
CONTRIBUTING TO OSDD
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DOCUMENTS
FAQs
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WHAT IS OSDD
OSDD is a CSIR-led global initiative with a vision to provide affordable healthcare to the developing world.
more ?
CHALLENGES AND PROJECTS
Update to your Flash Player required, click here or visit http://www.adobe.com/products/flashplayer
MESSAGE FROM CHIEF MENTOR
“ June 2008 marked the 10th anniversary of the complete sequencing of M. tuberculosis genome, which was made available as Open Source to the scientific community. more ?
RESOURCE SPOTLIGHT
CRDD CRDD is a compilation of Computational Resources for Drug Discovery and includes a number of links, web-servers and a collaborative Wiki. visit website ?
!Space !Space is an experimental Idea Blog maintained to discuss Challenges, Projects and Ideas. Contributors can directly register and comment on the projects.
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India is open to collaborate for

- Better Education, Health and Environment for All
- Through newer technologies, Improved medicines, sustaiable resources of energy..

Thank you for your patience