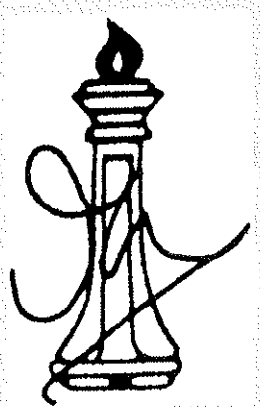
ANNUAL REPORT

2001 - 2002



JAWAHARLAL NEHRU CENTRE FOR ADVANCED SCIENTIFIC RESEARCH

Jakkur, Bangalore - 560 064

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CHAPTER I

The Centre

1. FOREWORD

I have great pleasure in presenting the Annual Report of the Centre for the year 2001 - 2002.

The Centre continues to intensify its research activities in the various Units. The Summer Research Fellowship Programme for young students has completed twelve years of operation. For the latest programme, over 10,000 application forms were despatched and they were also available for downloading from the Centre's website. The number of fellowships offered was nearly 120. It continues to be an effective medium for exposing young students at an early stage to the methods of research.

The Centre remains keen to attract highly motivated young graduates to science. In the Physical Sciences the Centre participated in JEST programme for the second time, along with fourteen other institutions, for joint selection of students; and the results are again encouraging. By organising topical programmes, the Centre is striving to be a unique medium for promoting excellence in science education, so that quality science education is within the reach of all strata in the society. With this end in view, the Centre is constantly looking for new ways to strengthen the Ph.D programme so that a larger number of bright research scholars can be motivated to join the Centre every year. The number of students has risen to near 60. Four students completed their work and were awarded their Ph.D. degrees during the year.

The Honorary Faculty of the Centre continue to act as a large networking of eminent scientists in the country helping in the promotion of research activity and training of young scientists.

The new hostel annexe and a building for the Educational Technology Unit have become operational.

The excellent academic atmosphere that prevails in the Centre is the result of the fine work of the students, the faculty, the honorary faculty and other members. I would like to acknowledge the help that the Centre has received from its well-wishers and friends. Their support has kept us going despite various limitations.

V. KRISHNAN
President

2. INTRODUCTION

The Jawaharlal Nehru Centre for Advanced Scientific Research was established in 1989 by the Department of Science and Technology, Government of India, to commemorate the centenary year of Pandit Jawaharlal Nehru, with the main objective of promoting scientific research at the highest level in chosen frontier and interdisciplinary areas of science and engineering. The Centre is registered as a Society under the Karnataka Societies Registration Act and is an autonomous national institution.

The Centre maintains close links and has a special relationship with the Indian Institute of Science (IISc), Bangalore, a renowned institution of advanced training and research. The Centre has its main Campus in Jakkur on the Bangalore-Hyderabad highway, about 11 kms from the Indian Institute of Science campus. Infrastructural facilities established by the Centre at the Indian Institute of Science are used by scientists of both the institutions.

The campus in Jakkur with a congenial atmosphere for research is on a 22 acre (approx) plot gifted by the Government of Karnataka. At the Indian Institute of Science Campus, the Centre has a Lecture hall, Visitors' House (JAWAHAR) and Guest Rooms catering to the academic visitors to the Centre and to the Indian Institute of Science.

The Centre has Fellows and full-time faculty in various areas of interest and has distinguished honorary faculty from prestigious institutions all over India. Students have been admitted for the Master's and the Ph.D degree Programmes. A programme of M.Sc. (by research) introduced in the Academic year 1999 – 2000 for the benefit of highly talented & motivated professional course students, is progressing well.

The Council of Management of the Centre meets twice a year. The General Body meets annually. The Academic Advisory Committee of the Centre meets at least twice a year.

3. OBJECTIVES

The objectives of the Centre are:

- To carry out front-line research in selected thrust areas of science and engineering;
- To promote collaborative research with scientists at the Indian Institute of Science and other institutions in the country;
- To provide a national and international forum for in-depth discussions on important scientific topics in areas of vital interest to scientists of the Centre and in the country at large;
- To organize periodic winter and summer schools in certain areas, where young talented scholars would be associated;
- To provide opportunities for talented young students to carry out research projects;
- To provide facilities to visiting scholars and faculty from all over India and abroad, to work for extended periods with the faculty of the Centre;
- To publish monographs and reports on frontier and futuristic areas of science as well as monographs of educational value.

4. PROGRESS

The Centre has completed 12 years and has made good progress in many directions. Research and academic activities in several areas have picked up momentum. Appointments to the core faculty of the Centre have been made in the areas of Life Sciences, Chemical and Materials Science, Theoretical Sciences and Fluid Dynamics. The Centre now holds two International patents, one on an antimalarial agent and the other on light emitting polymers.

The main campus of the Centre at Jakkur houses the various Units and Laboratories, the Library and the computer Laboratory, a seminar/lecture hall and a students hostel, faculty offices and the Administration. A new 128 kbps Internet link via satellite, in addition to the existing 64 kbps link, has been set up.

The Chemical Biology Unit and Condensed Matter Theory Unit of the Centre, a seminar hall and an office of the Centre are located on the IISc. Campus. Regular transport between the two campuses is available. Well-furnished accommodation for visitors and seminar participants is available, besides accommodation for students and faculty.

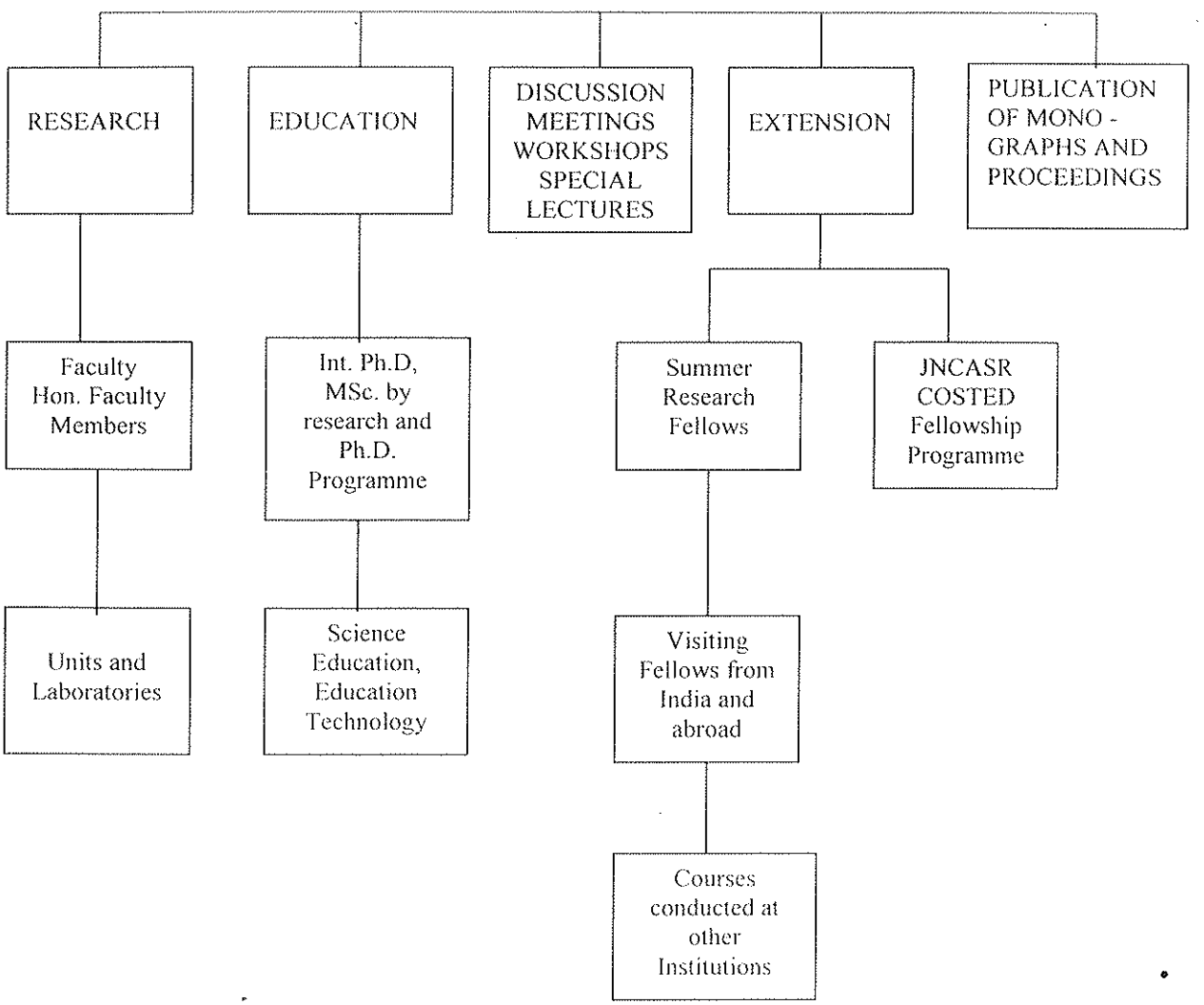
The Centre pursues active research programmes in chosen areas of science and engineering. The number of research students reached almost 60 during the year, and some have completed their studies and received respective degrees; some are registered for the integrated Ph.D Programme in Chemistry and others for the regular Ph.D programmes and a few for M.Sc. (by research) in various areas. The Honorary faculty of the Centre continue to play an important role in guiding academic and extension activities.

Since April 2001, 24 Discussion Meetings, 5 Endowment lectures, 2 Special Lectures, 4 Colloquia (at Jakkur campus), 9 Fluid Dynamics colloquia (at IISc. Campus), 24 seminars and 3 Frontier Lectures were held, either wholly or partially supported by the Centre.

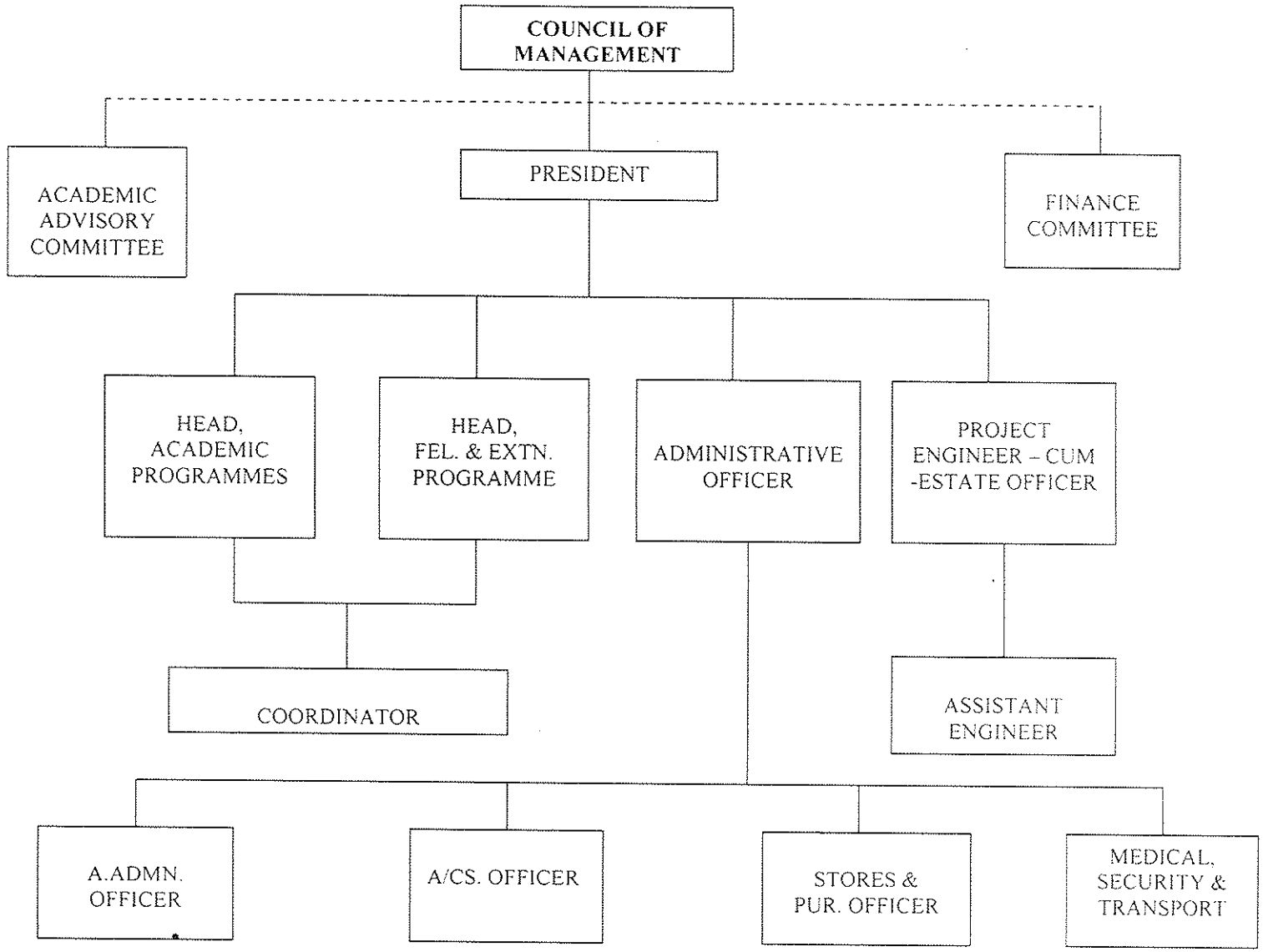
Summer Research Fellowship Programme, Science Education Programme, National Science Day, Academic Exchange Progamme, Visiting Scientists, Visiting Research Scholars, Visiting Fellowship Programme, Short-term courses, JNCASR-COSTED International Fellowship Programme, continue to run well and have been appreciated by the various participants.

5. ACTIVITIES CHART

JAWAHARLAL NEHRU CENTRE FOR ADVANCED SCIENTIFIC RESEARCH



6. ORGANISATION CHART



CHAPTER II

THE ORGANISATION

1. Council of Management

The administration and management of the affairs & finances of the Centre are conducted by the Council of Management. The Council of Management of the Centre meets twice a year.

The following are the members of the Council.

Raja Ramanna Chairman Council of Management JNCASR, Bangalore	Chairman
V. Krishnan President, JNCASR	Member
V.S. Ramamurthy Secretary Department of Science and Technology New Delhi	Member
C.N.R. Rao Linus Pauling Research Professor JNCASR	Member
S.K. Joshi National Physical Laboratory New Delhi	Member
Arun Sharma Joint Secretary & Financial Adviser Department of Science and Technology New Delhi	Member
M.M. Sharma Mumbai	Member
S. Varadarajan New Delhi	Member
G. Mehta Director, Indian Institute of Science, Bangalore	Member

A.K. Sood Indian Institute of Science Bangalore	Member
N. Nagaraja Rao Administrative Officer, JNCASR	Secretary

2. The Finance Committee

The Finance Committee of the Centre scrutinizes all financial proposals, and makes recommendations to the Council of Management.

The constitution of the Finance Committee is as follows:

V. Krishnan President, JNCASR	Chairman
C.N.R. Rao Linus Pauling Research Professor JNCASR	Member
Arun Sharma Joint Secretary & Financial Adviser Department of Science and Technology New Delhi	Member
A.K. Sood Indian Institute of Science Bangalore	Member
R.S. Gururaj Accounts Officer, JNCASR	Member
N. Nagaraja Rao Administrative Officer, JNCASR	Secretary

3. The Academic Advisory Committee

The functions of the AAC include planning, execution and coordination of research & other academic activities of the Centre. It also regulates the courses of study, procedure for admission of students, examination etc. It meets at least twice a year. The Committee makes its recommendations to the Council of Management.

The members of the Committee are :

V. Krishnan President, JNCASR	Chairman
C.N.R. Rao Linus Pauling Research Professor JNCASR	Member
Debashish Mukherjee IACS, Kolkata.	Member
Dipankar Chatterji IISc., Bangalore.	Member
N. Kumar Director, RRI, Bangalore	Member
P. Rama Rao Vice Chancellor University of Hyderabad Hyderabad	Member
N. Mukunda Head, Academic, Fellowships & Extn. Programmes, JNCASR	Member
M.R.S. Rao IISc., Bangalore	Member
K. VijayRaghavan, Director NCBS, Bangalore	Member
N. Nagaraja Rao Administrative Officer, JNCASR	Secretary

The faculties are involved in the academic activities of the Centre and assist the Academic Advisory Committee in the discharge of its functions. The last Annual Faculty Meeting was held in November 2001 which included lectures by the faculty on the advances made in various research areas. Two local faculty meetings were held in September 2001 and January 2002 to review the progress and provide inputs wherever required.

4. Administration

President
V. Krishnan, Ph.D. (IISc), F.A.Sc., F.N.A.

Head, Academic, Fellowships and Extension Programmes
N. Mukunda, Ph.D. (Rochester), F.A.Sc., F.N.A.

Administrative Officer
N. Nagaraja Rao, M. A. (Mysore), M.B.A. (IGNOU)
LL. B., (Bangalore)

Coordinator
W.H. Madhusudan, Ph.D. (IISc)

Warden & Student Counsellor
K.R. Sreenivas, Ph.D(IISc)

Associate Warden
Chandrabhas Narayana, Ph.D. (IISc)

Accounts Officer
R.S. Gururaj, B.Sc. (Mysore) M.PEd (Bangalore)

A. Administrative Officer
K. Raghunatha, B.Sc (Bangalore), LL.B. (Bangalore), PGD IRPM (Bangalore)
(till 11.9.2001)

B.N. Gurjar, B.Com., LL.B.(Bangalore)
(from 31.8.2001)

Secretary to President
D.V. Seetharaman
(till 31.1.2002)

A. Srinivasan, B.A.(Hyderabad)
(from 20.9.2001)

Stores & Purchase Officer
Sripathy Tirupathy, M.Com (Osmania), M.A. (Kakatiya)
(till 13.7.2001)

Asst. Stores & Purchase Officer
K. Bhaskara Rao, M.Sc.(Hyderbad), M.Phil (New Delhi)
(from 17.8.2001)

Project Engineer
S. Chikkappa, B.E. (Mysore)
Junior Engineer
Nadiger Nagaraj, DCE

Consulting Medical Officer
B.S. Subba Rao, M.B.B.S. (Mysore)

Consulting Lady Medical Officer
Kavitha Sridhar, M.B.B.S.

Honorary Medical Officers
P.H. Prasad, B.Sc., M.B.B.S (Karnatak), FCCP
G.R. Naghabhushan, M.B.B.S (Mysore), FCCP, FCGP, P.G. Dip in M&CH
L. Sharada, M.B.B.S. (DGO (Madras)
R.K. Nivedita, M.B.B.S. (Mysore)
C. Satish Rao, M.B.B.S. (Mysore)

Honorary Security Officer
M.R. Chandrasekhar, B.Sc., LL.B.

CHAPTER III

UNITS AND LABORATORIES

UNITS

1. Chemistry and Physics of Materials

The Unit has made outstanding contributions in the area of materials chemistry during the year 2001-2002. Synthesis through different chemical routes and characterization of nanotubes and nanowires of SiC, SiN, SiO_xN_y have been carried out. Nanotubes of chalcogenides such as NbS_2, HfS_2, TiS_2, Mn doped GaN, nanorods of doped and undoped ZnO and Ga_2O_3 were synthesized and various physical properties were measured.

Thin films and single crystals of lanthanum manganates and gallium nitrides were grown and characterized for their electrical, ferroelectric, magnetic and magnetoresistance properties. Studies on the physics of conductive polymers, organic semiconductors, nanosystems and electronics of biomolecules were pursued along with studies on devices such as organic field effect transistors, light emitting diodes and photodiodes. Atomistic computer simulations of organic assemblies such as micelles were performed to study the slow dynamics of water molecules and of ions at the surfactant – water interface. Ultrathin organic films on graphite surface were also studied using molecular dynamics simulations. Synthesis, structure and magnetic properties of a new class of iron arsenates with extended architectures have been investigated resulting in the isolation of novel solids. A possible mechanism of formation of such framework solids has been proposed. Electronic density distribution in the aromatic rings of oxocarbon dianions have been examined using high resolution X-ray diffraction data. Surface enrichment in binary and ternary liquid mixtures of alcohol-water has been investigated through mass analyses of a vapour jets. The formation of carbonyl sulfide from CS_2 and O_2 on Ni(110) surface has been examined using photoelectron spectroscopy. Metal nanocrystals coated with PVP-polymer were studied using UV-vis spectroscopy. A Raman spectrometer has been built indigenously and fibres of SiC and nanotubes of $NbSe_2$ and $HfSe_2$ have been studied. Temperature dependent Brillouin scattering studies have been carried out on $La_{0.8}Ca_{0.2}MnO_3$ and $Nd_{0.5}Sr_{0.5}MnO_3$.

The following are the members of the Unit:

Chair

C.N.R. Rao — F.A.Sc., F.N.A., F.R.S.

Hon. Professor

A.K. Sood, — F.A.Sc., F.N.A.

Associate Professors

K.S. Narayan	Ph.D.
G.U. Kulkarni	Ph.D.
S. Natarajan	Ph.D.

Faculty Fellows

S. Balasubramanian	Ph.D.
N. Chandrabhas	Ph.D.
A.R. Raju	Ph.D.

Research Associate (P)

Mahendra D. Khadkar

Technical Assistants

V. Sreenath	B.E.
S. Srinivas	B.E.
Usha Govind Tumkurkar	M.Sc.

Lab Assistants

J. Anil Kumar	D.E.E.
B.S. Vasudev	D.E.E.
Basavraj Devaramani	D.E.E
Alla Srinivasa Rao	L.E.C.E

R & D Assistants

Basavraj Katageri V
Geo Paul
Intyaz Pasha
Pranab Kumar Mukherjee

2. Chemical Biology

During the period the members of the unit actively involved in the following Research activities :

Improvements were made to a method for cavity volume calculations in proteins. The method was used to derive an estimate for the strength of the hydrophobic driving force in protein folding. Protein engineering studies were carried out on Maltose Binding Protein. Several Pro residues in alpha helices were replaced in order to attempt to increase protein stability. A thermodynamic characterization of wild type and mutants of

CcdB was carried out in order to understand the relation between protein stability and the temperature sensitive phenotype.

Design of new cyclitols as glycomimics is focused on two themes. Inositols represent an important class of biologically active cyclitols that play important role as secondary messengers in mediating cellular communication. An entirely new class of conformationally locked, bicyclic inositols have been conceptualized and novel synthetic strategies to access the first few members of these new entities have been devised. The first total synthesis of otteliones A and B, known to exhibit broad spectrum anti-cancer and anti-tubercular activity at nano- and pico-molar concentration, has also been completed.

Distamycin and netropsin are two naturally occurring antibiotic molecules that are also known for their sequence-specific DNA recognition. A new strategy for the solution phase synthesis of their oligopeptide analogs has been developed. The synthesis of various types of distamycin dimmers and trimers has also been completed. It would be interesting to explore their recognition on the floors of the minor groove of DNA with different quaternary structures. This aspect is currently being investigated.

The study of the aggregation properties of cationic and neutral bile salt analogs have led to the discovery of several new bile acid-derived gelators. Protocols to carry out thermal and photochemical transformations in the hydrophobic pockets of these gels have been worked out. Some of these novel bile acid analogs are being evaluated for their possible bioactive properties.

The following are the members of the Unit:

Chair

Uday Maitra	Ph.D., F.A.Sc.

Hon. Professors

P. Balaram	F.A.Sc., F.N.A.
V. Krishnan	F.A.Sc., F.N.A.
G.. Mehta	F.A.Sc., F.N.A.

Hon. Faculty

Raghavan Varadarajan	Ph.D., F.A.Sc.
Santanu Bhattacharya	Ph.D., F.A.Sc.

Research Associate

Gautam Panda

R & D Assistant

Manjula N

3. Condensed Matter Theory

The members of the Condensed Matter Theory Unit (CMTU) are engaged in theoretical research on a variety of topics in the general area of Condensed Matter Physics and Chemistry. During 2001-02, members of CMTU made important progress on a wide variety of problems in this area. The research topics pursued by the members of CMTU during this period with support from JNCASR are listed below.

Strongly Correlated Electronic Systems: *d*-wave superconductivity in cuprates; kinetically-driven magnetism in double perovskites and dilute magnetic semiconductors; spin, charge and orbital ordering in manganites; metal-insulator transitions; disordered and quasi-periodic electronic systems; low dimensional systems such as quantum wires and spin chains; exactly solvable and integrable models.

Soft Condensed Matter : vortex matter in type-II superconductors; semiflexible polymers; charged micellar systems; porous networks and biomembranes; solvation in complex liquids; colloidal suspensions; surfactant solutions; liquid crystals.

Nonequilibrium Statistical Physics : drifting flux lattice; sedimentation; stick-slip phenomena; martensitic transformations; fluid and magnetohydrodynamic turbulence; spatiotemporal chaos in excitable media; driven diffusive systems; slow dynamics near the glass transition; dynamics of evolving networks; growth of thin films in molecular beam epitaxy.

The following are the members of the unit:

Chair

Chandan Dasgupta	F.A.Sc.

Hon. Professors

Biman Bagchi,	F.A.Sc., F.N.A.
H.R. Krishnamurthy	F.A.Sc., F.N.A
N. Kumar,	F.A.Sc., F.N.A.
T.V. Ramakrishnan	F.A.Sc., F.N.A.
S. Ramasesha	F.A.Sc.
D.D. Sarma	F.A.Sc., F.N.A.
B. Sriram Shastry	F.A.Sc.

Hon. Faculty

G. Ananthakrishna	F.A.Sc.
Binny J. Cherayil	Ph.D.
Diptiman Sen	Ph.D.
Rahul Pandit	F.A.Sc.
Sriram Ramaswamy	F.A.Sc.
K.L. Sebastian	F.A.Sc.
Sanjay Jain	Ph.D.
S. Yashonath	F.A.Sc.

Research Associates

Girish S Setlur
Krishnakumar S.R. Menon

R & D Assistant

Apratim Chatterji

4. Education Technology

Accomplishments of the unit during the year are :

1. Multimedia package of "Our Earth in the Sky" was released and distributed. The Second print run of the same title was also completed.
2. The 2 volume multimedia CD-ROM's titled "Learning Science Vol. I and Vol. II is nearing the end of development and is expected for release very soon.
3. A Programme of "A Celebration of Chemistry" which is held all over the country for the popularization of science is done at Pune, Chandigarh, Chennai and Siliguri.
4. Voice over recording of Understanding Chemistry in Kannada is completed.

The following are the members of the unit :

Chair

V. Krishnan	FA.Sc., F.N.A.

Programme Scientist

Jayanthi Chandrasekaran	Ph.D.

Technical Assistants

D.K. Bhaskar	B.E.
Jatinder Kaur	M.Sc.

Co-ordinator (Hon)

Indumati Rao	M.A., M.S.

Multimedia Asst. (Hon)

Sanjay S. Rao

5. Evolutionary and Organismal Biology

The EOBU conducts advanced research in *four* laboratories.

1. **Chronobiology** : Circadian rhythms in biology and behaviour of the fruitfly *Drosophila melanogaster* and the different castes of workers ants (*major, median and minor*) of *Camponotus compressus* are being intensely researched. This is the only laboratory anywhere to research evolutionary modifications of circadian parameters consequent upon a social organization in animals. The laboratory which we were readying for work on circadian rhythms in the field mouse is now commissioned and working.

2. **Evolutionary Genetics** : Experimental and theoretical studies on *Drosophila melanogaster* are in progress to better understand the dynamic behaviour and demographic stochasticity of very small populations linked by migration (metapopulations).

3. **Biodiversity** : Theoretical, experimental, field and policy research on the biodiversity of India are in progress.

4. **Behavioural Ecology** : Field and laboratory studies on the ecology sociobiology of the queen-less ponerine ant *Diacamma ceylonense* continue.

The following are the members of the unit :

Chair

M.K. Chandrashekaran	Ph D, D Sc, F A Sc, F N A

Honorary Professors

Madhav Gadgil	Ph D, F A Sc , F N A
Raghavendra Gadagkar	Ph D, F A Sc, F N A
Vidyanand Nanjundiah	Ph D, F A Sc, F NA

Associate Professor

Amitabh Joshi Ph D

Faculty Fellow

Vijay Kumar Sharma Ph D

Jr. Scientific Assistant

A.V. Nagarathnamma M Sc

R & D Assistants

Anitha D
Danya Kumar
Nagamani M. Swamy
Puroshotham L
Rajamani M
Rangapriya
Sagar Kathuria
Vallikiran M
Vinayaga Srinivasa G
Yuvana Satya Priya

Junior Research Fellows

Akarsh C R
Sowmya L

Lab Assistants

Deepika N S
Padmanaba C R
Ramya S

6. Fluid Dynamics

The members of the unit actively involved in the following Research activities during the period.

Atmospheric Fluid Dynamics: Work on monsoon rainfall, using wavelets, has progressed further and much more systematic analysis has confirmed the results of the preliminary work carried out last year.

Numerical simulations on the lifted temperature minimum, and in particular the evolution of parameters associated with the phenomenon through night, have been completed and recently published. The work demonstrates the importance of site-specific surface parameters in determining the nature of evolution. The work also throws light on the evolution of nocturnal inversions.

Field experiments on the lifted temperature minimum are in progress. We were able to observe the lifted temperature minimum in the filed. There are distinct differences in the temperature traces produced on the days with "Ramdas type" minimum and the "convective type" minimum. Further experiments are being done to study the parametric dependence of the phenomenon in the field.

Stability and Transition: In further development of work being carried out on the theory of stability in nonparallel flows, careful analysis has reveled that agreement of the present theory with numerical simulations is excellent, and furthermore has enabled an explanation of what had been considered a minor discrepancy in previous work.

In the laminar flow in a 2-D channel, it was shown that a minor viscosity gradient of the correct sign located in the production layer of the dominant disturbance can stabilize the flow by an order-of-magnitude. Secondary instabilities in such flows are being studied and preliminary results indicate that the disturbance growth/decay is dictated by the linear modes.

Entrainment in Free-Shear-Flows: Using dynamical system computations, it is shown that entrainment in the vicinity of vortical structures is a sensitive function of relative motion between the coherent structures and surrounding fluid, as well as the spacing between the structures.

A numerical model is being developed using "diffusion vortex method" to study the effect of axial acceleration on the entrainment process in a jet. Now code is being validated against 2-D planar jet data. Experimental work has been started to see the effect of ambient viscosity on the jet entrainment process.

Double diffusive convection: Preliminary results from experiments and numerical simulations on the effect of viscosity in the double diffusive fingering process looks promising in explaining, geological structures, columnar basalt observed in the Arabian coast.

The following are the members of the unit :

Chair

R. Narasimha	Ph D, F A Sc, F N A, F R S

Faculty Fellows

Rama Govindarajan,	Ph D
K. R. Sreenivas	Ph D

Research Associate

K. Sanjeev Rao

R & D Assistant

Faraz Mehdi

7. Geodynamics

Research Activities :

Three projects have been completed and the results published in the form of research papers. These relate to :

(i) Recognition and delineation of palaeolakes in the Kaveri Basin in Karnataka and palaeoclimatic inferences.
(ii) River response to neotectonism and tectonogeomorphic evolution of the Western Ghat and Sahyadri mountain in Karnataka, and
(iii) Fluvial response to reactivation of thrusts, faults and folds in central and eastern Kumaun Himalaya in Uttaranchal.

Detailed coloured geological map of the Ladakh - Karakoram- Kunlun Region in northwestern Himalaya has published.

Book Writing :

The manuscripts of two original books for laymen published. The one, entitled "Himalaya : Emergence and Evolution" (Universities Press) was published during middle of the year 2001, and the other "River Saraswati That Disappeared" (Oriental Longman) has been revised in the light of referees' comments and published during 2002.

Chair

K.S. Valdiya F.A.Sc., F.N.A.

8. Molecular Biology and Genetics

MBGU unit consists of six independent laboratories looking into diverse areas of research. These include biochemistry, cell and molecular biology of Plasmodium, design of antimalarial drugs, screening of natural products for mechanisms of neurovirulence of AIDS, human molecular genetics, vascular developmental biology and transcriptioned regulation.

The focus of Dr. Namita Surolia's laboratory is the identification of unique targets in *Plasmodium*, for development of new and more potent antimalarials. The recent discovery of fatty acid synthesis pathway in the parasite along with the finding that a widely used antibacterial agent can be used as antimalarial has given a good lead in this direction. Dr. Hemalatha Balaram's laboratory is studying the role of protein association in functional activity of hypoxanthine guanine phosphoribosyltransferase using interface mutants. Studies monitoring structural and functional variations in Plasmepsin, an

aspartic protease with change in pH have been completed. Dr. Anuranjan Anand and his group are interested in studying molecular genetic aspects of specific types of epilepsy and trying to find genetic susceptibility factors. They are also screening mutations in some known deafness genes to understand non-sindromic hearing loss.

Dr. Ranga Uday Kumar's laboratory works on the following aspects of HIV biology; epidemiological and molecular characterization of HIV, developing molecular adjuvants for DNA vaccines.

Dr. Maneesha Inamdar's laboratory studies molecular and developmental aspects of blood vessel formation using an in vitro embryonic stem cell model and in vivo using mouse embryos. A novel gene *asrij*, has been identified that is expressed in embryonic stem cells and in a tissue-specific manner during development. Dr. Tapas Kumar Kundu's lab investigates transcription regulation by histone modifications and human SWI/SNF complex. They have developed a complete reconstituted human transcription system based on HeLa cell culture especially, from flag tag cell lines.

The following are the members of the unit :

Chair

Dipankar Chatterji	F.N.A., F.A.Sc., F.N.A.

Honorary Professor

H. Sharat Chandra	F.A.Sc., F.N.A.

Faculty Fellows

Anuranjan Anand	Ph.D.
Hemalatha Balaram	Ph.D.
Maneesha Inamdar	Ph.D.
Namita Surolia	Ph.D.
Ranga Uday Kumar	Ph.D.
Tapas Kumar Kundu	Ph.D.

Research Associates

Balasubramanyan
Srinivas H.

Veternary Trainee

Vasanth Kumar S P

R & D Assistants

Annapuna B C
Aruna V
Bimba Jain
Deetha T D
Hari Kishore
Kiruthiga Balusamy
Marthandan M
Mohan Kumar K M
Nagendran R
Prashanth Kumar B R
Ranjith Prasad Anand
Ravi Shankar H M
Santhosh G
Siddappa N B
Smita P
Sriram Saravanan S

9. Theoretical Sciences

The research work during 2001 - 2002 has concentrated on the following areas :

Ab initio density functional theory calculations of structural and vibrational properties of bulk metals and metal surfaces. Liquid-Liquid and metal – non metal transition in silicon and the negative pressure critical point. Analysis and dynamical models based on saddle point statistics study of potential energy landscapes; existence of ideal glass transitions. Computational schemes simulating relaxor ferroelectric phase transitions, effects of disorder and short range chemical order and dielectric properties. Resonant cavity enhanced photodiode based on polymers. Complex magnetic behaviour of cuprates and manganites, unusual elementary excitations. Design of organic materials for non linear absorption and optical limiting behaviour.

The following are the members of the unit :

Chair

N. Mukunda	F.A.Sc., F.N.A.

Faculty Fellows

Shobhana Narasimhan	Ph.D.
Srikant Sastry	Ph.D.
Swapan K. Pati	Ph.D.
Umesh V. Waghmare	Ph.D.

LABORATORIES

1. Computer Laboratory

Over the last year, the computer laboratory has been able to satisfy the computing and networking needs of researchers at the Nehru Centre. Some highlights of the activities are:

- Hevy duty, high end monochrome and colour printers were acquired.
- Downloadable Summer Research Fellowship Application Form activity continued.
- 128 kbps VSAT link to internet commissioned.
- Local Aread Network (LAN) extended to 3 buildings in campus.
- A modular webcanlendar programme to schedule academic events was created.
- Nearly 60 absolete items in Computer Laboratory condemned.
- 2 Units of 4 CPU computing machines (Compaq ES40) acquired.
- New webpages of the Centre unveiled with constant upkeep through a faculty committee.
- Content based restrictions on internet access imposed, in accordance with the guidelines of the Supreme Court of India (AIR 1997 SC 3011)

The following are the members of the unit :

Head

S. Balasubramanian Ph.D.

R & D Assistants

Geetha Francis
Rajesh Kanna T R
Shethal T K
Sreelakshmi S

Endowed Research Professors :

1. AstraZeneca Research Centre India
   - Astra Chair in Life Sciences
   M.K. Chandrashekaran, F.A.Sc., F.N.A.

2. Defence Research and Development Organisation
   - D.S. Kothari Chair
   M.M. Sharma, F.R.S., F.A.Sc., F.N.A.

3. Council of Scientific and Industrial Research
   - S.S. Bhatnagar Chair
   K.S. Valdiya, F.A.Sc., F.N.A.

4. IBM World Trade Corporation
   - IBM Information Technology Chair
   V. Rajaraman, F.A.Sc., F.N.A

5. Hindustan Lever Ltd.
   - Hindustan Lever Chair
   R. Kumar, F.A.Sc., F.N.A.
   A. Chakravorty, F.A.Sc., F.N.A.

6. Reliance
   Linus Pauling Research Professor
   Prof. C.N.R. Rao, F.A.Sc., F.N.A., F.R.S.

7. Department of Atomic Energy
   - Vikram Sarabhai Chair
   S.K. Joshi, F.A.Sc., F.N.A.

CHAPTER IV

ACADEMIC PROGRAMMES

PART - I

1. Academic Activities

The Centre has signed a Memorandum of Understanding with the Manipal Academy of Higher Education (MAHE) - deemed university which enables the Centre to conduct an integrated Ph.D. programme as well as regular Ph.D. programme in science and engineering. The Centre selects candidates on an all-India basis, offers course work (in collaboration with IISc), provides research facilities and administers the programme, while MAHE awards the degrees. The regular Ph.D. programme in science and engineering is available to post-graduates who have successfully completed the GATE/CSIR-NET/UGC/JRF examination. The Centre has joined JEST programme (Joint Entrance Screening Test) in association with 12 other major research institutions in the country for selection of students for Ph.D. programme in experimental & theoretical physics.

During the year 2001 -2002, for Integrated Ph.d. 2 students and for the regular Ph.D. programme 14 students were admitted to work in the areas indicated below:

1. **Chemistry & Physics of Materials**

   Integrated Ph.D.
   Ayan Dutta
   Vivek Chand

   Ph.D.
   Asish Kumar Kundu
   Jinesh K.B.
   Neena Susan John
   Soumya Dutta

2. **Evolutionary & Organismal Biology**
   Shailesh Kumar
   Sharmillabharathi N

3. **Fluid Dynamics**
   Subarna Bhattacharyya

4. **Molecular Biology & Genetics**
   Prasanta Kumar Dash
   Senthamizh Selvi T
   Shobha S

5. **Theoretical Science**
Debaprasad Mukherjee
Gargi Dutta
Joydeep Bhattacharjee
Lakshmi S

The following student with engineering background has been admitted for M.Sc. (by research) for the year 20001- 2002

Kirti Chandra Sahu
Mukund Vasudevan

The Ph.D. degree has been awarded to the following students :

A. Alagiri Swamy
Vadhiraja Bhat

2. Discussion Meetings:

The Following discussion meetings have been held since the last Annual Report.

1. Advanced School on 'Recent Advances in Climate and Environmental Research' (11-13, April 2001), Convenor : Dr. Gangan Prathap (C-MMACS).

2. Sikkim International Nanotribology Symposium (16-25, May 2001), Convenor : Prof. S.K. Biswas (IISc).

3. International Conference on Tropical Ecosystems: Structure, Diversity and Human Welfare (July 15 - 18, 2001), Convenor : Dr. Gladwin Joseph, Ashoka Trust for Research in Ecology and the Environment, Bangalore.

4. International Conference on Civil Engineering – 2001 (23 - 25, July 2001), Convenor : Prof. K. Sridharan, (IISc.).

5. D.M. on Biomolecular Conformation and Function (July 26 - 27, 2001), Convenors : Prof. N. Srinivasan, Prof. S.K. Sikdar (IISc).

6. Meeting on Use of high energy ion beams for synthesis and modification of Nanomaterials (September, 3 - 5 2001), Convenor : Prof. Arup K. Raychaudhuri (IISc).

7. Symposium on Advances in Experimental Aerodynamics and Measurement Techniques (October 5 - 6, 2001), Convenor : Mr. B. Vasudevan (IISc).

8. Satellite Symposium on Cell growth and death (November 3, 2001), Convenor : Prof. R. Nayak (IISc.)

9. Fourth meeting of the Asian Crystallographic Association, (November 18 – 21, 2001), Convenor : Prof. M. Vijayan (IISc).

10. First Conference of Asian Consortium for Computational Materials Science (November 28 - 30, 2001), Convenor : Dr. Umesh Waghmare (JNCASR).

11. Advanced Materials Workshop – (3-4, December 2001), Sponsorer : JNCASR.

12. International Symposium on Solid State & Materials Chemistry (December 4 - 8, 2001), Convenor : Prof. Biman Bagchi (IISc).

13. Inservice Training programme for High School Teachers at Davanagere (December 10-19, 2001), Convenor : Prof. H.L. Bhat (IISc).

14. Quantum Computing Workshop, (December 11-12, 2001), Convenor : Prof. Ramesh Hariharan, (IISc.).

15. Symposium on Modern Trends in Inorganic Chemistry, (December 12 - 14, 2001) at Calcutta, Convenor : Prof. P. Banerjee (IACS, Calcutta).

16. Asia Academic Seminar, (December 18 - 21, 2001), Convenor : Prof. P. Rama Rao (Univ. of Hyd., Hyderabad).

17. Bio Vision 2001 - National Conference on Biomedical Engineering, (December 21-24, 2001), Convenors : Dr. A.G. Ramakrishnan(IISc.), Prof. Y.V. Venkatesh (IISc).

18. India & Abroad : A conference on Condensed Matter Physics, (Jan. 2-4, 2002), Convenor: Dr. Srikanth Sastry (JNCASR).

19. Workshop on Slow Dynamics and the Glass Transition, (January 5 - 9, 2002, Convenors : Dr. Srikanth Sastry (JNCASR), Chandan Dasgupta (IISc.)

20. International Conf. on Long Range Dependent Stochastic Processes and their applications, (January 7 - 12, 2002), Convenor : Dr. G. Rangarajan (IISc).

21. Symposium on Community Genetics in developing countries, (January 14 - 18, 2002), Convenor : Prof. N. Appaji Rao (IISc).

22. National Workshop on Alternative Building Methods, (January 16 - 18, 2002), Convenor : Prof. K.S. Jagadish, (IISc).

23. Discussion Meeting on Structural Biology, (January 21, 2002), Convenor : Prof. N. Yathindra, Univ. of Madras.

24. IUPAC Workshop on Nanomaterials (WAM II), (February 13 - 16, 2002), Sponsorer : JNACSR.

3. Lectures and Colloquia :

Endowment Lectures :

The Centre organized the following endowment lectures during the period under report:

1. DAE - Raja Ramanna Lecture in Physics by **T.V. Ramakrishnan**, IISc. Bangalore on **Why are the Colossal Magnetoresistance Manganites so Strange?**, October 12, 2001.

2. DAE - Raja Ramanna Prize Lecture in Physics by **Bikash Sinha,** Saha Institute of Nuclear Physics, Kolkata, on **The Micro and the Macro Cosmos**, October 12, 2001.

3. A.V. Rama Rao Foundation Lecture in Chemistry by **G. Mehta,** IISc, Bangalore, on **Natural Product synthesis: is it relevant any more?**, November 15, 2001.

4. A.V. Rama Rao Prize Lecture in Chemistry by **H. Ila,** IIT, Kanpur, on **From Synthons to bioactive molecules; Efficient stategies for heterocycle synthesis,** November 15, 2001

5. C.N.R. Rao Oration Award Lecture by **Dr. Srikanth Sastry,** JNCASR, Bangalore, on **Slow dynamics and the glass transition in liquids,** October 1, 2001.

Special Lectures

1. **The Use of Scientific advice in policy making by Prof. David Kind, F.R.S.**, Chief Scientific Adviser to the British Government, January 8, 2002.

2. **Raman Spectroscopy as a Probe in Condense Matter** by **Prof. Ajay K. Sood,** IISc., Bangalore, February 23, 2002.

Colloquium

The Following Colloquia were held since the last annual report:

1. Self-assembly of the small and the big (the wide domain of weak forces) by Prof. C.N.R. Rao, Linus pauling Research Centre, JNCASR, August 14, 2001.

2. DNA, a polymer and a molecular code by Prof. Albert Libchaber, The Rockerfeller University, New York, October 16, 2001.

3. The use of scientific advice in policy making by Prof. David King, Chief Scientific Adviser to the British Government, January 8, 2002.

4. Catalysis at the Homogeneous/Heterogeneous Interface, Prof. Howard Alper, University of Ottawa, January 17, 2002.

Colloquium - Fluid Dynamics (at IISc Campus)

The following colloquia were held since last annual report :

5. Mean and fluctuating pressure filed in boat-tail separated flows at transonic speeds by Dr. Rajan Kumar, NAL, Bangalore, April 4, 2001.

6. Monsoonal Atmosphere over the Bay of Bengal by Prof. G.S. Bhat, IISc., Bangalore, April 18, 2001.

7. Osillatory Rayleigh-Benard Convection in Viscoelastic Liquids by Dr. Anand Kumar, CMMACS, Bangalore, August 1, 2001.

8. Generalized Hydrodynamic Stability: Application to Transition to Turbulence by Dr. Kumar M Bobba, California Institute of Technology, California, August 23, 2001.

9. On Global flow Instability and Control, Prof. Dr. Vassilios Theofiles, DLR Institute for Fluid Mechanics, Gottingen, Germany, September 11, 2001.

10. Why is Space Transportation Expensive? by Prof. Ray Stalker, The University of Queensland, Australia, September 12, 2001 (jointly by ISRO-IISc Space Technology Cell and Astronautical Society of India).

11. Problem of Moving Boundaries in Fluid Mechanics by Prof. Albert Libchaber, Rockfeller University, New York, USA, November 13, 2001.

12. Dynamics of Vortex Interactions by Prof. V.V. Meleshko, Institute of Hydromechanics, National Academy of Sciences, Ukraine, December 5, 2001.

13. Flow Past Circular Cylindars at Large Revnolds Numbers by Prof. J. S.B. Gajjar, Manchester University, U.K., January 9, 2001.

4. Seminars

The following seminars were held since last annual report :

1. Optical Absorption and Electronic Transport in the Molecular Solid AlQ_3 by Prof. K.L. Narasimhan, TIFR, Mumbai, April 23, 2001.

2. Microbial biodiversity and its potential for biotechnology application by Dr. M.C. Srinivasan, NCL, Pune, May 21, 2001.

3. Social Evolution: Has Nature ever rewound the tape? by Prof. Raghavendra Gadagkar, IISc., Bangalore, September 6, 2001.

4. Applications of Genomics by Prof. G. Padmanaban, IISc, Bangalore, September 12, 2001.

5. Limits to Growth of Excitonic Atoms and Universal Limiting Values of Resistivity at Insulator-Metal Transition by Prof. P. Ganguly, NCL, Pune, September 19, 2001.

6. Expanding repeats and unstable minds: The slippery world of Trinucleotide repeats by Dr. Quasar Saleem, NCBS, September 20, 2001.

7. Aqueous Interfaces by Dr. S. Balasubramanian, JNCASR, October 19, 2001.

8. "K-Selection or a –Selection: Density-dependent selection revisited" by Dr. Amitabh Joshi, JNCASR, October 25, 2001.

9. Viral RNA polymerases: Molecular Architectures and Functional Modulations by Prof. Akira Ishhama, National Institute of Genetics, Shizuoka, Japan, November 5, 2001.

10. Scanning near-field Optical Microscopy : Introduction and Applications by Prof. G.U. Kulkarni and Prof. K.S. Narayan, JNCASR, November 28, 2001.

11. Persistence with fully Synchronon Dynamics by Dr. Gautam Menon, IMSC, Chennai, December 21, 2001.

12. Quasicrystal, Hyperatoms and Icosehedral Cluster Compounds in Al alloys by T.R. Anantharaman, Managing Trustee, Ashram Atmadeep, Gurgaon, December 26, 2001.

13. A study of two Transition Metal Systems; Magnetism in Fe_8N and the defect structure in $NiAl_3$ by Prof. G.W. Fernando, University of Connecticut, USA, January 10, 2002.

14. Molecular systematics and evolution of Indian Langur monkeys by Dr. Praveen K. Karanth, Haifa university, Israel, January 10, 2002.

15. Experiments in a Rb Magneto-Optic trap by Dr. Vasant Natarajan, IISc., Bangalore, January 11, 2002.

16. On the Weirdness of Water and its "Tetrahedral" Cousins: First Order Liquid-Liquid Transitions and near Misses by Prof. C.A. Angell, Arizoma State Univ., USA, January 25, 2002.

17. Insulin Signal, beyond Classical Dimensions by Dr. Khurshid Andrabi, University of Kashmir, February 8, 2002.

18. Modeling the incubation period of AIDS in India by Dr. Arni S.R. Srinivasa Rao, February 14, 2002.

19. Transgenic Frogs: The Prince comes of age by Dr. Maneesha S. Inamdar, JNCASR, February 14, 2002.

20. Raman Spectroscopy as a probe in Condensed Matter by Prof. Ajay K. Sood, IISc., Bangalore, February 23, 2002.

21. GaN and its Opto-Electric Devices by Dr. Durga Basak, IACS, Kolkata, March 6, 2002.

22. Abstraction Reaction of Adsorbates on Pt(111) by very low energy ion scatter by Dr. Rob Lahaye, Seoul National University, Seoul, Korea, March 14, 2002

23. On Assumption of fitness landscape: Major implications on Mathematical models of evolution by Mr. Ambedkar Dukkipati, IISc., Bangalore, March 14, 2002.

24. What Particle Physics has to say about the Early Universe by Prof. Afsar Abbas, IOPB, Bubaneswar, March 15, 2002.

5. Frontier Lectures (jointly with IISc.) :

1. **Living in a Difficult Neighbourhood Challenges for India in the next decade** by **Mr. Shekhar Gupta,** Editor – in – Chief, Indian Express, New Delhi, October 11, 2001.

2. **Antibiotics and the Cell's Protein Factories** by **Prof. Venki Ramakrishnan**, MRC Laboratory of Molecular Biology, Cambridge, U.K., January 23, 2002.

3. **Metaphors of Indian Arts** by **Dr. Kapila Vatsyayan**, Former Academic Director, Indira Gandhi National Centre for the Arts and Former President, India International Centre, New Delhi, March 22, 2002.

EXTENSION ACTIVITIES

PART – II

1. Summer Research Fellowships/ Department of Science Technology Fellowships/ Rajiv Gandhi Science Talent Research Fellowships

The Centre offers these fellowships for two summer months to bright undergraduate and graduate students. For the year 2001, 120 students were offered fresh fellowships and 18 renewals. Out of this, 40 students were awarded Department of Science Technology Fellowships and 10 students were awarded Rajiv Gandhi Science Talent Research Fellowships and.

Scientists in nearly 36 institutions across the country listed below have guided these students:

01. Abasaheb Garware College, Pune
02. Bose Institute, Calcutta
03. Centre for Advanced Technology, Indore
04. Centre for Biochemical Technology, Delhi
05. Centre for Development of Advanced Computing, Bangalore
06. Centre of DNA Fingerprinting & Diagnostics, Hyderabad
07. Central Leather Research Institute, Chennai
08. Delhi Univ South Campus, Delhi
09. Defense Research & Development Organisation, Delhi
10. Harish-Chandra Research Institute, Allahabad
11. Indian Association for the Cultivation of Science, Kolkata
12. Indira Gandhi Centre for Atomic Research, Kalpakkam
13. Indian Institute of Chemical Biology, Kolkata
14. Indian Institute of Chemical Technology, Hyderabad
15. Indian Institute of Technology, Bombay
16. Indian Institute of Technology, Kanpur
17. Indian Institute of Technology, Kharagpur
18. Indian Institute of Technology, Madras
19. Institute of Microbial Technology, Chandigarh

20. Indian Institute of Science, Bangalore
21. Indian Statistical Institute, Bangalore
22. Jawaharlal Nehru University, New Delhi
23. Jawaharlal Nehru Centre for Advanced Scientific Research
24. M.S. University Baroda
25. National Aerospace Laboratory, Bangalore
26. National Centre for Biological Sciences, Bangalore
27. National Chemical Laboratory, Pune
28. National Institute of Immunology, Delhi
29. Osmania University, Hyderabad
30. Physical Research Laboratory, Ahmedabad
31. Rajiv Gandhi Centre for Biotechnology, Thiruvananthapuram
32. Raman Research Institute, Bangalore
33. Regional Research Laboratory, Jammu
34. Tata Institute of Fundamental Research, Mumbai
35. University of Mysore, Mysore
36. University of Poona, Pune

Science Education Programme

"A Celebration in Chemistry" - was conducted at CLRI, Chennai on 18.8.2001.

National Science Day

The National Science Day was Celebrated on 26th February 2002. About forty students from Govt. Science College and Aditi School were invited to participate. The following lectures were delivered by the Faculty of the Centre.

- From Bacteria to Galaxy by Dr. Rama Govindarajan, Fluid Dynamics Unit
- The Power of modern biotechnology by Dr. Ranga Uday Kumar, Molecular Biology Unit.

2. Academic Exchange Programme:

As part of the academic exchange programme, the following scientists/scholars carried out collaborative work with scientists of the Centre and the Indian Institute of Science for varying periods during the year under report:

Visiting Professors

Prof. Vasanth Ram
Ruhr University, Bichum
Germany

Prof. Pradeep Talwani
Department of Geology & Geophysics
University of South Carolina
Columbia, SC 29208, USA.

Visiting Scientists:

Dr. Anushree Roy,
Indian Institute of Technology
Kharagpur

Prof. Noor Afzal
Aligarh Muslim University
Aligarh

Dr. Huynh Dang Chinh
Henoy University of Technology
Vietnam.

Mr. Njapba Ngu Julius,
Dept. of Chemistry,
University of Buca,
Buea, South West Province,
Cameroon
(IUPAC-UNESCO Funds)

Dr. Ranjit Kunnath
Caltech University, USA.

Visiting Scholars

Dr. Vanessa Gagliardini
Department of Chemistry
University of Alberta
Edmonton, T6G 2G2, CANADA.

Ms. Ngo Thi Hong Le
Institute of Materials Science
National Centre for Natural Science and Technology
Hanoi, Vietnam.

3. Visiting Fellowships:

The Centre offers Visiting Fellowships to research scientists in educational institutions and R&D Laboratories, tenable for 2-3 months, to work with the faculty of the Centre. The following were offered Visiting Fellowships during 2001 - 2002 to work at the institutions as indicated below:

Name & Address	associated with
Dr. K.P. Ramesh South Regional Station of National Dairy Research Inst. Bangalore 560 012 Adugodi BANGALORE 560 030	Prof. M.R.S. Rao, Dept. of Biochemistry, IISc Bangalore 560 012
Dr. Abhang Ranjana Y Dept. of Physics A.G. College Karve Road PUNE 411 004.	Prof. C. Dasgupta, Dept. of Physics, IISc Bangalore 560 012
Dr. Micheal Rajamathi Reader in Chemistry St. Joseph's College BANGALORE 560 27.	Prof. C.N.R. Rao, Chairman CPMU, JNCASR Bangalore 560 64
Dr. K. Nagarajan Selection Grade Lecturer Dept. of Physics, NMC, Puthanampatti - 621 007. TIRUCHIRAPPLI	Prof. K.S. Narayan, CPMU, JNCASR Bangalore 560 064
Dr. G. Harichandran Lecturer School of Chemical Sciences M.G. Univ., Kottayam KERALA - 686 560	Dr. S. Natarajan, CPMU, JNCASR, Bangalore 560 064

4. Short term courses :

The Centre conducted the following short courses during the period.

Place / University	Subject	Date	Resource persons
1. Gulbarga University, Gulbarga	Materials Chemistry (STC-MC)	16 - 18, Jan. 2002	Prof. G.U. Kulkarni Prof. K.C. Patil Prof. A. Umerji Dr. Swapan Pati
2. American College, Madurai	Physics of Materials in 0,1,2 and 3 dimensions	7-9, Feb. 2002	Prof. S. Ramasesha Prof. K.S. Narayan Dr. Umesh V Waghmare Dr. V. Venkataraman
3. S.V. University, Tirupati	Nanomaterials	19-20, Feb. 2002	Prof. C.N.R. Rao Prof. G.U. Kulkarni Prof. A.K. Raychaudhuri Prof. S. Natarajan Prof. A.K. Sood Dr. Murali Sastry
4. Burdwan University & Presidency College, Kolkata	Dynamics in Complex Chemical Systems and relaxation phenomena	21-22, Feb. 2002	Prof. Biman Bagchi Prof. S. Umapathy Dr. S. Balasubramanian

5. JNCASR-COSTED International Fellowships Programme

Under this programme International Fellowships are awarded to scientists from developing countries in Asia (other than India), Africa and Latin America. This enables scientists to participate in short term research programme, in Physical, Chemical and Biological sciences. The fellowships are for 3 months duration and for a maximum of ten participants in a year, of which six carry travel grants.

The following were awarded fellowships during the year:

Mr. Wisdom Harrison Kofi Hordzi
Swedru Secondary College
Ghana.

Mr. Richard Adu-Acheampong
Research Officer
Cocoa Research Institute of Ghana
New Tafo-Akim, **Ghana**

Dr. Varduhi Knaryan
Sr. Research Worker, National Academy of Armenia, Yeravan 375 014,
Armenia

Mr. H.M.A.M.C. Herath
Dept. of Chemistry
University of Peradeniya, **Sri Lanka**

CHAPTER V

RESEARCH PROGRAMMES

1. Research Areas

There are ongoing research programmes in several frontier, interdisciplinary areas of science and engineering. The main areas of research interest at present are :

- Atmospheric Sciences and Theoretical Fluid Mechanics
- Condensed Matter Theory
- Ecology and Biodiversity
- Physics and Chemistry of Materials including Surface Science, Molecular Electronics, Nanomaterials and Carbon Structures
- Emerging areas of Computer Science
- Gene Targeting, Gene Therapy and Molecular Parasitology
- Human Genome
- Geodynamics
- Theoretical Sciences
- Chemical Biology

2. Research Facilities

The Centre has the following state-of-art facilities in some focused areas in science and engineering. The following major equipments are functional :

- Scanning Electron Microscope (LEICA)
- X-ray Diffractometer (SEIFERT)
- Scanning Tunneling Microscope/Atomic Force Microscope
- High Resolution 300 KV Transmission Electron Microscope (JEOL)
- A custom built high resolution electron spectrometer with ultra high-vaccum ESCA, VEELS, LEED and STM/AFM attachments (OMICRON)
- Esterline Augus A620 x 20 channel Event Recorder
- Photomultiplier Unit
- Monochromator with interference filters, neutral density filters
- Thermohygrograph and field binoculars

- TGA/DTA (Metlar)
- A custom built cluster unit
- Single crystal X-ray diffractometer with CCD Camera
- 15 tesla Cryocooled Superconducting Magnet (Cryo Industries of America)
- Floating Zone Melting Crystal Growths (NEC, Japan)
- Indigenously built Cluster Source Apparatus
- Brillouin Spectrometer
- Magnetometer (VSM) and Faraday Balance
- Mossbauer Spectrometer
- Computational facilities that include Silicon Graphics Power Challenger with 4 parallel processors, a Hewlett-Packard Kclass-II with 4 CPUs and a large number of Silicon Graphics Workstations and Indy and O_2.

3. Research Support

The following are some of the areas, for which research support has been provided by the Centre since the last Annual Report.

Molecular Interactions vital for cell Survival	:	Prof. V. Nagaraja
Quantum Optics	:	Prof. R.M. Godbole/ Prof. N. Mukunda
π facial selectivity of carbonyl bicyclic compounds	:	Prof. G. Mehta

4. Sponsored Research

1. Investigator : S. Balasubramanian
   Title : Molecular Modelling of Discoid Amphiphilic Aggregates
   Funding Agnecy : Council of Scientific and Industrial Research
   Duration : 3 years

2. Investigator : Anuranjan Anand
   Title : Genetic Variations in Neurotransmitter Genes in Schizophrenia
   Funding Agency : Council of Scientific and Industrial Research
   Duration : 3 years

3. Investigator : Vijay Kumar Sarma
   Title : Investigating the circadian organization of the fruitfly *Drosophila melanogaster*
   Funding Agency : Indian National Science Academy
   Duration : 3 years

4. Investigator : Anuranjan Anand
   Title : Molecular Genetic basis of Juvenile Myoclonic Epilepsy.
   Funding Agency : Department of Science & Technology
   Duration : 3 years

5. Investigator : Ranga Udaykumar
   Title : Construction and Analysis of Eukaryotic Expression of TAT protein of HIV - I/II
   Funding Agency : Department of Science & Technology
   Duration : 3 years

6. Investigator : Hemalatha Balaram
   Title : Elucidation of the Purine Salvage Pathway in Plasmodium Falciparum
   Funding Agency : Department of Science & Technology
   Duration : 3 years

7. Investigator : M.K. Chandrashekaran
   Title : Light of the Circadian Rhythms in Drosophila and ants.
   Funding Agency : Department of Science & Technology
   Duration : 3 years

8. Investigator : K.S. Narayan
Title : Absorption Photoconduction and Emission in Certain polymeric systems.
Funding Agency : Council of Scientific and Industrial Research
Duration : 2 years

9. Investigator : V. Rajaraman
Title : The development of modular self study material In basics of information technology
Funding Agency : Infosys
Duration : 3 years

10. Investigator : R. Narasimha
Title : Aerodynamics studies
Funding Agency : Boeing Company, Seattle, USA
Duration : 3 years

11. Investigator : C.N.R. Rao
Title : Materials based on transition metal oxides
Funding Agency : DAE (BRNS)
Duration : 4 years

12. Investigator : C.N.R. Rao
Title : Storage of Hydrogen using graphitic Nano fibres
Funding Agency : DST
Duration : 2 years

13. Investigator : Anuranjan Anand
Title : A Genome search for deaf genes and mutations in India and Israel
Funding Agency : DBT
Duration : 1 year

14. Investigator : Amitabh Joshi & V.K. Sharma
Title : Empirical Investigation of Adaptation to different light Regimes in Laboratory Population of *Drosophila Melanogaster*
Funding Agency : DST
Duration : 3 years

15. Investigator : Ranga Uday Kumar
Title : Development of Indigenous Diagnostic ELISA Kits based on Capsid Antigen capture Assay for HIV - 1 and HIV - 2
Funding Agency : DST
Duration : 2 years

16. Investigator : K.N. Ganeshaiah
Title : A Digitized Inventory of Plant Resources other than Medicinal species
Funding Agency : DBT
Duration : 2 years

17. Investigator : Maneesha Inamdar
Title : Signalling Mechanisms in the Development of Blood vessels
Funding Agency : CSIR
Duration : 3 years

18. Investigator : Tapas Kumar Kundu
Title : Mechanism of Transcription Regulation by Human SWI/SNF complex and Histone Acetylation/Deacetylation
Funding Agency : CSIR
Duration : 3 years

19. Investigator : Hemalatha Balaram
Title : Characterization of Plasmodium falciparum inosine Monophosphate dehydrogenase(IMPDH) as drug target
Funding Agency : Indian Council for Medical Research
Duration : 2 years

20. Investigator : Rama Govindarajan
Title : Flow Stabilization and Destabilization using viscosity Stratification as a Flow Control Option
Funding Agency : DRDO
Duration : 2 years

21. Investigator : C.N.R. Rao
Title : Study of Ziegler-Natta Catalysis
Funding Agency : REL
Duration : 2 years

22. Investigator : K.S. Narayan
Title : Polymer based image sensors and optical detectors
Funding Agency : MIT
Duration : 2 years

23. Investigator : Tapas Kumar Kundu
Title : Transcription regulation through the Acetylation of Human HMG Proteins and its Link to Cancers.
Funding Agency : DAE
Duration : 3 years

24. Investigator : Namita Surolia
Title : Fatty acid biosynthesis in Malaria Parasite Plasmodium falsiparum as Target for developing novel anti-Malarials.
Funding Agency : DBT
Duration : 3 years

25. Investigator : K.S. Narayan
Title : Studies on mechanism of photo current generation in Bacteriorhodhopsin films
Funding Agency : DRDO
Duration : 2 years

26. Investigator : Maneesha S Inamdar
Title : Functional analysis of identified gene trap clones in blood vessel formation studies on embryonic stem cells and chimeric mice.
Funding Agency : DST
Duration : 3 years

27. Investigator : Hemalatha Balaram
Title : Plasmodium falciparum hyposanthine guanine phosphoribosyltransferase and adenylosuccinate Synthetic: Targets for antimalarial drug development.
Funding Agency : DBT
Duration : 3 years

28. Investigator : Namita Surolia
Title : New molecules through genomic Research
Funding Agency : ICMR
Duration : 2 years

CHAPTER VI

PUBLICATIONS

1. Research Publications of Units :

i) Chemistry and Physics of Materials Unit

1. Materials Chemistry, Rao, C.N.R., Encyclopedia of Physical Science and Technology, 9, 181 (2001).

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(vi) Geodynamics Unit

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(viii) Theoretical Science Unit

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2. Research Publications from Honorary Faculty/ Endowed Professors

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3. Books and Publications

Books authored /edited:

C.N.R. Rao and W. Jones : Supramolecular Organization and Materials Design, Cambridge University Press, 2002

Gadagkar R : The Social Biology of Ropalidia marginata: Towards Understanding the Evolution of Eusociality, Harvard University Press, Cambridge, Massachussets, USA., 2001.

K.S. Valdiya: Himalaya : Emergence and Evolution, Universities Press, Hyderabad, 139 p. 2001

K.S. Valdiya: Saraswati : the River that Disappeared: Universities Press, Hyderabad, 2001.

4. Special Issue of the Journal of the Indian Institute of Science:

Brillouin scattering in manganites and low-dimensional conductors - N. Chandrabhas

Surprising effects of minor viscosity gradients - Rama Govindarajan

Nanostructured amorphous metals, alloys and metal oxides as new catalysts for organic synthesis - S. Chandrasekaran

DNA lipid cation interactions: From monolayers to DNA - Gold/Silver composite systems - K.N. Ganesh

Are the Indian strains of HIV less pathogenic? - Ranga Uday Kumar

CHAPTER VII

AWARDS/DISTINCTIONS

The following Faculty and Honorary Faculty Members of the Centre have won various distinctions and awards both at the national and international level in recognition of their research and developmental work:

Awards & Honors

Prof. S. Chandrasekaran Hon. Professor	:	125 years of IACS-Commemoration Lecture AV Rama Rao Endowment Lecture – Andhra University Silver Medal-Chemical Research Society of India Jawaharlal Nehru Birth Centenary Lecture of the Indian National Science Academy Prof. T.R. Anatharaman Endowment Lecture – Cochin University
Prof. Dattagupta Hon. Professor	:	DAE Raja Ramanna Prize Lecture in Physics of JNCASR Bibharani Devi Memorial Lectureship of Calcutta Univ.
Prof. B.M. Deb Hon. Professor	:	Acharya J.C. Ghosh Memorial Medal
Prof. Dipankar Chatterji Hon. Professor	:	Ranbaxi Research Award in Basic Medical Sciences B.C. Guha Memorial Lecture award
Prof. Gadagkar R. Hon. Professor	:	Guest of the Rektor, Wissenschaftskolleg zu Berlin, Germany (October – November 2001)
Prof. M.V. George Hon. Professor	:	Life Time Achievement Gold Medal of the Chemical Research Society of India.

Dr. K. Kasturirangan Hon. Professor	: International Collaboration Accomplishment Award conferred by ISOABE, Bangalore. Honoris Causa Doctorate Degree of Gurunanak Dev University, Amritsar. 'Honorary Patronship' of the South Indian Education Society, Mumbai. 4th Sri Chandrasekarendra Saraswati National Eminence Award by South Indian Education Society, Mumbai. D.Sc (Honoris Causa) by Gurunanak Dev University, Amritsar.
Prof. N. Kumar Hon. Professor	Homi Bhabha Visiting Lecturer for 2001.
Prof. **R.A. Mashelkar** Hon. Professor	: Shanti Swarup Bhatnagar Medal Award (2001) by Indian National Science Academy, New Delhi for excellence in Science Shanti Swarup Bhatnagar Award (2001) by Indian Science Congress Association, Calcutta. JEPPIAR Educational Trust Award (2001) for Excellence of Science & Technology D.Sc. (Honoris Causa), Banaras Hindu University, Varanasi D. Litt. (Honoris Causa), Tilak Maharashtra Vidyapeeth, Pune. D.Sc. (Honoris Causa), University of London, UK.
Prof. V. Nagaraja Hon. Professor	: First Biotechnology Process, Product and Technology Development Award
Prof. Rahul Pandit Hon. Professor	: Shanti Swarup Bhatnagar Award for Physical Science
Prof. Ramasesha Hon. Professor	: Amrut Modi Chair in Chemical Sciences, IISc.

Prof. G. Rangarajan Hon. Professor	: Homi bhabha Fellowship in Science
Prof. C.N.R. Rao Linus Pauling Research Professor	: Karnataka Ratna, Highest honour of the State of Karnataka. (2001)
	AVRA Foundation Award, Hyderabad (2002).
	D.S. Kothari Lectureship, INSA (2002).
	Doctor of Science degree (honoris causa) of Aligarh Muslim University
	Doctor of Science degree (honoris causa) of Vidyasagar University
Prof. **N. Sathyamurthy** Hon. Professor	: FICCI Award - 2001
Prof. Seyed E. Hasnain Hon. Faculty Member	: G.D. Birla Award for Scientific Research
	Dr. K.V. Rao Endowment Oration Award.
	Rustom Ranji Oration Award
Dr. Shobhana Narasimhan Faculty Fellow.	: Materials Research Society of India Medal
Prof. A.K. Sood Hon. Professor	: Homi Jehangir bhabha Medal
Prof. Uday Maitra Hon. Professor	: S.S. Bhatnagar Award in Chemical Sciences, 2001
Dr. Vijay Kumar Sharma Faculty Fellow	: Anil Kumar Bose Memorial Award for life sciences for the year 2001.

Editorial Boards

Prof. D.D. Sarma Hon. Professor	: Selected Board Member, Journal of Electron Spectroscopy and Related Phenomena.
Dr. Seyed E. Hasnain Hon. Faculty Member	: Co-Editor, Infectional Genetics and Evolution (Elsevier Press (Netherlands)
	Member, Editorial Board, Emerging Infectious Diseases
	Member, Editorial Board, Journal of Biosciences
Prof. M. Vijayan Hon. Professor	: Co-editor, Acta Crystallographica

Fellowships

Prof. Amitabh Joshi Associate Professor	: Fellow, Institute of Advanced Studies, Berlin
Prof. Kasturirangan Hon. Professor	: Honorary Fellow, Indian Institute of Chemical Engineers, Mumbai
Prof. P.T. Manoharan Hon. Professor	: Elected to the Fellowship of the World Innovation Foundation (F.W.I.F.)
Dr. Namita Surolia Faculty Fellow	: Elected fellow of Indian Academy of Sciences
Prof. C.N.R. Rao Linus Pauling Research Professor	: Honorary Fellowship, Indian Institute of Chemical Engineers, Mumbai (2001)
Dr. Seyed E. Hasnain Hon. Faculty Member	: Fellow, AP Academy of Sciences, Hyderabad
Prof. A.K. Sood Hon. Professor	: TWAS Fellowship
Prof. K.S. Valdiya Bhatnagar Research Professor	: Honorary Fellow, The Geological Society of America Honorary Fellow, Geological Society of Nepal.
Prof. Varadarajan Hon. Professor	: Elected Fellow, Indian Academy of Sciences, 2001.

Memberships

Prof. Amitabh Joshi
Associate Professor
: Member, Local Organizing Committee, Association for Tropical Biology, Annual Meeting.

Member, VC's Empowered Committee for Restructuring the Undergraduate Science Programme, Delhi University.

Member, Planning Committee for DST sponsored Indian School in Chronobiology

Prof. S. Chandrasekaran
Hon. Professor
: Vice President / General Secretary – Chemical Research Society of India.

Prof. B.M. Deb
Hon. Professor
: Vice-President, Chemical Research Society of India
.

Prof. Dipankar Chatterji
Hon. Professor
: Member, Council-Indian National Science Academy

Dr. K. Kasturirangan
Hon. Professor
: President, Indian Academy of Sciences for the years 2001 – 2003.

Member, Working Committee of the Current Science Association for the triennium 2001 – 2003.

Visitor's Nominee, The Executive Council of the University of Hyderabad.

Member, Governing Body and the Council of TIFAC

Member, Board of Governors of Indian Institute of Technology, Roorkee.

Dr. Namita Surolia
Faculty Fellow
: Elected Member of GRC

Prof. P. Rama Rao
Hon. Professor
: 2nd Vice-President of International Union of Materials Research Societies (IUMRS)

Prof. C.N.R. Rao
Linus Pauling Research Professor
: Honorary Member, African Academy of Sciences

Prof. D.D. Sarma Hon. Professor	: Member, International Advisory Board, Italian Synchrotron Centre.
Dr. Seyed E. Hasnain Hon. Faculty Member	: Co-Editor, Infectional Genetics and Evolution (Elsevier Press (Netherlands)
	Member, Editorial Board, Current Science
	Member, Editorial Board, Indian Journal of Medical Microbiology.
	Member, Editorial Board, Emerging Infectious Diseases
	Member, Editorial Board, Journal of Biosciences
Dr. Umesh V. Waghmare Faculty Fellow	: Associate, Indian Academy of Sciences, Bangalore.
Prof. M. Vijayan Hon. Professor	: Elected Founder President, Indian Crystallographic Association

G. R. VENKATANARAYANA
CHARTERED ACCOUNTANTS
No. 618, 75th Cross, 6th Block,
Rajajinagar, Bangalore - 560 010
Phone : 3404921 Fax : 3500525
email : grv@vsnl.com

Partners :
G. R. Venkatanarayana, B.Com., F.C.A
G. S. Umesh, B.Com., F.C.A.,

AUDITOR'S REPORT

We have examined the Balance Sheet of JAWAHARLAL NEHRU CENTRE FOR ADVANCED SCIENTIFIC RESEARCH, Jakkur Campus, Jakkur , Bangalore 560064 as at 31st March 2002 and also the Income & Expenditure Account for the year ended on that date. These financial statements are the responsibility of the Institution's management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with auditing standards generally accepted in India. Those Standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from materials misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audit proves a reasonable basis for our opinion.

(a) We have obtained all the information and explanations which, to the best of our Knowledge and belief were necessary for purposes of our audit.

(b) In our opinion, proper books of account, as required by law, have been kept by the Institution so far as appears from our examination of such books.

(c) The Balance Sheet and the Income & Expenditure Account referred to in this report is in agreement with the books of account.

(d) In our opinion and to the best of our information and according to the explanations given to us, subject to notes on accounts and accounting policies stated, the said accounts give a true and fair view:

.....2

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(i) Insofar as it relates to the Balance sheet, of the state of affairs of the Company as at 31st March 2002.

(ii) In the case of Income & Expenditure Account, of the excess of Expenditure over Income for the year ended on that date.

for M/S G.R.VENKATANARAYANA
Chartered Accountants

G.R.VENKATANARAYANA
Partner

M/s. G.R. VENKATANARAYANA
Chartered Accountants
618, 75th Cross, 6th Block,
Rajajinagar, BANGALORE - 560 010

BANGALORE
03.10.2002

JAWAHARLAL NEHRU CENTRE FOR ADVANCED SCIENTIFIC RESEARCH

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDING 31.03.2002

2000-01	EXPENDITURE	Rs.	2001-02	2000-01	INCOME	Rs.	2001-02
9309.00	TO ADVERTISEMENTS	1090911.00	1090911.00				
937379.00	TO DOMESTIC TRAVEL ALLOWANCES	325945.00					
79765.00	TO FOREIGN TRAVEL EXPENSES	56100.00	382045.00				
207072.00	TO INSURANCE						
602393.00	TO CPF						
3098666.00	TO BUILDING MAINT	2020704.00					
492130.00	TO GARDEN MAINT	495370.00					
3196347.00	TO EQUIPMENT MAINT	2776475.00					
386048.00	TO GUEST HOUSE MAINT	175805.00					
16292.00	TO VEHICLE MAINT	47703.00					
129766.00	TO 0FFICE MAINT	366381.00					
66475.00	TO CANTEEN MAINT	932272.00					
1303831.00	TO ELECTRICITY & WATER MAINT	1521546.00	8336256.00				
550755.00	TO COSTED PROGRAMME	438524.00					
1704576.00	TO DISCUSSION MEETINGS	819165.00					
81554.00	TO PUBLICATIONS	116502.00					
0.00	TO SRFP 1996	13006.00					
0.00	TO CTSSSP 1997	77642.00					
1627723.00	TO PHD PROGRAMME	2312357.00					
0.00	TO SHORT TERM COURSE	59650.00					
377955.00	TO S R F P	699904.00					
15890.00	TO CTSSP 2000	36784.00					
	TO JEST	136750.00					
41250.00	TO ETU-MULTIMEDIA						
	TO CONSUMABLES PCM	2448.00	4712732.00				
5232984.00	TO CONSUMABLES LAB	7574015.00	7574015.00				
18635962.92	TO SURPLUS C/O		10909194.57				
77002657.17	TOTAL Rs		73936600.32		TOTAL Rs		73936600.32

JAWAHARLAL NEHRU CENTRE FOR ADVANCED SCIENTIFIC RESEARCH

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDING 31.03.2002

2000-01	EXPENDITURE	Rs.	2001-02	2000-01	INCOME	Rs.	2001-02
9087191.58	To OP Balanace JNC		9594559.08				
				75000000.00	BY G-I-A DST -JNC	71000000.00	71000000.00
	RECURRING EXPENDITURE						
	----------				INTEREST		
14543619.00	TO SALARY & HONORARIA	14715352.00			--------		
292755.00	TO MEDICAL REIMBUREMENT	560270.00		314245.00	BY INT. ON TERM DEPOSIT	345111.00	
0.00	TO BONUS	119855.00		493212.00	BY INT. ON SB ACCOUNT	687167.00	1032278.00
30306.00	TO STAFF TRAINING	12643.00					
83517.00	TO RETIREMENT BENEFITS	56107.00					
95020.00	TO L T C	1407.00	15465634.00				
					OTHER RECEIPTS		
67136.00	TO UNIFORMS	13914.00			----------		
620860.00	TO PRINTING & STATIONARY	1115694.00					
296824.00	TO POSTAGE	473412.00		546566.00	BY JAWAHAR RECEIPTS	593364.25	
542854.00	TO TELEPHONE,TELEX & FAX	522133.00		65365.00	BY GUEST ROOM RECPTS	28586.00	
11069.00	TO BANK CHARGES	59515.00		34721.00	BY GUEST ROOM CONSUMABLES RCPT	26530.00	
1517681.00	TO CONVEYANCE & TRANSPORT	1542540.00		162460.00	BY TUITION FEES	139541.00	
41655.00	TO PETROL, OIL & LUBRICANT	53470.00		189884.17	BY MISC. RECPTS	829883.07	
44700.00	TO BOOK BINDING	41365.00		109463.00	BY LICENCE FEES	120436.00	
14981.00	TO NEWS PAPER & MAGAZINES	19695.00		32597.00	BY MEDICAL CONTRIBUTIONS	85306.00	
7459.67	TO MISC.EXPENSES	58963.67		46114.00	BY ELEC & WATER CHARGE RCPTS	80676.00	
192452.00	TO COUNCIL & OTHER MEETINGS	321402.00		8030.00	BY ANNUAL FEES - PHD		1904322.32
950722.00	TO SECURITY SERVICES	946140.00					
3000.00	TO LEGAL EXPENSES	13500.00					
4446.00	TO T A TO CANDIDATES	0.00					
21800.00	TO AUDIT FEES	21000.00					
54816.00	TO MEMBERSHIP FEES	66443.00					
68690.00	TO GUEST HOUSE CONSUMABLES	63336.00					
10595.00	TO FREIGHT & CLEARING CHARGES	53587.00					
16158.00	TO CANTEEN SUBSIDY	10773.00					
211394.00	TO INSURANCE	179674.00					
250000.00	TO PATENT FEES	721672.00	6298228.67				
9126833.00	TO ELECTRICITY & WATER CHARGES	9573025.00	9573025.00				

JAWAHARLAL NEHRU CENTRE FOR ADVANCED SCIENTIFIC RESEARCH

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDING 31.03.2002

	NON RECURRING EXPENDITURES			18635962.92	BY SURPLUS B/F		10909194.57
					BY PROVISION MADE IN THE EARLIER		
2514236.00	TO INFRA STRUC FACILITY	508786.00			YEAR WRITTEN BACK		10000000.00
15000.00	TO OFF.EQUP.& APPLIANCES	98701.00					
8217673.00	TO SCI.EQUIPMENTS	11486077.00					
603368.00	TO FURNITURE	1322204.00					
	TO VEHICLES	1000.00					
437963.00	TO LIBRARY BOOKS	305487.00					
8340516.00	TO LIBRARY JOURNALS	4642941.00					
3296904.00	TO BUILDING-JNC/HOSTEL BLOCK	160650.00					
3053225.00	TO BLDG. CONST - NEW LAB	0.00					
88570.00	TO COMPUTER	0.00					
679229.00	TO BLDG.CONSTN. ANIMAL HOUSE	713539.00					
859206.00	TO STAFF HOUSING	55504.00					
124632.00	TO LAND	5808126.00					
	TO ETU-BUILDING	1754632.00					
	TO SCI.EQUIPMENTS CNM	2500.00					
	TO SCI.EQUIPMENTS CS	40401.00	26900548.00				
				9594559.08	BY EXCESS OF EXP.OVER INCOME		5991353.43
28230522.00			26900548.00	28230522.00			26900548.00

R.S.GURURAJ
ACCOUNTS OFFICER

V KRISHNAN
PRESIDENT

for M/S G.R.VENKATANARAYANA
CHARTERED ACCOUNTANTS

(G.R.VENKATANARAYANA)
PARTNER

M/s. G.R. VENKATANARAYANA Chartered Accountants

JAWAHARLAL NEHRU CENTRE FOR ADVANCED SCIENTIFIC RESEARCH

BALANCE SHEET AS ON 31.3.2002

2000-01	LIABILITY		2001-02	2000-01	ASSET		2001-02
Rs.		Rs.	Rs.	Rs.		Rs.	Rs.
	CAPITAL FUND				FIXED ASSETS		
	FIXED ASSETS				SCHEDULE 2		
	(AS PER CONTRA)				(AS PER CONTRA)		
350009234.66	J.N.CENTRE	366866881.66		350009234.66	J.N.CENTRE	366866881.66	
	CARBON &				CARBON &		
34179930.00	NANO-MATERIALS	34182430.00		34179930.00	NANO-MATERIALS	34182430.00	
	PHYSICS & CHEMISTRY				PHYSICS & CHEMISTRY		
9878095.00	OF MATERIALS	9878095.00		9878095.00	OF MATERIALS	9878095.00	
2647113.00	CLUSTER STUDIES	2687514.00		2647113.00	CLUSTER STUDIES	2687514.00	
			413614920.66				413614920.66
				996240.00	ADVANCES & DEPOSITS : (SCH - 3)		869416.00
84066.00	CLUSTER STUDIES		39541.00				
					DEFICIT : AS PER INCOME &		
13040105.45	CREDITORS (SCH-1)		5520034.45	9594559.08	EXPENDITURE ACCOUNT- JNC		5991353.43
23727935.23	SCHEME BALANCES		34782551.98				
	PROFESSORSHIP				PROFESSORSHIP ENDOWMENT		31324600.00
37141138.08	ENDOWMENT FUND (SCH-4)		39646693.42	31292000.00	FUND INVESTMENTS (SCH-4)		
					CLOSING BALANCES		
				3727648.37	BANK-AC.NO.13474 : CANARA BANK	192726.62	
				7026527.08	BANK-AC.NO.15889 : CANARA BANK	9499478.42	
				21262021.23	BANK-AC.NO.18520 : CANARA BANK	31904125.38	
				69357.00	BY CASH - JNC	2843.00	
				24892.00	BY CASH - SCHEMES	204278.00	
							41803451.42
470707617.42	TOTAL		493603741.51	470707617.42	TOTAL		493603741.51

PLACE : BANGALORE

As per our report of even date
for M/s G.R.VENKATANARAYANA
Chartered accountants

R.S.GURURAJ
ACCOUNTS OFFICER

V KRISHNAN
PRESIDENT

(G.R.VENKATANARAYANA)
PARTNER

Jawaharlal Nehru Centre for Advanced Scientific Research

Bangalore 560 064

Accounting Policies and the Notes on the Accounts for the year 2001-2002.

1. The fixed assets are stated at cost. The Centre has not provided depreciation on fixed assets, since they are created out of Grant-in-Aid funds.

2. The gratuity to the staff members is accounted as and when it is paid.

3. Investments of the Centre are stated at cost. The interest on investment is accounted as and when they are received from the concerned banks and financial institutions.

4. The foreign currency transactions are translated at the rates prevailing on the date of transaction.

5. The Centre has put into operation a system whereby the accounting standards with respect to the above are brought in conformity with the mandatory accounting standards recommended by the institute of Chartered Accountants of India.

for M/s G.R. Venkatanarayana
Chartered Accountants

R.S. Gururaj
Accounts Officer

V. Krishnan
President

G.R. Venkatanarayana
Partner

JAWAHARLAL NEHRU CENTRE FOR ADVANCED SCIENTIFIC RESEARCH

SHEDULE NO 1- CREDITORS

SL NO	PARTICULARS	Rs.	Rs.
	A		
	SECURITY DEPOSIT & EMD		
1	HARISH KUMAR	7775.00	
2	DODDAMANE BROS	6575.00	
3	KUMAR ELECTRICALS	26650.00	
4	TOMS & CO	19019.00	
5	WCI SHIPPING CORPN	10000.00	
6	N M SRINIVASAMURTHY	1375.00	
7	BABU TRADERS	1000.00	
8	M P CHANDRASHEKAR	10800.00	
9	Y RAMESH	7491.00	
10	VINAYAKA ENTERPRISES	2700.00	
11	INDIRA ELECTRICALS	18000.00	
12	M S MAINTENANCE	19419.00	
13	BIT BYTE COMPUTERS	5948.00	
14	DIESELTECH ENGINEERS	170.00	
15	Y S VENKATA REDDY	75287.00	
16	PURUSHOTHAM RAJU	10800.00	
17	B & B ESTATES & INFRASTRUCTURE	44221.00	
18	Dr.ANURANJAN ANAND	7437.00	
19	SREENATH V	1250.00	
			275917.00
	B		
	OUTSTANDING LIEBAILITIES		
1	IT - TDS	9848.00	
2	AUDIT FEES PAYABLE	21000.00	
3	CPF INT. PAYABLE	820694.00	
4	KST-TDS	959.00	
			852501.00
	C		
	OTHERS		
1	IISC - CEMENT	511237.45	
2	CAUTION MONEY DEPOSIT	204720.00	
3	IUPAC	13747.00	
4	I.N S A	140800.00	
5	GRATUITY FUND	84245.00	
			954749.45
	D		
1	L/C - EQUIPMENTS		3436867.00
	TOTAL A+B+C+D		5520034.45

BANGALORE

R.S.GURURAJ
ACCOUNTS OFFICER

V KRISHNAN
PRESIDENT

for M/S G.R.VENKATANARAYANA
CHARTERED ACCOUNTANTS

(G.R.VENKATANARAYANA)
PARTNER

G.R. VENKATANARAYANA & CO. Chartered Accountants BANGALORE-19

JAWAHARLAL NEHRU CENTRE FOR ADVANCED RESEARCH

SCHEDULE NO - 2 FIXED ASSETS

No	Name of the asset	As on 31.03.2001	Additions during the year	As on 31.03.2002
	A			
1	Land at Jakkur(granted by Government of Karnataka free of cost,vide order No.RD.174-LGB-87(P)/21.9.89) & RD/4 AQB/94/18.8.96,15.55 & 1.37 Acres respectively			
2	BUILDINGS	79658165.26		79658165.26
3	INFRA STRUC FACILITY	30855415.32	508786.00	31364201.32
4	OFF.EQUP.& APPLIANCES	3686895.63	98701.00	3785596.63
5	SCI.EQUIPMENTS	109633420.47	5486077.00	115119497.47
6	FURNITURE	6809323.87	1322204.00	8131527.87
7	VEHICLES	772304.10	1000.00	773304.10
8	LIBRARY BOOKS	4942530.21	305487.00	5248017.21
9	LIBRARY JOURNALS	23781860.80	642941.00	24424801.80
11	BUILDING-JNC/HOSTEL BLOCK	15410185.00	160650.00	15570835.00
12	BLDG. CONST - NEW LAB	25377072.00		25377072.00
13	COMPUTER	6283899.00		6283899.00
14	BLDG.CONSTN. ANIMAL HOUSE	4712066.00	713539.00	5425605.00
15	STAFF HOUSING	4062527.00	55504.00	4118031.00
16	LAND	6730153.00	5808126.00	12538279.00
17	ETU-BUILDING	0.00	1754632.00	1754632.00
19	SC EQUIP.ADV TECH LAB	20202562.00		20202562.00
20	SCI.EQUIPMENT MAGNET	7090855.00		7090855.00
	TOTAL A	350009234.66	16857647.00	366866881.66
	B			
	CORE GROUP ON CARBON & NANO MATERIALS			
1	SCI.EQUIPMENTS CNM	34179930.00	2500.00	34182430.00
	TOTAL B	34179930.00	2500.00	34182430.00
	C			
	UNIT OF PHYSICS AND CHEMISTRY OF MATERIALS			
1	SCI.EQUIPMENTS PCM	9869295.00	0.00	9869295.00
2	FURNITURE PCM	8800.00	0.00	8800.00
	TOTAL C	9878095.00	0.00	9878095.00
	D			
	CLUSTER STUDIES			
1	SC EQUIP.CLUSTER STUDIES	2647113.00	40401.00	2687514.00
	TOTAL D	2647113.00	40401.00	2687514.00

R.S GURURAJ
ACCOUNTS OFFICER

V KRISHNAN
PRESIDENT

for M/S G.R.VENKATANARAYANA
CHARTERED ACCOUNTANTS

(G.R.VENKATANARAYANA)
PARTNER

JAWAHARLAL NEHRU CENTRE FOR ADVANCED RESEARCH

SCHEDULE NO - 3 ADVANCES & DEPOSITS

A	DEPOSITS		
1	S.CRS. DEPOSIT	261025.00	261025.00
B	ADVANCES		
1	ASIATIC INDL GASES	13500.00	
2	NAMITA SUROLIA	2000.00	
3	S K JOSHI	10190.00	
4	HEMALATHA BALARAM	4750.00	
5	AMITABH JOSHI	5000.00	
6	CHANDAN DAS GUPTA	6000.00	
7	CYLINDER DEPOSIT	10000.00	
8	MIGA GASES (P) LTD.	2000.00	
9	R GADAGKAR	10000.00	
10	R NARASIMHA	6575.00	
11	V NANJUNDIAH	9000.00	
12	BHASKAR D K	1200.00	
13	ASIATIC AIR-O-GAS ENGG.CO.LTD	5000.00	
14	RANGA UDAY KUMAR	10000.00	
15	RAMA GOVINDARAJAN	13000.00	
16	JNC STUDENTS RESIDENCE ADVANCE	7087.00	
17	ISRO K R RAMANATHAN PROF.R N	32014.00	
18	V K SHARMA	259.00	
19	MANEESHA INAMDAR	4324.00	
20	K R SRINIVAS	11053.00	
21	SAJO P NAIK	8250.00	
22	BHASKARA RAO K	23000.00	
23	LTC ADVANCE	261.00	
24	VENKATAREDDY/ MTRL ADV	294182.00	
25	CPF	11229.00	
26	DST/HB/EPSPPF/98	874.00	
27	LINUS	24443.00	
28	GIA/DST/CS	600.00	
			525791.00
C	PERMANENT IMPREST		
1	PERM.IMPREST	25500.00	25500.00
D	FESTIVAL ADVANCE		
1	FESTIVAL ADVANCE	57100.00	57100.00
	TOTAL A+B+C+D		869416.00

R.S.GURURAJ
ACCOUNTS OFFICER

V KRISHNAN
PRESIDENT

for M/S G.R.VENKATANARAYANA
CHARTERED ACCOUNTANTS

(G.R.VENKATANARAYANA)
PARTNER

JAWAHARLAL NEHRU CENTRE FOR ADVANCED RESEARCH

SCHEDULE NO - 4 ENDOWMENTS AND PROFESSORSHIP FUND

SL NO	PARTICULARS		
1	IBM PROFESSORSHIP FUND	1017463.80	
2	HLL PROF.SHIP FUND	2887567.68	
3	GHARDA PROF.SHIP FUND	822141.38	
4	ASTRA RES.CEN.PROF.SHIP FUND	1010760.00	
5	DAE VIKRAM SARABHAI FUND	1413549.70	
6	DRDO D S KOTHARI P.SHIP FUND	1768762.00	
7	CSIR BHATNAGAR P.SHIP FUND	1682808.00	
8	SHANTHA SEETHARAMAIAH ST.FUND	177119.12	
9	JNC CORPUS FUND	10085192.84	
10	JNC CNR CORPUS FUND	334551.00	
11	JNC ROYALTY FUND	155210.90	
12	BAPU NARAYANASWANY PRIZE	66790.00	
13	DEPARTMENT OF SPACE	1768740.00	
14	A V RAMARAO EF LECTURES	601047.00	
15	ISRO MULTIMEDIA PACKAGE	880193.00	
16	ISRO DAWAN LECTURE	483096.00	
17	RELIANCE INDUSTRIES	6487648.00	
18	DAE RAJARAMANNA LECTURE	529059.00	
19	TATA EDUCATION TRUST	5764887.00	
20	ISRO-SCIENCE EDUCATION PROG	989107.00	
21	DBT PROF RAMALINGASWAMY FUND	721000.00	
	Total		39646693.42

DEPOSITS ENDOWMENT PROFESSORSHIP FUND

1	ICICI	2590000.00	
2	IDBI	6500000.00	
3	HDFC	7050000.00	
4	CRB CAPITAL	12000.00	
5	ENDOWMENT DEPOSIT CANARA BANK	10240000.00	
6	U T I	1832600.00	
7	IDBI FLEXIBONDS	600000.00	
8	DEPOSITS - SYNDICATE BANK	2500000.00	
	Total	31324600.00	31324600.00

R.S.GURURAJ
ACCOUNTS OFFICER

V KRISHNAN
PRESIDENT

for M/S G.R.VENKATANARAYANA
CHARTERED ACCOUNTANTS

(G.R.VENKATANARAYANA)
PARTNER

G.R. VENKATANARAYANA Chartered Accountants

JAWAHARLAL NEHRU CENTRE FOR ADVANCED SCIENTIFIC RESEARCH
SCHEME BALANCES - SCHEDULE NO 5

			DEBIT	CREDIT	CREDIT
1	2122	SALARY - LETTER	766668.00		
2	2123	PROFESSIONAL TAX	14875.00		
3	2124	STUDENTS RESIDENCE	110836.00		
4	2125	GIS	8229.00		
5	4002	R G F INNOVATIVE IDEAS		261488.00	
6	4003	R G F SUMMER PROGRAMME		79000.00	
7	4004	CSIR - K S VALDIA		15830.05	
8	4006	INSA		42054.00	
9	4007	LIST- R NARASIMHA		11852.00	
10	4008	LIST- V NANJUNDAIA H		23815.00	
11	4010	AIRFORCE OFFICE-K S NARAYAN		2336.00	
12	4013	MONTBLEX\DST\R NARASIMHA		1577.00	
13	4014	IAS - LIFESCAPE		24134.00	
14	4017	DST/NAMITHA SUROLIA		175541.00	
15	4024	CSIR GRANT-SAJI VARGHESE		9904.00	
16	4026	E M R - NAMITA SUROLIA		12498.00	
17	4030	CSIR/K S NARAYAN		51023.00	
18	4031	DST/INDO-ISRAEL/K S NARAYAN		117428.00	
19	4032	BOEING - R NARASIMHA		67817.00	
20	4033	DST/SRFP - 98		50000.00	
21	4034	CSIR/HEMALA BALARAM		91922.00	
22	4035	DST\HEMALATHA BALRAM		125397.00	
23	4037	DST/MKC/LCRD		623469.00	
24	4039	CSIR - SUJAYA SUBBAIAH	373.00		
25	4040	CSIR - N G PRASAD		16569.00	
26	4041	CSIR/GVNGS/A.ANAND		227763.00	
27	4042	UTC/P&W/USA - R NARASIMHA		17685.00	
28	4043	UGC-A.G.MANOJ		54376.00	
29	4044	INFOSYS-RAJARAMAN		479424.00	
30	4047	CSIR/S BALASUBRAMANIAN	4799.00		
31	4048	INSA - V.K. SHARMA		17097.00	
32	4049	CSIR - R. JAYALAKSHMI	868.00		
33	4050	NAL/ARDB/R.GOVINDARAJAN		11198.00	
34	4051	ARDB/RODDAM NARASIMHA		851502.00	
35	4052	JNC/DBT/R UDAY KUMAR		346769.00	
36	4053	DBT\MGBJMEV\A.ANAND		373265.00	
37	4054	SCHOOL CHEMISTRY KIT		61847.00	
38	4057	NRB/NSTT/RAMA GOVINDARAJAN		59851.00	
39	4058	DST/AMITABH JOSHI		33435.00	
40	4059	SIG/HEMALATHA BALRAM		359750.00	
41	4061	SIG/KR SRINIVAS	51212.00		
42	4062	CSIR/TAPAS KUMAR KUNDU	23637.00		
43	4063	DAE/C N R RAO		2194280.18	
44	4064	DST/C N R RAO		1127518.00	
45	4065	CSIR/NAMITHA SUROLIA		23622.00	
46	4066	DBT/ANURANJAN ANAND		736531.00	
47	4067	ISRO/K.S.VALDIYA/4067		5000.00	
48	4068	CSIR/GENERAL/4068		444167.00	
49	4069	ETU/MULTIMEDIA/4069	181546.00		
50	4070	DRDO/C N R RAO		9327376.75	
51	4071	DST/RANGA UDAYA KUMAR		735710.00	
52	4072	DBT/K N GANESHAIAH		1609306.00	
53	4073	CSIR/MANEESHA INAMDAR	110836.00		
54	4074	REL/C N R RAO		143298.00	
55	4075	DRDO/RAMA GOVINDARAJ		292458.00	

JAWAHARLAL NEHRU CENTRE FOR ADVANCED SCIENTIFIC RESEARCH
SCHEME BALANCES - SCHEDULE NO 5

			DEBIT	CREDIT	CREDIT
56	4076	ICMR/HEMALATHA BALRAM		488148.00	
57	4077	IT/KS NARAYAN		48998.00	
58	4078	DAE/TAPAS KUMAR KUNDU		105575.00	
59	4079	DBT/NAMITHA SUROLIA		1184564.00	
60	4080	UGC/KAVITHA SHIVA		70500.00	
61	4082	DRDO/KS NARAYAN		1731618.00	
62	4083	DST/MANEESHA INAMDAR		1062206.00	
63	4084	DBT/HEMALATHA BALRAM		1847713.00	
64	4085	TWAS/CNR		206271.00	
65	4086	HINDI/UC		4000000.00	
66	4087	IJMM/CNR	256198.00		
67	4088	NBHM/DR.RANGARAJAN	19136.00		
68	4089	INSA/CDLS		263350.00	
69	4090	CSIR/V SWAMINATHAN	4488.00		
70	4091	CSIR/RAM SHANKAR		500.00	
71	4093	CSIR/S NATARAJAN		332218.00	
72	4094	IPR/S&IC/JNCASR		1729234.00	
73	4097	SHANTHA/S NATARAJAN		600000.00	
74	4501	IT - TDS	8902.00		
75	4502	KST-TDS	3998.00		
76	5003	NAMITA SUROLIA	35170.00		
77	5006	K S NARAYAN	17402.00		
78	5007	A.R. RAJU	23500.00		
79	5009	PROF. K S VALDIYA	5000.00		
80	5013	HEMALATHA BALARAM	2650.00		
81	5015	C N R RAO	7286.00		
82	5018	AMITABH JOSHI		9960.00	
83	5024	M K CHANDRASHEKARAN	10529.00		
84	5037	V. RAJARAMAN		29282.00	
85	5043	ANURANJAN ANAND	16470.00		
86	5055	SAJI VARGHEESE		6000.00	
87	5067	KRISHNAN V	9947.00		
88	5072	DR RANGA UDAY KUMAR		7443.00	
89	5084	RAMA GOVINDARAJAN	2000.00		
90	5090	GOVINDARAJ		4902.00	
91	5098	A.G. MANOJ	1139.00		
92	5100	CSIR/COE/C N R RAO		1506763.00	
93	5104	V K SHARMA	14986.00		
94	5107	MANEESHA INAMDAR	77.00		
95	5115	TAPAS KUMAR KUNDU	227.00		
96	5118	K N GANESHAIAH	26041.00		
97	5119	ACCMS CONFERENCE	44156.00		
98	5120	DR.RANGARAJAN	6395.00		
			1789576.00	36572127.98	34782551.98

NOTE: AMOUNTS MENTIONED AGAINST ITEM NO 1 TO 4 ARE TO BE REAPPRORIATED TO THE RESPECTIVE SCHEME ACCOUNT

R.S.GURURAJ
ACCOUNTS OFFICER

V KRISHNAN
PRESIDENT

for M/S G.R.VENKATANARAYANA
CHARTERED ACCOUNTANTS

(G.R.VENKATANARAYANA)
PARTNER

JAWAHARLAL NEHRU CENTRE FOR ADVANCED RESEARCH

INCOME & EXPENDITURE - CLUSTER STUDIES

2000-01		2001-02	2000-01		2001-02
	RECURRING EXPENDITURE				
34883.00	TO CONSUMABLES CS	44525.00	118949.00	BY OP - BALANCE - CS	84066.00
84066.00	TO SURPLUS C/O	39541.00			
118949.00	TOTAL Rs	84066.00	118949.00	TOTAL Rs	84066.00
	NON RECURRING EXPENDITURES				
			84066.00	BY SURPLUS B/F	39451.00
84066.00	TO SURPLUS C/O	39541.00			
84066.00	TOTAL Rs	39541.00	84066.00	TOTAL Rs	39451.00

for M/S G.R.VENKATANARAYANA
CHARTERED ACCOUNTANTS

R.S.GURURAJ
ACCOUNTS OFFICER

V KRISHNAN
PRESIDEN

(G.R.VENKATANARAYANA)
PARTNER

G.R. VENKATANARAYANA Chartered Accountants BANGALORE-10

JAWAHARLAL NEHRU CENTRE FOR ADVANCED SCIENTIFIC RESEARCH
CPF AND GRATUITY FUND STATEMENT AS ON 31.03.2002

Particulars	Rs.	Rs.	Particulars	Rs.	Rs.
Opening Balance	4195955		Canara Bank	1265000	
			ICICI	100000	
Subscriptions during the year	2124398		IDBI Flexi bonds	3700000	
			KBJNL	200000	
Interest on subscriptions	610197		UTI	400000	
					5665000.00
Total	6930550				
			Cash at Bank		
Less withdrawals	1400134	5530416.00	SB A/C No.17513		
			Canara Bank,IISc branch		2293167.00
CONTRIBUTION					
Opening balance	2726944		Gratuity funds receivable from JNCASR		84245.00
Contribution during the year	714185		Receivable from JNC towards		
			CPF contribution		820694.00
Interest on total contributions	244197				
Total	3685326		Amount receivable from Endowments		100000.00
Less withdrawals	137352	3547974.00	**Deficit of interest**		
			Deficit for the year 2001-02	304534	1033199.00
			Deficit for the Previous years	728665	
Gratuity fund		917915.00			
Total		**9996305.00**			**9996305.00**

R.S.GURURAJ
ACCOUNTS OFFICER

V KRISHNAN
PRESIDENT

for M/S G.R.VENKATANARAYANA
CHARTERED ACCOUNTANTS

(G.R.VENKATANARAYANA)
PARTNER

M/s. G.R. VENKATANARAYANA Chartered Accountants BANGALORE-10