Curriculum Vitae

Dr. S. NARAYANA KALKURA

Director and Professor, Crystal Growth Centre, Anna University Chennai, Chennai-60025

Education (Post-Graduation onwards & Professional Career)

Ph.D	KeralaUniversity	1990	Biocrystallisation and characterization Advisor: Prof. S. Devanarayanan
M.Sc	KeralaUniversity	1982	Physics
B.Sc	Kerala University	1980	Physics (major), Chemistry and mathematics (minor)

Position and Employment

AnnaUniversity, Chennai	Professor	Since 2008	Biomaterials, crystallization of biomolecules and characterization
Institute für Medizinische Biochemie und Molekular Biologie, DESY, University of Hamburg, Germany	Staff Scientist	2001-04	Crystallisation of proteins, Crystallisation in space, structural analysis, dynamic light scattering
Anna University	Assistant Professor	2000-08	Biomaterials, crystallization of biomolecules
AnnaUniversity	Senior Lecturer	1996-2000	Biomaterials, crystallization of biomolecules
National Institute of Biosciences and Human Technology, Tsukuba, Japan.	STA Fellow	1996-97	Crystallisation of proteins
AnnaUniversity	Lecturer	1991-96	Crystal deposition diseases, Crystallisation of biomolecules, biomaterials and characterization

Details of the doctoral students who have obtained Ph.D degree

Name	Title of the Ph.D.thesis
Dr.M.Manimaran (1995)	Instrumentation of computer controlled crystal growth system and crystallization and characterization of medium band gaps II-IV-V_2 semiconducting infrared nonlinear optical materials and organic biomolecules
Dr.E.K.Girija (1998)	Investigations on biological crystal and analyses and epidemiological studies of urinary calculi
Dr.G.R.Sivakumar (2000)	In vitro studies on the growth and characterization of the crystalline constituents of metabolic acid and nonmetabollic urinary stones: dicalcium phosphate and magnesium phosphate
Dr.M.Ashok (2003)	Investigation on the crystallization of calcium Phosphate biomaterials and the trace element Analysis of the urinary stones and gallstones
Dr.T. K. Anee (2003)	Investigations on the low temperature Synthesis of crystallization of calcium Phosphate based biomaterials
Dr.N. M. Sundaram (2005)	Investigation on the Cholesterol, Cholesteryl acetate, hydroxyapatite and lysozyme Crystallization and influence of magnetic field on the nucleation process
Dr .S. Ramalingam (2005)	Studies on the nucleation kinetics, crystallization and characterization of single crystals of potassium dihydrogen phosphate and sulphates of potassium and magnesium
Dr.R.Vani(2011)	Investigations on Biomineralsiation of Urinary Calculi and Synthesis of Nanobiomaterials.
Dr.R.V.Suganthi(2011)	Investigations on the Crystallisation and Effect of Swift Heavy ion Irradiation on Helical Hydroxyapatite
Dr.Ahymah Joshy(2012)	Synthesis of Nano Hydroxyapatite and its Polymer Composites for Drug Delivery and Tissue Engineering Applications.
Dr.K.Elayaraja(2012)	Investigations on the Bioactivity and Drug Delivery of the Nanocrystalline Hydroxyapatite Composites, Thin films and its surface Modification by Swift Heavy ion Irradiation.
Dr. VSarathchandra (2013)	Investigations on Metal Ions Dopedand Irradiation Effects On Hydroxyapatite For Drug Delivery Applications and Defluoridation
Dr.K.Thanigaiarul(2014)	Investigations on Metal Ions Incorporated Nanocrystalline Hydroxyapatite, Nanocomposite thin films and surface modification by Low energy Implantation
Dr.RamanaRamya(2017)	Investigations on bioceramics and polymer comosites subjected to gamma and swift heavy ionirradiation
Dr. M.Shanthini(2017)	Studies on improved polymer -ceramic composite scaffolds for tissue engineering and drugdelivery applications
Dr.N.Sakthivel(2017)	Synthesis and Characterization ofgelatin based scaffolds for drug delivery and tissue engineeringapplications

Details of the students who have obtained M.Phil /M.S degree:-

Name	**Title of the M.Phil/M.S. Thesis**
Catherine Martin(2015)	Synthesis & Characterization Of Polymer Based Scaffolds For Tissue Engineering & Drug Delivery Applications
T.S.Sheena(2013)	Effect of metal ions on calcium phosphate mineralisation
Ramana Ramya.J(2012)	Influence of Amino Acids on Mineralisation of Hydroxyapatite
K Dharani. (2011)	Synthesis and Characterisation of Biomaterials for Tissue Engineering and Drug Delivery
A. KJijin Raj, (2008)	Investigations On Hydroxyapatite Formation In A Collagen Matrix.
M. Gunasekaran(2001)	Crystallization and Characterization of Cystine and Ferrocene
R. Vani(2000)	*In vitro* Crystallization and Characterization of an Amino acid: Cystine
N.M. Sundaram (1998)	In vitro Crystallisation and Characterization of Cholesterol

Honors/Awards

1) Fellow of the Academy of Sciences Chennai-2016
2) Erasmus Mundus Heritage Fellow- 2015 at Politecnico di Milano, Milan, Italy
3) Erasmus-Mundus Svaagata Fellow-2014 at Universidad Politécnica de Valencia, Spain
4) ACITVE Researcher Award 2013 by Anna University
5) Post-Doctoral Fellow at the Institute für Medizinische Biochemie und Molekular Biologie, DESY, University of Hamburg, Germany 2001-2004
6) *Award from Science and Technology Agency* (S.T.A) of Government of Japan.
7) National award of *Certificate of Excellence* from All India Council for Technical Education, Govt.of India, for carrying out research project with excellence.
8) *Andhra University Medal* for having shown conspicuous merit in research work in the field of Physics.
9) *Young Scientist Award* by Kerala State Committee on Science and Technology, Government of Kerala.
10) Department of Science and Technology, *S.E.R.C. Research fellowship* 1995.
11) *Boyscast Fellowship* awarded by Department of Science and Technology, Govt. of India.
12) Award of *Research Associateship and Senior Research* Fellowship by the Council of Scientific and Industrial Research (C.S.I.R).

Reveiwer of the manuscripts of the following research journals.

1. Journal of Colloid and Interface Science-

2 Journals of Alloys and Compounds

3. Materials Research Bulletin-

4. Materials Science and Engineering C

5. Journal of Solid State Chemistry

6. Journal of Crystal Growth

7. Biomedical Materials-

8. Journal of Materials science: Materials in Medicine

9. Journal of Applied Surface Science

10. Materials Science and Engineering B

11. Bulletin of Materials Science

12. Solid State Sciences

13. Current Applied Physics

14. Chemical Papers

15. Journal of Materials Science

16. Colloids and Surfaces A: Physicochemical and Engineering Aspects

17. Indian Journal of Pure and Applied Physics

18. Journal of Physics and Chemistry of Solids

19. Acta Biomaterilia

20. Crystal Research and Technology

21. Crystal Growth and Design

22. Spectrochimica Acta

23. RSC Advances

24. Journal of Materials Science: Materials in Electronics

PATENT APPLIED:-

"Medium for Removal of Fluoride from Water"-

APPLICATION NUMBER-1424/CHE/2010-PUBLICATION DATE (U/S 11A)-10/06/2011

Membership of Professional Organizations:

- Life Member of Indian Crystallographic Association.
- Life Member of Indian Association of Crystal Growth.
- Life Member of Society for Biomaterials and Artificial Organs.
- Life member of Association of Medical Physicists of India
- Life member of Society for Tissue Engineering and Regenerative Medicine
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Visits and Training Abroad:

(a) Presentation at the Asian Bioceramics Symposium held at OsakaCityUniversity, Osaka, Japan during September 25-27 2007.
(b)Gave an Invited lecture at the Second International Conference on New Biomedical Materials, Cardiff, U.K, 5-8 April 2003
(c)Did experiments using Synchrotron radiation facility available at the ESRF, Grenoble, France during 7-8 May 2002
(d) Presented papers at the International Conference on Crystallisation of Biological Macromolecules at Jena, Germany 20-28 March 2002.
(e) Gave Lectures on crystallisation of biomolecules at Materials and Surface Science Institute, University of Limerick, Limerick,Ireland on October 2001 and February 2002.
(f) Did post-doctoral research at the Institut für Medizinische Biochemie und Molkularbiologie at University of Hamburg, Germany on protein crystallization and structure analysis usng synchrotron radiation facility available at DESY, Hamburg during 2001-2004.
(g) Worked as Science and Technology Agency (S.T.A) research fellowduring 1996-97 for a year at National Institute of Bioscience and Human Technology at Tsukuba, Japan. Got training on the crystallisation of biological macromolecules like lysozyme and memberane proteins viz., reaction centers from Rhodobactor Sphaeroides. Studied the solubility, phase diagram and kinetics of crystallization of biological macromolecules.
(h) Presented a paper at the National conference on Crystal Growth held at Ritsumeiken University, Japan during July-August 1996.
(i) Delivered an invited lecture at the "International Conference on Crystal Growth of Biological Macromolecules", held at the University of Maryland, USA, during August 1989

(j)Attended an International Conference on Crystal Growth of Biological Macromolecules held at Strasbourg, France during July 1987.

Research experience and professional expertise:

Doing research in an inter-disciplinary field of bio-crystallization, biomineralisation and biomimetics since 1983. The samples werecharacterized using optical microscope, SEM, micro-hardness, thermal, UV-Visible, IR, laser Raman spectroscopic techniques and Proton Induced X-ray Emission Techniques, Inductively Coupled Plasma Analysis(PIXE). Has working experience with SPEX Ramalog equipped with 1401 double monochromater and Seifert X-ray powders diffractometer, SEM, EDAX and DLS systems.

Established a Bio-crystallization Laboratory at Crystal Growth Center of Anna University, Chennai. In addition,teaching graduate and post graduate students of AnnaUniversity.

Did post-doctoral research at the Institut für Medizinische Biochemie und Molkularbiologie at University of Hamburg, Germany on protein crystallization and structure analysis during 2001-2004. Crystallisation kinetics of protein solutions were also studied by dynamic light scattering. Detailed structure analysis of Mistletoe Lectin proteins and Thermolysin were carried out. Studied the allergen aggregations using dynamic light scattering.

Also studied the **effect of zero gravity on the crystallization** of Mistletoe Lectin proteins, in collaboration with **European Space Agency,** using Granada Crystallization facility (NASDA GCF -Second Flight) during January – March 2004.

Developed a innovative technique to synthesise nano crystalline hydroxy apatite (a bone and dental replacement material) fairly easily at low temperatures using sol- gel method of synthesis of calcium phosphates.

Synthesized bigger crystals of Magnesium sulphate, which is used as a fertilizer as well as in medical industry and its morphology, was modified from orthorhombic to tetragonal with a higher growth rate.

Had three months training in synthesis and characterisation of biomaterials at Sri Chitra Institute of Medical Sciences and Technology during July- Oct 1995 under SERC Fellowship awarded by Department of Science and Technology, Government of India.

Synthesized and characterized biomaterials such as hydroxy apatites ($Ca_{10}(PO_4)_6.(OH)_2$) by a novel polymer route which are used as bone and dental replacement materials. Effect of trace elements on the crystallisation of calcium phosphates and struvites, calcium oxalate and cystine have been studied.

Had one year training in crystallization of Lysozyme and membrane proteins viz., reaction centers from Rhodobactor Sphaeroides, as a STA. Fellow at National Institute of Bioscience and Human Technology at Tsukuba, Japan.

Analysis of the gallstones, urinary stones and kidney stones removed after surgery were analysed with the help of XRD, thermal, IR, Raman, SEM and micro hardness, PIXE and ICP techniques.

Developed a technique to produce single crystals of uric acid fairly easily without the use of bulk solvents at room temperature. Uric acid, sodium urate, brushite, calcium oxalate and cystine that are responsible for arthritis, gout, urinary stones, and kidneystones have been crystallized and characterized. Inhibiting effects of juices of medicinal plants (Phyllanthus niruri and Ocimum Sanctum) which are used in native medicines to cure diseases of urino-genital system, on crystallization of brushite has been studied.

Crystals of steroids such as cholesterol and cholesteryl acetate which are responsible for heart attacks and gallstones were crystallized successfully in silica gel. Crystallization of fibrous cholesterol monohydrate was reported for the first time.

Plant steroid, viz., β-sitosterol and sex hormones such as Progesterone (female hormone), Testosterone (male hormone) were crystallized and characterized. Crystallization and growth kinetics of an intercalation compound, bile acid (Cholic acid) were studied.

Vibrational assignments of cholesterol monohydrate and sex hormones were done using IR and Raman Spectra. These studies revealed the tautomeric behavior of cholesterol and progesterone crystals.

Other relevant experience:

a. Teaching :**UG:20 yr. ; PG:22 yr.**

b. Research : **28 yr.**

c. Research guidance**: Ph.D. (Awarded):Thirteen; M.Phil:seven; M.Sc : Six**

Computer languages known: BASIC & FORTRAN

Sponsored Research Projects executed:

1). 1986-88: Co-investigator of a project entitled "Structure, Crystallization and Physico-chemical **Studies of Biopolymers**", sponsored by the Department of Science, Technology and Environment committee, Government of Kerala.

2). 1995-1997: Principal Investigator of a major project entitled "Investigations on **Cholesterol Crystallization to Devise New Drugs and Treatment**" sanctioned by All India Council for Technical Education, Government of India.

3) 1998-2002: Principal Investigator of a project entitled "Investigations on the trace elements analysis to **study the crystal deposition diseases**" sanctioned by Inter University Consortium for Department of atomic energy facilities".

4)1999-2001: Principal Investigator of a project entitled "Study of **crystallogenesis** of protein to obtain higher quality crystals for structural analysis" supported by All India Council for Technical Education, Govt. of India.

5) 2001-2003: Principal Investigator of a Project entitled "Investigations on **Crystal deposition diseases**" supported by University Grants Commission of Government of India.

6) 2006-2009: Principal Investigator of a Project entitled 'Effect of **irradiation** on hydroxyapatite and their **biological performance**' Fundingagency-Inter-UniversityAcceleratorCenter,New Delhi

7)2007-2010: Principal Investigator of Project entitled" Investigations On The Synthesis Of Nanocrystalline Calcium Phosphates To Prepare **Bone and Dental Replacement** Materials And Drug Delivery Systems" by Department of Science and Technology, New Delhi.

8) 2009-2012- "Synthesis of Bioactive composite materials for tissue replacement" by All India Council for Technical Education, New Delhi.

9) 2009-2012- "Implantation and trace element analysis of materials of importance in Biology" by UGC-DAE consortium for Scientific Research. Kolkata

10) 2010-2013- "Synthesis and Physical Characterization of Hydroxyapatite Based Scaffolds" by the Department of Biotechnology, New Delhi.

11) 2011-2014-Investigations of physical and biological performance of swift heavy ionirradiation on calcium phosphate based bioceramic and its polymercomposite by IUAC, New Delhi

12)2013-2016- "Investigations on the Pathological deposition of biominerals" by supported by University Grants Commission of Government of India.

13) 2015-2018- "Investigations on the synthesis of metal oxides nanobioceramic materials for hyperthermia against sarcoma" by Department of Biotechnology under Twinning Programme.

14) 2016- 2018 Indo- German (DST-DAAD) joint research project entitled Development of biomimetic collagen based composite scaffolds for tissue regeneration and drug delivery" with University of Duisburg-Essen

15) 2016-2018Indo-French Centre for the Promotion of Advanced Research(IFCPAR)/Department of Science & Technology "Biodegradable core shell electrospun mats and interconnected porous scaffolds for tunable anticancer drug delivery and tissue engineering application" with Institut Européen des Membranes MONTPELLIER, France.

16) 2017 2020 Identification ofArsenic andFluoridevulnerabilityzones in therural centralgangetic plainand southernregions of indiaandremediation ofdrinking waterusingenvironmentalfriendly nanomaterialssupported by DST.

Workshops/schools/meetings/training attended:

1. Fifth International Course on Physics of Materials, IIT, Madras, December, 1986.

2. International Schools on Crystal Growth and Characterization of Advanced Materials for Solid State Applications, Anna University, Madras, Jan-Feb, 1988.

3. International workshop on Crystal Growth of Technologically important materials for Device Applications, AnnaUniversity, Madras, November 8-15, 1991.

4. International School on Advanced Electronic Materials, Anna University, Madras 6-15, February 1995.

5. Training on preparation of Biomaterials from 15-7-1995 to 15-10-1995 at Sri Chitra Thirunal Institute of Medical Sciences and Technology, Trivandrum.

6. Workshop on Material processing in space and space Biotechnology, 1 August 1997, ISRO, Bangalore.

7. School on Materials for Advanced Research and Technology, 3-17 Oct. 1997, Anna University, August 1997.

8. School of Synchrotron radiation held at Inter University Centre, Indore, November10-14, 1997

9. All India Training course on Application of Direct methods in Crystallography of small/medium sized molecules held at University of Madras, Chennai, 1--21 December 1998.

10. Workshop on potential Indian participation on board International space station for conducting scientific experiments. July 9-10, 1999, ISRO Bangalore.

11.Certificate Course on Advances in Instrumentation Analysis, AnnaUniversity, 3-8 July 2000

12. Workshop on Microscopic Techniques held at Saha Institute of Nuclear Physics, Calcutta, 19-22 Sept. 2000.

13. Workshop on Training in Methods for Macromolecular Crystallography: from Measurement to Model. At European Molecular Biology Laboratory at Hamburg, Germany from October 31- November 7, 2001.

14. Course of Crystallisation of Biological Macromolecules at IMB, Jena, Germany at 20-22 March 2002.

15. International Symposium on Recent Trends in Macromolecular Structure and Function organized by Department of Crystallography and Biophysics, University of Madras during January 19-23, 2004

16.U.G.C sponsored Refresher Course on Recent Trends in Crystal Growth and Characterization held at CrystalGrowthCenter, AnnaUniversity, Chennai during November17 – December 7 2004

17. Indo-Japan Workshop on Crystal Growth and applications of Advanced Materials for optoelectronics held at CrystalGrowthCenter during December 7-10 2004

18.Indo-Australian conference on Biomaterials, implantable Devices and Tissue Engineering held from January 19-21, 2005 at Sree Chitra Institute of Medical Sciences and Technology, Trivandrum.

19. Tenth National Seminar on Crystal Growth he at Kongu Eng. College, Erode during 27-29 Jan. 2005

20. Seminar on Physics with Home Made Equipment and Innovative Experiments held at CrystalGrowthCenter, AnnaUniversity, on March 14-15 2005

21**.** National Conference on Optics and Related Phenomenon held at Condensed Matter Physics Laboratory, S.N.College, Kollam, 29-30 August 2005

24. National Symposium on Crystal Growth and Characterization, at Department of Physics, LoyolaCollege, Chennai during 29-30 September 2005.

25. International Workshop on Nanoscience and Technology during 13-17 February 2006 at Department of Physics, AnnaUniversity**.**

26**.** Indo-Australian Conference on Biomaterials, Implants, Tissue Engineering and Regenerative Medicine held from January 10-12, 2007 at Sree Chitra Institute of Medical Sciences and Technology, Trivandrum.

27. The National Conference on Recent Trends in Optoelectronics and Laser Technology during April 9-11, 2007 at Department of Optoelectronics, University of Kerala, Trivandrum.

28. Asian Bioceramics Symposium held at OsakaCityUniversity, Osaka, Japan during September 25-27 2007.

29. 10th International Conference on Advanced Materials 8-13, October 2007, BangaloreIndia

30. Workshop on Awareness of Intellectual Property Rights and Related Issues held at AnnaUniversity, Chennai on 21-22 Feb 2008.

31 The International Conference on Perspectives in Vibrational Spectroscopy held at Trivandrum during 24-28 February 2008

32. National Workshop on Trace Elements Research held at NorthEasternHillUniversity, Shillong during March 4-6 2008.

33. National Conference on Recent trends in Materials Science held at PondicherryUniversity on March 19-20 2008

34. Workshop on"Recent Developments in Nanomaterials Research" held at PeriyarUniversity, Salem on 31st March 2008.

35. Workshop on Electron Microscopy orgnised by Sree Chitra Thirunal Institute of Medical Sciences and Technology, Thiruvananthapuram on 5th July 2008-

36. 38th National Seminar on Crystallography ,February 11-13, 2009 at University of Mysore, Mysore

37. Invited lecture at the Indo-French conference on 'Nanostructuring by ion beams' organized from 25th Feb. to 2nd March 2009 at the Institute of Physics, Bhubaneswar

38. Invited lecture at the National Seminar on Advanced Materials and Applications March 5-6, 2009 Department of Physics, KarpagamUniversity, Coimbatore

39. Resource person for the Refresher course to be conducted by UGC academic staff college, University of Mysore, Mysore from 11th to 31st March 2009. The Thrust area of the course is "Advances in Materials processing and characterization".

40. Invited to give a talk and Chaired a session at the International Physics Conference held at the Bangladesh University of Engineering and Technology (BUET) from 15-17, May 2009 in Dhaka, Bangladesh.

41. Delivered a lecture at the 24th Refresher course in Physics organized by UGC-Academic Staff College of University of Kerala on 16th October 2009.

42. Invited lecture at the conference on Application of Bio Material in Engineering held at IFET College of Engineering, Villupuram on 23rd Jan 2010.

43. Invited lecture at the 14TH National Seminar on Crystal Growth held at Vellore Institute of Technology, Vellore on 10th March 2010.

44. Invited Lecture at Conference on Recent Scenario in Materials Science held at VivekanandaCollege, Kaniyakumari on 1st April 2010

45. Resource person at the Refresher Course on Materials Science held at the PondicherryUniversity on 18th March 2010.

46. Invited lecture at the AICTE sponsored staff development programme on Nanotechnology at SriSaiRamEngineeringCollege, Tambaram Chennai on April 2010.

48. Resource Person of the Refresher course in Physics to be held at the University of Kerala, on 13th July 2010.

49. Invited lecture at the 'Ion Beams for Biomaterials' to be held at IUAC, New Delhi on 3rdAugust, 2010.

50. Invited lecture at the UGC Refresher Course on "Nanoscience & Nanotechnology" held at Madras University Chennai-25 from Nov8-Dec2, 2010.

51. Invited lecture at the International workshop on "Advanced functional Nanomaterials" held at Centre for Nanoscience, Anna University Chennai-25 from 21-24 Feb 2011.

52. Invited lecture at the Physics Department, Karnatak University, Dharwad on 24-25 March 2011 in connection with the Faculty Development Programme for Undergraduate Science Faculty Members in Physics.
53. Invited lecture at 5th Refresher Course in Materials Science held at University on Mysore during 1-07-2011.
54. Invited lecture at Bangladesh University of Science and Technology on 8-9th October 2011.
55. Invited lecture at the Refresher Course on Nanoscience and Technology held at University of Madras during 11th November 2011
56. Invited lecture at the International Conference on Advanced Materials, ICAM 2012 – January 5-7, 2012- held at Loyola College, Chennai
57. Invited lecture at the International Conference on "Biomaterials, Implant Devices and Tissue Engineering BIDTE-2012" at Rajalakshmi Engineering College, Chennai, India from Jan 6-8, 2012.
58. Invited lecture on"Materials used in developing nano drug delivery systems",on Jan 27th 2012 at the Department of Pharmaceutics, Faculty of Pharmacy, Sri Ramachandra University, Chennai,
59. Invited talk at the National Seminar on Advanced Nanomaterials (ANM-2012) at Periyar University, Salem, on February 6, 2012.
60. Invited lecture at the Workshop on Photon and Ion induced X-ray emission spectroscopy held at Department of Physics, Karnatak University, Dharwad during 23-25 Feb 2012
61. Invited lecture at the National Seminar on Indigenous materials development for Industrial applications, held at Anna University during 28th Feb 2012
62. Invited talk at the National Workshop on Urolithiasis and its Management in Siddha at the Siddha Regional Research Institute, Puducherry on March 6, 2012.
63. Delivered an invited lecture at the seminar on "Nano materials" on 05/03/2012 at the Sri Sai Ram Institute of Technology, Chennai.
64. Invited lecture on Nanomaterials at the Workshop on Applied Materials held at Department of Physics, University of Calicut on 8-9 March 2012
65. Invited lecture at the National Seminar on Recent Trends in Physics held at University College, Thiruvananthapuram, on 23 March 2012.
66. Gave a seminar on "Investigations on Biomineralisation and Trace element analysis" at Bhabha Atomic Research Centre on May 8 2012.
67. Delivered an Invited lecture on Nano biomimetics at the Summer Training Programme
68.Nanoscience and Nanotechnology held at University of Madras on 12th June 2012
69.Invited lecture on 41st National seminar on Crystallography held at University of Madras on October 8 October 2012.
70.invited to deliver a lecture and Chair the sessions during Karpagam University Annual Research Congress to be held during 29-30 Nov 2012 at the KARPAGAM UNIVERSITY, Coimbatore.
71.Resource person at the UGC - Academic Staff College of University of Mysore in
the 6th Refresher Course in Materials Science on December 14 2012.
72.I have delivered the invited a lecture at the Thematic orientation workshop on Trace element analysis and Radiological Sciences" held at Manipur University, Imphal during the period March 12-14 2013.
73.Lecture in the National Seminar on "Condensed Matter and Materials Physics" (NA-CMAMP) is proposed to be organized during 19-20, March 2013 in the Department of Physics, Gulbarga University, Gulbarga.

74.Delivered an Invited lecture at the referesher course in Physics held at CAS in Crystallography and Biophysics, University of Madras, 2nd Sept 2013

75.Delivered an Invited lecture on recent trends in Nanobiotechnolgy held at Anna University on 19th Sept 2013
76.Delivered an Invited lecture on Nano biomimetic Technology on 4th October 2013 at the Science City, Chennai.

77.Resource person at the UGC - Academic Staff College of University of Mysore in the 6th Refresher Course in Materials Science on October 29 2013.
78. Resource person at the Refresher Course in Nano-Sciences (Physics, Chemistry, Material Science, Mechanical / Electronics Engg.) for College / University teachers on 7th November 2013 in Academic Staff College, (UGC), University of Kerala.
79. Delivered an Invited lecture at the National Seminar on the "Recent trends in Physics" on Nov-27 2013 held at Govt.Arts & Science College, Kozhikode.
80. Delivered an Invited lecture and chaired a session at the IUMRS-ICA-2013, held in Bangalore, India on Dec.16- 17, 2013.
81. Delivered an Invited lecture at the World congress on Research and Innovations organised at St.Josephs College, Irinjalakuda, 19th December 2013.
82. Oral presentation at the National Conference on Condensed Matter Physics and Applications held at the Manipal Institute of Technology Manipal University on 27th December 2013
83. Invited lecture at the 5TH International Conference on Perspectives in Vibrational Spectroscopy on 9th July at Trivandrum,Kerala
84. Invited lecture at the Faculty Development programme on Advances in Molecular Diagnostics and Therapeutics held at PSG College of Technology, Coimbatore on 18-24 August 2014
85. Invited lecture at the National Conference on Advanced Technologies for Materials Processing and Diagnostics, held at Kochi Kerala during September 18-20 2014.
86.Invited talk at theNational Seminar on 'New Frontiers in Physics-Scope and Challenges" held during October 28-30, 2014 at St.Xavier's College, Thumba, Thiruvananthapuram.
87.Invited talk at theNational Seminar on 'Recent trends in Crystallography" held during 30-12-2014 at Department of Physics,Cochin University of Science and Technology,Cochin.
88. Invited talk at the National Conference on "Adavances in Crystal Growth and Nanotechnology, held at C.M.S.College, Kottayam Kerala during 16th January 2015
89. Invited Technical talk at the National Seminar on New materials and Nanotechnology, held at Heera College of Engineering and Technology, Thiruvananthapuram, on 17th January 2015
90. Resource person in the "National Level Lecture Workshop on Novel Materials" held during 13-14th February 2015, at the KLE's S.K.Arts College and H.S.K.Science Institute, Hubballi, Karnataka.
91. Resource person in the UGC refresher course on "Nanosciences' on 16th February 2015, at the University of Madras, Chennai.
92. Invited talk at the National Seminar on Advances in Crystallography held at the Lady Doc College, Madurai on MARCH 2 2015
93. Invited talk at the 19th National Seminar on Crystal Growthheld at the VIT UNIVERSITY, VELLORE, on 14thMarch, 2015.
94. Invited talk at the the National Seminar on Nano Science and Nano Technology held at S.N.COLLEGE, VARKALA March 16th 2015
95. Invited talk at the National Conference On Application Of Rapid Prototyping Techniques In Biomaterials held at the Karpaga Vinayaga College Of Engineering And Technology, Padalam on March 19 2015
96. International Summer School on "Advancements in Engineering and global development" conducted jointly by University of Edinburgh UK and Anna University on 24-06-2015
97. One day Workshop on "Recent Developments in Tissue Engineering" 29-09- 2015, CENTRE FOR MEDICAL ELECTRONICS, Anna University, Chennai
98. Invited lecture at the Workshop on "Fundamentals and applications of Nanoscience and Nanotechnology" conducted by Science City, Chennai, on 7-10-2015
99. UGC sponsored short term course on "New materials their characterisation and applications" Conducted by Dept of Aerospace and Engineering,MIT, Anna University on 13-10-2015
100. Resource Person at the UGC sponsored National Seminar on "Perspectives in Raman Spectroscopy" St.John's College, Anchal,Kerala on15th October 2015

Languages Known: English, Hindi, Malayalam, Tamil, Tulu, Kannadaand German

Other Duties:

a)Board of Studies Member of ANNA UNIVERSITY, KARPAGAM UNIVERSITY, MYSORE UNIVERSITY and National Engineering College, Kovilpatti.

b) Member of the syllabus Subcommittee for framing the Curricula and Syllabi for Undergraduate courses offered by the Engineering colleges affiliated to Anna University under the Faculty of Technology.

c) Governing Council Member of Inter University Accelerator Centre, New Delhi

List of publications:

a) Monograph

1. **S. Narayana Kalkura** "Crystals of Organic Molecules " in Conducting Polymers Edited by Xavier, F.P. and Pragasam, J., Loyola College Publications, Madras, 1996, p187-193

2. **A book chapter** on "Application of Gel growth in the Field of Crystal Deposition Diseases" in the **"Handbook of Crystal Growth"** published by **Springer Publishers in 2010**;**(chapter 48, pp 1607-1636)**

3. A chapter on **"Effect of Swift Heavy Ion Irradiation on Calcium Phosphate based Bioceramics"** in a book entitled **"Synthesis and Engineering of Nanostructures by Energetic Ion" Published by Nova Publishers, USA in 2010;** (**chapter 20, pp 335-342**)

b) Articles in journals/contributions to books:

1. **Narayana Kalkura, S**. and.Devanarayanan.S. (1986): Growth of Cholesterol Crystals in Silica gel, J.Mat.Sci.Lett. **5**, 741-742

2.**Narayana Kalkura, S**. and Devanarayanan.S. (1987): Fibrous Crystals of Cholesterol in Silica gel, J.Cryst.Growth. **83**, 446-448

3. **Narayana Kalkura S**., Ramakrishnan, V. and Devanarayanan. S. (1987): IR and Raman studies of Cholesterol monohydrate grown in gel medium, Infrared Physics. **27**, 335-337

4. Devanarayanan, S. and **Narayana Kalkura, S.** (1988): Growth of $Te(OH)_6Na_2PO_4.H_2O$ single crystals in Silica gel and their characterisation, Cryst.Res.Tech. **6**, 811-813

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6. **Narayana Kalkura, S**. and Devanarayanan, S. (1989): Growth of ß-sitosterol crystals in silica gel and their characterisation, J.Mat.Science Lett. **8**, 481-482

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