

**UNIVERSITY OF CALICUT  
(IQAC)**

**INFORMATION FOR  
ACADEMIC AND ADMINISTRATIVE AUDIT OF THE DEPARTMENT  
Year: 2020 - 21**

**(Provide information for last five years from 2016-17 to 2020-21)**

1. **Name of the Department:** Department of Nanoscience & Technology

2. **Year of establishment:** 2010

3. **Courses offered:** PG, Ph.D., Others

Year	PG	M.Phil	Ph.D.	Others
2016-17	M Tech Nanoscience & Technology	Nil	Nanoscience & Technology	Nil
2017-18	M Tech Nanoscience & Technology	Nil	Nanoscience & Technology	Nil
2018-19	M Tech Nanoscience & Technology	Nil	Nanoscience & Technology	Nil
2019-20	M Tech Nanoscience & Technology	Nil	Nanoscience & Technology	Nil
2020-21	M Tech Nanoscience & Technology	Nil	Nanoscience & Technology	Nil

4. Courses introduced during last 5 years : NIL

5. Does the department have Academic flexibility?  
If yes since when? No : From 2010 onwards the department is  
under CCSS PG

6. Interdisciplinary programs offered and  
Departments involved : YES, Department itself is  
interdisciplinary in nature, MTech

7. Courses conducted in collaboration with other  
Universities and Institutions : NIL

8. Details of programmes discontinued, if any, : NIL
9. Examination System: Annual/ Semester/Choice Based Credit System/ Credit and Grading system/ any other system, specify:

Examination and Evaluation

The evaluation scheme for each paper shall contain two parts as given below

- (1) Internal Evaluation
- (2) External Evaluation

40% weight shall be given to the internal evaluation. The remaining 60% weight shall be for the end semester external evaluation.

Internal Evaluation

The internal evaluation shall be based on a predetermined transparent system involving periodic written tests, viva-voce, seminars, and assignments/records of Lab skill. The details of executing the internal evaluation shall be decided by the Departmental Council.

External Evaluation

The external examination in theory courses is to be conducted with question papers set by external examiners. The evaluation of the answer scripts shall be done by the teacher offering the paper and an external expert based on a well-defined scheme of valuation framed by them.

The external examination in practical courses shall be conducted and evaluated by two examiners- one internal and an external examiner from other science departments of the university or from other institutions.

The Departmental Council is empowered to lay down the procedure for the conduct of examinations and the valuation of answer scripts from time to time.

10. Participation of the department in the curriculum development for courses offered by the Departments.

Faculty members of the Department is actively participated in the development curriculum and syllabi for the PG program offered in the Department. Syllabus revision was done from time to time. Dr. Sindhu S (current HOD) is the Board of Studies Chairman for the past 5 Years. The Board in its recent meeting revised the curriculum and syllabi in accordance with the OBE mode with proper mapping of the course outcomes with program outcomes.

11. Does the department have different syllabus than the one used by university for PG courses?:

The University or the Department will follow only one syllabus offered for the MTech Nanoscience and Technology Program. BOS for Nanoscience is a single board. This program is offered only in University Department.

12. Number of teaching posts sanctioned, filled and vacant:

<b>Designation</b>	<b>Sanctioned</b>	<b>Filled</b>	<b>Filled under CAS</b>
Professor	1	0	
Associate Professor	1	0	
Assistant Professor	3	3	
<b>Total</b>	<b>5</b>	<b>3</b>	

13. Faculty profile with name, qualification, designation, experience, nature of appointment (confirmed/ probation/temporary):

a) Appointed on Government Sanctioned Post.

<b>Name</b>	<b>Designation</b>	<b>Qualifications</b>	<b>Teaching/Research Experience</b>	<b>Nature of appointment.</b>
Dr Sindhu S	Assistant Professor	PhD	Teaching: 13 Years Research: 20 Years (after PhD)	Confirmed
Dr Shibu ES	Assistant Professor	PhD	Teaching: 3.5 years Research: 11 years (after PhD)	Under Probation
Dr Vijisha K Rajan	Assistant Professor	PhD	Teaching: 2.1 years Research: 2.1 years (after PhD)	Under Probation

b) Appointed directly by the UGC under its Faculty Recharge Programme

Name	Designation	Qualifications	Teaching/Research Experience	Nature of appointment.
Dr Kishore Sridharan	Assistant Professor	PhD	Teaching: 6 Years Research: 7 Years (after PhD)	Confirmed

c) Appointed from University Fund (Ad-hoc/Guest/contract Faculty).

Name	Designation	Qualifications	Teaching/Research Experience	Nature of appointment,.
Dr Nishad K K	Assistant Professor	PhD	Teaching: 1 year 1 month	Contract
Jabeen Fatima M J	Assistant Professor	PhD	Teaching: 2 years 7 months	Contract
Dr Sanjay U	Assistant Professor	PhD	Teaching: 6 months	Contract
Dr Nijisha P	Assistant Professor	PhD	Teaching: 2 years 2 months	Contract
Dr Divya P	Assistant Professor	PhD	Teaching: 2 years 5 months	Contract
Dr Deepa K G	Assistant Professor	PhD	Teaching :9 months Research : 9 years	Contract
Dr Lakshmikanth T M	Assistant Professor	PhD	Teaching :2 years	Contract

14. List of Visiting Fellows/Teachers, Adjunct and Emeritus Professors, (for last 5 years): NIL

15. Percentage of classes taken by temporary/visiting faculty (programme- wise information):

MTech Nanoscience and Technology : 75 % by Contract/ Guest Teachers

16. Programme-wise Student Teacher Ratio: (Average of 5 Years):

M Tech Nanoscience & Technology - 3:1

PhD-5 : 1

17. Number of academic support staff (technical) and administrative staff sanctioned, filled and vacant:

Sr. No.	Posts	Sanctioned posts	Filled	Actual
1	Laboratory Assistant	0	0	0
2	Clerk (office)	1	1	1
3	Laboratory Attendant	0	0	0
4	Peon	0	0	0
5	Other	0	0	0

18. Thrust areas of research as identified by the department:

1. Nanostructured Materials for Energy & Sensor Applications:

- Materials for Electrochromic application:
- Materials for Supercapacitor application:
- Meta-materials for EMI shielding
- Materials for Electrochemical Sensors

2. Nanostructured Materials for Photocatalysis and Solar-Fuel Generation Applications:

- Design and development of visible-light-driven photocatalysts
- Organic contaminants (dye molecules, Emerging pollutants) degradation
- Hydrogen generation
- Carbon dioxide reduction

3. Engineering Nanomaterials for Biology and Technology

- Precision nanoclusters for supramolecular assembly
- Inorganic perovskites for device fabrication
- Carbon nanomaterials for advanced spectroscopy and microscopy
- Photosensitive nanoprobe for switchable surface enhanced Raman scattering
- Luminescent nanomaterials for invisible-visible security printing

4. Computational research on compounds for pharmaceutical and industrial applications

- Virtual screening of potential candidates having various medicinal applications (antioxidant, anticancer, etc.).
- Drug designing – 2D/3D QSAR studies
- Computational biology and nanotechnology
- Analysis of interaction of designed molecules in biological system
- Screening of potential candidates with properties like NLO, conductivity (polymers), UV sensing, Metal sensing, etc.,

19. Information about research grants, projects completed and ongoing during the period of last 4 years

a) From National funding agencies (like UGC, CSIR, DST, DBT etc): Nil

Sr. No.	Name of the Principle Investigator (Co-investigator)	Title of the Project	Funding Agency, Duration & date of sanction	Amount (in Lakh)	Remarks if any
1.	Dr Kishore Sridharan	Fabrication of stable semiconductor nanostructures using atomic layer deposition technique for environmental remediation and solar-fuel generation	DST, 5 years, 01.10.2015	35 Lakhs	Completed
2.	Dr. Shibu E S	Photolabile Nanoprobes for Light induced delivery, Imaging, Phototherapy, Chemotherapeutics and Neurogenic disorders	SERB, 5 years, 18-09-2017 to 17-09-2022	35 Lakhs	On going

b) From International funding agencies: Nil

Sr. No.	Name of the Principle Investigator (CO-investigator)	Title of the Project	Funding Agency, Duration & date of sanction	Amount (in Lacs)	Remarks if any
---------	--	----------------------	---	------------------	----------------

--	--	--	--	--	--

20. Funds received at Departmental level through DST-FIST; CSIR, UGC-SAP/CAS, DAE, DBT, BRNS, ICSSR, AICTE, etc: **NA**

Scheme and Funding Agency	Non- Recurring	Recurring	Project Fellow	Total

21. Research facilities available in the department and recognition received, if any? :

**Current Research Facilities at DNST**

- ❖ Wet Chemical Lab with Fume Hood Facility
- ❖ FTIR Spectrometer with ATR facility
- ❖ UV-Vis Spectrophotometer
- ❖ Spectrofluorimeter or PL analysis
- ❖ Electrochemical Impedance Spectrometer & Solar Simulator
- ❖ E- beam with Thermal Vacuum Coating Unit
- ❖ Water Chiller for the coating Unit
- ❖ Hall Measurement Unit
- ❖ Dynamic Light Scattering - Particle Size Analyzer
- ❖ Xenon Photo-catalytic Reactor
- ❖ SILAR Setup for thin film deposition
- ❖ Programmable Tubular Furnace with inert atmosphere heating
- ❖ Electrospinning Unit for Nanofiber preparation
- ❖ Profilometer
- ❖ Ultrapure Water Purification system
- ❖ Computer Lab
- ❖ DC power supply
- ❖ High temperature Furnaces and Heating mantles
- ❖ Hot Air Ovens & Hot plates with controlled heating
- ❖ High Speed Centrifuge
- ❖ Inert gas facility, Sonicator, Analytical Balance etc.
- ❖ Ultra micro balance
- ❖ Probe Sonicator

22. Special research laboratories sponsored by / created by industry or corporate bodies.: NIL

23. Publications:

<b>Name of Teacher</b>	<b>Papers published in peer reviewed journals</b>	<b>Monographs, Books, Chapters in books</b>	<b>Citations</b>	<b>h-index</b>	<b>Impact factor range/Average Impact factor</b>
Dr Sindhu S	25 (2016-2021)	3	Total: 1442 Since 2016: 550	Total: 20 Since 2016: 13	Between 1-7 (2016-2021 period)
Dr Kishore Sridharan	16 (2016-2021)		Total: 1002 Since 2016: 820	Total: 17 Since 2016: 15	Impact Factor range: 1.9-8.82 (2016-2021 period); Average Impact factor: 3.9
Dr Shibu E S	6 (2016-2021)	-	Total: 1380 Since 2016: 712	Total: 17 Since 2016: 13	Between 8.85-15.75 (2016-2021 period); Average impact factor: 11.25
Dr Vijisha K Rajan	22 (2016-2021)	5	Total: 260 Since 2016: 260	Total: 9 Since 2016: 9	Between 1.4-6.5 (2016-2021 period) Average impact factor:

24. Details of patents filed & granted and income generated: Nil

25. Consultancy services provided, name of the teacher/s and income generated: Nil



Sr. No.	Year	Name of the teacher	Nature of consultancy	Funds generated (In Lakh)

26. Details of teachers invited as resource persons for Refresher courses, Orientation courses, Seminars, Workshops, Conferences at national and international levels.

1. Details of Dr. Sindhu S

SI No	Topics	Name of the Seminar/ Workshop	Organizer	Duration	Year & Date
19	Chaired session: Nanophotonics	Virtual International Conference, Raman Optorotics Webinar Series 2020:	Department of Optoelectronics, University of Kerala	1 day	01.12.2020
18	Chaired session	Webinar Series ,Session -9, Liquid Crystal Materials for Information Display	Department of Chemistry, NIT, Calicut	1 day	2020, 12.11.2020
17	Gel Electrolyte and its applications	Resource Person , Refresher course in Physical Sciences	UGC-HRDC, Kannur University	1 day	2020, 14.10.2020
16	Polymer gel electrolytes transport properties and applications	National Seminar on Theoretical Physics and Materials Science	Dept. of Physics, Victoria College, Palakkad	2 days	4 <sup>th</sup> to 5 <sup>th</sup> October 2018
15	Advanced Nanomaterials for energy and health care	Spectrum 2017-18 , Innovations in Materials and optoelectronics	Dept. of Physics, MAMO college, Manassery, Mukkam	2 days	12-13 December 2017
14	Energy Applications of semiconducting nanostructures	Resource Person , Refresher course in Nanoscience	Kannur University	1 day	20 <sup>th</sup> March 2017
13	Performance assessment of gel and liquid electrolytes in solar cell applications	National Conference on Advanced Materials: Processing and Characterization (AMPC 2017)	Dept. of Physics, NIT Trichy	2 days	27 <sup>th</sup> and 28 <sup>th</sup> February 2017

12	Electrode-Electrolyte Interface in Photo-electrochemical Cells	Fourth International Conference on Nanostructured Materials and Nanocomposites (ICNM 2017)	Inter University Centre for Nanoscience and Nanotechnology (IIUCNN), Mahatma Gandhi University, Kottayam, Kerala,	3 days	10-12 February 2017
11	Chaired Session	Fourth International Conference on Nanostructured Materials and Nanocomposites (ICNM 2017)	Inter University Centre for Nanoscience and Nanotechnology (IIUCNN), Mahatma Gandhi University, Kottayam, Kerala,	3 days	10-12 February 2017
11	Nanomaterials and Applications	National Seminar on Nanoscience & Technology	St. Thomas College, Thrissur	1 day	22 <sup>nd</sup> June 2016
12	Influence of fillers on the conductivity and transport properties of polymer gel electrolytes : EIS approach	International Conference on Recent Trends in Materials Science and Technology 2018 (ICMST 2018)	VSSC, Trivandrum	4 days	10 <sup>th</sup> to 13 <sup>th</sup> of October 2018
12	Polymer Matrix – A Suitable Mould to Restrain the Liquid Electrolyte for Electrochemical Applications	<i>9<sup>th</sup> International Conference on Materials for Advanced Technologies (ICMAT 2017)</i>	MRS Singapore @ Singapore	6 days	<i>18-23 June 2017.</i>

## 2. Details of Dr Kishore Sridharan

Topic	Name of the Seminar/ Workshop	Organizer	Duration	Year & Date
Introduction to Functional Nanostructured	Guest Lecture in “St. Agnes College Eminent Seminar Series 2017”	Department of Physics, St. Agnes College,	1 day	16.08.2017

Materials and their Characterization		Mangaluru 575002		
Design and development of functional nanostructured materials	Invited Talk in “Seminar Series of DAMP, Manipal 2018”	Department of Atomic and Molecular Physics, Manipal Academy of Higher Education, Manipal 576104	1 day	01.09.2018
Nanoscience: Convergence of Physics and Chemistry Concepts	Resource Person in “Winter School in Basic Sciences”	UGC-HRDC, Kannur University, Kannur 670002	1 day	11.12.2019
Role of Nanostructured Materials in addressing the challenges of the 21st Century	Resource Person in “Webinar Series on Applied Sciences 2020”	Department of Science & Humanities, M. Kumarasamy College of Engineering, Karur – 639113	1 day	14.07.2020
Materials Science at the Nanoscale	Resource person of the “3rd Refresher Course in Materials Science: Recombinant Memetics”	UGC-Human Resource Development Centre, University of Calicut, P.O. Thenhipalam 673635	1 day	23.11.2020

### 3. Details of Dr Shibu E S

<b>Topic</b>	<b>Name of the Seminar/ Workshop</b>	<b>Organizer</b>	<b>Duration</b>	<b>Year &amp; Date</b>
Engineered Nanomaterials for molecular sensing and Bioimaging	Invited talk at the “International conference on Chemistry and Physics of Materials”	Department of Chemistry, St Thomas’ College, Thrissur Kerala	3 days	19.12.2018 to 21-12-2018
Engineered Nanomaterials for molecular sensing and Bioimaging	Invited talk at the “National Conference on Interdisciplinary Approaches in	Department of Chemistry, MG College, Trivandrum, Kerala	1 day	15.03.2019

	Materials and Biological Research”			
Frontiers in Chemical Sciences	Invited talk on “ Precision Nanomaterials for molecular sensing and bioimaging	Department of Chemistry, University of Calicut	3 days	17-19 March 2021

#### 4. Details of Dr. Vijisha K. Rajan

SI No	Topics	Name of the Seminar/ Workshop	Organizer	Duration	Year & Date
1	chair person in the scientific session of the virtual international conference on surface chemistry	virtual international conference on surface chemistry	Department of chemistry, Annamalai university	2 days	27-28 August 2020

27. Details of teachers participated in Refresher courses, Orientation courses, Seminars, Workshops, Conferences at national and international levels. (participant, presented paper, chaired the session)

Name of Faculty Member	Name of the Course/ Summer School	Place	Duration	Sponsoring Agency
Dr Sindhu S	Refresher Course in Nanoscience (Multidisciplinary)	UGC-HRDC University of Calicut	29.11.2018 to 19.12.2018	UGC
Dr Sindhu S	Refresher Course in Materials Science (Multidisciplinary)	UGC HRDC, University of Calicut	03.12.2019 to 16.12.2019	UGC
Dr Kishore Sridharan	4-Week Induction/Orientation Programme for “Faculty in Universities/Colleges	Teaching Learning Centre, Ramanujan College,	26.06.2020 to 24.07.2020	MHRD

	/ Institutes of Higher Education”	University of Delhi		
Dr Vijisha K. Rajan	Certificate course on Moodle online platform	University of Calicut	26-06-2020 to 01-07-2020	University of Calicut

28. Participation of teachers in various academic activities as members of committees at University level, State level, National level, International level bodies. (give details)

1. Dr Kishore Sridharan: Member of International Scientific Committee; The 3rd International Workshop Advances on Photocatalysis including Environmental and Energy Applications (AdvPhotoCat-EE 2021, <https://photocatalysis-workshop.eu/organizers/>)

2. Dr Kishore Sridharan: Member of Advisory Committee; International Conference on Smart Materials and Nanotechnology (ICSMN-2020, <http://icsmn.sknscoe.ac.in/committee.php>)

29. Details of teachers appointed/nominated on Editorial Boards at university, state, national and international levels.

1. Dr Kishore Sridharan: Editorial Board Member, Journal of Nanomaterials (IF: 1.980, <https://www.hindawi.com/journals/jnm/editors/>)

2. Dr Kishore Sridharan: Editorial Board Member, International Journal of Photoenergy (IF: 1.880, <https://www.hindawi.com/journals/ijp/editors/>)

30. Awards / Prizes and recognitions received by teachers at university, state, national and international level:

1. Dr Kishore Sridharan: DST INSPIRE Faculty Award; Department of Science and Technology, Government of India

2. Dr Kishore Sridharan: Brain Korea 21 (BK21) Plus Postdoctoral Fellowship, Hanyang University, Republic of Korea

3. Dr Kishore Sridharan: Best Ph.D. Dissertation Award: Graduate School, Hanyang University, Republic of Korea

4. Dr Shibu E S: Madam Marie Curie Fellowship; European Union; Host institution: IOGS at University of Bordeaux, France

5. Dr Shibu E S: Ramanujan Fellow; SERB, Government of India

31. Awards and Prizes received by students at university, state, national and international level:  
Nil

**32. Details of Seminars/ Conferences/Workshops organized at university, state, national and international level and the source of funding with details:**

<b>Name of Conference/ Seminars / Workshops</b>	<b>Funding agency</b>	<b>No. of Participants</b>	<b>University/State/National/ International</b>	<b>Dates</b>
Nanostructured Materials for Catalytic and Biomedical Application	University Fund	108	National	16.12.2016
Nanomaterials for Energy, Environment and Health	State Plan Grant	107	National	16.03.2018
Quantum Mechanics & Group Theory	University Fund	52	National	11.03.2019 to 15.03.2019
Advanced Analytical Techniques in Materials Science	State Plan Grant	135	National	20.01.2020 to 3.01.2020
Online Workshop on the “ Beauty of Quantum Mechanics in Real Life”	-	~500	National	21.06.2021 to 25.06.2021

**33. Student profile programme-wise at PG**

<b>PG</b>	<b>Applications Received</b>	<b>No. of students Admitted</b>	<b>Seats Available</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>	<b>Year</b>
M Tech Nanoscience & Technology	22	6	10	3	3	6	2016
M Tech Nanoscience & Technology	14	7	10	2	5	7	2017

M Tech Nanoscience & Technology	14	8	10	3	5	8	2018
M Tech Nanoscience & Technology	8	5	10	3	2	5	2019
M Tech Nanoscience & Technology	30	7	12	2	5	7	2020

**34. Year-wise results of students at PG:**

PG	Year	Appeared	Passed	Pass %	Grade %			
					O	A	B	C
M Tech Nanoscience & Technology	2016	0	0	0				
M Tech Nanoscience & Technology	2017	6	6	100				
M Tech Nanoscience & Technology	2018	0	0	0				
M Tech Nanoscience & Technology	2019	7	7	100				

M Tech Nanoscience & Technology	2020	8	Result not published	NA				
---------------------------------------	------	---	-------------------------	----	--	--	--	--

**35. Information about M. Phil. programme: Not Applicable**

Year	Applications Received	No. of students admitted	Male	Female	Total

**36. Information about Ph. D. programme :**

Year	Applications Received	No. of students admitted	Male	Female	Total
2016	Nil	Nil	NA	NA	NA
2017	Nil	Nil	NA	NA	NA
2018	Nil	Nil	NA	NA	NA
2019	5	3	0	3	NA
2020	Nil	Nil	NA	NA	NA

**37. Number of students awarded M.Phil., Ph.D ,Degree :**

Year	M.Phil	Ph.D.	Male	Female	Total
2016	NA	1	0	1	1
2017	NA	1	0	1	1
2018	NA	1	0	1	1
2019	NA	2	0	2	2
2020	NA	1	0	1	1

**38. Diversity of Students: (Year-wise)**



Name of the Programme	Year	% of students from the same university	% of students from other universities within the State	% of students from universities outside the State	% of students from other countries
UG	NA	NA	NA	NA	NA
PG	2016	0	0	0	0
	2017	29	57	14	0
	2018	63	0	37	0
	2019	0	80	20	0
	2020				
M. Phil.	NA	NA	NA	NA	NA
Ph. D.	2016	0	0	0	0
	2017	0	0	0	0
	2018	0	0	0	0
	2019	67	33	0	0
	2020	0	0	0	0

39. Number of students cleared Civil Services and Defense Services examinations, NET, SET, GATE and other competitive examinations? Give Category wise data. : Nil

Year	MPSC/UPSC	NET/SET	GATE	Other Exams	Total

40. Student progression/ placement record: Number/ percentage of students proceeded for higher studies Number/percentage of students placed:

Year	% proceeded for higher studies		% of students placed
	UG to PG	PG to Ph.D./ M.Phil	
2016	NA	1	
2017	NA	50	17

2018	NA	0	0
2019	NA	29	29
2020	NA	13	13

**41. Diversity of Faculty:**

Teaching faculty	%
from the same university	25
from other universities within the State	25
from other States	25
from outside the country	25

**42. Number of faculty who were awarded M.Phil., Ph.D., D.Sc. / D.Lit.: NIL**

**43. Present details of departmental infrastructural & other facilities with regard to**

- a) Central Library Books and Journals, etc, relevant to Department :
- b) Departmental Library (books, journals etc.) : 504
- c) Computers and Internet facilities for staff : One Computer with Internet facility
- d) Total number of class rooms : 2
- e) Class rooms with ICT facility : Nil
- f) Students' laboratory : 5
- g) Research laboratories : 5
- h) Seminar Hall : Nil
- i) Smart class room : 2
- j) Any other facility LCDs, : Nil

**44. List of post-doctoral students and Research Associates**

- a) Post-doctoral. students- Nil

Sr. No.	Name of the Faculty	Post-doctoral Students	Research Topic
1			

**b) Research Associates- Nil**

Sr. No.	Name of the Faculty	Research Associates	Research Topic
1			

**45. Number of post graduate students getting financial assistance from the university/state / central government : 17**

**46. Curricular Aspects:**

a) Does the faculty take initiative in curriculum development process? : YES

b) Is curriculum suitable to make students globally competitive in the

Subject? If yes, substantiate. : YES. The curriculum offers research oriented theory, lab and project work for the students. This program indulges research attitude to the students and many of our students are pursuing higher studies in abroad Universities.

c) Does the department offer program with sufficient no. of electives options. : Yes

d) While framing curriculum, is feed-back taken from stakeholder's viz. Students/Alumni/Parents/Employers considered? : Yes

e) What is the frequency of curriculum revision? (3/4/5 years or more) : 3 Years

f) Does the curriculum have emerging thrust areas, including interdisciplinary areas? (If yes, elaborate). : Yes, the department itself is interdisciplinary. Curriculum includes thrust areas of nanomaterials for energy applications, bio-applications etc.

#### 47. Teaching-Learning, Evaluation.

1) Number of teachers preparing & following Academic Teaching plan : 4

2) How many teachers use the following teaching methods?

a) Interactive lecture method using blackboard, Group discussions, Problem solving, Seminars. : 4

b) Use ICT methods to support lectures.: 4

3) Does the Department have Peer review processes? If yes, are the suggestions effectively used to improve the teaching quality? :

Take feedback for each course from the students

4) Does the department have any mechanism to ensure that entire syllabus is completed? : yes

5) Do you offer Bridge/Remedial courses? If yes, Give details. :

Yet to start the bridge course

6) What is the method for conducting internal evaluation?:

Progressive evaluation including, assignment, written test and seminar for each course

48. Teacher Performance:

- 1) Whether the performance of the teacher assessed by the students? If yes, are the feedback reports analysed and suggestions communicated to teachers? : Yes
- 2) Number of teachers getting a) Very Good \_\_\_\_ b) Good \_\_4\_\_  
c) Average \_\_\_\_\_ remarks from students.:
- 3) Whether suggestion boxes are kept in the department to get suggestions from students on infrastructural facilities available in the department? : No
- 4) Are the suggestions received from students used for improvement of facilities? - NA
- 5) Do teachers submit Self-Appraisal Reports? Are these reports appraised by HOD and forwarded to the university with comments? : YES
- 6) What is the individual faculty wise h index?

Dr. Sindhu S : H Index: 20

Dr. Shibu E S : H Index: 17

Dr. Kishore Sridharan : H Index: 17

Dr. Vijisha K Rajan : H Index: 9

7) Give details of “beyond syllabus scholarly activities” of the department: The department conduct cultural activities regularly in connection with Onam, Christmas and New year including teachers, students and other staffs of the department.

49. List the distinguished alumni of the department (maximum 10):

Department alumni is relatively young (7 years) to list that kind of distinguished personalities. All alumni are in the beginning of their career or in higher studies.

50. Give details of student enrichment programmes (special lectures / workshops / seminar) involving external experts:

<b>Name of Conference/ Seminars / Workshops</b>	<b>Funding agency</b>	<b>No. of Participants</b>	<b>University/State/National/ International</b>	<b>Dates</b>
Nanostructured Materials for Catalytic and Biomedical Application	University Fund	108	National	16.12.2016
Nanomaterials for Energy, Environment and Health	State Plan Grant	107	National	16.03.2018

Quantum Mechanics & Group Theory	University Fund	52	National	11.03.2019 to 15.03.2019
Advanced Analytical Techniques in Materials Science	State Plan Grant	135	National	20.01.2020 to 3.01.2020
Online Workshop on the “ Beauty of Quantum Mechanics in Real Life”	-	~500	National	21.06.2021 to 25.06.2021

51. How does the department ensure that programme objectives are constantly met and learning outcomes are monitored? : by collecting feedback for each course

52. Highlight the Special facilities (if, any) of the Department:

Department set-up well equipped labs for the MTech lab experiments and analysis

53. Highlight the unique features of the department.

The department is interdisciplinary in nature with students of engineering and science background in the same class.

54. State the Innovative practices adopted in the department:

55. Highlight the participation of students and faculty in extension activities.

Students and faculty members are actively participated in the “Ente Maram “project conducted by the green campus committee of the University by planting tree saplings inside the campus.

56. Detail five major Strengths, Weaknesses, Opportunities and Challenges (SWOC) of the department.

- **Strengths**

- Skilled work force
- Motivated students
- High employability of graduates
- Innovative research in basic and applied areas
- Potential for commercialization of technology through technology transfer

- **Weaknesses**

- Insufficient number of teaching staff
- Poor supporting services
- Insufficient/inappropriate physical infrastructure
- Poor academic ambience
- Policy issues about interdisciplinary degrees

- **Opportunities**
  - Employability
  - Innovative research
  - Technology transfer
  - Novel materials for different advanced applications, device prototypes, patents etc
- **Challenges**
  - Insufficient funding
  - Proper acceptance of interdisciplinary degrees without equivalency
  - No clear policies for courses in Nanoscience & Technology (interdisciplinary programs)

57. Future plans of the department:

**Short Term:**

- Appointment of enough permanent teachers in the department
- Start a new interdisciplinary PG program in Nanoscience (MSc Nanoscience and Nanotechnology) with intake of 24
- Increase the intake of research scholars
- Revamping curriculum by adding more technical training programmes
- Infrastructure development for the PG and research students
- Creation of posts of technician and lab assistant
- Offer internship for the undergraduates or PG students from colleges to get exposure in advanced research areas.
- Conduct national/international seminars, Frontier Lectures etc.
- Publications/Patents

**Long Term:**

- Development of focused research labs based on the faculty expertise
- Procurements of more specialised instruments and setting up labs
- Implementation of externally funded projects by faculty members
- Strengthening inter departmental collaboration and expansion of national and international research collaboration.
- Develop appropriate plan to share the facilities and sophisticated instruments among related disciplines
- Strengthening the collaboration with industries – more productive approach
- Review the strategic plan proposed and incorporate necessary modification for future plans
- Interaction with industries to make technology/advanced research transfer

- Revise or set new objectives for quality output in teaching and research.
- Plan for more physical infrastructure for further expansion of the department.
- Conduct national/international seminars, Frontier Lectures etc.
- Publications/Patents
- Annual evaluation

Declaration by the Head of the Department/Institution:

I am aware that the above information provided by the department will be validated by the AAA committee during the visit.

Date: 07.07.2021



Head of the Department  
Department of Nano Science & Technology  
University of Calicut  
P.O. Calicut University  
Malappuram, Kerala - 673635

# Department of Nanoscience and Technology

## Faculty Profile

(for last five years from 2016-17 to 2020-21)

1. Name of the faculty: **Dr. Shibu E. S.**
2. Name of the Department: Nanoscience and Technology
3. Educational qualifications: MSc, PhD
4. Present position: Assistant Professor and Ramanujan Fellow (SERB)
5. Address for correspondence:

Dr. Shibu E. S.  
Assistant Professor and Ramanujan Fellow (SERB)  
Dept. of Nanoscience and Technology  
University of Calicut, 673635

6. E-mail and contact number: shibu@uoc.ac.in; +91 9400498353
7. Specialization: Nanoscience
8. Total teaching experience: 6 years
9. Courses taught:

1. Physical Chemistry Undergraduate laboratory course, IIT Madras, India, July 2007- July 2009.
2. Functional Materials, Ph.D. course, CSIR-CECRI, India, July 2017 to February 2021.
3. Bionanomaterials (UOC)-2021 onwards

10. Research experience:

**Assistant Professor** at Department of Nanoscience and Technology, University of Calicut (20<sup>th</sup> February 2021-)

**Ramanujan Fellow and Assistant Professor** at CSIR-CECRI, Karaikudi, from 20<sup>th</sup> September 2017 to 19<sup>th</sup> February 2021.

**Madam Marie Curie Fellow** at LP2N Nanophotonics, Institute of Optics Graduate School, University of Bordeaux, France, from 1<sup>st</sup> April 2015 to 31<sup>st</sup> March 2017, associated with Prof. Brahim Lounis.

**CNRS Post-Doctoral Fellow** at LP2N Nanophotonics, Institute of Optics Graduate School, University of Bordeaux, France, from 25<sup>th</sup> September 2013 to 31<sup>st</sup> March 2015, associated with Prof. Brahim Lounis.

**JSPS Post-Doctoral Fellow** at Nano-Bioanalysis Group, Health Research Institute, National Institute of Advanced Science and Technology (AIST) Japan, November 2011-September 2013, associated with Prof. Vasudevanpillai Biju.



**PRESTO Post-Doctoral Fellow** at Nano-Bioanalysis Group, Health Research Institute, AIST Japan, Precursory Research for Embryonic Science and Technology (PRESTO) January 2011 to October 2011, associated with Prof. Vasudevanpillai Biju.

**Research Associate** at Department of Science and Technology (DST) Unit on Nanoscience and Technology, IIT Madras, Chennai, India, June 2010-December 2010, associated with Prof. T. Pradeep.

**Senior Research Fellow** at DST Unit on Nanoscience and Technology, IIT Madras, Chennai, India, March 2008-June 2010, under the supervision of Padma Shri Prof. T. Pradeep.

**Junior Research Fellow** at DST Unit on Nanoscience and Technology, IIT Madras, Chennai, India, March 2006-June 2008, under the supervision of Padma Shri Prof. T. Pradeep.

**Project Associate** at DST Unit on Nanoscience and Technology, IIT Madras, Chennai, India, March 2005-March 2006, under the guidance of Padma Shri Prof. T. Pradeep.

**M. Sc. Project** at National Institute for Interdisciplinary Science and Technology (NIIST), Trivandrum, Kerala, India, 2003 April and May, under the guidance of Dr. D. Ramaiah (Former Director, CSIR-Northeast Institute of Science and Technology (CSIR-NEIST)).

11. Major research projects completed: Title of the project, Date of sanction and Duration, Grant received, Funding agency. PI or Co-PI.

**Ongoing Project**

Project title: Photolabile Nanoprobes for Light induced delivery, Imaging, Phototherapy, Chemotherapeutics and Neurogenic disorders

Project number-**SB/S2/RJN-005/2017 dated-17/07/2017**

Duration- 5 years

Grant received- **76,50,000 INR**

Total Project amount- **1,14,29,833 INR**

Funding agency- SERB (Science and Engineering Research Board)

Role- **PI (Principal Investigator)**

12. Minor research projects completed: Title of the project, Date of sanction and Duration, Grant received, Funding agency. PI or Co-PI.

NIL

13. Number of students awarded Ph.D. degree: Name of the student, topic of research, date of registration, date of declaration of Ph.D. degree.

NIL

14. Number of students registered for Ph.D. degree: Name of the student, topic of research, date of registration.

- (1) Rival Jose V; Supramolecular Interactions in Functionally Modified Stimuli-Responsive Nanoprobes; 27-08-2020; ID number-10CC20A05004 (Guide)
- (2) Mymoona P.; Manipulation of Switchable Nanogaps Between Covalently Bounded Atomically Precise Noble Metal Nanoclusters and Plasmonic Nanosystems; 09-08-2018; ID number-10CC18A05002 (Co-guide)
- (3) Lakshmi K. M.; Photosensitive Nanoprobes-Based Cargo Systems for Advanced Drug Delivery; 14-08-2019; ID number- 10CC19A05007 (Co-guide)

15. Provide information as indicated in 11 and 12 above.

16. Participation in conferences, symposia, seminars and workshops: International, national, state or university level, attended. Presented paper, chaired session. Resource person.

1. Invited talk at the "International conference on Chemistry and Physics of Materials" held at St Thomas' College, Thrissur (19-21, December 2018).
2. Invited talk at the "National Conference on Interdisciplinary Approaches in Materials and Biological Research" held at MG College Trivandrum (15-03-2019)
3. Poster presentation entitled "Semiconductor QDs-Based Bimodal Nanoparticles for Bioimaging" on Asian photochemistry meeting held at Osaka University, Suita, Japan (November 2012).
4. Poster presentation entitled "Core to Shell Electron Transfer in Fullerene-Shelled Quantum Dot Nanoparticles" on RCAS-TNNA Symposium held at Academia Sinica, Taiwan (October 2012).
5. Poster presentation entitled "Fullerene-Shelled Quantum Dot Supramolecular Architecture for Light Energy Harvesting" on JSPS-DST Japan-India bilateral seminar held at Takamatsu, Japan (October 2012).
6. Poster presentation entitled "Photoinduced Electron Transfer from Quantum Dot Core to Fullerene Shell in a Supramolecular Architecture" on Japanese Photochemistry meeting held at Tokyo Institute of Technology, Tokyo, Japan (September 2012).
7. Poster presentation entitled "Engineered Semiconductor Quantum Dots for the Detection and Imaging of Biomolecular Functioning" on AIST annual meeting held at Awajishima, Japan (September 2012).
8. Attended "Japanese Chemical Society meeting" held at Keio University, Tokyo, Japn (March 2012).
9. Oral presentation entitled "Fullerene-Shelled Quantum Dots Supramolecular Nanoparticles for Bioimaging and Light Energy Harvesting" on Japanese Photochemistry meeting held at Miyazaki, Japan (August 2011).
10. Poster presentation entitled "Periodic Self-assembly of Dansyl Glutathione Protected Gold Nanoparticles Leading to Fluorescent Superlattices" on Asia NANO conference, Biopolis, held at Singapore National University, Singapore (November 2008).
11. Poster presentation entitled "Ligand Exchange of Au<sub>25</sub>SG<sub>18</sub> Leading to Functionalized Gold Clusters: Spectroscopy, Kinetics and Luminescence" on Future Directions in Advanced Materials Research held at Shimla, India (April 2008).
12. Poster presentation entitled "Ligand Exchange of Au<sub>25</sub>SG<sub>18</sub> Leading to Functionalized Gold Clusters: Spectroscopy, Kinetics and Luminescence" on International Conference on Nano Science and Technology (ICONSAT), Chennai, India (February 2008).
13. Attended "The First Indo-US Advanced Studies Institute on Nanoscale Science and Engineering", Chennai, India (January 2008).

17. Innovative processes developed in teaching and learning.

NIL

18. Participation in curricular development: Actively involved in the curriculum development and syllabus revision.

19. Participation in co-curricular and extra-curricular activities. NIL

20. Refresher and Orientation courses attended: NIL

21. Examination /Evaluation reforms initiated: Actively involved in conducting both internal and external examinations.
22. Publication of research papers: in peer reviewed journals, non-peer reviewed journals, conference proceedings, impact factors, citations, h-index. Numbers in SCOPUS.

**Total citations- 1375, h-index-16**

1. Rival, V. J.; Mymoona, P.; Vinoth, R.; Vinu Mohan, A. M.; **Shibu, E. S.\*** Light-Emitting Atomically Precise Nanocluster-Based Flexible QR Codes for Anti-Counterfeiting. *ACS Appl. Mater. Interfaces* **2021**, *13*, 10583-10593. (Impact Factor- 8.8)
2. Rival, V. J.; Mymoona, P.; Lakshmi, K. M.; Nonappa, Pradeep, T.; **Shibu, E. S.\*** Self-assembly of precision noble metal nanoclusters: Hierarchical structural complexity, colloidal superstructures and applications. *Small* **2021** (Early View; DOI: 10.1002/sml.202005718). (Impact Factor- 11.5)
3. Rival, V. J.; Nonappa; **Shibu, E. S.\*** Light-Triggered Reversible Supracolloidal Self-Assembly of Precision Gold Nanoclusters. *ACS Appl. Mater. Interfaces* **2020**, *12*, 14569-14577. (Impact Factor- 8.8)
4. **Shibu, E. S.**; Nadezda, V.; Cognet, L.; Lounis, B. Small gold nanorods with tunable absorption for photothermal microscopy in cells. *Adv. Sci.* **2017**, *4*, 1600280. (Impact Factor- 15.84)
5. Biju, V.; Hamada, M.; Ono, K.; Sugino, S.; Ohnishi, T.; **Shibu, E. S.**; Yamamura, S.; Sawada, M.; Nakanishi, S.; Shigeri, Y.; Wakida, S.-I. Nanoparticles speckled by ready-to-conjugate lanthanide complexes for multimodal imaging. *Nanoscale* **2015**, *7*, 14829-14837. (Impact Factor- 6.89)
6. Leduc, C.; Si, S.; Gautier, J. J.; Gao, Z.; **Shibu, E. S.**; Gautreau, A.; Giannone, G.; Cognet, L.; Lounis, B. Single-molecule imaging in live cell using gold nanoparticles. *Methods Cell Biol.* **2015**, *125*, 13-27. (Impact Factor- 1.44)
7. **Shibu E. S.**; Hamada, M.; Nakanishi, S.; Wakida, S.; Biju, V. Photoluminescence of CdSe and CdSe/ZnS Quantum Dots: Modifications for Making the Invisible Visible at Ensemble and Single-Molecule Levels. *Coord. Chem. Rev.*, **2014**, *263-264*, 2-12. (Impact Factor- 15.36)
8. **Shibu, E. S.**; Ono, K.; Sugino, S.; Nishioka, A.; Yasuda, A.; Shigeri, Y.; Wakida, S.; Sawada, M.; Biju, V. Photouncaging Fluorescent-Magnetic Bimodal Nanoparticle for *In vitro* and *In vivo* Imaging. *ACS Nano* **2013**, *7*, 9851-9859. (Impact Factor- 14.588)
9. **Shibu, E. S.**; Saito, H.; Sugino, S.; Nosaka, Y.; Biju, V. Singlet Oxygen Sensitizing NIR-Fluorescent Multimodal Nanoparticles. *Angew. Chem. Int. Ed.* **2013**, *52*, 10559-10563. (Impact Factor- 12.959)
10. **Shibu, E. S.**; Sonoda, A.; Tao, Z.; Feng, Q.; Furube, A.; Masuo, S.; Wang, L.; Tamai, N.; Ishikawa, M.; Biju, V. Energy Materials: Supramolecular Nanoparticles for Solar Energy Harvesting. *Nano Rev.* **2013**, *4*, 21079. (Impact Factor- 3.5)
11. Kumar, S.; **Shibu, E. S.**; Pradeep, T.; Sood, A. Ultrafast Photoinduced Enhancement of Nonlinear Optical Response in 15-Atom Gold Clusters on Indium Tin Oxide Conducting Film. *Opt. Express* **2013**, *21*, 8483-8492. (Impact Factor- 3.669)
12. **Shibu, E. S.**; Hamada, M.; Murase, N.; Biju, V. Nanomaterials Formulations for Photothermal and Photodynamic Therapy of Cancer. *J. Photochem. Photobiol. C* **2013**, *15*, 53-72. (Impact Factor- 11.952)
13. Biju, V.; Anas, A.; Akita, H.; **Shibu, E. S.**; Itoh, T.; Harashima, H.; Ishikawa, M. FRET From Quantum Dots to Photodecompose Undesired Acceptors and Report the Condensation and Decondensation of Plasmid DNA. *ACS Nano* **2012**, *6*, 3776–3788. (Impact Factor- 14.588)
14. **Shibu, E. S.**; Sonoda, A.; Tao, Z.; Feng, Q.; Furube, A.; Masuo, S.; Wang, L.; Tamai, N.; Ishikawa, M.; Biju, V. Photofabrication of Fullerene-Shelled Quantum Dots Supramolecular Nanoparticles for Solar Energy Harvesting. *ACS Nano* **2012**, *6*, 1601-1608. (Impact Factor- 14.588)

15. George, A.; **Shibu, E. S.**; Maliyekkal, S. M.; Bootharaju, M. S.; Pradeep, T. Luminescent, Freestanding Composite Films of Au<sub>15</sub> for Specific Metal Ion Sensing. *ACS Appl. Mater. Interfaces* **2012**, *4*, 639-644. (Impact Factor- 8.8)
16. Hamada, M.; **Shibu, E. S.**; Itoh, T.; Kiran, M. S.; Nakanishi, S.; Ishikawa, M.; Biju, V. Single-Molecule Photochemical Reactions of Auger-Ionized Quantum Dots. *Nano Rev.* **2011**, *2*, 475. (Impact Factor- 3.5)
17. **Shibu, E. S.**; Cyriac, J.; Pradeep, T.; Chakrabarti, J. Gold Nanoparticle Superlattices as Functional Solids for Concomitant Conductivity and SERS Tuning. *Nanoscale* **2011**, *3*, 1066-1072. (Impact Factor- 6.89)
18. **Shibu, E. S.**; Pradeep, T. Quantum Clusters in Cavities: Trapped Au<sub>15</sub>in Cyclodextrins. *Chem. Mater.* **2011**, *23*, 989-999. (Impact Factor- 9.57)
19. **Shibu, E. S.**; Habeeb Muhammed, M. A.; Kimura, K.; Pradeep, T. Fluorescent Superlattices of Gold Nanoparticles: A New Class of Functional Materials. *Nano Res.* **2009**, *2*, 220-234. (Impact Factor- 8.18)
20. **Shibu, E. S.**; Radha, B.; Verma, P. K.; Bhyrappa, P.; Kulkarni, G. U.; Pal, S. K.; Pradeep, T. Functionalized Au<sub>22</sub> Clusters: Synthesis, Characterization, and Patterning. *ACS Appl. Mater. Interfaces* **2009**, *1*, 2199-2210. (Impact Factor- 8.8)
21. **Shibu, E. S.**; Kimura, K.; Pradeep, T. Gold Nanoparticle Superlattices: Novel Surface Enhanced Raman Scattering Active Substrates. *Chem. Mater.* **2009**, *21*, 3773-3781. (Impact Factor- 9.57)
22. Ramasamy, P.; Guha, S.; **Shibu, E. S.**; Sreeprasad, T. S.; Bag, S.; Banerjee, A.; Pradeep, T. Size Tuning of Au Nanoparticles Formed by Electron Beam Irradiation of Au<sub>25</sub> Quantum Clusters Anchored Within and Outside of Dipeptide Nanotubes. *J. Mater. Chem.* **2009**, *19*, 8456-8462. (Impact Factor- 6.62)
23. **Shibu, E. S.**; T. Pradeep. Photoluminescence and Temperature-Dependent Emission Studies of Au<sub>25</sub> Clusters in the Solid State. *Int. J. Nanoscience.* **2009**, *2*, 223-226. (Impact Factor- 1.5)
24. Nishida, N.; **Shibu, E. S.**; Yao, H.; Oonishi, T.; Kimura, K.; Pradeep, T. Fluorescent Gold Nanoparticle Superlattices. *Adv. Mater.* **2008**, *20*, 4719-4723. (Impact Factor- 27.39)
25. **Shibu, E. S.**; Muhammed, M. A. H.; Tsukuda, T.; Pradeep, T. Ligand Exchange of Au<sub>25</sub>SG<sub>18</sub> Leading to Functionalized Gold Clusters: Spectroscopy, Kinetics, and Luminescence. *J. Phys. Chem. C* **2008**, *112*, 12168-12176. (Impact Factor- 4.189)

23. Books published: with ISBN No., Without ISBN No., Chapters in books.

A Textbook of Nanoscience and Nanotechnology, McGraw-Hill Education, New Delhi, 2011 (Coauthor with Prof. T. Pradeep, IIT Madras, India). ISBN- 9781259007323

24. Patents Applied/Granted: National. International, commercialized:

1. Gold and Silver Quantum Clusters in Molecular Containers and Methods for Their Preparation and Use, T. Pradeep and **E. S. Shibu**, 2015, US8999717 (US patent).
2. Caged nanoparticles for bioimaging, V. Biju, **E. S. Shibu**, S. Sugino, S. Wakida, Y. Yoshida, JP 2013-144006 (Japanese patent).
3. Gold and Silver Quantum Clusters and Methods for Their Preparation and Use, T. Pradeep and **E. S. Shibu**, PCT/IB2011/000260, February 14, 2011 (PCT).
4. Gold and Silver Quantum Clusters and Methods for Their Preparation and Use, T. Pradeep and **E. S. Shibu**, 4036/CHE/2010, filed on December 30, 2010 (Indian patent).

25. Consultancy services provided and revenue generated:

NIL

26. Conferences, seminars, symposia and workshops organized as convener/coordinator:

NIL

27. Number of collaborations: 2

**Prof. Pradeep**, IIT Madras, India

**Prof. Nonappa**, Tampere University, Finland

28. Awards /recognitions received: International, National, State, University level.

Ramanujan Fellowship (SERB)-2017

Madam Marie Curie Fellowship (European Union)-2015

JSPS Fellowship (Japan Govt.)-2011

CSIR/UGC (CSIR)-2006

3<sup>rd</sup> Rank, MSc Chemistry (University of Calicut)-2004

Note: If necessary for Item No. 11 and 12 provide information in Enclosure-I, for 13, 14 and 15 Enclosure-II, for 16 Enclosure-III, for 22 and 23 Enclosure- IV and so on.

\*\*\*\*

# Department of Nanoscience and Technology

## Faculty Profile

(for last five years from 2016-17 to 2020-21)

1. Name of the faculty : **Dr. SINDHU S**
2. Name of the Department : Nanoscience and Technology
3. Educational qualifications : MSc, Mphil, PhD
4. Present position : Assistant Professor & HOD
5. Address for correspondence : Department of Nanoscience and Technology  
University of Calicut, Kerala- 673635
6. E-mail and contact number : [sindhus@uoc.ac.in](mailto:sindhus@uoc.ac.in) , Mob: 9895944901
7. Specialization : Nanomaterials
8. Total teaching experience : 10.9 Years at University of Calicut  
2 Years at Amrita Viswavidyapeetham University
9. Courses taught : MTech Nanoscience/Nanotechnology  
NST.104 Introduction to Nanomaterials  
NST.105 Nano Lab – 1  
NST.201 Design and synthesis of Nanomaterials  
NST.205 Nano Lab-II  
NST.304-A Nanomaterials for Energy Conversion and Storage  
NST.305 Mini Project  
NST.401 Major Project
10. Research experience : 19 Years of Research experience after PhD
11. Major research projects completed: Title of the project, Date of sanction and Duration, Grant received, Funding agency. PI or Co-PI.

Title of the project	Date of sanction and Duration	Amount Received (Rs)	Funding Agency	PI or CO-PI
Optimization of quantum dot sensitization over TiO <sub>2</sub>	Start: 29.11.2012 End: 31.03.2016	18,13,688/-	KSCSTE, Govt. of Kerala	PI

photoelectrode for Quantum dot sensitized solar cells				
Surface engineering and tuning of quantum dot sensitized photoelectrode for the enhanced performance of QDSSC	Start: 26.08.2013 End: 25.08.2016	16,57,872/-	CSIR, Govt. of India	PI

12. Minor research projects completed: Title of the project, Date of sanction and Duration, Grant received, Funding agency. PI or Co-PI.

NIL

13. Number of students awarded Ph.D. degree: Name of the student, topic of research, date of registration, date of declaration of Ph.D. degree.

Sl. no	Name of Student	Date of Registration	Topic	Date of PhD Degree Declaration
1	Dharsana M.V.	12.12.2013	Antimony selenide nanostructures as light harvester in a QDSSC architecture with binary and ternary oxide photoanodes	03.01.2020
2	Rajita Ramanarayanan	11.11.2013	Hybrid FRET systems for energy harvesting Applications	02.12.2019
3	Bhabhina N M	04.03.2013	Hybrid nanocomposites for photocatalysis	15.02.2019
4	Nijisha P	01.11.2012	Synthesis and Characterization of Gel electrolytes	20.03.2019
5	Niveditha C.V	01.11.2012	Electrochemical synthesis of nanomaterials	22.03.2018
6	Jabeen Fatima M.J.	26.03.2010	Design, synthesis and relevance of doped and un-doped metal oxide nanostructures as photoelectrodes for photovoltaic applications	15.07.2016

14. Number of students registered for Ph.D. degree: Name of the student, topic of research, date of registration.

Sl. no	Name of Student	Date of Registration	Topic	Status
01	Amrutha Raveendran	12.06.2019	Design, Synthesis and Structure-Property Optimization of Nanostructured Materials for Energy Application	Ongoing - FT
02	Swetha P	04.04.2019	Preparation and Investigation of Nanocomposites as Meta-material at Infra-red region	Ongoing - FT
04	Aswini R	01.04.2019	Synthesis and Property Tuning of Nanostructured Materials for Electrochromic Applications	Ongoing - FT
05	Jyothilakshmi V P	23.07.2016	Surface engineering and tuning of quantum dot sensitized photoelectrode for the enhanced performance of QDSSC	Ongoing - FT

15. Provide information as indicated in 11 and 12 above. NA

16. Participation in conferences, symposia, seminars and workshops: International, national, state or university level, attended. Presented paper, chaired session. Resource person.

Sl No	Topics	Name of the Seminar/ Workshop	Organizer	Duration	Year & Date
19	Chaired session: Nanophotonics	Virtual International Conference, Raman Optorotics Webinar Series 2020:	Department of Optoelectronics, University of Kerala	1 day	01.12.2020
18	Chaired session	Webinar Series ,Session -9, Liquid Crystal Materials for Information Display	Department of Chemistry, NIT, Calicut	1 day	2020, 12.11.2020
17	Gel Electrolyte and its applications	Resource Person , Refresher course in Physical Sciences	UGC-HRDC, Kannur University	1 day	2020, 14.10.2020



16	Polymer gel electrolytes transport properties and applications	National Seminar on Theoretical Physics and Materials Science	Dept. of Physics, Victoria College, Palakkad	2 days	4 <sup>th</sup> to 5 <sup>th</sup> October 2018
15	Advanced Nanomaterials for energy and health care	Spectrum 2017-18 , Innovations in Materials and optoelectronics	Dept. of Physics, MAMO college, Manassery, Mukkam	2 days	12-13 December 2017
14	Energy Applications of semiconducting nanostructures	Resource Person , Refresher course in Nanoscience	Kannur University	1 day	20 <sup>th</sup> March 2017
13	Performance assessment of gel and liquid electrolytes in solar cell applications	National Conference on Advanced Materials: Processing and Characterization (AMPC 2017)	Dept. of Physics, NIT Trichy	2 days	27 <sup>th</sup> and 28 <sup>th</sup> February 2017
12	Electrode-Electrolyte Interface in Photo-electrochemical Cells	Fourth International Conference on Nanostructured Materials and Nanocomposites (ICNM 2017)	Inter University Centre for Nanoscience and Nanotechnology (IIUCNN), Mahatma Gandhi University, Kottayam, Kerala,	3 days	10-12 February 2017
11	Chaired Session	Fourth International Conference on Nanostructured Materials and Nanocomposites (ICNM 2017)	Inter University Centre for Nanoscience and Nanotechnology (IIUCNN), Mahatma Gandhi University, Kottayam, Kerala,	3 days	10-12 February 2017
11	Nanomaterials and Applications	National Seminar on Nanoscience & Technology	St. Thomas College, Thrissur	1 day	22 <sup>nd</sup> June 2016
12	Influence of fillers on the conductivity and transport properties of polymer gel electrolytes : EIS approach	International Conference on Recent Trends in Materials Science and Technology 2018 (ICMST 2018)	VSSC, Trivandrum	4 days	10 <sup>th</sup> to 13 <sup>th</sup> of October 2018
12	Polymer Matrix – A Suitable Mould to Restrain the Liquid Electrolyte for Electrochemical Applications	9 <sup>th</sup> International Conference on Materials for Advanced Technologies (ICMAT 2017)	MRS Singapore @ Singapore	6 days	18-23 June 2017.

17. Innovative processes developed in teaching and learning.

18. Participation in curricular development :

1. Head, Department of Nanoscience and Technology, 23.07.2016 - till date
2. Chairman, Board of Studies, Nanoscience and Technology- 11.02.2020 – 10.02.2023
3. Chairman, Board of Studies, Nanoscience and Technology- 22.07.2016 – 21.07.2019
4. Chairman, Board of Examinations, MTech Nanoscience, 2016 December- till date
5. Member, Research Admission Committee, DNST- 2012-till date
6. Member, CSIF committee-2016-till date
7. Member Academic Committee CCSSPG – 2016 – till date
8. Member in the Faculty of Science, University of Calicut- 2016-2019, 2020-2023
9. Member of the Academic Council of University of Calicut– 2014 – till date
10. MTech Nanoscience Course Co-ordinator, 2011 to -2020
11. Curriculum Development for M.Tech Nanoscience &Technology, University of Calicut

19. Participation in co-curricular and extra-curricular activities

- External Examiner for M.Tech Green Energy Technology, Pondicherry University
- External Examiner for M.Tech Nanoscience and Technology, Pondicherry University
- Member in the JRF selection committee in a UGC Project at Centre for Green Energy Technology, Pondicherry University

Journal Reviewer

- ❖ Journal of Solid State electrochemistry, ECS publishing
- ❖ Journal of the Electrochemical Society, ECS Publishing
- ❖ Chemical Society Review, RSC publishing
- ❖ Crystal Growth & Design, American Chemical Society
- ❖ Applied Materials & Interfaces, American Chemical Society
- ❖ Ceramics International , Elsevier Publications
- ❖ Materials Chemistry and Physics, Elsevier Publications
- ❖ International Journal of Photoenergy, Hindawi Publishing
- ❖ International Journal of Hydrogen energy, Elsevier Publications
- ❖ Solar Energy, Elsevier Publications
- ❖ Journal of Nanostructure in Chemistry, Springer publishing
- ❖ Materials research Express, IOP publishing

20. Refresher and Orientation courses attended:

Name of the Course/	Place	Duration	Sponsoring Agency
---------------------	-------	----------	-------------------

Summer School			
Orientation Programme	ASC, University of Calicut	02.03.2012 to 29.03.2012	UGC
Refresher Course in Nanoscience (Multidisciplinary)	ASC, University of Calicut	17.09.2014 to 09.10.2014	UGC
Refresher Course in Nanoscience (Multidisciplinary)	UGC-HRDC University of Calicut	29.11.2018 to 19.12.2018	UGC
Refresher Course in Materials Science (Multidisciplinary)	UGC HRDC, University of Calicut	03.12.2019 to 16.12.2019	UGC

21. Examination /Evaluation reforms initiated: Chairman, Board of Examinations, MTech Nanoscience, 2016 December- till date

22. Publication of research papers: in peer reviewed journals, non-peer reviewed journals, conference proceedings, impact factors, citations, h-index. Numbers in SCOPUS.

**Google Scholar:** <https://scholar.google.com/citations?user=EGntyKoAAAAJ&hl=en>

**Citations** : 1435  
**h-index** : 20  
**i10-index** : 31

1. Dharsana M. Vidyadharan, Bhabhina Ninnora Meethal, Jyothilakshmi V.P and **Sindhu S.**, Highly Transparent Titania in Mixed Organic Solvent with Controlled Surface Area and Porosity, *Solar Energy* 213 (2021) 43–52. <https://doi.org/10.1016/j.solener.2020.11.002>
2. Rajita Ramanarayanan, **Sindhu.S.**, Synthesis and characterisation of green luminescent Carbon dots from guava leaf extract, *Materials Today: Proceedings* 33 (2020) 2223–2227, ISSN: 2214-7853. **SNIP=0.576.**
3. Jyothilakshmi V P, Bhabhina N M, Dharsana M V, **Sindhu S.**, Wet Chemical Synthesis of Lead Sulfide Nanoparticles and its Application as Light Harvester in Photovoltaic Cell, *Materials Today: Proceedings* 33 (2020) 2125–2129, ISSN: 2214-7853. **SNIP=0.576.**
4. Ambily Krishnan, Dharsana M. Vidyadharan, Geetha Vishnu, **Sindhu S.**, Pradeesh Kannan, Co-electro Deposited  $\text{Cu}_2\text{ZnSnS}_4$  Thin Films as Counter Electrodes for Cost-Effective Dye Sensitized Solar Cells, *Materials Today: Proceedings* 25(2) (2020) 122-128, ISSN: 2214-7853. **SNIP=0.576.**
5. Rajita Ramanarayanan, Fadeela Chundekat Ummer, **Sindhu S.**, Exploring Dynamics of Resonance Energy Transfer in Hybrid Quantum Dot Sensitized Solar Cells (QDSSC), *Mater. Res. Express* 7 (2020) 025517, ISSN: 2053-1591. **IF = 1.929.**

6. Nijisha Pullanjiyot, **Sindhu S.**, Enhanced electrochemical properties of metal oxide interspersed polymer gel electrolyte for QSDSSC application. *Solar Energy*, 186 (2019) 37-45, ISSN: 0038-092X, **IF = 4.67**. <https://doi.org/10.1016/j.solener.2019.04.086>
7. Dharsana M. Vidyadharan, Nijisha Pullanjiyot, Bhabhina N. Meethal, **Sindhu S.**, Highly Stable Ethylene Glycol Capped Blue Emitting Sb<sub>2</sub>Se<sub>3</sub> Quantum Dots via Hydrothermal Approach, *Applied Nanosciene*, 9 (4) (2019) 435-445. ISSN: 2190-5509 (Print) 2190-5517 (Online), **IF = 2.88**
8. Rajita Ramanarayanan, Bhabhina N. Meethal, Nijisha Pullanjiyot, Niveditha C.V, **Sindhu S.**, Physicochemical properties of red and black gold colloids: A rational design through green pathway, *Mater. Res. Express* 6 (2019) 085033-44, ISSN: 2053-1591. **IF = 1.929**.
9. Rajita Ramanarayanan, Niveditha Chokiveetil, Nijisha Pullanjiyot, Bhabhina Ninnora Meethal, **Sindhu S.**, The Deterministic Role of Resonance Energy Transfer in the Performance of Bio-Inspired Colloidal Silver Nanoparticles Incorporated Dye Sensitized Solar Cells, *Mater. Res. Bull.*, 144 (2019) 28-36, ISSN: 0025-5408, **IF = 4.01**
10. Bhabhina N. M., Abdul Faisal Panichikkal, Jabeen Fatima M J, Dharsana M Vidyadharan, **Sindhu S.**, Shining black nanoscopic ternary zincspiropoffite: A panchromatic light harvester for depollution, *Materials & Design*, 165 (2019) 107600, ISSN: 0264-1275. **IF = 6.289**.  
<https://doi.org/10.1016/j.matdes.2019.107600>
11. Bhabhina N. M., **Sindhu S.**, Bromine-Induced Defects in Anion-Deficient Zinc Oxide as Stable Photocatalysis Promoters, *Chemistry Select* 3 (2018), 13345– 13354, Online ISSN:2365-6549. **IF = 1.81**
12. Niveditha C.V., Jabeen Fatima M. J., Rajita Ramanarayanan, **Sindhu S.** Size Control through Scan Rate Modulation: Mapping Water Splitting Efficiency of Micro to Nano Size Cuboidal Copper Oxide Particles, *J. Electro. Chem. Soc.*, 165 (14) (2018) H908-H915, ISSN: 0013-4651 (print) 1945-7111 (web). **IF = 3.72**
13. Niveditha C. V., Aswini R, Jabeen Fatima M. J., Rajita Ramanarayan, Nijisha Pullanjiyot, **Sindhu S.**, Feather like highly active Co<sub>3</sub>O<sub>4</sub> electrode for supercapacitor application: a potentiodynamic approach, *Mater. Res. Express*, 5(6) (2018) p065501, ISSN: 2053-1591. **IF =1.929**.
14. Rajita Ramanarayanan, Bhabhina N.M, Dharsana M.V, Nivedita C.V, **Sindhu S.**, Green synthesis of zinc oxide nanoparticles using extract of Avertrhoa bilimbi(L) and their photo electrode applications, *Materials Today Proceedings* 5 (2018) 16472–16477, ISSN: 2214-7853. **SNIP=0.576**
15. Niveditha C V, Jabeen Fatima M J, Rajita Ramanarayanan, Bhabhina N M, **Sindhu S.** Effect of number of cycles in potentiodynamic deposition of p-type copper oxide and its supercapacitor applications, *Materials Today Proceedings* 5 (2018) 16433–16442, ISSN: 2214-7853. **SNIP=0.576**
16. Bhabhina N M, Nijisha P, Niveditha C V, Rajita Ramanarayanan, **Sindhu S.** Inorganic-Organic semiconductor hybrid nanocomposite for anti-corrosion applications, *Materials Today Proceedings* 5 (2018) p16394–16401, ISSN: 2214-7853. **SNIP=0.576**
17. Bhabhina N. M., Rajita Ramanarayanan, **Sindhu S.**, Surface modification of oxygen deficient ZnO nanotubes by interstitially incorporated carbon: A superior photocatalytic platform for

- sustainable water and surface treatments, *Appl. Nanosci.* 8 (6) (2018) p1545-1555, ISSN: 2190-5509 (Print) 2190-5517 (Online). **IF = 2.88.**
18. Niveditha C.V., Nizamudeen A.C., Jabeen Fatima M. J., **S.Sindhu**, Showcasing electrode-electrolyte interfacial potential as a vital parameter in the hydrogen generation by metal oxides electrodes, *Mater. Res. Express* 5 (2018) p035504, ISSN: 2053-1591. **IF =1.929.**
19. Bhabhina N. M, Nijisha P., **S. Sindhu**, Anchoring of polymeric precursor on oxygen deficient ZnO nanotubes: A chelation assisted combined nucleation-growth-dissolution synthesis strategy, *Mater. & Design.*, 130, 2017, P426-432, ISSN: 0264-1275. **IF = 6.289.** <https://doi.org/10.1016/j.matdes.2017.05.090>
20. Rajita Ramanarayanan, Nijisha P., Niveditha C.V., **Sindhu S.**, Natural dyes from red amaranth leaves as light-harvesting pigments for dye-sensitized solar cells, *Mater. Res. Bull.*, 90, 2017, P156-16, ISSN: 0025-5408. **IF=4.01**
21. Niveditha C. V., Jabeen Fatima M.J, **S. Sindhu** Electrochemical Synthesis of p-type Copper Oxide, *Nanosystems, Phys. Chem. and Math.*, 7(4), 2016, P747-751, ISSN 2305-7971 (Online version) **IF =0.76.**
22. P. Nijisha, N. M. Bhabhina, **Sindhu S.**, Application of gel Electrolyte in Dye Sensitized Solar Cells, *Nanosystems, Phys. Chem. and Math.*, 7(4), 2016, P752-754, ISSN 2305-7971 (Online version) **IF =0.76.**
23. Dharsana M. V., **S. Sindhu**, Antimony selenide nanoparticles-a panchromatic sensitizer: Fast synthesis and study of their photovoltaic behavior, *Materials Letters*, 183, 2016, 448-450, ISSN: 0167-577X. **IF = 3.2.**
24. Nijisha P., Dharsana M.V., and **Sindhu S.** Synthesis and Electrochemical Characterization of Physically Cross-Linked Gel Electrolyte for QSDSSC Application, *Materials & Design*, 101, 2016, 270-276, ISSN: 0264-1275. **IF = 6.289 .** <https://doi.org/10.1016/j.matdes.2016.03.136>.
25. Niveditha C.V., Jabeen Fatima M. J., **S.Sindhu**, Comprehensive Interfacial Study of Potentially Dynamically Synthesized Copper Oxide Thin Films for photoelectrochemical Applications, *J. Electro. Chem. Soc.*, 163, 6, 2016, H426-H433, ISSN: 0013-4651 (print) 1945-7111 (web). **IF =3.72**
23. Books published: with ISBN No., Without ISBN No., Chapters in books.
- N. M. Bhabhina and **Sindhu S.**, Carbon as photocatalytic promoter in zinc oxide nanotubes 8-19, (2019) ISBN 978-93-5321-814-0
  - Rajita Ramanarayanan, Sindhu Swaminathan, Emphasising the role of silver nanoparticles in the enhancement of photocatalytic efficiency of TiO<sub>2</sub>, 40-47 (2019) ISBN 978-93-5321-814-0.
  - Bhabhina N. M., Ajisha P. C., Dharsana M. Vidyadharan, Jyothilakshmi V. P., **Sindhu S.**, A comparative approach to structural heterogeneity of polyaniline and its ZnO nanocomposites, Advanced Polymeric Systems: Applications in Nanostructured Materials, Composites and Biomedical Fields, Chapter 5, *River Publishers, Niels Jernes Vej 10, 9220 Aalborg, Denmark (2020)*
24. Patents Applied/Granted: National. International, commercialized: NIL
25. Consultancy services provided and revenue generated: NIL
26. Conferences ,seminars, symposia and workshops organized as convener/coordinator:

- Coordinator for Refresher Course in Nanoscience at UGC- HRDC- Calicut University
- Coordinator for Refresher Course in Materials Science at UGC- HRDC- University of Calicut (2020)
- Organizer, National Workshop on Advances in NANO, January 27-28, 2012
- Convener, National Seminar on Nanomaterials for Energy, Environment and Health, 16<sup>th</sup> March 2018 (NEEH 2018)
- Convener, Workshop on Quantum Mechanics and Group Theory (QMGT 2019)
- Convener, National Workshop on Advanced Analytical Techniques in Materials Science (WAATMS 2020), January 20-23, 2020.

27. Number of collaborations: 3

28. Awards /recognitions received: International, National, State, University level.: NIL

\*\*\*\*\*

# Department of Nanoscience and Technology

## Faculty Profile

(for last five years from 2016-17 to 2020-21)

1. Name of the faculty: **Dr. Vijisha K. Rajan**
2. Name of the Department: Nanoscience and Technology
3. Educational qualifications: MSc. (Applied Chemistry), MPhil. (Chemistry), PhD. (Applied Chemistry)
4. Present position: Assistant Professor (Level 10)
5. Address for correspondence: Assistant Professor, Department of Nanoscience and Technology, University of Calicut, Malappuram - 673635
6. E-mail and contact number: [drvijishakrajan@uoc.ac.in](mailto:drvijishakrajan@uoc.ac.in), +919745178115
7. Specialization: Computational Chemistry
8. Total teaching experience: 24.5 months
9. Courses taught: MSc. Applied Chemistry & MPhil Chemistry - As Assistant Professor on contract in Department of Chemistry, University of Calicut; General Chemistry for engineering students – As guest lecturer in GPTC Chelakkara; MTech Nanoscience and Technology – As Assistant Professor (level 10) in Department of Nanoscience and Technology, University of Calicut.
10. Research experience: 4 years during the PhD period.
11. Major research projects completed: Title of the project, Date of sanction and Duration, Grant received, Funding agency. PI or Co-PI. - Nil
12. Minor research projects completed: Title of the project, Date of sanction and Duration, Grant received, Funding agency. PI or Co-PI. - Nil
13. Number of students awarded Ph.D. degree: Name of the student, topic of research, date of registration, date of declaration of Ph.D. degree. - Nil
14. Number of students registered for Ph.D. degree: Name of the student, topic of research, date of registration. - Nil
15. Provide information as indicated in 11 and 12 above. - Nil
16. Participation in conferences, symposia, seminars and workshops: International, national, state or university level, attended. Presented paper, chaired session. Resource person.

### Seminar presentations

International
---------------

1	Vijisha. K. Rajan; K. Muraleedharan: Presented a poster on Preparation and characterization of Pure and Doped Semiconductors of ZnS and CdS: International Conference on advances in new materials conducted by Department of Inorganic Chemistry, University of Madras, Chennai-600025. (Published abstract in the proceedings) ISSN = 978-81-89843-57-1.
2	Vijisha. K. Rajan; K. Muraleedharan: Presented a paper on Determination of Gas phase Gibbs free energy of amines and alkanolamines- A Computational study: International Seminar "Saturnalia of Crystallography" organized by the Department of Chemistry, Little Flower College, Guruvayoor, Thrissur on 24 <sup>th</sup> July 2014. (Published abstract in the proceedings)
3	Vijisha. K. Rajan; K. Muraleedharan: Presented a poster on Study of antiferromagnetic coupling interactions by Density Functional Theory: International conference on Nanomaterials for energy, environment, catalysis and sensors (ICNEECS-2015), at Department of Physical Chemistry, Madurai kamaraj Univeristy, Madurai on 11-12 December, 2015. (Published abstract in the proceedings)
4	K.P. Safna Hussan, M. Shahin Thayyil, S.K. Deshpande, T.V. Jinitha, Vijisha K. Rajan, K.L. Ngai: Molecular Dynamics of double active pharmaceutical ingredient- benzalkonium ibuprofenate studied by Broadband Dielectric Spectroscopy; 8 <sup>th</sup> International Discussion Meeting on Relaxations in Complex Systems, Wista, Poland, 2017. ISBN 978-83-226-3251-2
National	
1	Vijisha. K. Rajan; K. Muraleedharan: presented a paper on DFT-B3LYP study of electronic properties of Gallic acid: UGC sponsored National Seminar on Recent Advances in Chemistry, organized by the Department of Chemistry, Kandaswami Kandar's College, Tamil Nadu, on 13-14 August 2015. (Published full paper in the proceedings) ISBN: 978-93-84443-51-1.
2	Vijisha. K. Rajan; K. Muraleedharan: Presented a paper on DFT based calculation of Gas phase basicity and proton affinity of alkylamines: National Seminar on Recent Advances in Chemistry (NSRAC-15), at Department of Chemistry, St.Mary's College, Thrissur on 19 <sup>th</sup> August 2015. (Published full paper in the proceedings)
3	Vijisha. K. Rajan; K. Muraleedharan: presented a paper on DFT-B3LYP Study of electronic properties and uv-visible spectra of triamterene molecule: National Seminar on Recent Advances in Material Science (RAMS-2015), at Department of Physics, T. M. Govt. College, Tirur on 30 <sup>th</sup> Sep- 1 <sup>st</sup> Oct, 2015. (Published full paper in the proceedings)
4	Vijisha. K. Rajan; K. Muraleedharan: Presented a paper on Steric hindrance and carbamate stability of amines – a DFT-B3LYP computational analysis: National Seminar on Chemistry for Sustainable Future, at Department of Chemistry, Little Flower College, Guruvayoor on 13-14 October, 2015. (Published abstract in the proceedings)
5	Sarada. K; Vijisha. K. Rajan; K. Muraleedharan: Presented a paper on Electronic structure calculation of anhydrous Copper and Silver oxalate to predict the thermal decomposition: National Seminar on Chemistry for Sustainable Future, at Department of Chemistry, Little Flower College, Guruvayoor on 13-14 October, 2015. (Published abstract in the proceedings)
6	Vijisha. K. Rajan; K. Muraleedharan: Presented a paper on Natural bond orbital analysis of Gallic acid by Density Functional Theory: National conference on Colloquium on exotic materials and its implication in societal life, at Department of Chemistry, Sri Vyasa N S S College, Wadakkanchery, on 17-18 December, 2015.
7	Vijisha. K. Rajan; K. Muraleedharan: Presented a paper on Electroless Palladium plating on Silver powder: UGC Sponsored Graduate Seminar on Advances in Materials Chemistry, University of Calicut at the Seminar hall of the Department on 5 <sup>th</sup> December 2014.

### **Seminars organized/chaired**

1. Participated as a chair person in the scientific session of the virtual international conference on surface chemistry on 27-28 August 2020 at Annamalai University.



- Involved in the organizing committee for the national seminar on Frontiers in chemical sciences (FCS-2020) held by Department of Chemistry, University of Calicut on 29-31 January 2020.

### **Seminars attended:**

- Attended UGC sponsored one day seminar on Natural Radioactivity and its Significances organized by Department of Physics, Chemistry and Botany at SVNSS College, Wadakanchery.
  - Participated in the national conference on Advances in Organic and Physical Chemistry (AOPChem-2012), organized by Department of Chemistry, Calicut University.
  - Attended in the Science Academies' Lecture Workshop on Advances in molecular Spectroscopy organized by Department of Chemistry, Calicut University.
  - Participated in the national conference on New Materials in Chemistry (NMC-2015), organized by Department of Chemistry, Calicut University during 30-31 January 2015.
  - Participated in the national conference on Enchanting Developments in Advanced Materials (EDAM-2015), organized by Department of Chemistry, Calicut University on 27 July 2015.
  - Participated in the National seminar on Frontiers in Chemistry 2017 organized by Department of Chemistry, Calicut University on 28-30 March 2017.
17. Innovative processes developed in teaching and learning: Under this pandemic condition, online teaching has been carried out through different platforms like Google-meet, Zoom, Microsoft-teams, Moodle, Google classroom, etc. Both live classes and video lectures have been given to students. Classes were taken by power point presentations also. Exams and assignments were conducted and evaluated through Google forms, Google classroom and Moodle. Discussions on competitive examinations like CSIR-UGC, GATE, etc., and seminars on general topics have also been conducted to make students confident and updated. Written notes were also given to students on specific topics so that they can understand easily.
18. Participation in curricular development: Actively involved in the curriculum development and syllabus revision.
19. Participation in co-curricular and extra-curricular activities: Actively involved in conducting academic programs like seminars, lectures, etc., and also in conducting some cultural fests in the department.
20. Refresher and Orientation courses attended: Nil
21. Examination /Evaluation reforms initiated: Actively involved in conducting both internal and external examinations.
22. Publication of research papers: in peer reviewed journals, non-peer reviewed journals, conference proceedings, impact factors, citations, h-index. Numbers in SCOPUS.

### **Journal publications**

No	Details of paper	Journal	International or national	Publisher with ISSN	Web address of the journal	Page charges paid or not	Indexed by	Impact factor if any
1	V.A Ansi, K.R. Vijisha, K. Muraleedharan, N.K. Renuka. Fluorescent	Sensors and Actuato	I	Elsevier 0924-4247	<a href="https://www.journals.elsevier.c">https://www.journals.elsevier.c</a>	No	Scopus	2.923

	carbon nanodots as efficient nitro aromatic sensor-analysis based on computational perspectives.	rs A: Physical . 302 (2020) 111817. <a href="https://doi.org/10.1016/j.sna.2019.111817">doi=10.1016/j.sna.2019.111817</a>			<a href="https://www.sensors-and-actuators-a-physical">om/sensors-and-actuators-a-physical</a>			
2	E. Janeeshma, Vijisha K. Rajan, Jos T. Puthur. Spectral variations associated with anthocyanin accumulation; an apt tool to evaluate zinc stress in Zea mays L.	Chemistry and Ecology (2020). <a href="https://doi.org/10.1080/02757540.2020.1799993">doi=10.1080/02757540.2020.1799993</a>	I	Taylor and Francis 1029-0370	<a href="https://www.tandfonline.com/doi/full/10.1080/02757540.2020.1799993">https://www.tandfonline.com/doi/full/10.1080/02757540.2020.1799993</a>	No	Science Citation Index Expanded	1.468
3	<b>Vijisha K. Rajan</b> , Ragi. C. K, K. Muraleedharan: A computational exploration into the structure, antioxidant capacity, mechanism of radical scavenging and druglikeness of the natural food colorant Petunidin from Berries and grapes.	Heliyon , 2, e02115, 2019. <a href="https://doi.org/10.1016/j.heliyon.2019.e02115">doi=/10.1016/j.heliyon.2019.e02115</a>	I	Elsevier 0955-2863	<a href="https://www.sciencedirect.com/journal/heliyon">https://www.sciencedirect.com/journal/heliyon</a>	No	Scopus	-
4	Amitha G. S., <b>Vijisha K. Rajan</b> , K Muraleedharan, Suni Vasudevan, Amritha B, Betti base and its modified phthalonitrile derivative for the turn on fluorimetric detection of Hg <sup>2+</sup> and Cr <sup>3+</sup> ions.	Journal of Photochemistry & Photobiology A: Chemistry: 382, 2019, 111904. <a href="https://doi.org/10.1016/j.jphotochem.2019.111904">doi=10.1016/j.jphotochem.2019.111904</a>	I	Elsevier 1010-6030	<a href="https://www.sciencedirect.com/journal/journal-of-photochemistry-and-photobiology-a-chemistry">https://www.sciencedirect.com/journal/journal-of-photochemistry-and-photobiology-a-chemistry</a>	No	Scopus	3.306
5	Safna Hussan K. P.; Mohamed Shahin Thayyil; Vijisha K. Rajan; Anu Antony. <u>The Interplay between Charge Transport and CO<sub>2</sub> Capturing Mechanism in [EMIM][SCN] Ionic</u>	Journal of Physical Chemistry- B. 123 (30), 6618-6626,	I	ACS 1120-6106	<a href="https://pubs.acs.org/journal/jpcb">https://pubs.acs.org/journal/jpcb</a>	No	Scopus	3.146

	<u>Liquid: A Broadband Dielectric Study.</u>	2019. <a href="https://doi.org/10.1021/acs.jpcc.9b03929">doi=10.1021/acs.jpcc.9b03929</a>						
6	Amitha G S, <b>Vijisha K. Rajan</b> , K Muraleedharan, Suni Vasudevan, Novel 4,4'-fluoresceinoxy bisphthalonitrile showing aggregation-induced enhanced emission and fluorescence turn off behavior to Fe <sup>3+</sup> ions.	Journal of Fluorescence 29, 279-291, 2019. <a href="https://doi.org/10.1007/s10895-018-02338-0">doi=10.1007/s10895-018-02338-0</a>	I	Springer 1053-0509	<a href="https://www.springer.com/journal/10895">https://www.springer.com/journal/10895</a>	No	Scopus	2.093
7	Shameera Ahamed. T. K, <b>Vijisha K. Rajan</b> , Sabira. K, K. Muraleedharan, DFT and QTAIM based Investigation on the structure and antioxidant behavior of lichen substances Atranorin, Evernic acid and Diffractaic acid.	Computational biology and chemistry, 80, 66-78, 2019. <a href="https://doi.org/10.1016/j.compbiolchem.2019.03.009">doi=10.1016/j.compbiolchem.2019.03.009</a>	I	Elsevier 1476-9271	<a href="https://www.journals.elsevier.com/computational-biology-and-chemistry">https://www.journals.elsevier.com/computational-biology-and-chemistry</a>	No	Scopus	1.853
8	Vintu M, <b>Vijisha K. Rajan</b> , Muraleedharan K, Unnikrishnan Gopalakrishnapanicker, Suzuki coupling derived indolocarbazole based macromolecule as a solid phase/ solution phase sensor for Hg <sup>2+</sup> : Experimental and Theoretical explorations.	European Polymer Journal, 114, 287-297, 2019. <a href="https://doi.org/10.1016/j.eurpolymj.2019.02.033">doi=10.1016/j.eurpolymj.2019.02.033</a>	I	Elsevier 0014-3057	<a href="https://www.journals.elsevier.com/european-polymer-journal">https://www.journals.elsevier.com/european-polymer-journal</a>	No	Scopus	4.166
9	T.K. Shameera Ahamed, <b>Vijisha K. Rajan</b> , K. Muraleedharan: QSAR modeling of benzoquinone derivatives as 5-lipoxygenase inhibitors.	Food Science and Human Wellness, 8, 53-62, 2019. <a href="https://doi.org/10.1016/j.fshw.2019.02.009">doi=10.1016/j.fshw.2019.02.009</a>	I	KeAi 2213-4530	<a href="http://www.keaipublishing.com/en/journals/food-science-and-human-wellness/">http://www.keaipublishing.com/en/journals/food-science-and-human-wellness/</a>	No	Scopus	2.455

		<a href="#">9.02.00 1</a>						
10	K.P Safna Hussan, M. Shahin Thayyil, <b>Vijisha K. Rajan</b> , K. Muraleedharan. DFT studies on global parameters, antioxidant mechanism and molecular docking of amlodipine besylate.	Computational biology and chemistry, 80, 46-53, 2019. <a href="#">doi=10.1016/j.compbiochem.2019.03.006</a>	I	Elsevier 1476-9271	<a href="https://www.journals.elsevier.com/computational-biology-and-chemistry">https://www.journals.elsevier.com/computational-biology-and-chemistry</a>	No	Scopus	1.853
11	<b>Vijisha K. Rajan</b> ; C. K. Hasna; K. Muraleedharan. The natural food colorant Peonidin from cranberries as a potential radical scavenger- A DFT based mechanistic analysis.	Food chemistry: 262, 2018, 184-190. <a href="#">doi=10.1016/j.foodchem.2018.04.074</a>	I	Elsevier 0308-8146	<a href="https://www.journals.elsevier.com/food-chemistry">https://www.journals.elsevier.com/food-chemistry</a>	No	Scopus	6.306
12	<b>Vijisha K. Rajan</b> , Shameera Ahamed T.K., K. Muraleedharan: Studies on the UV filtering and radical scavenging capacity of the bitter masking flavanone Eriodictyol.	<u>Journal of Photochemistry and Photobiology B: Biology</u> : 185, 2018, 254-261. <a href="#">doi=10.1016/j.jphotobiol.2018.06.017</a>	I	Elsevier 1011-1344	<a href="https://www.science-direct.com/journal/journal-of-photochemistry-and-photobiology-biology">https://www.science-direct.com/journal/journal-of-photochemistry-and-photobiology-biology</a>	No	Scopus	4.383
13	<b>Vijisha K. Rajan</b> , Shameera Ahamed T.K., Hasna C.K, K. Muraleedharan: A non toxic natural food colorant and antioxidant 'Peonidin' as a pH indicator: A TDDFT analysis.	Computational biology and chemistry: 76, 2018, 202-209. <a href="#">doi=10.1016/j.compbiochem.2018.04.074</a>	I	Elsevier 1476-9271	<a href="https://www.journals.elsevier.com/computational-biology-and-chemistry">https://www.journals.elsevier.com/computational-biology-and-chemistry</a>	No	Scopus	1.853

		<a href="#">chem.2018.07.015</a>						
14	<b>Vijisha K. Rajan</b> , Shameera Ahamed T.K., K. Muraleedharan: Studies on the UV filtering and radical scavenging capacity of the bitter masking flavanone Eriodictyol.	Data in Brief 20, 2018, 981-985. <a href="#">doi=10.1016/j.dib.2018.08.149</a>	I	Elsevier 2352-3409	<a href="https://www.journals.elsevier.com/data-in-brief">https://www.journals.elsevier.com/data-in-brief</a>	No		0.287
15	Shameera Ahamed T.K., <b>Vijisha K. Rajan</b> , Sabira K, K. Muraleedharan QSAR classification-based virtual screening followed by molecular docking studies for identification of potential inhibitors of 5-Lipoxygenase.	Computational biology and chemistry 77, 2018, 154-166. <a href="#">doi=10.1016/j.compbiolchem.2018.10.002</a>	I	Elsevier 1476-9271	<a href="https://www.journals.elsevier.com/computational-biology-and-chemistry">https://www.journals.elsevier.com/computational-biology-and-chemistry</a>	No	Scopus	1.853
16	K.P. Safna Hussan, Mohamed Shaiyil, M. Binesh, S.K. Deshpande, <b>Vijisha K. Rajan</b> . Molecular dynamics in amorphous pharmaceutically important protic ionic liquid-benzalkonium chloride.	Journal of Molecular Liquids, 251, 2018, 487-491. <a href="#">doi=10.1016/j.molliq.2017.12.007</a>	I	Elsevier 0167-7322	<a href="https://www.journals.elsevier.com/journal-of-molecular-liquids">https://www.journals.elsevier.com/journal-of-molecular-liquids</a>	No	Scopus	5.065
17	K.P Safna Hussan, M. Shaiyil, <b>Vijisha K. Rajan</b> , K. Muraleedharan: Experimental and theoretical studies on a double active pharmaceutical ingredient, benzalkonium ibuprofenate.	Computational biology and chemistry, 72, 2018, 113-121. <a href="#">doi=10.1016/j.compbiolchem.2</a>	I	Elsevier 1476-9271	<a href="https://www.journals.elsevier.com/computational-biology-and-chemistry">https://www.journals.elsevier.com/computational-biology-and-chemistry</a>	No	Scopus	1.853

		<a href="#">017.12.004</a>						
18	Bassila Hassan; <b>Vijisha K. Rajan</b> ; V. M. Abdul Mujeeb; K. Muraleedharan. A DFT based analysis of adsorption of Hg <sup>2+</sup> ion on chitosan monomer and its citralidene and salicylidene derivatives: Prior to the removal of Hg toxicity.	International Journal of Biological Macromolecules : 99(1), 2017, 549-554. <a href="#">doi=10.1016/j.ijbiomac.2017.03.032</a>	I	Elsevier 0141-8130	<a href="https://www.journals.elsevier.com/international-journal-of-biological-macromolecules">https://www.journals.elsevier.com/international-journal-of-biological-macromolecules</a>	No	Scopus	5.162
19	<b>Vijisha K. Rajan</b> ; K. Muraleedharan. The pKa values of amine based solvents for CO <sub>2</sub> capture and its temperature dependence—An analysis by density functional theory.	International Journal of Greenhouse Gas Control: 58, 2017, 62-70. <a href="#">doi=10.1016/j.ijggc.2017.01.009</a>	I	Elsevier 1750-5836	<a href="https://www.journals.elsevier.com/international-journal-of-greenhouse-gas-control">https://www.journals.elsevier.com/international-journal-of-greenhouse-gas-control</a>	No	Scopus	3.698
20	T. Noushad; P. Alikutty; H. Basila; <b>Vijisha K. Rajan</b> ; K. Muraleedharan; V. M. Abdul Mujeeb. A comparative study on the druggability of Schiff bases and dithiocarbamate derivatives of chitosan.	Polymer Bulletin : 73 (8). 2016, 2165-2177. <a href="#">doi=10.1007/s00289-016-1601-y</a>	I	Springer 0170-0839	<a href="https://www.springer.com/journal/289">https://www.springer.com/journal/289</a>	No	Scopus	2.014
21	<b>Vijisha K. Rajan</b> ; K. Muraleedharan. A computational investigation on the structure, global parameters and antioxidant capacity of a polyphenol, Gallic acid.	Food chemistry: 220, 2016, 93-99. <a href="#">doi=10.1016/j.foodchem.2016.09.178</a>	I	Elsevier 0308-8146	<a href="https://www.journals.elsevier.com/food-chemistry">https://www.journals.elsevier.com/food-chemistry</a>	No	Scopus	6.306

22	K. Sarada; <b>Vijisha K. Rajan</b> ; K. Muraleedharan; Exploration of the thermal decomposition of oxalates of copper and silver by experimental and computational methods.	Journal of Analytical and Applied Pyrolysis: 120, 2016, 207-214. <a href="https://doi.org/10.1016/j.jaap.2016.05.007">doi=10.1016/j.jaap.2016.05.007</a>	I	Elsevier 0165-2370	<a href="https://www.journals.elsevier.com/journal-of-analytical-and-applied-pyrolysis">https://www.journals.elsevier.com/journal-of-analytical-and-applied-pyrolysis</a>	No	Scopus	4.296
23	K.P.Safna Hussan, M. Shahin Thayyil, S.K.Deshpande, T.V.Jinitha, <b>Vijisha K. Rajan</b> , K.L.Ngai. Synthesis and molecular dynamics of double active pharmaceutical ingredient Benzalkonium Ibuprofenate.	Journal of Molecular Liquids, 223, 2016, 1333-1339. <a href="https://doi.org/10.1016/j.molliq.2016.09.054">doi=10.1016/j.molliq.2016.09.054</a>	I	Elsevier 0167-7322	<a href="https://www.journals.elsevier.com/journal-of-molecular-liquids">https://www.journals.elsevier.com/journal-of-molecular-liquids</a>	No	Scopus	5.065
24	K. Muraleedharan; <b>Vijisha K. Rajan</b> ; V. M. Abdul Mujeeb. Green synthesis of pure and doped semiconductor nanoparticles of ZnS and CdS:	Transactions of Nonferrous Metal Society of China: 25, 2014, 3265-3270. <a href="https://doi.org/10.1016/S1003-6326(15)63963-2">doi=10.1016/S1003-6326(15)63963-2</a>	I	Taylor and Francis 1003-6326	<a href="https://www.journals.elsevier.com/transactions-of-nonferrous-metals-society-of-china">https://www.journals.elsevier.com/transactions-of-nonferrous-metals-society-of-china</a>	No	Science Citation Index Expanded	2.615

### **Seminar presentations**

International	
1	Vijisha. K. Rajan; K. Muraleedharan: Presented a poster on Preparation and characterization of Pure and Doped Semiconductors of ZnS and CdS: International Conference on advances in new materials conducted by Department of Inorganic Chemistry, University of Madras, Chennai-600025. (Published abstract in the proceedings) ISSN = 978-81-89843-57-1.
2	Vijisha. K. Rajan; K. Muraleedharan: Presented a paper on Determination of Gas phase Gibbs free energy of amines and alkanolamines- A Computational study: International Seminar "Saturnalia

	of Crystallography” organized by the Department of Chemistry, Little Flower College, Guruvayoor, Thrissur on 24 <sup>th</sup> July 2014. (Published abstract in the proceedings)
3	Vijisha. K. Rajan; K. Muraleedharan: Presented a poster on Study of antiferromagnetic coupling interactions by Density Functional Theory: International conference on Nanomaterials for energy, environment, catalysis and sensors (ICNEECS-2015), at Department of Physical Chemistry, Madurai kamaraj Univeristy, Madurai on 11-12 December, 2015. (Published abstract in the proceedings)
4	K.P. Safna Hussan, M. Shahin Thayyil, S.K. Deshpande, T.V. Jinitha, Vijisha K. Rajan, K.L. Ngai: Molecular Dynamics of double active pharmaceutical ingredient- benzalkonium ibuprofenate studied by Broadband Dielectric Spectroscopy; 8 <sup>th</sup> International Discussion Meeting on Relaxations in Complex Systems, Wista, Poland, 2017. ISBN 978-83-226-3251-2
National	
1	Vijisha. K. Rajan; K. Muraleedharan: presented a paper on DFT-B3LYP study of electronic properties of Gallic acid: UGC sponsored National Seminar on Recent Advances in Chemistry, organized by the Department of Chemistry, Kandaswami Kandar’s College, Tamil Nadu, on 13-14 August 2015. (Published full paper in the proceedings) ISBN: 978-93-84443-51-1.
2	Vijisha. K. Rajan; K. Muraleedharan: Presented a paper on DFT based calculation of Gas phase basicity and proton affinity of alkylamines: National Seminar on Recent Advances in Chemistry (NSRAC-15), at Department of Chemistry, St.Mary’s College, Thrissur on 19 <sup>th</sup> August 2015. (Published full paper in the proceedings)
3	Vijisha. K. Rajan; K. Muraleedharan: presented a paper on DFT-B3LYP Study of electronic properties and uv-visible spectra of triamterene molecule: National Seminar on Recent Advances in Material Science (RAMS-2015), at Department of Physics, T. M. Govt. College, Tirur on 30 <sup>th</sup> Sep- 1 <sup>st</sup> Oct, 2015. (Published full paper in the proceedings)
4	Vijisha. K. Rajan; K. Muraleedharan: Presented a paper on Steric hindrance and carbamate stability of amines – a DFT-B3LYP computational analysis: National Seminar on Chemistry for Sustainable Future, at Department of Chemistry, Little Flower College, Guruvayoor on 13-14 October, 2015. (Published abstract in the proceedings)
5	Sarada. K; Vijisha. K. Rajan; K. Muraleedharan: Presented a paper on Electronic structure calculation of anhydrous Copper and Silver oxalate to predict the thermal decomposition: National Seminar on Chemistry for Sustainable Future, at Department of Chemistry, Little Flower College, Guruvayoor on 13-14 October, 2015. (Published abstract in the proceedings)
6	Vijisha. K. Rajan; K. Muraleedharan: Presented a paper on Electroless Palladium plating on Silver powder: UGC Sponsored Graduate Seminar on Advances in Materials Chemistry, University of Calicut at the Seminar hall of the Department on 5 <sup>th</sup> December 2014.

23. Books published: with ISBN No., Without ISBN No., Chapters in books.

No	Chapter	Book	Publication	ISSN/ISBN
1	Vijisha. K. Rajan; K. Muraleedharan. Study of pKa values of alkylamines based on density functional theory.	Computational Chemistry Methodology in structural Biology and Material Sciences, (Part I, Chapter 1)	Taylor & Fransis.CRC Press	ISBN: 9781771885683
2	Vijisha.K.Rajan; K. Muraleedharan; Computational study of complexes of delphinidin with Al <sup>3+</sup> and Ni <sup>2+</sup> - prior to reduce the metal toxicity.	Heavy metals and metalloids in biosphere - Impacts and assessment; ENVBOOK series	DPH Pvt. Ltd. 2016.	ISBN: 978-93-5056-860-6.
3	Vijisha. K. Rajan, K. Muraleedharan, K.P Safna	Polyphenols: Prevention and Treatment of Human diseases.	Elsevier, 2018	ISBN: 978-0-12-813008-7



	Hussan. Theoretical structural evaluation and toxicological study of a bitter masking bioactive flavanone, 'Eriodictyol' from Rose hip.	(Volume 2, Chapter 5)		
4	<b>Vijisha K. Rajan</b> , Sarada K, K. Muraleedharan. Electroless palladium plating on silver powder.	Advanced materials in Chemistry (chapter 4)	Department of Chemistry, University of Calicut	-
5	Vinduja P., Vijisha K. Rajan, Swathi Krishna, K. Muraleedharan A computational modelling of the structure, Frontier Molecular Orbital (FMO) analysis, and global & local reactive descriptors of a phytochemical 'Coumestrol'	Computational Modeling Of Nanomaterials: Spintronics, Porous Materials And Composites-2019	Apple Academic Press, CRC Press and Taylor & Francis Group From USA and Canada	

24. Patents Applied/Granted: National. International, commercialized: Nil

25. Consultancy services provided and revenue generated: Nil

26. Conferences ,seminars, symposia and workshops organized as convener/coordinator:

1. Participated as a chair person in the scientific session of the virtual international conference on surface chemistry on 27-28 August 2020 at Annamalai University.
2. Involved in the organizing committee for the national seminar on Frontiers in chemical sciences (FCS-2020) held by Department of Chemistry, University of Calicut on 29-31 January 2020.

27. Number of collaborations: 4

28. Awards /recognitions received: International, National, State, University level:

1. Qualified UGC-JRF (81<sup>th</sup> rank) in the CSIR-UGC examination held on 22-12-2013.
2. First position in M.Phil. Chemistry examination 2013 by Calicut University.
3. Awarded the post metric rank scholarship for rank holders funded by UGC during 2010-2012.
4. Awarded State Merit Scholarship 2010-2012.
5. Awarded the Kanakam Thampuram Memorial Prize for securing highest mark in courses Quantum Chemistry and Group Theory and Spectroscopy of the M. Sc. Applied Chemistry Examinations (2010-2012) held by Calicut University.
6. Awarded the Prof. M. P. Kannan Endowment Prize for securing highest index mark in courses Quantum Chemistry, Group Theory and Spectroscopy, of the M. Sc. Applied Chemistry Examinations (2010-2012) held by Calicut University.
7. First rank in B.Sc. Chemistry Examination 2010 held by University of Calicut.

Note: If necessary for Item No. 11 and 12 provide information in Enclosure-I, for 13, 14 and 15 Enclosure- II, for 16 Enclosure-III, for 22 and 23 Enclosure- IV and so on.

\*\*\*\*\*

# Department of Nanoscience and Technology

## Faculty Profile

(for last five years from 2016-17 to 2020-21)

1. Name of the faculty: **Dr. Kishore Sridharan**
2. Name of the Department: Department of Nanoscience and Technology
3. Educational qualifications: B.Sc. Physics, M.Sc. Physics, M. Tech. Nanotechnology and Ph.D. Materials Science and Engineering
4. Present position: UGC-Assistant Professor
5. Address for correspondence: 150, KMC Quarters, End Point Road, Manipal, Udupi 576104
6. E-mail and contact number: sridharankishore@uoc.ac.in, 9444146036
7. Specialization: Nanostructured materials synthesis, photocatalysis, optical nonlinearity
8. Total teaching experience: 6 years
9. Courses taught:
  - NST.102 Structure and Bonding in Solids
  - NST.105 Nano Lab – I
  - NST.202 Characterization Techniques of Nanomaterials
  - NST.301 Advanced Nanomaterials
10. Research experience: 7 years
11. Major research projects completed: Title of the project, Date of sanction and Duration, Grant received, Funding agency. PI or Co-PI.
  - Title of the project:** Fabrication of stable semiconductor nanostructures using atomic layer deposition technique for environmental remediation and solar-fuel generation
  - Date of sanction:** 01.10.2015
  - Duration:** 5 years
  - Grant received:** Rs.35,00,000/-
  - Funding agency:** Department of Science and Technology
  - PI or Co-PI:** Principal Investigator
12. Minor research projects completed: Title of the project, Date of sanction and Duration, Grant received, Funding agency. PI or Co-PI.

Nil

13. Number of students awarded Ph.D. degree: Name of the student, topic of research, date of registration, date of declaration of Ph.D. degree.

**Name of the student:** Sulakshana Shenoy

**Topic of research:** Photo-physical studies and bandgap engineering on transition metal dichalcogenides for applications in photocatalysis

**Date of registration:** 21.07.2016

**Date of declaration of Ph.D. degree:** Thesis submitted

14. Number of students registered for Ph.D. degree: Name of the student, topic of research, date of registration.

Nil

15. Provide information as indicated in 11 and 12 above.

16. Participation in conferences, symposia, seminars and workshops: International, national, state or university level, attended. Presented paper, chaired session. Resource person.

**Invited Lecture/Talks delivered as resource person:**

1. “Materials Science at the Nanoscale”, as Resource person of the 3rd Refresher Course in Materials Science: Recombinant Memetics, 23rd November 2020, UGC-Human Resource Development Centre, University of Calicut, P.O. Thenhipalam 673635, Kerala, India

2. “Role of Nanostructured Materials in addressing the challenges of the 21st Century”, as Resource person of the Webinar, 14th July 2020, Department of Science & Humanities, M. Kumarasamy College of Engineering, Karur – 639113, Tamil Nadu, India

3. “Nanoscience: Convergence of Physics and Chemistry Concepts”, 11<sup>th</sup> December 2019, “Winter School in Basic Sciences” UGC-Human Resource Development Centre, Kannur University, Kannur – 670002, Kerala, India

4. “*Design and development of functional nanostructured materials*”, 1<sup>st</sup> September 2018, Department of Atomic and Molecular Physics, Manipal Academy of Higher Education, Manipal – 576104, Karnataka, India

5. “*Introduction to Functional Nanostructured Materials and their Characterization*”, 16<sup>th</sup> August 2017, Department of Physics, St. Agnes College, Mangaluru – 575002, Karnataka, India

17. Innovative processes developed in teaching and learning: Nil

18. Participation in curricular development:

Contributed in revising the curriculum and syllabus of M.Tech. Nanoscience and Technology program for 2021-22 admission onwards. Developed a new elective course based on my expertise titled “NST.304-C Nanomaterials for Photocatalysis and Solar Fuel Generation”.

19. Participation in co-curricular and extra-curricular activities:

**Editorial Board Member:**

1. Journal of Nanomaterials (No. of Edited Articles: 4)
2. International Journal of Photoenergy (No. of Edited Articles: 1)

20. Refresher and Orientation courses attended: 1

Successfully completed 4-week Induction/Orientation Programme for “Faculty in Universities/Colleges/Institutes of Higher Education” from June 26 – July 24, 2020 and obtained A+ grade, organized by *Teaching Learning Centre, Ramanujan College, University of Delhi*

21. Examination /Evaluation reforms initiated: Nil

22. Publication of research papers: in peer reviewed journals, non-peer reviewed journals, conference proceedings, impact factors, citations, h-index. Numbers in SCOPUS.

**ORCID:** <https://orcid.org/0000-0002-2099-2962>

**Google Scholar:** [http://scholar.google.co.in/citations?user=Yv\\_1FvkAAAAJ](http://scholar.google.co.in/citations?user=Yv_1FvkAAAAJ)

**Publons:** <https://publons.com/researcher/2834336/kishore-sridharan/>

**Publications in peer reviewed journals:**

1. Advanced Two-Dimensional Heterojunction Photocatalysts of Stoichiometric and Non-Stoichiometric Bismuth Oxyhalides with Graphitic Carbon Nitride for Sustainable Energy and Environmental Applications

**Kishore Sridharan\***, Sulakshana Shenoy, S. Girish Kumar, Chiaki Terashima, Akira Fujishima and Sudhagar Pitchaimuthu

*Catalysts* 11 (2021) 426 (Impact Factor: 3.520, Citations: 0)

**DOI Link:** <https://doi.org/10.3390/catal11040426>

2. Bimetallic nanoparticles grafted ZnO hierarchical structures as efficient visible light driven photocatalyst: An experimental and theoretical study

Sulakshana Shenoy, Kartick Tarafder and **Kishore Sridharan\***

*Journal of Molecular Structure* 1236 (2021) 130355 (Impact Factor: 2.463, Citations: 0)

**DOI Link:** <https://doi.org/10.1016/j.molstruc.2021.130355>

3. Rapid sonochemical synthesis of copper doped ZnO grafted on graphene as a multi-component hierarchically structured visible-light-driven photocatalyst

Sulakshana Shenoy, Saeed Ahmed, Irene MC Lo, Shubra Singh and **Kishore Sridharan\***

*Materials Research Bulletin* 140 (2021) 111290 (Impact Factor: 4.019, Citations: 0)

**DOI Link:** <https://doi.org/10.1016/j.materresbull.2021.111290>

4. Bismuth oxybromide nanoplates embedded on activated charcoal as effective visible light driven photocatalyst

Sulakshana Shenoy and **Kishore Sridharan\***

*Chemical Physics Letters* **749** (2020) 137435 (Impact Factor: 1.901, Citations: 6)

DOI Link: <https://doi.org/10.1016/j.cplett.2020.137435>

5. Graphitic C<sub>3</sub>N<sub>4</sub>/CdS composite photocatalyst: Synthesis, characterization and photodegradation of methylene blue under visible light

Sulakshana Shenoy, Kartick Tarafder and **Kishore Sridharan\***

*Physica B: Physics of Condensed Matter* **595** (2020) 412367 (Impact Factor: 1.90, Citations: 3)

DOI Link: <https://doi.org/10.1016/j.physb.2020.412367>

5. Ultrashort and short pulse nonlinear optical investigations in thiolated nine-atom silver quantum clusters embedded in one-dimensional TiO<sub>2</sub> nanotube matrix

**Kishore Sridharan\***, Pranitha Sankar and Reji Philip\*

*Optical Materials* **94** (2019) 53-57 (Impact Factor: 2.320, Citations: 2)

DOI Link: <https://doi.org/10.1016/j.optmat.2019.05.033>

6. Cadmium sulfide nanostructures: Influence of morphology on the photocatalytic degradation of erioglaucine and hydrogen evolution

Sulakshana Shenoy, Eunyong Jang, Tae Joo Park, Chinnakonda S. Gopinath and **Kishore Sridharan\***

*Applied Surface Science* **483** (2019) 696-705 (Impact Factor: 4.439, Citations: 18)

DOI Link: <https://doi.org/10.1016/j.apsusc.2019.04.018>

7. Porous cobalt chalcogenide nanostructures as high performance pseudo-capacitor electrodes

Karthik S. Bhat, Sulakshana Shenoy, H.S. Nagaraja and **Kishore Sridharan\***

*Electrochimica Acta* **248** (2017) 188-196 (Impact Factor: 5.116, Citations: 26)

DOI Link: <https://doi.org/10.1016/j.electacta.2017.07.137>

8. Crystallization kinetics of Sn doped Ge<sub>20</sub>Te<sub>80-x</sub>Sn<sub>x</sub> (0 ≤ x ≤ 4) chalcogenide glassy alloys

Brian Jeevan Fernandes, N. Naresh, K. Ramesh, **Kishore Sridharan\***, and N. K. Udayashankar\*

*Journal of Alloys and Compounds* **721** (2017) 674-682 (Impact Factor: 3.779, Citations: 17)

DOI Link: <https://doi.org/10.1016/j.jallcom.2017.06.070>

9. Melt quenched vanadium oxide embedded in graphene oxide sheets as composite electrodes for amperometric dopamine sensing and lithium ion battery applications

M. Sreejesh, Sulakshana Shenoy, **Kishore Sridharan\***, D. Kufian, A.K. Arof and H.S. Nagaraja\*

*Applied Surface Science* **410** (2017) 336-343 (**Impact Factor: 4.439, Citations: 7**)

**DOI Link:** <http://doi.org/10.1016/j.apsusc.2017.02.246>

10. Ultrafast and short pulse optical nonlinearity in isolated, sparingly sulfonated water-soluble graphene

Sreekanth P, **Kishore Sridharan**,\* D. Koushik, P. Sankar, V.P.M. Pillai and Reji Philip\*

*Carbon* **111** (2017) 283-290 (**Impact Factor: 7.082, Citations: 15**)

**DOI Link:** <http://dx.doi.org/10.1016/j.carbon.2016.10.009>

11. Nonlinear transmission and optical power limiting in Magnesium ferrite nanoparticles: effects of laser pulsewidth and particle size

Sreekanth P, **Kishore Sridharan**,\* A.R. Abraham, H.P. Janardhanan, N. Kalarikkal and Reji Philip

*RSC Advances* **6** (2016) 106754-106761 (**Impact Factor: 3.119, Citations: 24**)

**DOI Link:** <http://dx.doi.org/10.1039/C6RA15788B>

13. Microwave assisted growth of stannous ferrite microcubes as electrodes for potentiometric nonenzymatic H<sub>2</sub>O<sub>2</sub> sensor and supercapacitor applications

Bindu K, **Kishore Sridharan**,\* Ajith K.M., H.N. Lim and H.S. Nagaraja\*

*Electrochimica Acta* **217** (2016) 139-149 (**Impact Factor: 6.215, Citations: 35**)

**DOI Link:** <http://dx.doi.org/10.1016/j.electacta.2016.09.083>

14. Eliminated phototoxicity of TiO<sub>2</sub> particles by atomic-layer-deposited Al<sub>2</sub>O<sub>3</sub> coating layer for UV-protection applications

Eunyong Jang, **Kishore Sridharan**, Young Min Park and Tae Joo Park

*Chemistry - A European Journal* **22** (2016) 12022-12026 (**Impact Factor: 4.857, Citations: 21**)

**DOI Link:** <http://dx.doi.org/10.1002/chem.201600815>

15. Memory type switching behavior of ternary Ge<sub>20</sub>Te<sub>80-x</sub>Sn<sub>x</sub> (0 ≤ x ≤ 4) chalcogenide compounds

Brian Jeevan Fernandes, **Kishore Sridharan**,\* P. Munga, K. Ramesh and N. K. Udayashankar\*

*Journal of Physics D: Applied Physics* **49** (2016) 295104 (**Impact Factor: 3.169, Citations: 15**)

**DOI Link:** <http://dx.doi.org/10.1088/0022-3727/49/29/295104>

23. Books published: with ISBN No., Without ISBN No., Chapters in books: Nil

24. Patents Applied/Granted: National. International, commercialized: Nil

25. Consultancy services provided and revenue generated: Nil
26. Conferences, seminars, symposia and workshops organized as convener/coordinator: Nil
27. Number of collaborations: 5

1. Dr. Sudhagar Pitchaimuthu  
Group Leader, Multifunctional Photocatalyst & Coating,  
SPECIFIC, Materials Research Centre,  
College of Engineering, Swansea University  
Bay Campus, Swansea SA1 8EN  
United Kingdom.

2. Dr. Irene M. C. LO,  
Chair Professor  
Department of Civil & Environmental Engineering,  
The Hong Kong University of Science & Technology  
Clear Water Bay, Hong Kong

3. Dr. Chinnakonda S. Gopinath  
Chief Scientist  
Chair, Catalysis and Inorganic chemistry division  
National Chemical Laboratory  
Dr. Homi Bhabha Road  
Pune 411008, India

4. Dr. Reji Philip  
Professor  
Light and Matter Physics Group  
Raman Research Institute  
C.V. Raman Avenue, Sadashivanagar  
Bangalore 560080, India

5. Dr. Tae Joo Park  
Professor  
Department of Materials Science and Chemical Engineering  
Hanyang University, Ansan 15588  
Republic of Korea

28. Awards /recognitions received: International, National, State, University level: 4

**National:**

1. DST INSPIRE Faculty Award, Ministry of Science and Technology, Government of India, Aug 2015

**International:**

1. Brain Korea 21 Plus (BK21<sup>+</sup>) Postdoctoral Fellowship, Republic of Korea, Sep 2014
2. Best Ph.D. Thesis Award, Hanyang University, Republic of Korea, Aug 2014

3. Best Poster Award, *International Nanophotonics and Nanoenergy Conference (INPEC) 2014*,  
Ewha Womans University, Seoul, Republic of Korea, July 2014

Note: If necessary for Item No. 11 and 12 provide information in Enclosure-I, for 13,14 and 15 Enclosure-II, for 16 Enclosure-III, for 22 and 23 Enclosure- IV and so on.

\*\*\*\*