Bio-Data

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(Annamalai University Faculty on Deputation Basis)

Designation **: Associate Professor**
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Academic Qualifications **: M.Sc., Ph.D.**

Professional Experience (Teaching: 18 years; Research: 22 years)

- **Associate Professor**
  School of Physics
  Madurai Kamaraj University *Nov 2020- present*
  Madurai--625 021
- Associate Professor
  Department of Physics *Aug 2015- Nov 2020*
  Annamalai University
  Annamalainagar-608 002
- Assistant Professor *Aug 2003- Aug 2015*
  Department of Physics
  Annamalai University

Field of Specialization

- *Applied Spectroscopy*
- *Molecular Physics*
- *Nuclear and Particle Physics*
- *Biomedical Instrumentation*

Research Interests/Areas

- *Biophotonics*
- *Cancer Theranostics*
- *Nanomedicine*
- *Nanomaterials for Energy and Environmental Applications*

RESEARCH SUPERVISION

Programmes	Completed	Ongoing
M.Phil	23	-
Ph.D	06	04

RESEARCH COLLABORATION (BOTH INTERNATIONAL & NATIONAL)

Name of the collaborators	Institution	Collaboration details	Collaboration Output
Dr. J. Kavikumar	Department of Science and Mathematics, Universiti Tun Hussein Onn, Malaysia	Research Collaboration	Research papers and Book Chapters
Dr. R. S. Jayasree	Scientist F Division of Biophotonics and Imaging Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST), Trivandrum, India	Research Collaboration	4 papers have been published

Dr. C. Murali Krishna	Scientist F PI and Scientific Officer, The Advanced Centre for Treatment, Research and Education in Cancer *(*ACTREC), Navi Mumbai	Research Collaboration	2 papers have been published
Dr. N. Ponpandian	Professor and Head, Department of Nanoscience and Technology, Bharathiar University, Coimbatore	Research Collaboration	4 papers have been published
Dr.B. Deva Prasad Raju	Professor, Department of Future Studies, Sri Venkateswara University, Tirupati	Research Collaboration	Research papers
Dr. Basudev Roy	Assistant Professor, Department of Physics, Indian Institute of Technology Madras (IIT-Madras), Chennai	Research Collaboration	Research papers
Dr. N. Rajendra Prasad	Associate Professor, Department of Biochemistry Biotechnology, Annamalai University	Research Collaboration	4 papers have been published

Publications

1. Saranya S, Dhanapandian S, Sankaranarayanan Nagarajan, Suthakaran S, **Krishnakumar N**, Hydrothermal synthesis and characterization of nanostructured nickel diselenide ($NiSe_2$) from the decomposition of nickel acetate tetrahydrate (Ni $(CH3COO)_2).4H_2O$. ***Materials Letters***, 2020, 277:128398. doi.org/10.1016/j.matlet.2020.128398. **[Impact Factor 3.423].**
2. Suthakaran S, Dhanapandian S, **Krishnakumar N**, Ponpandian N. Hydrothermal synthesis of surfactant assisted Zn doped SnO_2 nanoparticles with enhanced photocatalytic performance and energy storage performance

Journal of Physics and Chemistry of Solids, 2020,141:109407. https://doi.org/10.1016/j.pcs.2020.109407. **[Impact Factor 3.995].**

3. Suthakaran S, Dhanapandian S, **Krishnakumar N**, Ponpandian N. Surfactant-assisted hydrothermal synthesis of Zr doped SnO_2 nanoparticles with photocatalytic and supercapacitor applications, ***Materials Science in Semiconductor Processing***, 2020, 111: 104982. https://doi.org/10.1016/j.mssp..2020.104982. **[Impact Factor 3.927]**
4. Venkatachalam P, Kalaivani T, **Krishnakumar N**. Erbium doped anatase TiO_2 nanoparticles for photovoltaic applications. ***Optical and Quantum Electronics***. 2019, 51:315. https://doi.org/10.1007/s11082-019-2034-2. **[Impact Factor 2.084].**
5. Venkatachalam P, Kalaivani T, **Krishnakumar N**. Perovskite sensitized erbium doped TiO_2 photoanode solar cells with enhanced photovoltaic performance. ***Optical Materials***. 2019, 94:1-8. https://doi.org/10.1016/j.optmat.2019.05.039 **[Impact Factor 3.080]**
6. Suthakaran S, Dhanapandian S, **Krishnakumar N**, Ponpandian N. Surfactants assisted SnO_2 nanoparticles synthesized by a hydrothermal approach and potential applications in water purification and energy conversion. ***Journal of Materials Science: Materials in Electronics***. 2019, 30:13174-13190, Doi.org/10.1007/s10854-019-01681-7. **[Impact Factor 2.478].**
7. Suthakaran S, Dhanapandian S, **Krishnakumar N**, Ponpandian N. Hydrothermal synthesis of SnO_2 nanoparticles and its photocatalytic degradation of methyl violet and electrochemical performance. ***Materials Research Express***. 2019;6(8):0850i3. Doi.org/10.1088/2053-1591/ab29c2. **[Impact Factor 1.620].**
8. Adavallan K, Gurushankar K, Nazeer SS, Gohulkumar M, Jayasree RS, **Krishnakumar N**. Optical redox ratio using endogenous fluorescence to assess the metabolic changes associated with treatment response of bioconjugated gold nanoparticles in streptozotocin-induced diabetic rats. ***Laser Physics Letters***. 2017, 14:065901. Doi.org/10.1088/1612-202X/aa6b21. **[Impact Factor 2.016].**

9. Anandan M, Dinesh S, **Krishnakumar N**, Balamurugan K. Tuning the crystalline size of template free hexagonal ZnO nanoparticles via precipitation synthesis towards enhanced photocatalytic performance. ***Journal of Materials Science: Materials in Electronics***. 2017, 28:2574-85. DOI: 10.1007/s10854-016-5833-2. **[Impact Factor 2.478]**
10. Anandan M, Dinesh S, **Krishnakumar N**, Balamurugan K. Influence of Co doping on combined photocatalytic and antibacterial activity of ZnO nanoparticles. ***Materials Research Express***. 2016, 3:115009. DOI:10.1088/2053-1591/3/11/115009.**[Impact Factor 1.620]**
11. Anandan M, Dinesh S, **Krishnakumar N**, Balamurugan K. Improved photocatalytic properties and anti-bacterial activity of size reduced ZnO nanoparticles via PEG-assisted precipitation route. ***Journal of Materials Science: Materials in Electronics***. 2016, 27:12517-26. DOI: 10.1007/s10854-016-5764-y. **[Impact Factor 2.478]**
12. Sethupathi R, Gurushankar K, **Krishnakumar N**. Optical redox ratio differentiates early tissue transformations in DMBA-induced hamster oral carcinogenesis based on autofluorescence spectroscopy coupled with multivariate analysis. ***Laser Physics***. 2016, 26(11):116202. DOI: 10.1088/1054-660X/26/11/116202 **[Impact Factor 1.366]**
13. Gurushankar K, Gohulkumar M, Kumar P, Krishna CM, **Krishnakumar N**. Raman spectroscopy detects biomolecular changes associated with nanoencapsulated hesperetin treatment in experimental oral carcinogenesis. ***Laser Physics Letters***. 2016, 21;13:035901. DOI:10.1088/1612-2011/13/3/035901 **[Impact Factor 2.016]**
14. Sethupathi R, Gohulkumar M, **Krishnakumar N**. Optical diagnosis approach for the early detection of tissue transformation in DMBA induced oral carcinogenesis using fluorescence spectroscopy coupled with multivariate analysis. ***Optik***. 2016, 127:4205-10. DOI: 10.1016/j.ijleo.2015.12.143 **[Impact Factor: 2. 443].**
15. Gohulkumar M, Kumar P, Murali Krishna C, **Krishnakumar N**. Evaluation of Raman spectroscopy for prediction of antitumor response to silibinin and its

nanoparticulates in DMBA-induced oral carcinogenesis. ***Journal of Raman Spectroscopy***. 2016, 47:375-83. DOI: 10.1002/jrs.4831 **[Impact Factor: 3.133].**

16. Gurushankar K, Nazeer SS, Jayasree RS, **Krishnakumar N**. Evaluation of antitumor activity of hesperetin-loaded nanoparticles against DMBA-induced oral carcinogenesis based on tissue autofluorescence spectroscopy and multivariate analysis. ***Journal of Fluorescence***. 2015, 25:931-9. DOI: 10.1007/s10895-015-1575-4. **[Impact Factor: 2.217].**
17. Gohulkumar M, Nazeer SS, Jayasree RS, Gurushankar K, **Krishnakumar N**. Monitoring the metabolic response to nanoencapsulated silibinin treatment in DMBA-induced oral carcinogenesis using endogenous fluorescence. ***Analytical Methods***. 2014, 6:9744-53. DOI: 10.1039/c4ay01877j. **[Impact Factor: 2.896].**
18. Gurushankar K, Nazeer SS, Gohulkumar M, Jayasree RS, **Krishnakumar N**. Endogenous porphyrin fluorescence as a biomarker for monitoring the anti-angiogenic effect in antitumor response to hesperetin loaded nanoparticles in experimental oral carcinogenesis. ***RSC Advances***. 2014, 4:46896-906. DOI: 10.1039/c4ra06140c. **[Impact Factor:3.361].**
19. Gohulkumar M, Gurushankar K, Prasad NR, **Krishnakumar N**. Enhanced cytotoxicity and apoptosis-induced anticancer effect of silibinin-loaded nanoparticles in oral carcinoma (KB) cells. ***Materials Science and Engineering: C.*** 2014, 41:274-82. DOI: 10.1016/j.msec.2014.04.056. **[Impact Factor: 7.328].**
20. Adavallan K, **Krishnakumar N**. Mulberry leaf extract mediated synthesis of gold nanoparticles and its anti-bacterial activity against human pathogens. ***Advances in Natural Sciences: Nanoscience and Nanotechnology*** *(IOP).* 2014, 5:025018. DOI:10.1088/2043-6262/5/2/025018.
21. Muthuvel A, Adavallan K, Balamurugan K, **Krishnakumar N.** Biosynthesis of gold nanoparticles using Solanum nigrum leaf extract and screening their free radical scavenging and antibacterial properties. ***Biomedicine & Preventive Nutrition*** *(Elsevier).* 2014 , 4:325-32. DOI:10.1016/j.bionut.2014.03.004.
22. Gurushankar K, Gohulkumar M, Rajendraparasad N, **Krishnakumar N,** Synthesis, characterization and *in vitro* anti-cancer evaluation of hesperetin-

loaded nanoparticles in human oral carcinoma (KB) cells, ***Advances in Natural Sciences: Nanoscience and Nanotechnology*** *(IOP)*, 2014, ***5***: 15006. DOI:10.1088/2043-6262/5/1/015006. **[Best paper (Highlights in 2014)].**

23. Venkatachalam P, Joby N, **Krishnakumar N,** Enhanced photovoltaic characterization and charge transport of TiO_2 nanoparticles/ nanotubes composite photoanode based on indigo carmine dye-sensitized solar cells**,** ***J Sol-Gel Sci Technology*****,** 2013, 67: 618-628, DOI: 10.1007/s10971-013-3121-7**.** [**Impact Factor 2.326].**
24. **Krishnakumar N**, Sulfikkarali NK, Manoharan S, Nirmal Madhavan R, Screening of chemopreventive effect of naringenin-loaded nanoparticles in DMBA-induced hamster buccal pouch carcinogenesis by FT-IR spectroscopy, ***Molecular and Cellular Biochemistry*****,** 2013, 382: 27-36. DOI: 10.1007/s11010-013-1715-6. **[Impact Factor: 3.396].**
25. Sulfikkarali NK, **Krishnakumar N,** S.Manoharan S, Venkatachalam P, Raman spectroscopic investigation of the chemopreventive response of naringenin and its nanoparticles on DMBA-induced experimental oral carcinogenesis, ***Spectrochimica Acta part A*** 2013, 67: 618-628. DOI:10.1016/j.saa.2013.05.076. [**Impact Factor: 4.098].**
26. Sulfikkarali NK, **Krishnakumar N**, Manoharan S, Nirmal Madhavan R, Chemopreventive efficacy of naringenin-loaded nanoparticles in 7,12 dimethylbenz[a]anthracene induced experimental oral carcinogenesis, ***Pathology & Oncology Research,*** 2013, 19: 287-296. DOI: 10.1007/s12253-012-9581-1. [**Impact Factor: 3.201].**
27. Sulfikkarali NK, **Krishnakumar N**, Evaluation of chemopreventive response of naringenin-loaded nanoparticles in experimental oral carcinogenesis using Laser-induced autofluorescence spectroscopy, ***Laser Physics,*** 2013, 23:045601. DOI:10.1088/1054-660X/23/4/045601. **[Impact Factor: 1.366].**
28. **Krishnakumar N**, Milton Prabu S, Sulfikkarali NK, Quercetin protects against cadmium-induced biochemical and structural changes in rat liver revealed by

FT-IR spectroscopy, ***Biomedicine and Preventive Nutrition(Elsevier)***, 2012, 2:79-285. DOI:10.1016/j.bionut.2012.03.010.

29. Pramod KS, Vijayasundaram V, **Krishnakumar N,** Palaniappan PL RM, The effect of titanium dioxide exposure on the thermal properties of Zebrafish (Danio rerio) bones. ***Journal of Thermal Analysis and Calorimetry,*** 2012, *108.133-139.* DOI: 10.1007/s10973-011-1774-4. [**Impact Factor: 4.626].**
30. **Krishnakumar N**, Sulfikkarali NK, Rajendraprasad N, Karthikeyan S, Enhanced anticancer activity of naringenin-loaded nanoparticles in human cervical (HeLa) cancer cells. ***Biomedicine and Preventive Nutrition(Elsevier)***, 20111:223-231.DOI: 10.1016/j.bionut.2011.09.003.
31. **Krishnakumar N,** Palaniappan PL RM, Manoharan S, Arun Manohar MG, Chemopreventive efficacy of piperine in 7, 12-dimethyl benz [a] anthracene (DMBA)-induced hamster buccal pouch carcinogenesis: An FT-IR study. ***Food and Chemical Toxicology,*** 2009, 47:2813–2820. DOI:10.1016/j.fct.2009.08.017**. [Impact Factor: 6.023].**
32. Palaniappan PL RM , **Krishnakumar N,** Vadivelu M, Vijayasundaram V, The study of the changes in the biochemical and mineral contents of bones of *Catla catla* due to lead intoxication. ***Environmental Toxicology,*** 2009, 25: 61-67. DOI: 10.1002/tox.20475. [**Impact Factor: 4.119].**
33. Palaniappan PL RM , **Krishnakumar N,** Vadivelu M, Bioaccumulation of lead and the influence of chelating agents in Catla catla fingerlings. ***Environmental Chemistry Letters***, 2009, 7:51–54. DOI: 10.1007/s10311-008-0134-5. [**Impact Factor: 9.027].**
34. Palaniappan PL.RM, Sadhanayakam S, **Krishnakumar N,** Vadivelu M, Morphological changes due to Lead exposure and the influence of DMSA on the gill tissues of the freshwater fish, Catla catla. ***Food and Chemical Toxicology***, 2008, 46:2440–2444. DOI:10.1016/j.fct.2008.03.028**.** [**Impact Factor: 6.023].**
35. Palaniappan PL.RM, **Krishnakumar N,** Vadivelu M, FT-IR study of the effect of lead and the influence of chelating agents, DMSA and D-Penicillamine, on the biochemical contents of brain tissues of Catla catla fingerlings. ***Aquatic***

Sciences, 2008, 70:314-322**.** DOI: 10.1007/s00027-008-8053-x. [**Impact Factor 2.744].**

36. **Krishnakumar N**, Nirmal Madhavan R, Sumesh P, Palaniappan PL RM, Venkatachalam P, Ramachandran CR, FT-IR spectroscopic analysis of normal and malignant human oral tissues, ***American Institute of Physics Proceedings***, Volume 1, Number 1. 149-151. 2008/ 978-0-7354-0606-3/0 .
37. Venkatachalam P, Lakshmana Rao L, **Krishna Kumar N**, Anupama Jose, *Nazeer SS,* Diagnosis of breast cancer based on FT-IR spectroscopy*,* ***American Institute of Physics Proceedings,*** *Volume 1, Number 1, 144-148. 2008/ 978-0-7354-0606-3/08.*

International Conference Presentations

- *Reduced graphene oxide-gold nanocomposites enhances cytotoxic and apoptosis-induced anticancer effect in breast cancer cells,* International Conference on Applications of Smart Materials, 05-07, February 2020, Annamalai University, Tamilnadu, India.
- *FT-IR spectroscopy as a diagnostic tool for monitoring biochemical and structural changes at the molecular level during silibinin nanosuspension in DMBA-induced oral carcinogenesis,* International Conference on Recent Trends in Synthetic Methods and Material Chemistry (RTSMC-2019) 2 3 February 2018, Annamalai University, Tamilnadu, India.
- *Optical redox ratio using endogenous fluorescence to assess the metabolic changes associated with treatment response of bioconjugated gold nanoparticles in streptozotocin-induced diabetic rats,* International Symposium on Photonics Applications and Nanmaterials (ISPAN 2015), 28-30, October 2015, SCTIMST, Trivananthapuram, India.
- *Quercetin nanosuspension enhances anti-cancer efficacy on human lung cancer cells***,** Second International Conference on Nanostructured Materials and Nanocomposites (ICNM-2014), 19-21, December 2014, Mahatma Gandhi University, Kerala, India

- *Raman spectroscopic analysis of the antitumor response of silibinin and its nanoparticulates in experimental oral carcinogenesis,* International Conference on Perspectives in Vibrational Spectroscopy (ICOPVS 2013), 8-12, July 2014, Marivanios College, Kerala, India.
- *FT-IR spectroscopic analysis of mulberry leaf extract mediated gold nanoparticles in streptozotocin induced diabetic liver tissues,* International Conference on Perspectives in Vibrational Spectroscopy (ICOPVS 2013), 6-9, August 2013, Bishop Moore College, Kerala, India.
- *Hesperetin nanosuspension enhances anti-tumor efficacy in oral carcinoma KB cells,* International Conference on Phytochemicals in Health and Disease: Challenges and Oppurtunities, 23-25, January 2013, Annamalai University, Tamilnadu, India
- *Evaluation of chemopreventive response of silibinin and its nanoparticles in experimental oral carcinogenesis using light-induced autofluorescence spectroscopy*, International Conference on Diabetes and Cancer, 19 & 20, December 2012, Annamalai University, Tamilnadu, India.
- *Raman spectroscopy analysis of antitumor effect of naringenin-loaded nanoparticles in experimental oral carcinogenesis*, International Conference on Raman Spectroscopy (ICORS 2012), 12-16 August 2012, IISc, Bangalore, India
- *Attenuative effect of naringenin on cadmium-induced oxidative, macromolecular and structural alterations on rat heart revealed by FTIR spectroscopy*, International Congress on Nutrition in Cardiovascular Diseases, 15 & 16, November 2010 Annamalai University, Tamilnadu, India.
- *Enhanced anticancer activity of naringenin-loaded eudragit nanoparticles in human cervical cancer cells*, International Conference on Recent Frontiers in Applied Spectroscopy (ICORFAS 2010), 22-24, September 2010, Annamalai University, Tamilnadu, India.
- *Quercetin protects against cadmium-induced biochemical and structural alterations in rat liver tissues: An FT-IR spectroscopic study,* International

Conference on Perspectives in Vibrational Spectroscopy (ICOPVS 2010), 21-24 February 2010, Banaras Hindu University, Varanasi, India.

- *FT-IR spectroscopic analysis of normal and malignant human oral tissues*, International Conference on Perspectives in Vibrational Spectroscopy (ICOPVS 2008), 24-28 February 2008, Marivanios College, Kerala, India.