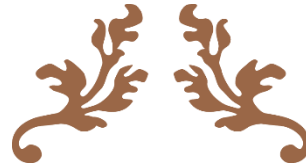


**Women's  
Christian  
College**

**Lighted to Lighten**



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# **CO-CURRICULAR ACTIVITIES 2022-2023**

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**POST GRADUATE DEPARTMENT OF  
PHYSICS**



# POST GRADUATE DEPARTMENT OF PHYSICS

## ACTIVITIES : 2022 – 2023

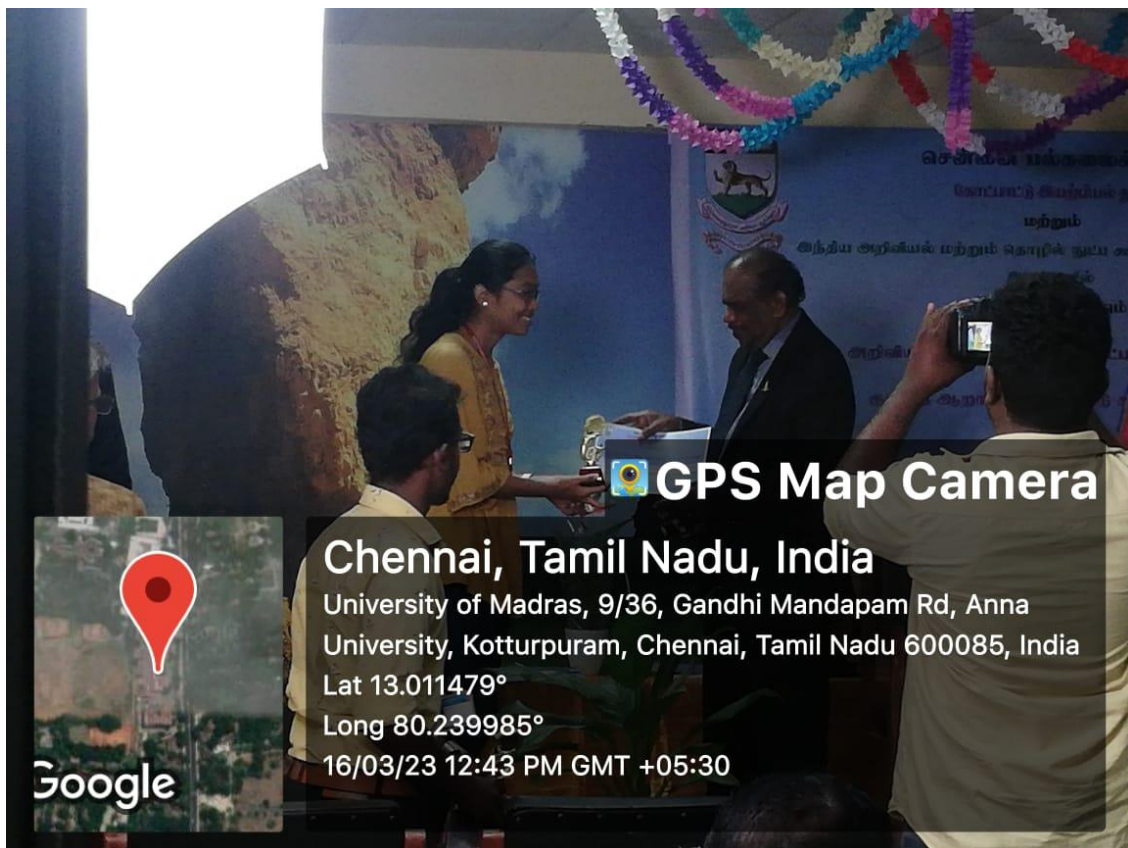
(Conferences, Seminars, Webinars, Workshops, Industrial Visits, Field Trips, Talks, Campaigns, etc.)

1. An **educational field trip** was organized for students to Mysore and Coorg from 26-03-2023 to 28-03-2023. The students visited **JSS College of Pharmacy, Mysore** on 26th March 2023. On the campus, the students visited the various research facilities in the institute and saw the different ways in which research is carried out. The students were also educated on the various opportunities for internships available.





2. **Ms. Anish Mishal A** won the third prize in the e-poster competition entitled “**IMPACT OF MODERN SCIENCE & DISRUPTIVE TECHNOLOGIES ON HUMAN LIFESTYLE AND PRODUCTION**” by the Department of Theoretical Physics, University of Madras

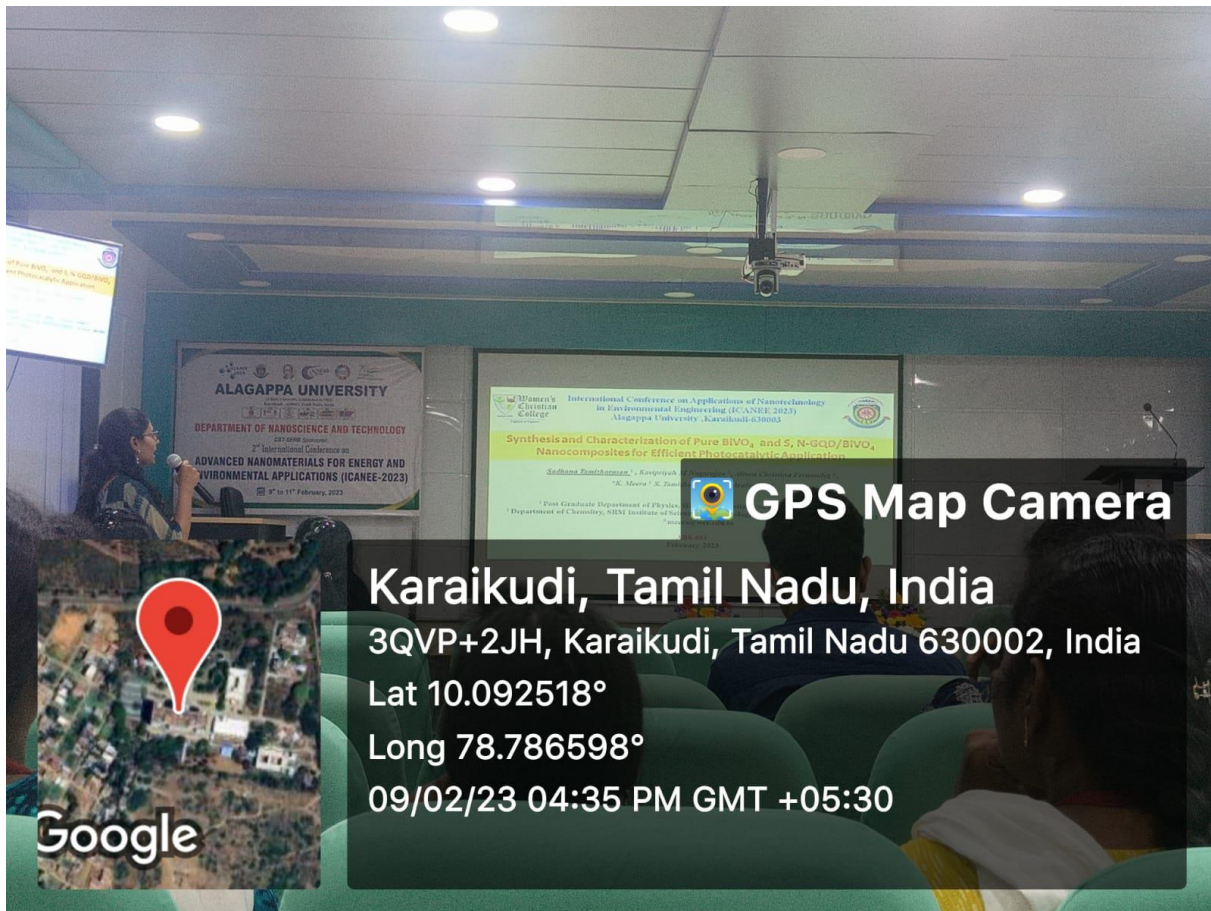




**Ms. Sheryl Rachel Irene** won the **Best Poster Award** for her presentation at the International Conference on Pure and Applied Physics organized by the Department of Physics, Women's Christian College, Chennai on 23<sup>rd</sup> and 24<sup>th</sup> Marc 2023



The students of the department actively participated in academic and co-curricular activities.





**4th Year**

**Development and Characterization of Fe<sub>3</sub>O<sub>4</sub> and ZnO with ZnO/Fe<sub>3</sub>O<sub>4</sub> core-shell nanoparticles for Magnetic Hyperthermia Cancer Treatment**

Anirudh M. Narayana, Sathya Narayanan, Vikram Chandra Perumal, Sangeetha P. P. (Christa University of Health, Science & Technology, Chennai, India)

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**INTRODUCTION**

- There is a need to look on the better and safer treatments to treat cancer as today's method are ineffective.
- The use of magnetic nanoparticles in these treatments can increase the efficiency of the medication by the cancer treatment like Chemotherapy, etc.
- The most promising magnetic nanoparticles is Magnetite (Fe<sub>3</sub>O<sub>4</sub>) because of its unique magnetic property.

**RESULTS AND DISCUSSION**

**1. XRD Analysis**

- The diffraction pattern of ZnO, ZnO/Fe<sub>3</sub>O<sub>4</sub>, and Fe<sub>3</sub>O<sub>4</sub> nanoparticles.
- Labels: XRD, Crystallographic structure, etc.
- The average crystallite size of pure Fe<sub>3</sub>O<sub>4</sub> is 14.22 nm.
- Crystallite size of ZnO is 11.06 nm.

**2. TEM Analysis**

- The morphology size is similar to shape.
- Labels: ZnO, ZnO/Fe<sub>3</sub>O<sub>4</sub>, Fe<sub>3</sub>O<sub>4</sub>.

**3. DSC Analysis**

- Labels: ZnO, ZnO/Fe<sub>3</sub>O<sub>4</sub>, Fe<sub>3</sub>O<sub>4</sub>.
- Labels: Sample name, Weight, Heating rate, etc.
- Labels: ZnO, ZnO/Fe<sub>3</sub>O<sub>4</sub>, Fe<sub>3</sub>O<sub>4</sub>.
- Labels: ZnO, ZnO/Fe<sub>3</sub>O<sub>4</sub>, Fe<sub>3</sub>O<sub>4</sub>.
- Labels: ZnO, ZnO/Fe<sub>3</sub>O<sub>4</sub>, Fe<sub>3</sub>O<sub>4</sub>.

**4. FTIR Analysis**

- The chemical structure of ZnO, ZnO/Fe<sub>3</sub>O<sub>4</sub>, and Fe<sub>3</sub>O<sub>4</sub>.
- The chemical structure of ZnO, ZnO/Fe<sub>3</sub>O<sub>4</sub>, and Fe<sub>3</sub>O<sub>4</sub>.
- The chemical structure of ZnO, ZnO/Fe<sub>3</sub>O<sub>4</sub>, and Fe<sub>3</sub>O<sub>4</sub>.

**5. UV-Vis Analysis**

- The UV-Vis spectra of ZnO, ZnO/Fe<sub>3</sub>O<sub>4</sub>, and Fe<sub>3</sub>O<sub>4</sub>.
- The UV-Vis spectra of ZnO, ZnO/Fe<sub>3</sub>O<sub>4</sub>, and Fe<sub>3</sub>O<sub>4</sub>.
- The UV-Vis spectra of ZnO, ZnO/Fe<sub>3</sub>O<sub>4</sub>, and Fe<sub>3</sub>O<sub>4</sub>.

**6. TGA Analysis**

- The TGA curves of ZnO, ZnO/Fe<sub>3</sub>O<sub>4</sub>, and Fe<sub>3</sub>O<sub>4</sub>.
- The TGA curves of ZnO, ZnO/Fe<sub>3</sub>O<sub>4</sub>, and Fe<sub>3</sub>O<sub>4</sub>.
- The TGA curves of ZnO, ZnO/Fe<sub>3</sub>O<sub>4</sub>, and Fe<sub>3</sub>O<sub>4</sub>.

**7. Zeta Potential Analysis**

- The zeta potential of ZnO, ZnO/Fe<sub>3</sub>O<sub>4</sub>, and Fe<sub>3</sub>O<sub>4</sub>.
- The zeta potential of ZnO, ZnO/Fe<sub>3</sub>O<sub>4</sub>, and Fe<sub>3</sub>O<sub>4</sub>.
- The zeta potential of ZnO, ZnO/Fe<sub>3</sub>O<sub>4</sub>, and Fe<sub>3</sub>O<sub>4</sub>.

**8. MTT Assay**

- Low cost.
- Abundant source.
- Biocompatible.
- High Magnetism.
- High Surface Area.

**CONCLUSION**

- The pure and core-shell ZnO/Fe<sub>3</sub>O<sub>4</sub> nanoparticles have successfully synthesized.
- These nanoparticles are suitable for cancer treatment.
- These nanoparticles have high magnetic property.
- These nanoparticles have high surface area.
- These nanoparticles have high zeta potential.
- These nanoparticles have high stability.
- These nanoparticles have high biocompatibility.
- These nanoparticles have high cytotoxicity.
- These nanoparticles have high efficiency.
- These nanoparticles have high selectivity.
- These nanoparticles have high specificity.
- These nanoparticles have high sensitivity.
- These nanoparticles have high accuracy.
- These nanoparticles have high precision.
- These nanoparticles have high reliability.
- These nanoparticles have high validity.
- These nanoparticles have high credibility.
- These nanoparticles have high trustworthiness.
- These nanoparticles have high respectability.
- These nanoparticles have high reputation.
- These nanoparticles have high esteem.
- These nanoparticles have high honor.
- These nanoparticles have high prestige.
- These nanoparticles have high status.
- These nanoparticles have high rank.
- These nanoparticles have high position.
- These nanoparticles have high level.
- These nanoparticles have high degree.
- These nanoparticles have high grade.
- These nanoparticles have high class.
- These nanoparticles have high order.
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- These nanoparticles have high class.
- These nanoparticles have high order.
- These nanoparticles have high tier.

**ACKNOWLEDGMENT**

We thank the Department of Chemistry, Christa University of Health, Science & Technology, Chennai, India for providing the facilities for the synthesis and characterization of ZnO, ZnO/Fe<sub>3</sub>O<sub>4</sub>, and Fe<sub>3</sub>O<sub>4</sub> nanoparticles.

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