Dr. B. Geetha Priyadarshini
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BIOSKETCH

Dr. Geetha Priyadarshini is an Associate Professor and Team Lead of the Nanostructured Surfaces and Thin Films Laboratory at PSG Institute of Advanced Studies, Coimbatore, where she also serves as Clean Room Faculty-in-Charge. She earned her Ph.D. in Metallurgical and Materials Engineering from IIT Kharagpur in the year 2012, specializing in thin film synthesis by magnetron sputtering. Her research spans nanocrystalline materials for energy harvesting, superhard nanocomposite coatings, thermoelectric thin films, and coatings for aerospace and cutting tool applications. She has guided several Ph.D., M.Tech, and M.Sc. scholars, published extensively in reputed journals, and holds a patent on SnSe thermoelectric thin film fabrication. Recipient of multiple awards, including the *Best Outgoing Student Award (2007)* and GATE (AIR 60), Dr. Priyadarshini has led national projects funded by DRDO and DST-SERB, and actively collaborates with academic and industrial partners. She is a member of professional bodies such as the Indian Institute of Metals, Materials Research Society of India, and Society of Materials Chemistry.

Educational Profile

- **Doctor of Philosophy (Ph.D.) in Metallurgical and Materials Engineering**
  Year of Passing: 2012
  Thesis title: Synthesis and Characterization of Nickel, Titanium and Nickel-Titanium Thin Films by Magnetron Sputtering: Influence of Process Parameters
  Thesis Supervisor: Dr. Shampa Aich, Metallurgical and Materials Engineering, Indian Institute of Technology (IIT), Kharagpur

- **Master of Science (M.Sc.) in Materials Science**
  PSG College of Technology
  Year of Passing: 2007

- **Bachelor of Science (B.Sc.) in Applied Sciences**
  PSG College of Technology
  Year of Passing: 2005

Positions Held

2022 –Present	Associate Professor Department of Physics PSG Institute of Advanced Studies Peelamedu, Coimbatore
2019 –2022	Assistant Professor (Selection grade) Department of Physics PSG Institute of Advanced Studies Peelamedu, Coimbatore
2017-2019	Assistant Professor (Senior grade)

	Department of Physics PSG College of Technology Peelamedu, Coimbatore
2013-2017	Assistant Professor Department of Physics PSG College of Technology Peelamedu, Coimbatore
2011-2013	Research Associate Department of Physics Indian Institute of Technology (IIT), Delhi
2007-2011	Graduate Research Fellow Department of Metallurgical and Materials Engineering Indian Institute of Technology (IIT), Kharagpur

Research Areas

- Nanocrystalline materials for energy harvesting (solar and thermoelectric)
- Superhard nanocomposite coatings
- Chalcogenide thin films
- Process-structure-property relations
- Inorganic-Organic nanocomposite coatings
- Coatings for thermal protection

Awards & Achievements

- Recipient of Best outgoing student award- 2007 among the students of M.Sc. Materials Science.
- Qualified GATE-2007 with All India ranking of 60 conducted by Indian institute of Technology - Kanpur.
- Recipient of institute assistantship provided by IIT Kharagpur for attending 140th Annual Meeting-TMS 2011 International conference at San Diego, California, USA.
- Awarded First prize in poster presentation at 2nd Research Scholars Day', IIT Kharagpur.

Research Group

Research Scholars (Ongoing)

Student Name: Mrs. P. Bhagyashree

Research Topic: Oxychalcogenide thin films

E-mail: pba@psgias.ac.in

Student Name: Ms. M. Jyolsna Raj

Research Topic: CFTS thin film solar cells

E-mail: mjk@psgias.ac.in

Alumni

Name: Dr. Charumathi. N
Thesis Title:
Year of Ph.D. Award: 2025
Degree Awarded by: Bharathiar University

Name: Dr. Aswani S Kumar
Thesis Title:
Year of Ph.D. Award: 2024
Degree Awarded by: Anna University

Name: Dr. J. Bibeye Jaheziel
Thesis Title:
Year of Ph.D. Award: 2023
Degree Awarded by: Anna University

Name: Dr. D. Sivagami
Thesis Title:
Year of Ph.D. Award: 2021
Degree Awarded by: Bharathiar University

Funded Projects

1. An Integrated Approach in Advancement of Quaternary Oxychalcogenide Synthesis for Thermoelectric Application (CRS/2023-24/04/1315), 12 Lakhs.
2. Development of Cost-Effective 2.5 KW Proton exchange membrane (PEM) Fuel Cell Stack based on less-Pt Bimetallic Electrocatalysts and Mesoporous Carbon Support Materials , Co-PI, 386.46 Lakhs
3. Multifunctional Al_2O_3-rGO hybrid reinforced in polyimide coatings for thermal protection, PI, DRDO-CARS (2021 – 2022), 24.4 Lakhs.
4. Development of Cutting Tool Inserts Superimposed with WS_2 based Nano-Composite Solid Lubricant Coatings for Dry Machining of Ti-6Al-4V Alloys, PI, DST-SERB, Ongoing, (2018-2021), 48 Lakhs.
5. Fabrication and Characterization of Nano-structured Thin Film Thermoelectric Devices for Waste Heat Recovery, PI, DRDO-CARS, (2016-2019), 21 lakhs
6. Development of novel thermoelectric module using doped and nanostructured ZnO based materials for energy generation, Co-PI, DST-SERB, (2018-2021), 56 Lakhs.
7. High Speed machining of aerospace alloys using PVD coated cutters, Co-PI, DRDO-CARS,(2014-2017), 9.8 lakhs
8. Zirconium coating on Mild Steel, SREC, Coimbatore.
9. TiN coating on ring traveler, Lakshmi Ring Travelers, Coimbatore.

Patent

Indian patent on “A method of obtaining tin selenide thin films” Joint Indian Patent with DRDO, CVRDE -Filed, Application No. 201911040407, Filing Date: 04/10/2019.

Laboratories In-charge

1. Nanostructured Surfaces and Thin Films Laboratory
2. Clean room faculty in-charge

Invited Talks

1. Invited talk on “Processing of nanocrystalline materials using magnetron sputtering”, The 4th International Conference on Advances in Materials and Materials Processing ICAMMP-IV conducted during 5-7th November 2016, Organized by IIT Kharagpur.
2. Invited talk on “Introduction to Nano Technology and its applications” in Two Day Workshop on Micro and Nano technology, conducted during 09 – 10 March 2017, Organized by Dept. of EEE, PSG College of Technology, Coimbatore.
3. Invited talk on “Thin Film Thermoelectric materials and devices” in Two day Symposium on Thermoelectric Materials Devices and Systems organized by PSG Institute of Advanced Studies, Coimbatore during December 10-11, 2018.
4. Invited talk on “Nanostructured Chalcogenide thin films for solar and thermal energy harvesting” in International Symposium of Metastable, Amorphous and Nanostructured Materials (ISMANAM), conducted by IIT Madras, during July 8-12, 2019.

5. "Chalcogenides for Energy Applications" in International Conference on Advanced Energy Materials and Applications (AEMA-21)" on 27th Oct 2021, organized by Department of Physics, Hindusthan College of Arts and Science, Coimbatore.
6. "Quaternary chalcogenide/carbon composites for energy applications- IX" in International scientific conference on actual problems of solid state physics" on 22nd Nov 2021 organized by Scientific-Practical Materials Research Centre of National Academy of Sciences of Belarus (Online).
7. Invited to deliver lecture on "Combinatorial reactive co-sputtering approach for synthesis of nanocomposite coatings" at Indo-French seminar on Innovation in Manufacturing and Machining of Advanced Aerospace Materials, (03.03.2023) organized by Department of Production Engineering, PSG College of Technology, Coimbatore.
8. Invited lecture on "Chalcogenides for Energy Applications" at National Level Seminar on Recent Advances in Physics-2023 (17.03.2023) organized by Department of Physics, Hindustan College of Arts and Science, Coimbatore.
9. Invited lecture on "Coatings for Cutting Tools" at Six days FDP on Design, Processes, and Applications of Additive Manufacturing on 26th January 2024, organized by Department of Mechanical Engineering, EASA College of Engineering and Technology, Coimbatore.
10. Invited speaker in SPARC Workshop on Shape Memory Alloys, 19th-21st March 2025 on the topic-Thin-Film Fabrication: Challenges and Innovations, IIT Kharagpur.

Journal Publications

1. B. Geetha Priyadarshini, S. Aich, M. Chakraborty, "An Investigation on Phase Formations and Microstructures of Ni-rich Ni-Ti Shape Memory Alloy Thin Films", Metallurgical and Materials Transactions A, 42, 3284, 2011.
2. B. Geetha Priyadarshini, S. Aich, M. Chakraborty, "Structural and morphological investigations on DC-magnetron sputtered nickel films deposited on Si (100)", Journal of Materials Science, 46, 2860 (2011).
3. B. Geetha Priyadarshini, Manoj Gupta, S. Ghosh, M. Chakraborty and S. Aich, "Role of substrate-bias during single and co-sputter deposition of Ni, Ti and Ni-Ti thin films," Surface Engineering, 29 (9) 689 (2013).
4. B. Geetha Priyadarshini, S. Aich, M. Chakraborty, "Substrate bias voltage and deposition temperature dependence on properties of rf-Magnetron Sputtered Titanium Films on silicon (100), Bulletin of Materials Science 37 (7)1691 (2014).
5. B. Geetha Priyadarshini, S. Aich, M. Chakraborty, "On the microstructure and interfacial properties of sputtered Nickel thin film on Si (100), Bulletin of Materials Science 37 (6), 1265 (2014).
6. A K Sharma, B. Geetha Priyadarshini, B R Mehta, "An Amorphous Barium titanate thin-films improves the light trapping Si solar cells", RSC Advances,5, 59881-59886, 2015.
7. B. Geetha Priyadarshini, S. Aich, M. Chakraborty, "Resputtering effect on nanocrystalline Ni-Ti alloy films", Met. Mat. Trans A, 47 (4), pp 1751-1760 2016.
8. B. Geetha Priyadarshini, A.K. Sharma, Design of multifunctional Coatings for Terrestrial Solar Glass Panel, Bulletin of Materials Science, 39 (3), pp 683-689 2016.
9. B. Geetha Priyadarshini, S. Aich, M. Chakraborty, "Nano-crystalline Ni-Ti alloy thin films fabricated using magnetron co-sputtering: Effect of substrate conditions, Thin Solid Films, 616, 2016, PP. 733-745.
10. Nair, B, Priyadarshini, B.G, Process, structure, property and applications of metallic glasses. AIMS Materials Science, 3,3, 2016, pp.1022 – 1053, 2016.

11. V Prasath, V Krishnaraj, J Kanchana, BG Priyadarshini, A Tewari, Performance evaluation on high speed machining of custom 465 steel Materials Today: Proceedings 2017, 4 (10), 10810- 10815
12. Geetha Priyadarshini B, Vignesh N, Madhuri V, Vasantha Priya L, Sivakumar B, Elakkiya V, Selvakumar B, Angleo P C Phase competition induced bio-electrochemical resistance and bio-compatibility effect in nano-crystalline Zr_x-Cu_{100-x} thin films, 2018, Journal of Nanoscience and Nanotechnology 17, 1-10
13. D. Sivagami, B. Geetha Priyadarshini Enhancing the Optical Behavior of Glass Surface by Creation of Microstructures in Single-Step Hydrothermal Wet Etching, 2018 ChemistrySelect 3 (41), 11494-11504
14. Sivagami D, Geetha Priyadarshini B Origin of Thickness-Dependent Surface Currents in Nano-Structured CdS Thin Films Prepared by Chemical Bath Deposition, 2019, Advanced Science, Engineering and Medicine 11, 1-11.
15. Geetha Priyadarshini. B, Understanding Structure-Property Relation In Nano-Crystalline Ni-Ti Shape Memory Alloy Thin Film Microactuator, 2019, ISSS Journal of Micro and Smart Systems, 8 2019 1-11.
16. J Kanchana, V Prasath, V Krishnaraj, B Geetha Priyadarshini, Multi response optimization of process parameters using grey relational analysis for milling of hardened Custom 465 steel Procedia Manufacturing ,2019, 30, 451-458
17. Prasath, V., Krishnaraj, V., Kanchana, J. and Priyadarshini, B.G., Tool Wear Behavior in Milling of Hardened Custom 465 Steel. In Advances in Forming, Machining and Automation, 2019, Springer, Singapore, 517-525.
18. Simya, O.K., Priyadarshini, B.G., Balachander, K. and Ashok, A.M., 2020. Formation of a phase pure kesterite CZTSe thin films using multisource hybrid physical vapour deposition. Materials Research Express, 7(1), p.016419.
19. Prasath, V., Krishnaraj, V., Geetha Priyadarshini, B. and Kanchana, J., 2020. Multi-objective optimization of Pulsed direct current magnetron sputtered titanium nitride thin film using Grey relational analysis. Proceedings of the Institution of Mechanical Engineers, Part L: Journal of Materials: Design and Applications, p.1464420720951899.
20. Sivagami, D. and Priyadarshini, B.G., 2020. Composition dependent structural, morphological, optical and electrical properties of CdS: Co window layer grown by chemical bath deposition. Materials Science for Energy Technologies, 3, pp.709-718.
21. Duraisamy, S., Suppan, T., Mohanta, K., Krishnamoorthy, M. and Geetha Priyadarshini. B, 2020. Novel synthesis of Cu_2CoSnS_4-carbon quantum dots nano-composites potential light absorber for hybrid photovoltaics. Nanotechnology, 31(23), p.235401.
22. Bibeye Jahaziel Ronadson, Krishnaraj Vijayan, Geetha Priyadarshini. B, Investigation on influence of micro-textured tool in machining of Ti-6Al-4V alloy. Journal of Mechanical Science and Technology, 36(4), 1987, 2022.
23. Sivagami D, Geetha Priyadarshini. B, Role of carbon quantum dot for enhanced performance of photo-absorption in Cu_2CoSnS_4 superstrate solar cell device, Materials Advances, 3, 2022, 2405-2416.
24. Bibeye Jahaziel Ronadson, Krishnaraj Vijayan, Aswani S Kumar, Jayakrishnan Nampoothiri, Kanchana J, Geetha Priyadarshini. B, Influence of varying nitrogen content on the structure, tribomechanical properties and machining performance of CrN_x-WS_2 nanocomposites, Journal of Manufacturing Processes, 80, 2022, 692-705.
25. Aswani S Kumar, Geetha Priyadarshini. B, Bibeye Jahaziel Ronadson, Krishnaraj Vijayan, Performance Analysis of Ti_2AlN Superimposed WC Cutting Tool, Journal of Manufacturing Processes, 2022, 82, pp.306-318.
26. Abishekraj, N., Gowtham, T., Krishnaraj, V., Jahaziel, R.B. and Geetha Priyadarshini B.,

2020, August. Surface roughness evaluation in machining titanium alloys using non-textured and textured cutting inserts. In IOP Conference Series: Materials Science and Engineering (Vol. 912, No. 3, p. 032076). IOP Publishing.

27. Abishekraj, N., Gowtham, T., Jahaziel, R.B., Krishnaraj, V. and Geetha Priyadarshini B, 2021. Investigation of Cutting Temperature on Machining Titanium Alloys Using Micro-textured Cutting Inserts. In Materials, Design, and Manufacturing for Sustainable Environment (pp. 387-396). Springer, Singapore.
28. Jahaziel, R.B., Krishnaraj, V., Sudhagar, S. and Priyadarshini, B.G., 2023. Improving dry machining performance of surface modified cutting tools through combined effect of texture and TiN-WS_2 coating. Journal of Manufacturing Processes, 85, pp.101-108.
29. Kumar, A.S., Priyadarshini, B.G., Jahaziel, B. and Krishnaraj, V., 2023. On the formation of Ti_2AlN MAX phase coatings and improvement in tool life by superimposing on tungsten carbide cutting tool for machining Ti-6Al-4V alloys. *Journal of Manufacturing Processes*, *107*, pp.210-225.
30. Ponnusamy, P., Panthalingal, M.K., Badhirappan, G.P. and Pullithadathil, B., 2024. Durable Electrocatalyst Support Materials Based on N-Doped Mesoporous Carbon Nanofibers with Titanium Nitride Overlay Coating for High-Performance Proton Exchange Membrane Fuel Cells. *ACS Applied Nano Materials*, *7*(5), pp.4676-4691.
31. Nataraj, C., Mohanta, K. and Badhirappan, G.P., 2024. Investigations on Optical Absorption and the Pyro-phototronic Effect with Selectively Patterned Black Silicon for Advanced Photodetection. *ACS Applied Materials & Interfaces*, *16*(18), pp.23960-23972.
32. Bhagyashree, P., Promod, A.K., Venkatesan, M., Ashok, A.M., Sathishkumar, D. and Priyadarshini, B.G., 2024. Synthesis and characterization of polycrystalline SnSe/$SnSe_2$ heterophase thermoelectric thin films via chemical spray pyrolysis. *Journal of Materials Science: Materials in Electronics*, *35*(29), pp.1-21.
33. Nataraj, C., Mohanta, K. and Badhirappan, G.P., 2025. Silicon Meta-atoms Enabled Self-powered Selectively Patterned Black Silicon Photodetector for Real-time Monitoring of Sunlight. *Journal of Materials Chemistry C*, *13*(11), pp.5865-5879.

Total Number of Conference Papers/Proceedings: 35