Bio-data

DR. SUNITA MAHAVAR
Assistant Professor,
Solar Energy Research Laboratory (SERL)
Department of Physics
University of Rajasthan
Jaipur-302004, Rajasthan, India
Phone No. +918239528824 (Mo)
Email: smjpr1986@gmail.com

ACADEMIC EXPERIENCE

From Dec. 2013 to cont. Assistant Professor, Department of Physics, University of Rajasthan, Jaipur (India)

HONORY POSITION

Senior Lecturer in the Research Focus Area: Material Science Innovation and Modelling (MaSIM) at the Mahikeng Campus of the North-West University (NWU), South Africa.

From April 2024 to March 2027

ACADEMIC QUALIFICATION:

• Ph.D. (Physics)	University of Rajasthan, Jaipur, India
• NET (JRF and SRF)	Council of Scientific and Industrial Research, New Delhi, India
• M.Sc. (Physics)	University of Rajasthan, Jaipur, India
• B.Sc.(Phy., Chem. & Maths)	Maharani's College, University of Rajasthan, Jaipur, India

TEACHING EXPERIENCE:

Undergraduate courses

- Thermodynamics and statistical physics
- Waves and oscillation
- Electromagnetism
- Mathematical Physics
- Optics
- Mechanics

Postgraduate courses

- Solar Energy
- Statistical Physics

RESEARCH INTEREST:

Solar Thermal Energy: Development, fabrication and testing of solar thermal collectors viz. solar water heaters, solar cookers, solar stills, solar concentrators etc.; synthesis of nanoparticles and their use in solar absorber materials, heat transfer fluids and heat storage systems.

RESEARCH PROJECTS

- UGC Start-Up Grant by University Grants Commission, New Delhi, India
  Project title: *Experimental study of a Building Material Solar Water Heaters and generation of solar radiation data through the instruments purchased from other grants*
  Duration: 2 years (April 2015- March 2017)
  Sanctioned amount: Rs. 6.00 lakh
- Department of Science and Technology, Technology Mission Division, Government of India, under Solar Energy Research Initiative Programme (SERI-2016).
  Project title: *Development of low cost solar paraboloid collector systems for process heat generation*
  Duration: 3 years (July, 2017- Jan, 2021)
  Sanctioned amount: Rs. 43,12,220
  Project No. DST/TMD/SERI/S91
- Science and Engineering Research Board (SERB), Government of India
  Project title: *Design and development of a solar thermal powered cooling system employing solar concentrator developed at SERL"*
  Duration: 3 years (April, 2019 to March 2022)
  Sanctioned amount: Rs. 43,39,000
  Project No. EEQ/2018/000811

INTERNATIONAL TRAVEL:

- Participated as an **Indian expert delegation (**Supported by Ministry of Education and Science of the Republic of Bulgaria and Ministry of Science and Technology of the Republic of India, DST) in the **India-Bulgaria Scientific workshop** on Solar Energy: strategies, research and applications, 7-8 November 2016, **Sofia, Bulgaria**. Organized by Central Laboratory of Solar Energy and New Energy Sources (CL SENES)-(BAS). **Title of Talk**: Development of Solar Thermal Appliances using Building Materials

- **Recipient of DST travel grant for poster presentation** of paper "Development of solar thermal appliances using building materials" at **Solar World Congress** together with International conference on solar heating and cooling for buildings and industry, 29th Oct. -2nd Nov. 2017, Abu Dhabi, **United Arab Emirates**.

- **Recipient of Rajasthan University travel grant for Paper presentation** "Experimental Study of a Building Integrated Solar Water Heater, 18th **International**

Conference on Sustainable Energy Technologies, Aug., 20-22nd 2019, Kuala Lumpur, **Malaysia**.

INVITED TALK

- Indian expert delegation talk (Supported by Ministry of Education and Science of the Republic of Bulgaria and Ministry of Science and Technology of the Republic of India, DST) in India-Bulgaria Scientific workshop on Solar Energy: strategies, research and applications, 7-8 November, 2016, Sofia, Bulgaria. Organized by Central laboratory of Solar Energy and New Energy Sources (CL SENES)-(BAS). Title of Talk: Development of Solar Thermal Appliances using Building Materials
- International workshop on Fundamentals of solar thermal technologies, Dec. 5-6, 2016 at **University of Kota, Kota (India)** organized by Department of Pure and Applied Physics, University of Kota, (India). **Title of Talk**: Development and testing of solar thermal appliances.
- International workshop on Renewable Energy Waste and Recycling, 3-4th Dec., 2018 at **University of Kota, Kota (India)** organized by Department of Pure and Applied Physics, University of Kota, (India) and supported by Durham University, UK. **Title of Talk:** Development of Solar Thermal Appliances using waste materials
- Invited talk on "An Introduction to Solar Energy and it's Research Prospects, (online mode) on 11 May 2020 organized by **DR. Bhimrao Ambedkar University, Agra, India**
- Invited talk on "Renewable Energy: an Introduction and Research Prospects" on 30th October 2021 at the National Conference on Recent Advances in Physics (RAP-2021) organized by the **Department of Physics, Govt. Raj Rishi College, Alwar.**
- Invited talk on "Solar Thermal Collectors and their Applications" at International conference on Renewable Energy and Sustainable Technologies (ICREST-2024) held from July 04-06, 2024 organized by Department of Applied Sciences & Humanities, Faculty of Engineering & Technology, **Jamia Millia Islamia, New Delhi, India**.

REGISTERED PHD SCHOLARS

- 03 Registered and 02 in Process

GUIDED STUDENT PROJECTS

- About 15

PUBLICATIONS:

Indian Patent:

Title: "Solitary pole affixed segmented paraboloid solar radiation reflector along with dual axis tracker for heat application"
Application No. is 202011040370
Current Status: Granted 06 January 2024 (Journal number 02/2024, Journal date-12/01/2024-Indian Patent Office

Book chapter:

1. Mahavar S. Review of Materials Used in Various Solar Thermal Appliances. Solar Engineering-I (Applications) Vol. 5 Ch.6. Editors: Dr. Sri Sivakumar,Dr. Umesh Chandra Sharma &Dr. Ram Prasad, Studium Press LLC, USA.2015.
2. Mahavar S., Goyal A., Balakin B.V. (2021) Investigation of a Solar Concentrator for Water Distillation. In: Ghosh S.K., Ghosh K., Das S., Dan P.K., Kundu A. (eds) Advances in Thermal Engineering, Manufacturing, and Production Management. ICTEMA 2020. Lecture Notes in Mechanical Engineering. Springer, Singapore. https://doi.org/10.1007/978-981-16-2347-9_18, ISSN 2195-4364
3. Sandeep Kumar, Pawan Kumar Kuldeep, Sunita Mahavar, Design development of a heat storage system at small scale for solar thermal collectors, book chapter in Recent Advances in Thermofluids and Manufacturing Engineering: Select Proceedings of ICTMS 2022, Lecture Notes in Mechanical Engineering. Springer, Singapore, pp 401-410.,
4. Mahavar S., Recent Advancements in Solar Thermal Technology for Heating and Cooling Applications, book chapter in Wind and Solar Energy Applications, CRC Press, Taylor & Francis Group, 2023. e-book ISBN 9781003321897

International Journal

1. Sandeep Kumar, **Sunita Mahavar**, Ashmore Mawire, Celestino Rodrigues Ruivo, Design development of an economic solar paraboloidal concentrator for industrial process heat generation, Energy Conversion and Management 2023, 292, 117380. https://doi.org/10.1016/j.enconman.2023.117380, ISSN 0196-8904
2. Kuldeep, P.K.; Kumar, S.; Khan, M.S.; Panchal, H.; Mawire, A.; **Mahavar, S**. Investigation of Heat Transfer Fluids Using a Solar Concentrator for Medium Temperature Storage Receiver Systems and Applications. *Energies* 2022, *15*, 7868. **https://doi.org/10.3390/en15217868**
3. **Mahavar S.**, Khan M.S., Yadav T., Synthesis, Characterization and Testing of Black Metal Oxide Nanoparticles as Solar Concentrator Receiver Material, Materials Today: Proceedings 8, 22–27, 2019. https://doi.org/10.1016/j.matpr.2019.02.076; ISSN 2214-785
4. **Mahavar S.**, Sengar N., Dashora P., Analytical model for electric back up power estimation of solar box type cookers., Energy, 134, 871-881, 2017. https://www.sciencedirect.com/journal/energy; ISSN **0360-5442**

5. **Mahavar S.,** Rajawat P, Punia R.C., Verma M., Dashora P., Evaluating the optimum load range for box-type solar cookers., Renewable Energy, 74, 187-194, 2015, ISSN 0960-1481. https://doi.org/10.1016/j.renene.2014.08.003
6. **Mahavar S.**, Verma M., Rajawat P., Sengar N. and Dashora P., Novel solar cookers: suitable for small families, International Journal of Sustainable Energy, 2013, 32(6), 574-586.
7. **Mahavar S.**, Rajawat P., Marwal V.K., Punia R.C. and Dashora P., Modeling and on-field testing of a Solar Rice Cooker, Energy, 49, 404-412, 2012., ISSN 0360-5442
8. **Mahavar S.**,SengarN., Rajawat P., Verma M. and Dashora P.,Design development and performance studies of a novel Single Family Solar Cooker., Renewable Energy, 47, 67-76, 2012.
9. **Mahavar S.**,SengarN., Verma M.,Dashora, P.,Extensive experimental studies of a Single Family Solar Cooker., International Journal of Energy, Information and Communications. 2(4), 169-179, 2011. ISSN 2652-1989
10. RajawatP., **Mahavar S**., Dashora P. Fabrication and Experimental Study of a Solar Cookerwith Electrical Back-Up, Journal of Energy, 1(4), 225-231, 2014.
11. Rajawat P, **Mahavar S,** Dashora P. A Study of a Solar Tracking System (STS), Advanced Electrochemistry, 2, 84-89, 2014.
12. Sengar N., Dashora P., **Mahavar S**., Punia R.C., Mathematical Formalism to Study EnergyDistribution Pattern in Solar Hot Boxes for Global Solar Radiation, International Journal of Innovative Research in Science, Engineering and Technology, 3(12), 18148-156, 2014.
13. SengarN., Dashora, P., Gupta M., **Mahavar S.**, Experimental studies, energy saving and payback period of a cylindrical Building Material Housing Solar Cooker., International Journal of Energy, Information and Communications. 2(3), 75-84, 2011. ISSN 2652-1989
14. Sengar N., **Mahavar S.,** Dashora P., Mathematical Formalism to Study Energy Distribution Between Base and Walls of Solar Hot Boxes for Mirror Reflected Solar Radiation, International Journal of Renewable Energy Research, 9(1), 457-469, 2019., https://doi.org/10.20508/ijrer.v9i1.8792.g7759; ISSN 1309-0127
15. Kuldeep, P.K.; Kumar, S.; Chandra S., Gora M., Kumar A., Mahavar S. An investigation of solar concentrator receiver designs through sensible heat test. Research & Reviews: Journal of Pure and Applied Physics, 2022, 10, pp. 35-50. DOI: 10.4172/2320- 2459.10.5.006, ISSN 2320–2459
16. **Mahavar S.,** Bhardwaj A., Dashora P. Fabrication and testing of a light weight solar concentrator, International Journal of Solid State Materials, 2(2), 2016.

National Journal

17. Marwal V.K., Punia R.C., Sengar N., **Mahavar S.** and Dashora P., A comparative study of correlation functions for estimation of monthly mean daily global solar radiation for, Jaipur, Rajasthan (India), Indian Journal of Science and Technology, 5(5), 2729-32, 2012. Issn 0974-5645
18. SengarN., Dashora P., **Mahavar S**., Low-cost solar cooker: Promising solution towards reducing indoor air pollution from solid fuel use, Indian Journal of Science and Technology. 3(10), 1038-1042, 2010. (citation-5)

International/National Conferences/Workshops

- More than 45

CONFERENCE PARTICIPATION:

Oral presentation

- International Conference on Materials for Energy & Sustainable Development 27-29 Oct. 2023, Organized by School of Physical Sciences, Jawaharlal Nehru University, Delhi, India.
- International conferences on advanced materials, June 12-14, 2019, Kannur, Kerala.
- 18th International Conference on Sustainable Energy Technologies, Aug., 20-22nd 2019, Kuala Lumpur, Malaysia
- National conference on Energy and Environment, 16-17 Sept. 2016, organized jointly by IIT, Madras and The Coimbatore district small industries association at CODISSIA, Coimbatore.
- Specific purpose solar cookers: Development and cooking performance study, Energy Meet, 22nd Nov. 2012, University of Kota, Kota, India.
- National Conference on Environmental Conservation and Management for Sustainable Era, 20-22nd Dec. 2012, S.S Jain Subodh P.G. College, Jaipur, India
- National Conference on Renewable Energy, 5-7 Nov., 2009, Vyas Institute of Engineering and Technology, Jodhpur, India.

Poster presentation

- 9th World Renewable Energy Technology Congress & Expo-2018, 21st to 23rd August 2018, Pravasi Bhartiya Kendra, Delhi, India.
- Solar World Congress together with International Conference on Solar Heating and Cooling for Buildings and Industry, 29th Oct. -2nd Nov. 2017, Abu Dhabi, United Arab Emirates.
- 6th Solar Cooker International World Conference, 16-18th Jan. 2017, Muni Seva Ashram, Goraj, Vadodara (India)
- National Conference on Science and Engineering (NCSE), 27-28 July, 2014, JK Lakshmipat University, Jaipur (India)
- International Congress on Renewable Energy ICORE, 2-4th Nov., 2011, Tezpur University, Assam India.
- International Conference on Renewable Energy ICRE, 17-21 Jan., 2011, University of Rajasthan, Jaipur, India.

Conference/Workshop participation as co-author/attended

- ISES Solar World Congress, 30th Oct. - 4th Nov. 2023, Delhi, India
- Fifth International Conference CONSOLFOOD2023, Advances Solar Thermal Food Processing, 12-14 July 2023 SOMESO | A CORUÑA-SPAIN, Attended at Vatsalaya, Jaipur (Jaipur conference partner)
- National Conference on Recent Advances at Interfaces of Physical and Life Sciences (RAIPLS), July 6-7, 2018, University of Rajasthan, Jaipur (India)

- International Conference on Energy Storage Technologies and Systems (ICOEST), Nov. 23-25, 2018, Suresh Gyan Vihar University, Jaipur, India.
- National conference on recent trends in science, engineering and management (NCRTSEM) 21st Oct. 2016, College of Engineering and Technology, Bikaner (India)
- National conference on renewable energy and energy conservation (NCREEC), May 20-21, 2016, Poornima University, Jaipur (India)
- Social relevance of research, 15 Feb. 2016, Human resource development centre, University of Rajasthan, Jaipur (India)
- International Conference on Nanostructuring by Ion Beams, ICNIB, 23-25th 2013, Jaipur, India.
- Workshop on Experimental methods in Condensed Matter Physics, 26-27th 2009, University of Rajasthan, Jaipur.
- International Conference on Renewable Energy ICRE, 17-21st Jan., 2011, University of Rajasthan, Jaipur, India.
- International Congress on Renewable Energy, 2-4th Nov. 2011, Tezpur Univeristy, Assam, India
- Third International Conference on Electroactive Polymers: Materials and Devices ICEP, 12-12 Oct. 2008, Jaipur, India.

AWARDS:

- Unnat Bharat Sewashree Award 2024 by Unnat Bharat Sangathan Trust, Mata Mantari Devi Charitable Trust, Delhi
- Best paper award in International Conference on Thermal Engineering and Management Advances (ICTEMA 2020), 19-20 December, 2020, virtually organized by Jalpaiguri Govt. Engineering College, India.
- Best poster award in the International conference on 9th World Renewable Energy Technology Congress & Expo-2018, 21st to 23rd August 2018, Pravasi Bhartiya Kendra, Delhi, India.
- Best paper award in National Conference on Science and Engineering, 27-28 July, 2014, JK Lakshmipat University, Jaipur.
- SPMF (Shyampersadmukherji fellowship, CSIR), Shortlisted May 2009
- International conference travel support (2011 and 2012) by Department of Science and Technology (DST), New Delhi, Council of Scientific and Industrial Research (CSIR) , New Delhi, Centre for International Co-operation in Science (CICS), Chennai
- Rajasthan Board student scholarship (2001-2003)
- Gargi Award 2001