

Faculty Spotlight

Prof. Satishchandra B. Ogale

Director & Professor, RISE, TCG CREST

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Research Focus

Clean energy materials, advanced functional materials, energy storage technologies, and spintronics.

Profile

Prof. Satishchandra B. Ogale is a distinguished materials physicist whose research has significantly advanced the fields of sustainable energy materials, energy storage technologies, and advanced functional materials. His work spans clean and renewable energy systems, battery technologies, nanoscience, and spintronics, with a strong emphasis on translating fundamental materials research into scalable energy solutions.

Over the course of his academic and research career, he has held several prestigious scientific positions across India, the United States, and Europe, including appointments at Indian Institute of Science Education and Research Pune, University of Maryland, and CSIR–National Chemical Laboratory. He is an elected Fellow of the Indian Academy of Sciences and the National Academy of Sciences, India.

In 2026, Prof. Ogale received the prestigious The World Academy of Sciences (TWAS) Award for his seminal contributions to sustainable energy research through advanced functional materials and energy technologies — an honour received by only a selected number of Indian scientists over the past four decades.

Academic and Research Journey

- Ph. D., Pune University (1980)
- Visiting Professor at institutions including University of Southern California, FOM Institute, Amsterdam, Bell Communications Research, University of León, and University of Maryland, College Park
- Professor and Emeritus Professor, Indian Institute of Science Education and Research, Pune (2015–present)
- Chief Scientist and Ramanujan Fellow, CSIR–National Chemical Laboratory (2008–2015)
- Senior Scientist and Visiting Professor, University of Maryland (1996–2006)
- Professor and Chair, Department of Physics, Savitribai Phule Pune University (1979–1996)

Selected Research Contributions

1. "Laser unzipped single wall carbon nanotube coating on copper as effective bifunctional electrocatalyst: An Experimental and DFT study, S. Saha, SK Singh SK, RK Biswas, S. Jadhav, B. Das and S. B. Ogale Adv. Func. Mater. e75512, (2026)

2. "Black Phosphorus Nanosheets as Efficient Ion Navigators at Room Temperature in Polyacrylonitrile-Based Composite Solid Polymer Electrolyte for Li-Ion Batteries", S. Jadhav, L. Kaulage, S. Saha S, A. Bano, S. B. Ogale, Small, 21, e04995, (2026)

3. Key anodic interfacial phenomena and their control in next-generation lithium and sodium metal batteries
K Roy, MK Bhunia, PE Karthik, A Rana, B Das, A Banerjee, S Ogale
Small 21 (8), 2410167, (2025)

Research Group

Scientific Officers
- Dr. Suparna Saha
- Dr. Niladri Ballav

Research Associate
- Dr. Arya Sukumaran

Faculty Spotlight



Prof. G. P. Das

Emeritus Professor, RISE, TCG CREST

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Research Focus

Condensed matter physics, computational materials science, AI/ML-driven materials discovery, quantum structures, spintronics, and energy materials.

Profile

Prof. G. P. Das is a distinguished condensed matter physicist and materials scientist whose research focuses on the electronic structure and properties of materials spanning bulk systems to nanoscale architectures. His work has contributed significantly to the understanding and development of advanced materials for energy, electronics, quantum technologies, and nano-devices.

His research interests include first-principles investigations and AI/ML-assisted studies of alloys and intermetallics, energy materials, two-dimensional materials, semiconductor spintronics, quantum structures, and topological materials. Over the course of his academic and scientific career, he has played a key role in advancing computational materials science research in India through interdisciplinary and collaborative investigations.

Prof. Das has held research and academic positions at institutions including Bhabha Atomic Research Centre, Indian Association for the Cultivation of Science, and Indian Institute of Technology, Kharagpur. His international research experience includes postdoctoral work at the Max Planck Institute for Solid State Research, Stuttgart.

Academic and Research Journey

- Ph. D., University of Mumbai (1985)
- Postdoctoral Researcher, Max Planck Institute for Solid State Research, Stuttgart (1987–1989)
- Scientist, Bhabha Atomic Research Centre, Mumbai (1978–2004)
- Professor, Indian Association for the Cultivation of Science, Kolkata (2004–2006)
- Senior Professor, Indian Association for the Cultivation of Science, Kolkata (2006–2018)
- Visiting Professor, Indian Institute of Technology, Kharagpur (2018–2021)

Major Research Initiatives

- DST–NEST Project on Battery Technologies (2026–present)
- Sweden–India STINT Project (2022–2025)
- IBIQuS Project on Quantum Structures
- VR–SIDA Project on Hydrogen Storage
- Collaborative Research Programme on Spintronics Materials
- DMRL Project on Alloy Thermodynamics

Selected Research Contributions

1. "Integrating density functional theory with deep neural networks for accurate voltage prediction in alkali-metal-ion battery materials", S. M. Hossain, N.A. Koshi, S-C Lee, G.P. Das and S. Bhattacharjee, Small Methods 10 (3), 02076 (2026)
2. "Large circular photo galvanic effect in non-centrosymmetric magnetic Weyl semimetal CeAlSi", A Roy Karmakar, A. Taraphder, and G. P. Das, Phys. Rev. B 111, 195105 (2025)
3. "Understanding the role of four-phonon scattering in the lattice thermal transport of monolayer MoS_2", S. Chaudhuri, A. Bhattacharya, A. K. Das, G. P. Das and B. N. Dev, Phys. Rev. B 109, 235424 (2024).



Faculty Spotlight

Dr. Bidisa Das

Associate Professor, RISE, TCG CREST

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Research Focus

Computational catalysis, sustainable fuels, zinc-ion batteries, electrolyte chemistry, and ion transport in energy storage systems.

Profile

Dr. Bidisa Das is a computational materials scientist whose research focuses on modelling advanced materials and catalytic systems for sustainable energy applications. Her work combines first-principles simulations and theoretical investigations to understand catalytic pathways, electrochemical interfaces, and ion transport mechanisms relevant to next-generation energy technologies.

Her research explores the design of novel catalysts derived from naturally occurring minerals for sustainable fuel generation, alongside computational studies on dendrite mitigation in zinc-ion batteries and ion solvation phenomena critical to electrolyte performance and ionic mobility. Through interdisciplinary computational investigations, her work contributes to the development of safer, more efficient, and sustainable energy storage systems.

Prior to joining Research Institute for Sustainable Energy (RISE), Dr. Das held research positions at institutions including Indian Institute of Science, National Institute of Advanced Industrial Science and Technology, and the Indian Association for the Cultivation of Science.

Academic and Research Journey

- Ph. D., Indian Institute of Science (2004)
- Postdoctoral Researcher, National Institute of Advanced Industrial Science and Technology, Tsukuba, Japan (2004–2006)
- Research Scientist, Indian Association for the Cultivation of Science (2007–2022)

Selected Research Contributions

1. Role of $Cu^{\delta+}$ sites for a favorable electrocatalytic CO_2 reduction on $CuSiO_3$ surface, B. R. Bhagat, B. Das, Applied Physics Reviews, 2026, 13, 011410.
2. DFT investigation on pure and doped Fe-oxyhydroxide clusters for homogeneous, electrocatalytic OER, S.De, B. Das, ACS Appl. Energy Mater., 2026, 9, 629.
3. Amide additives enhance the under-standing of kinetic reversibility in zinc anode stability using ultramicroelectrodes, J. H. Nguyen, A. Rana, K. Shiprath, B R. Bhagat, S. Paul, S. Chatterjee, N. Roy, I. Das, B. Das, A. Banerjee, J. E. Dick, Chemical Science, 2026, 17, 2302.

Research Group

Doctoral Students

- Suraj Kumar Singh (joined 2025).
- Shaonsikta Chatterjee (joined 2025).
- Ipsita Das (joined 2023) co-supervisor, TCG CREST-IISER partnership program.

Postdoctoral Scholars

- Dr. Arunendu Das

Doctoral Student Graduated

- Dr Sharmistha De (IACS, Kolkata, 2020-2025)



Faculty Spotlight

Dr. Abhik Banerjee

Associate Professor, RISE, TCG CREST

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Research Focus

Solid-state batteries, low-cost solid electrolytes, lithium and sodium battery systems, electrochemical diagnostics, and advanced electrode engineering.

Profile

Dr. Abhik Banerjee works at the intersection of advanced battery materials, electrochemical diagnostics, and next-generation energy storage technologies. His research focuses on the development of low-cost solid electrolytes and understanding their structure–property relationships using advanced diffraction, spectroscopy, microscopic, and scattering techniques.

His work also includes the development of low-stack-pressure silicon alloy anodes for solid-state batteries, electrolyte engineering for anode-free lithium and sodium batteries, and full-cell diagnostics through three-electrode impedance spectroscopy integrated with advanced characterisation tools. In addition, his group explores dry-coated electrode fabrication strategies for sodium-ion and solid-state battery systems aimed at improving scalability and manufacturing efficiency.

Prior to joining Research Institute for Sustainable Energy (RISE), Dr. Banerjee held research positions at institutions including CSIR-National Chemical Laboratory, Ulsan National Institute of Science and Technology, and University of California, San Diego.

Academic and Research Journey

- Ph. D., CSIR-National Chemical Laboratory, Pune (2015)
- Postdoctoral Associate, Ulsan National Institute of Science and Technology (2015–2016)
- Postdoctoral Associate, University of California, San Diego (2017–2020)
- Assistant Professor, Research Institute for Sustainable Energy (RISE) (2020–2023)

Selected Research Contributions

1. Das, Ishita, et al. "Influence of Positional Isomerism in Weakly Solvating Ethers on Lithium Metal Deposition." Angewandte Chemie International Edition (2026): e22584.
2. Jakhar, Rishika, et al. "Engineering Na-Rich P2-Type Layered Oxides Through Li/Ti Dual Doping for Oxygen Redox Activation and Superior Structural Stability." Advanced Energy Materials (2026): e06119.
3. Bera, Susmita, et al. "Effect of the Cation Sublattice Configuration on Li Ion Dynamics for the Spinel Li–Mg–Al–Cl System." ACS Energy Letters 10, no. 9 (2025): 4703-4711
4. Mandal, Lily, et al "Evolution of Interfacial Electro-Chemo-Mechanics between Lithium Metal and Halide Solid Electrolyte." Chemistry of Materials 36, no. 20 (2024): 10336-10350.

Research Group

Scientific Officers
- Dr. Lily Mondal
- Dr. Aniruddha Basu
- Dr. Ripan Kr. Biswas
- Dr. Susmita Bera

PhD Students
- Newton Roy
- Mahendra Mainkar N.
- Ishita Das
- Debalina Sarkar
- Moumita Samanta
- Debopam Pal
- Silvia Begum

Project Associates
- Shruti Guha
- Ishani Ganguly
- Mrigesh Palav
- Gayatri Unni
- Sumanth N.
- Tiasa Seal
- Annesha Gupta

Visiting Students
- Anupama Joy
- Nisha Kumari
- Tejpratap Singh

Research Engineer
- Sreeroop Ghosh
- Sayan Chatterjee

Research Associate
- Dr. Pritha Mondal

Interns
- Amal M M
- Ambily Ganga
- Md. Waqar Ahmed
- Surya Nandi
- Pritam Ghosh
- Arkoprabha Adhikary
- Abhinandan Dhar



Faculty Spotlight

Dr. Dheeraj Kumar Singh

Assistant Professor, RISE, TCG CREST

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Research Focus

Solid-state batteries, solid–solid interfaces, electrochemical diagnostics, interfacial dynamics, and in-operando characterisation techniques.

Profile

Dr. Dheeraj Kumar Singh works on understanding the complex interfacial dynamics governing the performance and stability of solid-state batteries (SSBs). His research focuses on investigating solid–solid interfaces and identifying the fundamental bottlenecks that limit the practical implementation of next-generation solid-state energy storage systems.

His group employs advanced in-situ and in-operando characterisation techniques, including atomic force microscopy (AFM), X-ray photoelectron spectroscopy (XPS), scanning electron microscopy (SEM), and electrochemical impedance spectroscopy (EIS), to study interfacial evolution, dendrite formation, electro-chemo-mechanical behaviour, and ion transport phenomena in solid-state battery systems.

Prior to joining Research Institute for Sustainable Energy (RISE), Dr. Singh carried out research at institutions including Jawaharlal Nehru Centre for Advanced Scientific Research and University of Giessen, where he worked extensively on advanced electrochemical systems and solid-state energy materials.

Academic and Research Journey

- Ph. D., Jawaharlal Nehru Centre for Advanced Scientific Research, Bengaluru (2019)
- Postdoctoral Associate, Jawaharlal Nehru Centre for Advanced Scientific Research (2018–2019)
- Postdoctoral Associate, University of Giessen (2019–2022)

Selected Research Contributions

1. In Situ Observation of Room-Temperature Magnesium Metal Deposition on a NASICON/IL Hybrid Solid Electrolyte., Wei, Z., Singh, D.K., Helmbrecht, K., Sann, J., Yusim, Y., Kieser, J.A., Glaser, C., Rohnke, M., Groß, A., and Janek, J. Adv. Energy Mater, 2023, 2302525.

2. Non-Linear Kinetics of the Lithium Metal Anode on Li_6PS_5Cl at High Current Density: Dendrite Growth and the Role of Lithium Microstructure on Creep. Singh, D.K., Fuchs, T., Krempaszky, C., Mogwitz, B., and Janek, J. Adv. Sci., 2023, 2302521.

Research Group

Doctoral Students

- Somtirtha Das (joined 2025)
- Samannita Sarkhel (joined 2025)
- Rizia Parvin (joined 2025)
- Shalini Chatterjee (joined 2025)



Faculty Spotlight

Arpita Nandy

Assistant Professor, RISE, TCG CREST

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Research Focus

Microbiology, electrochemistry, environmental biotechnology, bioelectrochemical systems, waste remediation, and renewable fuel generation.

Profile

Dr. Arpita Nandy works at the intersection of microbiology, electrochemistry, and environmental biotechnology, with a focus on developing sustainable solutions for waste remediation and clean energy generation. Her interdisciplinary research integrates biological and electrochemical approaches to address challenges in environmental sustainability and renewable fuel production.

Her work explores innovative strategies such as integrated bioelectrochemical systems (BES) for environmental remediation and the conversion of organic waste into renewable fuels through advanced bio-assisted technologies. By combining microbial systems with electrochemical processes, her research aims to develop scalable and environmentally responsible approaches for circular bioeconomy applications.

Prior to joining Research Institute for Sustainable Energy (RISE), Dr. Nandy held academic and research positions at institutions including University of Calcutta, University of Calgary, University of Bath, and Indian Institute of Science Education and Research, Mohali.

Academic and Research Journey

- Ph. D., University of Calcutta (2017)
- Visiting Faculty, BRS (PG) College, University of Calcutta (2017–2018)
- Postdoctoral Associate, University of Calgary (2018–2020)
- Postdoctoral Associate, University of Bath (2021–2022)
- DBT Research Associate, Indian Institute of Science Education and Research, Mohali (2022–2023)

Selected Research Contributions

1. Investigation of MIL-53 (Fe)@Fe_3O_4 nanocomposites as sustainable catalysts for lignocellulose delignification in rice straw for biofuel applications, A. Rai, A. Singha Roy, N. Roy, L. Mane, S. S. Hivarkar, P. K. Dhakephalkar, S. S. Dagar, A. Nandy Bioresource Technology Reports, 2025, 32, 102364.

2. Sustainability Science and Technology in 2024 and beyond: equitable publishing aligned with United Nations' Sustainable Development Goals, J. Baltrusaitis, B. Bakshi, K. Chojnacka, C.J. Chuck... A.Nandy, L. Zhang, Sustainability Science and Technology, 2024, 1, 010201.

Research Group

Doctoral Students
- Ayan Singha Roy (joined 2025)
- Aditya Saha (joined 2025)

Postdoctoral Scholar
- Dr. Kriti Sengupta

Project Assistant
- Sreeram Rakesh (joined 2025)