Mahesh P. Suryawanshi, Ph. D.

ARC DECRA Fellow & Lecturer

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SUMMARY OF PROFILE

Highly committed an ARC DECRA fellow and a named Top 2% best scientists in the world (Stanford World Ranking, 2021, 2022, and 2023) with over a decade of research experience in several reputed institutions. A subject matter expert in renewable energy technologies and advanced materials manufacturing with 107 peer reviewed articles published in high impact journals including Chemical Reviews, Progress in Materials Science, Advanced Energy Materials, Advanced Functional Materials, Advanced Science, Small, Journal of Materials Chemistry A, Chemistry of Materials etc. with h-index of 41 and > 4630 citations, 6 patents and 1 book, 1 pre-print and 6 book chapters. Received several competitive fellowships, awards, incentives, scholarship, and research funding of ~ AUD $2.42M as Lead CI or Co-CI. Holds a Doctorate Degree in Physics (specialised in Renewable Energy Engineering, specifically solar hydrogen production system*) and a Certificate in Machine Learning and Data Science: Making Data-Driven Decisions from MIT, USA.*

EMPLOYMENT AND RESEARCH/PROJECT MANAGEMENT EXPERIENCE

- **ARC DECRA Fellow & Lectuer;** Feb. 2024 – Jan. 2025
  Mentor: Prof. Xiaojing Hao & Prof. Ziv Hameiri
- **ARC DECRA Fellow & Lecturer;** Feb. 2021 – Jan. 2024
  University of New South Wales (UNSW) Sydney, Australia.
  Mentor/s: Prof. Xiaojing Hao, Prof. Rose Amal & Prof. Martin A. Green
- **Associate Lecturer/Research Fellow;** June 2019 – January 2021
  University of New South Wales (UNSW) Sydney, Australia.
  Advisor: Prof. Xiaojing Hao & Prof. Martin Green
- **Brain Korea (BK) 21 Postdoctoral Fellow;** Aug. 2015 – June 2019
  Chonnam National University, South Korea
  Advisor: Prof. Jin Hyeok Kim

RESEARCH HIGHLIGHTS

- **Group Leader of Materials Innovation Lab for Sustainable Energy Futures (Mater-E Lab) at UNSW**, becoming a first lab in Australia to design and develop floating-photovoltaic driven direct seawater splitting to produce renewable hydrogen from seawater as well as synthesis of emerging perovskite-inspired chalcogenide and chalcohalide nanocrystals for solar energy conversion.

- **Demonstrated modified SILAR approach, direct solution coating and vapor transport deposition** for the preparation of chalcogenide compounds for thin film solar cells (**Provision Patents: KR 10-2013-0112071, KR10-2013-0112071**).
- **Demonstrated green synthetic strategies (e. g. deep eutectic and vegetable oil-based solvents) for the preparation of colloidal chalcogenide nanocrystals** using "bottom-up approach and their applications in solar-driven hydrogen production (**Provisional Patents: KR 10-2017-0036807, KR 10-2017-0022168**).
- **Developed a facile, room temperature electroless deposition approach** for the preparation of metal oxyhydroxides electrocatalysts (Major contribution in the synthesis methodology for electrocatalysts preparation).

EDUCATION

- **Ph.D.: Physics (**specialised in Renewable Energy Engineering, specifically solar hydrogen production system**); Aug. 2011 ~ Aug. 2015**
  Shivaji University, Kolhapur, India & Chonnam National University, South Korea (Ph. D. Exchange Student), **Supervisors:** Prof. Annasaheb V. Moholkar and Prof. Jin Hyeok Kim
- **M. Sc.: Physics (Renewable Energy Science); July 2008 ~ Dec. 2010**
  Shivaji University, Kolhapur, India, **Supervisor:** Prof. Pramod S. Patil
- **B. Sc.: Physics; July 2005 ~ Apr. 2008**
  Shivaji University, Kolhapur, India

PROFESSIONAL RECOGNITION, AWARDS, FELLOWSHIPS/HONOR

1. **Discovery Early Career Researcher Award (DECRA)** by the Australian Research Council (ARC), University of New South Wales (UNSW) Sydney, Australia (2021 ~ 2024) (~ 513K AUD)
2. **Early Career Research Award under APOSTD/2019/078** by the Ministry of Education, Research, Culture and Sports, Generalitat Valenciana, Spain and European Commission to work with A/Prof. Sixto Gimenez at the University of Jaume I (UJI), Spain (2019 ~ 2021) (~ 290K AUD).
3. **Brain Korea 21 (BK 21) Postdoctoral Fellowship** by Korea Ministry of Education and Human Resource Development to support early-career research work at Chonnam National University, Gwangju, South Korea (2016 ~ 2019) (~ 170K AUD)
4. **International Exchange Student Scholarship** from Korean Government to pursue Ph. D. research at Chonnam National University, South Korea under the supervision of Prof. Jin Hyeok Kim (2012 ~ 2015)
5. **Key Scientific Article Certificate** from Renewable Energy Global Innovations Series (REGI), Canada, (2015), for the publication in Phys. Chem. Chem. Phys. 17 (2015) 19777-19788
6. **Honour to highlight the articles** and the work done **as Inside Front and Back Cover in the Journal of Materials Chemistry A,** (10.1039/C8TA07343K and 10.1039/C8TA05901B), **Cover Art in Chemistry of Materials** (10.1021/acs.chemmater.0c03543) and **Cover Art in ACS Applied Energy Materials (**10.1021/acsaem.0c00040**)**
7. **Performance-based Incentives** for 3 research articles of ~ 1000 USD from Chonnam National University, South Korea

GRANTS

- **Discovery Project (DE230101676)** by the Australian Research Council (ARC) on "Nitride Materials: In the "Bond Ionicity Goldilocks Zone" for Solar Energy". 2023-2026 **($326,000)**, Martin Green (Lead CI), **Mahesh P. Suryawanshi (Co-lead CI)**, Judy Hart (Co-CI), Rob Patterson (Co-CI).
- **Discovery Early Career Researcher Award (DE210101565)** by the Australian Research Council (ARC) on "Emerging Ionic Chalcogenide Perovskites for Solar Energy Conversion". 2021-2025 (**$513,193**), **Mahesh P. Suryawanshi (Lead CI**).
- **UNSW SPREE Capex Fund 2023**, "Hydrogen Fuel and Quantum Dots", (**$31,000**), **Mahesh Suryawanshi (Lead CI)**
- **UNSW Global Research and Innovation Program (GRIP) Grant 2023,** "Solar Synergy: UNSW-IISC Revolutionizing Solar Energy with Next-Gen Semiconductors Absorber Materials" **($18,531) Mahesh Suryawanshi (Lead CI)**
- **UNSW GROW Grant** on "A Physics-informed, Bayesian Framework to Optimize Perovskite Composition", 2022 (**$53,576**), Priyank Kumar (Lead CI), **Mahesh P. Suryawanshi (Co-lead CI),** Hassan Masood (Co-CI).
- **UNSW Capex Fund,** "Temperature-Dependent PLQY System", 2022 (**$40,000**)**,** Ziv Hameiri, Xiaojing Hao, **Mahesh Suryawanshi**, Robert Lee Chin
- **UNSW Research Infrastructure Scheme,** "Photoluminescence Spectrometer for Photophysical Studies of Molecules and Materials", 2022 (**$193,500**), Vinh Nguyen, Timothy Schmidt, Jessica Alves, Jonathon Beves, Martin Peeks, Tom Wu, Rona Chandrawati, Ned Ekins-Daukes, Michael Nielson, Robert Patterson, **Mahesh Suryawanshi**.
- **UNSW Taste of Research Scholarship** on "Lead-free Perovskite Nanocrystals: Ligand Assisted Reprecipitation Synthesis and Their Optoelectronic Properties", 2021 (**$6,000**), **Mahesh P. Suryawanshi (Lead CI)**, Xiaojing Hao (Co-CI)
- **UNSW 2021 Strategic Fund SPF02** Performance-based Grant (PS64022), 2021 (**$3,217**), **Mahesh P. Suryawanshi (Lead CI)**.
- **Early Career Research Award (APOSTD/2019/078)** by the Ministry of Education, Research, Culture and Sports, Generalitat Valenciana, Spain and European Commission on "Artificial Photosynthesis System for Simultaneous Production of H2 fuel and Value-Added Chemical Products from Biomass (ArtiPSy2). 2019-2021 (**$290,300**), **Mahesh P. Suryawanshi (Lead CI)**.

SUPERVISION/MENTORING

1. **Ph**. **D. students:**
   1) Xinyao Guo, (Primary Supervisor, SPREE, UNSW, 2022).
   2) Furqan Choudhary (Primary Supervisor, SPREE, UNSW 2023)
   3) Yiming Xia (Primary Supervisor, SPREE, UNSW 2024).
   4) Yangfan Zhang (Primary Supervisor, SPREE, UNSW 2024)
   5) Hongrui Zhang (Primary Supervisor, SPREE UNSW, 2024, current)

6) Mani Kaur (Joint Supervisor, School of ChemEng, UNSW, 2021)

7) Dilpium Samarasinghe (Joint Supervisor, School of ChemEng, UNSW, 2024)

RESEARCH OUTPUTS

- **PUBLICATIONS (107)**

107 peer-reviewed journal articles in high impact journals such as Chemical Reviews, Progress in Materials Science, Advanced Energy Materials, Advanced Functional Materials, Advanced Science, ACS Catalysis, Small, Journal of Materials Chemistry A, Chemistry of Materials etc. Total citations are >4678, H-index is 42 and i10 index is 84 (Google Scholar - https://scholar.google.com/citations?user=gYVP8U8AAAAJ&hl=en)

- **Book (1)**

- **Mahesh P. Suryawanshi, Xiaojing Hao, Uma V. Ghorpade, "Metal Chalcohalide Semiconductors: From Fundamental Properties to Synthesis and Applications"** Wiley**,** under publishing process (schedule to publish by July 2024).
- Jin Hyeok Kim, R. B. V. Chalapathy, Archana S. Kamble, Sachin A. Pawar, **Mahesh P. Suryawanshi,** Abhishek Lokhande, **"Thin film Solar Cells: Principles and Applications",** Chonnam National University Press, South Korea, **2016 ISBN: 978-89-6849-324-9 (93560).**

- **Re-print (1)**

- Prof. Bahman Shabani, **Dr. Mahesh P. Suryawanshi**, "Hydrogen Energy Technologies" 2023 MDPI, St. Alban-Anlage 66 4052 Basel, Switzerland, ISBN 978-3-0365-9301-2. doi.org/10.3390/books978-3-0365-9301-2

- **Book Chapters (6)**

- **Chapter 4: "Catalysts for Electrolysis and Electrochemical Water Splitting"**, Umesh P. Suryawanshi, Mayur A. Gaikwad, Uma Ghorpade, Jin Hyeok Kim, **Mahesh P. Suryawanshi*** in the book entitled "Challenges and Opportunities in Green Hydrogen Production", Springer Nature Publishers, Switzerland – 2023 ISBN: 879-3-031-23100-2
- **Chapter 5: "Materials for Solar-Driven Water Splitting"**, Yiming Xia, Seung Wook Shin, **Mahesh P. Suryawanshi*** in the book entitled "Challenges and Opportunities in Green Hydrogen Production", Springer Nature Publishers, Switzerland – 2023 ISBN: 879-3-031-23100-2.
- **Chapter 4: "Physical Methods for Synthesis and Thin-Film Deposition"**, Sachin R. Rondiya, Anurag Roy, Ganesh K. Rahane, Ashok Jadhavar, Mahesh M. Kamble, Puneeth Kumar P., Hareesh K., **Mahesh P. Suryawanshi**, Nelson Y. Dzade, Sandesh R. Jadkar in the book entitled "Applications of Nanomaterials for Energy Storage Devices" 1st Edition, CRC Press, USA, 2023, ISBN – 9781003216308, https://doi.org/10.1201/9781003216308
- **Chapter 7: Thin Film Solar Cells Based on Inorganic Absorbers Layers Derived from Colloidal Quaternary Nanocrystal Inks" Mahesh Suryawanshi,** Uma Ghorpade, Jin Hyeok

Kim, "Applications of One-Dimensional Nanomaterials", American Scientific Publishers, USA – 2010 ISBN: 1-58883-263-5.

- **Chapter 8: "Synthesis of $Cu_2ZnSn(S,Se)_4$ Nanoparticles"**, **Mahesh P. Suryawanshi**, Annasaheb V. Moholkar, in the book entitled "Earth-Abundant Nanomaterials for Photovoltaic Applications", World Scientific Publishing Co Pte Ltd, Singapore, Under Publishing Process.
- **Chapter 7: "Spinel Nanoferrites as Catalysts",** Yiming Xia, Uma V. Ghorpade, **Mahesh P. Suryawanshi,** in the book entitled "Spinel Nanoferrites, Physicochemical and Biological Applications 1st Edition, Elsevier, 2024, ISBN: 9780323955447, Under Publishing Process.

ADMINISTRATIVE/LEADERSHIP EXPERIENCE

- **Early Career Representative, Engineering Faculty Research Committee, UNSW**
- **Equity, Diversity, and Inclusion (EDI) School Officer, SPREE, UNSW**
- **Secretary & SPREE Representative, Early Career Academic Network (ECAN) Engineering, UNSW**
- **Laboratory Space Manager, TETB 165, SPREE, UNSW**
- **Life-time Member, Materials Research Society of Korea**
- **Topic Editor 'Hydrogen Energy Technologies' 2nd Volume, MDPI.**
- **Topic Editor 'Emerging Materials and Technologies for Electrolysis of Seawater' Materials, MDPI**
- **Reviewer for International Journals:** Nature Materials, Joule, ACS Energy Letters, ACS Applied Materials and Interfaces, Inorganic Chemistry, ACS Omega (ACS Publications), Journal of Materials Chemistry A, Nanoscale, RSC advances (RSC Publications), Solar Energy Materials and Solar Cells, Electrochimica Acta, Applied Surface Science, Journal of Alloys and Compounds, Chinese Journal of Physics (Elsevier), Asia-Pacific Journal of Chemical Engineering (Wiley), Ionics, Journal of Materials Science: Electronic Materials (Springer)