

NAME: LYDIA HELENA WONG

Job Title: Associate Professor (with tenure)
Year of Birth: 1980
Researcher unique identifier : Researcher ID A-2239-2011
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A. PROFESSIONAL PREPARATION

NTU	Singapore	Materials Science	B.App Sci (Hons) 2002
NTU	Singapore	Materials Science	PhD 2007
Stanford University	USA	Chemical Eng/MSE	Post Doc 2010

B. APPOINTMENTS

Mar 2020 - present	Assistant Chair (Research) , School of Materials Science and Engineering, NTU
Mar 2016 - present	Associate Professor , School of Materials Science and Engineering, NTU
Aug 2016 – present	Cluster Director , Energy Research Institute @ NTU (ERI@N)
Aug 2015 – July 2018	Assistant Chair (Students) , School of Materials Science and Engineering, NTU
Jan 2011 – Feb 2016	Assistant Professor , School of Materials Science and Engineering, NTU
May 2008–Dec 2010	Teaching Fellow/Visiting Assistant Professor , School of Materials Science and Engineering, NTU
Feb 2006 – Apr 2008	Senior Engineer , Technology Development, Chartered Semiconductor Manufacturing

C. PUBLICATIONS

Total publications > 140, Total citations: > 9000 citations, H index : 56 (Google Scholar – Jan 2023)

5- 10 publications most relevant to this grant application:

1. S. Hadke, L.H. Wong* et al. (2021). "Emerging Chalcogenide Thin Films for Solar Energy Harvesting Devices" *Chemical Reviews*, 122 (11), 10170-10265, DOI:10.1021/acs.chemrev.1c00301
2. Rai, Monika; Yuan, Zhengtian; Sadhu, Anupam; Leow, Shin Woei; Etgar, Lioz; Magdassi, Shlomo; Wong, Lydia Helena[^], Multimodal Approach towards Large Area Fully Semitransparent Perovskite Solar Module, *Advanced Energy Materials*, 2021, 11 (45), 102276.
3. Anupam Sadhu, Monika Rai, Teddy Salim, Xin Jin, Joel Ming Rui Tan, Shin Woei Leow, Mahmoud G Ahmed, Shlomo Magdassi, Subodh G Mhaisalkar, Lydia Helena Wong, Dual Role of Cu-Chalcogenide as Hole-Transporting Layer and Interface Passivator for p-i-n Architecture Perovskite Solar Cell, *Advanced Functional Materials*, 2021, 2103807, <https://doi.org/10.1002/adfm.202103807>
4. Youngkyu Hwang, Anupam Sadhu, Sangho Shin, Shin Woei Leow, Ze Zhao, Jingyu Deng, Joshua A Jackman, Munho Kim, Lydia H Wong, Nam-Joon Cho, An Intrinsically Micro-/Nanostructured Pollen Substrate with Tunable Optical Properties for Optoelectronic Applications, *Advanced Materials* 33 (32), 2100566, DOI: 10.1002/adma.202100566
5. M Rai, LH Wong, L Etgar, Effect of Perovskite Thickness on Electroluminescence and Solar Cell Conversion Efficiency, *The journal of physical chemistry letters* 11 (19), 8189-8194, DOI: 10.1021/acs.jpcllett.0c02363
6. Biplab Ghosh, Benny Febriansyah, Padinhare Cholakkal Harikesh, Teck Ming Koh, Shreyash Hadke, Lydia H Wong, Jason England, Subodh G Mhaisalkar, Nripan Mathews, Direct Band Gap Mixed-Valence Organic-inorganic Gold Perovskite as Visible Light Absorbers, *Chemistry of Materials* 32 (15), 6318-6325, DOI: 10.1021/acs.chemmater.0c00345

7. Shreyash Hadke, Sergiu Levcenko, Gopalakrishnan Sai Gautam, Charles J Hages, José A Márquez, Victor Izquierdo-Roca, Emily A Carter, Thomas Unold, **Lydia H Wong***, Suppressed Deep Traps and Bandgap Fluctuations in Cu₂CdSnS₄ Solar Cells with ≈8% Efficiency, *Advanced Energy Materials*, 2019, 9 (45), 1902509. <https://doi.org/10.1002/aenm.201902509>
8. SH Hadke, S Levcenko, S Lie, CJ Hages, JA Márquez, T Unold, **LH Wong***, Synergistic Effects of Double Cation Substitution in Solution-Processed CZTS Solar Cells with over 10% Efficiency, *Advanced Energy Materials*, 2018, 8 (32), 1802540 <https://doi.org/10.1002/aenm.201802540>
9. A Guchhait, HA Dewi, SW Leow, H Wang, G Han, FB Suhaimi,..L.H. **Wong**, et al, Over 20% Efficient CIGS–Perovskite Tandem Solar Cells, *ACS Energy Lett.*, 2017, 2 (4), pp 807–812 <https://doi.org/10.1021/acsenergylett.7b00187>
10. Zhen Li[^], Sneha A. Kulkarni, Pablo P. Boix, Enzheng Shi, Anyuan Cao, Kunwu Fu*, Sudip K. Batabyal[^], Jun Zhang , Qihua Xiong , Lydia Helena Wong , Nripan Mathews, and Subodh G. Mhaisalkar. Laminated Carbon Nanotube Networks for Metal Electrode-Free Efficient Perovskite Solar Cells. *ACS Nano*, 2014, 8 (7), pp 6797–6804, DOI: 10.1021/nn501096h

D. RESEARCH AREA AND EXPERTISE

- Novel materials for solar energy harvesting: molecular/structural modification for improved charge separation and transport, integration of organic/inorganic nanomaterials for improved carrier conductivity.
- Accelerated discovery of new materials by high throughput experiments and machine learning.
- Printable photovoltaic devices: Cu chalcogenide thin film solar cells, tandem cells, perovskite solar cell, semi transparent solar cells, organic/inorganic hybrid cells; novel techniques for printable photovoltaic devices.
- Solar driven fuel generation: photoelectrochemical cells, development of new absorber for photoanode/photocathodes, development of new catalyst for Oxygen and Hydrogen evolution reactions, catalyst design for CO₂ reduction reactions.

E. SUMMARY OF RESEARCH OUTCOMES FROM ALL PREVIOUS GRANTS

Lydia has managed > \$10 million competitive grants (cumulative) from 2008 till now in the area of materials design for solar harvesting technologies from various agencies. In A*STAR PSF grant, NRF CEPO program and MOE Tier 2, Lydia led a team to produce high quality printable Cu-chalcogenide solar cells which has broken world records in CuZnSnS₄ (2015) and novel kesterite (2019) solar cells. In MOE Tier 2 (Jan 2017- July 2020) her team built high-throughput thin film deposition system based on solution methods (spray pyrolysis, inkjet printing), high throughput UV-Visible spectroscopy and the photoelectrochemical scanning droplet cell. In the recently concluded NRF CREATE SHARE project, innovations in transparent conductor, novel hole transporting layers, plasmonic and down conversion nanoparticles resulted in semi transparent perovskite solar cell with efficiency of 9.5% under 1 sun and 12% under 0.05 sun for of 21 cm² which is the highest reported value under the category of large area semi-transparent perovskite solar cell with AVT >20%.

F. Service, Award and Recognition

- Associate Editor, *Journal of Materials Chemistry A* (Royal Society of Chemistry), 2023 -
- Nanyang Education Award (2013 and 2020), Koh Boon Hwee Award, MSE Teacher of the Year Award.
- Editorial Advisory Board of *Solar Rapid Research Letter* (Wiley, IF 8.5)
- Guest Editor *Journal of Materials Chemistry A* (RSC, IF~15)
- Invited Speakers at >20 international conferences such as: MRS-Spring and Fall (USA), ECS-Spring, E-MRS, etc (2016 to now)
- Member of NTU Senate (2020-2024)
- Secretary of Materials Research Society of Singapore (2022-2024)

G. Supervision of Research Staffs and Students

- Graduated > 15 PhD students and > 5 M.Eng students

- Presently supervising 6 PhD students, 1 MSc student and 5 Research Staffs, and 8 Undergraduate Final Year students.