Boon Siang Jason YEO

Contact Information

Address	Department of Chemistry National University of Singapore S8-02-05D Singapore 117543
Tel. No.:	+65-65162836 (office)
Email:	chmyeos@nus.edu.sg
Webpage:	https://chemistry.nus.edu.sg/people/yeo-boon-siang-jason/
ORCID:	0000-0003-1609-0867
Researcher ID:	C-6487-2014

Employment

Jan 2019 – Present	Associate Professor (tenured) in the Department of Chemistry, National University of Singapore Deputy Head, Education (**2021–Present**), Assistant Head (**2020-2021**) in the Department of Chemistry, NUS
Dec 2015 – Mar 2021	Group Leader of the Solar Fuels Lab in the Solar Energy Research Institute of Singapore (SERIS)
Apr 2012 – Dec 2018	Assistant Professor (tenure-track) in the Department of Chemistry, National University of Singapore

Professional Training

Feb 2009 – Jan 2012	Chemist Postdoctoral Fellow in the Lawrence Berkeley National Laboratory and University of California, Berkeley
Jan 2005 – Jan 2009	Dr. Sc. in Chemistry, ETH Zürich
Jul 2001 – Jul 2004	M.Sc. in Chemistry, National University of Singapore Gold Medal for the Most Outstanding M.Sc. Thesis in Chemistry
Jul 1997 – Jun 2001	B.Sc. with Honors (First Class) in Chemistry National University of Singapore

Awards and Honors

1. World's Top 2% of Scientists List. **2023**, **2022**, **2021**.
2. Ertl Prize, **2024**, Ertl Center for Electrochemistry and Catalysis.
3. Dean's Chair, **Jul 2021 - Jun 2024**, National University of Singapore
4. Faculty Teaching Excellence Award for AY **2019/2020**, National University of Singapore
5. Faculty Honours Roll (Teaching) for AY **2016/2017**, National University of Singapore
6. Faculty Teaching Excellence Award for AY **2015/2016**, National University of Singapore

7. Annual Teaching Excellence Award for AY **2014/2015**, National University of Singapore
8. Faculty Teaching Excellence Award for AY **2014/2015**, National University of Singapore
9. Faculty Teaching Excellence Award for AY **2013/2014**, National University of Singapore
10. Travel Grant, **2008**. Huber Kudlich Foundation, Switzerland
11. Gold Medal for the Most Outstanding M.Sc. Thesis in Chemistry, **2005**. Singapore National Institute of Chemistry
12. President's Graduate Fellowship, **2002-2003**. National University of Singapore
13. Book Prize for Best Undergraduate in Level 2 Chemistry, **1999**. Singapore National Institute of Chemistry.

Grants

Active

1. MOE Tier II (Involvement: co-PI; with 1 other main PI and 1 co-PI) (Electrochemical Bicarbonate Conversion to Formate: A Promising Approach towards Capture and Conversion of CO_2) – 796,822 SGD (**Jan 2024 – Dec 2026**)
2. MOE Tier II (Involvement: PI) Electrochemical polymerization of carbon dioxide and its reduced intermediates to C_6- C_{20} hydrocarbons – 514,800 SGD (**Aug 2023-Jul 2026**)
3. Shell Global Solutions International B.V. (Involvement: PI) (Electrochemical Conversion of Acetylene to Butadiene, Higher Olefins and Oxygenates) - 347,230 SGD (**Jan 2023-Jan 2025**)
4. Ministry of National Development (NEA) (Involvement: co-PI, with 1 other main PI) (Cost-effective removal and recovery of heavy metals from non-incinerable wastes for recycling and reuse with near-zero waste discharge) - 2 million SGD (**Sept 2021 – Aug 2024**)
5. Shell International Exploration and Production Inc. (Involvement: PI) (Electrocatalysts for the production of ethanol and *n*-propanol) - 136,539 SGD (**May 2021-Apr 2024**)
6. NRF-Shell (Involvement: PI; with 1 other co-PI) (Electrocatalysts for the production of ethanol and *n*-propanol) - 3.4 million SGD (**May 2021-Apr 2025**)
7. NRF-CRP (Involvement: co-PI; with 1 other main PI and 2 co-PIs) Organic thin-film energy sources for highly distributed nanopower generation – ~7 million SGD (**Mar 2021-Mar 2026**)

Past

8. FRC Tier 1 (Involvement: PI) (Electrocatalytic 'Fischer-Tropsch' production of hydrocarbons) – 215,000 SGD (**Mar 2020 – Dec 2022**)
9. Green Fuels Program, NUS (Involvement: PI; with 4 other PIs) - 1.4 million SGD (**July 2018-July 2022**)
10. NRF Intra-CREATE CARES-BEARS (Involvement: co-PI; with 9 other PIs) (A table top chemical factory for the reduction of CO_2 to value added chemicals) - 4,999,532 SGD (**Jan 2018-Jun 2021**)
11. Provision of Consultancy Services to update the Solar Photovoltaic (PV) Roadmap Study, Prime Minister's Office (Involvement: Technical Lead; with SERIS, NUS, NTU, EPGC) – 498,000 SGD (**Oct 2018 – Dec 2019**)
12. MOE Tier II (Involvement: PI) (C-C Coupling Electrocatalysts for Reducing CO_2 to n-Propanol and n-Butanol) - 366,047 SGD (**June 2017-May 2020**)
13. Solar Energy Research Institute of Singapore (Involvement: PI) Establish Solar Fuels Lab, 400,000 SGD, 2 RA positions for 4 years (**Dec 2015 – Mar 2021**)
14. NUS-IMRE joint project (Involvement: PI) (Development of tandem catalysts for the efficient adsorption and electroreduction of carbon dioxide to high value products) - 78,000 SGD (**Sept 2017-Jun 2019**)
15. FRC Tier 1 (Involvement: PI) (Developing Non-noble Transition Metal Carbides and Nitrides for Hydrogen Evolution) - 179,000 SGD (**Oct 2015-Sept 2018**)
16. NRF CREATE SINBERISE (Involvement: PI; with 6 other PIs) 3,353,302 SGD (**Mar 2013-Mar 2018**)
17. FRC Tier 1 (Involvement: PI) (Understanding Structure-Activity and Structure-Selectivity Relationships for Electrochemical Energy Conversion Reactions by Operando X-Ray Spectroscopy) - 171,000 SGD. (**Aug 2014-Aug 2017**)

18. Collaboration with Practical Analyzer Solutions Pte Ltd (PAS), Prototype Development Project (Involvement: PI) (High Pressure Electrochemical Cell Body) - Contribution of 12,000 SGD by PAS (**Jan 2016-Jul 2016**)
19. NUS Start-up grant (Involvement: PI) (Understanding and Developing Catalytic Materials for Energy Conversion Reactions: Electrochemical Reduction of Carbon Dioxide to Transportation Fuels) - 773,838 SGD. (**Jun 2012-Jun 2015**)

Current Research Interests

Developing catalysts for the electrochemical reduction of CO_2 to multi-carbon hydrocarbons and oxygenates; Catalysis of oxygen and hydrogen evolution reactions; Use of operando spectroscopies for probing catalysts.

Peer-Reviewed Publications

According to current records of the Web of Science, Publications # 8, 11, 26, 32, 44, 45, 50, 52, 55, 56 and 58 *have received enough citations to be placed in the top 1% of the academic field of Chemistry based on a highly cited threshold for the field and publication year.*

1. M.P.L. Kang, H. Ma, R. Ganganahalli and B.S. Yeo. Surfactant-Enhanced Formation of Ethylene from Carbon Monoxide Electroreduction on Copper Catalysts. *ACS Catal.* 14, 116. **2024**.

2. H. Ma, E. Ibáñez-Alé, R. Ganganahalli, J. Pérez-Ramírez, N. López, and B.S. Yeo. Direct Electroreduction of Carbonate to Formate. *J. Am. Chem. Soc.* 145, 24707. **2023**.

3. F. You, S.B. Xi, J.J.Y. Ho, F. Calle-Vallejo and B.S. Yeo. Influence of Copper Sites with Different Coordination on the Adsorption and Electroreduction of CO_2 and CO. *ACS Catal.* 13, 11136. **2023**.

4. P. Preikschas, A.J. Martin, B.S. Yeo and J. Pérez-Ramírez. NMR-based quantification of liquid products in CO_2 electroreduction on phosphate-derived nickel catalysts. *Comm. Chem.* 6, 147 **2023**.

5. C. Wei, Y. Yang, H. Ma, G. Sun, Y. Chen, C. Zhang, B.S. Yeo, C. He and A.B. Wong. Nanoscale Management of CO Transport in CO_2 Electroreduction: Boosting Faradaic Efficiency to Multicarbon Products via Nanostructured Tandem Electrocatalysts. *Adv. Funct. Mater.* 33, 2214992. **2023**.

6. S. Kwon, J. Zhang, R. Ganganahalli, S. Verma, B.S. Yeo. Enhanced Carbon Monoxide Electroreduction to >1 $A{\cdot}cm^{-2}$ C_{2+} Products Using Copper Catalysts Dispersed on MgAl Layered Double Hydroxide Nanosheet House−of−Cards Scaffolds. *Angew. Chemie Int. Ed.* 62, e202217252. **2023**.

7. W.J. Teh, M.J. Kolb, F. Calle-Vallejo and B.S. Yeo. Enhanced Charge Transfer Kinetics for the Electroreduction of Carbon Dioxide on Silver Electrodes Functionalised with Cationic Surfactants. *Adv. Funct. Mater.* 33, 22106167. **2023**.

8. C.Y.J. Lim, M. Yilmaz, J.M. Arce-Ramos, A.D. Handoko, W.J. Teh, Y. Zheng, Z.H.J. Khoo, M. Lin, M. Isaacs, T.L.D Tam, Y. Bai, C.K. Ng, B.S. Yeo, G. Sankar, I. Parkin, K. Hippalgaonkar, M. Sullivan, J. Zhang, Y.F. Lim. Surface Charge as Universal Activity Descriptors for Electrochemical CO_2 Reduction to Multi-Carbon Products on Organic-Functionalised Cu. *Nature Comm.* 14, 235. **2023**. ***(WoS Highly Cited Paper)***

9. F. Shao, Z. Xia, F. You, J.K. Wong, Q.H. Low, H. Xiao, B.S. Yeo. Surface Water as an Initial Proton Source for the Electrochemical CO Reduction Reaction on Copper Surfaces. *Angew. Chemie Int. Ed.* 62, e202214210. **2023**.

10. Y. Zhou, R. Ganganahalli, S. Verma, H.R. Tan, B.S. Yeo. Production of C_3 – C_6 Acetate Esters via CO Electroreduction in a Membrane Electrode Assembly Cell. *Angew. Chemie Int. Ed.* 61, e202202859. **2022** ***(HOT Paper)***.

11. Y. Zhou, A.J. Martín, F. Dattila, S.B. Xi, N. López, J. Pérez-Ramírez, B.S. Yeo. Long-chain hydrocarbons by CO_2 electroreduction using polarized nickel catalysts. *Nature Catal.* 5, 545. **2022**. ***(WoS Highly Cited Paper)***

12. M.P.L. Kang, M.J. Kolb, F. Calle-Vallejo and B.S. Yeo. The Role of Undercoordinated Sites on Zinc Electrodes for CO_2 Reduction to CO. *Adv. Funct. Mater.* 32, 2111597. **2022**.

13. T.L.D. Tam, A. Moudgil, W.J. Teh, Z.M. Wong, A.D. Handoko, S.W. Chien, S.W. Yang, B.S. Yeo, W.L. Leong and J.W. Xu. Polaron Delocalization Dependence of the Conductivity and the Seebeck Coefficient in Doped Conjugated Polymers. *J. Phys. Chem. B*. 126, 2073. **2022**.

14. S. Pablo-García, F.L.P. Veenstra, L.R.L. Ting, R. García-Muelas, F. Dattila, A.J. Martín, B.S. Yeo, J. Pérez-Ramírez and N. López. Mechanistic routes toward C_3 products in copper-catalysed CO_2 electroreduction. *Catal. Sci. Technol.* 12, 409. **2022**.

15. W.J. Teh, O. Pique, Q.H. Low, W.H. Zhu, F. Calle-Vallejo and B.S. Yeo. Toward Efficient Tandem Electroreduction of CO_2 to Methanol using Anodized Titanium. *ACS Catal*. 11, 8467. **2021**.

16. L.R.L. Ting, Y.J. Peng and B.S. Yeo. Mechanistic Insights into the Selective Electroreduction of Crotonaldehyde to Crotyl Alcohol and 1-Butanol. *ChemSusChem*. 14, 2963. **2021**.

17. O. Pique, Q.H. Low, A.D. Handoko, B.S. Yeo and F. Calle-Vallejo. Selectivity Map for the Late Stages of CO and CO_2 Reduction to C_2 Species on Copper Electrodes. *Angew. Chemie Int. Ed.* 60, 10784. **2021** ***(HOT Paper)***.

18. A. Rendón-Calle, Q.H. Low, S.H.L. Hong, S. Builes, B.S. Yeo and F. Calle-Vallejo. How symmetry factors cause potential- and facet-dependent pathway shifts during CO_2 reduction to CH_4 on Cu electrodes. *Appl. Catal. B*. 285, 119776. **2021.**

19. Y.S. Zhou and B.S Yeo. Formation of C–C bonds during electrocatalytic CO_2 reduction on non-copper electrodes. *J. Mat. Chem. A.* 8, 23162. **2020** ***(Invited)***.

20. L.R.L. Ting, R. García-Muelas, A.J.M. Martín, F.L.P. Veenstra, S.T.J. Chen, Y. Peng, E.Y.X. Per, S. Pablo-García, N. López, J. Pérez-Ramírez, and B.S. Yeo. Electrochemical Reduction of Carbon Dioxide to 1-Butanol on Oxide-Derived Copper. *Angew. Chemie Int. Ed*. 59, 21072. **2020.**

21. Q.H. Low and B.S. Yeo. Catalysts for the Electrochemical Reduction of Carbon Dioxide to Methanol. J. Electrochem. Energy. 17, 040802. **2020** ***(Invited; Special Issue: Emerging Investigators in Electrochemical Energy Conversion and Storage 2020)***.

22. L.R.L. Ting, O. Piqué, S.Y. Lim, M. Tanhaei, F. Calle-Vallejo and B.S. Yeo. Enhancing CO_2 Electroreduction to Ethanol on Copper-Silver Composites by Opening an Alternative Catalytic Pathway. *ACS Catal.* 10, 4059. **2020.**

23. S. Malkhandi and B.S. Yeo. Electrochemical conversion of carbon dioxide to high value chemicals using gas-diffusion electrodes. *Curr. Opin. Chem. Eng.* 26, 112. **2019** ***(Invited)***.

24. J. E. Pander III, J.W.J. Lum and B.S. Yeo. The Importance of Morphology on the Activity of Lead Cathodes for the Reduction of Carbon Dioxide to Formate. *J. Mater. Chem. A*. 7, 4093. **2019**.

25. Q.H. Low, N.W.X. Loo, F. Calle-Vallejo and B.S. Yeo. Enhanced Electroreduction of Carbon Dioxide to Methanol using Zinc Dendrites Pulse-deposited on Silver Foam. *Angew. Chemie Int. Ed*. 58, 2256. **2019**. ***(HOT Paper)***.

26. A.D. Handoko, F. Wei, Jenndy, B.S. Yeo and Z.W. Seh. Understanding heterogeneous electrocatalytic carbon dioxide reduction through operando techniques. *Nature Catal.* 1, 922. **2018**. ***(WoS Highly Cited Paper)***.

27. L. Gong, J. Koh and B.S. Yeo. Mechanistic Study of the Synergy between Iron and Transition Metals towards the Oxygen Evolution Reaction. *ChemSusChem*. 11, 3790. **2018**.

28. Y. Huang, C.W. Ong and B.S. Yeo. Effects of Electrolyte Anions on the Reduction of Carbon Dioxide to Ethylene and Ethanol on Copper (100) and (111) Surfaces. *ChemSusChem*. 11, 3299. **2018**.

29. Y. Deng, Y. Huang, D. Ren, A.D. Handoko, Z.W. Seh, P. Hirunsit and B.S. Yeo. On the Role of Sulfur for the Selective Electrochemical Reduction of CO_2 to Formate on CuS_x Catalysts. *ACS Appl. Mater. Interfaces*. 10, 28572. **2018**.

30. L.R.L. Ting and B.S. Yeo. Recent Advances in Understanding Mechanisms for the Electrochemical Reduction of Carbon Dioxide. *Curr. Opin. Electrochem.* 8, 126. **2018** ***(Invited)***.

31. S.S. Pramana, A. Cavallaro, C. Li, A.D. Handoko, K.W. Chan, R.J. Walker, A. Regoutz, J.S. Herrin, B.S. Yeo, D.J. Payne, J.A. Kilner, M.P. Ryan and S.J. Skinner. Crystal structure and surface characteristics of Sr-doped $GdBaCo_2O_{6-\delta}$ double perovskites: oxygen evolution reaction and conductivity *J. Mater Chem. A.* 6, 5335. **2018**.

32. D. Ren, J. Fong and B.S. Yeo. The effects of currents and potentials on the selectivities of copper toward carbon dioxide electroreduction. *Nature Comm.* 9, 925. **2018**. **(Highlighted by the Editor, Adam Weingarten, in *Focus in Energy Materials*)**. ***(WoS Highly Cited Paper)***.

33. L. Mandal, K.R. Yang, M.R. Motapothula, D. Ren, P. Lobaccaro, A. Patra, M. Sherburne, V.S. Batista, B.S. Yeo, J.W. Ager, J. Martin, and T. Venkatesan. Investigating the Role of Copper Oxide in Electrochemical CO_2 Reduction in Real Time. *ACS Appl. Mater. Interfaces*. 10, 8574. **2018**.

34. U. Joshi, S. Malkhandi, Y. Ren, T.L. Tan, S.Y. Chiam and B.S. Yeo. Ruthenium–Tungsten Composite Catalyst for the Efficient and Contamination-Resistant Electrochemical Evolution of Hydrogen. *ACS Appl. Mater. Interfaces*. 10, 6354. **2018**.

35. Y. Huang, Y. Deng, A.D. Handoko, G.K.L. Goh and B.S. Yeo. Rational Design of Sulfur-Doped Copper Catalysts for the Selective Electroreduction of Carbon Dioxide to Formate. *ChemSusChem*. 11, 320. **2018**.

36. L. Gong, X.Y.E. Chng, Y.H. Du, S.B. Xi and B.S. Yeo. Enhanced Catalysis of the Electrochemical Oxygen Evolution Reaction by Amorphous Cobalt Oxide / Adsorbed Iron(III) Ions. *ACS Catal*. 8, 807. **2018**.

37. J.E. Pander III, D. Ren, Y. Huang, N.W.X. Loo, S.H.L. Hong and B.S. Yeo. Understanding the Heterogeneous Electrocatalytic Reduction of Carbon Dioxide on Oxide-Derived Catalysts. *ChemElectroChem*. 5, 219. **2018** ***(Invited)***.

38. J.E. Pander III, D. Ren and B.S. Yeo. Practices for the collection and reporting of electrocatalytic performance and mechanistic information for the CO_2 reduction reaction. *Catal. Sci. Tech.* 7, 5820. **2017**. ***(Invited)***. ***(Listed among the HOT Catalysis Science & Technology articles in 2017)***.

39. Y. Deng and B.S. Yeo. Characterization of Electrocatalytic Water Splitting and CO_2 Reduction Reactions Using In Situ/Operando Raman Spectroscopy. *ACS Catal*. 7, 7873. **2017.** ***(Invited)***.

40. D. Ren, N.W.X. Loo, L. Gong, B.S. Yeo. Continuous Production of Ethylene from Carbon Dioxide and Water Using Intermittent Sunlight. *ACS Sustainable Chem. Eng.* 5, 9191. **2017**.

41. A.D. Handoko, K.W. Chan and B.S. Yeo. $-CH_3$ Mediated Pathway for the Electroreduction of CO_2 to Ethane and Ethanol on Thick Oxide-Derived Copper Catalysts at Low Overpotentials. *ACS Energy Lett.* 2, 2103. **2017**.

42. U. Joshi, S. Malkhandi and B.S. Yeo. Investigating synergistic interactions of group 4, 5 and 6 metals with gold nanoparticles for the catalysis of the electrochemical hydrogen evolution reaction. *Phys. Chem. Chem. Phys*. 19, 20861. **2017**.

43. Z. Chen, K. Leng, X. Zhao, S. Malkhandi, W. Tang, B. Tian, L. Dong, L. Zheng, M. Lin, B.S. Yeo and K.P. Loh. Interface Confined Hydrogen Evolution Reaction in Zero Valent Metal Nanoparticles-Intercalated Molybdenum Sulfide. *Nature Comm.* 8, 14548. **2017**.

44. Y. Huang, A.D. Handoko, P. Hirunsit and B.S. Yeo. Electrochemical Reduction of CO_2 Using Copper Single-Crystal Surfaces: Effects of CO* Coverage on the Selective Formation of Ethylene. *ACS Catal*. 7, 1749. **2017**. ***(WoS Highly Cited Paper)***.

45. D. Ren, B.S.H. Ang and B.S. Yeo. Tuning the Selectivity of Carbon Dioxide Electroreduction toward Ethanol on Oxide-Derived Cu_xZn Catalysts. *ACS Catal.* 6, 8239. **2016**. ***(WoS Highly Cited Paper)***

46. Y.L. Deng, L.R.L. Ting, P.H.L. Neo, Y.J. Zhang, A.A. Peterson, and B.S. Yeo. Operando Raman Spectroscopy of Amorphous Molybdenum Sulfide (MoS_x) during the Electrochemical Hydrogen Evolution Reaction: Identification of Sulfur Atoms as Catalytically Active Sites for H^+ Reduction. *ACS Catal.* 6, 7790. **2016**.

47. A.D. Handoko, C.W. Ong, Y. Huang, Z.G. Lee, L. Lin, G.B. Panetti, and B.S. Yeo. Mechanistic Insights into the Selective Electroreduction of Carbon Dioxide to Ethylene on Cu_2O-Derived Copper Catalysts. *J. Phy. Chem. C*. 120, 20058. **2016**.

48. U. Joshi, J. Lee, C. Giordano, S. Malkhandi and B.S. Yeo. Enhanced Catalysis of the Electrochemical Hydrogen Evolution Reaction using Composites of Molybdenum-Based Compounds, Gold Nanoparticles and Carbon. *Phys. Chem. Chem. Phys.* 18, 21548. **2016**.

49. L. Gong, D. Ren, Y.L. Deng and B.S. Yeo. Efficient and Stable Evolution of Oxygen Using Pulse-Electrodeposited Ir/Ni Oxide Catalyst in Fe-Spiked KOH Electrolyte. *ACS Appl. Mater. Interfaces*. 8, 15985. **2016**.

50. Y.L. Deng, A.D. Handoko, Y.H. Du, S.B. Xi and B.S. Yeo. In Situ Raman Spectroscopy of Copper and Copper Oxide Surfaces during Electrochemical Oxygen Evolution Reaction: Identification of Cu^{III}

Oxides as Catalytically Active Species. *ACS Catal.* 6, 2473. **2016.** ***(Featured in the ACS select virtual issue '*****The Way Forward in Molecular Electrocatalysis', 2016)** ***(WoS Highly Cited Paper)***.

51. D. Ren, N.T. Wong, A.D. Handoko, Y. Huang and B.S. Yeo. Mechanistic Insights into the Enhanced Activity and Stability of Agglomerated Cu Nanocrysals for the Electrochemical Reduction of Carbon Dioxide to n-Propanol. *J. Phys. Chem. Lett.* 7, 20. **2016**.

52. L.R.L. Ting, Y.L. Deng, L. Ma, Y.J. Zhang, A.A. Peterson, and B.S. Yeo. Catalytic Activities of Sulfur Atoms in Amorphous Molybdenum Sulfide for the Electrochemical Hydrogen Evolution Reaction. *ACS Catal.* 6, 861. **2016.** ***(WoS Highly Cited Paper)***.

53. A.D. Handoko, S. Deng, Y. Deng, A.W.F. Cheng, K.W. Chan, Y. Pan, H.R. Tan, E.S. Tok, C.S. Sow and B.S. Yeo, Enhanced Activity of H_2O_2-treated Copper (II) Oxide Nanostructures during the Electrochemical Evolution of Oxygen. *Catal. Sci. Technol.* 6, 269. **2016**. ***(Listed among the most accessed Catalysis Science & Technology articles in 2016)***.

54. C.S. Chen, J.H. Wan and B.S. Yeo. Electrochemical Reduction of Carbon Dioxide to Ethane using Nanostructured Cu_2O-Derived Copper Catalyst and Palladium (II) Chloride. *J. Phys. Chem. C*. 119, 26875. **2015**.

55. D. Ren, Y. Deng, A.D. Handoko, C.S. Chen, S. Malkhandi and B.S. Yeo. Selective Electrochemical Reduction of Carbon Dioxide to Ethylene and Ethanol on Copper (I) Oxide Catalysts. *ACS Catal.* 5, 2814. **2015.** ***(WoS Highly Cited Paper)***.

56. L. Ma, L.R.L. Ting, V. Molinari, C. Giordano and B.S. Yeo. Efficient hydrogen evolution reaction catalyzed by molybdenum carbide and molybdenum nitride nanocatalysts synthesized via the urea glass route. *J. Mat. Chem. A.* 3, 8361. **2015.** ***(WoS Highly Cited Paper).***

57. D. Ren, Y. Huang and B.S. Yeo. Electrocatalysts for the Selective Reduction of Carbon Dioxide to Useful Products. *Chimia.* 69, 131. **2015.** ***(Invited)***.

58. C.S. Chen, A.D. Handoko, J.H. Wan, L. Ma, D. Ren and B.S. Yeo. Stable and Selective Electrochemical Reduction of Carbon Dioxide to Ethylene on Copper Mesocrystals. *Catal Sci. Technol.* 5, 161. **2015**. ***(WoS Highly Cited Paper)***.

59. D. Friebel, M. Bajdich, B.S. Yeo, M.W. Louie, D.J. Miller, H.S. Casalongue, F. Mbuga, T.C. Weng, D. Nordlund, D. Sokaras, R. Alonso-Mori, A.T. Bell and A. Nilsson. On the chemical state of Co oxide electrocatalysts during alkaline water splitting. *Phys. Chem. Chem. Phys*. 15, 17460. **2013**.

60. B.S. Yeo and A.T. Bell. In Situ Raman Study of Nickel Oxide and Gold-Supported Nickel Oxide Catalysts for the Electrochemical Evolution of Oxygen. *J. Phys. Chem. C.* 116, 94720. **2012**.

61. F. Somodi, S. Werner, Z.M. Peng, A.B. Getsoian, A.N. Milnar, B.S. Yeo and A.T. Bell. Size and Composition Control of Pt-In Nanoparticles Prepared by Seed-Meditated Growth Using Bimetallic Seeds. *Langmuir*. 28, 3345. **2012**.

62. H.K. Carlson, A.T. Iavarone, A. Gorur, B.S. Yeo, R. Tran, R.A. Melnyk, R.A. Mathies, M. Auer and J.D. Coates. Surface multiheme c-type cytochromes from Thermincola potens and implications for respiratory metal reduction by Gram-positive bacteria. *Proc. Natl. Acad. Sci. USA*. 109, 1702. **2012**.

63. B.S. Yeo and A.T. Bell. Enhanced Activity of Gold-Supported Cobalt Oxide for the Electrochemical Evolution of Oxygen. *J. Am. Chem. Soc.* 133, 5587. **2011**.

64. B.S. Yeo, S.L. Klaus, P.N. Ross, R.A. Mathies and A.T. Bell. Identification of Hydroperoxy Species as Reaction Intermediates in the Electrochemical Evolution of Oxygen on Gold. *ChemPhysChem.* 11, 1854. **2010**.

65. T. Schmid, B.S. Yeo, G. Leong, J. Stadler and R. Zenobi. Performing Tip-Enhanced Raman Spectroscopy in Liquids. *J. Raman Spectrosc.* 40, 1392. **2009**.

66. B.S. Yeo, E. Amstad, T. Schmid, J. Stadler and R. Zenobi. Investigating the Surface of a Polymer Blend Thin Film with Tip-Enhanced Raman Spectroscopy. *Small*, 5, 952. **2009**.

67. B.S. Yeo, J. Stadler, T. Schmid, R. Zenobi and W.H. Zhang. Tip-Enhanced Raman Spectroscopy – Its Status, Challenges and Future Directions. *Chem. Phys. Lett.* 472, 1. **2009**. *(Cover)* ***(Invited)***.

68. T. Schmid, A. Messmer, B.S. Yeo, W.H. Zhang and R. Zenobi. Towards Chemical Analysis of Nanostructures in Biofilms II: Tip-Enhanced Raman Spectroscopy of Alginates. *Anal. Bioanal. Chem.*, 391, 1907. **2008**. *(Cover)*.

69. T. Schmid, J. Burkhard, B.S. Yeo, W.H. Zhang and R. Zenobi. Towards Chemical Analysis of Nanostructures in Biofilms I: Imaging of Biological Nanostructures. *Anal. Bioanal. Chem.*, 391, 1899. **2008**. *(Cover)*.

70. B.S. Yeo, T. Schmid, W.H. Zhang and R. Zenobi. A Strategy to Prevent Signal Losses, Analyte Decomposition and Fluctuating Carbon Contamination Bands in Surface-Enhanced Raman Spectroscopy. *Appl. Spectrosc.*, 62, 708. **2008**.

71. B.S. Yeo, S. Mädler, T. Schmid, W.H. Zhang and R. Zenobi. Tip-Enhanced Raman Spectroscopy Can See More: The Case of Cytochrome c. *J. Phys. Chem. C*, 112, 4867. **2008**.

72. W.H. Zhang, T. Schmid, B.S. Yeo and R. Zenobi. Near-Field Heating, Annealing and Signal Loss in Tip-Enhanced Raman Spectroscopy. *J. Phys. Chem. C*, 112, 2104. **2008**.

73. W.H. Zhang, T. Schmid, B.S. Yeo and R. Zenobi. Tip-Enhanced Raman Spectroscopy Reveals Rich Nanoscale Adsorption Chemistry of 2-Mercaptopyridine on Ag. *Israel J. Chem.*, 47, 177. **2007**. ***(Invited)***.

74. W.H. Zhang, X.D. Cui, B.S. Yeo, T. Schmid, C. Hafner and R. Zenobi. Nanoscale Roughness on Metal Surfaces Can Increase Tip-Enhanced Raman Scattering by an Order of Magnitude. *Nano Lett.*, 7, 1401. **2007**. ***(Featured in the analytical currents section of Anal. Chem. 79, 4742. 2007)***.

75. X.D. Cui, W.H. Zhang, B.S. Yeo, R. Zenobi, C. Hafner and D. Erni. Tuning the Resonance Frequency of Ag-Coated Dielectric Tips. *Opt. Express*,15, 8309. **2007**.

76. B.S. Yeo, T. Schmid, W.H. Zhang and R. Zenobi. Towards Rapid Nanoscale Chemical Analysis Using Tip-Enhanced Raman Spectroscopy with Ag-Coated Dielectric Tips. *Anal. Bioanal. Chem.*, 387, 2655. **2007**.

77. W.H. Zhang, B.S. Yeo, T. Schmid and R. Zenobi. Single Molecule Tip-Enhanced Raman Spectroscopy with Silver Tips. *J. Phys. Chem. C*, 111, 1733. **2007**. ***(First report of single molecule detection with TERS; one of the most downloaded articles in Jan-Mar 2007 of the journal; featured in TRAC-Trend. Anal. Chem. 26 (3), iv. 2007)***.

78. T. Schmid, T.A. Schmitz, P.D. Setz, B.S. Yeo, W.H. Zhang and R. Zenobi. Methods for Molecular Nanoanalysis. *Chimia*, 60, A783. **2006**.

79. B.S. Yeo, W.H. Zhang, C. Vannier and R. Zenobi. Enhancement of Raman Signals with Silver-Coated Tips. *Appl. Spectrosc.*, 60, 1142. **2006**.

80. C. Vannier, B.S. Yeo, J. Melanson and R. Zenobi. Multifunctional Microscope for Far-Field and Tip-Enhanced Raman Spectroscopy. *Rev. Sci. Instrum.*, 77, 023104. **2006**.

81. B.S. Yeo, Z.H. Chen and W.S. Sim. Efficient Growth of Ordered Thin Oxide Films on Ni(111) by NO2 Oxidation. *Surf. Sci.*, 557 (1-3), 201. **2004**.

82. B.S. Yeo, Z.H. Chen and W.S. Sim. Surface Functionalization of Ni(111) with Acrylate Monolayers. *Langmuir*, 19, 2787. **2003**.

83. W.S. Sim, T.C. Li, P.X. Yang and B.S. Yeo. Isolation and Identification of Surface-Bound Acetone Enolate on Ni(111). *J. Am. Chem. Soc.*, 124, 4970. **2002**.

Book Chapters

1. H.M. Jeong, B.S. Yeo and Y.K. Kwon. Copper Catalysts for the Electrochemical Reduction of Carbon Dioxide. In *Energy and Environment Series No. 21. Electrochemical Reduction of Carbon Dioxide: Overcoming the Limitations of Photosynthesis*. Eds: F. Marken and D. Fermin. The Royal Society of Chemistry. Pg 63-87. **2018.**

2. B.S. Yeo, T. Schmid, W.H. Zhang and R. Zenobi. Spectroscopic Imaging with Nanometer Resolution using Near-Field Methods. In *Infrared and Raman Spectroscopic Imaging.* Eds.: R. Salzer and H.W. Siesler.Wiley-VCH, Weinheim. Pg 473-499. **2009**.

3. T. Schmid, B.S. Yeo, W.H. Zhang and R. Zenobi. Use of Tip-Enhanced Vibrational Spectroscopy for Analytical Applications in Chemistry, Biology, and Materials Science. In *Advances in Nano-Optics and Nano-Photonics.* Eds.: S. Kawata and V.M. Shalaev. Elsevier, Amsterdam. Pg 115-155. **2007**.

Other Articles

1. B.S. Yeo. Oxygen evolution by stabilized single Ru atoms. *Nature Catal.* 2, 284. **2019** (**Invited** News and Views)

Invited Oral Presentations

1. 244th Electrochemical Society Meeting – **Oct 2023**
2. Seminar in the University of the Basque Country (UPV/EHU) – **Sep 2023**
3. European Fuel Cell Forum (**Keynote**) – **Jul 2023**
4. Gordon Research Conference (Transformative Science for the New Carbon Economy) – **May 2023**
5. Workshop on Catalytic Approaches for Carbon Capture, Utilization, and Renewable Energy Storage (Nanyang Technological University, Singapore) – **Dec 2022**
6. 7th Ertl Symposium on Catalysis in Electrochemistry – **Oct 2022**
7. Seminar in the Seoul National University – **Oct 2022**
8. Seminar (online) in the Wuhan University of Technology – **Oct 2022**
9. 241st Electrochemical Society Meeting – **Jun 2022**
10. Exxon Mobil, Megatrend Technical Sharing Series – **May 2022**
11. Ions and Photons in Analytical Science (IPAS2021) – **Apr 2022**
12. 17th NSTDA Annual Conference; NAC 2022 – **Mar 2022 (Online)**
13. Yonsei University Virtual Symposium: "Energy Technologies for the Sustainable Future" – **Feb 2022 (Online)**

14. International Symposium on Photo & Electro Catalytic CO_2 Reduction – **Nov 2021 (Online)**
15. 82nd Japanese Society of Applied Physics (JSAP) Autumn Meeting – **Sept 2021 (Online)**
16. 6th Ertl Symposium on Electrochemistry and Catalysis – **Nov 2020 (Online)**
17. SNU 10-10 Project Workshop on Electrocatalysis – **Nov 2020 (Online)**
18. 6th International Conference on Electronic Materials and Nanotechnology for Green Environment (ENGE 2020) – **Nov 2020 (Online)**
19. PRiME 2020 **(Keynote)** – **Oct 2020 (Online)**
20. Green Scene Webinar Series, A*STAR – **Jun 2020 (Online)**
21. Seminar in the Hong Kong University of Science and Technology – **Dec 2019**
22. 4th SNU Solar Fuel Material Workshop (Seoul, Korea) – **Sep 2019**
23. Materials Challenges in Alternative and Renewable Energy 2019 (MCARE 2019) – **Aug 2019**
24. The 2019 Nankai International Symposium on Solar Energy Conversion – **June 2019**
25. 235th Electrochemical Society Meeting – **May 2019**
26. 5th Ertl Symposium on Catalytic and Adsorption Reactions in Chemical Processes – **Nov 2018**
27. Asia Clean Energy Summit, PV Asia Scientific Conference – **Nov 2018**
28. International Symposium on Electrocatalysis (Electrocat2018) – **Aug 2018**
29. Seminar in the Siemens AG, Erlangen – **Jun 2018**
30. Seminar in the Technical University of Delft – **Jun 2018**
31. Seminar in the Stockholm University – **Jun 2018**
32. Seminar in the Leiden University – **Feb 2018**
33. Leibniz Institute for Catalysis, Germany (Keynote) – **Dec 2017**
34. Seminar in the ETH Zurich – **Dec 2017**
35. 232nd Electrochemical Society Meeting – **Oct 2017**
36. 231st Electrochemical Society Meeting – **Jun 2017**
37. 253rd American Chemical Society National Meeting and Exposition – **Apr 2017**
38. 3rd International Conference on Molecular & Functional Catalysis (ICFMC-3) – **Feb 2017**
39. Materials Challenges in Alternative and Renewable Energy 2017 (MCARE 2017) – **Feb 2017**
40. QAFCO-Texas A&M at Qatar Chemistry Conference – **Jan 2017**
41. XIVth International Conference on Electrified Interfaces- **Jul 2016**
42. RESOLV GSS Summer School Solvation Science (University of Bochum) – **May 2016**
43. 228th Electrochemical Society Meeting – **Oct 2015**
44. 247th American Chemical Society National Meeting and Exposition – **Mar 2014**
45. Seminar in the Lawrence Livermore National Laboratory – **May 2011**

Memberships and other appointments

Photonics Control Technology Team, RIKEN Center for Advanced Photonics	Visiting Scientist (**2019-2023)**
The Electrochemical Society, Singapore Chapter	Founding member and Secretary (Since **2017**)
Singapore Catalysis Society	Secretary (Since **2022**) Elected Member of Executive Committee (In **2017,** re-elected in **2019, 2022**)
The Electrochemical Society	Member
Materials Research Society	Member
American Chemical Society	Member

Service to the Scientific Community

1. Guest Editor (with Yan Ning, Paul Liu and Chen Luwei) of a special Issue in *Applied Catalysis B: Environmental* (**2023**) on '*Celebrating 15-year Anniversary of Singapore Catalysis Society (SCS)*'
2. Co-organizer of the Southeast Asia Catalysis Conference 2023 (**18-19 May 2023**)
3. Co-organizer of Symposium 11 of the 72nd Meeting of the International Society of Electrochemistry (**Aug 2021- Sept 2021**)

4. Associate Editor of the *Journal of Electrochemical Energy Conversion and Storage* (American Society of Mechanical Engineers) (**Feb 2021-Present**)
5. Co-organizer of Symposium 1 of the MCARE 2019 (Materials Challenges in Alternative and Renewable Energy 2019 (**19-23 Aug 2019**)
6. Member of Editorial Board (Section: Electrochemistry) of *Molecules* (**Nov 2018 - Present**)
7. Co-Chair of Symposium No. 6. The 10th Singapore International Chemistry Conference (SICC 10, **16- 19 Dec 2018**)
8. Co-Organizer of the 9th Singapore Catalysis Society Annual Forum (**25 May 2018**)
9. Guest Editor (with Andrew A. Peterson) of a Special Issue in *Catalysis Today* (**Jun 2017**) on '*Electrochemical reduction of carbon dioxide by heterogeneous and homogeneous catalysis: experiment and theory*'
10. Member of the Organizing Committee of the 1st Singapore ECS International Symposium on Energy Materials (**Dec 2017**)

Media reports

Sustainable electro-synthesis of esters (July 2022)

- Faculty of Science News (https://www.science.nus.edu.sg/blog/2022/07/27/sustainable-electro-synthesis-of-esters/)
- Phys.org (https://phys.org/news/2022-07-sustainable-electro-synthesis-esters.html)

Electrochemical reduction of carbon dioxide to long-chain hydrocarbons using polarized nickel catalysts (July 2022)

- Chemistry World (https://www.chemistryworld.com/news/forgotten-research-leads-to-nickel-catalyst-that-turns-co2-into-longer-hydrocarbons/4015898.article)

Electrochemical reduction of carbon dioxide to ethanol (May 2020)

- Faculty of Science News (https://www.science.nus.edu.sg/blog/2020/05/04/electrochemical-reduction-of-carbon-dioxide-to-ethanol/) 4 May 2020.
- Phys.org (https://phys.org/news/2020-05-electrochemical-reduction-carbon-dioxide-ethanol.html) 5 May 2020
- Nanowerk (https://www.nanowerk.com/news2/green/newsid=55082.php) 6 May 2020
- Green car congress (https://www.greencarcongress.com/2020/05/20200507-nus.html) 7 May 2020

Carbon dioxide to methanol conversion (Apr 2019)

- Faculty of Science News (https://www.science.nus.edu.sg/blog/2019/04/05/carbon-dioxide-to-methanol-conversion/) 5 Apr 2019.

Selective catalysts for carbon dioxide recycling (Apr 2018)

- Faculty of Science News. (https://www.science.nus.edu.sg/blog/2018/04/25/selective-catalysts-for-carbon-dioxide-recycling/) 25 Apr 2018.
- Phys. Org (https://phys.org/news/2018-04-catalysts-carbon-dioxide-recycling.html) 25 Apr 2018.

A green way to produce ethylene (Nov 2017)

- The Straits Times (http://www.straitstimes.com/singapore/cleaning-up-the-plastic-making-process) 24 November 2017.
- NUS News (http://news.nus.edu.sg/press-releases/green-ethylene-production) 24 November 2017.
- Chemical Engineering Magazine (http://www.chemengonline.com/making-ethylene-artificial-photosynthesis/) 1 Jan 2018.
- Phys.Org (https://phys.org/news/2017-11-scientists-artificial-photosynthesis-device-

greener.html) 24 November 2017.
- The Engineer (https://www.theengineer.co.uk/photosynthesis-ethylene/) 24 November 2017.
- Science Daily (https://www.sciencedaily.com/releases/2017/11/171124084755.htm) 24 November 2017.
- Tech Explorist (https://www.techexplorist.com/artificial-photosynthesis-device-produce-ethylene-gas/) 24 November 2017.

Copper catalyst for reducing carbon dioxide to propanol (Sept 2016)

- NUS News. (https://news.nus.edu.sg/copper-catalyst-for-green-energy/) 26 Sept 2016.

Single molecule Tip-enhanced Raman Spectroscopy (Jan 2007)

- Fingerabdruck von einzelnen Molekülen (Fingerprint from a single molecule). Neue Zürcher Zeitung. (https://www.nzz.ch/articleEV32S-1.105028) 6 Feb 2007.
- A Breakthrough in Chemical Analysis. ETH Life. (http://archiv.ethlife.ethz.ch/e/articles/sciencelife/Raman.html) 25 Jan 2007.

Education

Courses taught in the NUS

Sustainable and Green Chemistry (CM4269) – **AY2018/2019; AY2019/2020 (Semester 1); AY2019/2020 (Special semester); AY2020/2021**
Topics in Environmental Chemistry (CM5244) – **AY2013/2014; AY2014/2015; AY2015/2016; AY2016/2017; AY2017/2018, AY2018/2019; AY2019/2020; AY2020/2021; AY2021/2022; AY2022/2023; AY2023/2024**
Instrumental Analysis II (CM3242) – **AY2017/2018**
Analytical Chemistry I (CM2142) – **AY2013/2014; AY2014/2015; AY2015/2016; AY2016/2017**
Environmental Chemistry (CM 3261) – **AY2014/2015**

Undergraduate students trained to date

35 students for their FYP theses (three had won 1st prize in the annual FYP symposiums of the Dept in 2012, 2016 and 2017; one won the poster prize in the Singapore Catalysis Society Forum 2018; one won the NUS Chemistry Poster Achievement Award; one was awarded the outstanding University Research prize in 2019)
20 students for their UROPS / SPS projects

Ph.D. students trained to date

Mr Teh Wei Jie (PhD. Sept 2023), Ms. Louisa Ting Rui Lin (Ph.D. Sept 2021), Mr Low Qi Hang (Ph.D. Sept 2021), Dr. Ubisha Joshi (Ph.D. Aug 2019), Dr. Huang Yun (Ph.D. Aug 2018), Dr. Gong Luo (Ph.D. Aug 2018), Dr. Ren Dan (Ph.D. Dec 2017), Dr. Deng Yilin (Ph.D. Aug 2017)

Postdoctoral scientists trained to date

13 postdocs

Participation in theses and oral examination committees

I have served in the thesis committee and as examiner for > 100 Ph.D and M.Sc students in the NUS. I also examined an average of 2-3 honors (4th year undergraduate) theses per year.

I was an external examiner for the PhD thesis of Ms Sooan Bae (Gwangju Institute of Science and Technology; Nov 2023), Mr Joshua Leverett (University of New South Wales; July 2023), Mr Stefan Johannnes Raaijman (Leiden University; Jan 2022), Mr. Pranit Srinivas Iyengar (EPFL, Jul 2021) Mr. Zhu Shangqian (Hong Kong University of Science and Technology, Dec 2019), Ms. Elena Perez Gallent (Leiden University; Feb 2018), Mr Marco Valenti (Delft University of Technology; Jun 2018) and Mr Hansaem Jang (Gwangju Institute of Science and Technology; Oct 2019).

Other duties

From Sept 2017-June 2020, I was the student counselor of the Department of Chemistry, with the responsibility of providing tangible help to students in need.

Service, Outreach and other activities

Service

Member of the Science and Technology Board (STB) for the Singapore Energy Consortium (SEC)	**Jan 2024-Dec 2025**
Member of the Science and Technology Board (STB) for the Singapore Energy Centre (SgEC)	**Nov 2021 – Nov 2023**
Expert Panel Member of Chemistry and Chemical Engineering (EP1), University Research Committee, NUS	**Aug 2020-Present**
Deputy Head (Education) of the Department of Chemistry, NUS	**Jul 2021 – Present**
Assistant Head of the Department of Chemistry, NUS	**Jul 2020 – Jun 2021**
Member of the Faculty Teaching Excellence Committee (FTEC) in the Faculty of Science	**Jul 2020 - Jun 2022**
Member of the NUS University-Level Mid-Term Advisory Report Committee for Science and Technology disciplines (S&T U-MTARC)	**Apr 2020 – Mar 2021**

Outreach

Speaker for students from the River Valley High School	**25 May 2023**
Speaker for the Special Class in the NUS Open House	**9 Mar 2019**
Speaker to participants of the International Science Summer Camp, Singapore	**2 Jul 2018**
Speaker to students in the Catholic Junior College	**24 May 2018**
Speaker for the Chemistry Master Class in the FoS Open House	**12 May 2018**
Speaker to students in the Methodist Girls School	**24 Apr 2018**
Speaker to students in the CHIJ Katong	**24 May 2017**
Speaker for the Chemistry Master Class in the FoS Open House	**13 May 2017**
Speaker to SRP Students (On research methods)	**12 Apr 2017**
Speaker to students in the Methodist Girls School	**14 Apr 2017**
Speaker for the Dialogue in Chemistry Education, NUS	**15 Nov 2016**
Speaker for the One-North Festival. A*STAR	**5 Aug 2016**
Speaker for the NUS Chemistry research & training workshop for Malaysia Chinese high school teachers	**25 May 2016**
Speaker for the Chemistry Master Class in the FoS Open House	**23 May 2015**
Speaker to NUS High School students	**25 Sept 2013**

Examiner / Assessor

Panel judge for A*STAR Talent Search	**2019, 2020**

Panel judge - ICAAS-WSPS Most Outstanding Junior College Science Student Award	**2017, 2018, 2019, 2020, 2022**
Assessor for the Singapore Science and Engineering fair (SSEF)	**2018, 2019, 2020, 2021, 2022, 2023**
Examiner for SRP-H3 exams	**2013, 2016, 2017, 2018**
FoS Assessor for students applying for NUS Scholarships	**2022, 2023**
FoS Assessor for students applying to NUS under Discretion Admission	**2014, 2019**
FoS Assessor for Outstanding Undergraduate Research Program (OURP)	**2014, 2015**

Fund-raising

Member of the fund raising committee (with the industries) for the NUS Department of Chemistry 88th Anniversary Dinner (**Mar-Oct 2017**)

Student recruitment

Department evaluator for applicants to the M.Sc. Chemistry for Energy and Environment Program, NUS	**Mar 2017**
Committee member to establish the new M.Sc. Chemistry for Energy and Environment program in the NUS	**2016/2017**
Interviewer for admission to the graduate program, Dept of Chemistry, NUS	**1-3 Mar 2013**
Speaker to ACJC students for promoting the department of chemistry, NUS	**20 Feb 2013**
Speaker for the graduate roadshow in China to promote the department of chemistry, NUS	**23-27 Oct 2012**

From **2009-2011**, I also mentored high school students participating in the CAL Forum held in the San Francisco Bay Area. This program aims to help young men to discover a professional mission in life that is best adapted to their individual talents and that will have a significant positive impact on society.