

Curriculum Vitae

I. BIOGRAPHICAL DATA

Name: Hua Song

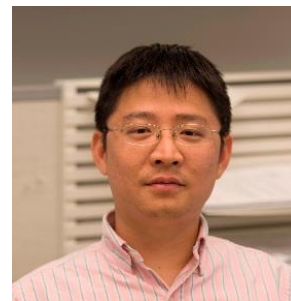
Date of Birth: December 11, 1978

Present Position: Professor

Full Address: EEEL 457B, 2500 University Drive NW, Calgary, Alberta T2N 1N4

E-mail: sonh@ucalgary.ca

Group Website: <https://www.ucalgary.ca/groups/gcrg/home>



II. PROFESSIONAL RECORD

A. Academic Record

- i) Undergraduate:
B.Sc., July 2001
Chemical Engineering
Northwestern Polytechnical University, Xi'an, P.R. China
- ii) Graduate:
M.Sc., July 2004
Chemical Engineering
Tsinghua University, Beijing, P.R. China
Ph.D., June 2009
Chemical Engineering
The Ohio State University, Columbus, USA

B. Academic and Other Appointments

- i) Full Professor at University of Calgary, July 2023 – Present
- ii) Associate Professor (Tenured) at University of Calgary, July 2017 – June 2023
- iii) Visiting scholar at University of California, Berkeley, July 2018 - June 2019
- iv) Assistant Professor at University of Calgary, July 2012 - June 2017
- v) Research Chemical Engineer II at RTI International, January 2011 - June 2012
- vi) Lead Research Engineer at Babcock & Wilcox, June 2009 - December 2010

C. Administrative Responsibilities

None

D. Professional Certification and Memberships in Learned Societies

- i) Professional Engineer, February 2013 – Present

E. Awards, Distinctions and Fellowships

- i) Eyes High Doctoral Recruitment Scholarship Award, University of Calgary, November 2015
- ii) Mitacs Globalink Research Award, Mitacs, May 2015 - 2023
- iii) URG Conference Travel Award, University of Calgary, May 2015
- iv) Zandmer New Faculty Research Award, University of Calgary, February 2014
- v) Kokes Travel Award winner for the 21st North American Catalysis Society Meeting, March 2009
- vi) 2nd place winner in the 2008 Ohio Fuel Cell Symposium Poster Competition, May 2008
- vii) Outstanding Graduate Award for Academic Achievement at Ohio State University, April 2008

III. EDUCATIONAL ACTIVITIES

A. Instruction

i) Undergraduate Level:

- Separation Process II (undergraduate core course: lecture, lab, and tutorial), ENCH 505 (Fall 2013~2016, 2019~2023)
- Engineering Thermodynamics (undergraduate core course: lecture and tutorial), ENGG 311 (Winter 2020~2021)
- Probability and Statistics for Engineers (undergraduate core course: lecture and tutorial), ENGG 319 (Fall 2017, Fall 2022~2023)
- Energy Engineering Thermodynamics (undergraduate core course: lecture and tutorial), ENER 560 (Fall 2017)
- Chemical Engineering Laboratory (undergraduate core course: lab), ENCH 551 (Fall 2012~2015, Fall 2019~2020)
- Chemical Process Design II (undergraduate core course), ENCH 531 (Winter 2015, 2020~2023)
- Chemical Process Design I (undergraduate core course), ENCH 511 (Fall 2013~ 2015, 2019~2023)
- Introduction to Instrumental Characterization Techniques (technical elective, self-created, lecture & tutorial), ENCH 519 (Winter 2014)

ii) Graduate Level:

- Chemical Thermodynamics (graduate core course: lecture), ENCH 633 (Winter 2013 and 2014)
- Error Analysis and Experimental Design (graduate core course: lecture and tutorial), ENCH 701 (Winter 2016~2018, 2022~2023)

iii) Invited seminars/lectures:

- “Methane Assisted Catalytic Biomass Valorization”, China University of Mining and Technology, Xuzhou, Jiangsu, China, May 25, 2023
- “Methane Assisted Catalytic Crude Oil Upgrading”, China University of Petroleum (East China), Qingdao, China, May 23, 2023
- “Non-thermal Plasma Assisted Low-cost Resources Valorization under Methane”, Shandong University, Jinan, Shandong, China, May 22, 2023
- “Methane Assisted Catalytic Biomass Valorization”, Xi’an Jiaotong University, Xi’an, Shaanxi, China, April 27, 2023
- “Methane assisted catalytic biomass valorization”, ACS Spring 2023 National Meeting, Indianapolis, IN, March 2023
- “Heterogeneous Catalysis and Its Applications in Energy Conversion and Environmental Control”, China University of Petroleum (East China), Qingdao, China, June 27-July 7, 2022
- “Methane Assisted Catalytic Valorization of Low-Cost Carbon Resources”, Xi’an Jiaotong University, Xi’an, Shaanxi, China, June 2022
- “Heterogeneous Catalysis and Its Applications in Energy Conversion and Environmental Control”, China University of Petroleum (East China), Qingdao, China, July 5-8, 2021
- “Low-temperature Methane Activation and its Utilizations”, Shanghai Jiaotong University, Shanghai, China, November 2, 2020
- “Catalytic Carbon Sources Upgrading under Methane Environment”, Shanghai Tech University, Shanghai, China, June 18, 2019
- “Catalytic Carbon Sources Upgrading under Methane Environment”, University of California, Berkeley, United States, March 26, 2019
- “Catalytic Carbon Sources Upgrading under Methane Environment”, Synfuels China, Beijing, China, August 30, 2018
- “Catalytic Carbon Sources Upgrading under Methane Environment”, Guangxi University, Nanjing, China, June 13, 2018
- “Catalytic Low-cost Carbon Sources Upgrading under Methane Environment”, Soochow University, Suzhou, China, June 11, 2018

- “Catalytic Carbon Sources Upgrading under Methane Environment”, Tsinghua University, Beijing, China, January 10, 2017
- “Catalytic Valorization of Municipal Solid Wastes”, Shandong Chambroad Petrochemicals, Binzhou, China, July 6, 2016
- “Preparation and Characterization of Biomass-derived Materials”, Zhejiang University of Technology, Hangzhou, China, June 16-17, 2016
- “Catalysis – The Way of Changing Our Energy Perspective”, Shandong Chambroad Petrochemicals, Binzhou, China, June 6, 2016
- “Catalytic Bitumen Upgrading under Methane Environment”, China University of Petroleum (East China), June 4, 2016
- “Natural Gas – The Clean Fossil Fuel to Power Our Future”, East China University of Science and Technology, Shanghai, China, January 4, 2016
- “Catalytic Heavy Crude Oil Upgrading Using Natural Gas”, China University of Petroleum (East China), August 5, 2015
- “Natural Gas – The Clean Fossil Fuel to Power Our Future”, Zhejiang University of Technology, Hangzhou, China, July 6, 2015
- “Green Catalysis– The Way of facilitating sustainable energy development”, State Grid Corporation of China, Beijing, China, August 29, 2014
- “Natural Gas – The Clean Fossil Fuel to Power Our Future”, Xi’an Shiyou University, Xi’an, China, May 22, 2014
- “Catalysis – The Way of Changing Our Energy Perspective”, University of Science and Technology Beijing, December 30, 2013
- “Natural Gas – The Clean Fossil Fuel to Power Our Future”, Changzhou University, Changzhou, China, December 24, 2013

B. Graduate and Undergraduate Supervision

i) Current graduate students:

- Mohamadamin Amarzadeh, Chemical and Petroleum Engineering, M.Sc., September 2023 ~ August 2025
- Milad Zehtab Salmasi, Chemical and Petroleum Engineering, Ph.D., July 2023 ~ June 2026
- Ali Omidkar, Chemical and Petroleum Engineering, M.Sc., September 2022 ~ August 2024
- Érika Bonatti, Chemical and Petroleum Engineering, M.Sc., September 2022 ~ August 2024
- Kamran Haddadian, Chemical and Petroleum Engineering, Ph.D., September 2022 ~ August 2026

ii) List of past-supervised graduate students:

- Shijun Meng, Chemical and Petroleum Engineering, Ph.D., May 2019 ~ April 2023
- Jack Jarvis, Chemical and Petroleum Engineering, Ph.D., September 2018 ~ April 2023
- Yimeng Li, Chemical and Petroleum Engineering, M.Sc., January 2020 ~ April 2022
- Aiguo Wang, Chemical and Petroleum Engineering, Ph.D., September 2015 ~ August 2018
- Peng He, Chemical and Petroleum Engineering, Ph.D., January 2014 ~ December 2017
- Shize Chen, Chemical and Petroleum Engineering, M.Sc., January 2017 ~ September 2019
- Shijun Meng, Chemical and Petroleum Engineering, M.Sc., September 2017 ~ April 2019
- Jack Jarvis, Chemical and Petroleum Engineering, M.Sc., September 2016 ~ August 2018
- Danielle Austin, Chemical and Petroleum Engineering, M.Sc., May 2016 ~ April 2018
- Yingqi Luan, Chemical and Petroleum Engineering, M.Eng., May 2014 ~ April 2016
- Lulu Zhao, Chemical and Petroleum Engineering, M.Eng., May 2014 ~ April 2016
- Honghong Shi (*Co-supervised*), Chemical and Petroleum Engineering, M.Sc., January 2013 ~ December 2014

iii) Examiner/supervision committee:

- Yanna Liu, Mechanical and Manufacturing Engineering, Ph.D. Defense, April 2023
- Jiu Wang, Chemical and Petroleum Engineering, Ph.D. candidacy exam, August 2022
- Yanna Liu, Mechanical and Manufacturing Engineering, Ph.D. candidacy exam, March 2021
- Bo Min Kim, Mechanical and Manufacturing Engineering, M.Sc. Defense, August 31, 2020

- Xinyao Liu, Chemical and Petroleum Engineering, M.Sc. Defense, August 27, 2020
- Yuhai Du, Chemical and Petroleum Engineering, M.Eng. Defense, July 20, 2020
- Camilla Fernandes de Oliveira, Chemical and Petroleum Engineering, M.Sc. Defense, May 1, 2020
- David Shi, Chemical and Petroleum Engineering, M.Sc. Defense, April 30, 2020
- Zhenyu Xing, Mechanical and Manufacturing Engineering, Ph.D. Defense, April 29, 2020
- Yecan Wang, Chemical and Petroleum Engineering, M.Sc. Defense, October 10, 2019
- Pradeep Shrestha, Chemical and Petroleum Engineering, M.Sc. Defense, September 12, 2019
- Ran Li, Chemical and Petroleum Engineering, Ph.D. Defense, June 10, 2019
- Ran Li, Chemical and Petroleum Engineering, Ph.D. candidacy exam, August 2018
- Neeraj Prakash, Mechanical and Manufacturing Engineering, M.Sc. Defense, April 2018
- Jiujie Cai, Chemical and Petroleum Engineering, Ph.D. candidacy exam, December 2017
- Qiaohong Wang, Chemical and Petroleum Engineering, M. Eng. Defense, September 2017
- Qian Shan, Mechanical and Manufacturing Engineering, Ph.D. candidacy exam, August 2017
- Yuanchao Feng, Chemical and Petroleum Engineering, Ph.D. Defense, June 2017
- Yuan Li, Mechanical and Manufacturing Engineering, Ph.D. candidacy exam, August 2016
- Jiabin Zhou, Mechanical and Manufacturing Engineering, M.Sc. Defense, August 2016
- Yuanchao Feng, Mechanical and Manufacturing Engineering, Ph.D. candidacy exam, April 2016
- Ran Li, Chemical and Petroleum Engineering, M.Sc. Defense, March 2016
- Qiang Deng, Mechanical and Manufacturing Engineering, M. Eng. Defense, April 2015
- Belal Jum'ah Abu Tarboush, Chemical and Petroleum Engineering, Ph.D. Defense, January 2014
- Shubha Shalini Vincent, Chemical and Petroleum Engineering, M.Sc. Defense, August 2013
- Yang Yang, Mechanical and Manufacturing Engineering, Ph.D. Defense, August 2013
- Shamiul Islam, Chemical and Petroleum Engineering, Ph.D. Defense, February 2013
- Mohamad Mojarab, Chemical and Petroleum Engineering, Ph.D. Candidacy exam, 2013

iv) External Examiner:

- Ali Faghihnejad, Chemical & Materials Engineering, University of Alberta, Ph.D. Defense, July 2013

v) Supervision of visiting/exchange students:

- Wei Cheng, China University of Petroleum (East China), January ~ August 2015

vi) Supervision of senior undergraduate students (working in my research group):

- Saana Tandon, Chemical Engineering, Indian Institute of Technology Roorkee, Summer 2023 through Mitacs Globalink
- Fay He, Chemical and Petroleum Engineering, University of Calgary, Fall 2019 ~ Winter 2020
- Yilei Han, Chemical Engineering, Tsinghua University, Summer 2018 through Mitacs Globalink
- Ashley Wong, Chemical and Petroleum Engineering, University of Calgary, Summer 2017
- Casey Kou, Chemical and Petroleum Engineering, University of Calgary, Winter 2017
- Yumeng Wen, Chemical & Materials Engineering, University of Alberta, Summer 2016
- Richard Gatip, Chemical and Petroleum Engineering, University of Calgary, Summer 2016
- Carlos Castaneda Trujillo, Summer 2015 through Mitacs Globalink
- Jacqueline Liu, Chemical Engineering, McGill University, Summer 2015
- José Humberto Ramírez Leyva, Universidad de las Américas Puebla, Summer 2014 through Mitacs Globalink

C. Postdoctoral Fellow Trainees

- Avinash Alagumalai, Machine learning enabled catalyst discovery for renewable diesel synthesis under methane environment, June 2023 ~ May 2024
- Muhammad Faizan, Methane assisted Organic Solid Wastes Upgrading, March 2023 ~ February 2024
- Hoang Nguyen Minh, Non-thermal Plasma Assisted Catalytic Liquid Phase Upgrading, September 2022 ~ August 2024
- Manpreet Kaur, Photo/Electro Assisted Catalytic Methane Conversion, July 2022 ~ August 2024

- Mingyuan Cao, Machine-Learning-Oriented Non-Thermal Plasma-Catalysis Integrated Model for Virtual Dry Reforming of Methane with Carbon Dioxide Catalyst Screening: “Fingerprints” to “Target” funded by Eyes High Postdoctoral Match-Funding Fellowship, September 2022 ~ August 2024
- Wenping Li, Non-Thermal Plasma Assisted Photocatalytic Water Splitting and Air Purification funded by NSERC Alliance Mission Grant, November 2020 ~ October 2024
- Hao Xu, Methane Assisted Catalytic Heavy Crude Upgrading funded by Mitacs Accelerate Scholarship, September 2019 ~ September 2022
- Aiguo Wang, Photoelectric catalytic methane valorization, October 2018 ~ September 2020
- Peng He, Catalytic Heavy Conventional Upgrading Using Natural Gas funded by Kara Technologies, January 2018 ~ September 2019
- Jonathan Harray, Non-thermal Plasma Assisted Catalytic Bitumen Partial Upgrading under Methane funded by Imperial Oil and NSERC, November 2017 ~ April 2019
- Qingyin Li, Aromatics Formation from Paraffin-rich Oil under Methane funded by Shandong Chambroad Petrochemicals, October 2015 ~ September 2017
- Yang Lou, Catalytic Light Olefin Upgrading Using Natural Gas for Gasoline Quality Improvement funded by MEG Energy and AIEES, January ~ December 2015
- Wenpo Shan, An Integrated Process to Simultaneously Convert Natural Gas and Low-Cost Biomass to Liquid Fuels funded by AIEES and NSERC, April 2014 ~ April 2015
- Cuijuan Zhang, Biomass pyrolysis under methane environment for upgraded oil production funded by AIEES, April ~ October 2013

IV. SCHOLARLY ACTIVITIES

A. Research Support (Total: \$8,025,951 CAD + \$1,655,000 USD + \$1,610,000 CAD Pending)

i) Grants:

- “In-liquid plasma-driven light crude oils upgrading with methane over immobilized enzyme catalyst”, ACS Petroleum Research New Direction Fund, 2 years for \$125,000 USD (PI: *Pending*)
- “Pilot Demonstration of a Highly Integrated Organic Solid Wastes Valorization Process”, NSERC Alliance Grant and Mitacs Accelerate, 2 years (April 1, 2023 ~ April 30, 2025) for \$1,225,000 CAD (PI: *Pending*)
- “Non-thermal Plasma Assisted Photocatalytic Conversion of Low-cost Light Hydrocarbons to Value-added Fuel and Chemicals at Ambient Conditions”, NSERC Alliance Grant and Mitacs Accelerate, 2 years (September 1, 2022 ~ August 31, 2024) for \$260,000 (PI: *Pending*)
- “Plasma-assisted ammonia and value-added hydrocarbons productions from CH₄ and N₂”, Mitacs Accelerate, 8 months for \$30,000 CAD (PI)
- “Nonthermal Plasma Assisted Photocatalytic Air Purification and Sterilization at Ambient Conditions”, NSERC Alliance Missions Grant, 2 years (April 1, 2022 ~ March 31, 2024) for \$600,000 (PI)
- “Methane Assisted Catalytic Upgrading of Extra Heavy Crudes under Moderate Conditions”, NSERC Alliance Grant, Mitacs Accelerate, and Alberta Innovates, 2 years (April 1, 2022 ~ July 31, 2024) for \$410,000 (PI)
- “Catalytic Organic Solid Wastes Valorization Using Natural Gas”, NSERC Alliance Grant, 2 years (April 1, 2022 ~ March 31, 2024) for \$200,000 (PI)
- “Catalytic Valorization of Low-cost Light Crudes under Methane Environment”, NSERC Alliance Grant, 2 years (July 15, 2021 ~ July 14, 2023) for \$200,000 (PI)
- “Catalytic Valorization of Low-cost Light Crudes under Methane Environment”, Alberta Innovates, 2 years (September 1, 2020 ~ August 31, 2022) for \$100,000 (PI)
- “Multifunctional Catalyst Characterization System for Supporting Catalytic Natural Gas Valorization Program”, NSERC RTI Grant, 1 year (April 1, 2021 ~ March 31, 2022) for \$150,000 (PI)
- “Natural Gas Valorization”, Guangxi Huarui Energy Technology Co. Ltd., 3 years (January 1, 2020 ~ December 31, 2022) for ¥ 2 million RMB (~\$375,000 CAD) (PI)

- “Catalytic Organic Solid Wastes Upgrading Using Natural Gas for Valuable Commodities Production”, Natural Sciences and Engineering Research Council of Canada (NSERC) Discovery Grant, 5 years (April 1, 2019 ~ March 31, 2024) for \$165,000 (PI)
- “Flow Reactor System for a Comprehensive Research & Development Program in GHG Reduction Technologies”, NSERC RTI Grant, 1 year (April 1, 2019 ~ March 31, 2020) for \$125,556 (Co-PI)
- “Catalytic Heavy Oil Partial Upgrading under Natural Gas”, NSERC CRD Grant, 2 years (January 23, 2019 ~ January 22, 2021) for \$200,000 (PI)
- “Catalytic Heavy Oil Partial Upgrading under Natural Gas”, Alberta Innovates, 2 years (March 1, 2019 ~ May 1, 2021) for \$400,000 (PI)
- “Non-thermal Plasma Assisted Catalytic Bitumen Partial Upgrading under Methane Environment”, NSERC CRD Grant, 2 years (October 1, 2017 ~ March 31, 2020) for \$120,000 (PI)
- “Plasma Assisted Catalytic Bitumen Upgrading under Methane Environment”, TelStar Group, 2 years (October 1, 2016 ~ September 30, 2018) for \$100,000 (PI)
- Eyes High Doctoral Recruitment Scholarship Award, U of C, 5 years (September 1, 2016 ~ August 31, 2021) for \$150,000 (PI)
- “Catalytic Heavy Crude Oil Upgrading Using Natural Gas”, NSERC CRD Grant, 2 years (May 2, 2014 ~ May 1, 2016) for \$80,000 (PI)
- “An Integrated Process to Simultaneously Convert Natural Gas and Low-Cost Biomass to Liquid Fuels”, Alberta Innovates, 1.5 year (September 1, 2013 ~ April 15, 2015) for \$65,000 (PI)
- “Determining heating Value of Selected Municipal Solid Wastes and Their Suitability for Producing High-Quality Biochar”, AIEES, 1 year (January 1, 2013 ~ December 31, 2013) for \$50,000 (Co-PI)
- “Catalytic Natural Gas Upgrading of Low-Cost Carbon Resources for Producing Valuable Commodities”, NSERC Discovery Grant, 5 years (April 1, 2014 ~ March 31, 2019) for \$100,000 (PI)
- “Partial Upgrading of Bitumen using Natural Gas”, NSERC Engage Grant, 6 months (July 1, 2014 ~ December 31, 2014) for \$25,000 (PI)
- “Forming collaboration with NORAM on natural gas partial upgrading of bitumen”, NSERC Interaction Grant, 3 months (November 1, 2013 ~ January 31, 2014) for \$2,072.00 (PI)
- “A Facility for Innovative Hydrocarbon Energy Research”, Canada Foundation for Innovation – Leaders Opportunity Fund (CFI-LOF) and Alberta Innovation and Advanced Education through Small Equipment Grants Stream of the Alberta Capacity Program (RCP), \$292,500 (PI)
- “Catalytic Light Olefin Upgrading Using Natural Gas for Gasoline Quality Improvement”, Alberta Innovates, 3 years (October 1, 2013 ~ January 15, 2017) for \$150,000 (PI)
- “Catalytic Simultaneous Conversion of CO₂ and Low-Cost Carbon Source into Valuable Liquid Commodities under Near Atmospheric Pressure”, CPE New Faculty Research Award, 2 years (March 1, 2014 ~ September 30, 2016) for \$50,000 (PI)
- “Catalytic Heavy Crude Oil Upgrading Using Natural Gas”, University Seed Grant, 18 months (January 1, 2013 ~ July 1, 2014) for \$18,000 (PI)
- “Near Atmospheric Pressure Catalytic Syngas to Liquid Fuels”, University Starter Grant, 18 months (September 1, 2012 ~ February 28, 2013) for \$5,000 (PI)
- University Research Grants Committee (URGC) Travel Grant, \$1,800 (March, 2015)
- University Start-up Fund, U of C, 4 years (July 1, 2012 ~ June 30, 2016) for \$100,000 (PI)
- “Conversion of CO₂ into Commercial Materials Using Carbon Feedstocks”, 2011~2012, U.S. Department of Energy (DOE) through National Energy Technology Laboratory (NETL), Agreement No.: DE-FE0004329 (3 years, \$1,000,000 USD project) (PI)

ii) Contracts:

- “Plasma-assisted ammonia and value-added hydrocarbons productions from CH₄ and N₂”, Carbon Upcycling Technologies, 8 months for \$50,000 CAD (PI)

- “Pilot Demonstration of a Highly Integrated Organic Solid Wastes Valorization Process”, Kara Technologies and Shell International, 2 years (April 1, 2023 ~ April 30, 2025) for \$500,000 CAD (PI)
- “Non-thermal Plasma Assisted Photocatalytic Conversion of Low-cost Light Hydrocarbons to Value-added Fuel and Chemicals at Ambient Conditions”, Carbon Upcycling Technologies, 2 years (September 1, 2022 ~ August 31, 2024) for \$100,000 (PI)
- “Catalytic Upgrading of Extra Heavy Crude Using Natural Gas”, Kara Technologies and Strathcona Resources, 2 years (January 1, 2022 ~ December 31, 2023) for \$100,000 (PI)
- “Non-Thermal Plasma-Catalytic Dielectric Barrier Discharge Reactor for Water-Splitting”, Carbon Upcycling Technologies, 3 month (February 5, 2021 ~ May 31, 2021) for \$25,000 (PI)
- “Desulfurization on 2 Cielo Samples”, Cielo Waste Solutions, 2 month (October 1, 2020 ~ December 31, 2020) for \$20,000 (PI)
- “Catalytic Biomass Valorization Using Natural Gas”, Kara Technologies, 2 years (September 1, 2020 ~ August 31, 2022) for \$200,000 (PI)
- “Catalytic Targeted Upgrading of Extra Heavy Crude under Natural Gas”, Kara Technologies, 2 years (September 1, 2020 ~ August 31, 2022) for \$50,000 (PI)
- “Catalytic Valorization of Low-cost Light Crudes under Methane Environment”, Kara Technologies, 2 years (June 30, 2020 ~ September 30, 2022) for \$100,000 (PI)
- “Catalytic Heavy Oil Upgrading for Pipeline Transportation”, Kara Technologies, 5 years (August 1, 2017 ~ May 1, 2021) for \$757,500 (PI)
- “Non-thermal plasma assisted catalytic bitumen partial upgrading under methane environment”, Institute for Oil Sands Innovation at University of Alberta, 2 years (October 1, 2017 ~ March 31, 2020) for \$120,000 (PI)
- “Catalytic Valorization of Crude Oil for Chemical Production”, Guangxi Sino-Green Energy and Environmental Technologies, 1.5 years (April 1, 2018 ~ December 31, 2019) for \$150,000 (PI)
- “Aromatics Production from Petrochemical Intermediates under Methane”, Shandong Chambroad Petrochemicals, 2 years (August 1, 2016 ~ July 31, 2018) for RMB ¥ 1,200,000 (approximately CAD \$232,560) (PI)
- “Catalytic Bitumen Upgrading under Methane Environment”, TelStar Group, 2 years (September 1, 2016 ~ August 31, 2018) for \$60,000 (PI)
- “Direct Olefin Reduction”, MEG Energy, 1.5 years (August 1, 2017 ~ January 31, 2019) for \$120,000 (PI)
- “Partial Upgrading of Bitumen using Natural Gas”, BC Research, 3 years (March 1, 2014 ~ February 28, 2017) for \$105,000 (PI)
- “Methane Upgrading of Bitumen”, Imperial Oil, 2 years (May 2, 2014 ~ May 1, 2016) for \$100,000 (PI)
- “Catalytic Light Olefin Upgrading Using Natural Gas for Gasoline Quality Improvement”, MEG Energy, 3 years (October 1, 2013 ~ January 15, 2017) for \$150,000 (PI)
- “Low Temperature Catalytic NO_x Control in the Flue Gas”, 2010~2011, 1 year \$100,000 USD project received from Babcock & Wilcox Power Generation Group (B&W PGG) through internal fundamental program, Project No.: R002FD1007 (PI)
- “Low Temperature Catalytic Coal/Biomass Gasification at Atmospheric Pressure”, 2010-2011, 1 year \$110,000 USD project received from Babcock & Wilcox Power Generation Group (B&W PGG) through internal fundamental program, Project No.: R002FD1006 (PI)
- “HMI CO₂ Solid Sorbents Development”, 2009~2011, 2-year \$125,000 USD project received from Babcock & Wilcox Power Generation Group (B&W PGG) through internal fundamental program, Project No.: R002FD9002 (PI)
- “Ammonia Less NO_x Control”, 2009~2011, 2-year \$200,000 USD project received from Babcock & Wilcox Power Generation Group (B&W PGG) through internal fundamental program, Project No.: R002FD8002 (PI)

- “Selective Catalytic Oxidation of Ammonia”, 2009~2010, 1 year \$120,000 USD project received from Babcock & Wilcox Power Generation Group (B&W PGG) through internal fundamental program, Project No.: R002FD7004 (PI)

B. Invited Keynote Addresses:

- Song, H.*, “Methane assisted catalytic biomass valorization”, ACS Spring 2023 National Meeting, Indianapolis, IN, March 2023
- Song, H.*, “Non-thermal Plasma Assisted Photocatalytic Valorization of Low-cost Carbon Resources”, “Engineering” Lecture Hall, Beijing, China, April 2022
- Song, H.*, “Catalytic upgrading of biomass and its model compounds under methane environment”, 7th International Conference on Biomass Energy, Xiamen, China, April 2022
- Song, H.*, “Advanced Production of Renewable Fuel and Chemicals”, China-Canada Bioenergy Network March Webinar, March 2022
- Song, H.*, Meng, S., Wang, A., He, P., “Catalytic Methane Valorization at Mild Conditions through Coupling Effect”, 69th Canadian Chemical Engineering Conference, Halifax, NS, October 2019
- Song, H.*, He, P., Jarvis, J., Kou, S., "Co-aromatization of methane with olefins: The role of catalytic sites in the inner pores and on the external surface of metal modified zeolites", 254th ACS National meeting, Washington D.C., August 2017
- Song, H.*, He, P., Lyu, X., Shi, H., “Catalytic Low-Cost Carbon Resources Pyrolysis under Natural Gas for Upgraded Oil Production”, 247th ACS National meeting & exposition, Dallas, TX, March 2014
- Song, H., Ozkan, U.S., “Catalytic Hydrogen Production from Bio-renewable Resources”, 2nd international Symposium on Bioenergy and Bioprocess Technology, Qingdao, P.R. China, October 2008

C. Publications:

- i) Peer-reviewed journal papers (As first author or corresponding author; total citation: >3,000; Cumulative Impact Factor: >800):
- [1] Narasimhan, R., Devarajan, B., Venkateswaran, B., Nachimuthu, R., Alagumalai, A., Song, H.*, “Recent advancements in biomass-derived cellulose aerogels and their composites as alternatives for building thermal insulation applications”, Journal of Cleaner Production, (*Submitted*) Impact Factor: **11.1 (Q1)**
 - [2] Omidkar, A., Alagumalai, A., Li, Z., Song, H.*, “Machine learning assisted techno-economic and life cycle assessment of organic solid waste upgrading under natural gas”, Applied Energy, (*Submitted*) Impact Factor: **11.2 (Q1)**
 - [3] Kaur, M., Faizan, M., Song, H.*, “Plasmonic Titanium Nitride based Ammonia Synthesis by Photo-electrocatalytic Reduction of Nitrogen”, Journal of Materials Chemistry A, (*Submitted*) Impact Factor: **11.9 (Q1)**
 - [4] Jarvis, J., Li, Z., Song, H.*, “Inhibiting Platinum Sintering in Direct Ethane Dehydrogenation and Nonoxidative Methane Activation Reactions by Sequential Sulfide Layered Chemical Vapor Deposition”, Journal of the American Chemical Society, (*Submitted*) Impact Factor: **15.0 (Q1)**
 - [5] Alagumalai, A., Devarajan, B., Song, H.*, “Catalyzing a sustainable future by unlocking the potential of heterogeneous catalysts in energy conversion and storage systems”, Catalysis Science & Technology, (*Under review*) Impact Factor: **5.0**
 - [6] Liu, Y., Li, S., Meng, S., Xiao, S., Song, H.*, Du, K., “Defects-enriched 2D ultrathin g-C₃N₄/In₂O₃ nanoparticles for superior NO₂ gas-sensing performance at room temperature”, Sensors and Actuators B: Chemical, (*Under review*) Impact Factor: **8.4 (Q1)**
 - [7] Haddadian, K., Omidkar, A., Li, Z., Song, H.*, “Techno-economic and life cycle assessment of different technologies for aiding bitumen transportation”, Journal of Cleaner Production, (*Under review*) Impact Factor: **11.1 (Q1)**
 - [8] Jarvis, J., Xu, H., Li, Y., Li, Z., Li, W., Meng, S., Chang, L.Y., Liu, L., Song, H.*, “Methane-assisted Selective Bio-crude Deoxygenation for High-Quality Renewable Fuel Production: A Rational Catalyst Design and Mechanistic Study”, Chemical Engineering Journal, (*Under review*), Impact Factor: **15.1 (Q1)**

- [9] Meng, S., Li, W., Li, Z., Song, H.*, “Non-thermal Plasma Assisted Non-oxidative Methane Liquefaction for Fuel Production at Near Ambient Conditions”, Catalysis Science & Technology, (*Accepted with revision*) Impact Factor: 5.0
- [10] Nguyen, H., Omidkar, A., Li, W., Meng, S., Li, Z., Song, H.*, “Non-thermal Plasma Assisted Catalytic Nitrogen Fixation with Methane at Ambient Conditions”, Chemical Engineering Journal, (*Accepted with revision*) Impact Factor: **15.1 (Q1)**
- [11] Meng, S., Li, W., Li, Z., Song, H.*, “Recent Progress of the Transition Metal-based Catalysts in the Catalytic Biomass Gasification: A Mini-Review”, Fuel, (*Accepted with revision*) Impact Factor: 7.4 (Q1)
- [12] Mahian, O., Alagumalai, A., Devarajan, B., Song, H.*, Wongwises, S., Ledesma-Amaro, R., Sheremet, M., Lichtfouse E., “Machine learning in biohydrogen production: A review”, Biofuel Research Journal (2023), 10(2), 1844, Impact Factor: **13.0 (Q1) Invited**
- [13] Omidkar, A., Xu, H., Li, Z., Haddadian, K., Song, H.*, “Techno-economic and life cycle assessment of renewable diesel production via methane-assisted catalytic waste cooking oil upgrading”, Journal of Cleaner Production, (2023), 414, 137512 Impact Factor: **11.072 (Q1)**
- [14] Nguyen, H., Omidkar, A., Song, H.*, “Technical challenges and prospects in sustainable catalytic ammonia production”, ChemPlusChem (2023), DOI: 10.1002/cplu.202300129, Impact Factor: 3.4, **Invited**
- [15] Priya, A. K., Devarajan, B., Alagumalai, A., Song, H.*, “The potential of biobased agro solutions towards sustainable bioeconomy: A review”, RSC Sustainability (2023), DOI: 10.1039/D3SU00075C, **Invited**
- [16] Priya, A. K., Devarajan, B., Alagumalai, A., Song, H.*, “Artificial intelligence enabled carbon capture: A review”, Science of The Total Environment, (2023), 886, 163913 Impact Factor: 9.8 (Q1)
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- Song, H., “Catalytic Hydrogen Production from Bioethanol”, Bioethanol, ISBN: 978-953-51-0008-9, Rijeka, Croatia: InTech
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iii) Technical reports:

- “Catalytic Heavy Oil Partial Upgrading under Natural Gas”, NSERC Final Report, CRDPJ/531607-2018, July 2021
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- “Catalytic Heavy Oil Partial Upgrading under Natural Gas”, Alberta Innovates Midterm Report, AI-2552, June 2020
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- “Catalytic Light Olefin Upgrading by Methane”, Alberta Innovates Final Report, AI-2142, January 2017
- “Catalytic heavy crude oil upgrading using natural gas”, NSERC Final Report, CRDPJ/460752-2013, June 2016
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D. Technology Transfer:

i) Consulting:

- Kara Technologies, August 2017 ~ Present

ii) Licensing:

- “Plasma-assisted ammonia and value-added hydrocarbons productions from CH₄ and N₂”, licensed to Carbon Upcycling Technologies
- “Organic solid biomass conversion for liquid fuels/chemicals production in the presence of methane containing gas environment and catalyst structure”, licensed to Shell International

- “Methane Assisted Biocrude Desulfurization”, licensed to Cielo Waste Solutions
- “Catalytic Heavy Oil Partial Upgrading Using Natural Gas” licensed to StrathCona Resources and VODA Midstream
- “Catalytic Valorization of Municipal Solid Wastes” licensed to Directex from Mexico and E2S2-Systems from Singapore

iii) Patents:

- [1] Song, H., Jarvis, J., Li, Z., Method of Deoxygenation of a Hydrocarbon in the Presence of Methane-Containing Gas Environment and Catalyst Structure, (2022), PCT/IB2022/053945, **Filed**
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V. SERVICE ACTIVITIES

A. University Service:

- i) TUCFA Representative (2014-2015)
- ii) Chair of Career Leadership Sub-committee at SSE Diversity and Inclusivity Action Committee (2016~2018)
- iii) Member of Energy Engineering Program Committee (2017~2018)
- iv) Member of SSE Safety Improvement Team (2022~2023)
- v) Judge for 3MT Competition at Department of Chemical and Petroleum Engineering (2016)
- vi) Adjudicator for graduate and undergraduate scholarship applications (Total: More than **600** applications):
 - 15 applications for 2023 Medals Doctoral Competition (June 2023)
 - 35 applications for 2023 Graduate Award Competition (March 2023)
 - 36 applications for 2022 Graduate Award Competition (March 2022)
 - 29 applications for 2022 FGS Entrance Competition (March 2022)
 - 44 applications for 2021 Graduate Award Competition (March 2021)
 - 7 applications for 2020 Medals Doctoral Competition (July 2020)
 - 50 applications for 2020 Graduate Award Competition (April 2020)
 - 43 applications for 2018 Graduate Award Competition (April 2018)
 - 43 applications for 2017 Graduate Award Competition (April 2017)
 - 45 applications for NSERC CGSM Competition (January 2017)
 - 14 applications in the doctoral category for the GOLD MEDALS (Governor General's Gold Medal and Chancellor's Graduate Medals) competition (July ~ August, 2016)
 - 53 applications for 2016 Graduate Award Competition (March, 2016)
 - 5 applications for 2016 PURE award (March, 2016)
 - 57 applications for 2015 Graduate Award Competition (2015)

- 45 applications for 2015 NSERC CGS Master's Competition (2015)
- 38 applications for 2014 NSERC CGS Competition (2014)
- 2014 CGS University Microfilms International Distinguished Dissertation Awards (July 2014)
- 2014 AITF research proposals (February 2014)
- 45 applications for 2013 NSERC CGS Competition (2013)
- 10 applications for 2013 PURE award (2013)

vii) Neutral Chair:

- Ghada Hamdy Nafie (April 2020, Ph.D. Defense, Chemical and Petroleum Engineering)
- Qinwan Chong (December 2019, Ph.D. Defense, Chemical and Petroleum Engineering)
- Farouq Ahmed (April 2018, M.Eng. Defense, Chemical and Petroleum Engineering)
- Tianlin Zhang (March 2016, M.Sc. Defense, Chemical and Petroleum Engineering)
- Syed Sabbir Ahmed (September 2013, M.Sc. Defense, Electrical and Computer engineering)
- Emadoddin Livani (April 2013, Ph.D. Defense, Electrical and Computer Engineering)
- Rashid Popal (March 2013, M.Sc. Defense, Civil Engineering)
- Alba Corona Hernandez (January 2013, M.Sc. Defense, Chemical and Petroleum Engineering)

B. Professional Service:

i) Memberships:

- Member of executive committee of Energy Division of Chemical Institute of Canada
- Member of American Chemical Society (ACS), American Institute of Chemical Engineers (AIChE), Association of Professional Engineers and Geoscientists of Alberta (APEGA), Sigma Xi, and North American Catalysis Society (NACS)

ii) Editorships:

- Editorial board member of Frontiers in Chemistry – Inorganic Chemistry, Journal of Materials Science and Chemical Engineering, Chemical Engineering, AIMS Materials Science, and Journal of Chemical Engineering & Process Technique
- Guest editor of a special issue of Energy & Fuels

iii) Conference organization:

- Organizer of the “Thermochemical Conversion Processes” sessions for 2015 CSChE National Conference
- Presider of the honor symposium for 2012 PETR Distinguished Researcher at 244th ACS National Meeting
- Presider of the “New Opportunities for Recovery and Conversion of Fossil Fuels” sessions at 247th ACS National Meeting

iv) Journal reviews: Nature, Nature Communications, Journal of the American Chemical Society, Angewandte Chemie, Journal of Catalysis, Journal of Physical Chemistry, Bioresource Technology, ACS Applied Nano Materials, ACS Applied Materials & Interfaces, Environmental Science & Technology, Chemical Engineering Journal, Journal of Cleaner Production, Inorganic Chemistry Frontiers, RSC Advances, Applied Energy, Applied Catalysis B: Environmental, International Journal of Hydrogen Energy, Waste Management, Journal of Analytical and Applied Pyrolysis, Catalysis Today, Topics in Catalysis, Energy & Fuels, Fuel, Industrial & Engineering Chemistry Research, ChemCatChem, ChemSusChem, Catalysis Communications, Catalysis Letters, AIChE Journal, Canadian Journal of Chemical Engineering, etc.

v) Grant reviews: NSERC Strategic Partnership Grants, NSERC Alliance Grant, ACS Petroleum Research Fund-New Directions, National Science Centre of Poland, Netherlands Organization for Scientific Research, Swiss National Science Foundation, Canada foundation for innovation, Mitacs Accelerate, and Fund from Canadian Centre for Clean Coal/Carbon and Mineral Processing Technologies (C⁵MPT), Competitive Research Grants from King Abdullah University of Science and Technology (KAUST)

C. Public Service:

- As president (February 2021 ~ September 2022) Tsinghua Alumni Association of Calgary, I have managed the daily operation and organized a series of activities
- As vice president and member of trustee council of Tsinghua Alumni Association of Calgary, I have dedicated myself to the following duties for the association:
 - Organized and chaired 2019 Annual General Meeting held on November 10, 2019
 - Co-organized 2020 Spring Festival Celebration Event and successfully raised \$5,500 CAD for this event held on January 26, 2020

VI. OTHER ACTIVITIES

A. Hobbies:

- Long-distance running, swimming, chess