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CURRICULUM VITAE

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EDUCATION

PH.D. AEROSPACE ENGINEERING Korea Advanced Institute of Science and Technology, GPA: 4.13/4.30	03/2016 – 02/2020 Daejeon, South Korea
M.S. AEROSPACE ENGINEERING Korea Advanced Institute of Science and Technology, GPA: 4.17/4.30	03/2014 – 02/2016 Daejeon, South Korea
B.S. AEROSPACE ENGINEERING Korea Aerospace University, GPA: 4.40/4.50	03/2010 – 02/2014 Goyang-si, South Korea

EMPLOYMENT HISTORY

ASSISTANT PROFESSOR Department of Aerospace Engineering, Korea Advanced Institute of Science and Technology	07/2023 – present Daejeon, South Korea
POSTDOCTORAL RESEARCH ASSOCIATE Center for Hypersonics & Entry Systems Studies, University of Illinois at Urbana-Champaign	08/2020 – 07/2023 Urbana, IL, USA
POSTDOCTORAL RESEARCHER Institute of Mechanical Technology, Korea Advanced Institute of Science and Technology	03/2020 – 08/2020 Daejeon, South Korea
TEACHING ASSISTANT Korea Advanced Institute of Science and Technology	03/2016 – 02/2020 Daejeon, South Korea

PUBLICATIONS

Archival International Journals

- [1] **S. M. Jo**, S. Venturi, J. G. Kim, and M. Panesi, “Rovibrational internal energy transfer and dissociation of high-temperature oxygen mixture”, *Journal of Chemical Physics*, vol. 158, p. 064305, 6 2023.
- [2] **S. M. Jo**, S. Venturi, M. Sharma, A. Munafò, and M. Panesi, “Rovibrational-specific QCT and master equation study on $N_2(X^1\Sigma_g^+)+O(^3P)$ and $NO(X^2\Pi)+N(^4S)$ systems in high-energy collisions”, *Journal of Physical Chemistry A*, vol. 126, pp. 3273–3290, 21 2022.
- [3] S. Jung, **S. M. Jo**, and O. J. Kwon, “An angular discretization method using repulsive particles for the three-dimensional radiative transfer equation”, *International Journal of Aeronautical and Space Sciences*, vol. 23, pp. 501–510, 2022.

- [4] M. Sharma, **S. M. Jo**, S. Venturi, D. Schwenke, R. Jaffe, and M. Panesi, “A comprehensive study of HCN: Potential energy surfaces, state-to-state kinetics and master equation analysis”, *Journal of Physical Chemistry A*, vol. 126, pp. 8249–8265, 44 2022.
- [5] **S. M. Jo**, M. Panesi, and J. G. Kim, “Prediction of shock standoff distance with modified rotational relaxation time of air mixture”, *Physics of Fluids*, vol. 33, p. 047102, 2021.
- [6] I. Kim, Y. Yang, G. Park, and **S. M. Jo**, “Catalytic recombination assessment on carbon in dissociated shock tube flow”, *Acta Astronautica*, vol. 181, pp. 52–60, 2021.
- [7] J. G. Kim and **S. M. Jo**, “Modification of chemical-kinetic parameters for 11-air species in re-entry flows”, *International Journal of Heat and Mass Transfer*, vol. 169, p. 120950, 2021, **Corresponding Author**.
- [8] H. Shim, **S. M. Jo**, O. J. Kwon, and G. Park, “Temperature measurement of carbon dioxide using emission spectroscopy”, *Journal of Quantitative Spectroscopy and Radiative Transfer*, vol. 260, p. 107463, 2021.
- [9] **S. M. Jo**, O. J. Kwon, and J. G. Kim, “Stagnation-point heating of Fire II with a non-Boltzmann radiation model”, *International Journal of Heat and Mass Transfer*, vol. 153, p. 119566, 2020.
- [10] **S. M. Jo**, O. J. Kwon, and J. G. Kim, “Electronic-state-resolved analysis of high-enthalpy air plasma flows”, *Physical Review E*, vol. 100, p. 033203, 2019.
- [11] **S. M. Jo**, H. Shim, G. Park, O. J. Kwon, and J. G. Kim, “Temperature determination in a shock tube using hydroxyl radical A-X band emission”, *Physics of Fluids*, vol. 31, p. 026109, 2019.
- [12] **S. M. Jo**, J. W. Kim, and O. J. Kwon, “A narrow-band k-distribution model with single mixture gas assumption for radiative flows”, *Infrared Physics & Technology*, vol. 91, pp. 27–36, 2018.
- [13] **S. M. Jo**, H. M. Lee, and O. J. Kwon, “Prediction of surficial pressure loading for an underwater projectile using cfd-based database”, *International Journal of Aeronautical and Space Sciences*, vol. 19, pp. 618–625, 2018.

International Conference Proceedings

- [1] **S. M. Jo**, S. Kumar, V. L. Maout, A. Munafò, and M. Panesi, “Multi-fidelity modeling framework for radiative transfer in hypersonic atmospheric entry”, in *AIAA SciTech Forum*, 2023.
- [2] **S. M. Jo**, V. L. Maout, A. Munafò, and M. Panesi, “A multi-solver approach for studying ablation and radiation interactions in hypersonic flows”, in *AIAA Aviation Forum*, 2023.
- [3] S. Kumar, **S. M. Jo**, A. Munafò, D. J. Bodony, and M. Panesi, “Numerical study of radiative heat effects in inductively coupled plasma discharges”, in *AIAA Aviation Forum*, 2023.
- [4] S. Kumar, A. Munafò, **S. M. Jo**, and M. Panesi, “State-to-state analysis of a nitrogen rf inductively coupled plasma”, in *AIAA SciTech Forum*, 2023.
- [5] P. R. Sirmalla, **S. M. Jo**, R. Chiodi, A. Munafò, M. Panesi, and D. J. Bodony, “Radiative heat transfer in thermal protection systems using a one-way coupled fluid-solid framework”, in *AIAA SciTech Forum*, 2023.
- [6] **S. M. Jo**, A. Munafò, and M. Panesi, “Multi-fidelity modeling framework for high-temperature gas radiation”, in *9th International Workshop on Radiation of High Temperature Gases for Space Missions*, 2022.
- [7] **S. M. Jo**, A. Munafò, M. Sharma, S. Venturi, and M. Panesi, “Rovibrational-specific master equation analysis of high-temperature air mixture”, in *AIAA SciTech Forum*, 2022.
- [8] **S. M. Jo**, P. Rostkowski, A. Doostan, J. G. Kim, and M. Panesi, “Influence of non-Boltzmann radiation around titan atmospheric entry vehicles”, in *AIAA Aviation Forum*, 2022.

- [9] **S. M. Jo**, P. Rostkowski, and M. Panesi, “Bayesian inference of chemical-kinetic parameters of CN for Titan entry”, in *32nd International Symposium on Rarefied Gas Dynamics*, 2022.
- [10] S. Kumar, **S. M. Jo**, A. Munafò, and M. Panesi, “Non-equilibrium modeling of inductively coupled plasma discharges”, in *9th International Workshop on Radiation of High Temperature Gases for Space Missions*, 2022.
- [11] S. Kumar, A. Munafò, **S. M. Jo**, N. N. Mansour, and M. Panesi, “High-fidelity simulation of RF inductively coupled plasma discharges”, in *AIAA Aviation Forum*, 2022.
- [12] **S. M. Jo**, S. Venturi, A. Munafò, M. Sharma, and M. Panesi, “Physics-driven modeling for aerothermodynamics”, in *AIAA Aviation Forum*, 2021.
- [13] **S. M. Jo**, O. J. Kwon, and J. G. Kim, “Master equation analysis and rotational relaxation time for N₂-N₂”, in *AIAA SciTech*, 2020.
- [14] **S. M. Jo** and O. J. Kwon, “Numerical study of air-launched projectiles for fixed rotary wing aircraft safety”, in *8th Asian/Australian Rotorcraft Forum*, 2019.
- [15] **S. M. Jo**, O. J. Kwon, and J. G. Kim, “An electronic state-to-state analysis method for nonequilibrium air flows”, in *AIAA SciTech*, 2019.
- [16] **S. M. Jo**, J. Y. Hwang, and O. J. Kwon, “Numerical study of free-flight projectiles air-launched from a rotorcraft”, in *7th Asian/Australian Rotorcraft Forum*, 2018.
- [17] **S. M. Jo**, G. Park, and O. J. Kwon, “Prediction of stagnation-point radiative heating for FIRE II”, in *31st International Symposium on Shock Waves*, **Best Presentation Award**, 2017.

Under Review/In Preparation Journals

- [1] **S. M. Jo** and M. Panesi, “High-performance and multi-fidelity radiation analysis for hypersonic aerothermodynamics (In Preparation)”, 2022.
- [2] **S. M. Jo** and M. Panesi, “Influence of chemical-kinetic parameters in prediction of shock-heated electronic non-Boltzmann air radiation (In Preparation)”, 2022.

TEACHING AND ADVISING

- **Teaching Assistant**, Korea Advanced Institute of Science and Technology 2016 – 2019
- **Substitute Teaching (Molecular Gas Dynamics AE512)**, University of Illinois at Urbana-Champaign 2022

AWARDS, HONORS, AND GRANTS

- American Institute of Aeronautics and Astronautics, Thermophysics Discussion Group, USA 2020 – present
- Postdoc Abroad Program (selected but not received, 34 k\$), National Research Foundation, South Korea 2021
- Best Paper Award, Korea Institute of Military Science and Technology 2020
- Best Presentation Award, 31st International Symposium on Shock Waves 2017
- Dean of the College Award, Korea Aerospace University 2014
- National Sciences & Technology Scholarship, Korea Science and Engineering Foundation 2012 – 2014

INVITED LECTURES

- NASA Ames Research Center, USA - Shock Layer Kinetics and Radiation Technical Meeting 06/2023
– Towards Next-Generation Tools for Hypersonics: Computational Suite at CHES and its Applications
- Sejong University, Republic of Korea - Invited Seminar 10/2022

- Construction of Aerothermodynamic Modeling Framework for Hypersonic System Design
- NASA Ames Research Center, USA - Shock Layer Kinetics and Radiation Technical Meeting 07/2022
 - Sensitivity Analysis for Modeling N_2/CH_4 Shock Waves

PROJECTS

- NASA, USA - Advanced Computational Center for Entry System Simulation (Researcher) 2021 – present
 - Development of a high-performance and multi-fidelity framework for radiation analysis
 - Uncertainty quantification of thermochemical nonequilibrium models
- AFOSR, USA - Development of Physics-Based Air Thermo-Chemistry (Researcher) 2020 – 2022
 - Development of a reduced-order model for hypersonic flows
- NRF, South Korea - Aerothermochemistry with Machine-Learning-Driven Molecular Dynamics (PI) 2021
 - Selected but not received, 34 k\$
- ADD, South Korea - High-Speed Vehicle Research Center at KAIST (Researcher) 2014 – 2019
 - Initial launch safety study by means of unsteady 3-D CFD simulations with 6-DOF analysis
- NRF, South Korea - Thermochemical Nonequilibrium Modeling of Air in Hypersonic Flows (Researcher) 2019
- LIG Nex-1, South Korea - Ejecting Trajectory Analysis of a Guided Missile (Researcher) 2018
- KARI, South Korea - Base Heating Analysis of a Launch Vehicle with Multi-Nozzles (Researcher) 2016 – 2017
 - Development of flow-radiation coupled strategy for plume
- ADD, South Korea - Radiative Heat Transfer Analysis of High-Speed Vehicle (Researcher) 2015 – 2017
 - Development of flow-radiation coupled strategy for re-entry flows
- LIG Nex-1, South Korea - Modeling of Infrared Signature for Guided Missile Exhaust Gas (Researcher) 2015