Jongwon LIM

E-mail: ljw1015@hanyang.ac.kr | Mobile: +82)10-4179-3657 | Personal website (under maintenance)

Research Interests

Aerodynamics, Turbulence, Fluid dynamics modeling, Data-driven method, Artificial Intelligence

Education & Work Experience

Military service, Seoul Metropolitan Fire & Disaster Headquarters, Republic of Korea   2022 - 2024
- Conscripted into the Korean Army for 21 months and worked at civil disaster training center.

Master of Science in Physics (GPA 3.93/4.0)   2020 - 2022
Hanyang University, Seoul, Republic of Korea
- Advisor: Prof. Tae Jeong Kim
- Dissertation: Search for charged lepton flavor violation in top quark sector with hadronic tau final state using CMS Run 2 data at $\sqrt{s}$ = 13 TeV [pdf] (Best Dissertation Award)

Bachelor of Science in Physics and **Mechanical Engineering**, Cum Laude   2016 - 2020
Hanyang University, Seoul, Republic of Korea

Research Experience

Compact Muon Solenoid (CMS) Experiment, Large Hadron Collider (LHC), CERN   2020 - 2022
Team Leader: Prof. Tae Jeong Kim
- Mainly contributed to an analysis "Search for lepton flavour violation (LFV) in top quark interactions".
- Performed big data analysis with statistical methods and improved machine learning algorithms.

Elementary Particle Physics Lab., Department of Physics, Hanyang University   2018 - 2022
Advisor: Prof. Tae Jeong Kim
- Initially participated in studying the $t\bar{t}b\bar{b}$ process as an undergraduate research student.
- Produced about 15M simulated proton collision events and optimized hyper-parameters of DNN algorithm.
- Published two papers with improved identification efficiency of b-jets in $t\bar{t}b\bar{b}$.

Parallel Computing Lab., Department of Mechanical Engineering, Hanyang University   2019
Advisor: Prof. Sang Hwan Lee
- Led a team project "Design of Collision Warning and Braking Algorithms" and won two awards.
- Developed algorithms for real-time object detection using RCNN and vehicle control using computer vision.

Publications

[1]   CMS Collaboration*, "Search for lepton flavour violation in top quark interactions with an up-type quark, a muon, and a τ lepton," CMS Preliminary (TOP-PAS-22-011), 2024.

[2]   C. Jang, S.-K. Ko, J. Choi, **J. Lim**, Y.-K. Noh, and T. J. Kim, "Learning to increase matching efficiency in identifying additional b-jets in the $t\bar{t}b\bar{b}$ process," *The European Physical Journal Plus*, 2022. DOI: 10.1140/epjp/s13360-022-03024-8.

[3]   **J. Lim**, C.-T. Lu, J.-H. Park, and J. Park, "Implementation of the ATLAS-SUSY-2018-04 analysis in the MadAnalysis 5 framework (staus in the di-tau plus missing transverse energy channel; 139 fb^-1)," *Modern physics letters A*, 2021. DOI: 10.1142/s0217732321410091.

[4]   J. Choi, T. J. Kim, **J. Lim**, J. Park, Y. Ryou, J. Song, and S. Yun, "Identification of additional jets in the $t\bar{t}b\bar{b}$ events by using deep neural network," *Journal of the Korean Physical Society*, 2020. DOI: 10.3938/jkps.77.1100.

* [1] is approved by CMS with preliminary result and will be submitted to *J. High Energy Physics*.

Conference Presentations

[1] "Search for Charged Lepton Flavour Violation in top quark interaction with muon and tau in pp collisions at $\sqrt{s}$ = 13 TeV", P1-pa22, *2022 KPS Spring Meeting: The Korean Physics Society*, Apr. 20-22 (2022)

[2] "Search for LFV in top quark sector with charm, muon, and tau final states". *2020 KPS Fall Meeting: The Korean Physics Society*, Nov. 4-6 (2020)

Scholarships & Awards

The Best Dissertation Award, Graduate School of Hanyang University	2022
Graduate Program Scholarship (Full Tuition), Hanyang University	2020 - 2021
Han Ki-su Scholarship ($2,500 USD), Hanyang University	2020
Academic Honor Award (Cum Laude), Hanyang University	2020
The 11th Capstone Design Fair (3rd Place, $200 USD), Hanyang University	2019
Mechanical Engineering Design Project Presentation (2nd Place, $300 USD), Hanyang University	2019
Natural Science Academic Conference (2nd Place, $300 USD), Hanyang University	2019
Academic Excellence Scholarship (30% of Tuition), Hanyang University	2017
Learning Mate Program (2nd Place), Hanyang University	2017

Teaching Experience

Teaching Assistant, General Physics and Experiment 1 & 2 (Hanyang University, UG-level)	2020 - 2021

Skills

- Programming Languages: Python, C, C++, MATLAB
- Machine Learning: PyTorch, Keras, Tensorflow
- Programming Tools: ROOT, LabView
- Other computing skills: Linux, Git, TeX

Extracurricular Activities

Inertia, Computer club, Department of physics, Hanyang University	2016 - 2020
$\hbar$-action, Academic Physics club, Department of physics, Hanyang University	2016 - 2020
Hanaklang (2nd Violin), Hanyang Amateur Orchestra, Hanyang University	2017 - 2019
Volunteer, National Folk Museum, Seoul, Republic of Korea	2016

References

Prof. Tae Jeong Kim
Master research advisor
Department of Physics, Hanyang University, Seoul, Republic of Korea
E-mail: taekim@hanyang.ac.kr

Prof. Byung-gu Cheon
Master's dissertation committee member
Department of Physics, Hanyang University, Seoul, Republic of Korea
E-mail: bgcheon@hanyang.ac.kr

Prof. Kwang-Geol Lee
Bachelor thesis committee member
Department of Physics, Hanyang University, Seoul, Republic of Korea
E-mail: kglee@hanyang.ac.kr