

2025 COSPAR Outstanding Paper Awards for Young Scientists

Life Sciences in Space Research (LSSR)

Ge Zhang in **LSSR-D-24-00117** entitled “*Integrated spaceflight transcriptomic analyses and simulated space experiments reveal key molecular features and functional changes driven by space stressors in space-flown C. elegans*” **LSSR** 44: 10-22 (2025)

<https://doi.org/10.1016/j.lssr.2024.11.004>

Zhang Ge, a master degree student, is currently pursuing a doctoral degree at the Institute of Environmental Systems Biology, Dalian Maritime University. Her thesis work focuses on investigating the effects and underlying mechanisms of spaceflight—particularly space radiation and microgravity—on lifespan changes in *Caenorhabditis elegans*. Her research aims to identify key molecular factors and regulatory pathways involved in aging and lifespan modulation under different space-related stressors. To date, she has published five journal articles and has applied for two invention patents. As the first author of the awarded paper, she integrated transcriptomic data from *C. elegans* subjected to four spaceflights aboard the International Space Station (ISS) and identified 32 reproducibly differentially expressed genes, which were enriched in pathways related to the structural constituent of cuticle, defense response, unfolded protein response, and longevity regulation. Further, they explored the potential space stressors responsible for these transcriptomic changes through simulated microgravity and low-dose radiation experiments. This study provides new insights into the molecular and physiological adaptations of *C. elegans* to spaceflight, highlighting the distinct impacts of microgravity and space radiation.



Luis Poveda in **LSSR-D-24-00107** entitled “*Thoracolumbar spine muscle size and composition changes in long-duration space missions*” **LSSR** 44: 1-8 (2025)

<https://doi.org/10.1016/j.lssr.2024.11.003>

Luis Poveda is a 5th year PhD candidate in the Center for Injury Biomechanics at Wake Forest School of Medicine, where he also earned his Master of Science degree. Luis specializes in biomechanical analysis



and injury causation, with extensive research experience spanning both the automotive safety and spaceflight fields. During his master’s program, Luis received a Student Grant Augmentation Fellowship to study injury risks for astronauts operating a lunar rover in a standing posture. He also investigated the effects of prolonged microgravity on thoracolumbar muscle health. His

doctoral research focuses on how vehicle geometry, impact speed, and pedestrian characteristics influence injury risk, using advanced computational modeling and machine learning to improve prediction accuracy. Email address: luis.poveda@wfusm.edu

Yuxue Mu in **LSSR-D-24-180** entitled “*The effect of Hydrogen-rich water on retinal degeneration in the outer nuclear layer of simulated weightlessness rats*” **LSSR** 45: 158-169 (2025)

<https://doi.org/10.1016/j.lssr.2025.03.004>

