Ghanghoon Paik

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Education

The Pennsylvania State University University Park, PA

Ph.D in Aerospace Engineering *Aug 2024*

Minor in Computational Science

Dissertation title: Multiple Gravity-Assist Trajectory Design with Continuous-Thrust Synergetic Maneuver (Advisor: Dr. Robert Melton)

M.S. in Aerospace Engineering *May 2015*

Minor in Computational Science

Thesis title: Optimal Orbit Raising Via Particle Swarm Optimization (Advisor: Dr. Robert Melton)

B.S. in Aerospace Engineering *May 2013*

Research Interest

Primary Research Areas: Astrodynamics, Trajectory Optimization, Heuristic Methods

Interdisciplinary Focus: Autonomous Systems, machine learning, Robotics, and UAS

Research and Competition:

- **2022 NIST First Responder UAS Indoor Challenge (3rd place, Prize: $ 80,000)**
- **Interactive and Collaborative Robot-Assisted Emergency Evacuation (PI: Dr. Alan Wagner)**
- **30th Annual Intelligent Ground Vehicle Competition**
- **29th Annual Intelligent Ground Vehicle Competition**
- **2022 VFS Design-Build-Vertical Flight Student Competition (3rd place)**
- **2021 VFS Design-Build-Vertical Flight Student Competition (Best Computational Simulation Award)**
- **10th ESA Global Trajectory Optimization Competition**
- **9th ESA Global Trajectory Optimization Competition**
- **2017 AAS/AIAA Astrodynamics Specialist Conference Student Competition**

Publication

- **G. Paik**, R. Melton, "A Mission Planning Technique for Low-Thrust Synergetic Gravity-Assist Missions", AAS 24-348, AAS/AIAA Astrodynamics Specialist Conference, Broomfield, CO, August 11-15, 2024
- M. Nayyar, **G. Paik**, et al., "Characterizing Evacuee Behavior During a Robot-Guided Evacuation", 2023 IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR), Naraha, Fukushima, Japan, 2023, pp. 119-125
- **G. Paik**, R. Melton, "Preliminary Sequencing Strategy for Synergetic Gravity-Assist Missions", AAS 23-275, AAS/AIAA Astrodynamics Specialist Conference, Big Sky, MT, August 13-17, 2023
- M. Nayyar, **G. Paik**, Z. Yuan, T. Zheng, M. Zhu, H. Lin, et al., "Learning evacuee models from robot-guided emergency evacuation experiments", arXiv preprint, 2023.
- **G. Paik**, R. Melton, "Preliminary Sequencing Method for Multiple Garavity Assist with Low-Thrust Synergetic Maneuvers", AAS 23-344, 33rd AAS/AIAA Space Flight Mechanics Meeting, Austin, TX, January 15-19, 2023
- **G. Paik**, R. Melton, "Preliminary Trajectory Design Method for Continuous Thrust Synergetic Maneuvers for Planetary Flybys", AAS 22-833, AAS/AIAA Astrodynamics Specialist Conference, Charlotte, NC, August 7-11, 2022

- **G. Paik**, R. Melton, "Evaluation of Low-Thrust Synergetic Maneuvers During Planetary Flybys", AAS 21-721, AAS/AIAA Astrodynamics Specialist Conference, Big Sky, Virtual, August 9-11, 2021
- **G. Paik**, R. Melton, "Low-Thrust Multiple Gravity Assist Missions", AAS 20-527, AAS/AIAA Astrodynamics Specialist Conference, South Lake Tahoe, CA, August 9-13, 2020
- D. Conte, A. Goodyear, J. Reiter, **G. Paik**, et al., "GTOC 9: Results from the Astrodynamics Research Group of Penn State", ESA Acta Futura, Issue 11 on The Kessler Run (pp. 109-115), January 8, 2018
- Reiter, J. A., D. Conte, A. M. Goodyear, **G. Paik**, G. He, P. C. Scarcella, M. Nayyar, M. J. Shaw, "The Astrodynamics Research Group of Penn State (ARGoPS) Solution to the 2017 Astrodynamics Specialist Conference Student Competition", AAS 17-621, AAS/AIAA Astrodynamics Specialist Conference, Stevenson, WA, August 20-24, 2017

Teaching Experience

Teaching Assistant Aug 2016 – Dec 2016
- Course: Aerospace Analysis (AERSP 313)

Teaching Assistant Aug 2015 – May 2016
- Course: Programming for Engineers with MATLAB (CMPSC 200)
- Led 3 labs of 30-60 students per semester

Professional Experience

Institute for Computational Data and Sciences at Penn State Jan 2017 – Present
HPC Software Consultant
- Developed a system performance analyzing tool
- Lead daily customer-facing engagement resolving researcher's difficulties in using clusters and scheduler

MathWorks Jun 2021 – Aug 2021
Parallel Computing Support Application Engineer
- Designed and implemented parallel computing support packages using bash and MATLAB scripts
- Developed internal testing tools and provided Git repository management and updates

Service

Reviewer, Acta Astronautica
Reviewer, Computers in Human Behavior
Reviewer, International Space Station Research and Development Conference

Skill

Languages: C/C++, Python, MATLAB

Tools: OpenMP, MPI, PyTorch, Git, OpenCV, ROS, Unity, Docker

Reference

Dr. Roshan Eapen, Assistant Professor, Pennsylvania State University
rpe5185@psu.edu

Dr. Robert Melton, Professor, Director of Undergraduate Program, Pennsylvania State University
r81@psu.edu

Dr. David Spencer, Professor Emiritus, Pennsylvania State University
dbs9@psu.edu

Dr. Alan Wagner, Associate Professor, Pennsylvania State University
azw78@psu.edu