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Sunghun Jung

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EDUCATION

Doctor of Philosophy in Mechanical Engineering (Systems, Measurement, and Controls)
Purdue University, West Lafayette, IN — Dec 2013
Thesis: Scalable Autonomous Operations of Unmanned Assets

Master of Science in Mechanical Engineering (Systems, Measurement, and Controls)
Purdue University, West Lafayette, IN — Dec 2010
Thesis: Real-Time UAV Autonomy through Offline Calculations

Bachelor of Science in Mechanical Engineering — Aug 2009
University of Minnesota, Twin Cities, MN

RESEARCH INTEREST

- Scalable mission concept design, simulation, and experiments of the autonomous systems
- Energy efficient path planning of the autonomous systems using control and optimization methods
- Health management using BMS technology of the autonomous systems
- Multi-UAVs control and optimization for autonomous scalable operations

PROFESSIONAL EXPERIENCE

Chosun University, **Faculty of Smart Vehicle System Engineering,** *Assistant Professor* — Mar 2020 – Current
- None

Dongshin University, **Department of Electric Vehicle Engineering,** *Assistant Professor* — Sep 2018 – Feb 2020
- Head of the Department of Electric Vehicle Engineering (Mar 2019 – Feb 2020)

Chodang University, **Department of Drone System,** *Assistant Professor* — Aug 2016 – Aug 2018
- Leading the department by setting up a new curriculum

Youth Period Co., Ltd. (Startup Company), *CTO* — Mar 2014 – Apr 2018
- Contribute advice on the overall procedures from the start-up item selection and the development of Korea's first electric skateboard to the marketing and the item performance upgrading (50% Shareholder)

Samsung SDI, Automotive Battery Pack System, *Senior Engineer* — Jan 2014 – Aug 2016
- Developed the BMS testbench for validating and evaluating the existing BMS algorithms which are currently being used for IT, xEV, and ESS systems
- Developed KF based SOC estimation algorithm for xEV systems and evaluated using Autonomie vehicle simulator
- Developed hybrid battery pack combining high-power pack and high-capacity pack for increasing flight time of the octocopter
- Analyzed overall ASW and BSW of xEV battery pack SW developed on the base of AUTOSAR

Samsung Advanced Institute of Technology (SAIT), Energy Lab, *R&D Intern* — Jun 2012 – Aug 2012
- Performed concept design of a speed bump and a wind turbine for energy harvesting application, especially for the WSN
- Performed ANSYS stress analysis for various piezoelectric cantilever beams and tapered beam designs resulting in good stress distributed candidate design

Republic of Korea Marine Corps, 6th Marine Brigade, *Sergeant* — Jun 2003 – Jun 2005
- Led an M30 4.2" mortar squad to provide exact indirect fires responsive to the Fire Direction Center

PUBLICATIONS

In Preparation
- Under Development

Under Review

- Under Development

Accepted

- S. Jung, Special Issue on Unmanned Aerial Vehicles (UAVs), *Applied Sciences*, Vol. 10, No. 8078, pp. 1-5, 2020 (ISSN 0022-0434) (20200708, IF: 2.474)
- J. Jin, S. Jung, and H. J. Kim, Development of Wireless Power Transmission System for Transfer Cart with Shortened Track, *Applied Sciences*, Vol. 10, No. 4694, pp. 1-11, 2020 (ISSN 0022-0434) (20200708, IF: 2.474)
- W. Kim, S. Jung, Y. Moon, and S. C. Mangum, Morphological Band Registration of Multispectral Cameras for Water Quality Analysis with Unmanned Aerial Vehicle, *Remote Sensing*, Vol. 12, No. 2024, pp. 1-20, 2020 (ISSN 2072-4292) (20200624, IF: 4.509)
- S. Jung, Development and Verification of Hybrid Power Controller Using Indoor HIL Test for the Solar UAV, *Energies*, Vol. 13, No. 2110, pp. 1-11, 2020 (ISSN 1996-1073) (20200428, IF: 2.707)
- W. Kim, S. Roh, Y. Moon, and S. Jung, Evaluation of Rededge-M Camera for Water Color Observation after Image Processing, *Journal of Korean Society of Surveying, Geodesy, Photogrammetry and Cartography*, Vol. 37, No. 3, pp. 167-175, 2019 (ISSN 1598-4850) (20190626)
- S. Jung, Development of Path-Planning Tool for Unmanned System Considering Energy Consumption, *Applied Sciences*, Vol. 9, No. 3341, pp. 1-20, 2019 (ISSN 0022-0434) (20190814, IF: 2.474)
- S. Jung, Y. Jo, and Y. Kim, Aerial Surveillance with Low-Altitude Long-Endurance Tethered Multirotor UAVs using Photovoltaic Power Management System, *Energies*, Vol. 12, No. 1323, pp. 1-14, 2019 (ISSN 1996-1073) (20190406, IF: 2.707)
- W. Choi and S. Jung, Investigation of Launch Performance Degradation of the Rupture-Type Missile Canister, *Applied Sciences*, Vol. 9, No. 1290, pp. 1-11, 2019 (ISSN 2076-3417) (20190327, IF: 2.474)
- S. Jung, Y. Jo, and Y. Kim, Flight Time Estimation for Continuous Surveillance Missions using a Multirotor UAV, *Energies*, Vol. 12, No. 1323, pp. 1-15, 2019 (ISSN 1996-1073) (20190305, IF: 2.707)
- S. Jung and K. B. Ariyur, Robustness for Scalable Autonomous UAV Operations, *International Journal of Aeronautical and Space Sciences*, Vol. 18, No. 4, pp. 767-779, 2017 (ISSN 2093-2480) (20171027, IF: 0.511)
- K. Oh, D. Sin, and S. Jung, Development of an Optimized Attitude Control Algorithm of Underwater Autonomous Vehicles for Path Tracking, Transactions of the Korean Society of Mechanical Engineers, Vol. 5, pp. 74-75, 2017 (ISSN 1225-5963) (20170531)
- S. Jung and K. B. Ariyur, Automated Wireless Recharging for Small UAVs, *International Journal of Aeronautical and Space Sciences*, Vol. 18, No. 3, pp. 588-600, 2017 (ISSN 2093-2480) (20170920, IF: 0.511)
- S. Jung and K. B. Ariyur, Compensating UAV GPS Data Accuracy Through use of Relative Positioning and GPS Data of a UGV, *Journal of Mechanical Science and Technology*, Vol. 31, No. 9, pp. 4471-4480, 2017 (ISSN 1976-3824) (20170514, IF: 1.221)
- S. Jung and H. Jeong, Extended Kalman Filter-Based State of Charge and State of Power Estimation Algorithm for Unmanned Aerial Vehicle Li-Po Battery Pack, *Energies*, Vol. 10, No. 9, pp. 1237-1249, 2017 (ISSN 1996-1073) (20170821, IF: 2.707)
- S. Jung, EKF Based SOH State Estimation Algorithm for UAV Li-Po Battery Pack, *Journal of the Korea Convergence Society,* Vol. 8, No. 6, pp. 237-243, 2017 (ISSN 2233-4890) (20170628)
- S. Jung and H. Jeong, Optimal Battery Pack Design Tool for the Delivery UAV, *Journal of the Korea Convergence Society,* Vol. 8, No. 6, pp. 219-226, 2017 (ISSN 2233-4890) (20170628)
- S. Jung and K. B. Ariyur, Strategic Cattle Roundup using Multiple Quadrotor UAVs, *International Journal of Aeronautical and Space Sciences*, Vol. 18, No. 2, pp. 315-326, 2017 (ISSN 2093-2480) (20170524, IF: 0.511)
- S. Jung and H. Kim, Autolanding Mission Planning of the IT Convergence Hoverable UAV, *Journal of the Korea Convergence Society*, Vol. 8, No. 6, pp. 9-16, 2017 (ISSN 2233-4890) (20170628)
- S. Jung, The Control of Spring-Mass-Damper Convergence System using H_∞ Controller and μ-Synthesis Controller, *Journal of the Korea Convergence Society*, Vol. 8, No. 5, pp. 1-11, 2017 (ISSN 2233-4890) (20170528)
- S. Jung, IT Convergence UAV Swarm Control for Aerial Advertising, *Journal of the Korea Convergence Society,* Vol. 8, No. 4, pp. 183-188, 2017 (ISSN 2233-4890) (20170428)

- S. Jung, System Identification of Quadrotor IT Convergence UAV using Batch and RLS Estimation Methods, *Journal of the Korea Convergence Society*, Vol. 8, No. 4, pp. 9-18, 2017 (ISSN 2233-4890) (20170428)
- S. Jung and H. Kim, Analysis of Amazon Prime Air UAV Delivery Service, *Journal of Knowledge Information Technology and Systems*, Vol. 12, No. 2, pp. 253-266, 2017 (ISSN 1975-7700) (20170407)
- S. Jung and S. Youn, The First Korean-Made IT Convergence Electric Skateboard, *Journal of the Korea Convergence Society*, Vol. 8, No. 3, pp. 31-40, 2017 (ISSN 2233-4890) (20170328)
- S. Jung and K. B. Ariyur, Enabling Operational Autonomy for UAVs with Robustness, *AIAA Infotech@Aerospace*, Massachusetts, USA, 2013 (ISBN 9781629931524) (20130819)
- C. Liu, S. Jung, and K. B. Ariyur, Absolute Orientation for a UAV using Celestial Objects, *AIAA Infotech@Aerospace*, Massachusetts, USA, 2013 (ISBN 9781629931524) (20130819)
- S. Jung and K. B. Ariyur, Increasing Operational and Fuel Efficiency for Multi-UAV Missions, *AIAA Infotech@Aerospace*, Massachusetts, USA, 2013 (ISBN 9781629931524) (20130819)
- S. Jung and K. B. Ariyur, Enabling Operational Autonomy for UAVs with Scalability, *AIAA Journal of Aerospace Information Systems*, Vol. 10, No. 11, pp. 516-529, 2013 (ISSN 2327-3097) (20131115, IF: 0.892)
- S. Jung, T. Lee, T. Mina, and K. B. Ariyur, Inductive or Magnetic Recharging for Small UAVs, *SAE Aerospace Electronics and Avionics Systems Conference*, Arizona, USA, 2012 (ISSN 0148-7191) (20121022)
- S. Jung, T. Mina, and K. B. Ariyur, Compensating UAV GPS Through Use of Relative Positioning to a UGV, *Proceedings of the 25th International Technical Meeting of the Satellite Division of the Institute of Navigation*, Tennessee, USA, 2012 (20120917)
- S. Jung and K. B. Ariyur, Robustness for Large Scale UAV Autonomous Operations, *IEEE International Systems Conference*, Quebec, Canada, 2011 (20110404)
- S. Jung and K. B. Ariyur, Scalable Autonomy for UAVs, *AIAA Infotech@Aerospace*, Missouri, USA, 2011 (ISBN 9781629931524) (20110329)

BOOKS

- None

PATENTS

- S. Jung and C. Chung, Hybrid Power Supply System for the Unmanned Aerial Vehicle, 10-2020-0170804 (Under Review)
- S. Jung, Marine Environment Monitoring System, 10-2020-0159337 (Under Review)
- S. Jung and W. Kim, Devices for Sensing Remote Water Quality Based on Drones, 10-2018-0003984

INTERVIEW

- S. Jung, Jeonnam R&D Project Support Ranked at the Bottom… Why?, *CMB*, May 2020, https://bit.ly/2LodfvS
- S. Jung, Jeonnam-do Promotes the Establishment of a Used Battery Recycling Center, *CMB*, Nov 2019, https://bit.ly/340howl
- S. Jung, Jeonnam Yeonggwang-gun Developed E-Mobility Cluster, *CMB*, Jun 2019, https://bit.ly/37TpRm2
- S. Jung, The First Commercialized Major Domestic Drone Parts… Progressive Localization, *CMB*, Mar 2019, https://bit.ly/3gAuohh

COLUMNS

- S. Jung, Drone Remote Exploration Photogrammetry, *Expert Review in Congressional Human Network*, Oct 2018, https://goo.gl/67WRw5
- S. Jung, Drones, Now Float in the Sea … The 'Power' of Marine Exploration Drone, *Expert Column in Daily Korea Newspaper*, Jan 2018, https://goo.gl/CJsiyJ
- S. Jung, Increased Technological Maturity Rather Than the Short-Term Performance is Necessary to Develop the Drone Industry, *Expert Column in Daily Korea Newspaper*, Dec 2017, https://goo.gl/uUvWd2
- S. Jung, Open-Source Autopilot System for Drone, *Expert Column in Daily Korea Newspaper*, Jun 2017, https://goo.gl/LPgXwY
- S. Jung, Why 'Drone Industry' Has No Choice But to Receive an Issue in the Fourth Industrial Revolution,

Expert Column in Daily Korea Newspaper, Mar 2017, https://goo.gl/H5BB0R

- S. Jung, Desperate Need for the Customized Training for 'Drone Development and Pilot Training,' *Expert Column in Daily Korea Newspaper*, Dec 2016, https://goo.gl/AGlbhB

RESEARCH PROPOSALS

Chosun University, Faculty of Smart Vehicle System Engineering, *Assistant Professor* Mar 2020 – Current

- **National Research Foundation of Korea ($37,500), Senior Researcher** Jun 2020 – Feb 2021
  Project Title: Development of Hybrid Power Source based Long-Endurance VTOL UAV and Automated Hydrogen Refueling System
- **LINC+ by National Research Foundation of Korea ($30,000), Senior Researcher** May 2020 – Jan 2021
  Project Title: Development of Hybrid Power Controller for the UAV

Dongshin University, Dept. of Electric Vehicle Engineering, *Assistant Professor* Sep 2018 – Feb 2020

- **JeonNam TechnoPark ($60,000), Senior Researcher** Sep 2018 – May 2020
  Project Title: Developing the Marine Environment Monitoring Unmanned Aerial System for the Reduction of Fish Farm Damage
- **National Research Foundation of Korea ($60,000), Senior Researcher** Sep 2018 – Feb 2020
  Project Title: Real-Time Web Map Service Based on a Solar Powered Unmanned Aerial Vehicle

Chodang University, Dept. of Drone System, *Assistant Professor* Sep 2016 – Aug 2018

- **JeonNam TechnoPark ($60,000), Senior Researcher** Jun 2018 – Aug 2018
  Project Title: Developing the Marine Environment Monitoring Unmanned Aerial System for the Reduction of Fish Farm Damage
- **National Research Foundation of Korea ($30,000), Senior Researcher** Mar 2017 – Aug 2018
  Project Title: Real-Time Web Map Service Based on a Solar Powered Unmanned Aerial Vehicle
- **Korea Institute of Ocean Science & Technology, Support Project for Establishing Infrastructure for the Young Researcher ($25,000), Senior Researcher** May 2017 – Dec 2017
  Project Title: Developing an Above-Water Radiometer Drone for Measuring Remote Sensing Reflectance
- **Honam University, Industry-University Cooperation Organization ($50,000), Researcher** Sep 2016 – May 2017
  Project Title: Development of the Characterization Circuit and Algorithm for the Agricultural UAV Li-Ion Battery Pack

TEACHING EXPERIENCE

- MATLAB Programming, Engineering SW Practice, College Mathematics I/II, Engineering Mathematics, Dynamics, Introduction to Mechanical Engineering, Computer Architecture, Dongshin University, Jeollanam-do, Sep 2018 to Feb 2020 (1 year 6 months)
- Physics I, Computer Programming, Aviation Legislation, Image Processing, Aerodynamics, Flight Dynamics, and Fluid Dynamics, Chodang University, Jeollanam-do, Sep 2016 to Aug 2018 (2 years)
- Machine Design I class, Purdue University, IN, From Jan 2011 to Aug 2013 (2 years 8 months)

HONORS, AWARDS, AND SCHOLARSHIPS

Samsung SDI

- *Achievement Award*, Hunsoo Kim (Head of Battery R&D Center), Nov 2015

TECHNICAL SKILLS

- MATLAB/Simulink, C, C++, Python

REFEREES

- Professor Kartik B. Ariyur
  School of Mechanical Engineering, Purdue University, 585 Purdue Mall, West Lafayette, IN 47907, USA
  Mobile: +1-765-494-8613, Email: kariyur@purdue.edu, Web: https://engineering.purdue.edu/~kariyur
- Professor Inseok Hwang
  School of Aeronautics and Astronautics, Purdue University, 585 Purdue Mall, West Lafayette, IN 47907, USA
  Mobile: +1-765-494-0687, Email: ihwang@purdue.edu, Web: https://engineering.purdue.edu/~ihwang/
- Professor Moonkyu Kwak
  School of Mechanical, Robotics and Energy Engineering, Dongguk University, 30 Pildong-ro 1-gil, Jung-gu, Seoul, 04620, Republic of Korea
  Mobile: +82-10-6247-3705, Email: kwakm@dongguk.edu

ACADEMIC MEMBERSHIP

- IEEE (Institute of Electrical and Electronics Engineers) Member
- AIAA (American Institute of Aeronautics and Astronautics) Member
- IJASS (International Journal of Aeronautical and Space Sciences) Member
- KSAS (The Korean Society for Aeronautical and Space Sciences) Member

ACADEMIC PAPER REVIEWER

- Remote Sensing (SCIE, IF: 3.244)
- Sensors (SCIE, IF: 2.677)
- Energies (SCIE, IF: 2.262)
- Applied Sciences (SCIE, IF: 2.474)
- Robotica (SCIE, IF: 1.554)
- Journal of Intelligent and Robotic Systems (SCIE, IF: 1.512)
- International Journal of Aeronautical and Space Sciences (SCIE, IF: 0.4)
- Unmanned Systems (Scopus)

LANGUAGE SKILLS

- Korean (Native), English (Fluently)