Hai-Nguyen Nguyen

Ph.D. Candidate, Mechanical Engineering

Interactive & Networked Robotics Lab.
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Education

Sep. 2012 – present **Ph.D. Student**, *Seoul National University*, Korea.
Topic: Design, Modeling and Control of Novel Aerial Manipulation Systems using Thrust Propelled Vehicles.
Advisor: Prof. Dongjun Lee, Department of Mechanical & Aerospace Engineering.

Jun. 2008 & Dec. 2010 **B.Eng. Mechatronics & M.Sc. Applied Mechanics**, *Hanoi University of Science and Technology*, Vietnam.

Academic Service

Review IEEE Transactions on Robotics 2015, 2016, 2017
Mechatronics 2017
Nonlinear Dynamics 2017
IEEE International Conference on Robotics & Automation 2015, 2016, 2017
IEEE/RSJ International Conference on Intelligent Robots & Systems 2014, 2016

Skills

Coding C++/Python, Matlab/Maple/Processing

Robotics Quadrotors (AscTec, PX4), Haptic devices (Phantom, Force Dimension), Motion capture systems (VICON, OptiTrack), MCUs (Arduino, Odroid,Jetson), ROS

Publications

[1] **Hai-Nguyen Nguyen**, Sangyul Park, Junyoung Park and Dongjun Lee, "A novel robotic platform for aerial manipulation using quadrotors as rotating thrust generators," ***IEEE Transactions on Robotics (T-RO)***, 2017. (in revision)

[2] Jeongae Bak, **Hai-Nguyen Nguyen**, Sangyul Park, Dongjun Lee, TaeWon Seo, Sangrok Jin, Jongwon Kim, "Positioning control of an underwater robot with tilting thrusters via decomposition of thrust vector," ***International Journal of Control, Automation and Systems (IJCAS)***, 15(X), pp. 1-9 2017.

[3] **Hai-Nguyen Nguyen**, Chansu Ha and Dongjun Lee, "Mechanics, control and internal dynamics of quadrotor tool operation," ***Automatica***, 61, pp. 289-301, 2015. (regular paper)

[4] **Hai-Nguyen Nguyen**, Sangyul Park and Dongjun Lee, "Aerial tool operation system using quadrotors as rotating thrust generators," in ***IEEE/RSJ International Conference on Intelligent Robots & Systems (IROS)***, Hamburg, Germany, 2015. (featured in IEEE Spectrum)

[5] **Hai-Nguyen Nguyen** and Dongjun Lee, "Hybrid force/motion control and internal dynamics of quadrotors for tool operation," in ***IEEE/RSJ International Conference on Intelligent Robots & Systems (IROS)***, Tokyo, Japan, 2013.

[6] **Hai-Nguyen Nguyen**, Sangyul Park, Junyoung Park and Dongjun Lee, "Aerial Manipulation using Multiple Quadrotors as Rotating Thrusters: Experiment Results," in ***Korea Robotics Society Annual Conference (KRoC)***, Gangwon, Korea, 2017. (Best Video Award)

[7] Juhyeok Kim, **Hai-Nguyen Nguyen** and Dongjun Lee, "Preliminary Control Design on Spherically-Connected Multiple-Quadrotor Manipulator System," in ***International Conference on Ubiquitous Robots and Ambient Intelligence (URAI)***, Goyang, Korea, 2015.

[8] Sangyul Park, **Hai-Nguyen Nguyen** and Dongjun Lee, "Modeling and control of a spherically-connected multi-quadrotor tool system," in ***ICROS Annual Conference***, Daejeon, Korea, 2015.

[9] **Hai-Nguyen Nguyen**, Hyunsoo Yang and Dongjun Lee, "Dynamics and control problems related to aerial manipulation using quadrotors," in ***International Conference on Electronics, Information and Communication (ICEIC)***, Singapore, 2015.

[10] **Hai-Nguyen Nguyen** and Dongjun Lee, "Coordinated rotation control of multiple rigid bodies in SO(3)," in ***IEEE International Conference on Control, Automation and Systems (ICCAS)***, Gwangju, Korea, 2013.

[11] Van-Phong Dinh and **Hai-Nguyen Nguyen**, "A new approach of using null space of Jacobian matrix in simulation of multibody dynamics", ***Studies in Applied Electromagnetics and Mechanics***, 37, pp. 44–58, 2012.

[12] Van-Phong Dinh, Tran-Thang Do, **Hai-Nguyen Nguyen** and Minh-Quan Pham, "On a robot controlling and simulation software," in ***International Symposium on Dynamics and Control***, Hanoi, Vietnam, 2011.

[13] Van-Phong Dinh, Tran-Thang Do, **Hai-Nguyen Nguyen** and Minh-Quan Pham, "Dynamic and control of mechanical systems in the neighbourhood of singularity configurations," in ***Vietnam Conference on Mechatronics (VCM)***, Hochiminh City, Vietnam, 2010. (in Vietnamese)

Presentations

[1] **Hai-Nguyen Nguyen**, Sangyul Park, Junyoung Park and Dongjun Lee, "Spherically-connected 3-quadrotor (S3Q) platform for aerial manipulation: experimental validation," in ***IEEE International Conference on Control, Automation and Systems (ICCAS)***, Gyeongju, Korea, 2016. (poster section)

[2] **Hai-Nguyen Nguyen**, Sangyul Park and Dongjun Lee, "Aerial manipulation using spherically-connected multiple-quadrotor tool system," in ***IEEE International Conference on Robotics & Automation (ICRA)***, Seattle, WA, 2015. (poster section)

[3] **Hai-Nguyen Nguyen**, Juhyeok Kim and Dongjun Lee, "Preliminary result on aerial tool operation using quadrotors as rotating thrust generators," in ***International Symposium on Distributed Autonomous Robotic Systems (DARS)***, Daejeon, Korea, 2014. (poster section)

Patents

[1] Dongjun Lee, **Hai-Nguyen Nguyen** and Hoyong Lee, "Aerial robot system based on multi-rotor for mechanical tasks," *Korea Patent No. 10-1614620-0000*, April 15, 2016.

[2] Dongjun Lee, **Hai-Nguyen Nguyen** and Sangyul Park, "Multi-link type working apparatus moved by thrust generating device," *US Patent Application No. 14/923,442*, October 27, 2015.

[3] Dongjun Lee, **Hai-Nguyen Nguyen** and Sangyul Park, "Multi-link type working apparatus moved by thrust generating device," *Korea Patent Application No. 10-2015-0024404*, February 17, 2015.

Honors and Awards

2017 Best Video Award, Korea Robotics Society Annual Conference

2015 Travel Award, IEEE/RSJ International Conference on Intelligent Robots & Systems

2013 – 2015 Lecture & Research Scholarship, Seoul National University

2013 Global Scholarship, Seoul National University

2012 – 2016 BK Scholarship, Brain Korea 21 & 21 Plus Program, Korea Government

2010, 2011 Award for Exceptional Researchers (Stakhanovite Appellation), Institute of Mechanics

2003 Merit-based Scholarship, Hanoi University of Science and Technology

2002 First Prize in Physics, Annual Excellent Student Contest, Haiphong City

2001 Third Prize in Biology, Annual Excellent Student Contest, Haiphong City

Research Experience

Sep. 2012 – present **Graduate Researcher**, *Seoul National University*, Korea.
Working in Interactive & Networked Robotics Laboratory (INRoL).
- Designed a coordinated control law for multiple bodies in SE(3) using passive decomposition (*ICCAS 2013*).
- Developed a control framework for aerial tool operation using a simple rigid tool attached on a quadrotor (*IROS 2013, Automatica 2015*).
- Developed a new aerial platform for aerial manipulation using multiple quadrotors as rotating thrust generators (*DARS 2014, ICRA 2015, IROS 2015, TRO 2017*).
- Collaborated with Rodel Lab, SNU, and developed a new control decode scheme for underwater robot with tilting thrusters (IJCAS 2017).

Sep. 2009 – present **Permanent Researcher**, *Vietnam Academy of Science and Technology*, Vietnam.
Joined Department of Mechatronics, Institute of Mechanics in Sep. 2009 and became permanent researcher from Mar. 2010. Co-developed software for a prototype of welding robot. Developed a control law for the robot in the presence of singular configurations.

Dec. 2007 – Aug. 2009 **Graduate Researcher**, *Hanoi University of Science and Technology*, Vietnam.
Studied at Department of Applied Mechanics. Studied multibody system formalisms. Developed an algorithm for generating symbolic models of tree-topology multibody systems. Developed a formalism for multibody systems using null-space of Jacobian matrix.

Teaching Experience

Sep. 2013 – Jul. 2017 **Teaching Assistant**, *Seoul National University*, Korea.
(1) Control System I (Spring 2015, Spring 2016, Spring 2017)
(2) Control System II (Fall 2013, Fall 2014, Fall 2016)
(3) Robot Mechanics (Spring 2014, Spring 2016)