

YONG HOON LEE, Ph.D.

Postdoctoral Research Associate, Department of Industrial and Enterprise Systems Engineering
University of Illinois at Urbana-Champaign · 104 S. Mathews Ave. #406, Urbana, IL 61801
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EDUCATION

- **Ph.D.** *University of Illinois at Urbana-Champaign, Urbana, IL, USA* Aug 2020
Mechanical Engineering, Advisors: Dr. James T. Allison and Dr. Randy H. Ewoldt
“Methods for the integrated design of viscoelastic materials and structural geometry”
- **M.S.** *Ajou University, Suwon, South Korea* Aug 2010
Mechanical Engineering, Advisor: Dr. Yun-Ho Choi, Professor Emeritus
“A study on the application of Navier-Stokes equations to the unstructured grid system”
- **B.S.** *Ajou University, Suwon, South Korea* Aug 2008
Mechanical Engineering, Graduated with Honor

HONORS AND AWARDS

- **Mavis Future Faculty Fellows Academy: Mavis Fellow** Aug 2019 – May 2020
Grainger College of Engineering
University of Illinois at Urbana-Champaign, Urbana, IL
- **List of Teachers Ranked as Excellent by their Students** Dec 2019
SE 320: Control Systems
University of Illinois at Urbana-Champaign, Urbana, IL
- **2017 Journal of Mechanical Design Editor’s Choice Award:** Aug 2018
Honorable Mention Announced in DOI:10.1115/1.4041528
Yong Hoon Lee et al., *J. Mech. Design*, 139(5):053401, May 2017. DOI:10.1115/1.4036133
American Society of Mechanical Engineers (ASME)
- **2009 ATES Paper Contest for ANSYS Fluent Academic Users:** Aug 2009
Finalist Award
Yong Hoon Lee et al., In *ATES Paper Contest for ANSYS Fluent Academic Users* (Seoul, South Korea)
Advanced Technology Engineering Service (ATES)
- **Graduate College Travel Award and MechSE Schaller Travel Grant** Feb 2019
Yong Hoon Lee et al., In *Proceedings of the 13th WCSMO* (Beijing, China), May 2019.
Graduate College, Department of Mechanical Science and Engineering
University of Illinois at Urbana-Champaign

RESEARCH EXPERIENCE

- **Postdoctoral Research Associate** Engineering System Design Laboratory Jul 2020 – present
 - Technical lead for the projects involving development of multidisciplinary control co-design and its implementation for the floating offshore wind energy systems (Funding sources: two projects under ARPA-E: ATLANTIS program)
 - Technical advisory and mentoring role for graduate students working on the computational design of scramjet applications (Funding source: Center for Exascale-enabled Scramjet Design)
 - Project planning and proposal writing for the fundamental development in the modeling for design (NSF) and the hydrokinetic turbine multidisciplinary control co-design (ARPA-E)
 - Leading and mentoring graduate and undergraduate researchers in the Engineering System Design Laboratory

- **Research Assistant** Engineering System Design Laboratory Aug 2015 – Jul 2020
 Conducted dissertation research and other research projects funded by NSF CMMI-1463203: Design of Rheologically-Complex Soft Materials, CMMI-1653118: Integrated Design of Intelligent Structures with Tailored Distributed Damping, Engineering Research Center for Compact and Efficient Fluid Power (NSF EEC-0540834).
University of Illinois at Urbana-Champaign, Urbana, IL
- **CAE/CFD Research Engineer** Nuclear Energy Division Jun 2010 – Aug 2013
 Developed in-house CFD and thermal-hydraulic solvers (based on OpenFOAM in part). Conducted numerical simulations (fluids and structures) on spent nuclear fuel transport casks for design and safety analysis. Technical support in obtaining licenses from regulatory agencies (including US Nuclear Regulatory Commission and Korea Institute of Nuclear Safety).
Korea Nuclear Engineering and Services Corp., Seoul, South Korea
- **Student Researcher** Thermal Hydraulic Safety Research Division Sep 2008 – Sep 2009
 Developed large-break loss of coolant accident (LB-LOCA) simulation models for the 1-D and 3-D thermal hydraulic system code (SPACE) under development.
Korea Atomic Energy Research Institute, Daejeon, South Korea
- **Research Assistant** Computational Fluid Dynamics Laboratory Sep 2008 – Aug 2010
 Conducted research on developing a preconditioned Navier-Stokes equation solver for the unstructured grid system and all Mach-number flow. Conducted numerical studies on automotive HVAC systems, flow with ion transport, and flow instability at the low-Reynolds number as industry-supported projects.
Ajou University, Suwon, South Korea

TEACHING EXPERIENCE

- **Invited Lecture** Engineering Technology & Industrial Distribution Seminar Oct 2021
 Presented research on the system-level integrated and multidisciplinary design with floating offshore wind turbine and engineered materials applications at the graduate departmental seminar.
Texas A&M University, College Station, TX
- **Guest Instructions** SE 413 Engineering Design Optimization Apr 2017, Jan 2020
 – Spring 2020: Instructed two weeks of course lectures as a substitute instructor, regarding fundamentals of physical system modeling, design optimization, and mathematical theories.
 – Spring 2017: Developed a course curriculum regarding surrogate modeling, an educational computer code, and presented the developed course materials as a guest instructor.
University of Illinois at Urbana-Champaign, Urbana, IL
- **Teaching Assistant** Industrial and Enterprise Systems Engineering Aug 2019 – Dec 2019
 Instructed two laboratory sections, held office hours to assist students learning, and graded laboratory reports, exams, and homeworks of SE 320: Control Systems.
University of Illinois at Urbana-Champaign, Urbana, IL
- **Teaching Assistant** Mechanical Science and Engineering Jan 2019 – May 2019
 Instructed one laboratory section of ME 310: Fundamentals of Fluid Dynamics.
University of Illinois at Urbana-Champaign, Urbana, IL
- **Lecturer** Mechanical and Automotive Engineering Mar 2014 – Jun 2014
 Instructed Manufacturing Processes course as a primary instructor.
Masan University, Changwon, South Korea
- **Teaching Assistant** Mechanical Engineering Sep 2008 – Aug 2010
 Instructed one section of Engineering Drawing and Computer Aided Design (Fall 2008)
 Instructed laboratory sections of Computational Fluid Dynamics (Fall 2008, Fall 2009)
 Held office hours and graded homework in sections of Numerical Analysis (Spring 2009, Spring 2010)
Ajou University, Suwon, South Korea

PEER-REVIEWED JOURNAL ARTICLES

(✉ : Lee is the corresponding author)

5. Albert Patterson, Yong Hoon Lee, and James T. Allison, “Generation and enforcement of process-driven manufacturability constraints: A survey of methods and perspectives for product design”, **Journal of Mechanical Design**, 143(11), November 2021, pp.110801. DOI:10.1115/1.4050740
4. Yong Hoon Lee ✉, Jonathon K. Schuh, Randy H. Ewoldt, and James T. Allison, “Simultaneous design of non-Newtonian lubricant and surface texture using surrogate-based multiobjective optimization”, **Structural and Multidisciplinary Optimization**, 60(1), July 2019, pp.99-116. DOI:10.1007/s00158-019-02201-1
3. Jonathon K. Schuh, Yong Hoon Lee, James T. Allison, and Randy H. Ewoldt, “Design-driven modeling of surface-textured full-film lubricated sliding: Validation and rationale of nonstandard thrust observations”, **Tribology Letters**, 65(2), June 2017, pp.35. DOI:10.1007/s11249-017-0818-8
2. Yong Hoon Lee, Jonathon K. Schuh, Randy H. Ewoldt, and James T. Allison, “Enhancing full-film lubrication performance via arbitrary surface texture design”, **Journal of Mechanical Design**, 139(5), May 2017, pp.053401. DOI:10.1115/1.4036133 (**2017 Journal of Mechanical Design Editors’ Choice Award - Honorable Mention**)
1. Dong-Gyu Lee, Jea-Ho Park, Yong Hoon Lee, Chang-Yeol Baeg, and Hyung-Jin Kim, “Natural convection heat transfer characteristics in the canister with horizontal installation of dual purpose cask for spent nuclear fuel”, **Nuclear Engineering and Technology**, 45(7), December 2013, pp.969-978. DOI:10.5516/NET.06.2012.092

WORKING PAPERS (IN PREPARATION OR IN REVIEW STAGES)








(✉ : Lee is the corresponding author)

- (*) Yong Hoon Lee ✉ and James T. Allison, “Efficient sampling and implicit constraint management methods for multiobjective adaptive surrogate-based optimization”, (in review, full paper available as per request).
- (*) Saeid Bayat, Yong Hoon Lee ✉, and James T. Allison, “Nested control co-design for a horizontal-axis floating offshore wind turbine”, (in review, full paper available as per request)
- (*) Daniel R. Herber, Yong Hoon Lee, and James T. Allison, “Unified framework for solving general linear-quadratic dynamic optimization problems utilizing direct transcription and quadratic programming”, (in preparation, full paper available as per request).
- (*) Yong Hoon Lee ✉, Saeid Bayat, and James T. Allison, “Control co-design for a wind turbine using surrogate dynamic model based on linearized dynamic model data”, (in preparation, preliminary results available as per request).
- (*) Yong Hoon Lee ✉ and James T. Allison, “Integrating hydrostatic, hydrodynamic, and rigid-body dynamic models for the design of floating offshore vertical-axis wind turbine systems”, (in preparation, preliminary results available as per request).


ARTICLES IN CONFERENCE PROCEEDINGS

(🗨 : Lee is the presenting author)

14. Athul K. Sundarrajan, Yong Hoon Lee, James T. Allison, and Daniel R. Herber, “Open-loop control co-design of floating offshore wind turbines using linear parameter-varying models”, In *47th Design Automation Conference, ASME IDETC/CIE*, DETC2021-67573, August 2021, pp. 1-13. DOI:10.1115/DETC2021-67573 [FULL PROCEEDING PAPER]
13. Yong Hoon Lee 🗨, Sung Youn Boo, and James T. Allison, “A framework for integrating hydrostatics, hydrodynamics, and rigid-body dynamics for the control co-design of floating offshore vertical-axis wind turbine systems”, In *Wind Energy Science Conference*, May 2021. [EXTENDED ABSTRACT]
12. Saeid Bayat, Yong Hoon Lee, and James T. Allison, “Control co-design of horizontal floating offshore wind turbines using a simplified low order model”, In *Wind Energy Science Conference*, May 2021. [EXTENDED ABSTRACT]









11. Yong Hoon Lee , Vedant, Randy H. Ewoldt, and James T. Allison, “Strain-actuated solar arrays for spacecraft attitude control assisted by viscoelastic damping”, In *Advances in Structural and Multidisciplinary Optimization, Proceedings of the 13th World Congress of Structural and Multidisciplinary Optimization* (Beijing, China), X. Guo, H. Huang, Eds., Dalian: DUT E&AV Press, January 2020, pp.149-155. ISBN:978-7-89437-207-9 [FULL PROCEEDING PAPER]
10. Albert E. Patterson, Yong Hoon Lee , and James T. Allison, “Overview of the development and enforcement of process-driven manufacturability constraints in product design”, In *24th Design for Manufacturing and the Life Cycle Conference, ASME IDETC/CIE* (Anaheim, CA, USA), DETC2019-97384, August 2019, pp.1-11. doi:10.1115/DETC2019-97384 [FULL PROCEEDING PAPER]
9. Chendi Lin, Daniel R. Herber, Vedant, Yong Hoon Lee, Alexander R. M. Ghosh, Randy H. Ewoldt, and James T. Allison, “Attitude control system complexity reduction via tailored viscoelastic damping co-design”, In *AAS Guidance and Control Conference* (Breckenridge, CO, USA), AAS 18-103, February 2018, pp.1-13. [FULL PROCEEDING PAPER]
8. Yong Hoon Lee , Jonathon K. Schuh, Randy H. Ewoldt, and James T. Allison, “Simultaneous design of non-Newtonian lubricant and surface texture using surrogate-based optimization”, In *AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, AIAA SciTech Forum* (Kissimmee, FL, USA), AIAA 2018-1906, January 2018, pp.1-14. doi:10.2514/6.2018-1906 [FULL PROCEEDING PAPER]
7. Chendi Lin, Yong Hoon Lee, Jonathon K. Schuh, Randy H. Ewoldt, and James T. Allison, “Efficient optimal surface texture design using linearization”, In *Advances in Structural and Multidisciplinary Optimization, Proceedings of the 12th World Congress of Structural and Multidisciplinary Optimization* (Braunschweig, Germany), A. Schumacher, T. Vietor, S. Fiebig, K. U. Bletzinger, K. Maute, Eds., Cham: Springer, January 2018, pp.632-647. doi:10.1007/978-3-319-67988-4_48 [FULL PROCEEDING PAPER]
6. Yong Hoon Lee , R. E. Corman, Randy H. Ewoldt, and James T. Allison, “A multiobjective adaptive surrogate modeling-based optimization (MO-ASMO) framework using efficient sampling strategies”, In *43rd Design Automation Conference, ASME IDETC/CIE* (Cleveland, OH, USA), DETC2017-67541, August 2017, pp.V02BT03A023. doi:10.1115/DETC2017-67541 [FULL PROCEEDING PAPER]
5. Yong Hoon Lee , Jonathon K. Schuh, Randy H. Ewoldt, and James T. Allison, “Shape parameterization comparison for full-film lubrication texture design”, In *42nd Design Automation Conference, ASME IDETC/CIE* (Charlotte, NC, USA), DETC2016-60168, August 2016, pp.V02BT03A037. doi:10.1115/DETC2016-60168 [FULL PROCEEDING PAPER]
4. Dong-Gyu Lee, Yong Hoon Lee, Wi-Soo Jeong, and Jea-Ho Park, “Heat transfer analysis around transport cask under transport hood”, In *8th International Symposium on Radiation Safety Management* (Gyeongju, South Korea), November 2011. [FULL PROCEEDING PAPER]
3. Yong Hoon Lee , Jin-Won Seo, Jae-Hong Park, and Yun-Ho Choi, “Numerical study on performance assessment and installation conditions of an automotive air cleaner”, In *Korean Society for Computational Fluids Engineering Spring Conference* (Jeju, South Korea), 60115923, May 2010, pp.263-270. [FULL PROCEEDING PAPER]
2. Jin-Won Seo, Ji-Yeon Kim, Yong Hoon Lee, Yun-Ho Choi, Bongha Song, and Jongpaek Ha, “Numerical study for efficient air distribution in automotive HVAC system”, In *The Korean Society of Automotive Engineers (KSAE) Annual Conference and Exhibition* (Daejeon, South Korea), 76306949, November 2008, pp.594. [FULL PROCEEDING PAPER]
1. Yong Hoon Lee , Jin-Won Seo, and Yun-Ho Choi, “A study of the assessment process of the performance of automotive HVAC system using FLUENT”, In *ATES Paper Contest for ANSYS Fluent Academic Users* (Seoul, South Korea), September 2009. **(Finalist Award.)** [EXTENDED ABSTRACT]

INVITED LECTURE

1. Yong Hoon Lee , “System-level integrated and multidisciplinary design on floating offshore wind turbine and engineered materials applications”, In *Engineering Technology & Industrial Distribution Seminar*

Series (Departmental Seminar for Graduate Students), Texas A&M University, October 15, 2021, (slides and video available as per request). [ABSTRACT FLYER]

ABSTRACT-ONLY PRESENTATIONS AND POSTERS

13. Yong Hoon Lee , Vedant, and James T. Allison, “Computationally-efficient modeling and optimization of strain-actuated solar arrays with tailored viscoelastic damping for spacecraft attitude control”, In *AAS Guidance and Control Conference* (Breckenridge, CO, USA), February 2020. LINK: <http://hdl.handle.net/2142/106101>
12. Yong Hoon Lee , R. E. Corman, Randy H. Ewoldt, and James T. Allison, “Continuous relaxation spectra and its reduced-dimensionality descriptions for engineering design with linear viscoelasticity”, In *26th Symposium on Fluid Mechanics and Rheology of Nonlinear Materials and Complex Fluids, ASME 2019 IMECE* (Salt Lake City, UT, USA), IMECE2019-13370, November 2019.
11. Jonathon K. Schuh, Yong Hoon Lee, James T. Allison, and Randy H. Ewoldt, “Designing with non-linear viscoelastic fluids”, In *The 70th Annual Meeting of the American Physical Society - Division of Fluid Dynamics* (Denver, CO, USA), November 2017.
10. Jonathon K. Schuh, Yong Hoon Lee, James T. Allison, and Randy H. Ewoldt, “Toward co-design of surface textures and Non-Newtonian fluids for decreased friction in lubricated viscous sliding”, In *The Society of Rheology 89th Annual Meeting* (Denver, CO, USA), October 2017.
9. R. E. Corman, Yong Hoon Lee, James T. Allison, and Randy H. Ewoldt, “Selecting design-appropriate material descriptions for linear viscoelastic materials”, In *The Society of Rheology 89th Annual Meeting* (Denver, CO, USA), October 2017.
8. Jonathon K. Schuh, Yong Hoon Lee, James T. Allison, and Randy H. Ewoldt, “A validated computational model for the design of surface textures in full-film lubricated sliding”, In *The 69th Annual Meeting of the American Physical Society - Division of Fluid Dynamics* (Portland, OR, USA), November 2016.
7. Jonathon K. Schuh, Yong Hoon Lee, James T. Allison, and Randy H. Ewoldt, “Design appropriate modeling for determining optimal friction reduction with surface textures”, In *CCEFP Fluid Power Innovation & Research Conference* (Minneapolis, MN, USA), October 2016.
6. Yong Hoon Lee , Jonathon K. Schuh, Randy H. Ewoldt, and James T. Allison, “Generalization of surface texture shape reduces friction and increases load capacity simultaneously in sliding contact with full-film lubrication”, In *CCEFP Fluid Power Innovation & Research Conference* (Minneapolis, MN, USA), October 2016.
5. Jonathon K. Schuh , Yong Hoon Lee , James T. Allison, and Randy H. Ewoldt, “Rheological design for efficient fluid power”, In CCEFP Webinar Series, February 2016. *Schuh and Lee contributed equally and co-presented.*
4. Jonathon K. Schuh, Yong Hoon Lee, James T. Allison, and Randy H. Ewoldt, “Surface textures and non-newtonian fluids for decreasing friction in lubricated sliding contact”, In *CCEFP Fluid Power Innovation & Research Conference* (Minneapolis, MN, USA), October 2015.
3. Yong Hoon Lee , Duk Woon Jeong, and Jea Ho Park, “Preliminary design of a transport package for fresh fuels using LS-DYNA”, In *LS-DYNA Korea User Conference* (Seoul, South Korea), November 2012.
2. Yong Hoon Lee , “Thermal design technology for casks considering spent fuel burnup credit”, In *International Technical Seminar on SNF Storage and Transportation* (Daejeon, South Korea), November 2010.
1. Yong Hoon Lee , Dong-Gyu Lee, Jea-Ho Park, Tae-Man Kim, and Hyung-Jin Kim, “Thermal design technology for spent nuclear fuel transport cask”, In *Korea ANSYS User Conference* (Gyeongju, South Korea), September 2010.

TECHNICAL REPORT, COMPUTER CODES, AND OTHERS

9. Yong Hoon Lee and Saeid Bayat “Derivative function surrogate model-based control co-design of non-linear floating offshore wind turbine models”, 2021. <https://github.com/WEIS-UIUC-CSU/WEIS/tree/uiuc-dfsm>
8. Saeid Bayat and Yong Hoon Lee “Simplified low-order floating offshore wind turbine model-based control co-design implementation for WEIS”, 2021. <https://github.com/WEIS-UIUC-CSU/WEIS/tree/uiuc-proxy>
7. Yong Hoon Lee, “Integrated design analysis and optimization tool for floating offshore vertical-axis wind turbines”, 2020-2021. <https://github.com/FloatVAWT/FloatVAWT-CapytaineDriver>
6. Yong Hoon Lee, Daniel R. Herber, and Athul Krishna Sundarrajan, “Control co-design driver for linear OpenFAST wind turbine model”, 2020. https://github.com/WEIS-UIUC-CSU/FASTLin_DTQP_Driver
5. Tais Rocha Pereira, Albert Patterson, Yong Hoon Lee, and Sherri L. Messimer, “Critical buckling load of thin-walled plastic cylinders in axial and radial loading: overview and FEA case study”, engrXiv, August 2019. DOI:10.31224/osf.io/2mtfu
4. Yong Hoon Lee, “Multiobjective adaptive surrogate modeling-based optimization (MO-ASMO) toolbox II”, 2018. <https://github.com/yonghoonlee/MO-ASMO-II>
3. Yong Hoon Lee, “Multiobjective adaptive surrogate modeling-based optimization (MO-ASMO) toolbox I”, 2017. <https://github.com/yonghoonlee/MO-ASMO-I>
2. Daniel R. Herber, Yong Hoon Lee, and James T. Allison, “DT QP Project”, 2017. <https://github.com/danielrherber/dt-qp-project>
1. Yong Hoon Lee, “A Modular Code for Teaching Surrogate Modeling-Based Optimization”, 2017. <https://github.com/yonghoonlee/SMBO-TeachingTool>

SERVICES

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- **Community Outreach** *Yankee Ridge Elementary School, Urbana, IL* Apr 2017
Presented a hands-on demonstration of trebuchets with simulation and experimentation as a part of the Urbana School District Junior Scientist Day.
 - **Peer Review**

Wind Energy (Journal)	2021, 2022
Structural and Multidisciplinary Optimization (Journal)	2019, 2020, 2021
Journal of Mechanical Design (Journal)	2020
Advances in Tribology (Journal)	2020
Engineering Optimization (Journal)	2019, 2020
ASME Conference on Smart Materials, Adaptive Structures and Intelligent Systems	2019
ASME International Design Engineering Technical Conferences	2017, 2018
Engineering Computations (Journal)	2015
 - **Student Research Mentoring** *Engineering System Design Laboratory*
 - Undergraduate student researcher Sep 2021 – present
Development of baseline PID controllers for horizontal-axis wind turbines.
 - Master’s student researcher Jun 2021 – present
Development of a data-driven design optimization approach with a computationally-expensive simulation model for scramjet application. Co-authoring a paper regarding design optimization with time-dependent simulations based on partial differential equations.
 - Undergraduate student researcher Jun 2021 – Sep 2021
Development of a derivative function surrogate model using the floating offshore wind turbine model.
 - Undergraduate student researcher Jan 2021 – May 2021
Development of a model predictive control implementation for the floating offshore wind turbines.

- Undergraduate student researcher May 2020 – Apr 2021
Development of a simulation model for floating offshore wind turbines using OpenFAST.
- Undergraduate student researcher May 2020 – Aug 2020
Development of a model for distributed damping design and analysis.
- Undergraduate student researcher Dec 2019 – May 2020
Development of rotational damping mechanisms and their test bed.
- Two undergraduate student researchers Jan 2019 – Dec 2019
Textured surface specimen fabrication, finite element analysis, and experimental design of tribo-rheological measurement.
- Master’s student researcher May 2017 – Aug 2018
Development of a free-form generative design representation for CFD applications.
- Undergraduate student researcher May 2016 – May 2018
Formulating optimization problems with fluid dynamics and viscoelastic materials, guided to present research findings at international conferences.
- Master’s student researcher Jan 2016 – Dec 2016
Development of a free-form generative design representation for the static fluid mixer.

PROFESSIONAL SOCIETY MEMBERSHIPS

- Member, International Society for Structural and Multidisciplinary Optimization (ISSMO) 2019 – present
- Member, American Institute of Aeronautics and Astronautics (AIAA) 2017 – present
- Member, American Society of Mechanical Engineers (ASME) 2015 – present
- Student Member, Korean Society for Computational Fluids Engineering (KSCFE) 2010 – 2013