

Curriculum Vitae

Daniel R. Herber

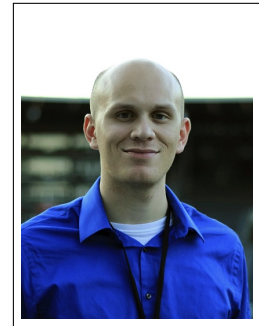
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Education

- 08/2014–Present *Ph.D.* candidate in *Systems and Entrepreneurial Engineering*, University of Illinois at Urbana-Champaign, GPA 3.83/4.00, Adviser—James T. Allison
- 8/2012–05/2014 *M.S.* in *Systems and Entrepreneurial Engineering*, University of Illinois at Urbana-Champaign, GPA 3.77/4.00, Adviser—James T. Allison
- 8/2008–12/2011 *B.S.* in *General Engineering*, Highest Honors, University of Illinois at Urbana-Champaign, GPA 3.81/4.00, Physics minor, Applied Statistics secondary field of concentration

Research Interests

- Methodology combined plant and control design (co-design) • co-design optimality conditions • scaling of dynamic optimization formulations • direct transcription • pseudospectral methods • modeling and simulation of dynamic systems • engineering design optimization • data-driven design optimization • multidisciplinary dynamic system design optimization • architecture design • graph enumeration
- Applications ocean wave energy conversion • hybrid powertrains • strain-actuated solar arrays • vehicle suspensions • electronic analog filter circuits

Research Experience

- 5/2016–7/2016 *Simulation & Analysis Intern*, Deere & Company, focusing on battery modeling and systems engineering projects.
- 5/2015–8/2015 *Simulation & Analysis Intern*, Deere & Company, researched methods to solve complex system architecture design problems focusing on hybrid powertrains and active suspensions.
- Various *Graduate Research Assistant*, Dept. of Industrial and Enterprise Systems Engineering, UIUC, appointment to work on various research projects, at least partially funded the following semesters: SP2013, FA2013, SP2014, FA2014, SP2015, FA2015, SP2016, FA2016, SP2017, FA2017.
- 1/2012–1/2014 *Research Intern*, John Deere Technology Innovation Center, Champaign, IL, developed a discrete event simulation of large-scale agricultural operations using MATLAB, SIMULINK, and R linked with agricultural environment simulations.
- 12/2011–Present *Graduate Member*, Engineering System Design Lab, UIUC.
- 9/2011–12/2011 *Undergraduate Member*, Engineering System Design Lab, UIUC, researched data-driven models of electric motors for use in engineering design optimization.

Teaching Experience

- FA2012, SP2016 *GE 312—Graduate Teaching Assistant*, Dept. of Industrial and Enterprise Systems Engineering, UIUC, duties included leading small groups on how to use the laboratory equipment, lecturing, and grading.

SP2015	<i>GE 598—Helper</i> , Dept. of Industrial and Enterprise Systems Engineering, UIUC, duties included lecturing on select days, curriculum development, and grading.
SP2014	<i>GE 413—Graduate Teaching Assistant</i> , Dept. of Industrial and Enterprise Systems Engineering, UIUC, duties included holding office hours, preparing course materials, and lecturing on select days.
FA2013	<i>GE 410—Graduate Teaching Assistant</i> , Dept. of Industrial and Enterprise Systems Engineering, UIUC, duties included holding office hours and lecturing on select days.
FA2011	<i>GE 410—Grader</i> , Dept. of Industrial and Enterprise Systems Engineering, UIUC, graded assignments and projects for the senior level mechanical component design course.
Various	<i>Undergraduate Project Adviser</i> , multiple student projects related to architectures with structured components, wave energy converters, hybrid powertrains, strain-actuated solar arrays, and trebuchet project. See link for one of the projects: http://tinyurl.com/Niu13a

Other Experience

10/2012–Present *Research Group IT Manager*, Engineering System Design Lab, UIUC, responsibilities include development and maintenance of the group website and computational resources.

Honors and Awards

8/2016	<i>List of Teachers Ranked as Excellent by Their Students Spring 2016</i> , based on student evaluations for position as a GE 312 teaching assistant.
5/2015	<i>JPL Research Poster Conference Award</i> , co-author on poster titled “Strain Actuation & Sensing of SC Structures for Payload Jitter Suppression and Momentum Dumping” presented at the Jet Propulsion Laboratory Research and Development poster session on Nov. 12, 2014.
4/2015	<i>Mavis Future Faculty Fellow</i> , selected as a MF3 Fellow for 2015–2016 whose program is designed to help doctoral students in the College of Engineering become the next generation of great engineering faculty.
3/2014	<i>Honorable Mention</i> , NSF Graduate Research Fellowship Program.
4/2013	<i>ISE Service Award</i> , given to recognize students who demonstrate leadership and commitment to the Dept. of Industrial and Enterprise Systems Engineering, UIUC.
3/2013	<i>Honorable Mention</i> , NSF Graduate Research Fellowship Program.
8/2012	<i>Best Technological Innovation</i> , given to an intern for the best technological innovation at the Research Park at UIUC, project with John Deere Technology Innovation Center.
1/2009–01/2012	<i>Dean’s List</i> , top 20% GPA in UIUC College of Engineering for all undergraduate semesters.
1/2009–12/2011	<i>James Scholar</i> , completion of UIUC College of Engineering honors program.

Service and Leadership

7/2014	<i>College for Kids Kamp Kaboom—Mechanics of Trebuchets</i> , helped organize and run a 6 hour event demonstrating engineering principles to elementary school students.
4/2013–2017	<i>Junior Scientist Day—Mechanics of Trebuchets</i> , helped organize and run a science fair-like exhibit demonstrating engineering principles to elementary school students using trebuchets.
3/2013–2014	<i>Engineering Open House—Mechanics of Trebuchets</i> , helped organize and run a science fair exhibit demonstrating engineering principles to K-12 students.

- Fall 2012–2014 *GE 100—Student Helper*, Dept. of Industrial and Enterprise Systems Engineering, UIUC, assisted with the design and instruction of trebuchet introductory project.
- 4/2012–Present *Peer Reviewer*, reviewed various journal articles and conference proceedings.

Professional Memberships

- 3/2012–Present American Society of Mechanical Engineers, student member
- 8/2012–Present American Institute of Aeronautics and Astronautics, student member

Select Coursework

IE513: Optimal System Design · GE598: Compliant Mechanism Design · GE524: Data-Based Systems Modeling · GE423: Mechatronics · IE400: Design & Analysis of Experiments · IE431: Quality Engineering · GE598: Engineering Design Science · IE598: Advanced Topics in Continuous Optimization

ECE515 Control System Theory & Design · ECE553 Optimum Control Systems · GE525: Control of Complex Systems · ECE528: Analysis of Nonlinear Systems · ECE517: Nonlinear and Adaptive Control · ME561: Convex Methods in Control

CS450: Numerical Analysis · MATH558: Methods of Applied Mathematics · GE400: Engineering Law · STAT420: Methods of Applied Statistics · ENG598: Creativity, Innovation, Vision

Programming Languages

- Advanced matlab · simscape · \LaTeX · markdown
- Dabbled python · C · R · php · html/css


Profiles

- Google Scholar, 126 citations. <http://tinyurl.com/DRHgooglescholar>
- ResearchGate. https://www.researchgate.net/profile/Daniel_Herber
- Matlab Central. <http://tinyurl.com/DRHmatlabcentral>
- GitHub. <http://tinyurl.com/DRHgithub>
- LinkedIn. <http://tinyurl.com/DRHlinkedin>
- Engineering System Design Lab. <http://tinyurl.com/DRHesdl>
- ORCID (0000-0003-4995-7375) <https://orcid.org/0000-0003-4995-7375>

Media





- CAPSat: Undergrad students prepare to launch a satellite (<http://ise.illinois.edu/newsroom/article/capsat>)
- Dan Herber wins Mavis Future Faculty Fellow (<http://ise.illinois.edu/newsroom/article/dan-herber-wins-mavis-future-faculty-fellow>)
- Interns have much to gain at Research Park (<https://dailyillini.com/uncategorized/2012/08/23/interns-have-much-to-gain-at-research-park/>)
- Research Park honors most valuable interns of 2012 (<http://www.researchpark.illinois.edu/news/research-park-honors-most-valuable-interns-2012>)

Publications—Unpublished

- * [D. R. Herber](#) and J. T. Allison, *Enhancements to the Perfect Matching-based Tree Algorithm for Generating Architectures*, preprint-v2,
 <http://systemdesign.illinois.edu/publications/Her17d.pdf>






- * J. T. Allison, C. Lin, Vedant, Y. H. Lee, D. R. Herber, A. Ghosh, and R. H. Ewoldt, *Attitude Control System Complexity Reduction via Tailored Viscoelastic Damping Co-Design*, (to appear) in AAS Guidance & Control Conference, Feb. 2018

Publications—Journal Articles




- $\mathcal{J}4$ C. M. Chilan, D. R. Herber, Y. K. Nakka, S.-J. Chung, J. T. Allison, J. B. Aldrich, and O. S. Alvarez-Salazar, “Co-Design of Strain-Actuated Solar Arrays for Spacecraft Precision Pointing and Jitter Reduction,” *AIAA Journal*, vol. 55, no. 9, pp. 3180–3195, Sep. 2017. doi: 10.2514/1.J055748,
 <http://systemdesign.illinois.edu/publications/Chilan2017a.pdf>
- $\mathcal{J}3$ D. R. Herber, T. Guo, and J. T. Allison, “Enumeration of Architectures with Perfect Matchings,” *ASME Journal of Mechanical Design*, vol. 139, no. 5, p. 051403, May 2017. doi: 10.1115/1.4036132,
 <http://systemdesign.illinois.edu/publications/Her17a.pdf>
- $\mathcal{J}2$ D. R. Herber, A. P. Deshmukh, M. E. Mitchell, and J. T. Allison, “Project-Based Curriculum for Teaching Analytical Design to Freshman Engineering Students via Reconfigurable Trebuchets,” *Education Sciences*, vol. 6, no. 1, Feb. 2016. doi: 10.3390/educsci6010007,
 <http://systemdesign.illinois.edu/publications/Her16a.pdf>
- $\mathcal{J}1$ J. T. Allison and D. R. Herber, “Multidisciplinary Design Optimization of Dynamic Engineering Systems,” *AIAA Journal*, vol. 52, no. 4, pp. 691–710, Apr. 2014. doi: 10.2514/1.J052182,
 <http://systemdesign.illinois.edu/publications/All14a.pdf>
—Special Section on Multidisciplinary Design Optimization—

Publications—Conference Proceedings

- $\mathcal{C}10$ D. R. Herber and J. T. Allison, “Unified Scaling of Dynamic Optimization Design Formulations,” in *ASME International Design Engineering Technical Conferences*, Cleveland, OH, USA, Aug. 2017, V02AT03A003. doi: 10.1115/DETC2017-67676,
 <http://systemdesign.illinois.edu/publications/Her17c.pdf>
- $\mathcal{C}9$ D. R. Herber and J. T. Allison, “Nested and Simultaneous Solution Strategies for General Combined Plant and Controller Design Problems,” in *ASME International Design Engineering Technical Conferences*, Cleveland, OH, USA, Aug. 2017, V02AT03A002. doi: 10.1115/DETC2017-67668,
 <http://systemdesign.illinois.edu/publications/Her17b.pdf>
- $\mathcal{C}8$ D. R. Herber, T. Guo, and J. T. Allison, “Enumeration of Architectures with Perfect Matchings,” in *ASME International Design Engineering Technical Conferences*, Charlotte, NC, USA, Aug. 2016, V02AT03A005. doi: 10.1115/DETC2016-60212,
 <http://systemdesign.illinois.edu/publications/Her16b.pdf>
- $\mathcal{C}7$ C. M. Chilan, D. R. Herber, Y. K. Nakka, S.-J. Chung, J. T. Allison, J. B. Aldrich, and O. S. Alvarez-Salazar, “Co-Design of Strain-Actuated Solar Arrays for Precision Pointing and Jitter Reduction,” in *AIAA Science and Technology Forum and Exposition*, San Diego, CA, USA, Jan. 2016. doi: 10.2514/6.2016-0162,
 <http://systemdesign.illinois.edu/publications/Chi16a.pdf>
- $\mathcal{C}6$ J. T. Allison, D. R. Herber, and A. P. Deshmukh, “Integrated Design of Dynamic Sustainable Energy Systems,” in *International Conference on Engineering Design*, vol. 1, Milan, Italy, Jul. 2015, pp. 299–308,
 <http://systemdesign.illinois.edu/publications/All15a.pdf>

- C5 A. P. Deshmukh, D. R. Herber, and J. T. Allison, “Bridging the Gap between Open-Loop and Closed-Loop Control in Co-Design: A Framework for Complete Optimal Plant and Control Architecture Design,” in *American Control Conference*, Chicago, IL, USA, Jul. 2015, pp. 4916–4922. doi: 10.1109/ACC.2015.7172104,
 <http://systemdesign.illinois.edu/publications/Des15a.pdf>
- C4 D. R. Herber, J. W. McDonald, O. S. Alvarez-Salazar, G. Krishnan, and J. T. Allison, “Reducing Spacecraft Jitter During Satellite Reorientation Maneuvers via Solar Array Dynamics,” in *AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Atlanta, GA, USA, Jun. 2014, pp. 1–17. doi: 10.2514/6.2014-3278,
 <http://systemdesign.illinois.edu/publications/Her14c.pdf>
- C3 D. R. Herber and J. T. Allison, “Wave Energy Extraction Maximization in Irregular Ocean Waves using Pseudospectral Methods,” in *ASME International Design Engineering Technical Conferences*, Portland, OR, USA, Aug. 2013, V03AT03A018. doi: 10.1115/DETC2013-12600,
 <http://systemdesign.illinois.edu/publications/Her13a.pdf>
—Nominated for the Design Automation Committee Best Paper Award—
- C2 J. T. Allison and D. R. Herber, “Multidisciplinary Design Optimization of Dynamic Engineering Systems,” in *AIAA Multidisciplinary Design Optimization Specialist Conference*, Boston, MA, USA, Apr. 2013, pp. 1–30. doi: 10.2514/6.2013-1462,
 <http://systemdesign.illinois.edu/publications/All13a.pdf>
- C1 J. T. Allison, A. Kaitharath, and D. R. Herber, “Wave Energy Extraction Maximization Using Direct Transcription,” in *ASME International Mechanical Engineering Congress and Exposition*, Houston, TX, USA, Nov. 2012, pp. 485–495. doi: 10.1115/IMECE2012-86619,
 <http://systemdesign.illinois.edu/publications/All12c.pdf>

Publications—Other

- O3 D. R. Herber, “Basic Implementation of Multiple-Interval Pseudospectral Methods to Solve Optimal Control Problems,” Engineering System Design Lab, Urbana, IL, USA, Technical Report UIUC-ESDL-2015-01, Jun. 2015. url: <http://hdl.handle.net/2142/77888>,
 <http://systemdesign.illinois.edu/publications/Her15a.pdf>
- O2 D. R. Herber, “Solving Optimal Control Problems using Simscape Models for State Derivatives,” Engineering System Design Lab, Urbana, IL, USA, Technical Report UIUC-ESDL-2014-01, Jul. 2014. url: <http://hdl.handle.net/2142/50015>,
 <http://systemdesign.illinois.edu/publications/Her14b.pdf>
- O1 D. R. Herber, “Dynamic System Design Optimization of Wave Energy Converters Utilizing Direct Transcription,” M.S. Thesis, University of Illinois at Urbana-Champaign, Urbana, IL, USA, May 2014. url: <http://hdl.handle.net/2142/49463>,
 <http://systemdesign.illinois.edu/publications/Her14a.pdf>

Presentations

- P7 Presenting author for C10 at the ASME International Design Engineering Technical Conference, Cleveland, OH, USA, Aug. 6–9 2017.
- P6 Presenting author for C9 at the ASME International Design Engineering Technical Conference, Cleveland, OH, USA, Aug. 6–9 2017.
- P5 Presenting author for C8 at the ASME International Design Engineering Technical Conference, Charlotte, NC, USA, Aug. 21–24 2016.

- $\mathcal{P}4$ Presenting author for $\mathcal{C}5$ at the American Control Conference, Chicago, IL, USA, July 1–3 2015.
- $\mathcal{P}3$ Presenting author for $\mathcal{C}4$ at the AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, Atlanta, GA, USA, June 16–20 2014.
- $\mathcal{P}2$ Presenting author for $\mathcal{C}3$ at the ASME International Design Engineering Technical Conference, Portland, OR, USA, Aug. 4–7 2013.
- $\mathcal{P}1$ Presenting author for $\mathcal{C}1$ at the ASME International Mechanical Engineering Congress & Exposition, Houston, TX, USA, Nov. 9–15 2012

Champaign, Illinois. November 7, 2017