

*Curriculum Vitae*

**James T. Allison**

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**Areas of Interest**

- Research            Design optimization of engineering systems; design for energy efficiency; multidisciplinary design optimization; electric and hybrid electric vehicle design; renewable energy systems; product family design; engineering aspects of mountaineering.
- Teaching            Courses in design optimization, system optimization, and engineering design at all levels. Design for energy efficiency. Also, numerical methods; automotive design; modeling and engineering analysis, such as solid mechanics, dynamics, and vibrations.

**Education**

- Ph.D.                Mechanical Engineering, University of Michigan, April 2008.  
Dissertation Title: *Optimal Partitioning and Coordination Decisions in Decomposition-based Design Optimization*.  
Dissertation Chair: Professor Panos Y. Papalambros  
Passed final defense 12/13/2007, degree conferral 4/25/2008.
- M.S.E.                Industrial and Operations Engineering, University of Michigan, December 2005.
- M.S.E.                Mechanical Engineering, University of Michigan, December 2004.
- B.S.                  Mechanical Engineering, Magna Cum Laude, University of Utah, May 2003.
- A.A.S.                Automotive Technology, High Honors, Weber State University, December 1998.

**Industry and Design Experience**

- 7/2008—Present    Senior Applications Engineer, Advanced Support Group, MathWorks Inc., Natick MA
- 2/2008—7/2008    Consulting Engineer, V Engine Design, Ford Motor Co., Dearborn, MI
- 1/2005—2/2006    Research Assistant, Hybrid Powertrain Systems, General Motors, Troy MI
- 4/2003—8/2003    Contract Mechanical Designer, Univ. of Utah Environmental Fluid Dynamics Laboratory
- 9/2000—6/2003    Mechanical Designer, Assistant Lab Engineer, Univ. of Utah Dept. of Chemical Engineering

**Research Experience**

- 2/2008—7/2008    Postdoctoral Research Fellow, University of Michigan Optimal Design Laboratory
- 9/2003—1/2008    Graduate Student Research Assistant, University of Michigan Optimal Design Laboratory
- 4/2002—8/2002    Undergraduate Research Assistant, University of Utah

**Teaching and Mentorship Experience**

- 5/2010—Present    Developing and teaching ME 149, a graduate course on engineering system design optimization; Tufts University, Department of Mechanical Engineering
- 7/2008—Present    Mentored early career engineers, supervised research projects; MathWorks, Inc.

- 1/2005—4/2008 Guest instructor ME 555, graduate design optimization course; University of Michigan.
- 1/2005—7/2008 Mentored and advised students at undergraduate, masters, and Ph.D. levels; University of Michigan.
- 1/2000—6/2003 Tutored undergraduate students, as individuals and in groups, in science, engineering, and math courses; University of Utah.

### Management and Technician Experience

- 9/1999—9/2000 Quality Assurance Manager, Petersen Motor Co., Ogden Utah
- 2/1999—9/1999 Assistant Service Manager, Petersen Motor Co., Ogden Utah
- 6/1994—6/1996 Automotive Technician, Kaysville and Ogden Utah

### Service and Leadership

- 12/2010 NSF grant review panelist
- 8/2010—Present Session organizer for design for energy efficiency and multidisciplinary design optimization sessions, 2011 ASME Design Engineering Technical Conference, Washington D.C.
- 3/2010—8/2010 Sponsor speaker and technical judge, mechanisms and robotics competition, 2010 ASME Design Engineering Technical Conference, Montreal, Quebec, Canada
- 1/2010—Present Technical Lead, MathWorks sponsorship of the 2010 American Solar Challenge
- 1/2010—Present Industrial Advisory Board Member, Benjamin Franklin Inst. of Tech., Boston MA
- 9/2009—8/2010 Session organizer and Chair for design for energy efficiency and multidisciplinary design optimization, 2010 ASME Design Engineering Technical Conference, Montreal, Quebec, Canada
- 2/2009—8/2009 Session organizer for multidisciplinary design optimization and decomposition-based design, 2009 ASME Design Engineering Technical Conference, San Diego California
- 2/2008—8/2008 Co-chair of multidisciplinary design optimization session, 2008 ASME Design Engineering Technical Conference, Brooklyn New York
- 7/2007—11/2007 Co-chair of engineering design technical session, University of Michigan College of Engineering Graduate Student Symposium
- 1/2004—Present Peer reviewer for Engineering Optimization, Structural and Multidisciplinary Optimization, ASME Journal of Mechanical Design, International Journal for Numerical Methods in Engineering, European Journal of Operational Research, International Journal of Production Economics, Management Science, Mathematics and Computers in Simulation, International Journal of Vehicle Design.
- 1/2002—7/2003 President and Founder of the Utah Solar Vehicle Design Team
- 9/1999—9/2000 Analyzed business practices and developed and implemented the total quality management program at Petersen Motor Co., Ogden Utah.
- 6/1996—6/1998 Full time volunteer teaching, training, service work in England.

### Honors and Awards

- 2007 1<sup>st</sup> place oral presentation and 2<sup>nd</sup> place poster, University of Michigan College of Engineering Graduate Student Symposium (engineering design session)
- 2007 Nominated for the ISSMO/Springer Prize, young investigator award
- 2004—2007 National Science Foundation Graduate Research Fellow
- 2002 Member Tau Beta Pi, Engineering Honor Society

2001	Member Pi Tau Sigma, Mechanical Engineering Honor Society
1999	Member Phi Kappa Phi, Collegiate Honor Society

### Professional Memberships

- American Society of Mechanical Engineers
- Society of Automotive Engineers
- International Society for Structural and Multidisciplinary Optimization
- American Institute of Aeronautics and Astronautics
- American Society for Engineering Education

### Publications—Journal Articles

- 1 M.J. Alexander, J.T. Allison, and P.Y. Papalambros. *Decomposition-based Design Optimization of Electric Vehicle Powertrains Using Proper Orthogonal Decomposition*. International Journal of Powertrains (in review).
- 2 M.J. Alexander, J.T. Allison, and P.Y. Papalambros. *Reduced Representations of Vector-Valued Coupling Variables in Decomposition-based Design Optimization*. Structural and Multidisciplinary Optimization (in review).
- 3 J.T. Allison and P.Y. Papalambros. *Consistency Constraint Allocation in Augmented Lagrangian Coordination*. ASME Journal of Mechanical Design, Vol 132, No. 7, 2010.  
<http://ode.engin.umich.edu/publications/PapalambrosPapers/2010/254JMD.pdf>
- 4 J.T. Allison, M. Kokkolaras, and P.Y. Papalambros. *Optimal Partitioning and Coordination Decisions in Decomposition-based Design Optimization*. ASME Journal of Mechanical Design, Vol. 131, No. 8, 2009.  
<http://ode.engin.umich.edu/publications/PapalambrosPapers/2009/239JMD.pdf>
- 5 J.T. Allison, M. Kokkolaras, and P.Y. Papalambros. *On Selection of Single-Level Formulations for Complex System Design Optimization*. ASME Journal of Mechanical Design, Vol. 129, No. 9, 2007, pp. 898-906.  
<http://ode.engin.umich.edu/publications/PapalambrosPapers/2007/232.pdf>

### Publications—Conference Proceedings

- 1 J.T. Allison and S. Nazari. *Combined Plant and Controller Design Using Decomposition-Based Design Optimization and the Minimum Principle*. In the Proceedings of the 2010 ASME Design Engineering Technical Conference DETC2010-28887. ASME, Aug. 15–Aug. 18 2010.  
<http://www.umich.edu/~jtalliso/publications/All10b.pdf>
- 2 E. MacDonald, K. Whitefoot, J.T. Allison, P.Y. Papalambros, and R. Gonzalez. *An Investigation of Sustainability, Preference, and Profitability in Design Optimization*. In the Proceedings of the 2010 ASME Design Engineering Technical Conference DETC2010-28887. ASME, Aug. 15–Aug. 18 2010.  
<http://www.umich.edu/~jtalliso/publications/Mac10a.pdf>
- 3 M.J. Alexander, J.T. Allison, P.Y. Papalambros, and D.J. Gorsich. *Constraint Management of Reduced Representation Variables in Decomposition-Based Design Optimization*. In the Proceedings of the 2010 ASME Design Engineering Technical Conference DETC2010-28887. ASME, Aug. 15–Aug. 18 2010.  
<http://ode.engin.umich.edu/publications/PapalambrosPapers/2010/277.pdf>
- 4 M.J. Alexander, J.T. Allison, and P.Y. Papalambros. *Reduced Representations of Vector-Valued Coupling Variables in Decomposition-Based Design Optimization*. In the Proceedings of the 8th World Congress on Structural and Multidisciplinary Optimization, Lisbon, Portugal, June 1–5, 2009.

- <http://ode.engin.umich.edu/publications/PapalambrosPapers/2009/265.pdf>
- 5 J.T. Allison and P.Y. Papalambros. *Consistency Constraint Allocation in Augmented Lagrangian Coordination*. In the Proceedings of the 2008 ASME Design Engineering Technical Conference DETC2008-49823. ASME, Aug. 3–Aug. 6 2008. See also journal publication [3] above.  
<http://ode.engin.umich.edu/publications/PapalambrosPapers/2008/254.pdf>
  - 6 J.T. Allison, M. Kokkolaras, and P.Y. Papalambros. *Optimal Partitioning and Coordination Decisions in Decomposition-based Design Optimization*. In the Proceedings of the 2007 Design Engineering Technical Conference DETC2007-34698. ASME, Sept. 4–Sept 7 2007. See also journal publication [4] above.  
<http://ode.engin.umich.edu/publications/PapalambrosPapers/2007/239.pdf>
  - 7 J.T. Allison and P.Y. Papalambros. *Optimal Partitioning and Coordination Decisions in System Design Using an Evolutionary Algorithm*. In the Proceedings of the 7th World Conference on Structural and Multidisciplinary Optimization, May 21–May 25 2007.  
<http://ode.engin.umich.edu/publications/PapalambrosPapers/2007/240.pdf>
  - 8 B. Sohns, J.T. Allison, H. Fathy, and J.L. Stein. *Efficient Parameterization of Large-Scale Dynamic Models Through the Use of Activity Analysis*. In the Proceedings of the 2006 ASME International Mechanical Engineering Congress and Exposition, Chicago, IL, Nov 5-10 2006.  
<http://www-personal.umich.edu/~jtalliso/publications/Soh06.pdf>
  - 9 J.T. Allison, B. Roth, M. Kokkolaras, I. Kroo, and P.Y. Papalambros. *Aircraft Family Design Using Decomposition-Based Methods*. In the Proceedings of the 11th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, Portsmouth, Virginia, Sept. 6-8 2006.  
<http://ode.engin.umich.edu/publications/PapalambrosPapers/2006/234.pdf>
  - 10 J.T. Allison, D. Walsh, M. Kokkolaras, P.Y. Papalambros, and M. Cartmell. *Analytical Target Cascading in Aircraft Design*. In the Proceedings of the 44th AIAA Aerospace Sciences Meeting and Exhibit AIAA-2006-1326. AIAA, January 9-12 2006.  
<http://ode.engin.umich.edu/publications/PapalambrosPapers/2006/227.pdf>
  - 11 J.T. Allison, M. Kokkolaras, and P.Y. Papalambros. *On the Impact of Coupling Strength on Complex System Optimization for Single-Level Formulations*. In the Proceedings of the ASME Design Engineering Technical Conference DETC2005-84790. ASME, Sept. 24–Sept 28 2005. See also journal publication [5] above.  
<http://ode.engin.umich.edu/publications/PapalambrosPapers/2005/212.pdf>
  - 12 J.T. Allison, M. Kokkolaras, M. Zawislak, and P.Y. Papalambros. *On the Use of Analytical Target Cascading and Collaborative Optimization for Complex System Design*. In the Proceedings of the 6th World Conference on Structural and Multidisciplinary Optimization, May 30–June 3 2005.  
<http://ode.engin.umich.edu/publications/PapalambrosPapers/2005/217.pdf>

## Other Publications

- 1 J.T. Allison. *Optimal Partitioning and Coordination Decisions in Decomposition-based Design Optimization*. Ph.D. dissertation, Department of Mechanical Engineering, University of Michigan, 2008.
- 2 J.T. Allison *Design Optimization Model for an Automotive Electric Water Pump*. Technical Report, University of Michigan, Optimal Design Laboratory, 2007.  
<http://ode.engin.umich.edu/repository/TR2007.Allison.pdf>
- 3 B. Sohns, J.T. Allison, H. Fathy, and J.L. Stein. *Parameterization of a HMMWV Model Through the Use of Model Validation Techniques*. In the Society of Automotive Engineers World Congress, Detroit, MI, April 3-7, 2006. (presentation only)

- 4 J.T. Allison, P.Y. Papalambros. *Practical Advances in Optimal System Design*. Graduate Student Symposium, University of Michigan, October 29th 2005, Ann Arbor, MI, USA. (poster and presentation)
- 5 J.T. Allison. *Complex System Optimization: A Review of Analytical Target Cascading, Collaborative Optimization, and Other Formulations*. Masters thesis, Department of Mechanical Engineering, University of Michigan, 2004.

Natick Massachusetts, November 6, 2010