

# Kurt Maute

## Curriculum Vitae

February 1, 2020

Professor  
Palmer Endowed Chair  
Ann and H.J. Smead Department of Aerospace Engineering Sciences  
Department of Mechanical Engineering, by courtesy  
University of Colorado Boulder  
Boulder, CO 80309-0429

### Education

Ph.D.        1998    University of Stuttgart, Germany, Civil Engineering, thesis advisor: E. Ramm  
B.S./M.S.   1992    University of Stuttgart, Germany, Aerospace Engineering

### Appointments

since 2019    *Associate Chair for Curriculum Advancement*, Department of Aerospace Engineering Sciences, University of Colorado Boulder  
since 2012    *Professor*, Department of Aerospace Engineering Sciences, University of Colorado Boulder  
2011-2014    *Associate Dean for Research*, College of Engineering and Applied Science, University of Colorado Boulder  
2010-2011    *Associate Chair for Undergraduate Studies*, Department of Aerospace Engineering Sciences, University of Colorado Boulder  
2008-2018    *Director*, Center for Aerospace Structures, University of Colorado Boulder  
2006-2012    *Associate Professor*, Department of Aerospace Engineering Sciences, University of Colorado Boulder  
2000-2006    *Assistant Professor*, Department of Aerospace Engineering Sciences, University of Colorado Boulder  
1998-1999    *Post-doctoral Research Associate*, Department of Aerospace Engineering Sciences, University of Colorado Boulder  
1992-1998    *Research Assistant*, Institute of Structural Mechanics, University of Stuttgart, Germany

### Research Areas

- Design optimization of structural and coupled multi-physics problems
- Topology and shape optimization
- Reliability and stochastic analysis, design optimization under uncertainty
- Computational mechanics of structural and coupled multi-physics problems
- Parameter sensitivity analysis, Reduced order modeling
- Numerical methods for analysis and optimization of large-scale problems
- Design of aerospace structures, smart structures and active materials

## Teaching Areas

- Structural and computational mechanics
- Structural dynamics
- Aeroelasticity
- Engineering design
- Computational design optimization methods

## Selected Research Projects

1. *Design Analysis Methodology for Topology Optimization of Thermally Loaded Structures*. DOD STTR, 2017-2018.
2. *Adaptive Multi-Resolution Design Optimization Framework*. DARPA, Co-PI: A. Doostan, 2017-2020.
3. *Structural topology and shape optimization, solution limitations as a result of element definition and the exploration of methods that can exploit additive manufactured shapes*. Industry, 2017-2018.
4. *Multifunctional Devices Enabled by 4D Hybrid Printing*. AFOSR, Co-PI: J. Qi (PI, Georgia Tech.), 2016-2019.
5. *Collaborative Research: Design of Active Composites Enabled by 3D Printing*. NSF, 2015-2018.
6. *Material with Tunable Constitution for Elastodynamic Deformation*, NSF, Co-PI: M. Hussein (PI), 2015-2018.
7. *Topology Optimization for Advanced Applications*. Industry, 2015.
8. *Level Set Topology Optimization for Contact Problems*. DOE/SNL, 2015-2019.
9. *High-performance In-situ Dust Analyzer*, NASA, Co-PIs: Z. Sternovski (PI), E. Grün, M. Horanyi, S. Kempf, 2013-2016.
10. *3D Printed Composites for Topology-Transforming Multifunctional Devices*, AFOSR, Co-PIs: J. Qi, M. Dunn, 2014-2016.
11. *Electrochemical/Mechanical Model of Li-ion Battery Pouch Cell*, NREL, 2013.
12. *Surface Micro-Patterning and Material Design to Enable in vivo Mobility*, NSF, Co-PIs: M. Rentschler (PI), 2012–2014.
13. *SNM: Roll-to-Roll Atomic/Molecular Layer Deposition*, NSF, Co-PIs: YC. Lee (PI), S. George, and P.R. Pagilla, 2012–2015.
14. *SEP: A Lab-to-Market Paradigm for the Optimal Design of Sustainable Energy Storage Materials*, NSF, Co-PIs: S.-H. Lee (PI), J. Milford, N. Moyen, and C. Stoldt, 2012–2015.
15. *EFRI-ODISSEI: Photo Origami*, NSF, J. Qi (PI), R. McLeod, P. Mather, and B. Stade, 2012–2015.
16. *A decomposition approach for rigorous treatment of uncertainty in manufacturing and design*, NSF, Co-PIs: A. Doostan, 2012–2015.
17. *EFRI-SEED: Living Wall Materials and Systems for Automatic Building Thermo-Regulation*, NSF, Co-PIs: J. Zhai (PI), Y. Ding, J. Qi, F. Andreas, 2010–2014.
18. *Modeling, Simulation and Design of Fluid-Matrix Composites*, CU Seed Grant, 2010.
19. *Tethered Coulomb Structure*, Co-Pi: H. Schaub (PI), 2009.

20. *Wind Turbine Drivetrain, Blade and Field Testing*, NREL, Co-PIs: S. Palo, 2008–2010.
21. *A Design Tool for Nanostructures with Tunable Thermal Properties*, AFOSR, Co-PIs: R. Yang (PI), M.L. Dunn, 2008–2010.
22. *A Design-Centered Approach to Nano-Engineering*, NSF, Co-PIs: M.L. Dunn, R. Yang, 2007–2010.
23. *Immersive Digital Design and Teaching Environment for Fluid Dynamics*, CU-EEF, Co-PIs: G. Pingen, 2007–2008.
24. *STTR - SMA flight control surfaces – Phase I & II*, ONR, 2005–2010.
25. *MURI: Energy Harvesting and Storage Systems for Air Force Aerovehicles*, AFOSR, Co-PIs: M.L. Dunn (PI), R. Yang, 2006–2010.
26. *STTR: Adaptive Skin-Stiffener Interconnects for Shape-Changing Vehicles – Phase I*, AFOSR, Co-PIs: J. Qi (PI), M.L. Dunn, 2006–2007.
27. *Design of Phononic Micro/ Nanostructures for Harsh Environment Device Technology*, AFOSR, Co-PIs: M.L. Dunn (PI), 2005–2007.
28. *Morphing at Large Stress and Strain through Electrochemical Actuation And Tailored Structural Design*, DARPA, Co-PIs: M.L. Dunn, R. Noble, C. Koval, 2004–2006.
29. *CAREER: A Biomimetic Approach to the Design of Shape-Controlled System*, NSF, 2004–2010.
30. *Adhesive Nanostructures*, NSF, Co-PIs: M.L. Dunn (PI), K. Stoldt, 2004–2005.
31. *Life-Cycle Reliability Analysis and Optimization of Microsystems*, NSF, Co-PIs: D. Frangopol, 2003–2006.
32. *Methodologies for Predicting and Testing the Effects of Combat Damage on Flight Envelopes*, AFOSR, Co-PIs: C. Farhat, P. Geuzaine, 2003–2005.
33. *Supersonic Aircraft Shaping Technology for a Constrained Shock Pressure Rise*, NASA, Co-PIs: C. Farhat (PI), B. Argrow, 2002 – 2003.
34. *Topology Optimization for the Design of 3-D Microelectromechanical Systems (MEMS) Undergoing Coupled Multiphysics Phenomena*, AFOSR, Co-PIs: M.L. Dunn (PI), V. Bright, 2002–2004.
35. *Novel SiCN Ceramics for Health Monitoring of High Temperature Systems*, AFOSR, Co-PIs: R. Raj (PI), D. Frangopol, 2001–2003.

## Teaching and Mentoring

Undergraduate courses taught at CU Boulder since 2000:

Course Number	Title
ASEN1022	<i>Material Science for Aerospace Engineers</i>
ASEN2001	<i>Statics, Materials, and Structures</i>
ASEN3112	<i>Structures</i>
ASEN4338	<i>Computer Analysis of Structures</i>
ASEN4018	<i>Senior Design - Design Synthesis</i>
ASEN4028	<i>Senior Design - Design Practicum</i>
ASEN4519	<i>Structural Dynamics of Aerospace Systems</i>

Graduate courses taught at CU Boulder since 2000:

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Course Number	Title
ASEN5012	<i>Mechanics of Aerospace Structures</i>
ASEN5022	<i>Dynamics of Aerospace Structures</i>
ASEN5519	<i>Design Optimization of Aerospace Structures</i>
ASEN 5519	<i>Topology Optimization</i>
ASEN5519	<i>Aeroelasticity</i>

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**Supervised post-doctoral research associates:**

J. S. Kong, 2003 – 2005, J. Bai, 2003 – 2006, M. Liu, 2003 – 2005, A. Evgrafov, 2005–2008, P. Lee, 2008–2009, R. Kabiri, 2013-2014, A. Tkachuk, 2014-2015, M. Lawry, 2016-2017, T. Gleim, 2017-2018, C. Messe, 2018, L. Noel, since 2018.

**Supervised Ph.D. thesis students (graduated):**

M. Nikbay, 2000 – 2002, M. Raulli, 2001 – 2004, M. Allen, 2001 – 2004, J. Pajot, 2002 – 2006, R. Santos, 2003 – 2006, M. Barcelos, 2002 – 2007, G. Pinggen, 2004 – 2008, G. Weickum, 2004 – 2008, C. Rupp, 2004 – 2009, M. Howard, 2005 – 2010, S. Golmon, 2007 – 2011, S. Kreissl, 2008 – 2011, C. DeLuca, 2009 – 2013, D. Makhija, 2008 – 2013, C. Lang, 2009 – 2013, J. Westfall, 2010 – 2013, N. Jenkins, 2010 – 2015, P. Coffin, 2011 – 2015, C. Villanueva, 2012 – 2016, M. Lawry, 2013 – 2016, R. Behrou, 2013 – 2016, A. Sharma, 2013-2017, T. Nagai, 2015-2018, M. Geiss, 2014-2018.

**Supervised Ph.D. thesis students (current):**

J. Barrera, since 2015, T. Nagai, since 2015, K. Doble, since 2016, M. Schmidt, since 2017, N. Sonne, since 2018, A. Christopherson, since 2019, N. Wunsch, since 2020.

**Supervised M.S. thesis students (graduated and current):**

J. Bollich, 2001 – 2002, R. Bischel, 2004 – 2005, R. Poola Subramanyaswamy, 2004 – 2005, K. Sylves, 2005-2007, N. Ledford, 2008 – 2010, V. Powell, 2009 – 2010, L. Negrete, 2014 – 2016, N. Eckert, 2015-2017, J. Erickson, 2016-2018, N. O’Neill, 2017-2018.

**Service to Professional Organizations (selected)**

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Managing editor	2004 – 2013	<i>Structure and Infrastructure Engineering</i>
Senior advisor	since 2005	<i>Structural and Multidisciplinary Optimization</i>
Exec. Board member	since 2007	<i>Int. Society of Structural and Multidisciplinary Optimization</i>

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**Selected Honors and Awards**

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Year	Honors / Award
2016	Palmer Endowed Chair
2016	Koiter Lecture at the 2016 Engineering Mechanics Symposium

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2016	Department Award for Outstanding Research
2013	Fellow, US Association for Computational Mechanics
2013	Dean's Performance Award for Teaching
2011	Joseph Negler Endowed Professorship
2011	Research Fellowship from Kansai University, Japan
2007	Sandia Sabbatical Fellowship
2006	H. Joseph Smead Fellow
2005	Dean's Award for Outstanding Junior Faculty at the College of Engineering and Applied Sciences
2004	AFRL Summer Faculty Fellowship
2004	NSF CAREER award
1998	Award for Excellence in Research at the University of Stuttgart, Germany

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## Publications

Names of Dr. Maute's graduate students are underlined; only refereed journal articles and book chapters are listed; conference proceedings and technical reports are not listed.

### *Refereed Journal Articles*

- [1] F. de Prenter, C. V. Verhoosel, H. van Brummelen, J. A. Evans, C. Messe, J. Benzaken, and K. Maute. Multigrid solvers for immersed finite element methods and immersed isogeometric analysis. *Computational Mechanics*, 2019, 10.1007/s00466-019-01796-y.
- [2] A. Pizzolato, A. Sharma, R. Ge, K. Maute, V. Verda, and A. Sciacovelli. Maximization of performance in multi-tube latent heat storage systems - Optimization of fins topology, effect of material properties and flow arrangements. *Energy*, 2019, 10.1016/j.energy.2019.02.155.
- [3] N. Boddeti, D.W. Rosen, K. Maute, and M.L. Dunn. Multiscale Optimal Design and Fabrication of Laminated Composites. *Composite Structures*, 228, 111366, 2019.
- [4] A. Pizzolato, A. Sharma, K. Maute, A. Sciacovelli, and V. Verda. Multi-scale topology optimization of multi-material structures with controllable geometric complexity – Applications to heat transfer problems. *Computer Methods in Applied Mechanics and Engineering*, 357, 12552, 2019.
- [5] M.E. Lynch, S. Sarkar and K Maute. Machine Learning to Aid Tuning of Numerical Parameters in Topology Optimization. *Journal of Mechanical Design*, 141(11): 114502, 2019.
- [6] M.J. Geiss, J.L. Barrera, N. Boddeti and K. Maute. A regularization scheme for explicit level-set XFEM topology optimization. *Front. Mech. Eng.* 14(2):153–170, 2019.
- [7] M. Geiss, N. Boddeti, O. Weeger, K. Maute, M.L. Dunn. Combined Level-Set-XFEM-Density Topology Optimization of 4D Printed Structures undergoing Large Deformation. ASME. *J. Mech. Des.* 141(5):051405, 2019.
- [8] N. Boddeti, Z. Ding, S. Kaijima, K. Maute and M.L. Dunn. Simultaneous Digital Design and Additive Manufacture of Structures and Materials. *Scientific Reports* 8: 15560, 2018.
- [9] A. Sharma and K. Maute. Stress-based topology optimization using spatial gradient stabilized XFEM. *Structural and Multidisciplinary Optimization*, 57(1): 17–38, 2018.

- [10] M. Lawry and K. Maute. Level set shape and topology optimization of finite strain bilateral contact problems. *International Journal for Numerical Methods in Engineering*, 113(8), 1340–1369, 2018.
- [11] L. Noel, P. Duysinx, and K. Maute. Level set topology optimization considering damage. *Structural and Multidisciplinary Optimization*, 56(4):737–753, 2017.
- [12] R. Behrou, M. Lawry, and K. Maute. Level set topology optimization of structural problems with interface cohesion. *International Journal for Numerical Methods in Engineering*, 112(8):990-1016, 2017.
- [13] A. Pizzolato, A. Sharma, K. Maute, A. Sciacovelli, and V. Verda. Design of effective fins for fast PCM melting and solidification in shell-and-tube latent heat thermal energy storage through topology optimization. *Applied Energy*, 208:210-227, 2017.
- [14] R. Behrou and K. Maute. Multiscale Modeling of Non-Local Damage Evolution in Lithium-Ion Batteries, *ECS Transactions* 77(11):1163-1177, 2017.
- [15] R. Behrou and K. Maute. Numerical Modeling of Damage Evolution Phenomenon in Solid-State Lithium-Ion Batteries. *Journal of The Electrochemical Society*, 164 (12) A1-A18 (2017).
- [16] A. Pizzolato, A. Sharma, K. Maute, A. Sciacovelli, and V. Verda. Topology optimization for heat transfer enhancement in Latent Heat Thermal Energy Storage. *International Journal of Heat and Mass Transfer*, 113:875-888, 2017.
- [17] C. Villanueva and K. Maute. CutFEM topology optimization of 3D laminar incompressible flow problems. *Computer Methods in Applied Mechanics and Engineering*, 320:444-473, 2017.
- [18] A. Sharma, H. Villanueva, and K. Maute. On shape sensitivities with Heaviside-enriched XFEM, *Structural and Multidisciplinary Optimization*, 55(2):385-408, 2017.
- [19] D. J. Glugla, M.D. Alim, K.D. Byars, D.P. Nair, C.N. Bowman, K. Maute, R.R. McLeod. Rigid Origami via Optical Programming and Deferred Self-Folding of a Two-Stage Photopolymer. *ACS Applied Materials & Interfaces*, 8:29658-29667, 2016.
- [20] N. Jenkins and K. Maute. An immersed boundary approach for shape and topology optimization of stationary fluid-structure interaction problems. *Structural and Multidisciplinary Optimization*, 54:1191–1208, 2016.
- [21] P. Coffin and K. Maute. A Level-set Method for Steady-State and Transient Natural Convection Problems. *Structural and Multidisciplinary Optimization*, 53(5):1047-1067, 2016.
- [22] P. Coffin and K. Maute. Level Set Topology Optimization of Cooling and Heating Devices using a Simplified Convection Model. *Structural and Multidisciplinary Optimization*, 53(5), 985-1003, 2016.
- [23] M. Lawry and K. Maute. Level set topology optimization of problems with sliding contact interfaces. *Structural and Multidisciplinary Optimization*, 52(6):1107-1119, 2015.
- [24] C. Lang, A. Sharma, A. Doostan, and K. Maute. Heaviside enriched extended stochastic FEM for problems with uncertain material interfaces. *Computational Mechanics*, 56(5):753-767, 2015.
- [25] M. Hadigol, K. Maute, and A. Doostan. On uncertainty quantification of lithium-ion batteries: Application to an LiC6/LiCoO2 cell. *Journal of Power Sources*, 300:507-524, 2015.
- [26] K. Maute, A. Tkachuk, J. Wu, H. J. Qi, Z. Ding, and M.L. Dunn. Level Set Topology Optimization of Printed Active Composites. *ASME Journal of Mechanical Design*, 137: 111704-1, 2015.
- [27] N. Jenkins and K. Maute. Level Set Topology Optimization of Stationary Fluid-Structure Interaction Problems. *Structural and Multidisciplinary Optimization*, 52(1):179-195, 2015.
- [28] D. Makhija and K. Maute. Level Set Topology Optimization of Scalar Transport Problems. *Structural and Multidisciplinary Optimization*, 51(2): 267-285, 2015.

- [29] C. Lang, D. Makhija, A. Doostan, and K. Maute. A Simple and Efficient Preconditioning Scheme for Heaviside Enriched XFEM. *Computational Mechanics*, 54:1357–1374, 2014.
- [30] C.H. Villanueva and K. Maute. Density and Level Set-XFEM Schemes for Topology Optimization of 3-D Structures. *Computational Mechanics*, 54(1):133-150, 2014.
- [31] D. Makhija, G. Pingen, and K. Maute. An immersed boundary method for fluids using the XFEM and the hydrodynamic Boltzmann transport equation. *Computer Methods in Applied Mechanics and Engineering*, 273:37–55, 2014.
- [32] D. Makhija and K. Maute. Numerical Instabilities in Level Set Topology Optimization with the Extended Finite Element Method. *Structural and Multidisciplinary Optimization*, 49(2):185-197, 2014.
- [33] S. Golmon, K. Maute, and M.L. Dunn. A Design Optimization Methodology for Li<sup>+</sup> Batteries. *Journal of Power Sources*, *Journal of Power Sources*, 253:239-250, 2014.
- [34] O. Sigmund and K. Maute. Topology optimization approaches: A comparative review. *Structural and Multidisciplinary Optimization*, 48(6):1031-1055, 2013.
- [35] G. Rozvany and K. Maute. Critical examination of recent assertions by Logo (2013) about the paper ‘Analytical and numerical solutions for a reliability based benchmark example’ (Rozvany and Maute 2011). *Structural and Multidisciplinary Optimization*, 48 (6): 1213-1220, 2013.
- [36] N.P. van Dijk, K. Maute, M. Langelaar, and F. van Keulen. Level-set methods for structural topology optimization: A review. *Structural and Multidisciplinary Optimization*, 48(3):437-472, 2013.
- [37] C. Lang, A. Doostan, and K. Maute. Extended stochastic FEM for heat transfer analysis with uncertain material interfaces. *Computational Mechanics*, 51(6): 1031-1049, 2013.
- [38] L.A. Stiles, H. Schaub, K. Maute, D.F. Moorer. Electrostatically inflated gossamer space structure voltage requirements due to orbital perturbations. *Acta Astronautica*, 84:109–121, 2013.
- [39] O. Sigmund and K. Maute. Sensitivity Filtering from a Continuum Mechanics Perspective. *Structural and Multidisciplinary Optimization*, 46:471–475, 2012.
- [40] S. Golmon, K. Maute, and M.L. Dunn. Multi-Scale Design Optimization of Lithium Batteries using Adjoint Sensitivity Analysis. *International Journal for Numerical Methods in Engineering*, 92:475–494, 2012.
- [41] S. Kreissl and K. Maute. Fluid Topology Optimization Based on the Extended Finite Element Method. *Structural and Multidisciplinary Optimization*, 46(3):311-326, 2012.
- [42] D. Makhija, G. Pingen, R. Yang, and K. Maute. Topology optimization of multi-component flows using a multi-relaxation time lattice Boltzmann method. *Computer and Fluids*, *Computers & Fluids* 67:104-114, 2012.
- [43] S.-B. Son, J.E. Trevey, H. Roh, S.-H. Kim, K.-B. Kim, J.S. Cho, J.-T. Moon, C.M. DeLuca, K. Maute, M.L. Dunn, H.N. Han, K.H. Oh, and S.-H. Lee. Microstructure Study of Electrochemically Driven Li<sub>x</sub>Si. *Adv. Energy Mater.*, 1(6):1199–1204, 2011.
- [44] S. Kreissl, G. Pingen, and K. Maute. Topology Optimization for Unsteady Flow. *International Journal for Numerical Methods in Engineering*, 87:1229-1253, 2011.
- [45] C.M. DeLuca, K. Maute, and M.L. Dunn. *Effects of Electrode Particle Morphology on Stress Generation in Silicon during Lithium Insertion*. *Journal of Power Sources*, 196:9672-9681, 2011.
- [46] J.E. Trevey, J. Wang, C.M. DeLuca, K. Maute, M.L. Dunn, S.-H. Lee, and V.M. Bright. Nanostructured silicon electrodes for solid-state 3-d rechargeable lithium batteries. *Sensors & Actuators: A. Physical*, 167(2):139-145, 2011.

- [47] G.I.N. Rozvany and K. Maute. Analytical and numerical solutions for a reliability-based benchmark example. *Structural and Multidisciplinary Optimization*, 43(6):745-753, 2011.
- [48] S. Kreissl, G. Pingen, and K. Maute. An explicit level-set approach for generalized shape optimization of fluids with the lattice Boltzmann method. *International Journal for Numerical Methods in Fluids*, 65(5):496–519, 2011.
- [49] C.J. Rupp, M.L. Dunn, and K. Maute. Analysis of Piezoelectric Energy Harvesting Systems with Nonlinear Circuits Using the Harmonic Balance Method. *Journal of Intelligent Material Systems and Structures*, 21(14):1383-1396.
- [50] S. Kreissl, G. Pingen, A. Evgrafov, and K. Maute. Topology Optimization of Flexible Micro-Fluidic Devices. *Structural and Multidisciplinary Optimization*, 42(4):495-516, 2010.
- [51] G. Pingen and K. Maute. Optimal design for non-Newtonian flows using a topology optimization approach. *Computers and Mathematics with Applications*, 59(7):2340-2350, 2010.
- [52] X. Li, K. Maute, M.L. Dunn, and R. Yang. Strain Effects on the Thermal Conductivity of Nanostructures. *Physical Review B*, 81(24):245318, 2010.
- [53] S. Golmon, K. Maute, M.L. Dunn, S.-H. Lee. Stress Generation in Silicon Particles during Lithium Insertion. *Applied Physics Letters*, 97(3):033111, 2010.
- [54] C.J. Rupp, M.L. Dunn, and K. Maute. Switchable Phononic Wave Filtering, Guiding, Harvesting, and Actuating in Polarization-Patterned Piezoelectric Solids. *Applied Physics Letters*, 96(11):111902, 2010.
- [55] G. Pingen, M. Waidmann, A. Evgrafov, and K. Maute. A Parametric Level-Set Approach for Topology Optimization of Fluids. *Structural and Multidisciplinary Optimization*, 41(1): 117-131, 2010.
- [56] B. Argrow, K. Maute, C. Farhat, and M. Nikbay. F-function lobe balancing for sonic boom minimization. *Computational Fluid Dynamics Journal*, 17(4): 221-234, 2009.
- [57] C.J. Rupp, A. Evgrafov, K. Maute, and M.L. Dunn. Design of Piezoelectric Energy Harvesting Systems: A Topology Optimization Approach Based on Multilayer Plates and Shells. *Journal of Intelligent Material Systems and Structures*, 20(16):1923-1939, 2009.
- [58] M. Howard, J. Pajot, K. Maute, and M.L. Dunn. A Computational Design Methodology for Assembly and Actuation of Thin-Film Structures via Patterning of Eigenstrains. *Journal of Microelectromechanical Systems*, 18(5):1137-1148, 2009.
- [59] K. Maute, G. Weickum, and M. Eldred. A Reduced-Order Stochastic Finite Element Approach for Design Optimization under Uncertainty. *Structural Safety*, 31:450-459, 2009.
- [60] S. Golmon, K. Maute, and M.L. Dunn. Numerical Modeling of Electrochemical-Mechanical Interactions in Lithium Polymer Batteries. *Computers & Structures*, 87:1567-1579, 2009.
- [61] M.L. Dunn and K. Maute. Photomechanics of Liquid Crystal Elastomer Films. *Mechanics of Materials*, 41:1083-1089, 2009.
- [62] M. Raulli, and K. Maute. Reliability Based Design Optimization of MEMS Considering Pull-in. *ASME Journal of Mechanical Design*, 131(6):061014, 2009.
- [63] G. Weickum, M.S. Eldred, and K. Maute. A multi-point reduced-order modeling approach of transient structural dynamics with application to robust design optimization. *Structural and Multidisciplinary Optimization*, 38(6):599-611, 2009.
- [64] K. Sylves, K. Maute, and M.L. Dunn. Adhesive surface design using topology optimization. *Structural and Multidisciplinary Optimization*, 30(5):455-468, 2009.
- [65] A. Evgrafov, K. Maute, R. G. Yang, and M. L. Dunn. Topology optimization for nano-scale heat transfer. *International Journal for Numerical Methods in Engineering*, 77(3):285-300, 2009.



- [66] G. Pingen, A. Evgrafov, and K. Maute. Adjoint Parameter Sensitivity Analysis for the Hydrodynamic Lattice Boltzmann Method with Applications to Design Optimization. *Computers and Fluids* 38(4): 910-923, 2009.
- [67] A. Evgrafov, C.J. Rupp, K. Maute, and M.L. Dunn. Large-scale parallel topology optimization using a dual-primal substructuring solver. *Structural and Multidisciplinary Optimization*, 36(4):329-345, 2008.
- [68] A. Evgrafov, C.J. Rupp, M.L. Dunn, and K. Maute. Optimal Synthesis of Tunable Elastic Wave-Guides. *Computer Methods in Applied Mechanics and Engineering*, 198:292-301, 2008.
- [69] G. Pingen, A. Evgrafov, and K. Maute. A Parallel Schur Complement Solver for the Solution of the Adjoint Steady-State Lattice Boltzmann Equations: Application to Design Optimization. *International Journal of Computational Fluid Dynamics*, 22(7): 457 – 464, 2008.
- [70] K. Maute, C. Farhat, B. Argrow, and M. Nikbay. Sonic Boom Mitigation via Shape Optimization an adjoint method and application to a supersonic fighter aircraft. *European Journal of Computational Mechanics* 17: 217-243, 2008.
- [71] A. Evgrafov, G. Pingen, and K. Maute. Topology Optimization of Fluid Domains: Kinetic Theory Approach. *ZAMM* 88(2):129-41, 2008.
- [72] M. Barcelos and K. Maute. Aeroelastic Design Optimization for Viscous and Turbulent Flows. *Computer Methods in Applied Mechanics and Engineering*, 197(19-20):1813-1832, 2008.
- [73] C. Farhat, K. Maute, B. Argrow, and M. Nikbay. A Shape Optimization Methodology for Reducing the Sonic Boom Initial Pressure Rise. *AIAA Journal*, 45(5):1007-1018, 2007.
- [74] G. Pingen, A. Evgrafov, and K. Maute. Topology Optimization of Flow Domains using the Lattice Boltzmann Method. *Structural and Multidisciplinary Optimization*, 34(6):507-524, 2007.
- [75] J. Bai, K. Maute, S. Shah, and R. Raj. Mechanical Design for Accommodating Thermal Expansion Mismatch in Multilayer Coatings for Environmental Protection at Ultrahigh Temperatures. *J. Am. Ceram. Soc.*, 90(1): 170–176, 2007.
- [76] C.J. Rupp, A. Evgrafov, K. Maute, and M.L. Dunn. Design of Phononic Materials/Structures for Surface Wave Devices Using Topology Optimization. *Structural and Multidisciplinary Optimization*, 34(2):111-122, 2007.
- [77] M. Liu, D.M. Frangopol, and K. Maute. Multi-objective Design Optimization of Electrostatically Actuated Microbeam Resonators with and without Parameter Uncertainty. *Reliability Engineering and System Safety* 92:1333-1343, 2006.
- [78] J.M. Pajot and K. Maute. Analytical Sensitivity Analysis of Geometrically Nonlinear Structures Based on the Co-Rotational Finite Element Method. *Finite Elements in Analysis and Design*, 42: 900–913, 2006.
- [79] M. Barcelos, H. Bavestrello, and K. Maute. A Schur-Newton-Krylov Solver for Steady-state Aeroelastic Analysis and Design Sensitivity Analysis. *Computer Methods in Applied Mechanics and Engineering*, 195: 2050–2069, 2006.
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