Curriculum Vitae

Joaquim R. R. A. Martins

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Contents

1 Contact Information

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2 Education

Ph.D. Aeronautics and Astronautics, Stanford University, 2002

M.Sc. Aeronautics and Astronautics, Stanford University, 1997

M.Eng. Aeronautics, Imperial College, London, UK, 1995

3 Academic Positions

Professor, Department of Aerospace Engineering, University of Michigan, Ann Arbor, MI, Sep 2015–present

Visiting Professor, ISAE–SUPAERO Institut Supérieur de l'Aéronautique et de l'Espace, Toulouse, France, 2015–2016.

Associate Professor, Department of Aerospace Engineering, University of Michigan, Ann Arbor, MI, Sep 2009–Aug 2016

Associate Professor, University of Toronto Institute for Aerospace Studies, Toronto, ON, Canada, Jul 2008–Aug 2009

Assistant Professor, University of Toronto Institute for Aerospace Studies, Toronto, ON, Canada, Nov 2002–Jun 2008

4 Academic Awards and Distinctions

- Fellow, American Institute of Aeronautics and Astronautics, 2020.
- Fellow, Royal Aeronautical Society, 2019.
- Best Paper in Applied Aerodynamics, AIAA ScitTech Forum, Jan 2019.
- Departmental Faculty Award, 2017.
- Marie Skłodowska–Curie Fellow, 2015–2016.
- Best Paper Award, *15th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Sep 2014.
- Best Paper Award, *14th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Sep 2012.
- Canada Research Chair in Multidisciplinary Design Optimization (Tier II), 2003–2009.

- Best Paper Award, *11th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Sep 2006.
- Ballhaus Prize for Best Thesis in the Department of Aeronautics, Stanford University, Jun 2003.
- Best Paper Award, *9th AIAA/ISSMO Symposium on Multidisciplinary Analysis and Optimization*, Sep 2002.
- Praxis XXI Scholarship, 1997–2001.
- US–Norway Fulbright Foundation Stipend, 1996–1997.
- British Aerospace Award, May 1995.

5 Keynote Presentations

[K12] Plenary speaker, *The 60th Israel Annual Conference on Aerospace Sciences*, Tel-Aviv & Haifa, Israel, Mar 2020.

[K11] Plenary speaker, *International Conference on Flow Dynamics*, Sendai, Japan, Nov 2019.

[K10] Plenary speaker, *Aerodynamic Tools and Design Methods in Aircraft Design Conference*, London, UK, Oct 2019.

[K9] Keynote presentation, *AIAA Aviation MDO Keynote*, Atlanta, GA, Jun 2018.

[K8] Keynote presentation, *Workshop on MDO for Industrial Applications in Aeronautics*, Braunschweig, Germany, Oct 2017.

[K7] Keynote lecture, *EUROGEN Conference*, Madrid, Spain, Sep 2017.

[K6] Plenary speaker, *MOPTA Conference*, Bethlehem, PA, Aug 2017.

[K5] Keynote lecture, *Congress on Numerical Methods in Engineering*, Lisbon, Portugal, Jun 2015.

[K4] Semi-plenary, *International Conference on Engineering and Applied Sciences Optimization*, Kos, Greece, Jun 2014.

[K3] Plenary speaker, *SIAM Conference on Optimization*, San Diego, May 2014.

[K2] Keynote address, *Aircraft Structural Design Conference*, Royal Aeronautical Society, London, UK, Oct 2010.

[K1] Plenary speaker, *International Forum on Aeroelasticity and Structural Dynamics*, Stockholm, Sweden, Jun 2007.

6 Editorial Boards

- Associate editor, *Journal of Aircraft*, 2016–present.
- Review editor, *Structural and Multidisciplinary Optimization*, 2014–present.
- Lifetime member of the Editorial Board for *Optimization and Engineering*, 2018.
- Associate editor for *Optimization and Engineering*, 2008–2018.
- Associate editor for the *AIAA Journal*, 2011–2015.
- Guest editor for a special issue of *Optimization and Engineering*, 2007.
- Associate editor for the *Canadian Aeronautics and Space Journal*, 2006–2008.

7 Reviewing Activities

- German Research Foundation (DFG) review panel, May 2018.
- Portuguese Foundation for Science and Technology (FCT) review panel, Nov 2017.
- ONERA (The French Aerospace Laboratory) evaluation panel (CEST), Nov 2015.
- Portuguese Foundation for Science and Technology (FCT) review panel for Mechanical Engineering, Mar 2008.
- Reviewer for various National Science Foundation panels.
- Delegate in the Partnership Group for Science and Engineering (PAGSE) Symposium, Ottawa, Mar 2006.
- Reviewer for the Netherlands Organization for Scientific Research
- Regular reviewer for the *AIAA Journal*, *Journal of Aircraft*, *Optimization and Engineering*, and *Structural and Multidisciplinary Optimization*. Reviewed manuscripts for the following journals: *ACM Transactions on Mathematical Software*, *Automatica*, *Aerospace Science and Technology*, *Computers and Geosciences*, *International Journal of Computational Fluid Dynamics*, *Journal of Mechanical Design*, *Journal of Fluids and Structures*, *Journal of Spacecraft and Rockets*, and *SIAM Journal of Scientific Computing*.
- Regular session chair at the *AIAA Multidisciplinary Analysis and Optimization Conference*, the *World Congress on Structural and Multidisciplinary Optimization*, and the *AIAA Multidisciplinary Design Optimization Specialist Conference*. Also served as a session chair at the *International Council of the Aeronautical Sciences Congress* and the *International Forum on Aeroelasticity and Structural Dynamics*.

8 Technical Committees

- Member, AIAA Aerodynamic Design Optimization Discussion Group, 2014–present.
- Member, International Organizing Committee for the Aircraft Structural Design Conference, 2012–present.
- Member, AIAA Multidisciplinary Design Optimization TC, 2006–2018.
- Co-organizer, NSF Workshop: "The Future of Multidisciplinary Design Optimization: Advancing the Design of Complex Systems", Fort Worth, TX, Sep 2010.
- Technical Co-Chair, *12th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Victoria, BC, Sep 2008.
- Co-organizer, *UTIAS–MITACS International Workshop on Aviation and Climate Change*, Toronto, May 2008, May 2010, and May 2012
- Co-organizer, *Fields Industrial Optimization Seminars*, 2008–2009.
- Member, Canadian Aeronautics and Space Institute Aircraft Design and Development TC, 2005–2009.

9 Publications

9.1 Book Chapters

[B3] J. R. R. A. Martins. *Advances and Trends in Optimization with Engineering Applications*, chapter Multidisciplinary Design Optimization of Aerospace Systems, pages 249–257. SIAM, Philadelphia, PA, 2017.

[B2] J. R. R. A. Martins. *Encyclopedia of Aerospace Engineering*, volume Green Aviation, chapter Fuel burn reduction through wing morphing, pages 75–79. Wiley, October 2016.

[B1] N. Xue, W. Du, J. R. R. A. Martins, and W. Shyy. *Handbook of Clean Energy Systems*, volume 5 : Energy Storage, chapter 26: Lithium-Ion Batteries: Thermo-Mechanics, Performance, and Design Optimization, pages 2849–2864. John Wiley & Sons, Ltd, 2015.

9.2 Refereed Journal Publications

[J117] M. A. Bouhlel, S. He, and J. R. R. A. Martins. Scalable gradient-enhanced artificial neural networks for airfoil shape design in the subsonic and transonic regimes. *Structural and Multidisciplinary Optimization*, 61:1363–1376, March 2020. doi:10.1007/s00158-020-02488-5.

[J116] B. J. Brelje, J. Anibal, A. Yildirim, C. A. Mader, and J. R. R. A. Martins. Flexible Formulation of Spatial Integration Constraints in Aerodynamic Shape Optimization. *AIAA Journal*, 58(6):2571–2580, June 2020. doi:10.2514/1.J058366.

[J115] T. R. Brooks, J. R. R. A. Martins, and G. J. Kennedy. Aerostructural Trade-offs for Tow-steered Composite Wings. *Journal of Aircraft*, 2020. doi:10.2514/1.C035699.

[J114] S. S. Chauhan and J. R. R. A. Martins. Tilt-wing eVTOL takeoff trajectory optimization. *Journal of Aircraft*, 57(1):93–112, January 2020. doi:10.2514/1.C035476.

[J113] J. S. Gray, C. A. Mader, G. K. W. Kenway, and J. R. R. A. Martins. Coupled Aeropropulsive Design Optimization of a Three-Dimensional BLI Propulsor Considering Inlet Distortion. *Journal of Aircraft*, 2020. doi:10.2514/1.C035845, (In press).

[J112] P. He, C. A. Mader, J. R. R. A. Martins, and K. J. Maki. DAFoam: An Open-Source Adjoint Framework for Multidisciplinary Design Optimization with OpenFOAM. *AIAA Journal*, 58(3), March 2020. doi:10.2514/1.J058853.

[J111] J. M. Hegseth, E. E. Bachynski, and J. R. R. A. Martins. Integrated Design Optimization of Spar Floating Wind Turbines. *Marine Structures*, 72:102771, July 2020. doi:10.1016/j.marstruc.2020.102771.

[J110] J. Li, M. Zhang, J. R. R. A. Martins, and C. Shu. Efficient Aerodynamic Shape Optimization with Deep-learning-based Filtering. *AIAA Journal*, 2020. doi:10.2514/1.J059254.

[J109] C. A. Mader, G. K. W. Kenway, A. Yildirim, and J. R. R. A. Martins. ADflow—An open-source computational fluid dynamics solver for aerodynamic and multidisciplinary optimization. *Journal of Aerospace Information Systems*, 2020. doi:10.2514/1.I010796.

[J108] M. Mangano and J. R. R. A. Martins. Multipoint Aerodynamic Shape Optimization for Subsonic and Supersonic Regimes. *Journal of Aircraft*, 2020. doi:10.2514/1.C035826.

[J107] A. Sgueglia, P. Schmollgruber, N. Bartoli, E. Benard, J. Morlier, J. Jasa, J. R. R. A. Martins, J. T. Hwang, and J. S. Gray. Multidisciplinary design optimization framework with coupled derivative computation for hybrid aircraft. *Journal of Aircraft*, 2020. doi:10.2514/1.C035509.

[J106] M. Shahabsafa, R. Fakhimi, W. Lei, S. He, L. Zuluaga, J. R. R. A. Martins, and T. Terlaky. Truss topology design optimization with guaranteed kinematic stability. *Structural and Multidisciplinary Optimization*, 2020. (In press).

[J105] Y. Shi, C. A. Mader, S. He, G. L. O. Halila, and J. R. R. A. Martins. Natural Laminar Flow Airfoil Design Using a Discrete Adjoint Approach with RANS-e^N Transition Prediction. *AIAA Journal*, 2020. (In press).

[J104] N. Bartoli, T. Lefebvre, S. Dubreuil, R. Olivanti, R. Priem, N. Bons, J. R. R. A. Martins, and J. Morlier. Adaptive modeling strategy for constrained global optimization with application to aerodynamic wing design. *Aerospace Science and Technology*, 90:85–102, July 2019. doi:10.1016/j.ast.2019.03.041.

[J103] N. P. Bons, X. He, C. A. Mader, and J. R. R. A. Martins. Multimodality in Aerodynamic Wing Design Optimization. *AIAA Journal*, 57(3):1004–1018, March 2019. doi:10.2514/1.J057294.

[J102] M. A. Bouhlel and J. R. R. A. Martins. Gradient-enhanced kriging for high-dimensional problems. *Engineering with Computers*, 1(35):157–173, January 2019. doi:10.1007/s00366-018-0590-x.

[J101] M. A. Bouhlel, J. T. Hwang, N. Bartoli, R. Lafage, J. Morlier, and J. R. R. A. Martins. A Python surrogate modeling framework with derivatives. *Advances in Engineering Software*, 135:102662, September 2019. doi:10.1016/j.advengsoft.2019.03.005.

[J100] B. Brelje and J. R. R. A. Martins. Electric, Hybrid, and Turboelectric Fixed-Wing Aircraft: A Review of Concepts, Models, and Design Approaches. *Progress in Aerospace Sciences*, 104:1–19, January 2019. doi:10.1016/j.paerosci.2018.06.004.

[J99] T. R. Brooks, J. R. R. A. Martins, and G. J. Kennedy. High-fidelity Aerostructural Optimization of Tow-steered Composite Wings. *Journal of Fluids and Structures*, 88:122–147, July 2019. doi:10.1016/j.jfluidstructs.2019.04.005.

[J98] D. A. Burdette and J. R. R. A. Martins. Impact of Morphing Trailing Edge on Mission Performance for the Common Research Model. *Journal of Aircraft*, 56(1):369–384, January 2019. doi:10.2514/1.C034967.

[J97] N. Garg, B. W. Pearce, P. A. Brandner, A. W. Phillips, J. R. R. A. Martins, and Y. L. Young. Experimental Investigation of a Hydrofoil Designed via Hydrostructural Optimization. *Journal of Fluids and Structures*, 84:243–262, January 2019. doi:10.1016/j.jfluidstructs.2018.10.010.

[J96] J. S. Gray, J. T. Hwang, J. R. R. A. Martins, K. T. Moore, and B. A. Naylor. OpenMDAO: An open-source framework for multidisciplinary design, analysis, and optimization. *Structural and Multidisciplinary Optimization*, 59(4):1075–1104, April 2019. doi:10.1007/s00158-019-02211-z.

[J95] J. S. Gray and J. R. R. A. Martins. Coupled Aeropropulsive Design Optimization of a Boundary-Layer Ingestion Propulsor. *The Aeronautical Journal*, 123(1259):121–137, January 2019. doi:10.1017/aer.2018.120.

[J94] G. L. O. Halila, G. Chen, Y. Shi, K. J. Fidkowski, J. R. R. A. Martins, and M. T. de Mendonça. High-Reynolds Number Transitional Flow Simulation via Parabolized Stability Equations with an Adaptive RANS Solver. *Aerospace Science and Technology*, 91:321–336, August 2019. doi:10.1016/j.ast.2019.05.018.

[J93] X. He, J. Li, C. A. Mader, A. Yildirim, and J. R. R. A. Martins. Robust aerodynamic shape optimization—from a circle to an airfoil. *Aerospace Science and Technology*, 87:48–61, April 2019. doi:10.1016/j.ast.2019.01.051.

[J92] P. He, G. Filip, J. R. R. A. Martins, and K. J. Maki. Design Optimization for Self-Propulsion of a Bulk Carrier Hull Using a Discrete Adjoint Method. *Computers & Fluids*, 192:104259, October 2019. doi:10.1016/j.compfluid.2019.104259.

[J91] P. He, J. R. R. A. Martins, C. A. Mader, and K. Maki. Aerothermal Optimization of a Ribbed U-Bend Cooling Channel Using the Adjoint Method. *International Journal of Heat and Mass*

Transfer, 140:152–172, September 2019. doi:10.1016/j.ijheatmasstransfer.2019.05.075.

[J90] J. T. Hwang, J. Jasa, and J. R. R. A. Martins. High-fidelity design-allocation optimization of a commercial aircraft maximizing airline profit. *Journal of Aircraft*, 56(3):1165–1178, May 2019. doi:10.2514/1.C035082.

[J89] E. Jonsson, C. Riso, C. A. Lupp, C. E. S. Cesnik, J. R. R. A. Martins, and B. I. Epureanu. Flutter and Post-Flutter Constraints in Aircraft Design Optimization. *Progress in Aerospace Sciences*, 109:100537, August 2019. doi:10.1016/j.paerosci.2019.04.001.

[J88] G. K. W. Kenway, C. A. Mader, P. He, and J. R. R. A. Martins. Effective Adjoint Approaches for Computational Fluid Dynamics. *Progress in Aerospace Sciences*, 110:100542, October 2019. doi:10.1016/j.paerosci.2019.05.002.

[J87] J. Li, S. He, and J. R. R. A. Martins. Data-driven Constraint Approach to Ensure Low-speed Performance in Transonic Aerodynamic Shape Optimization. *Aerospace Science and Technology*, 92:536–550, September 2019. doi:10.1016/j.ast.2019.06.008.

[J86] J. Li, M. A. Bouhlel, and J. R. R. A. Martins. Data-based Approach for Fast Airfoil Analysis and Optimization. *AIAA Journal*, 57(2):581–596, February 2019. doi:10.2514/1.J057129.

[J85] Y. Liao, N. Garg, J. R. R. A. Martins, and Y. L. Young. Viscous Fluid Structure Interaction Response of Composite Hydrofoils. *Composite Structures*, 212:571–585, March 2019. doi:10.1016/j.compstruct.2019.01.043.

[J84] Y. Liao, J. R. R. A. Martins, and Y. L. Young. Sweep and Anisotropy Effects on the Viscous Hydroelastic. *Composite Structures*, 230:111471, December 2019. doi:10.1016/j.compstruct.2019.111471.

[J83] M. H. A. Madsen, F. Zahle, N. N. Sørensen, and J. R. R. A. Martins. Multipoint high-fidelity CFD-based aerodynamic shape optimization of a 10 MW wind turbine. *Wind Energy Science*, 4:163–192, April 2019. doi:10.5194/wes-4-163-2019.

[J82] S. Roy, W. A. Crossley, K. T. Moore, J. S. Gray, and J. R. R. A. Martins. Monolithic approach towards next generation aircraft design considering airline operations and economics. *Journal of Aircraft*, 56(4):1565–1576, July 2019. doi:10.2514/1.C035312.

[J81] N. R. Secco and J. R. R. A. Martins. RANS-based Aerodynamic Shape Optimization of a Strut-braced Wing with Overset Meshes. *Journal of Aircraft*, 56(1):217–227, January 2019. doi:10.2514/1.C034934.

[J80] A. Yildirim, G. K. W. Kenway, C. A. Mader, and J. R. R. A. Martins. A Jacobian-free approximate Newton–Krylov startup strategy for RANS simulations. *Journal of Computational Physics*, 397:108741, Nov. 2019. doi:10.1016/j.jcp.2019.06.018.

[J79] T. R. Brooks, G. K. W. Kenway, and J. R. R. A. Martins. Benchmark Aerostructural Models for the Study of Transonic Aircraft Wings. *AIAA Journal*, 56(7):2840–2855, July 2018. doi:10.2514/1.J056603.

[J78] T. R. Brooks and J. R. R. A. Martins. On Manufacturing Constraints for Tow-steered Composite Design Optimization. *Composite Structures*, 204:548–559, November 2018. doi:10.1016/j.compstruct.2018.07.100.

[J77] D. A. Burdette and J. R. R. A. Martins. Design of a Transonic Wing with an Adaptive Morphing Trailing Edge via Aerostructural Optimization. *Aerospace Science and Technology*, 81:192–203, October 2018. doi:10.1016/j.ast.2018.08.004.

[J76] S. S. Chauhan, J. T. Hwang, and J. R. R. A. Martins. An automated selection algorithm for nonlinear solvers in MDO. *Structural and Multidisciplinary Optimization*, 58(2):349–377, June 2018. doi:10.1007/s00158-018-2004-5.

[J75] J. S. Gray, C. A. Mader, G. K. W. Kenway, and J. R. R. A. Martins. Modeling Boundary Layer Ingestion Using a Coupled Aeropropulsive Analysis. *Journal of Aircraft*, 55(3):1191–1199, May 2018. doi:10.2514/1.C034601.

[J74] P. He, C. A. Mader, J. R. R. A. Martins, and K. J. Maki. An Aerodynamic Design Optimization Framework Using a Discrete Adjoint Approach with OpenFOAM. *Computers & Fluids*, 168:285–303, May 2018. doi:10.1016/j.compfluid.2018.04.012.

[J73] J. T. Hwang and J. R. R. A. Martins. A computational architecture for coupling heterogeneous numerical models and computing coupled derivatives. *ACM Transactions on Mathematical Software*, 44(4):Article 37, June 2018. doi:10.1145/3182393.

[J72] J. T. Hwang and J. R. R. A. Martins. A fast-prediction surrogate model for large datasets. *Aerospace Science and Technology*, 75:74–87, April 2018. doi:10.1016/j.ast.2017.12.030.

[J71] J. P. Jasa, J. T. Hwang, and J. R. R. A. Martins. Open-source coupled aerostructural optimization using Python. *Structural and Multidisciplinary Optimization*, 57(4):1815–1827, April 2018. doi:10.1007/s00158-018-1912-8.

[J70] N. R. Secco, J. P. Jasa, G. K. W. Kenway, and J. R. R. A. Martins. Component-based Geometry Manipulation for Aerodynamic Shape Optimization with Overset Meshes. *AIAA Journal*, 56(9):3667–3679, September 2018. doi:10.2514/1.J056550.

[J69] M. Shahabsafa, A. Mohammad-Nezhad, T. Terlaky, L. Zuluaga, S. He, J. T. Hwang, and J. R. R. A. Martins. A novel approach to discrete truss design problems using mixed integer neighborhood search. *Structural and Multidisciplinary Optimization*, 58:2411—2429, December 2018. doi:10.1007/s00158-018-2099-8.

[J68] Y. Yu, Z. Lyu, Z. Xu, and J. R. R. A. Martins. On the Influence of Optimization Algorithm and Starting Design on Wing Aerodynamic Shape Optimization. *Aerospace Science and Technology*, 75:183–199, April 2018. doi:10.1016/j.ast.2018.01.016.

[J67] T. Dhert, T. Ashuri, and J. R. R. A. Martins. Aerodynamic Shape Optimization of Wind Turbine Blades Using a Reynolds-Averaged Navier–Stokes Model and an Adjoint Method. *Wind Energy*, 20(5):909–926, May 2017. doi:10.1002/we.2070.

[J66] N. Garg, G. K. W. Kenway, J. R. R. A. Martins, and Y. L. Young. High-fidelity Multipoint Hydrostructural Optimization of a 3-D Hydrofoil. *Journal of Fluids and Structures*, 71:15–39, May 2017. doi:10.1016/j.jfluidstructs.2017.02.001.

[J65] J. S. Gray, J. Chin, T. Hearn, E. Hendricks, T. Lavelle, and J. R. R. A. Martins. Chemical Equilibrium Analysis with Adjoint Derivatives for Propulsion Cycle Analysis. *Journal of Propulsion and Power*, 33(5):1041–1052, September 2017. doi:10.2514/1.B36215.

[J64] G. K. W. Kenway and J. R. R. A. Martins. Buffet Onset Constraint Formulation for Aerodynamic Shape Optimization. *AIAA Journal*, 55(6):1930–1947, June 2017. doi:10.2514/1.J055172.

[J63] A. B. Lambe, J. R. R. A. Martins, and G. J. Kennedy. An Evaluation of Constraint Aggregation Strategies for Wing Box Mass Minimization. *Structural and Multidisciplinary Optimization*, 55(1):257–277, January 2017. doi:10.1007/s00158-016-1495-1.

[J62] R. P. Liem, J. R. R. A. Martins, and G. K. Kenway. Expected Drag Minimization for Aerodynamic Design Optimization Based on Aircraft Operational Data. *Aerospace Science and Technology*, 63:344–362, April 2017. doi:10.1016/j.ast.2017.01.006.

[J61] S. Arreckx, A. B. Lambe, J. R. R. A. Martins, and D. Orban. A Matrix-Free Augmented Lagrangian Algorithm with Application to Large-Scale Structural Design Optimization. *Optimization and Engineering*, 17(2):359–384, June 2016. doi:10.1007/s11081-015-9287-9.

[J60] T. Ashuri, J. R. R. A. Martins, M. B. Zaaijer, G. A. van Kuik, and G. J. van Bussel. Aeroservoelastic Design Definition of a 20 MW Common Research Wind Turbine Model. *Wind Energy*, 19(11):2071—2087, November 2016. doi:10.1002/we.1970.

[J59] T. Ashuri, M. B. Zaaijer, J. R. R. A. Martins, and J. Zhang. Multidisciplinary Design Optimization of Large Wind Turbines—Technical, Economic, and Design Challenges. *Energy Conversion and Management*, 123:56–70, September 2016.

doi:10.1016/j.enconman.2016.06.004.

[J58] S. Chen, Z. Lyu, G. K. W. Kenway, and J. R. R. A. Martins. Aerodynamic Shape Optimization of the Common Research Model Wing-Body-Tail Configuration. *Journal of Aircraft*, 53(1):276–293, January 2016. doi:10.2514/1.C033328.

[J57] J. T. Hwang and J. R. R. A. Martins. An unstructured quadrilateral mesh generation algorithm for aircraft structures. *Aerospace Science and Technology*, 59:172–182, December 2016. doi:10.1016/j.ast.2016.10.010.

[J56] G. K. W. Kenway and J. R. R. A. Martins. Multipoint Aerodynamic Shape Optimization Investigations of the Common Research Model Wing. *AIAA Journal*, 54(1):113–128, January 2016. doi:10.2514/1.J054154.

[J55] A. B. Lambe and J. R. R. A. Martins. Matrix-free aerostructural optimization of aircraft wings. *Structural and Multidisciplinary Optimization*, 53(3):589–603, March 2016. doi:10.1007/s00158-015-1349-2.

[J54] N. Garg, G. K. W. Kenway, Z. Lyu, J. R. R. A. Martins, and Y. L. Young. High-fidelity Hydrodynamic Shape Optimization of a 3-D Hydrofoil. *Journal of Ship Research*, 59(4):209–226, December 2015. doi:10.5957/JOSR.59.4.150046.

[J53] R. P. Liem, C. A. Mader, and J. R. R. A. Martins. Surrogate Models and Mixtures of Experts in Aerodynamic Performance Prediction for Aircraft Mission Analysis. *Aerospace Science and Technology*, 43:126–151, June 2015. doi:10.1016/j.ast.2015.02.019.

[J52] R. P. Liem, G. K. W. Kenway, and J. R. R. A. Martins. Multimission Aircraft Fuel Burn Minimization via Multipoint Aerostructural Optimization. *AIAA Journal*, 53(1):104–122, January 2015. doi:10.2514/1.J052940.

[J51] Z. Lyu and J. R. R. A. Martins. Aerodynamic Shape Optimization of an Adaptive Morphing Trailing Edge Wing. *Journal of Aircraft*, 52(6):1951–1970, November 2015. doi:10.2514/1.C033116.

[J50] Z. Lyu, G. K. W. Kenway, and J. R. R. A. Martins. Aerodynamic Shape Optimization Investigations of the Common Research Model Wing Benchmark. *AIAA Journal*, 53(4):968–985, April 2015. doi:10.2514/1.J053318.

[J49] T. Ashuri, M. B. Zaaijer, J. R. R. A. Martins, G. J. W. van Bussel, and G. A. M. van Kuik. Multidisciplinary Design Optimization of Offshore Wind Turbines for Minimum Levelized Cost of Energy. *Renewable Energy*, 68:893–905, August 2014. doi:10.1016/j.renene.2014.02.045.

[J48] W. Du, N. Xue, W. Shyy, and J. R. R. A. Martins. A Surrogate-Based Multi-Scale Model for Mass Transport and Electrochemical Kinetics in Lithium-Ion Battery Electrodes. *Journal of the Electrochemical Society*, 161(8):E3086–E3096, April 2014. doi:10.1149/2.013408jes.

[J47] A. Gogulapati, P. P. Friedmann, and J. R. R. A. Martins. Optimization of the Kinematics of a Flapping Wing MAV in Hover for Enhanced Performance. *AIAA Journal*, 52(10):2342–2354, October 2014. doi:10.2514/1.J053083.

[J46] J. T. Hwang, D. Y. Lee, J. W. Cutler, and J. R. R. A. Martins. Large-Scale Multidisciplinary Optimization of a Small Satellite's Design and Operation. *Journal of Spacecraft and Rockets*, 51(5):1648–1663, September 2014. doi:10.2514/1.A32751.

[J45] K. A. James, G. J. Kennedy, and J. R. R. A. Martins. Concurrent Aerostructural Topology Optimization of a Wing Box. *Computers and Structures*, 134:1–17, April 2014. doi:10.1016/j.compstruc.2013.12.007.

[J44] G. J. Kennedy and J. R. R. A. Martins. A parallel aerostructural optimization framework for aircraft design studies. *Structural and Multidisciplinary Optimization*, 50(6):1079–1101, December 2014. doi:10.1007/s00158-014-1108-9.

[J43] G. J. Kennedy and J. R. R. A. Martins. A Parallel Finite-Element Framework for Large-

Scale Gradient-Based Design Optimization of High-Performance Structures. *Finite Elements in Analysis and Design*, 87:56–73, September 2014. doi:10.1016/j.finel.2014.04.011.

[J42] G. K. W. Kenway, G. J. Kennedy, and J. R. R. A. Martins. Scalable Parallel Approach for High-Fidelity Steady-State Aeroelastic Analysis and Derivative Computations. *AIAA Journal*, 52(5):935–951, May 2014. doi:10.2514/1.J052255.

[J41] G. K. W. Kenway and J. R. R. A. Martins. Multipoint High-Fidelity Aerostructural Optimization of a Transport Aircraft Configuration. *Journal of Aircraft*, 51(1):144–160, January 2014. doi:10.2514/1.C032150.

[J40] Z. Lyu and J. R. R. A. Martins. Aerodynamic Design Optimization Studies of a Blended-Wing-Body Aircraft. *Journal of Aircraft*, 51(5):1604–1617, September 2014. doi:10.2514/1.C032491.

[J39] C. A. Mader and J. R. R. A. Martins. Computing Stability Derivatives and their Gradients for Aerodynamic Shape Optimization. *AIAA Journal*, 52(11):2533–2546, November 2014. doi:10.2514/1.J052922.

[J38] N. Xue, W. Du, T. A. Greszler, W. Shyy, and J. R. R. A. Martins. Design of a lithium-ion battery pack for PHEV using a hybrid optimization method. *Applied Energy*, 115:591–602, February 2014. doi:10.1016/j.apenergy.2013.10.044.

[J37] W. Du, N. Xue, A. M. Sastry, J. R. R. A. Martins, and W. Shyy. Energy Density Comparison of Li-ion Cathode Materials using Dimensional Analysis. *Journal of The Electrochemical Society*, 160(8):A1187–A1193, May 2013. doi:10.1149/2.069308jes.

[J36] W. Du, N. Xue, A. Gupta, A. M. Sastry, J. R. R. A. Martins, and W. Shyy. Optimization of LiMn2O4 Electrode Properties in a Gradient- and Surrogate-Based Framework. *Acta Mechanica Sinica*, 29(3):335–347, June 2013. doi:10.1007_s10409-013-0039-x.

[J35] G. J. Kennedy and J. R. R. A. Martins. A Laminate Parametrization Technique for Discrete Ply Angle Problems with Manufacturing Constraints. *Structural and Multidisciplinary Optimization*, 48(2):379–393, August 2013. doi:10.1007/s00158-013-0906-9.

[J34] C. A. Mader and J. R. R. A. Martins. Stability-Constrained Aerodynamic Shape Optimization of Flying Wings. *Journal of Aircraft*, 50(5):1431–1449, September 2013. doi:10.2514/1.C031956.

[J33] J. R. R. A. Martins and A. B. Lambe. Multidisciplinary Design Optimization: A Survey of Architectures. *AIAA Journal*, 51(9):2049–2075, September 2013. doi:10.2514/1.J051895.

[J32] J. R. R. A. Martins and J. T. Hwang. Review and Unification of Methods for Computing Derivatives of Multidisciplinary Computational Models. *AIAA Journal*, 51(11):2582–2599, November 2013. doi:10.2514/1.J052184.

[J31] M. Nelson, D. Temple, J. T. Hwang, Y. L. Young, J. R. R. A. Martins, and M. Collette. Simultaneous Optimization of Propeller-Hull Systems to Minimize Lifetime Fuel Consumption. *Applied Ocean Research*, 43:46–52, October 2013. doi:10.1016/j.apor.2013.07.004.

[J30] N. Xue, W. Du, A. Gupta, W. Shyy, A. M. Sastry, and J. R. R. A. Martins. Optimization of a Single Lithium-ion Battery Cell with a Gradient-based Algorithm. *Journal of the Electrochemical Society*, 160(8):A1071–A1078, May 2013. doi:10.1149/2.036308jes.

[J29] T. Grotker, U. Holtmann, H. Keding, and M. Wloka. *The Developer's Guide to Debugging*. 2nd edition, 2012.

[J28] S. Haghighat, H. H. T. Liu, and J. R. R. A. Martins. A Model-Predictive Gust Load Alleviation Controller for a Highly Flexible Aircraft. *Journal of Guidance, Control and Dynamics*, 35(6):1751–1766, November 2012. doi:10.2514/1.57013.

[J27] S. Haghighat, J. R. R. A. Martins, and H. H. T. Liu. Aeroservoelastic Design Optimization of a Flexible Wing. *Journal of Aircraft*, 49(2):432–443, March 2012. doi:10.2514/1.C031344.

[J26] R. P. Henderson, J. R. R. A. Martins, and R. E. Perez. Aircraft Conceptual Design for

Optimal Environmental Performance. *The Aeronautical Journal*, 116(1175):1–22, Jan. 2012.

[J25] K. A. James and J. R. R. A. Martins. An Isoparametric Approach to Level Set Topology Optimization Using a Body-Fitted Finite Element Mesh. *Computers and Structures*, 90–91:97–106, January 2012. doi:10.1016/j.compstruc.2011.10.004.

[J24] K. A. James, E. Lee, and J. R. R. A. Martins. Stress-Based Topology Optimization Using an Isoparametric Level Set Method. *Finite Elements in Analysis and Design*, 58:20–30, October 2012. doi:10.1016/j.finel.2012.03.012.

[J23] G. J. Kennedy and J. R. R. A. Martins. A homogenization-based theory for anisotropic beams with accurate though-section stress and strain prediction. *International Journal of Solids and Structures*, 49(1):54–72, Jan. 2012. doi:10.1016/j.ijsolstr.2011.09.012.

[J22] A. B. Lambe and J. R. R. A. Martins. Extensions to the Design Structure Matrix for the Description of Multidisciplinary Design, Analysis, and Optimization Processes. *Structural and Multidisciplinary Optimization*, 46:273–284, August 2012. doi:10.1007/s00158-012-0763-y.

[J21] E. Lee, K. A. James, and J. R. R. A. Martins. Stress-Constrained Topology Optimization with Design-Dependent Loading. *Structural and Multidisciplinary Optimization*, 46:647–661, November 2012. doi:10.1007/s00158-012-0780-x.

[J20] E. Lee and J. R. R. A. Martins. Structural Topology Optimization with Design-Dependent Pressure Loads. *Computer Methods in Applied Mechanics and Engineering*, 233–236:40–48, August 2012. doi:10.1016/j.cma.2012.04.007.

[J19] C. A. Mader and J. R. R. A. Martins. Derivatives for Time-Spectral Computational Fluid Dynamics Using an Automatic Differentiation Adjoint. *AIAA Journal*, 50(12):2809–2819, December 2012. doi:10.2514/1.J051658.

[J18] R. E. Perez, P. W. Jansen, and J. R. R. A. Martins. pyOpt: A Python-Based Object-Oriented Framework for Nonlinear Constrained Optimization. *Structural and Multidisciplinary Optimization*, 45(1):101–118, January 2012. doi:10.1007/s00158-011-0666-3.

[J17] G. J. Kennedy, J. S. Hansen, and J. R. R. A. Martins. A Timoshenko beam theory with pressure corrections for layered orthotropic beams. *International Journal of Solids and Structures*, 48(16-17):2373–2382, 2011. doi:10.1016/j.ijsolstr.2011.04.009.

[J16] C. A. Mader and J. R. R. A. Martins. Computation of Aircraft Stability Derivatives Using an Automatic Differentiation Adjoint Approach. *AIAA Journal*, 49(12):2737–2750, December 2011. doi:10.2514/1.J051147.

[J15] T. W. Simpson and J. R. R. A. Martins. Multidisciplinary Design Optimization for Complex Engineered Systems Design: Report from an NSF Workshop. *Journal of Mechanical Design*, 133(10):101002, Oct. 2011. doi:10.1115/1.4004465.

[J14] Q. Thomson and J. R. R. A. Martins. Adaptive Accuracy Trust Region: Using Cross-Validation in the Optimization Process. *Engineering Optimization*, 43(6):615–633, June 2011. doi:10.1080/0305215X.2010.508521.

[J13] P. Jansen, R. E. Perez, and J. R. R. A. Martins. Aerostructural Optimization of Nonplanar Lifting Surfaces. *Journal of Aircraft*, 47(5):1491–1503, September 2010. doi:10.2514/1.44727.

[J12] N. P. Tedford and J. R. R. A. Martins. Benchmarking Multidisciplinary Design Optimization Algorithms. *Optimization and Engineering*, 11(1):159–183, Feb. 2010. doi:10.1007/s11081-009-9082-6.

[J11] I. R. Chittick and J. R. R. A. Martins. An Asymmetric Suboptimization Approach to Aerostructural Optimization. *Optimization and Engineering*, 10(1):133–152, Mar. 2009. doi:10.1007/s11081-008-9046-2.

[J10] K. James, J. S. Hansen, and J. R. R. A. Martins. Structural Topology Optimization for Multiple Load Cases Using a Dynamic Aggregation Technique. *Engineering Optimization*,

41(12):1103–1118, Dec. 2009. doi:10.1080/03052150902926827.

[J9] J. R. R. A. Martins, C. Marriage, and N. P. Tedford. pyMDO: An Object-Oriented Framework for Multidisciplinary Design Optimization. *ACM Transactions on Mathematical Software*, 36(4):20:1–20:25, Aug. 2009. doi:10.1145/1555386.1555389.

[J8] I. R. Chittick and J. R. R. A. Martins. Aero-Structural Optimization Using Adjoint Coupled Post-Optimality Sensitivities. *Structures and Multidisciplinary Optimization*, 36:59–70, December 2008. doi:10.1007/s00158-007-0200-9.

[J7] C. A. Mader, J. R. R. A. Martins, J. J. Alonso, and E. van der Weide. ADjoint: An Approach for the Rapid Development of Discrete Adjoint Solvers. *AIAA Journal*, 46(4):863–873, Apr. 2008. doi:10.2514/1.29123.

[J6] A. C. Marta, C. A. Mader, J. R. R. A. Martins, E. van der Weide, and J. J. Alonso. A methodology for the development of discrete adjoint solvers using automatic differentiation tools. *International Journal of Computational Fluid Dynamics*, 21(9):307–327, 2007. doi:10.1080/10618560701678647.

[J5] N. M. K. Poon and J. R. R. A. Martins. An Adaptive Approach to Constraint Aggregation Using Adjoint Sensitivity Analysis. *Structural and Multidisciplinary Optimization*, 34(1):61–73, July 2007. doi:10.1007/s00158-006-0061-7.

[J4] P. Thokala and J. R. R. A. Martins. Variable-complexity optimization applied to airfoil design. *Engineering Optimization*, 39(3):271–286, Apr. 2006. doi:10.1080/03052150601107976.

[J3] J. R. R. A. Martins, J. J. Alonso, and J. J. Reuther. A Coupled-Adjoint Sensitivity Analysis Method for High-Fidelity Aero-Structural Design. *Optimization and Engineering*, 6(1):33–62, Mar. 2005. doi:10.1023/B:OPTE.0000048536.47956.62.

[J2] J. R. R. A. Martins, J. J. Alonso, and J. J. Reuther. High-Fidelity Aerostructural Design Optimization of a Supersonic Business Jet. *Journal of Aircraft*, 41(3):523–530, May 2004. doi:10.2514/1.11478.

[J1] J. R. R. A. Martins, P. Sturdza, and J. J. Alonso. The Complex-Step Derivative Approximation. *ACM Transactions on Mathematical Software*, 29(3):245–262, September 2003. doi:10.1145/838250.838251.

9.3 Papers in Conference Proceedings

[C154] J. L. Anibal, C. A. Mader, and J. R. R. A. Martins. Aerothermal Optimization of X-57 High-Lift Motor Nacelle. In *AIAA SciTech Forum*, Orlando, FL, January 2020. AIAA.

[C153] N. P. Bons, J. R. R. A. Martins, C. A. Mader, M. McMullen, and M. Suen. High-fidelity Aerostructural Optimization Studies of the Aerion AS2 Supersonic Business Jet. In *Proceedings of the AIAA Aviation Forum*, June 2020. 2020-3182.

[C152] N. P. Bons and J. R. R. A. Martins. Aerostructural Wing Design Exploration with Multidisciplinary Design Optimization. In *Proceedings of the AIAA SciTech Forum*, Orlando, FL, January 2020.

[C151] S. S. Chauhan and J. R. R. A. Martins. RANS-Based Aerodynamic Shape Optimization of a Wing Considering Propeller-Wing Interaction. In *AIAA SciTech Forum*, Orlando, FL, January 2020. AIAA.

[C150] X. Du, P. He, and J. R. R. A. Martins. A B-Spline-based Generative Adversarial Network Model for Fast Interactive Airfoil Aerodynamic Optimization. In *AIAA SciTech Forum*, Orlando, FL, January 2020. AIAA.

[C149] Y. Liao, S. He, J. R. R. A. Martins, and Y. L. Young. Hydrostructural Optimization of Generic Composite Hydrofoils. In *AIAA SciTech Forum*, Orlando, FL, January 2020. AIAA.

[C148] Y. Liao, A. Yildirim, Y. L. Young, and J. R. R. A. Martins. Hydrodynamic Optimization of a T-foil. In *SNAME Maritime Convention*. The Society of Naval Architects and Marine Engineers, 2020.

[C147] J. R. R. A. Martins. Perspectives on Aerodynamic Design Optimization. In *AIAA SciTech Forum*, Orlando, FL, January 2020. AIAA.

[C146] N. Bartoli, M. Meliani, J. Morlier, T. Lefebvre, M.-A. Bouhlel, and J. R. R. A. Martins. Multi-fidelity efficient global optimization: Methodology and application to airfoil shape design. In *AIAA Aviation Forum*, June 2019.

[C145] B. J. Brelje, J. L. Anibal, A. Yildirim, C. A. Mader, and J. R. R. A. Martins. Flexible Formulation of Spatial Integration Constraints in Aerodynamic Shape Optimization. In *57th AIAA Aerospace Sciences Meeting, AIAA SciTech Forum*, San Diego, CA, January 2019.

[C144] B. J. Brelje and J. R. R. A. Martins. Coupled component sizing and aerodynamic shape optimization via geometric constraints. In *AIAA AVIATION Forum*, Dallas, TX, June 2019. American Institute of Aeronautics and Astronautics.

[C143] B. J. Brelje, J. P. Jasa, J. R. R. A. Martins, and J. S. Gray. Development of a Conceptual-Level Thermal Management System Design Capability in OpenConcept. In *NATO Research Symposium on Hybrid/Electric Aero-Propulsion Systems for Military Applications (AVT-RSY-323)*, Trondheim, NO, October 2019.

[C142] G. L. O. Halila, G. Chen, Y. Shi, K. J. Fidkowski, J. R. R. A. Martins, and M. T. Mendonça. High-Reynolds Number Transitional Flow Prediction using a Coupled Discontinuous-Galerkin RANS PSE Framework. In *Proceedings of the 57th AIAA Aerospace Sciences Meeting*, San Diego, CA, January 2019.

[C141] P. He, C. A. Mader, J. R. R. A. Martins, and K. J. Maki. An object-oriented framework for rapid discrete adjoint development using OpenFOAM. In *AIAA Science and Technology Forum and Exposition*, January 2019.

[C140] S. He, E. Jonsson, C. A. Mader, and J. R. R. A. Martins. Aerodynamic Shape Optimization with Time Spectral Flutter Adjoint. In *2019 AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, San Diego, CA, January 2019. American Institute of Aeronautics and Astronautics.

[C139] S. He, E. Jonsson, C. A. Mader, and J. R. R. A. Martins. A Coupled Newton–Krylov Time-Spectral Solver for Wing Flutter and LCO Prediction. In *AIAA Aviation Forum*, Dallas, TX, June 2019.

[C138] J. P. Jasa, J. S. Gray, J. A. Seidel, C. A. Mader, and J. R. R. A. Martins. Multipoint Variable Cycle Engine Design Using Gradient-based Optimization. In *57th AIAA Aerospace Sciences Meeting, AIAA SciTech Forum, 2019*, San Diego, CA, January 2019.

[C137] J. P. Jasa, S. S. Chauhan, J. S. Gray, and J. R. R. A. Martins. How Certain Physical Considerations Impact Aerostructural Wing Optimization. In *AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Dallas, TX, June 2019.

[C136] E. Jonsson, C. A. Mader, G. J. Kennedy, and J. R. R. A. Martins. Computational Modeling of Flutter Constraint for High-Fidelity Aerostructural Optimization. In *2019 AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, San Diego, CA, January 2019. American Institute of Aeronautics and Astronautics.

[C135] M. Mangano and J. R. R. A. Martins. Multipoint Aerodynamic Shape Optimization for Subsonic and Supersonic Regimes. In *57th AIAA Aerospace Sciences Meeting, AIAA SciTech Forum, 2019*, San Diego, CA, January 2019.

[C134] J. R. R. A. Martins and G. J. Kennedy. Enabling Large-scale Multidisciplinary Design Optimization through Adjoint Sensitivity Analysis. In *57th AIAA Aerospace Sciences Meeting,*

AIAA SciTech Forum, San Diego, CA, January 2019.

[C133] J. R. R. A. Martins. CFD-based Aircraft Design Optimization. In *Proceedings of the International Conference on Flow Dynamics*, Sendai, Japan, November 2019.

[C132] A. Yildirim, J. S. Gray, C. A. Mader, and J. R. R. A. Martins. Aeropropulsive Design Optimization of a Boundary Layer Ingestion System. In *AIAA Aviation Forum*, Dallas, TX, June 2019.

[C131] N. P. Bons, C. A. Mader, J. R. R. A. Martins, A. P. C. Cuco, and F. I. K. Odaguil. High-Fidelity Aerodynamic Shape Optimization of a Full Configuration Regional Jet. In *2018 AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, Kissimmee, FL, January 2018.

[C130] B. J. Brelje and J. R. R. A. Martins. Development of a Conceptual Design Model for Aircraft Electric Propulsion with Efficient Gradients. In *Proceedings of the AIAA/IEEE Electric Aircraft Technologies Symposium*, Cincinnati, OH, July 2018.

[C129] A. Chaudhuri, J. Jasa, J. R. R. A. Martins, and K. Willcox. Multifidelity Optimization Under Uncertainty for a Tailless Aircraft. In *2018 AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference; AIAA SciTech Forum*, Orlando, FL, January 2018.

[C128] S. S. Chauhan and J. R. R. A. Martins. Low-Fidelity Aerostructural Optimization of Aircraft Wings with a Simplified Wingbox Model Using OpenAeroStruct. In *Proceedings of the 6th International Conference on Engineering Optimization, EngOpt 2018*, pages 418–431, Lisbon, Portugal, September 2018. Springer.

[C127] A. Dener, J. E. Hicken, G. K. W. Kenway, and J. R. R. A. Martins. Enabling Modular Aerostructural Optimization: Individual Discipline Feasible without the Jacobians. In *2018 AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Atlanta, GA, June 2018.

[C126] J. S. Gray, G. K. W. Kenway, C. A. Mader, and J. R. R. A. Martins. Aero-propulsive Design Optimization of a Turboelectric Boundary Layer Ingestion Propulsion System. In *2018 AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Atlanta, GA, June 2018. AIAA 2018-3976.

[C125] S. He, E. Jonsson, C. A. Mader, and J. R. R. A. Martins. A Coupled Newton–Krylov Time Spectral Solver for Flutter Prediction. In *2018 AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, Kissimmee, FL, January 2018. American Institute of Aeronautics and Astronautics.

[C124] P. He, G. Filip, J. R. R. A. Martins, and K. J. Maki. Hull form hydrodynamic design using a discrete adjoint optimization method. In *13th International Marine Design Conference*, Helsinki, Finland, June 2018.

[C123] P. He, C. A. Mader, J. R. R. A. Martins, and K. J. Maki. Aerothermal optimization of internal cooling passages using a discrete adjoint method. In *AIAA/ASME Joint Thermophysics and Heat Transfer Conference*, Atlanta, GA, June 2018.

[C122] J. P. Jasa, J. T. Hwang, and J. R. R. A. Martins. Design and Trajectory Optimization of a Morphing Wing Aircraft. In *2018 AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference; AIAA SciTech Forum*, Orlando, FL, January 2018.

[C121] J. P. Jasa, C. A. Mader, and J. R. R. A. Martins. Trajectory Optimization of a Supersonic Air Vehicle with Thermal Fuel Management System. In *AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Atlanta, GA, June 2018.

[C120] S. Kota and J. R. R. A. Martins. FlexFoil Shape Adaptive Control Surfaces—Flight Test and Numerical Results. In *Proceedings of the 31st Congress of the International Council of Aeronautical Sciences*, Belo Horizonte, Brazil, September 2018.

[C119] J. Li, M. A. Bouhlel, and J. R. R. A. Martins. A data-based approach for fast airfoil analysis and optimization. In *2018 AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, Kissimmee, FL, January 2018.

[C118] S. Roy, W. A. Crossley, K. T. Moore, J. S. Gray, and J. R. R. A. Martins. Next generation aircraft design considering airline operations and economics. In *AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, Kissimmee, FL, January 2018.

[C117] N. R. Secco and J. R. R. A. Martins. RANS-based Aerodynamic Shape Optimization of a Strut-braced Wing with Overset Meshes. In *2018 AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, Kissimmee, FL, January 2018. American Institute of Aeronautics and Astronautics.

[C116] Y. Shi, R. Gross, C. A. Mader, and J. R. R. A. Martins. Transition Prediction Based on Linear Stability Theory with the RANS Solver for Three-Dimensional Configurations. In *Proceedings of the AIAA Aerospace Sciences Meeting, AIAA SciTech Forum*, Kissimmee, FL, January 2018.

[C115] N. Bartoli, T. Lefebvre, S. Dubreuil, R. Olivanti, N. Bons, J. R. R. A. Martins, M. A. Bouhlel, and J. Morlier. An adaptive optimization strategy based on mixture of experts for wing aerodynamic design optimization. In *Proceedings of the 18th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Denver, CO, June 2017.

[C114] N. P. Bons, X. He, C. A. Mader, and J. R. R. A. Martins. Multimodality in Aerodynamic Wing Design Optimization. In *18th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Denver, CO, June 2017.

[C113] T. R. Brooks, G. J. Kennedy, and J. R. R. A. Martins. High-fidelity Multipoint Aerostructural Optimization of a High Aspect Ratio Tow-steered Composite Wing. In *Proceedings of the 58th AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, AIAA SciTech Forum*, Grapevine, TX, January 2017.

[C112] T. R. Brooks, G. K. W. Kenway, and J. R. R. A. Martins. Undeflected Common Research Model (uCRM): An Aerostructural Model for the Study of High Aspect Ratio Transport Aircraft Wings. In *18th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Denver, CO, June 2017.

[C111] S. S. Chauhan, J. T. Hwang, and J. R. R. A. Martins. Benchmarking approaches for the multidisciplinary analysis of complex systems using a Taylor series-based scalable problem. In *12th World Congress on Structural and Multidisciplinary Optimization*, Braunschweig, Germany, June 2017.

[C110] J. M. Colomer, N. Bartoli, T. Lefebvre, S. Dubreuil, J. R. R. A. Martins, E. Benard, and J. Morlier. Similarity Maximization of a Scaled Aeroelastic Flight Demonstrator via Multidisciplinary Optimization. In *Proceedings of the AIAA SciTech Conference*, Grapevine, TX, January 2017. AIAA 2017-0573.

[C109] J. Gray, C. A. Mader, G. K. W. Kenway, , and J. R. R. A. Martins. Approach to Modeling Boundary Layer Ingestion using a Fully Coupled Propulsion-RANS Model. In *55th AIAA Aerospace Sciences Meeting (SciTech)*, Grapevine, TX, January 2017.

[C108] E. Jonsson, G. K. W. Kenway, G. J. Kennedy, and J. R. R. A. Martins. Development of Flutter Constraints for High-fidelity Aerostructural Optimization. In *18th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Denver, CO, June 2017. AIAA 2017-4455.

[C107] G. K. W. Kenway, N. Secco, J. R. R. A. Martins, A. Mishra, and K. Duraisamy. An Efficient Parallel Overset Method for Aerodynamic Shape Optimization. In *Proceedings of the 58th AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, AIAA SciTech Forum*, Grapevine, TX, January 2017.

[C106] C. A. Mader, G. K. Kenway, J. R. R. A. Martins, and A. Uranga. Aerostructural Optimization of the D8 Wing with Varying Cruise Mach Numbers. In *18th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*. American Institute of Aeronautics and Astronautics, June 2017.

[C105] S. Roy, K. Moore, J. T. Hwang, J. S. Gray, W. A. Crossley, and J. R. R. A. Martins. A Mixed Integer Efficient Global Optimization Algorithm for the Simultaneous Aircraft Allocation-Mission-Design Problem. In *Proceeding of the 58th AIAA Structures, Structural Dynamics, and Materials Conference*, Grapevine, TX, January 2017.

[C104] N. R. Secco, J. P. Jasa, G. K. W. Kenway, and J. R. R. A. Martins. Component-based Geometry Manipulation for Aerodynamic Shape Optimization with Overset Meshes. In *18th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*. American Institute of Aeronautics and Astronautics, June 2017. AIAA 2017-3327.

[C103] C. Vanaret, F. Gallard, and J. R. R. A. Martins. On the Consequences of the "No Free Lunch" Theorem for Optimization on the Choice of MDO Architecture. In *Proceedings of the AIAA SciTech Conference*, Grapevine, TX, January 2017. AIAA 2017-3148.

[C102] T. R. Brooks, G. J. Kennedy, and J. R. R. A. Martins. High-fidelity Aerostructural Optimization of a High Aspect Ratio Tow-steered Wing. In *57th AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*. American Institute of Aeronautics and Astronautics, January 2016.

[C101] D. A. Burdette, G. K. Kenway, and J. R. R. A. Martins. Performance Evaluation of a Morphing Trailing Edge Using Multipoint Aerostructural Design Optimization. In *57th AIAA Structures, Structural Dynamics, and Materials Conference*. AIAA, January 2016.

[C100] D. A. Burdette, G. K. W. Kenway, and J. R. R. A. Martins. Aerostructural design optimization of a continuous morphing trailing edge aircraft for improved mission performance. In *17th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Washington, D.C., June 2016.

[C99] N. Garg, G. K. W. Kenway, J. R. R. A. Martins, and Y. L. Young. High-fidelity Coupled Hydrostructural Optimization of a 3-D Hydrofoil. *International Symposium on Transport Phenomena and Dynamics of Rotating Machinery*, April 2016.

[C98] J. S. Gray, J. Chin, T. Hearn, E. S. Hendricks, T. M. Lavelle, and J. R. R. A. Martins. Thermodynamics For Gas Turbine Cycles With Analytic Derivatives in OpenMDAO. In *57th AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*. American Institute of Aeronautics and Astronautics, January 2016.

[C97] J. T. Hwang and J. R. R. A. Martins. Allocation-mission-design optimization of next-generation aircraft using a parallel computational framework. In *57th AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*. American Institute of Aeronautics and Astronautics, January 2016.

[C96] G. K. Kenway and J. R. R. A. Martins. Aerodynamic Shape Optimization of the CRM Configuration Including Buffet-Onset Conditions. In *54th AIAA Aerospace Sciences Meeting*, San Diego, CA, January 2016. American Institute of Aeronautics and Astronautics.

[C95] T. R. Brooks, J. T. Hwang, G. J. Kennedy, and J. R. R. A. Martins. High-fidelity structural optimization of a tow-steered composite wing. In *Proceedings of the 11th World Congress on Structural and Multidisciplinary Optimization*, Sydney, Australia, June 2015.

[C94] D. Burdette, G. K. W. Kenway, Z. Lyu, and J. R. R. A. Martins. Aerostructural Design Optimization of an Adaptive Morphing Trailing Edge Wing. In *Proceedings of the AIAA Science and Technology Forum and Exposition (SciTech)*, Kissimmee, FL, January 2015.

[C93] S. Chen, Z. Lyu, G. K. W. Kenway, and J. R. R. A. Martins. Aerodynamic Shape Optimization of the Common Research Model Wing-Body-Tail Configuration. In *Proceedings of the*

AIAA Science and Technology Forum and Exposition (SciTech), Kissimmee, FL, January 2015. AIAA 2015-1718.

[C92] A. Dener, J. E. Hicken, G. K. W. Kenway, Z. Lyu, and J. R. R. A. Martins. Comparison of Newton–Krylov and Quasi-Newton Algorithms for Aerodynamic Shape Optimization. In *Proceedings of the AIAA Science and Technology Forum and Exposition (SciTech)*, Kissimmee, FL, January 2015. AIAA 2015-1129.

[C91] J. T. Hwang and J. R. R. A. Martins. Parallel allocation-mission optimization of a 128-route network. In *Proceedings of the 16th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Dallas, TX, June 2015.

[C90] J. T. Hwang, S. Roy, J. Y. Kao, J. R. R. A. Martins, and W. A. Crossley. Simultaneous aircraft allocation and mission optimization using a modular adjoint approach. In *Proceedings of the 56th AIAA/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference*, Kissimmee, FL, Jan. 2015. AIAA 2015-0900.

[C89] D. Ivaldi, N. R. Secco, S. Chen, J. T. Hwang, and J. R. R. A. Martins. Aerodynamic Shape Optimization of a Truss-Braced-Wing Aircraft. In *Proceedings of the 16th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Dallas, TX, June 2015.

[C88] J. Y. Kao, J. T. Hwang, J. R. R. A. Martins, J. S. Gray, and K. T. Moore. A Modular Adjoint Approach to Aircraft Mission Analysis and Optimization. In *Proceedings of the AIAA Science and Technology Forum and Exposition (SciTech)*, Kissimmee, FL, January 2015. AIAA 2015-0136.

[C87] G. K. W. Kenway and J. R. R. A. Martins. Multipoint Aerodynamic Shape Optimization Investigations of the Common Research Model Wing. In *Proceedings of the AIAA Science and Technology Forum and Exposition (SciTech)*, Kissimmee, FL, January 2015.

[C86] G. W. K. Kenway and J. R. R. A. Martins. High-fidelity aerostructural optimization considering buffet onset. In *Proceedings of the 16th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Dallas, TX, June 2015. AIAA 2015-2790.

[C85] J. S. Gray, T. Hearn, K. Moore, J. T. Hwang, J. R. R. A. Martins, and A. Ning. Automatic Evaluation of Multidisciplinary Derivatives Using a Graph-Based Problem Formulation in OpenMDAO. In *Proceedings of the 15th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Atlanta, GA, June 2014.

[C84] J. T. Hwang, G. K. W. Kenway, and J. R. R. A. Martins. Geometry and Structural Modeling for High-Fidelity Aircraft Conceptual Design Optimization. In *Proceedings of the 15th AIAA Multidisciplinary Analysis and Optimization Conference*, Atlanta, GA, June 2014. AIAA 2014-2041.

[C83] G. J. Kennedy, G. K. W. Kenway, and J. R. R. A. Martins. High Aspect Ratio Wing Design: Optimal Aerostructural Tradeoffs for the Next Generation of Materials. In *Proceedings of the AIAA Science and Technology Forum and Exposition (SciTech)*, National Harbor, MD, January 2014.

[C82] G. J. Kennedy, G. K. W. Kenway, and J. R. R. A. Martins. Towards Gradient-Based Design Optimization of Flexible Transport Aircraft with Flutter Constraints. In *Proceedings of the 15th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Atlanta, GA, June 2014. AIAA 2014-2726.

[C81] G. K. W. Kenway, G. J. Kennedy, and J. R. R. A. Martins. Aerostructural Optimization of the Common Research Model Configuration. In *15th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Atlanta, GA, June 2014. AIAA 2014-3274.

[C80] A. B. Lambe, G. J. Kennedy, and J. R. R. A. Martins. Multidisciplinary Design Optimization of an Aircraft Wing via a Matrix-Free Approach. In *Proceedings of the 15th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Atlanta, GA, June

2014. AIAA 2014-2429.

[C79] R. P. Liem and J. R. R. A. Martins. Surrogate Models and Mixtures of Experts in Aerodynamic Performance Prediction for Mission Analysis. In *15th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Atlanta, GA, June 2014. AIAA-2014-2301.

[C78] Z. Lyu, G. K. W. Kenway, and J. R. R. A. Martins. RANS-based Aerodynamic Shape Optimization Investigations of the Common Research Model Wing. In *Proceedings of the AIAA Science and Technology Forum and Exposition (SciTech)*, National Harbor, MD, January 2014. AIAA 2014-0567.

[C77] Z. Lyu and J. R. R. A. Martins. Strategies for Solving High-Fidelity Aerodynamic Shape Optimization Problems. In *15th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Atlanta, GA, June 2014. AIAA 2014-2594.

[C76] Z. Lyu and J. R. R. A. Martins. Aerodynamic Shape Optimization of an Adaptive Morphing Trailing Edge Wing. In *Proceedings of the 15th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Atlanta, GA, June 2014. AIAA 2014-3275.

[C75] Z. Lyu, Z. Xu, and J. R. R. A. Martins. Benchmarking Optimization Algorithms for Wing Aerodynamic Design Optimization. In *Proceedings of the 8th International Conference on Computational Fluid Dynamics*, Chengdu, Sichuan, China, July 2014. ICCFD8-2014-0203.

[C74] A. Gogulapati, P. P. Friedmann, and J. R. R. A. Martins. Optimization of the Kinematics of a Flapping Wing MAV in Hover for Enhanced Performance. In *Proceedings of the 54th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, Boston, MA, April 2013.

[C73] J. T. Hwang, D. Y. Lee, J. W. Cutler, and J. R. R. A. Martins. Large-Scale MDO of a Small Satellite using a Novel Framework for the Solution of Coupled Systems and their Derivatives. In *Proceedings of the 54th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, Boston, MA, April 2013.

[C72] G. J. Kennedy and J. R. R. A. Martins. An Adjoint-based Derivative Evaluation Method for Time-dependent Aeroelastic Optimization of Flexible Aircraft. In *Proceedings of the 54th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, Boston, MA, April 2013.

[C71] G. J. Kennedy and J. R. Martins. Hybrid-parallel Methods for Large-scale Gradient-based Structural Design Optimization. In *Proceedings of the 10th World Congress on Structural and Multidisciplinary Optimization*, Orlando, FL, May 2013.

[C70] A. B. Lambe and J. R. R. A. Martins. A Matrix-Free Approach to Large-Scale Structural Optimization. In *Proceedings of the 10th World Congress on Structural and Multidisciplinary Optimization*, Orlando, FL, May 2013.

[C69] R. P. Liem, C. A. Mader, E. Lee, and J. R. R. A. Martins. Aerostructural design optimization of a 100-passenger regional jet with surrogate-based mission analysis. In *2013 Aviation Technology, Integration, and Operations Conference*, September 2013.

[C68] Z. Lyu and J. R. R. A. Martins. Aerodynamic Shape Optimization of a Blended-Wing-Body Aircraft. In *Proceedings of the 51st AIAA Aerospace Sciences Meeting*, Grapevine, TX, Jan. 2013. AIAA 2013-0283.

[C67] Z. Lyu and J. R. R. A. Martins. RANS-based Aerodynamic Shape Optimization of a Blended-Wing-Body Aircraft. In *21st AIAA Computational Fluid Dynamics Conference*, San Diego, CA, July 2013.

[C66] Z. Lyu, G. K. Kenway, C. Paige, and J. R. R. A. Martins. Automatic Differentiation Adjoint of the Reynolds-Averaged Navier–Stokes Equations with a Turbulence Model. In *21st AIAA Computational Fluid Dynamics Conference*, San Diego, CA, July 2013.

[C65] J. T. Hwang and J. R. R. A. Martins. A Dynamic Parametrization Scheme for 3-D Shape

Optimization Using Quasi-Newton Methods. In *Proceedings of the 50th AIAA Aerospace Sciences Meeting*, Nashville, TN, Jan. 2012. AIAA 2012-0962.

[C64] J. T. Hwang, A. M. Waas, and J. R. R. A. Martins. Micromechanical Modeling and Design Optimization of 2-D Triaxial Braided Composites. In *Proceedings of the 50th AIAA Aerospace Sciences Meeting*, Nashville, TN, Jan. 2012. AIAA 2012-1257.

[C63] J. T. Hwang and J. R. R. A. Martins. GeoMACH: Geometry-centric MDAO of Aircraft Configurations with High Fidelity. In *Proceedings of the 14th AIAA/ISSMO Multidisciplinary Analysis Optimization Conference*, Indianapolis, IN, Sept. 2012. AIAA 2012-5605.

[C62] G. J. Kennedy and J. R. R. A. Martins. A Regularized Discrete Laminate Parametrization Technique with Applications to Wing-Box Design Optimization. In *53rd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, Honolulu, HI, Apr. 2012. AIAA 2012-1519.

[C61] G. J. Kennedy and J. R. R. A. Martins. A Comparison of Metallic and Composite Aircraft Wings Using Aerostructural Design Optimization. In *14th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Indianapolis, IN, September 2012. AIAA-2012-5475.

[C60] G. K. W. Kenway, G. J. Kennedy, and J. R. R. A. Martins. A Scalable Parallel Approach for High-Fidelity Aerostructural Analysis and Optimization. In *53rd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, Honolulu, HI, Apr. 2012. AIAA 2012-1922.

[C59] R. P. Liem, G. K. W. Kenway, and J. R. R. A. Martins. Multi-point, multi-mission, high-fidelity aerostructural optimization of a long-range aircraft configuration. In *Proceedings of the 14th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Indianapolis, IN, Sept. 2012.

[C58] Z. Lu and J. R. R. A. Martins. Graph Partitioning-Based Coordination Methods for Large-Scale Multidisciplinary Design Optimization Problems. In *Proceedings of the 14th AIAA/ISSMO Multidisciplinary Analysis Optimization Conference*, Indianapolis, IN, September 2012. AIAA 2012-5522.

[C57] C. A. Mader and J. R. R. A. Martins. Optimal Flying Wings: A Numerical Optimization Study. In *53rd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, Honolulu, HI, Apr. 2012. AIAA 2012-1758.

[C56] J. R. R. A. Martins and J. T. Hwang. Review and Unification of Methods for Computing Derivatives of Multidisciplinary Systems. In *53rd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, Honolulu, HI, Apr. 2012. AIAA 2012-1589.

[C55] S. Haghighat, H. H. T. Liu, and J. R. R. A. Martins. Mixed-Norm Multi-Objective Robust Controller Applied to a Very Flexible Aircraft. In *Proceedings of the AIAA Guidance, Navigation and Control Conference*, Portland, OR, Aug. 2011. AIAA 2011-6256.

[C54] S. Haghighat, H. H. T. Liu, and J. R. R. A. Martins. Aeroservoelastic Design Optimization of a High Aspect Ratio Flying Wing. In *Proceedings of the International Forum on Aeroelasticity and Structural Dynamics*, Paris, France, June 2011. IFASD-2011-162.

[C53] K. A. James and J. R. R. A. Martins. Level Set Topology Optimization of Structures with Isoparametric Mesh Mapping. In *Proceedings of the 9th World Congress on Structural and Multidisciplinary Optimization*, Shizuoka, Japan, June 2011. Paper 257-1.

[C52] K. A. James, G. J. Kennedy, and J. R. R. A. Martins. Aerostructural Topology Optimization of an Aircraft Wingbox. In *Proceedings of the CASI AERO 2011 Conference*, Montreal, QC, Apr. 2011.

[C51] G. J. Kennedy and J. R. R. A. Martins. Aerostructural design optimization of composite aircraft with stress and local buckling constraints using an implicit structural parametrization.

In *Proceedings of CASI AERO 2011*, Montreal, Quebec, Apr. 2011.

[C50] A. B. Lambe and J. R. R. A. Martins. A Unified Description of MDO Architectures. In *Proceedings of the 9th World Congress on Structural and Multidisciplinary Optimization*, Shizuoka, Japan, June 2011.

[C49] C. A. Mader and J. R. R. A. Martins. Stability-Constrained Aerodynamic Shape Optimization of Flying Wings. In *Proceedings of the CASI Conference*, Montreal, QC, Apr. 2011.

[C48] S. Haghighat, H. H. T. Liu, and J. R. R. A. Martins. Application of Robust Control Design Techniques to the Aeroservoelastic Design Optimization of a Very Flexible UAV Wing. In *Proceedings of the 13th AIAA/ISSMO Multidisciplinary Analysis Optimization Conference*, Fort Worth, TX, Sept. 2010. AIAA 2010-9123.

[C47] K. A. James and J. R. R. A. Martins. Topology Optimization Using a Level Set Method with an Arbitrary Structured Mesh. In *6th AIAA Multidisciplinary Design Optimization Specialist Conference*, Orlando, FL, Apr. 2010. AIAA 2010-2842.

[C46] G. K. Kenway, R. Henderson, J. E. Hicken, N. B. Kuntawala, D. W. Zingg, J. R. R. A. Martins, and R. G. McKeand. Reducing Aviation's Environmental Impact Through Large Aircraft For Short Ranges. In *Proceedings of the 48th AIAA Aerospace Sciences Meeting and Exhibit*, Orlando, FL, Jan. 2010. AIAA 2010-1015.

[C45] G. K. Kenway, G. J. Kennedy, and J. R. R. A. Martins. A CAD-Free Approach to High-Fidelity Aerostructural Optimization. In *Proceedings of the 13th AIAA/ISSMO Multidisciplinary Analysis Optimization Conference*, number AIAA 2010-9231, Fort Worth, TX, 2010.

[C44] A. B. Lambe and J. R. R. A. Martins. A New Approach to Multidisciplinary Design Optimization via Internal Decomposition. In *Proceedings of the 13th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Fort Worth, TX, Sept. 2010. AIAA 2010-9325.

[C43] C. A. Mader and J. R. R. A. Martins. Stability-Constrained Aerodynamic Shape Optimization of a Flying Wing Configuration. In *Proceedings of the 13th AIAA/ISSMO Multidisciplinary Analysis Optimization Conference*, Forth Worth, TX, Sept. 2010. AIAA 2010-9199.

[C42] S. Haghighat, J. R. R. A. Martins, and H. H. T. Liu. Integrating an Active Control System with the Structural Design of a Flexible Wing Using Multidisciplinary Optimization. In *Proceedings of the International Forum on Aeroelasticity and Structural Dynamics*, Seattle, USA, June 2009.

[C41] S. Haghighat, H. H. T. Liu, and J. R. R. A. Martins. Application of Model Predictive Control to Gust Loads Alleviation Systems. In *Proceedings of the AIAA Atmospheric Flight Mechanics Conference and Exhibit*, Chicago, IL, Aug. 2009. AIAA 2009-5929.

[C40] S. Haghighat, H. H. T. Liu, and J. R. R. A. Martins. Gust Load Alleviation Using Model Predictive Control for Large Aspect Ratio UAV Wings. In *Canadian Aeronautics and Space Institute Annual General Meeting*, Ottawa, Canada, May 2009.

[C39] R. Henderson and J. R. R. A. Martins. Conceptual Design and Optimization of Environmentally-Friendly Aircraft. In *Proceedings of the 2009 SAE AeroTech Congress and Exhibition*. SAE, Nov. 2009.

[C38] C. A. Mader and J. R. R. A. Martins. A Discrete Adjoint Formulation for Stability Derivatives Using the ADjoint Approach. In *Proceedings of the CASI Conference*, Kanata, ON, May 2009.

[C37] S. Haghighat, H. H. T. Liu, and J. R. R. A. Martins. Modeling and Simulation of Flexible UAVs with Large Aspect Ratio. In *Proceedings of the International Conference on System Simulation and Scientific Computing*, Beijing, China, Oct. 2008.

[C36] K. A. James, J. S. Hansen, and J. R. R. A. Martins. Structural Topology Optimization for Multiple Load Cases While Avoiding Local Minima. In *Proceedings of the 4th AIAA Multidisciplinary Design Optimization Specialist Conference*, Schaumburg, IL, Apr. 2008. AIAA 2008-2287.

[C35] K. James and J. R. R. A. Martins. Three-Dimensional Structural Topology Optimization of an Aircraft Wing Using Level Set Methods. In *Proceedings of the 12th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Victoria, BC, Sept. 2008.

[C34] G. Kennedy, J. R. R. A. Martins, and J. S. Hansen. Aerostructural Optimization of Aircraft Structures Using Asymmetric Subspace Optimization. In *Proceedings of the 12th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Victoria, BC, Canada, Sept. 2008. AIAA 2008-5847.

[C33] G. K. W. Kenway and J. R. R. A. Martins. Aerostructural Shape Optimization of Wind Turbine Blades Considering Site-Specific Winds. In *Proceedings of the 12th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Victoria, BC, Sept. 2008. AIAA 2008-6025.

[C32] C. A. Mader, G. K. W. Kenway, and J. R. R. A. Martins. A Framework for High-Fidelity Aerostructural Optimization of Aircraft Configurations. In *Proceedings of the International Conference on System Simulation and Scientific Computing*, Beijing, China, Oct. 2008.

[C31] C. A. Mader, G. Kenway, and J. R. R. A. Martins. Towards High-Fidelity Aerostructural Optimization Using a Coupled ADjoint Approach. In *Proceedings of the 12th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Victoria, BC, Sept. 2008. AIAA 2008-5968.

[C30] C. J. Marriage and J. R. R. A. Martins. Reconfigurable Semi-Analytic Sensitivity Methods and MDO Architectures within the πMDO Framework. In *Proceedings of the 12th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Victoria, British Columbia, Canada, September 2008.

[C29] R. E. Perez, R. Henderson, and J. R. R. A. Martins. Multidisciplinary Design Optimization of Airframe and Engine for Emissions Reduction. In *Proceedings of the 12th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Victoria, BC, Sept. 2008. AIAA 2008-6014.

[C28] R. E. Perez and J. R. R. A. Martins. pyACDT: An Object-Oriented Framework for Aircraft Design Modelling and Multidisciplinary Optimization. In *Proceedings of the 12th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Victoria, BC, Sept. 2008. AIAA 2008-5955.

[C27] Q. Thomson and J. R. R. A. Martins. Progressive Validity Trust Region Optimization Using a Kriging Metamodel. In *Proceedings of the 12th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Victoria, BC, Sept. 2008.

[C26] A. T. Yu and J. R. R. A. Martins. A Configurable B-Spline Parametrization Method for Structural Optimization of Wing Boxes. In *Proceedings of the 12th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Victoria, BC, Sept. 2008.

[C25] C. A. Mader, J. R. R. A. Martins, and A. C. Marta. Towards Aerodynamic Shape Optimization of an Oblique Wing Using the ADjoint Approach. In *Proceedings of the CASI Conference*, Toronto, ON, Apr. 2007.

[C24] C. A. Mader, A. C. Marta, and J. R. R. A. Martins. Aerodynamic Shape Optimization of an Oblique Wing Using the ADjoint Approach. In *Proceedings of the 15th Conference of the CFD Society of Canada*, Toronto, ON, May 2007.

[C23] C. A. Mader, J. R. R. A. Martins, and A. C. Marta. Towards Aircraft Design Using an Automatic Discrete Adjoint Solver. In *Proceedings of the 18th AIAA Computational Fluid*

Dynamics Conference, Miami, FL, June 2007. AIAA 2008-5968.

[C22] J. R. R. A. Martins and I. R. Chittick. Subspace Optimization of Multidisciplinary Systems Using Coupled Post-Optimality Sensitivity Analysis. In *Proceedings of the 7th World Congress on Structural and Multidisciplinary Optimization*, Seoul, South Korea, May 2007.

[C21] J. R. R. A. Martins and C. Marriage. An Object-Oriented Framework for Multidisciplinary Design Optimization. In *Proceedings of the 3rd AIAA Multidisciplinary Design Optimization Specialist Conference*, Waikiki, HI, Apr. 2007. AIAA 2007-1906.

[C20] A. T. Yu and J. R. R. A. Martins. Structural Optimization of a Wing Box Using B-Spline Parametrization. In *Proceedings of the CASI Conference*, Toronto, ON, Apr. 2007.

[C19] J. R. R. A. Martins, J. J. Alonso, and E. van der Weide. An Automated Approach for Developing Discrete Adjoint Solvers. In *Proceedings of the 2nd AIAA Multidisciplinary Design Optimization Specialist Conference*, Newport, RI, May 2006. AIAA 2006-1608.

[C18] J. R. R. A. Martins, C. A. Mader, and J. J. Alonso. ADjoint: An Approach for Rapid Development of Discrete Adjoint Solvers. In *Proceedings of the 11th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Portsmouth, VA, Sept. 2006. AIAA 2006-7121.

[C17] N. P. Tedford and J. R. R. A. Martins. Comparison of MDO Architectures within a Universal Framework. In *Proceedings of the 2nd AIAA Multidisciplinary Design Optimization Specialist Conference*, Newport, RI, May 2006. AIAA 2006-1617.

[C16] N. P. Tedford and J. R. R. A. Martins. On the Common Structure of MDO Problems: A Comparison of Architectures. In *Proceedings of the 11th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Portsmouth, VA, Sept. 2006. AIAA 2006-7080.

[C15] J. R. R. A. Martins and N. M. K. Poon. On Structural Optimization Using Constraint Aggregation. In *Proceedings of the 6th World Congress on Structural and Multidisciplinary Optimization*, Rio de Janeiro, Brazil, May 2005.

[C14] N. M. K. Poon and J. R. R. A. Martins. Adaptive Constraint Aggregation for Structural Optimization Using Adjoint Sensitivities. In *Proceedings of the CASI Aircraft Design and Development Symposium*, Toronto, ON, Apr. 2005.

[C13] P. Thokala and J. R. R. A. Martins. Variable Complexity Methods Applied to Airfoil Optimization. In *Proceedings of the CASI Aircraft Design and Development Symposium*, Toronto, ON, Apr. 2005.

[C12] A. T. Yu and J. R. R. A. Martins. Efficient Coupled-Sensitivity Analysis Methods for Aero-Structural Optimization. In *Proceedings of the CASI Aircraft Design and Development Symposium*, Toronto, ON, Apr. 2005.

[C11] J. J. Alonso, P. LeGresley, E. van der Weide, J. R. R. A. Martins, and J. J. Reuther. pyMDO: A Framework for High-Fidelity Multi-Disciplinary Optimization. In *Proceedings of the 10th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, Albany, NY, Sept. 2004. AIAA 2004-4480.

[C10] J. J. Alonso, J. R. R. A. Martins, J. J. Reuther, and R. Haimes. High-Fidelity Aero-Structural Design Using a Parametric CAD-Based Model. In *Proceedings of the 16th AIAA Computational Fluid Dynamics Conference*, Orlando, FL, June 2003. AIAA 2003-3429.

[C9] J. R. R. A. Martins, J. J. Alonso, and J. J. Reuther. A Coupled-Adjoint Sensitivity Analysis Method for Aero-Structural Optimization. In *Proceedings of the CASI Aircraft Design and Development Symposium*, Montréal, QC, Apr. 2003.

[C8] J. R. R. A. Martins, J. J. Alonso, and P. LeGresley. Aero-Structural Optimization of Aircraft Configurations Using Coupled-Sensitivity Analysis. In *Proceedings of the SIAM Conference on Computational Science and Engineering*, San Diego, CA, Feb. 2003.

[C7] J. R. R. A. Martins, J. J. Alonso, and J. J. Reuther. Complete Configuration Aero-Structural

Optimization Using a Coupled Sensitivity Analysis Method. In *Proceedings of the 9th AIAA/ISSMO Symposium on Multidisciplinary Analysis and Optimization*, Atlanta, GA, Sept. 2002. AIAA 2002-5402.

[C6] J. R. R. A. Martins, J. J. Alonso, and J. J. Reuther. High-Fidelity Aero-Structural Design Optimization of a Supersonic Business Jet. In *Proceedings of the 43rd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, Denver, CO, Apr. 2002. AIAA 2002-1483.

[C5] J. R. R. A. Martins, P. Sturdza, and J. J. Alonso. The Connection Between the Complex-Step Derivative Approximation and Algorithmic Differentiation. In *Proceedings of the 39th AIAA Aerospace Sciences Meeting*, Reno, NV, Jan. 2001. AIAA 2001-0921.

[C4] J. R. R. A. Martins, J. J. Alonso, and J. J. Reuther. Aero-Structural Wing Design Optimization Using High-Fidelity Sensitivity Analysis. In H. Hölinger, editor, *Proceedings of the CEAS Conference on Multidisciplinary Aircraft Design and Optimization*, pages 211–226, Köln, Germany, June 2001.

[C3] P. Peterson, J. R. R. A. Martins, and J. J. Alonso. Fortran to Python Interface Generator with an Application to Aerospace Engineering. In *Proceedings of the 9th International Python Conference*, Long Beach, CA, Jan. 2001.

[C2] J. R. R. A. Martins, I. M. Kroo, and J. J. Alonso. An Automated Method for Sensitivity Analysis Using Complex Variables. In *Proceedings of the 38th AIAA Aerospace Sciences Meeting*, Reno, NV, Jan. 2000. AIAA 2000-0689.

[C1] J. Reuther, J. J. Alonso, J. R. R. A. Martins, and S. C. Smith. A Coupled Aero-Structural Optimization Method for Complete Aircraft Configurations. In *Proceedings of the 37th AIAA Aerospace Sciences Meeting and Exhibit*, Reno, NV, Jan. 1999. AIAA 99-0187.

10 Short Courses

[S12] *Optimal Design in Multidisciplinary Systems*, AIAA Short Course, Atlanta, GA, Jun 2018 (2 days; with Jaroslaw Sobieski).

[S11] *Multidisciplinary Design Optimization with Aerospace Applications*, Viettel Aerospace Institute, Hanoi, Vietnam, Jun 2018 (5 days).

[S10] *A Short Course on Multidisciplinary Design Optimization of Aircraft Configurations*, Gulfstream Aerospace, Savannah, GA, Jul 2017 (2 days).

[S9] *Optimal Design in Multidisciplinary Systems*, AIAA Short Course, Denver, CO, Jun 2017 (2 days; with Jaroslaw Sobieski).

[S8] *Optimal Design in Multidisciplinary Systems*, AIAA Short Course, Washington, DC, Jun 2016 (2 days; with Jaroslaw Sobieski).

[S7] *A Very Short Course on Multidisciplinary Design Optimization*, ISAE, Toulouse, France, Mar 2016.

[S6] *High-Fidelity Multidisciplinary Design Optimization*, Airbus Technical Workshop, Airbus, Filton, UK, Dec 2015 (2 days).

[S5] *Optimal Design in Multidisciplinary Systems*, AIAA Short Course, Dallas, TX, Jun 2015 (2 days; with Jaroslaw Sobieski).

[S4] *Optimal Design in Multidisciplinary Systems*, AIAA Short Course, Atlanta, GA, Jun 2014 (2 days; with Jaroslaw Sobieski).

[S3] *A Short Course on Multidisciplinary Design Optimization*, Embraer, São José dos Campos, Brazil, Jul 2012 (3 days).

[S2] *A Short Course on Multidisciplinary Design Optimization*, Portuguese Air Force Academy, Sintra, Portugal, May 2010 (2 days).

[S1] *A Short Course on Multidisciplinary Optimization*, 5th Annual Conference of the CFD Society of Canada, Toronto, May 2007 (1 day).

11 Invited Presentations

[P105] *Multidisciplinary Design Optimization for the Next Generation of Aircraft*, Seminar, Stanford University, Department of Aeronautics and Astronautics, May 2020 (remote presentation).

[P104] *Multidisciplinary Design Optimization for the Next Generation of Aircraft*, Invited lecture for 16.888/ESD.77 Multidisciplinary System Design Optimization, Massachusetts Institute of Technology, Department of Aeronautics and Astronautics, Apr 2020 (remote presentation).

[P103] *The Adjoint Method in Multidisciplinary Design Optimization*, AIAA SciTech Forum, Special Session in Honor of Antony Jameson's 85th Birthday, Orlando, FL, Jan 2020.

[P102] *Evolution of derivative computation, coupled adjoints, and OpenMDAO: a personal perspective*, OpenMDAO Workshop, Ohio Aerospace Institute, Oct 2019

[P101] *High-fidelity Multidisciplinary Design Optimization for the Next Generation of Aircraft*, Invited seminar, Queen Mary University, London, UK, Oct 2019

[P100] *Aerodynamic Design Optimization: Methods, Tools, and Applications*, Invited presentation, Aerodynamic Tools and Design Methods in Aircraft Design Conference, Royal Aeronautical Society, London, UK, Oct 2019

[P99] *Tow-steered Composite Wing Aerostructural Optimization—Test Article and Full Scale*, Invited presentation, International Forum on Aeroelasticity and Structural Dynamics, Savannah, GA, Jun 2019.

[P98] *Enabling Large-scale Multidisciplinary Design Optimization through Adjoint Sensitivity Analysis*, AIAA SciTech Forum, Special Session in Honor of Raphael Haftka's 75th Birthday, San Diego, CA, Jan 2019.

[P97] *Multidisciplinary Design Optimization for the Next Generation of Aircraft*, Invited seminar, Imperial College, London, Nov 2018.

[P96] *Promise and Challenges of MDO for the Next Generation of Aircraft*, Invited seminar, NASA Glenn Research Center, Cleveland, OH, Nov 2018.

[P95] *XRF1 use and Developments at the University of Michigan*, Centre for Modelling & Simulation, Bristol, UK, Oct 2018.

[P94] *Promise and Challenges of MDO for the Next Generation of Aircraft*, Invited seminar, Georgia Institute of Technology, Atlanta, GA, Oct 2018.

[P93] *Enabling Large-Scale Design Optimization of Multidisciplinary Systems*, Invited presentation, 1st Scientific Workshop in the Green Energy at Sea, NTNU Marine Technology Center, Trondheim, Norway, Oct 2018.

[P92] *Applications of SNOPT to Engineering Design Optimization*, SIAM Annual Meeting, Portland, OR, Jul 2018.

[P91] *Multidisciplinary Design Optimization of Aerospace Systems*, Invited presentation, United Technologies Corporation (remote presentation), May 2018.

[P90] *My Quest to Optimize Airplanes and Life*, Brown Bag Lunch and Learn Series, University of Michigan, Mar 2018.

[P89] *MACH: MDO for Aircraft Configurations with High-fidelity*, Airbus, Toulouse, France, Feb 2018.

[P88] *Desafios de MDO para a Próxima Geração de Aeronaves*, Embraer, São José dos Campos, Brazil, Jan 2018.

[P87] *Airbus-Michigan Center for Aero-Servo-Elasticity of Very Flexible Aircraft (CASE-VFA)* (with Carlos Cesnik), Airbus Flight Physics Symposium, Toulouse, France, Oct 2017.

[P86] *High-fidelity Multidisciplinary Design Optimization for Next-generation Aircraft*, CFD and MDO—State of the Art and the Future, Royal Aeronautical Society, London, UK, Oct 2017.

[P85] *Aircraft Design via Numerical Optimization: Are We There Yet?*, Gulfstream Aerospace, Savannah, GA, Jul 2017.

[P84] *Aircraft Design via Numerical Optimization Are We There Yet?*, Inha University, South Korea, Nov 2016.

[P83] *High-fidelity Adjoint-based Multidisciplinary Design Optimization of Aircraft Configurations*, 11th ASMO UK/ISSMO/NOED: International Conference on Numerical Optimisation Methods for Engineering Design, TUM Institute for Advanced Studies, Munich, Germany, Jul 2016.

[P82] *Multidisciplinary Design Optimization of Aircraft Configurations. Part 1: A modular coupled adjoint approach*, von Karman Institute Lecture Series, Brussels, Belgium, May 2016.

[P81] *Multidisciplinary Design Optimization of Aircraft Configurations. Part 2: High-fidelity aerostructural optimization*, von Karman Institute Lecture Series, Brussels, Belgium, May 2016.

[P80] *Optimisation numérique de la conception d'une aile d'avion: Rêve ou réalité?*, ENSEEIHT,Toulouse, France, May 2016.

[P79] *Optimisation numérique de la conception d'une aile d'avion: Rêve ou réalité?*, ONERA Fluid Mechanics and Energetics Branch, Paris, France, Mar 2016.

[P78] *Multidisciplinary design optimization (MDO): Theory and applications*, Red Cedar, East Lansing, MI, Feb 2016

[P77] *Multidisciplinary design optimization (MDO): A new scalable and modular approach*, ROMA Seminar, ISAE, Toulouse, France, Jan 2016.

[P76] *Practical wing design via numerical optimization: Are we there yet?*, University of Bristol, UK, Dec 2015.

[P75] *Optimisation numérique de la conception d'une aile d'avion: Rêve ou réalité?*, Institut Clément Ader, Toulouse, France, Nov 2015.

[P74] Wing design via numerical optimization: Are we there yet?, ONERA AGILE Workshop, Toulouse, Dec 2015.

[P73] *Optimisation numérique de la conception d'une aile d'avion: Rêve ou réalité?*, Dassault Aviation, Paris, France, Oct 2015.

[P72] *Optimisation numérique de la conception d'une aile d'avion: Rêve ou réalité?*, École Polytechnique, Paliseau, France, Oct 2015.

[P71] *Optimisation numérique de la conception d'une aile d'avion: Rêve ou réalité?*, Séminaire DAEP, ISAE, Toulouse, France, Oct 2015.

[P70] *High-Fidelity Multidisciplinary Design Optimization for the Next-Generation of Commercial Transport Aircraft*, AMEDEO ESR Training Course, ONERA, Paris, France, Oct 2015.

[P69] *High-Fidelity Multidisciplinary Design Optimization for the Next Generation of Aircraft*, Congress on Numerical Methods in Engineering, Lisbon, Portugal, Jul 2015.

[P68] *Wing Design via Numerical Optimization—Are we there yet?*, Lehigh University, May 2015.

[P67] *High-Fidelity Multidisciplinary Design Optimization*, Boeing, Huntington Beach, May 2015.

[P66] *High-Fidelity Aerostructural Optimization for the Next Generation of Aircraft*, Altair Symposium, Ann Arbor, MI, Apr 2015.

[P65] *Wing Design via Numerical Optimization—Are we there yet?*, Politecnico di Torino, Turin, Italy, Mar 2015.

[P64] *Aerodynamic and Aerostructural Wing Design Optimization*, AIAA Aerodynamic Technical Working Group, Kissimmee, FL, Jan 2015.

[P63] *Next-generation computational tools for airframe analysis and design*, Boeing, Huntington Beach, Dec 2014.

[P62] *Wing Design via Numerical Optimization: Are we there yet?*, Bombardier Aerospace, Montreal, Canada, Oct 2014.

[P61] *Wing Design via Numerical Optimization: Are we there yet?*, McGill University, Montreal, Canada, Oct 2014.

[P60] *CFD-Based Aerodynamic Shape Optimization for Aircraft Design*, CFD Summer School, Tsinghua University, Beijing, China, Jul 2014.

[P59] *Large-Scale Optimization of Multidisciplinary Engineering Systems*, SIAM Conference on Optimization, San Diego, May 2014.

[P58] *High-Fidelity Multidisciplinary Design Optimization for Aerospace Systems*, ATA Engineering, Poway, CA, May 2014.

[P57] *Wing Design via Numerical Optimization: Are We There Yet?*, Massachusetts Institute of Technology, Boston, MA, Apr 2014.

[P56] *Multidisciplinary Design Optimization of Aircraft Configurations, Massachusetts Institute of Technology*, Invited lecture for 16.888/ESD.77 Multidisciplinary System Design Optimization, Department of Aeronautics and Astronautics, Apr 2014, Boston, MA.

[P55] *High-Fidelity Wing Design Optimization*, Aurora Flight Sciences, Cambridge, MA, Apr 2014.

[P54] *Design Optimization of the CADRE CubeSat using OpenMDAO*, NASA Glenn Research Center, OH, Apr 2014.

[P53] *High-Fidelity Aerostructural Design Optimization of High Aspect Ratio Wings*, NASA Langley Research Center, VA, Apr 2014.

[P52] *Design Optimization of the CADRE CubeSat using OpenMDAO*, NASA Glenn Research Center, OH, Apr 2014.

[P51] *Aerodynamic Shape Optimization of a Morphing Wing*, NASA Langley Research Center, VA, Apr 2014.

[P50] *Towards Optimal Aeroelastic Tailoring of Wind Turbine Blades*, NTNU, Trondheim, Norway, Oct 2013.

[P49] *Optimal Aeroelastic Tailoring of Composite Wings*, Composites 2013, IV ECCOMAS Conference on the Mechanical Response of Composites, Ponta Delgada, Portugal, Sep 2013.

[P48] *A Matrix-Free Approach to Large-Scale Nonlinear Constrained Optimization*, 4th International Conference on Continuous Optimization, Caparica, Portugal, Jul 2013.

[P47] *Towards Practical High-Fidelity Aerostructural Optimization*, Research Consortium for Multidisciplinary System Design Workshop, Stanford University, Department of Aeronautics and Astronautics, Jul 2013.

[P46] *High-Fidelity Multidisciplinary Design Optimization for the Next Generation of Aircraft*, Airbus, Toulouse, France, Jun 2013.

[P45] *High-Fidelity Multidisciplinary Design Optimization for the Next Generation of Aircraft*, University of São Paulo, Brazil, Apr 2013.

[P44] *High-Fidelity Aerostructural Design Optimization of Commercial Transport Aircraft*, Boeing Tech Splash (remote presentation), Apr 2013.

[P43] *An Overview of MDO for Aircraft Configurations*, MSTC/AFOSR Multi-Fidelity Analysis for Aerospace Vehicle Design TIM Dayton, OH, Feb 2013.

[P42] *Towards Optimal Aeroelastic Tailoring of Wind Turbine Blades*, 2nd NREL Systems Engineering Workshop, Boulder, CO, Jan 2013.

[P41] *A Comparison of Metallic versus Composite Wings using Aerostructural Design Optimization*, Carbon Fiber Conference, La Jolla, CA, Dec 2012

[P40] *An Overview of Tools and Methods for the MDO of Aircraft Configurations*, NASA Langley Research Center, Hampton, VA, Nov 2012.

[P39] *High-Fidelity Multidisciplinary Design Optimization for the Next Generation of Aircraft*, University of Illinois Urbana-Champaign, IL, Oct 2012.

[P38] *High-Fidelity Multidisciplinary Design Optimization of Aircraft Configurations*, University of Michigan AE585 Seminar, Sep 2012.

[P37] *Optimal Aeroelastic Tailoring of Aircraft Wings Using a Coupled Adjoint Method*, ANSYS Inc., Lebanon, NH, Aug 2012.

[P36] *High-Fidelity Multidisciplinary Design Optimization of Aircraft Configurations*, Lockheed Martin, Palmdale, CA, Aug 2012.

[P35] *High-Fidelity Optimal Aeroelastic Tailoring of Highly Flexible Wings... and some other stuff*, MDO Consortium Workshop, Purdue University, Jul 2012.

[P34] *High-Fidelity Optimal Aeroelastic Tailoring of Highly Flexible Wings*, Boeing Development Center, Tukwila, WA, Jul 2012.

[P33] *Geometry-Centric MDAO of Aircraft Configurations with High-Fidelity*, NASA Glenn Research Center, Cleveland, OH, Jul 2012.

[P32] *High-Fidelity Optimal Aeroelastic Tailoring of Highly Flexible Wings*, Embraer, São José dos Campos, Brazil, Jul 2012.

[P31] *High-Fidelity Optimal Aeroelastic Tailoring of Highly Flexible Wings*, FlexSys Inc, Ann Arbor, MI, Jul 2012.

[P30] *High-Fidelity Aerostructural Optimization Tools for Future Aircraft Design*, 3rd International Workshop on Aviation and Climate Change, University of Toronto, Canada, May 2012.

[P29] *Multidisciplinary Design Optimization: An Introduction for Applied Mathematicians*, École Polytechnique de Montréal, Nov 2011.

[P28] *High-Fidelity Multidisciplinary Design Optimization for the Next Generation of Aircraft*, TU Delft, Netherlands, Oct 2011.

[P27] *Multidisciplinary Design Optimization*, Forum and Symposium on Digital Fabrication (remote presentation), Lima, Peru, Aug 2011.

[P26] *Aircraft Design Optimization for Minimum Environmental Impact*, Upper Michigan Green A Coalition Conference, Escanaba, MI, Jun 2011.

[P25] *Multidisciplinary Design Optimization: Theory and Applications*, tutorial for the Optimization Days conference, Montréal, Canada, May 2011.

[P24] *High-Fidelity Multidisciplinary Design Optimization of Aircraft Configurations*, Bombardier Aerospace, Dorval, QC, Canada, March 2011.

[P23] *Multidisciplinary Design Optimization of Aircraft Configurations*, Deutsches Zentrum für Luft- und Raumfahrt (DLR), Braunschweig, Germany, Aug 2010.

[P22] *ADjoint: An Approach for the Rapid Development of Discrete Adjoint Solvers*, Deutsches Zentrum für Luft- und Raumfahrt (DLR), Braunschweig, Germany, Aug 2010.

[P21] *High-Fidelity MDO for Aircraft Design*, Research Consortium for Multidisciplinary System Design Workshop, Massachusetts Institute of Technology, Department of Aeronautics and Astronautics, Jul 2010.

[P20] *Multidisciplinary Design Optimization of Aircraft Configurations*, NASA Glenn Research Center, Mar 2010.

[P19] *Architectures for Multidisciplinary Design Optimization*, Research Consortium for Multidisciplinary System Design Workshop, Stanford University, Department of Aeronautics and Astronautics, Jun 2009.

[P18] *Aerostructural Shape Optimization of Wind Turbine Blades Considering Site-Specific Winds*, The New Zealand Institute of Mathematics and its Applications, New Zealand, February 2009.

[P17] *High-Fidelity MDO of Aircraft Configurations*, TU Delft, Netherlands, Aug 2008.

[P16] *Adjoint Methods for High-Fidelity Aerostructural Design Optimization*, Imperial College, London, UK, Aug 2008.

[P15] *Aerodynamic Shape Optimization of an Oblique Flying Wing*, SIAM Conference on Optimization, Boston, MA, May 2008.

[P14] *MDO Approaches and Frameworks*, Research Consortium for Multidisciplinary System Design Workshop, Massachusetts Institute of Technology, Department of Aeronautics and Astronautics, Jul 2008.

[P13] *On Multidisciplinary Design Optimization: Theory and Algorithms*, Massachusetts Institute of Technology, Department of Aeronautics and Astronautics, Apr 2008.

[P12] *A Framework for Automatic Implementation of MDO Architectures*, 6th International Congress on Industrial and Applied Mathematics, Zürich, Jul 2007.

[P11] *An Object-Oriented Framework for Multidisciplinary Design Optimization*, Sandia National Laboratories, Albuquerque, NM, Jul 2007.

[P10] *Methods for High-Fidelity Multidisciplinary Design Optimization*, Research Consortium for Multidisciplinary System Design Workshop, Stanford University, CA, Jul 2007.

[P9] *Multidisciplinary Methods for High-Fidelity Aero-Structural Optimization*, International Forum on Aeroelasticity and Structural Dynamics, Stockholm, Jun 2007 (Plenary session).

[P8] *Multidisciplinary Optimization: Current Status and Future Directions*, Optimization in Engineering Workshop, Banff International Research Station, November 2006.

[P7] *High-Fidelity MDO of Aircraft Configurations*, Airbus, Toulouse, Dec 2006.

[P6] *High-Fidelity MDO of Aircraft Configurations*, Bombardier Aerospace, Montréal, Mar 2006.

[P5] *Aero-Structural Wing Design Using Coupled Sensitivity Analysis*, The Fields Institute, Toronto, Dec 2004.

[P4] *High-Fidelity Aero-Structural Design Optimization of Aircraft Configurations*, University of Minnesota, Aerospace Engineering and Mechanics Department, May 2004.

[P3] *High-Fidelity Aero-Structural Optimization of Aircraft Configurations*, Massachusetts Institute of Technology, Department of Aeronautics and Astronautics, Apr 2004.

[P2] *The Complex-Step Derivative Approximation*, Lawrence Livermore National Laboratory, Livermore, CA, Aug 2001.

[P1] *The Complex-Step Derivative Approximation*, Sandia National Laboratories, Albuquerque, NM, Mar 2001.

12 Software

All the software below is available under an open-source license unless otherwise stated.

pyOptSparse: An open-source Python wrapper providing a common interface to various optimization packages [J22]. This has been used in almost all the work done by the MDO Lab.

SMT: A surrogate modeling toolkit that provides a common Python interface to various techniques with a focus on derivative computation. It includes two new surrogate modeling techniques developed in the MDO Lab [J105,J93].

ADflow: A RANS structured overset CFD code with an efficient adjoint implementation for derivative computation [J106,J97]. Used in practically all the MDO Lab work involving CFD.

TACS: This is an open-source general purpose parallel structural finite element analysis code that include efficient derivative computation via an adjoint method [J48]. It has been used in all the MDO Lab work involving structural analysis and optimization.

IDWarp: Mesh deformation algorithm that propagates changes to the CFD surface mesh to the volume mesh; this is needed in aerostructural analysis and shape optimization.

pyHyp: Hyperbolic mesh generator developed in the MDO Lab. Automatically generates structured CFD meshes for fuselages and lifting surfaces.

MACH: A framework for high-fidelity aerostructural optimization [J38,J40] that integrates pyOptSparse, ADflow, TACS, and IDWarp. The integration code is *not* available under an open-source license..

OpenMDAO: An open-source MDO framework developed by NASA. Some of the core algorithms and data structures are based on theory and implementation developed by the MDO Lab [J85,J79].

OpenAeroStruct: This is a low-fidelity code for aerostructural wing design optimization developed for educational purposes that also provides a scalable research benchmark [J69].

DAFoam: A framework for adjoint-based aerodynamic shape optimization using OpenFOAM, which we have used for car [J70] and cooling passage optimization [J101,J76].

13 People Advised

13.1 Research Faculty

[4] Donald R. Jones, 2019–present

[3] Ping He, 2018–2020

[2] Charles A. Mader, 2015–2020

[1] Gaetan K. W. Kenway, 2015–2017

13.2 Post-doctoral Fellows

[9] Xiaosong Du, 2019–present

[8] Mohamed A. Bouhlel, 2016–2019

[7] Ping He, 2016–2018

[6] Raphael Gross, 2017–2018

[5] Charles A. Mader, 2012–2015

[4] Gaetan K. W. Kenway, 2013–2015

[3] Turaj Ashuri, 2012–2014

[2] Graeme J. Kennedy, 2012–2014

[1] Ruben Perez, 2010–2012

13.3 Ph.D. Theses

[21] Eirikur Jonsson, *High-fidelity Aerostructural Optimization of Flexible Wings with Flutter Constraints*. University of Michigan, 2020.

[20] Nicolas Bons, *High-fidelity Wing Design Exploration with Gradient-based Optimization*. University of Michigan, 2020.

[19] Gustavo Halila, *Aerodynamic Shape Optimization and Modeling for Flows Including Transition to Turbulence Effects*. University of Michigan, 2020. Co-advised with Prof. Krzysztof Fidkowski.

[18] John P. Jasa, *Multidisciplinary Design Optimization of an Aircraft Considering Path-Dependent Performance*. University of Michigan, 2019.

[17] Justin S. Gray, *Design Optimization of a Boundary Layer Ingestion Propulsor Using a Coupled Aeropropulsive Model*, 2018.

[16] Ney Secco, *Component-based Aerodynamic Shape Optimization using Overset Meshes*. University of Michigan, 2018.

[15] Timothy R. Brooks, *Design Optimization of Flexible Aircraft Wings Using Tow-steered Composites*. University of Michigan, 2018.

[14] David A. Burdette. *High-Fidelity Aerostructural Design Optimization of Transport Aircraft with Continuous Morphing Trailing Edge Technology*. University of Michigan, 2017.

[13] Nitin Garg. *High-Fidelity Hydrostructural Design Optimization of Lifting Surfaces*. University of Michigan, 2017. Co-advised with Prof. Julie Young.

[12] John T. Hwang. *A modular approach to large-scale design optimization of aerospace systems*. University of Michigan, 2015.

[11] Rhea P. Liem. *Multimission Fuel-Burn Minimization in Aircraft Design: A Surrogate-Modeling Approach*. University of Toronto, 2015.

[10] Andrew B. Lambe. *Matrix-Free Methods for Multidisciplinary Design Optimization*. University of Toronto, 2015.

[9] Zhoujie (Peter) Lyu. *High-Fidelity Aerodynamic Design Optimization of Aircraft Configurations*. University of Michigan, 2014.

[8] N. Xue. *Design and Optimization of Lithium-Ion Batteries for Electric-Vehicle Applications*. University of Michigan, 2014. Co-advised with Prof. Wei Shyy.

[7] Wenbo Du. *Multi-Scale Modeling, Surrogate-Based Analysis, and Optimization of Lithium-Ion Batteries for Vehicle Applications*. University of Michigan, 2013. Co-advised with Prof. Wei Shyy.

[6] Gaetan K. W. Kenway. *A Scalable, Parallel Approach for Multi-Point, High-Fidelity Aerostructural Optimization of Aircraft Configurations*. University of Toronto, 2013.

[5] Sohrab Haghighat. *Multidisciplinary Design Optimization of A Highly Flexible Aeroservoelastic Wing*. University of Toronto, 2012.

[4] Kai A. James. *Aerostructural Shape and Topology Optimization of Aircraft Wings*. University of Toronto, 2012.

[3] Graeme J. Kennedy. *Aerostructural analysis and design optimization of composite aircraft*. University of Toronto, 2012.

[2] Charles A. Mader. *Stability-Constrained Aerodynamic Shape Optimization with Applications to Flying Wings*. University of Toronto, August 2012.

[1] Alan T. Yu. *A Configurable B-Spline Parameterization Method for Structural Optimization of Wing Boxes*. University of Toronto, 2009.

13.4 Masters Thesis

[15] Marco Mangano, *Multi-point aerodynamic shape optimization for airfoils and wings at supersonic and subsonic regimes*. Technical University of Delft, 2018.

[14] Tristan Dhert, *High-fidelity aerodynamic shape optimization of wind turbine blades*. Technical University of Delft, 2017.

[13] Cody Paige. *Extension of the ADjoint approach to a laminar Navier–Stokes solver*. University of Toronto, 2013.

[12] Edmund Lee. *Stress-constrained structural topology optimization with design-dependent loads.* University of Toronto, 2012.

[11] Benjamin Yan. *A framework for aerostructural analysis of wind turbine blades.* University of Toronto, 2012.

[10] Fredyanto Koko. *Aerostructural and trajectory optimization of morphing wingtip devices.* Delft University of Technology, 2011.

[9] Ryan Henderson. *Multidisciplinary design optimization of airframe and engine for emissions reduction.* University of Toronto, 2010.

[8] Scott G. Moon. *Aero-structural optimization of divergence-critical wings.* University of Toronto, 2010.

[7] Peter W. Jansen. *Aerostructural optimization of non-planar lifting surfaces.* University of Toronto, 2009.

[6] Quinn P. Thomson. *Progressive validity trust region optimization.* University of Toronto, 2009.

[5] Chris Marriage. *Automatic implementation of multidisciplinary design optimization architectures using πMDO.* University of Toronto, 2008.

[4] Charles A. Mader. *ADjoint: An approach for the rapid development of discrete adjoint solvers.* University of Toronto, 2007.

[3] Ian R. Chittick. *A new subspace optimization method for aerostructural design.* University of Toronto, 2007.

[2] Nathan Tedford. *Comparison of MDO architectures within a universal framework.* University of Toronto, 2006.

[1] Praveen Thokala. *Variable complexity optimization.* University of Toronto, 2005.

14 Teaching

14.1 AER501: Advanced Mechanics of Structures

Description: This is a 4th year undergraduate course that is also open to graduate students. I completely redesigned this course when I started teaching it. It was part of a plan to modernize the 3rd and 4th year structural mechanics curriculum by introducing the finite-element method and structural optimization.

Terms taught: Winter 2003, Fall 2003, Fall 2004, Fall 2005, Fall 2006, Fall 2007, Fall 2008

14.2 AER406: Aircraft Design

Description: This is a senior year undergraduate class whose material is geared towards designing, building and flying electric UAVs. The final evaluation of the projects is based on presentations, a report, and a flight test. The course material consists on a review of aerodynamics, structures, propulsion, and stability and control, in a design oriented context.

Terms Taught: Winter 2008, Winter 2009

14.3 AER1415: Optimization Concepts and Applications

Description: This is a graduate course that I developed. The course covers a broad range optimization algorithms that includes not only gradient-based algorithms, but also genetic algorithms and other gradient-free methods. Sensitivity analysis methods are also taught. Multidisciplinary optimization (MDO) is taught towards the end of the course, which incorporates my latest research and culminates with an assignment involving a simplified aircraft MDO problem.

Terms Taught: Winter 2004, Fall 2004, Fall 2005, Fall 2006, Winter 2008, Fall 2008

14.4 AE588: Multidisciplinary Design Optimization

Description: This is a graduate course based on the AER1415 described above. The computational assignments were modified to include and aircraft design problem that illustrates the material in the various chapters.

Terms Taught: Winter 2010, Winter 2011, Winter 2012, Winter 2014, Winter 2017, Winter 2018, Winter 2019

14.5 AE481: Aircraft Design

Description: This is an undergraduate capstone course that consists in performing a design project. In the two years that I have taught this course, I have focused on environmentally friendly airliner projects.

Terms Taught: Fall 2009, Fall 2010, Fall 2011, Fall 2012, Fall 2013, Fall 2014, Fall 2016, Fall 2017, Fall 2018

14.6 AE510: Finite Elements I

Description: This is a graduate course on structural finite elements.

Terms Taught: Winter 2013, Winter 2015

15 Memberships in Professional Societies

- AIAA Lifetime Fellow
- Royal Aeronautical Society Fellow