Karen E. Willcox, MNZM, PhD
Director, Oden Institute for Computational Engineering and Sciences
Associate Vice President for Research
Professor of Aerospace Engineering and Engineering Mechanics
W. A. "Tex" Moncrief, Jr. Chair in Simulation-Based Engineering and Sciences
Peter O'Donnell, Jr. Centennial Chair in Computing Systems
The University of Texas at Austin
email: kwillcox@oden.utexas.edu   website : kiwi.oden.utexas.edu

Education

1994   University of Auckland, Bachelor of Engineering, First Class Honours (Engineering Science)
1996   Massachusetts Institute of Technology, Master of Science (Aeronautics and Astronautics)
          Thesis: *Aeroelastic Computations in the Time Domain using Unstructured Meshes*
2000   Massachusetts Institute of Technology, PhD (Aeronautics and Astronautics)
          Thesis: *Reduced-Order Aerodynamic Models for Aeroelastic Control of Turbomachines*

Experience

University of Texas at Austin
      2020-present   Associate Vice President for Research
      2018-present   Director, Oden Institute for Computational Engineering and Sciences
      2018-present   Professor of Aerospace Engineering and Engineering Mechanics
Santa Fe Institute
      2019-present   External Professor
Massachusetts Institute of Technology
      2012-2018   Professor, Aeronautics and Astronautics
      2011-2013   Associate Department Head, Aeronautics and Astronautics
      2008-2018   Founding Co-Director, MIT Center for Computational Engineering
      2005-2012   Associate Professor, Aeronautics and Astronautics
      2001-2005   Assistant Professor, Aeronautics and Astronautics
Singapore University of Technology and Design
      2018   Visiting Professor (7-month stay)
      2015   Visiting Professor (6-month stay)
      2011   Visiting Associate Professor (6-month stay)
University of Auckland, New Zealand
      2008-2009   Visiting Associate Professor, Department of Engineering Science (15-month stay)
      2015   Visiting Professor, Department of Engineering Science (8-month stay)
Sandia National Laboratories
      2005   Visiting Researcher, Computer Science Research Institute (5-month stay)
Stanford University
      2005   Visiting Scholar (1-month stay)
Boeing Phantom Works
      2000-2001   Visiting Researcher, Blended-Wing-Body Aircraft Design Group (1-year stay)
NASA Dryden Flight Research Center
      1996   Aerospace Intern, Aerodynamics Branch

Karen E. Willcox, MNZM, PhD

Professional Interests

Research: Data to decisions in engineering systems. Computational models and methods for design, optimization, control and uncertainty quantification of engineering systems. Predictive data science and scientific machine learning. Reduced-order modeling and multi-fidelity methods. Future aircraft technologies, aircraft system optimization, aircraft environmental impact, multidisciplinary design, unmanned aerial vehicles, Digital Twin, Digital Thread.

Education: EdTech for data visualization, modeling and analytics (mapping.mit.edu). Fly-by-Wire intervention to enable scalable differentiated instruction in community colleges (fbw.mit.edu). Mapping learning outcomes across the undergraduate engineering curriculum (xoces.mit.edu); linking topics across the curriculum (crosslinks.mit.edu).

Teaching: Principles of Automatic Control (undergraduate), Computational Methods in Aerospace Engineering (undergraduate), Signals and Systems (undergraduate), Multidisciplinary System Design Optimization (graduate), Flight Vehicle Aerodynamics (graduate), Numerical Methods for Partial Differential Equations (graduate).

Diversity, Equity and Inclusion: Established new Diversity, Equity, Inclusion and Outreach Committee at the Oden Institute. Grew diversity of undergraduate and graduate aerospace engineering student body as Associate Department Head in MIT. Led Rising Stars events at MIT and UT Austin to foster gender diversity in aerospace engineering and computational sciences. Active in outreach activities to promote girls' interest in science, mathematics and engineering, including volunteer grade school science extension classes, many outreach visits to K-12 schools, and participation in the Advisory Board for Girls' Angle. First-generation student mentor at MIT.

Professional Memberships

Fellow, American Institute of Aeronautics and Astronautics (AIAA)

Fellow, Society for Industrial and Applied Mathematics (SIAM)

Member, American Society for Engineering Education (ASEE)

Member, American Mathematical Society (AMS)

Member, Design Society

External Boards and Committees (active)

Advanced Simulation and Computing (ASC) Advisory Board at the Los Alamos National Laboratory (2021 – present)

MATH+ Scientific Advisory Board, Germany (2021 – present)

SIAM Activity Group on Data Science (Inaugural Program Director, 2021 – 2022)

Co-Chair, SIAM 2022 Conference on Mathematics of Data Science

AIAA 2022 SciTech Forum Executive Steering Committee

AIAA Board of Trustees (2020 – 2023)

Institute for Mathematical and Statistical Innovation (IMSI) Board of Trustees (2020 – 2024)

Advisory Board, Center of Excellence on Sustainable and Energy Efficient Aviation, TU Braunschweig, Germany (2020 – present)

National Science Foundation Advisory Committee for Cyberinfrastructure (2019 – present, Co-chair 2020 – 2022)

Science Board, Santa Fe Institute (2019 – present)

SIAM Journals Committee (2019 – present)

External Advisory Board, Michigan Institute for Computational Discovery and Engineering, University of Michigan (Member, 2017 – present)

National Academies Board on Mathematical Sciences and Analytics (BMSA) (2016 – present)

Advisory Board, Girls' Angle (2014 – present)

External Boards and Committees (past)

AIAA Multidisciplinary Design Optimization (MDO) Technical Committee (2001 – 2021); Chair (2019 – 2021); Vice-Chair (2017 – 2019); Awards Subcommittee Chair (2003 – 2006); Publications Subcommittee Chair (2011 – 2018)

National Academies Planning Committee on the Workshop on the Frontiers of Mechanistic Data-Driven Modeling for Additive Manufacturing (2019)

AIAA Fellows Selection Committee (2019 – 2022)

SIAM Fellows Selection Committee (2018 – 2020)

Department of Energy Working Group on Basic Research Needs for Scientific Machine Learning (2017 – 2019)

National Academies Committee to Assess the Risks of Unmanned Aircraft Systems (UAS) Integration (2017 – 2018)

SIAM Committee on Science Policy (2016 – 2018)

SIAM Activity Group on Computational Science and Engineering: Vice President (2013 – 2015), Program Director (2011 – 2013)

Co-Chair, SIAM 2013 Conference on Computational Science and Engineering

Co-Chair, Institute-wide Task Force on the Future of MIT Education (2013 – 2014)

MIT OpenCourseWare Faculty Advisory Committee (2011 – 2018; Chair 2015 – 2018)

Advisory Board, Department of Engineering Science, University of Auckland (Member, 2008 – 2018)

National Research Council, Committee to Conduct an Independent Assessment of the Nation's Wake Turbulence Research and Development Program (2007)

National Academies Decadal Survey of Civil Aeronautics, Aerodynamics and Acoustics Panel (2005 – 2006)

AIAA MDO Conference Technical Chair (2011 – 2012)

Visiting Committees and Review Boards

Department of Energy Advanced Scientific Computing Research (ASCR) Committee of Visitors (2021)

ExxonMobil Corporate Strategic Research, Capability Assessment External Review Panel (Physics and Mathematical Science and Scientific Computing) (2021)

Review Committee, Research Assessment of Aerospace Engineering, Delft University of Technology, Netherlands (2020 – 2021)

Committee to Visit Harvard University Information Technology (Member, 2019)

National Academies Panel on Review of the Information Technology Laboratory (ITL) at the National Institute of Standards and Technology (NIST) (2018)

Review Committee, TU Braunschweig Universities of Excellence, German Excellence Initiative (2018)

External Review Board, Computing and Information Sciences Research Foundation, Sandia National Laboratories (Member, 2016 – present)

Visiting Committee, Applied Mathematics & Statistics Department, Colorado School of Mines (Member, 2017)

HarvardX Review Committee, Harvard University (Member, 2016)

Board of Visitors, Institute for Computational Engineering and Sciences, University of Texas at Austin (2012 – 2018; Chair 2015 – 2018)

Assessment Committee, Accreditation of Aerospace Engineering, Delft University of Technology, Netherlands (2013)

Committee of Visitors, Division of Mathematical Sciences, National Science Foundation (Member, 2010)

Editorial Boards

Acta Numerica (Editorial Board Member, 2021 – present)

IEEE Computing in Science and Engineering (CiSE) (Associate Editor, 2021 – present)

AIAA Journal (Editorial Board Member, 2021 – present; Associate Editor, 2015 – 2020 and 2009 – 2011)

Journal on Data Centric Engineering (Advisory Board, 2019 – present)

SIAM Journal on Scientific Computing (Section Editor, 2013 – 2019; Associate Editor, 2008 – 2013)

ASA/SIAM Journal on Uncertainty Quantification (Associate Editor, 2012 – 2013)

SIAM Book Series on Computational Science and Engineering (Editorial Board Member, 2009 – present)

Major Internal Committees and Leadership Roles (at MIT and UT Austin)

UT Austin Provost Search Advisory Committee, Chair (2021)

Associate Vice President for Research, UT Austin (2020 – present)

Director, Oden Institute for Computational Engineering and Sciences, UT Austin (2018 – present)

MIT OpenCourseWare Faculty Advisory Committee (Chair, 2015 – 2018; Member, 2011 – 2018)

MIT Online Education Policy Initiative, Co-Chair (2015 – 2016)

Institute-wide Task Force on the Future of MIT Education, Co-Chair (2013 – 2014)

Co-Chair, Mission and Scope Subcommittee, Ad Hoc Committee on the Formation of a New Entity in the Areas of Complex and Socio-technical Systems, Information and Decision Systems, and Statistics (2013 – 2014)

Associate Department Head, MIT Department of Aeronautics and Astronautics (2011 – 2013)

Chair, Ad Hoc Committee on Statistics at MIT (2011 – 2012)

Founding Co-Director, MIT Center for Computational Engineering (2008 – 2018)

Public Positions and Testimonies

Testified to Congress for the Subcommittee on Energy of the House Committee on Science, Space, and Technology hearing on Accelerating Discovery: the Future of Scientific Computing at the Department of Energy (May 2021).

Selected Awards and Honors

Best Paper Award for "Toward predictive digital twins via component-based reduced-order models and interpretable machine learning", AIAA Multidisciplinary Design Optimization Best Paper, 2020

SIAM Student Paper Prize (E. Qian), "Multifidelity Monte Carlo estimation of variance and sensitivity indices," 2020

Southwest Research Institute Best Student Paper Award (M. Kapteyn), "Toward predictive digital twins via component-based reduced-order models and interpretable machine learning," AIAA Non-Deterministic Approaches Conference, Scitech Forum, 2020

Paper "Variance-based sensitivity analysis to support simulation-based design under uncertainty" one of the top 10 most accessed articles in *Journal of Mechanical Design* in 2019.

AIAA Fellow, Class of 2019

SIAM Fellow, Class of 2018

NeurIPS paper "Contour location via entropy reduction leveraging multiple information sources" selected for Spotlight Presentation (3% of submissions), 2018.

Best Paper Award, "Towards a Low-Order Model for Transonic Flutter Prediction," AIAA Theoretical Fluid Mechanics Conference, AIAA Aviation Forum, 2017

Member of the New Zealand Order of Merit (MNZM), awarded for services to aerospace engineering and education, 2017

Distinguished Alumni Award, University of Auckland, 2016

Member, Harvard Higher Education Leaders Forum, 2016 – 2019

SIAM SIGEST Award for paper "Goal-oriented inference: Approach, linear theory, and application to advection-diffusion," 2013

Sir Peter Blake Trust Emerging Leader Award, 2010

Selected for National Academies Frontiers of Engineering Education Symposium, 2010

AIAA MDO Technical Committee Service Award, 2008 and 2013

J. T. Oden Faculty Research Fellow, University of Texas at Austin, 2006

New Zealand Management Magazine, Young Leader, 2006

MIT Junior Bose Teaching Award, 2005

MIT Department of Aeronautics and Astronautics Teaching Award, 2004

Best Paper Award, "A Framework for Aircraft Conceptual Design and Environmental Performance Studies," AIAA Multidisciplinary Analysis and Optimization Conference, 2004

Leadership Activities

Academic: Given hundreds of invited lectures in the US and internationally, including multiple plenary/keynote talks at major international conferences. In 2021 delivered plenary talks at AIAA SciTech Forum (largest aerospace engineering conference) and SIAM Conference on Computational Science and Engineering (largest computational science and engineering conference). Published over 120 papers in refereed archival journals. Supervised theses for 62 graduate students (41 M.S., 21 PhD). Multiple graduate students and postdocs hold academic positions at prestigious universities and leadership positions in industry. Secured funding and managed multi-institutional research projects from many sources including the U.S. Air Force, Boeing, Lockheed Martin, U.S. Department of Energy, Federal Aviation Administration, NASA, National Science Foundation, DARPA, and U.S. Department of Education.

Major multi-institution research grants as lead include: Co-lead PI and Co-Director, AEOLUS Multifaceted Mathematics Capability Center on Advances in Experimental Design, Optimal Control, and Learning for Uncertain Complex Systems (Department of Energy, $10M total budget over 4 years). Lead PI, Multidisciplinary University Research Initiative (MURI) project on Managing Multiple Information Sources of Multi-physics Systems (Air Force Office of Scientific Research, $7.2M total budget over 5 years). Lead PI, MURI project on Machine Learning for Physics-Based Systems (Air Force Office of Scientific Research, $2M total budget over 3 years). Lead PI, RISE of the Machines: Robust, Interpretable, Scalable, Efficient Decision Support (Department of Energy, $4.4M total budget over 3 years). Co-lead PI and Co-Director, DiaMonD Multifaceted Mathematics Capability Center on Mathematics at the Interfaces of Data, Models, and Decisions (Department of Energy, $16.7M total budget over 5 years). Lead PI, Dynamic Data Driven Methods for Self-aware Aerospace Vehicles (Air Force Office of Scientific Research, $2.5M total budget over 6 years). Lead PI, Towards Scalable Differentiated Instruction using Technology-Enabled Competency-Based Dynamic Scaffolding (Department of Education, $2.9M total budget over 4 years).

Administrative: Director of the Oden Institute for Computational Engineering and Sciences at UT Austin (2018-present). Oversees Oden Institute operations involving >350 people, >$80M in active research contracts/grants, and >$150M endowment funding. Served as the founding co-director of the MIT Center for Computational Engineering (2008-2018) and the Associate Head of the MIT Department of Aeronautics and Astronautics (2011-2013). In Associate Head role, led reforms in the undergraduate degree program and put in place initiatives that successfully increased undergraduate enrollment in aerospace engineering.

Professional: Active professional service and leadership through multiple conference organizing committees, conference chair positions, technical committee leadership, organizational review committees, advisory boards, and editorial positions. Professional advocacy through leadership positions in SIAM and AIAA, and membership in key National Academies, Department of Energy and National Science Foundation committees. Testified to Congress on scientific computing (2021).

Publications: Edited Volumes and Books

1. Benner, P., Cohen, A., Ohlberger, M. and Willcox, K., *Model Reduction and Approximation: Theory and Algorithms*, SIAM Computational Science and Engineering Book Series, SIAM, Philadelphia, PA, 2017.

2. Biegler, L., Biros, G., Ghattas, O., Heinkenschloss, M., Keyes, D., Mallick, B., Tenorio, L., van Bloemen Waanders, B., Willcox, K. and Marzouk, Y. *Large-scale Inverse Problems and Quantification of Uncertainty,* Wiley Series in Computational Statistics, John Wiley & Sons, 2011.

Publications: Refereed Journal Articles

1. Kapteyn, M., Pretorius, J. and Willcox, K., A probabilistic graphical model foundation for enabling predictive digital twins at scale. *Nature Computational Science*, Vol. 1, No. 5, May 2021, pp. 337-347.

2. Niederer, S., Sacks, M., Girolami, M. and Willcox, K., Scaling digital twins from the artisanal to the industrial. *Nature Computational Science*, Vol. 1, No. 5, May 2021, pp. 313-320.

3. Khodabakhshi, P., Willcox, K., and Gunzburger, M. A multifidelity method for a nonlocal diffusion model. *Applied Mathematics Letters*, Volume 121, November 2021, 107361.

4. Willcox, K., Ghattas, O., and Heimbach, P. The imperative of physics-based modeling and inverse theory in computational science, *Nature Computational Science*, Vol. 1, No. 3, pp. 166-168, 2021.

5. Huang, L. and Willcox, K., Network models and sensor layers to design adaptive learning using educational mapping. *Design Science*, 7, E9. doi:10.1017/dsj.2021.8, 2021.

6. Ehre, M., Papaioannou, I., Willcox, K., and Straub, D., Conditional reliability analysis in high dimensions based on controlled mixture importance sampling and information reuse. *Computer Methods in Applied Mechanics and Engineering*, Volume 381, August 2021, 113826.

7. Singh, V. and Willcox, K., Decision Making Under Uncertainty for a Digital Thread Enabled Design Process. To appear, *Journal of Mechanical Design*, 143(9): 091707, September 2021.

8. McQuarrie, S., Huang, C. and Willcox, K., Data-driven reduced-order models via regularized operator inference for a single-injector combustion process. *Journal of the Royal Society of New Zealand*, 2021, DOI: 10.1080/03036758.2020.1863237.

9. Salinger S., Kapteyn M., Kays C., Pretorius J., Willcox K., A Hardware Testbed for Dynamic Data-Driven Aerospace Digital Twins. In: Darema F., Blasch E., Ravela S., Aved A. (eds) Dynamic Data Driven Application Systems. DDDAS 2020. *Lecture Notes in Computer Science*, Vol 12312. Springer, Cham, 2020.

10. Chaudhuri, A., Marques, A., and Willcox, K., mfEGRA: Multifidelity Efficient Global Reliability Analysis through Active Learning for Failure Boundary Location. To appear *Structural and Multidisciplinary Optimization*, 2021.

11. Benner, P., Goyal, P., Kramer, B., Peherstorfer, B., and Willcox, K., Operator inference for non-intrusive model reduction of systems with non-polynomial nonlinear terms. *Computer Methods in Applied Mechanics and Engineering*, Vol. 372, pp. 113433, December 2020.

12. Kramer, B., and Willcox, K., Balanced Truncation Model Reduction for Lifted Nonlinear Systems. In *Realization and Model Reduction of Dynamical Systems*, Springer, to appear, 2021.

13. Kapteyn, M., Knezevic, D., Huynh, D.B.P., Tran, Minh and Willcox, K., Data-driven physics-based digital twins via a library of component-based reduced-order models. *International Journal for Numerical Methods in Engineering*, 2020, https://doi.org/10.1002/nme.6423.

14. Qian, E., Kramer, B., Peherstorfer, B., and Willcox, K., Lift & Learn: Physics-informed machine learning for large-scale nonlinear dynamical systems. *Physica D: Nonlinear Phenomena*, Volume 406, May 2020, 132401.

15. Swischuk, R., Kramer, B., Huang, C., and Willcox, K., Learning physics-based reduced-order models for a single-injector combustion process. *AIAA Journal*, published online March 2020. Also in Proceedings of 2020 AIAA SciTech Forum & Exhibition, Orlando FL, January, 2020. DOI 10.2514/1.J058943

16. Marques, A., Lam, R., Chaudhuri, A., Opgenoord, M. and Willcox, K., Multifidelity method for locating aeroelastic flutter boundaries. *AIAA Journal*, Vol. 58, No. 4, April 2020, pp. 1772-1784. Also in 21st AIAA Non-Deterministic Approaches Conference (AIAA Scitech), San Diego, CA, January 2019. DOI 10.2514/6.2019-0438.

17. Chaudhuri, A., Kramer, B., and Willcox, K., Information Reuse for Importance Sampling in Reliability-Based Design Optimization, *Reliability Engineering & System Safety*, Vol. 201, pp. 106853, 2020.

18. Cook, L., Willcox, K., and Jarrett, J., Design Optimization Using Multiple Dominance Relations, *International Journal for Numerical Methods in Engineering*, Vol. 121, Issue 11, pp. 2481-2502, June 2020.

19. Lam, R., Zahm, O., Marzouk, Y. and Willcox, K., Multifidelity Dimension Reduction via Active Subspaces, *SIAM Journal on Scientific Computing*, 42 (2), A929-A956, 2020.

20. Feldstein, A., Lazzara, D., Princen, N. and Willcox, K., Multifidelity Data Fusion with Application to Blended-Wing-Body Multidisciplinary Analysis Under Uncertainty, *AIAA Journal*, Vol. 58, No. 2, pp. 889-906, 2020.

21. Cook, L., Mishra, A., Jarrett, J. Willcox, K., and Iaccarino, G. Optimization under turbulence model uncertainty for aerospace design, *Physics of Fluids*, Vol. 31, Issue 10, 105111, 2019.

22. Opgenoord, M. and Willcox, K., Design Methodology for Aeroelastic Tailoring of Additively-Manufactured Lattice Structures using Low-Order Methods, *AIAA Journal*, Vol. 57, No. 11, pp. 4903-4914, 2019.

23. Kapteyn, M., Willcox, K. and Philpott, A., Distributionally Robust Optimization for Engineering Design under Uncertainty. *International Journal for Numerical Methods in Engineering*, Vol. 120, Issue 7, pp. 835-859, July 2019. (An earlier version of this work appeared in AIAA Paper 2018-0666 in Proceedings of 2018 AIAA Non-Deterministic Approaches Conference, AIAA SciTech Forum, Kissimmee, FL, January, 2018.)

24. Opgenoord, M. and Willcox, K., Design for Additive Manufacturing: Cellular Structures in Early-Stage Aerospace Design, *Structural and Multidisciplinary Optimization*, Vol. 60, Issue 2, pp 411-428, 2019.

25. Kramer, B., Marques, A., Peherstorfer, B., Villa, U. and Willcox, K., Multifidelity probability estimation via fusion of estimators, *Journal of Computational Physics*, Vol. 392, pp. 385-402, 2019.

26. Kramer, B. and Willcox, K., Nonlinear model order reduction via lifting transformations and proper orthogonal decomposition, *AIAA Journal*, Vol. 57, No. 6, pp. 2297-2307, 2019.

27. Opgenoord, M., Drela, M. and Willcox, K., Influence of Transonic Flutter on the Conceptual Design of Next-Generation Transport Aircraft, *AIAA Journal*, Vol. 57, No. 5, pp. 1973-1987, 2019.

28. Swischuk, R., Mainini, L., Peherstorfer, B. and Willcox, K., Projection-based model reduction: Formulations for physics-based machine learning, *Computers and Fluids*, Vol. 179, pp. 704-717, January 2019.

29. Heinkenschloss, M., Kramer, B., Takhtaganov, T. and Willcox, K., Conditional-Value-at-Risk Estimation via Reduced-Order Models, *SIAM/ASA Journal on Uncertainty Quantification*, Vol. 6, Issue 4, pp. 1395-1423, 2018.

30. Cook, L., Jarrett, J. and Willcox, K., Generalized information reuse for optimization under uncertainty with non-sample average estimators, *International Journal for Numerical Methods in Engineering*, Volume 115, Issue 12, pp. 1457-1476, September 2018.

31. Qian, E., Peherstorfer, B., O'Malley, D., Vesselinov, V. and Willcox, K., Multifidelity Monte Carlo estimation of variance and sensitivity indices, *SIAM/ASA Journal on Uncertainty Quantification*, Vol. 6, No. 2, pp. 683-706, 2018. (SIAM Student Paper Prize)

32. Singh, V. and Willcox, K., Engineering Design with Digital Thread. *AIAA Journal*, Vol. 56, No. 11, pp. 4515-4528, 2018. Also in proceedings of 2018 AIAA Scitech Forum, Kissimmee, FL, January, 2018.

33. Baptista, R., Marzouk, Y., Willcox, K. and Peherstorfer, B., Optimal Approximations of Coupling in Multidisciplinary Models. *AIAA Journal*, Vol. 56, No. 6, pp. 2412-2428, 2018. (An earlier version of this work appeared in AIAA paper 2017-1935, 58th AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference (AIAA Scitech), Grapevine, TX, January 2017.)

34. Peherstorfer, B., Kramer, B. and Willcox, K., Multifidelity preconditioning of the cross-entropy method for rare event simulation and failure probability estimation. *SIAM/ASA Journal on Uncertainty Quantification*, Vol. 6, No. 2, pp. 737-761, 2018.

35. Li, H., Garg, V. and Willcox, K. Model adaptivity for goal-oriented inference using adjoints, *Computer Methods in Applied Mechanics and Engineering*, Vol. 331, pp. 1-22, April 2018.

36. Rude, U., Willcox, K., McInnes, L.C., De Sterck, H., Biros, G., Bungartz, H., Corones, J., Cramer, E., Crowley, J., Ghattas, O., Gunzburger, M., Hanke, M., Harrison, R., Heroux, M., Hesthaven, J., Jimack, P., Johnson, C., Jordan, K.E., Keyes, D.E., Krause, R., Kumar, V., Mayer, S., Meza, J., Mørken, K.M., Oden, J.T., Petzold, L., Raghavan, P., Shontz, S.M., Trefethen, A., Turner, P., Voevodin, V., Wohlmuth, B., and Woodward, C.S. Research and Education in Computational Science and Engineering, *SIAM Review*, Vol. 60, No. 3, 2018.

37. Curran, C., Allaire, D. and Willcox, K., Sensitivity Analysis Methods for Mitigating Uncertainty in Engineering System Design, *Systems Engineering*, published online January 2018. (Also AIAA Paper 2015-0899, 56th AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Kissimee, FL, January 5-9 2015.)

38. Opgenoord, M., Drela, M. and Willcox, K., Towards a Low-Order Model for Transonic Flutter Prediction, *AIAA Journal*, Vol. 56, No. 4, pp. 1519-1531, 2018. (Also AIAA Paper 2017-4340, AIAA Theoretical Fluid Mechanics Conference Best Paper.)

39. Peherstorfer, B., Gunzburger, M. and Willcox, K., Convergence analysis of multifidelity Monte Carlo estimation, *Numerische Mathematik*, 139(3):683-707, 2018.

40. Zimmermann, R., Peherstorfer, B. and Willcox, K., Geometric Subspace Updates with Applications to Online Adaptive Nonlinear Model Reduction, *SIAM Journal on Matrix Analysis and Applications*, Vol. 39, No. 1, pp. 234-261, 2018.

41. Peherstorfer, B., Willcox, K. and Gunzburger, M., Survey of multifidelity methods in uncertainty propagation, inference, and optimization, *SIAM Review* , Vol. 60, No. 3, 2018.

42. Willcox K. and Huang, L., Network models for mapping educational data, *Design Science*, Vol. 3, e18, 2017.

43. Peherstorfer, B., Gugercin, S. and Willcox, K., Data-driven reduced model construction with time-domain Loewner models, *SIAM Journal on Scientific Computing*, Vol. 39, No. 5, pp. A2152-A2178, 2017.

44. Cook, L., Jarrett, J. and Willcox, K., Extending horsetail matching for optimization under probabilistic, interval and mixed uncertainties, *AIAA Journal*, Vol. 56, No. 2, pp. 849-861, 2018.

45. Chaudhuri, A., Lam, R. and Willcox, K., Multifidelity uncertainty propagation via adaptive surrogates in coupled multidisciplinary systems. *AIAA Journal*, Vol. 56, No. 1, pp. 235-249, 2018.

46. Nguyen V.B., Dou HS., Willcox K., Khoo BC., Model order reduction for reacting flows: laminar Gaussian flame applications. In: Ben-Dor G., Sadot O., Igra O. (eds) *30th International Symposium on Shock Waves*, Springer, 2017.

47. Peherstorfer, B., Kramer, B. and Willcox, K., Combining multiple surrogate models to accelerate failure probability estimation with expensive high-fidelity models, *Journal of Computational Physics*, Vol. 341, pp. 61-75, 2017.

48. Kramer, B., Peherstorfer, B. and Willcox, K., Feedback Control for Systems with Uncertain Parameters Using Online-Adaptive Reduced Models, *SIAM Journal on Applied Dynamical Systems*, Vol. 16, No. 3, pp. 1563-1586, 2017.

49. Qian, E., Grepl, M., Veroy, K., and Willcox, K., A certified trust region reduced basis approach to PDE-constrained optimization, *SIAM Journal on Scientific Computing*, Vol. 39, No. 5 pp. S434-S460, 2017.

50. Singh, V. and Willcox, K., Methodology for Path Planning with Dynamic Data-Driven Flight Capability Estimation, *AIAA Journal*, Vol. 55, No. 8, pp. 2727-2738, 2017.

51. Spantini, A., Cui, T., Willcox, K., Tenorio, L. and Marzouk, Y. Goal-oriented optimal approximations of Bayesian linear inverse problems, *SIAM Journal on Scientific Computing*, Vol. 39, No. 5 pp. S167-S196, 2017.

52. Mainini, L. and Willcox, K., Data to decisions: Real-time structural assessment from sparse measurements affected by uncertainty, *Computers and Structures*, Vol. 182, pp. 296-312, 2017.

53. Peherstorfer, B., Willcox, K. and Gunzburger, M., Optimal model management for multifidelity Monte Carlo estimation, *SIAM Journal on Scientific Computing*, Vol. 38, No. 5, pp. A3163-A3194, 2016.

54. Amaral, S., Allaire, D., Willcox, K. and de la Rosa Blanco, E., A Decomposition-Based Uncertainty Quantification Approach for Environmental Impacts of Aviation Technology and Operation, *Artificial Intelligence for Engineering Design, Analysis and Manufacturing*, Volume 31, Issue 3 (Uncertainty Quantification for Engineering Design), pp. 251-264, August 2017.

55. Ulker, F., Allaire, D. and Willcox, K., Sensitivity Guided Decision Making for Wind Farm Micro-Siting, *International Journal for Numerical Methods in Fluids*, Vol. 83, Iss. 1, pp. 52-72, 2017.

56. Garg, V., Tenorio, L. and Willcox, K. Minimum local distance density estimation, *Communications in Statistics – Theory and Methods*, Vol. 46, No. 1, pp. 148-164, 2017.

57. Amaral, S., Allaire, D. and Willcox, K. Optimal L2-norm Empirical Importance Weights for the Change of Probability Measure, *Statistics and Computing*, 27 (3), 625-643, May 2017.

58. Opgenoord, M., Allaire, D. and Willcox, K., Variance-Based Sensitivity Analysis to Support Simulation-based Design under Uncertainty, *Journal of Mechanical Design*, Vol. 138, No. 11, pp. 111410-111410-12, 2016.

59. Zimmermann, R. and Willcox, K., An Accelerated Greedy Missing Point Estimation Procedure, *SIAM Journal on Scientific Computing*, Vol. 38, Issue 5, pp. A2827–A285, 2016.

60. Peherstorfer, B. and Willcox, K., Data-driven operator inference for nonintrusive projection-based model reduction, *Computer Methods in Applied Mechanics and Engineering*, Vol. 306, pp. 196-215, 2016.

61. Cui, T., Marzouk, Y. and Willcox, K., Scalable posterior approximations for large-scale Bayesian inverse problems via likelihood-informed parameter and state reduction, *Journal of Computational Physics*, available online 29 March 2016.

62. Peherstorfer, B. and Willcox, K., Dynamic data-driven model reduction: Adapting reduced models from incomplete data, *Advanced Modeling and Simulation in Engineering Sciences*, Vol. 3, Issue 1, 2016.

63. Opgenoord, M. and Willcox, K., Sensitivity Analysis Methods for Uncertainty Budgeting in System Design, *AIAA Journal*, Volume 54, Issue 10, pp. 3134-3148, 2016.

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Karen E. Willcox, MNZM, PhD

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2. Miller, H., Willcox, K. and Huang, L., Crosslinks: Improving Course Connectivity Using Online Open Educational Resources, in The Bridge, The National Academy of Sciences, Volume 46, Number 3, pp. 38-44, Fall 2016.

PhD Students Supervised

1. Patricia Astrid, TU Eindhoven PhD 2004. Now at Shell Global Solutions.
2. Tan Bui-Thanh, MIT PhD 2007. Now Associate Professor of Aerospace Engineering and Engineering Mechanics, UT Austin.
3. Theresa Robinson. MIT PhD 2007. Now at Rolls Royce.
4. Leia Stirling, MIT PhD 2008. Now Associate Professor of Industrial and Operations Engineering, University of Michigan.
5. Svein Hovland, Norwegian University of Science and Technology PhD 2008. Now at Frontier International.
6. Doug Allaire, MIT PhD 2009. Now Associate Professor of Mechanical Engineering, Texas A&M University.
7. Van Bo Nguyen, National University of Singapore PhD 2011. Now at A*STAR Institute for High Performance Computing.
8. David Lazzara, MIT PhD 2012. Now at The Boeing Company.
9. Andrew March, MIT PhD 2012. Now at MIT Lincoln Laboratory.
10. Ngoc Hien Nguyen, National University of Singapore PhD 2012. Now at National University of Singapore.
11. Chad Lieberman, MIT PhD 2013. Now at Chad E Lieberman Consulting.

12. Leo Ng, MIT PhD 2013. Now at Mathworks.
13. Chelsea Curran (He), MIT PhD 2014. Now at MIT Lincoln Laboratory.
14. Sergio Amaral, MIT PhD 2015. Now at Millenium Management.
15. Brian Cohen, MIT PhD 2018. Now at MIT Lincoln Laboratory.
16. Remi Lam, MIT PhD 2018. Now at DeepMind.
17. Max Opgenoord, MIT PhD 2018. Now at Amazon Prime Air.
18. Harriet Li, MIT PhD 2019. Now at Johns Hopkins University Applied Physics Laboratory.
19. Victor Singh, MIT PhD 2019. Now at The Boeing Company.
20. Elizabeth Qian, MIT PhD 2021. Now von Karman Postdoctoral Instructor at Caltech.
21. Michael Kapteyn, MIT PhD 2021. Now Postdoctoral Fellow at UT Austin.

Postdoctoral Researchers Supervised

1. Doug Allaire (MIT). Now Associate Professor, Texas A&M University.
2. Kayla Bicol (MIT). Now at Sysco.
3. Marcelo Buffoni (MIT). Now at ABB Switzerland Ltd.
4. Laurence Cook (MIT). Now at Arrival.
5. Tiangang Cui (MIT). Now Lecturer, Monash University.
6. Sonjoy Das (MIT). Now Adjunct Associate Professor, University at Buffalo.
7. Krzysztof Fidkowski (MIT). Now Associate Professor, University of Michigan.
8. Michalis Frangos (MIT). Now at Red Bull Technologies/Formula 1.
9. Vikram Garg (MIT). Now at Esgee Technologies.
10. Mengwu Guo (UT Austin). Now Assistant Professor, Twente University.
11. Phuong Huynh (MIT). Now Head of Operation and Research, Akselos.
12. James Koch (UT Austin). Now Staff Scientist at Pacific Northwest National Laboratory.
13. Boris Kramer (MIT). Now Assistant Professor, University of California, San Diego.
14. Remi Lam (MIT). Now at DeepMind.
15. Qifeng Liao (MIT). Now Associate Professor, ShanghaiTech University.
16. Chad Lieberman (MIT). Now at Chad E Lieberman Consulting.
17. Laura Mainini (MIT). Now Research Scientist, United Technologies Research Corporation.
18. Alexandre Marques (MIT). Now at MaxLinear.
19. Benjamin Peherstorfer (MIT). Now Assistant Professor, Courant Institute, New York University.
20. Demet Ulker (MIT). Now at Envision Energy.
21. Ralf Zimmermann (MIT). Now Associate Professor, University of Southern Denmark.