Stanford



Charbel Farhat

Vivian Church Hoff Professor of Aircraft Structures and Professor of Aeronautics and Astronautics

Curriculum Vitae available Online Resume available Online

CONTACT INFORMATION

- **Administrator**

  Grace Fontanilla - Administrative Associate

  Email grace.fontanilla@stanford.edu

  Tel (650) 725-4107

Bio

BIO

Charbel Farhat is the Vivian Church Hoff Professor of Aircraft Structures in the School of Engineering at Stanford University, where he is also a professor in the Institute for Computational and Mathematical Engineering. From 2008 to 2023, he chaired the Department of Aeronautics and Astronautics, serving from 2022 to 2023 as its inaugural James and Anna Marie Spilker Chair. He also directed the Stanford-King Abdulaziz City for Science and Technology Center of Excellence for Aeronautics and Astronautics (2014--2024) and served on multiple national advisory boards, including the Space Technology Industry-Government-University Roundtable (2017--2023), the U.S. Air Force Scientific Advisory Board (2015--2019), and the Bureau of Industry and Security's Emerging Technology and Research Advisory Committee (2008--2018). From 2007 to 2018, he directed the Army High Performance Computing Research Center at Stanford. Recognized by the U.S. Navy as a Primary Key-Influencer, he flew with the Blue Angels during Fleet Week 2014.

He holds a Ph.D. in Civil Engineering from the University of California, Berkeley and is a member of three national academies: the National Academy of Engineering, the Royal Academy of Engineering (UK), and the Lebanese Academy of Sciences. His honors include a Vannevar Bush Faculty Fellowship from the Department of Defense and Docteur Honoris Causa degrees from Ecole Normale Superieure Paris-Saclay, Ecole Centrale de Nantes, and Ecole Nationale Superieure d'Arts et Metiers. He is a 2024 Kuwait Prize laureate, a TAKREEM AMERICA Award recipient, and an ISI Highly Cited Researcher in Engineering.

Farhat is a Fellow of AIAA, ASME, IACM, SES, SIAM, USACM, and WIF. He was knighted in the Order of Academic Palms and awarded the Chevalier Medal by the Prime Minister of France. Among his many distinctions, he has received the Daniel Guggenheim Medal from ASME/SAE/AHS/AIAA, the Lifetime Achievement Award and the Spirit of St. Louis Medal from ASME, the Ashley Award for Aeroelasticity, the Structures, Structural Dynamics and Materials Award, the Collier Aerospace HyperX/AIAA Structures Award, and the Journal Authors Seminar Award from AIAA, the Computational Fluid Dynamics Award from SAE International, the Aurel Stodola Medal from ETH, and the ALERT Geomaterials Medal. From USACM, he has been awarded the John von Neumann Medal, the Computational and Applied Sciences Award, and the R.H. Gallagher Special Achievement Award. His contributions to computational mechanics have also been recognized with the Gauss-Newton Medal, the IACM Award, the Computational Mechanics Award, and

the Young Investigator Award from IACM. Additionally, he has received the Gordon Bell Prize and the Sidney Fernbach Award from IEEE, the Grand Prize from the Japan Society for Computational Engineering and Science, the Modeling and Simulation Award from DoD, and the Presidential Young Investigator Award from the National Science Foundation and the White House.

From 2014 to 2024, Farhat served as Editor-in-Chief of the International Journal for Numerical Methods in Engineering and, from 2017 to 2024, of the International Journal for Numerical Methods in Fluids. He is currently an Associate Editor of the Journal of Computational Physics and a member of the editorial boards of eight international scientific journals. A frequent AGARD and NATO lecturer, he has delivered keynote and plenary talks at major international conferences. He has authored over 650 refereed publications in fluid-structure interaction, computational fluid dynamics, structural mechanics, acoustics, supercomputing, parallel processing, model order reduction, and physics-based machine learning. His research has been funded by NSF, AFOSR, ONR, ARL, DARPA, NASA, DoE, and various national laboratories and industry leaders, including Autodesk, Boeing, Ford, Lockheed-Martin, Michelin, Toyota, and Volkswagen.

ACADEMIC APPOINTMENTS

- Professor, Aeronautics and Astronautics
- Member, Institute for Computational and Mathematical Engineering (ICME)

ADMINISTRATIVE APPOINTMENTS

- Chair, Department of Aeronautics and Astronautics, (2008- present)

HONORS AND AWARDS

- Daniel Guggenheim Medal, ASME/SAE/AHS/AIAA (2026)
- ALERT Geomaterials Medal, Alliance of Laboratories in Europe for Education, Research and Technolgy (2025)
- Aurel Stodola Medal, ETH, Zurich (2025)
- Kuwait Prize 2024, Kuwait Foundation for the Advancement of Sciences (2025)
- Laureate for the TAKREEM AMERICA Foundation, Scientific and Technological Achievement, TAKREEM AMERICA Foundation (2025)
- The SAE International Award for Computational Fluid Dynamics, International Society of Automotive Engineers (2025)
- 2023 Collier Aerospace HyperX/AIAA Structures Best Paper Award, American Institute of Aeronautics and Astronautics (2024)
- AIAA Journal Authors Seminar Award, American Institute of Aeronautics and Astronautics (2024)
- Fellow, Society of Engineering Science (2024)
- The Olof B. Widlund Prize, Domain Decomposition Methods (2024)
- Vannevar Bush Faculty Fellowship, Department of Defense (2023)
- Docteur Honoris Causa, Ecole Nationale Superieure d'Arts et Metiers (2022)
- 2021 AIAA Multidisciplinary Design Optimization Best Paper Award, American Institute of Aeronautics and Astronautics (2021)
- The Commander's Public Service Award, Department of the Air Force (2019)
- The Edison Lecture, University of Notre Dame (2019)
- Appointed to the Space Technology Industry-Government-University Roundtable, National Academies (2017)
- Docteur Honoris Causa, Ecole Normale Superieure Paris-Saclay, France (2017)
- Docteur Honoris Causa, Ecole Centrale de Nantes, France (2017)
- Elected to the Lebanese Academy of Sciences, Lebanese Academy of Sciences (2017)
- Spirit of St Louis Medal, American Society of Mechanical Engineers (2017)
- The AIAA Ashley Award for Aeroelasticity, American Institute of Aeronautics and Astronautics (2017)

- The Grand Prize, The Japan Society for Computational Engineering and Science (2017)
- Elected to the Royal Academy of Engineering (International Fellow), Royal Academy of Engineering (2016)
- The Ted Belytschko Lecture, Northwestern University (2016)
- Appointed to the United States Air Force Scientific Advisory Board (SAB), US Air Force (2015)
- The Liviu Librescu Memorial Lecture, Virginia Tech (2015)
- The MIT Den Hartog Lecture in Mechanics, Massachusetts Institute of Technology (2015)
- Designated Primary Key-Influencer and Flew with the Blue Angels, US Navy (2014)
- The Gauss-Newton Medal, International Association of Computational Mechanics (2014)
- Elected to the National Academy of Engineering, National Academy of Engineering (2013)
- The IACM Award, International Association of Computational Mechanics (2012)
- Fellow, Society of Industrial and Applied Mathematics (2011)
- Knighted by the Prime Minister of France in the Order of Academic Palms, Prime Minister of France (2011)
- Lifetime Achievement Award, American Society of Mechanical Engineers (2011)
- Structures, Structural Dynamics and Materials Award, American Institute of Aeronautics and Astronautics (2010)
- Highly Cited Researcher in Engineering, Institute for Scientific Information (ISI) Highly Cited (2009)
- John von Neumann Medal, US Association of Computational Mechanics (2009)
- Fellow, American Society of Mechanical Engineers (2003)
- The Subaru Educator Spotlight, Subaru (2003)
- Fellow, International Association of Computational Mechanics (2002)
- The Computational Mechanics Award, International Association of Computational Mechanics (2002)
- The Gordon Bell Award, Institute of Electrical and Electronics Engineers (2002)
- 2001 Modeling and Simulation Award, Department of Defense (2001)
- Engineer of the Year (AIAA Rocky Mountain Section), American Institute of Aeronautics and Astronautics (2001)
- Fellow, World Innovation Foundation (2001)
- Fellow, US Association of Computational Mechanics (2001)
- The Computational and Applied Sciences Medal, US Association of Computational Mechanics (2001)
- Fellow, American Institute of Aeronautics and Astronautics (1999)
- Young Investigator Award, International Association of Computational Mechanics (1998)
- The R. H. Gallagher Special Achievement Award for Young Investigators, US Association of Computational Mechanics (1997)
- The Sidney Fernbach Award, Institute of Electrical and Electronics Engineers (1997)
- The College of Engineering and Applied Sciences Research Award, University of Colorado (1996)
- The Sup'Prize Achievement Award, IBM (1995)
- Aerospace Structures and Materials Best Paper Award, American Society of Mechanical Engineers (1994)
- Arch T. Colwell Merit Award, Society of Automotive Engineering (1993)
- FNRS Fellowship, Belgian National Science Foundation (1993)
- Research Featured in Yearbook of Science and the Future, Encyclopaedia Britannica (1992)
- CRAY Research Gigaflop Performance Award, CRAY Research (1990)
- TRW Fellowship, TRW Foundation (1989-1992)
- CRAY Research Award, CRAY Research (1989)

- Presidential Young Investigator Award, National Science Foundation (1989)
- AGARD Lecturer, NATO Research & Technology Organisation (1988, 1991, 1993, 1995)
- PACER Fellowship, Control Data Corporation (1987-1989)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Associate Editor, Journal of Computational Physics, Elsevier (2024 - present)
- Member, Science Advisory Board Program on Intelligent Modelling for Decision-making in Critical Urban System, DesCartes, CNRS@CREATE (2022 - present)
- Chair, Search Committee for the Editor-in-Chief of the Journal of Aircraft, The American Institute of Aeronautics and Astronautics (2022 - 2022)
- Member, Pendray Award Committee, The American Institute of Aeronautics and Astronautics (2022 - 2022)
- Member, International Scientific and Educational Advisory Board (SEAB), Institute of Aeronautics and Astronautics, Paris-Saclay University, France (2021 - present)
- Judge, Physical Sciences & Engineering Jury for the Blavatnik National Awards for Young Scientists, New-York Academy of Sciences (2021 - 2023)
- Chair, Summerfield Book Award Committee, The American Institute of Aeronautics and Astronautics (2021 - 2021)
- Member, Leadership-Class Computing Facility (LCCF) Review Board, The National Science Foundation (2021 - 2021)
- Member, The American Institute of Aeronautics and Astronautics Publications Ethical Standards Subcommittee, The American Institute of Aeronautics and Astronautics (2018 - present)
- Member, The Space Technology Industry-Government-University Roundtable, The National Academies (2017 - present)
- Member, The United States Air Force Scientific Advisory Board (SAB), United States Air Force (2015 - 2019)
- Chair, Pendray Award Committee, The American Institute of Aeronautics and Astronautics (2015 - 2017)
- Editor-in-Chief, The International Journal for Numerical Methods in Engineering, Wiley (2014 - present)
- Chair, Naval Research Laboratory, Structural Materials Triennial Review Board, The Naval Research Laboratory (2014 - 2014)
- Member, The National Academy of Engineering, The National Academy of Engineering (2013 - present)
- Member, Airbus Fly Your Ideas Panel of Judges, Airbus (2013 - 2013)
- Member, The American Institute of Aeronautics and Astronautics Publications Committee, The American Institute of Aeronautics and Astronautics (2012 - present)
- Editor, The International Journal for Numerical Methods in Fluids, Wiley (2010 - present)
- Member, Board of Advisors of the Department of Aerospace and Mechanical Engineering, University of Southern California (2010 - present)
- Member, Board of Advisors, Association Teratec, Bruyeres-Le-Chatel, France (2010 - 2018)
- Fellow, The Society of Industrial and Applied Mathematics (2009 - present)
- Member, Executive Council, The International Association for Computational Mechanics, The International Association for Computational Mechanics (2009 - present)
- Member, Predictive Engineering Sciences Panel, Sandia National Laboratories (2009 - present)
- Member, Regolith Excavation Challenge Panel of Judges, California Space Authority (2009 - 2009)
- Member, Selection Committee 2009 Theodore von Karman Prize, The Society of Industrial and Applied Mathematics (2009 - 2009)
- Member, The US Bureau of Industry and Security's Emerging Technology and Research Advisory Committee, The United States Department of Commerce (2008 - 2018)
- Member, The American Society of Mechanical Engineers Applied Mechanics Division's Committee on Fluid-Structure Interaction, The American Society of Mechanical Engineers (2008 - 2009)
- Member, High Scientific Council, Office National d' Etudes et de Recherches Aerospatiales (ONERA) (2006 - 2012)
- Corresponding Member, Executive Council, The International Association for Computational Mechanics, The International Association for Computational Mechanics (2006 - 2009)
- Member, The Sandia Science Advisory Board, The Sandia National Laboratories (2006 - 2009)
- Member, Evaluation Committee, Institut Universitaire des Systemes Thermiques Industriels (IUSTI) (2006 - 2006)

- Member, Board of Advisors, Center for Scientific Computing and Optimization in Multidisciplinary Applications (SCOMA), Jyvaskyla, Finland (2005 - 2006)
- Member, Theme NumD Panel of Experts, Institut National de Recherche en Informatique et Automatique (INRIA) (2004 - present)
- Member, Simulation-Based Engineering Sciences Initiative Panel, The National Science Foundation (2004 - 2004)
- Member, Subcommittee on Computational Science, President's Information Technology Advisory Committee (PITAC), US Government (2004 - 2004)
- Fellow, The American Society of Mechanical Engineers (2003 - present)
- Vice-Chair, The Society for Industrial and Applied Mathematics' Activity Group on Supercomputing, The Society for Industrial and Applied Mathematics (2003 - 2006)
- Member, Information Technology Research Review Panel, The National Science Foundation (2003 - 2003)
- Fellow, The International Association of Computational Mechanics (2002 - present)
- Member, The Fourteenth Annual Robert J. Melosh Medal Competition Jury Panel, Duke University (2002 - present)
- Chair, The Engineering Sciences Research Foundation's External Review Panel, The Sandia National Laboratories (2002 - 2009)
- Member, Army Research Laboratory Technical Assessment Board's Panel on Air and Ground Vehicle Technology, The National Research Council (NRC) (2002 - 2007)
- Fellow, The World Innovation Foundation (2001 - present)
- Fellow, The US Association of Computational Mechanics (2001 - present)
- Member, Advanced Computational Research Panel, The National Science Foundation (2001 - present)
- Member, Structures Technical Committee, The American Institute of Aeronautics and Astronautics (2001 - 1996)
- Member, General Council, The International Association for Computational Mechanics, The International Association for Computational Mechanics (2000 - present)
- Member, Dynamic Data-Driven Application Systems Panel, The National Science Foundation (2000 - 2000)
- Fellow, The American Institute of Aeronautics and Astronautics (1999 - present)
- Member, Awards Committee, The Institute of Electrical and Electronics Engineers (1998 - 2004)
- Member, New Strategic Initiative for FY2000 and Beyond, The National Science Foundation (1998 - 1998)
- Member, Engineering Research Center Review Panel, The National Science Foundation (1997 - 1997)
- Member-at-Large, The United States Association for Computational Mechanics, The United States Association for Computational Mechanics (1995 - 2006)
- Member, Computational Aerosciences Review and Planning, NASA Ames Research Center (1994 - 1997)
- Member, MetaCenter Allocations Committee, The National Science Foundation (1994 - 1996)
- Member, The Joint Pittsburgh/Illinois Supercomputing Peer Review Board, Pittsburgh University (1993 - 1996)
- Member, IBM Academy of Science and Technology Study, IBM (1993 - 1993)
- NYI Awards Review Panel, The National Science Foundation (1993 - 1993)
- Member, ASC Postdoctoral Research Associateship Program Review Board, The National Science Foundation (1991 - 1991)
- Member, ASC SBIR Awards Review Panel, The National Science Foundation (1990 - 1990)

PROFESSIONAL EDUCATION

- PhD, The University of California, Berkeley, Civil Engineering (1987)
- MS, The University of California, Berkeley, Electrical Engineering and Computer Sciences (1986)
- MS, The University of California, Berkeley, Structural Engineering and Structural Mechanics (1984)
- MS, Universite de Paris VI, France, Applied Mechanics (1983)
- Diplome d'Ingenieur, Ecole Centrale des Arts et Manufactures, France (1983)

LINKS

- Research and Teaching Site: https://web.stanford.edu/group/frg
- Flying with the Blue Angels: https://www.flickr.com/photos/stanfordeng/sets/72157648134366930/

Research & Scholarship

RESEARCH INTERESTS

- Collaborative Learning
- Data Sciences
- Higher Education
- Leadership and Organization
- Lifelong Learning
- Math Education
- Research Methods

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Charbel Farhat and his Research Group (FRG) develop mathematical models, advanced computational algorithms, and high-performance software for the design, analysis, and digital twinning of complex systems in aerospace, marine, mechanical, and naval engineering. They contribute major advances to Simulation-Based Engineering Science. Current engineering foci in research are on reliable autonomous carrier landing in rough seas; dissipation of vertical landing energies through structural flexibility; nonlinear aeroelasticity of N+3 aircraft with High Aspect Ratio (HAR) wings; pulsation and flutter of a parachute; pendulum motion in main parachute clusters; coupled fluid-structure interaction (FSI) in supersonic inflatable aerodynamic decelerators for Mars landing; flight dynamics of hypersonic systems and their trajectories; and advanced digital twinning. Current theoretical and computational emphases in research are on high-performance, multi-scale modeling for the high-fidelity analysis of multi-component, multi-physics problems; discrete-event-free embedded boundary methods for CFD and FSI; efficient Bayesian optimization using physics-based surrogate models; modeling and quantifying model-form uncertainty; probabilistic, physics-based machine learning; mechanics-informed artificial neural networks for data-driven constitutive modeling; and efficient nonlinear projection-based model order reduction for time-critical applications such as design, active control, and digital twinning.

Teaching

COURSES

2025-26

- Numerical Methods for Compressible Flows: AA 214 (Win)
- Projection-Based Model Order Reduction: AA 216, CME 345 (Aut)

2024-25

- Mechanical Vibrations: AA 242B (Spr)
- Model Reduction: AA 216, CME 345 (Aut)
- Numerical Methods for Compressible Flows: AA 214 (Win)

2023-24

- Numerical Methods for Compressible Flows: AA 214 (Aut)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Kevli Li

Postdoctoral Faculty Sponsor

Sebastian Ares De Parga Regalado, Jonathan Cangelosi

Doctoral Dissertation Advisor (AC)

Rodrigo Blanco Arce, Jeffrey Durrant, Jeremy Huang, Ali Lasemi, Amit Nayak, Christian Porrello, Ashok Viswanathan, Yihong Zhu

Master's Program Advisor

Harold Gardon, Thomas Kelly, Bruce Liu, Jace Lu, Thomas Luo, Nolan Nguyen, Ege Teksoz

Publications

PUBLICATIONS

- **A probabilistic physics-based framework for the development and continuous adaptation of lifecycle digital twins** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Farhat, C., Daeninck, G., Harp, D.
  2027; 569
- **Accelerating Flight Test and Evaluation via Aerodynamic Projection-Based Reduced-Order Models** *AIAA JOURNAL*
  Chmiel, M. R., Ghoreyshi, M., Harp, D., Farhat, C.
  2026
- **Submesh inner product for projection-based model order reduction with adaptive mesh refinement** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*
  Little, C., Huang, J., Farhat, C.
  2026; 461
- **A staggered training framework for mechanics-informed neural networks in tractable multiscale homogenization with application to woven fabrics** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*
  As'ad, F., Farhat, C.
  2026; 452
- **A local-length-scale-based mesh adaptation method for compressible multi-material flows** *INTERNATIONAL JOURNAL OF MULTIPHASE FLOW*
  Lasemi, A., Farhat, C.
  2026; 198
- **Nonlinear projection-based model order reduction with machine learning regression for closure error modeling in the latent space** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*
  De Parga, S., Tezaur, R., Hernandez, C. G., Farhat, C.
  2026; 448
- **A tractable nonparametric probabilistic approach for modeling and quantifying model-form uncertainty in turbulent CFD** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Jewell, E., Farhat, C., Soize, C.
  2025; 536
- **Permeability Modeling of the Mars 2020 Parachute Broadcloth Material** *AIAA JOURNAL*
  Ghasimi, S., Rabinovitch, J., Chacon, L., Poovathingal, S. J., Phillippe, C. A., Foster, C., Roca, L., Panerai, F., As'ad, F., Farhat, C., Lobbia, M., Ataei, N.
  2025
- **Probabilistic learning from real-world observations of systems with unknown inputs for model-form UQ and digital twinning** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*

Zhang, Z. J., Bakar, A., Humphry, A., Javid, F., Nadeau, P., Ebrahimi, M., Butscher, A., Tessier, A., Rodriguez, J., Farhat, C.
2025; 440

- **Projection-based model order reduction of embedded boundary models for CFD and nonlinear FSI** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*
  Youkilis, N. B., Farhat, C.
  2025; 439
- **Reduced Order Modeling conditioned on monitored features for response and error bounds estimation in engineered systems** *MECHANICAL SYSTEMS AND SIGNAL PROCESSING*
  Vlachas, K., Simpson, T., Garland, A., Quinn, D., Farhat, C., Chatzi, E.
  2025; 226
- **Projection-Based Model Order Reduction of Adaptively Refined Large-Scale Turbulent Flows**
  Little, C. R., Farhat, C., AIAA
  AMER INST AERONAUTICS & ASTRONAUTICS.2025
- **Mesh Adaptation Grounded in a Local Length Scale for Compressible Multi-Material Flows**
  Lasemi, A., Farhat, C., AIAA
  AMER INST AERONAUTICS & ASTRONAUTICS.2025
- **Sensitivity Analysis and Validation of a Computational Framework for Supersonic Parachute Inflation Dynamics** *AIAA JOURNAL*
  As'ad, F., Avery, P., Farhat, C., Rabinovitch, J., Lobbia, M., Ataei, N.
  2024
- **Unified LSPG Model Reduction Framework and Assessment for Hypersonic Computational Fluid Dynamics** *AIAA JOURNAL*
  Chmiel, M. R., Barnett, J., Farhat, C.
  2024
- **Enhanced Multimodal Nonparametric Probabilistic Method for Model-Form Uncertainty Quantification and Digital Twinning** *AIAA JOURNAL*
  Azzi, M., Farhat, C.
  2024
- **A few words about Roland Glowinski** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Abgrall, R., Farhat, C., Pironneau, O.
  2024; 505
- **Permeability Modeling of Mars Parachute Broadcloth Materials**
  Ghasimi, S., Rabinovitch, J., Chacon, L., Poovathinga, S. J., Phillippe, C. A., Foster, C., Roca, L., Panerai, F., As'ad, F., Avery, P., Farhat, C., Lobbia, M., Ataei, et al
  AMER INST AERONAUTICS & ASTRONAUTICS.2024
- **Multimodal Data-Assimilation using the Nonparametric Probabilistic Method for Model-Form Uncertainty Quantiocation, Stochastic Model Updating, and Digital Twinning**
  Azzi, M., Farhat, C., AIAA
  AMER INST AERONAUTICS & ASTRONAUTICS.2024
- **Assessment of Projection-Based Model Order Reduction for a Benchmark Hypersonic Flow Problem**
  Chmiel, M. R., Barnett, J., Farhat, C., AIAA
  AMER INST AERONAUTICS & ASTRONAUTICS.2024
- **Bayesian Framework with Projection-based Model Order Reduction for Efficient Global Optimization**
  Porrello, C., Farhat, C., Dubreuil, S., AIAA
  AMER INST AERONAUTICS & ASTRONAUTICS.2024
- **Sensitivity Analysis and Validation of a Computational Framework for Supersonic Parachute Inflation Dynamics**
  As'ad, F., Avery, P., Farhat, C., Rabinovitch, J., Lobbia, M., Ataei, N., AIAA
  AMER INST AERONAUTICS & ASTRONAUTICS.2024
- **A mechanics-informed deep learning framework for data-driven nonlinear viscoelasticity** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*

As'ad, F., Farhat, C.
2023; 417

- **Projection-Based Dimensional Reduction of Adaptively Refined Nonlinear Models** *COMMUNICATIONS ON APPLIED MATHEMATICS AND COMPUTATION*
  Little, C., Farhat, C.
  2023
- **Neural-network-augmented projection-based model order reduction for mitigating the Kolmogorov barrier to reducibility** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Barnett, J., Farhat, C., Maday, Y.
  2023; 492
- **Displacement-based partitioned equations of motion for structures: Formulation and proof-of-concept applications** *INTERNATIONAL JOURNAL FOR NUMERICAL METHODS IN ENGINEERING*
  Park, K. C., Gonzalez, J. A., Park, Y. H., Shin, S. J., Kim, J. G., Maute, K. K., Farhat, C., Felippa, C. A.
  2023
- **Aerodynamic optimization with large shape and topology changes using a differentiable embedded boundary method** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Ho, J., Farhat, C.
  2023; 488
- **Acceleration of a Physics-Based Machine Learning Approach for Modeling and Quantifying Model-Form Uncertainties and Performing Model Updating** *JOURNAL OF COMPUTING AND INFORMATION SCIENCE IN ENGINEERING*
  Azzi, M., Ghnatios, C., Avery, P., Farhat, C.
  2023; 23 (1)
- **Nonlinear compressive reduced basis approximation for PDE's** *COMPTES RENDUS MECANIQUE*
  Cohen, A., Farhat, C., Maday, Y., Somacal, A.
  2023; 351
- **Space-local reduced-order bases for accelerating reduced-order models through sparsity** *INTERNATIONAL JOURNAL FOR NUMERICAL METHODS IN ENGINEERING*
  Anderson, S., White, C., Farhat, C.
  2022
- **Reprint of: Robust and globally efficient reduction of parametric, highly nonlinear computational models and real time online performance** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*
  Tezaur, R., As'ad, F., Farhat, C.
  2022; 402
- **Linear Reduced-Order Model Predictive Control** *IEEE TRANSACTIONS ON AUTOMATIC CONTROL*
  Lorenzetti, J., McClellan, A., Farhat, C., Pavone, M.
  2022; 67 (11): 5980-5995
- **Quadratic approximation manifold for mitigating the Kolmogorov barrier in nonlinear projection-based model order reduction** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Barnett, J., Farhat, C.
  2022; 464
- **Robust and globally efficient reduction of parametric, highly nonlinear computational models and real time online performance** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*
  Tezaur, R., As'ad, F., Farhat, C.
  2022; 399
- **Training a Neural-Network-Based Surrogate Model for Aerodynamic Optimisation Using a Gaussian Process** *INTERNATIONAL JOURNAL OF COMPUTATIONAL FLUID DYNAMICS*
  Ghazi, Y., Alhazmi, N., Tezaur, R., Farhat, C.
  2022; 36 (7): 538-554

- **A physics-based digital twin for model predictive control of autonomous unmanned aerial vehicle landing.** *Philosophical transactions. Series A, Mathematical, physical, and engineering sciences*
  McClellan, A., Lorenzetti, J., Pavone, M., Farhat, C.
  2022; 380 (2229): 20210204
- **A mechanics-informed artificial neural network approach in data-driven constitutive modeling** *INTERNATIONAL JOURNAL FOR NUMERICAL METHODS IN ENGINEERING*
  As'ad, F., Avery, P., Farhat, C.
  2022
- **PIECEWISE-GLOBAL NONLINEAR MODEL ORDER REDUCTION FOR PDE-CONSTRAINED OPTIMIZATION IN HIGH-DIMENSIONAL PARAMETER SPACES** *SIAM JOURNAL ON SCIENTIFIC COMPUTING*
  Boncoraglio, G., Farhat, C.
  2022; 44 (4): A2176-A2203
- **Active Manifold and Model-Order Reduction to Accelerate Multidisciplinary Analysis and Optimization** *AIAA JOURNAL*
  Boncoraglio, G., Farhat, C.
  2021; 59 (11): 4739-4753
- **Vanguard developments in computational methods for fluid-structure interaction** *INTERNATIONAL JOURNAL FOR NUMERICAL METHODS IN ENGINEERING*
  van Brummelen, E., Farhat, C.
  2021
- **The DGDD method for reduced-order modeling of conservation laws** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Riffaud, S., Bergmann, M., Farhat, C., Grimberg, S., Iollo, A.
  2021; 437
- **Homogenized Flux-Body Force Treatment of Compressible Viscous Porous Wall Boundary Conditions** *AIAA JOURNAL*
  Huang, D. Z., Wong, M., Lele, S. K., Farhat, C.
  2021; 59 (6): 2045-2059
- **A computationally tractable framework for nonlinear dynamic multiscale modeling of membrane woven fabrics** *INTERNATIONAL JOURNAL FOR NUMERICAL METHODS IN ENGINEERING*
  Avery, P., Huang, D. Z., He, W., Ehlers, J., Derkevorkian, A., Farhat, C.
  2021
- **Mesh sampling and weighting for the hyperreduction of nonlinear Petrov-Galerkin reduced-order models with local reduced-order bases** *INTERNATIONAL JOURNAL FOR NUMERICAL METHODS IN ENGINEERING*
  Grimberg, S., Farhat, C., Tezaur, R., Bou-Mosleh, C.
  2021
- **Gradient-based constrained optimization using a database of linear reduced-order models** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Choi, Y., Boncoraglio, G., Anderson, S., Amsallem, D., Farhat, C.
  2020; 423
- **On the stability of projection-based model order reduction for convection-dominated laminar and turbulent flows** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Grimberg, S., Farhat, C., Youkilis, N.
  2020; 419
- **Learning constitutive relations from indirect observations using deep neural networks** *JOURNAL OF COMPUTATIONAL PHYSICS*
  Huang, D. Z., Xu, K., Farhat, C., Darve, E.
  2020; 416
- **In situ adaptive reduction of nonlinear multiscale structural dynamics models** *INTERNATIONAL JOURNAL FOR NUMERICAL METHODS IN ENGINEERING*
  He, W., Avery, P., Farhat, C.
  2020

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