Annalisa Quaini

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Professor of Mathematics, University of Houston (USA)

Education

11/05- 01/09	**PhD in Applied Mathematics (Docteur ès Sciences)** Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland.
09/99 - 07/05	**M.S. (Laurea) in Aerospace Engineering**. Specialization: *Aerodynamics*. Politecnico di Milano, Italy. Final grade: 100/100 cum Laude.

Professional experience

09/22 - present	**Professor of Mathematics**, University of Houston (USA)
09/23 - present	**Associate Department Chair**, University of Houston (USA)
05/24 - present	**Vice President**, SIAM Texas-Louisiana Section
09/21 - 05/22	**William and Flora Hewlett Foundation Fellow**, Radcliffe Institute for Advanced Study, Harvard University (USA)
09/17 - 08/22	**Associate Professor of Mathematics**, University of Houston (USA)
08/11 - 08/17	**Assistant Professor of Mathematics**, University of Houston (USA)
12/14	**Gambrinus fellow**, TU Dortmund (Germany)
01/14 - 04/14	**Visiting fellow**, Emory University (USA)
03/09 - 08/11	**Postdoctoral Fellow**, University of Houston (USA)
11/05 -01/09	**Research assistant**, EPFL (Switzerland)

Research interests

- **Climate modeling**: finite volume, ocean modeling, regional modeling, reduced order modeling.
- **Reduced-order modeling** (ROM): data-driven methods, projection methods, proper orthogonal decomposition, reduced basis, ROM for bifurcation problems, ROM for optimal control.
- **Computational fluid dynamics**: finite element, finite volume, Large Eddy Simulation, reduced order modeling, surface flows, two-phase flows.
- **Multiphysics problems**: algorithms, domain decomposition, linear algebra, benchmarking and validation, fluid mechanics, solid mechanics, phase separation.
- **Multidisciplinary simulation** in collaboration with cardiologists and biomedical engineers.
- **Crowd dynamics**: microscopic and kinetic approaches, emotional contagion, parameter learning.

Publications

Refereed journal publications

[J1] L. Besabe, M. Girfoglio, A. Quaini, G. Rozza: *Randomized Proper Orthogonal Decomposition for data-driven reduced order modeling of a two-layer quasi-geostrophic ocean model.* Submitted.

[J2] M. Olshanskii and A. Quaini: *Phase-separated lipid vesicles: continuum modeling, simulation, and validation.* Submitted.

[J3] A. Hajisharifi, M. Girfoglio, A. Quaini, G. Rozza: *Combining extended convolutional autoencoders and reservoir computing for accurate reduced-order predictions of atmospheric flows.* Submitted.

[J4] A. Dalal, R. Durst, A. Quaini, I. Yotov: *A Robin-Robin splitting method for the Stokes-Biot fluid-poroelastic structure interaction model.* Submitted.

[J5] P. Siena, M. Girfoglio, A. Quaini, G. Rozza: *Stabilized POD Reduced Order Models for convection-dominated incompressible flows.* Comput. Appl. Math., Accepted.

[J6] D. Kim, D. Labate, K. Mily, and A. Quaini *Data driven learning to enhance a kinetic model of distressed crowd dynamics.* Math. Models Methods Appl. Sci., Published online.

[J7] M. Khamlich, F. Pichi, M. Girfoglio, A. Quaini, G. Rozza: *Optimal transport-based displacement interpolation with data augmentation for Reduced Order Modeling of nonlinear dynamical systems.* J. Comput. Phys., 531:113938, 2025.

[J8] M. Girfoglio, A. Quaini, G. Rozza: *A comparative computational study of different formulations of the compressible Euler equations for mesoscale atmospheric flows in a finite volume framework.* Computers & Fluids, 288:106510, 2025.

[J9] L. Besabe, M. Girfoglio, A. Quaini, G. Rozza: *Data-driven reduced order modeling of a two-layer quasi-geostrophic ocean model.* Results in Engineering, 25:103691, 2025.

[J10] L. Besabe, M. Girfoglio, A. Quaini, G. Rozza: *Linear and nonlinear filtering for a two-layer quasi-geostrophic ocean model.* Appl. Math. Comput., 488:129121, 2025.

[J11] N. Clinco, M. Girfoglio, A. Quaini, G. Rozza: *Computational study of numerical flux schemes for mesoscale atmospheric flows in a Finite Volume framework.* Commun. Appl. Ind. Math., 15(1):106-122, 2024.

[J12] A. Quaini, O. San, A. Veneziani, T. Iliescu: *Bridging Large Eddy Simulation and Reduced Order Modeling of convection-dominated flows through spatial filtering: review and perspectives.* Fluids, 9(8):178, 2024.

[J13] A. Hajisharifi, M. Girfoglio, A. Quaini, G. Rozza: *A Comparison of data-driven Reduced Order Models for the simulation of mesoscale atmospheric flow.* Finite Elements in Analysis & Design, 228:104050, 2024.

[J14] Y. Wang, Y. Palzhanov, D. T. Dang, A. Quaini, M. Olshanskii, S. Majd: *On fusogenicity of positively charged phased-separated lipid vesicles: experiments and computational simulations.* Biomolecules, 13(10):1473, 2023.

[J15] M. Olshanskii, Y. Palzhanov, A. Quaini: *A scalar auxiliary variable unfitted FEM for the surface Cahn-Hilliard equation.* J. Sci. Comput., 97:57, 2023.

[J16] N. Clinco, M. Girfoglio, A. Quaini, G. Rozza: *Filter stabilization for the mildly compressible Euler equations with application to atmosphere dynamics simulations.* Computers & Fluids, 266:106057, 2023.

[J17] N. Bellomo, J. Liao, A. Quaini, L. Russo, C. Siettos: *Human behavioral crowds review, critical analysis, and research perspectives.* Math. Models Methods Appl. Sci., 33(8):1611-1659, 2023.

[J18] M. Girfoglio, A. Quaini, G. Rozza: *Validation of an OpenFOAM-based solver for the Euler equations with benchmarks for mesoscale atmospheric modeling.* AIP Advances, 13(5):055024, 2023.

[J19] M. Girfoglio, A. Quaini, G. Rozza: *A hybrid projection/data-driven reduced order model for the Navier-Stokes equations with nonlinear filtering stabilization.* J. Comput. Phys., 486:112127, 2023.

[J20] M. Girfoglio, A. Quaini, G. Rozza: *A linear filter regularization for POD-based Reduced Order Models of the quasi-geostrophic equations.* Comptes-Rendus Mécaniques, 351(S1):1-21, 2023.

[J21] Y. Tissaoui, S. Marras, A. Quaini, F. A. V. De Braganca Alves, F. X. Giraldo *A non-column based, fully unstructured implementation of Kessler's microphysics with warm rain using continuous and discontinuous spectral elements.* J. Adv. Model. Earth Syst., 15(3):e2022MS003283, 2023.

[J22] M. Hess, A. Quaini, G. Rozza: *A data-driven surrogate modeling approach for time-dependent incompressible Navier-Stokes equations with Dynamic Mode Decomposition and manifold interpolation.* Adv. Comput. Math., 49, 22, 2023.

[J23] M. Girfoglio, A. Quaini, G. Rozza: *A novel Large Eddy Simulation model for the quasi-geostrophic equations in a finite volume setting.* J. Comput. Appl. Math., 418:114656, 2023.

[J24] C. Balzotti, P. Siena, M. Girfoglio, A. Quaini, G. Rozza: *A data-driven Reduced Order Method for parametric optimal blood flow control: application to coronary bypass graft.* Commun. Optim. Theory, 2022:1-19, Article ID 26, 2022.

[J25] M. Olshanskii, Y. Palzhanov, A. Quaini: *A comparison of Cahn–Hilliard and Navier–Stokes–Cahn–Hilliard models on manifolds.* Vietnam Journal of Mathematics, 50:929945, 2022.

[J26] M. Girfoglio, A. Quaini, G. Rozza: *A POD-Galerkin reduced order model for the Navier-Stokes equations in stream function-vorticity formulation.* Computers & Fluids, 244:105536, 2022.

[J27] Y. Wang, Y. Palzhanov, A. Quaini, M. Olshanskii, S. Majd: *Lipid domain coarsening and fluidity in multicomponent lipid vesicles: A continuum based model and its experimental validation.* BBA - Biomembranes, 1864(7):183898, 2022.

[J28] N. Bellomo, L. Gibelli, A. Quaini, and A. Reali: *Towards a mathematical theory of behavioral human crowds.* Math. Models Methods Appl. Sci., 32(2):321-358, 2022.

[J29] Olshanskii, A. Quaini, Q. Sun: *A finite element method for two-phase flow with material viscous interface.* Comput. Methods Appl. Math., 22(2):443-464, 2022.

[J30] M. Hess, A. Quaini, G. Rozza: *A comparison of reduced-order modeling approaches for PDEs with bifurcating solutions.* Electron. Trans. Numer. Anal. (ETNA), 56:52-65, 2022.

[J31] Y. Palzhanov, A. Zhiliakov, A. Quaini, and M. Olshanskii: *A decoupled, stable, and linear FEM for a phase-field model of variable density two-phase incompressible surface flow.* Comput. Methods Appl. Mech. Engrg., 387:114167, 2021.

[J32] Olshanskii, A. Quaini, Q. Sun: *An unfitted finite element method for two-phase Stokes problems with slip between phases.* J. Sci. Comput., 89(2), 41, 2021.

[J33] M. Girfoglio, A. Quaini, G. Rozza: *Pressure stabilization strategies for a LES filtering Reduced Order Model.* Fluids, 6(9):302, 2021.

[J34] M. Girfoglio, A. Quaini, G. Rozza: *Fluid–structure interaction simulations with a LES filtering approach in* solids4Foam. Commun. Appl. Ind. Math.,12(1):13-28, 2021.

[J35] D. Kim, K. O'Connell, W. Ott, A. Quaini: *A kinetic theory approach for 2D crowd dynamics with emotional contagion.* Math. Models Methods Appl. Sci., 31(6):1137-1162, 2021.

[J36] M. Girfoglio, A. Quaini, G. Rozza: *A POD-Galerkin reduced order model for a LES filtering approach.* J. Comput. Phys., 436:110260, 2021.

[J37] A. Zhiliakov, Y. Wang, A. Quaini, M. Olshanskii, S. Majd: *Experimental validation of a phase-field model to predict coarsening dynamics of lipid domains in multicomponent membranes.* BBA - Biomembranes, 1863(1):183446, 2021.

[J38] D. Kim, A. Quaini: *Coupling kinetic theory approaches for pedestrian dynamics and disease contagion in a confined environment.* Math. Models Methods Appl. Sci., 30(10):1893-1915, 2020.

[J39] K. Rathinakumar, A. Quaini: *A microscopic approach to study the onset of a highly infectious disease spreading.* Mathematical Biosciences, 329:108475, 2020.

[J40] F. Pichi, A. Quaini, G. Rozza: *A Reduced Order Modeling technique to study bifurcating phenomena: application to the Gross-Pitaevskii equation.* SIAM J. Sci. Comput., 42(5):B1115-B1135, 2020.

[J41] V. Yushutin, A. Quaini, M. Olshanskii: *Numerical modelling of phase separation on dynamic surfaces.* J. Comput. Phys., 407:109126, 2020.

[J42] H. Xu, F. Di Massimo, D. Baroli, A. Quaini, A. Veneziani: *Backflow stabilization by deconvolution-based Large Eddy Simulation modeling.* J. Comput. Phys., 404:109103, 2020.

[J43] M. Hess, A. Quaini, G. Rozza: *Reduced basis model order reduction for Navier-Stokes equations in domains with walls of varying curvature.* Int. J. Comput. Fluid Dyn., 34(2):119-126, 2020.

[J44] D. Kim, A. Quaini: *A kinetic theory approach to model pedestrian dynamics in bounded domains with obstacles.* Kinetic Rel. Models, 12(6):1273-1296, 2019.

[J45] M. Girfoglio, A. Quaini, G. Rozza: *A Finite Volume approximation of the Navier-Stokes equations with nonlinear filtering stabilization.* Computers & Fluids, 187:27-45, 2019.

[J46] M. Hess, A. Alla, A. Quaini, G. Rozza, M. Gunzburger: *A localized reduced-order modeling approach for PDEs with bifurcating solutions.* Comput. Methods Appl. Mech. Engrg., 351:379-403, 2019.

[J47] V. Yushutin, A. Quaini, S. Majd, M. Olshanskii: *A computational study of lateral phase separation in biological membranes.* Int. J. Num. Meth. Biomed. Eng., 35(3):e3181, 2019.

[J48] M. Olshanskii, A. Quaini, A. Reusken, V. Yushutin: *A finite element method for the surface Stokes problem.* SIAM J. Sci. Comput., 40(4):A2492-A2518, 2018.

[J49] Y. Wang, A. Quaini, S. Čanić: *A higher-order Discontinuous Galerkin/Arbitrary Lagrangian Eulerian partitioned approach to solving fluid-structure interaction problems with incompressible, viscous fluids and elastic structures.* J. Sci. Comput., 76(1):481-520, 2018.

[J50] Y. Wang, A. Quaini, S. Čanić, M. Vukicevic and S. Little: *3D experimental and computational analysis of eccentric mitral regurgitant jets in a mock imaging heart chamber.* Cardiovascular Engineering and Technology, 8(4):419-438, 2017.

[J51] D. Forti, M. Bukač, A. Quaini, S. Čanić, S. Deparis: *A monolithic approach to fluid-composite structure interaction.* J. Sci. Comput., 72(1):396-421, 2017.

[J52] G. Pitton, A. Quaini, G. Rozza: *Computational reduction strategies for the detection of steady bifurcations in incompressible fluid-dynamics: Applications to Coanda effect in cardiology.* J. Comput. Phys., 344:534-557, 2017.

[J53] S. Basting, A. Quaini, R. Glowinski, S. Čanić: *Extended ALE method for fluid-structure interaction problems with large structural displacements.* J. Comput. Phys., 331:312-336, 2017.

[J54] L. Shi, S. Čanić, A. Quaini, T.-W. Pan: *A study of self-propelled elastic cylindrical micro-swimmers using modeling and computation.* J. Comput. Phys., 314:264-286, 2016.

[J55] L. Bertagna, A. Quaini, A. Veneziani: *Deconvolution-based nonlinear filtering for incompressible flows at moderately large Reynolds numbers.* Int. J. Numer. Meth. Fluids, 81(8):463-488, 2016.

[J56] A. Quaini, R. Glowinski, and S. Čanić: *Symmetry breaking and preliminary results about a Hopf bifurcation for incompressible viscous flow in an expansion channel.* Int. J. Comput. Fluid Dyn., 30(1):7-19, 2016.

[J57] M. Bukač, S. Čanić, R. Glowinski, B. Muha, and A. Quaini: *A modular, operator-splitting scheme for fluid-structure interaction problems with thick structures.* Int. J. Numer. Meth. Fluids, 74(8):577-604, 2014.

[J58] T. Passerini, A. Quaini, U. Villa, A. Veneziani, and S. Čanić: *Validation of an open source framework for the simulation of blood flow in rigid and deformable vessels.* Int. J. Num. Meth. Biomed. Eng., 29(11):1192–1213, 2013.

[J59] R. Glowinski and A. Quaini: *When Euler-Poisson-Darboux meets Painlevé and Bratu: On the numerical solution of nonlinear wave equations.* Methods and Applications of Analysis, 20(4):405–424, 2013.

[J60] R. Glowinski and A. Quaini: *On the numerical solution of a nonlinear wave equation associated with the first Painlevé equation: an operator-splitting approach.* Chin. Ann. of Math., Series B, 34(2):237–254, 2013.

[J61] R. Glowinski and A. Quaini: *On an inequality of C. Sundberg: a computational investigation via nonlinear programming.* J. Optim. Theory Appl., 158(3):739–773, 2013.

[J62] M. Bukač, S. Čanić, R. Glowinski, J. Tambača, and A. Quaini: *Fluid-structure interaction in blood flow capturing non-zero longitudinal displacement.* J. Comput. Phys., 235:515–541, 2013.

[J63] A. Quaini, S. Čanić, R. Glowinski, S. Igo, C. Hartley, W. Zoghbi, and S. Little: *Validation of a 3D computational fluid-structure interaction model simulating flow through an elastic aperture.* J. Biomech., 45(2):310–318, 2012.

[J64] A. Quaini, S. Čanić, G. Guidoboni, R. Glowinski, S. Igo, C. Hartley, W. Zoghbi, and S. Little: *A three-dimensional computational fluid dynamics model of regurgitant mitral valve flow: validation against in vitro standards and 3D color Doppler methods.* Cardiovascular Engineering and Technology, 2(2):77–89, 2011.

[J65] A. Quaini, S. Čanić, and D. Paniagua: *Numerical characterization of stagnation zones near the aortic valve after implantation of Left Ventricular Assist Device.* Math. Biosci. Eng, 8(3):785–806, 2011.

[J66] S. Badia, A. Quaini, and A. Quarteroni: *Coupling Biot and Navier-Stokes equations for modelling fluid-poroelastic media interaction.* J. Comput. Phys., 228(21):7986–8014, 2009.

[J67] S. Badia, A. Quaini, and A. Quarteroni: *Modular vs. non-modular preconditioners for fluid-structure systems with large added-mass effect.* Comput. Methods Appl. Mech. Engrg., 197:4216–4232, 2008.

[J68] S. Badia, A. Quaini, and A. Quarteroni: *Splitting methods based on algebraic factorization for fluid-structure interaction.* SIAM J. Sci. Comput., 30(4):1778–1805, 2008.

[J69] A. Quaini and A. Quarteroni: *A semi-implicit approach for fluid-structure interaction based on an algebraic fractional step method.* Math. Models Methods Appl. Sci., 17(6):957–983, 2007.

Conference proceedings and book chapters (peer reviewed)

[P1] Y. Wang, Y. Palzhanov, D. T. Dang, A. Quaini, M. Olshanskii, S. Majd: *Fusogenicity of cationic liposomes with phase-separating multicomponent lipid compositions.* Abstract in Biophysical Journal, 123(3):304a, 2024.

[P2] M. Girfoglio, A. Quaini, G. Rozza: *GEA: a new finite volume-based open source code for the numerical simulation of atmospheric and ocean flows.* In: Finite Volumes for Complex Applications X – Volume 2, Hyperbolic and Related Problems, 151-159, Springer, 2023.

[P3] M. Hess, A. Quaini, G. Rozza: *Data-Driven Enhanced Model Reduction for Bifurcating Models in Computational Fluid Dynamics.* In: eccomas2022. `https://www.scipedia.com/public/Rozza_2022a`.

[P4] D. Kim, A. Quaini: *A 2D kinetic model for crowd dynamics with disease contagion.* In: N. Bellomo, M. Chaplain (eds) Predicting Pandemics in a Globally Connected World Volume 1 - Towards a multiscale, multidisciplinary vision through modeling and simulations, Birkhäuser-Springer, 2022.

[P5] Y. Wang, A. Zhiliakov, A. Quaini, M. Olshanskii, S. Majd: *Lipid domain formation and dynamics in multicomponent membranes: Experimental validation of a phase-field model*, Abstract in Biophysical Journal, 120(3): 225a, 2021.

[P6] D. Kim, A. Quaini: *A kinetic theory approach to model crowd dynamics with disease contagion.* In: N. Bellomo, L. Gibelli (eds) Crowd Dynamics Volume 3 - Modeling and Social Applications. Modeling and Simulation in Science, Engineering and Technology, Birkhäuser-Springer, 2021.

[P7] M. Hess, A. Quaini, G. Rozza: *A spectral element reduced basis method for Navier-Stokes equations with geometric variations.* In: Sherwin S., Moxey D., Peiro' J., Vincent P., Schwab C. (eds) Spectral and High Order Methods for Partial Differential Equations ICOSAHOM 2018. Lecture Notes in Computational Science and Engineering, vol 134, Springer Cham, 2020.

[P8] K. Bicol and A. Quaini: *On the sensitivity to model parameters in a filter stabilization technique for advection dominated advection-diffusion-reaction problems.* In: van Brummelen H., Corsini A., Perotto S., Rozza G. (eds) Numerical Methods for Flows. Lecture Notes in Computational Science and Engineering, vol 132. Springer, Cham, 2020.

[P9] L. Bertagna, A. Quaini, L.G. Rebholz, A. Veneziani: *On the sensitivity to the filtering radius in Leray models of incompressible flow.* In: Chetverushkin B., Fitzgibbon W., Kuznetsov Y., Neittaanmki P., Periaux J., Pironneau O. (eds) Contributions to Partial Differential Equations and Applications. Computational Methods in Applied Sciences, vol 47. Springer, Cham, pages 111-130, 2019.

[P10] S. Basting, A. Quaini, R. Glowinski, S. Čanić: *On the implementation and benchmarking of an extended ALE Method for FSI problems.* In Fluid-Structure Interaction: Modeling, Adaptive Discretizations and Solvers, S. Frei, B. Holm, T. Richter, T. Wick, H. Yang Eds., pages 3–39, 2017.

[P11] A. Quaini, R. Glowinski, S. Čanić: *A computational study on the generation of the Coanda effect in a mock heart chamber.* RIMS Kôkyûroku series, No. 2009-4, 2016.

[P12] A. Quaini and R. Glowinski: *Splitting methods for some nonlinear wave problems.* In Splitting Methods in Communication and Imaging, Science and Engineering, R. Glowinski, S.J. Osher, W. Yin Eds., pages 643–676, 2016.

[P13] A. Cesmelioglu, H. Lee, A. Quaini, K. Wang, S.-Y. Yi: *Optimization-based decoupling algorithms for a fluid-poroelastic system.* Topics in Numerical Partial Differential Equations and Scientific Computing. In The IMA Volumes in Mathematics and its Applications, volume 160: 79–98, 2016.

[P14] S. Basting, A. Quaini, R. Glowinski, S. Čanić: *Comparison of time discretization schemes for an inextensible beam.* Numerical Mathematics and Advanced Applications - ENUMATH 2013. In Lecture Notes in Computational Science and Engineering, A. Abdulle, S. Deparis, D. Kressner, F. Nobile, M. Picasso Eds., volume 103: 175–183, 2015.

[P15] R. Glowinski and A. Quaini: *On the numerical solution of a nonlinear wave equation associated with the first Painlevé equation: an operator-splitting approach.* In Partial Differential Equations: Theory, Control and Approximation, P.G. Ciarlet, T. Li, Y. Maday Eds., pages 243–264, 2014.

[P16] T. Passerini, A. Quaini, U. Villa, A. Veneziani, and S. Čanić: *Validation of an open source framework for the simulation of blood flow.* ASME 2013 Conference on Frontiers in Medical Devices: Applications of Computer Modeling and Simulation, FMD 2013, FMD2013-16125, 2013.

[P17] T. Passerini, A. Quaini, U. Villa, A. Veneziani, and S. Čanić: *Validation of an open source framework for the simulation of blood flow in rigid and deformable vessels.* ASME 2013 Summer Bioengineering Conference, SBC 2013, volume 1 A, 2013.

[P18] A. Quaini, S. Čanić, G. Guidoboni, R. Glowinski, S. Igo, C. Hartley, W. Zoghbi, S. Little: *Numerical simulation of an ultrasound imaging model of mitral valve regurgitation.* Abstract in Valves in the Heart of the Big Apple VI: Evaluation and Management of Valvular Heart Diseases 2010, Cardiology, 115:251–293, 2010.

[P19] A. Quarteroni, G. Rozza, and A. Quaini: *Reduced basis methods for optimal control of advection-diffusion problems.* In Advances in Numerical Mathematics, W. Fitzgibbon, R. Hoppe, J. Periaux, O, Pironneau, and Y. Vassilevski Eds., pages 193–216, 2006.

[P20] A. Quarteroni, G. Rozza, L. Dedè, and A. Quaini: *Numerical approximation of a control problem for advection-diffusion processes.* Proceedings of IFIP05 Conference. In System modeling and optimization, F. Ceragioli, A. Dontchev, H. Furuta, K. Marti, L. Pandolfi Eds. volume 199, pages 261–273, 2006.

Other publications (not peer reviewed)

[O1] D. Calvetti, A. Quaini: *Breaking Barriers at the Power of Diversity Event Before UQ24*, SIAM News, April 15, 2024.

[O2] A. Quaini, X. Qin, X. Tai, E. Zuazua: *Preface* to the Special Issue dedicated to the memory of Prof. Roland Glowinski, Annals of Mathematical Sciences and Applications, 8(3): i-iii, 2023.

[O3] A. Larese, A. Quaini: *Editorial*, Advances in Computational Science and Engineering, 1(1): i-iii, 2023.

Research grants and awards

- **National Science Foundation** DMS-2403506, *Conference: Power of Diversity in Uncertainty Quantification (PoD UQ)*, 2024.
- 2021-2022 William and Flora Hewlett Foundation Fellowship, **Harvard Radcliffe Institute**, *Mathematics of clouds and climate change.*
- **National Science Foundation** DMS-1953535, *Fusion-inducing liposomes for efficient intracellular delivery: Continuum models and experiments* (with M. Olshanskii and S. Majd), 2020-2023.
- **University of Houston** Bridge Funding Program award, *Advancing the understanding of membrane fusion through a computational platform based on continuum mechanics models*, 2019-2020.
- Award of the **Institute for Mathematical Sciences, National University of Singapore**, for the *International Workshop on Reduced Order Methods* in 2023.
- **National Science Foundation** DMS-1620384, *Collaborative Research: efficient modeling of incompressible fluid dynamics at moderate Reynolds numbers by deconvolution LES Filters - Analysis and applications to hemodynamics* (with A. Veneziani), 2016-2019.
- 2014 Gambrinus Fellowship, **TU Dortmund** (Germany), *Simulation of blood flow in the cardiovascular system and in medical devices.*
- 2014 Visiting Fellowship of the Department of Quantitative Theory and Methods, **Emory University**, *Large Eddy Simulation for blood flow problems in large arteries.*
- **National Science Foundation** DMS-1263572, *Collaborative Research: advancing the diagnosis and quantification of mitral valve regurgitation with mathematical modeling* (with S. Čanić and S. Little), 2013-2016.
- Postdoctoral Researcher Support from the **Department of Mathematics, University of Houston** (with S. Čanić and R. Glowinski), 2013.
- **National Science Foundation** DMS-1262385, *Coanda effect for incompressible flows in moving domains*, supplement for one year (with S. Čanić), 2013-2014.
- **National Science Foundation** DMS-1109189: *Coanda effect for incompressible flows in moving domains* (with S. Čanić), 2011-2013.

Selected conference presentations and invited talks

- Lecture in honor of the 50th anniversary of the Canadian Symposium on Fluid Dynamics at the Canadian Applied and Industrial Mathematics Society annual meeting, Queen's University (Canada), 06/24-27/2024.
- Invied talk at the ICERM workshop on Numerical Analysis of Multiphysics Problems, Brown University (USA), 02/12-16/24
- Invited talk at the 6th International Workshop on Model Reduction Techniques, Paris-Saclay (France), 11/22-24/2023.
- Colloquium talk at the Center for Mathematics and Artificial Intelligence, George Mason University (USA), 01/27/23.
- Keynote at the workshop "Calcolo scientifico e modelli matematici", Consiglio Nazionale Delle Ricerche (Italy), 06/6-8/22.
- Fellow's talk, Harvard Radcliffe Institute (USA), 04/12/2022.

- Keynote at the IX International Conference on Coupled Problems in Science and Engineering (online), 06/14-16/21.
- Keynote at Scientific Computing Around Louisiana, Louisiana State University (USA), 02/07-08/2020.
- Keynote at VII International Conference on Coupled Problems in Science and Engineering, Rhodes Island (Greece), 06/12-14/17.
- Invited talk at the International Workshop on Fluid-Structure Interaction Problems, National University of Singapore (Singapore), 05/30/16-06/03/16.

Mentoring

Mentoring or co-mentoring of the following students at University of Houston:

- Sachin Kumar (graduate student), Sep 2024-present.
- Irina Perepelitsa (graduate student), Jan 2024-present.
- Kamrun Mily (graduate student), Sep 2023-present.
- Maria Lozano (master's student), Jan 2025-May 2025.
- Lander Besabe (graduate student), Dec 2022-May 2025.
- Yerbol Palzhanov (graduate student), May 2020-April 2024.
- Qi Sun (graduate student), May 2020-May 2022.
- Quang Hoang (undergraduate student), Mar 2020-May 2021.
- Kaylie O'Connell (undergraduate student), Jan 2020-Dec 2020.
- Vladimir Yushutin (post-doctoral fellow), Oct 2017-Jan 2020.
- Kayla Bicol (graduate student), Sep 2015-July 2019.
- Daewa Kim (graduate student), Mar 2016-Apr 2019.
- Krithika Rathinakumar (graduate student), Sep 2015-Apr 2019.
- Yifan Wang (post-doctoral fellow), Aug 2014-Aug 2017.
- Lingling Shi (post-doctoral fellow), Aug 2014-Dec 2015.
- Taylor Ridley (undergraduate student), Aug 2013-Dec 2013.
- Samantha Crawford (undergraduate student), Sep 2009-Oct 2009.

Co-mentor at NSF funded "WhAM! A Research Collaboration Workshop for Women in Applied Mathematics", University of Minnesota , 12-15 Aug 2014. Reunion at Clemson University, 26-27 Feb 2015.

Teaching activity

- *Department of Mathematics, University of Houston:*
  - Developer of the course *Linear Algebra with Matlab*. Prior to this course, undergraduate students in mathematics could graduate without learning any implementation skills.
  - Instructor for *Numerical Partial Differential Equations*: fall 2023.

- Instructor for *Linear Algebra with Matlab*: fall 2020, spring 2020, spring 2019, fall 2018 (2 sections), spring 2018, spring and fall 2017, fall 2016 (2 sections), fall 2015.
- Instructor for *Numerical Analysis* (graduate class): *part I* in fall 2024, fall 2020, fall 2017, fall 2014, and *part II* in spring 2025, spring 2021, spring 2016, spring 2015.
- Instructor for *Calculus III*: fall 2014, fall 2013, fall 2012, spring and fall 2011, fall 2009.
- Instructor for *Advanced linear algebra I*: spring 2013, spring 2023, spring 2024.
- Instructor for Master's Tutorial (Introduction to scalar conservation laws): spring 2012.
- Instructor for *Calculus I*: spring and fall 2010, spring 2012.

• *Guest lectures*:

- Emory University (USA): lectures on modeling contagion in a confined environment, March 22, 2023 and April 17, 2024.
- Colorado State University (USA): 2 lectures on Computational Methods for PDEs, August 3-9, 2019.
- SISSA (Italy): 1 lecture at the Summer school on Reduced Order Methods in Computational Fluid Dynamics, July 08-12, 2019.
- TU Dortmund (Germany): short course (10 hours of lecture) on *Mathematical models and numerical methods for fluid-structure interaction*, December 8-15, 2014.

Service

Service for funding agencies and editorial work

- President of the SIAM Texas-Louisiana Section since May 2025-present.
- Vice president of the SIAM Texas-Louisiana Section since May 2024-April 2025.
- Founding Editor of *Advances in Computational Science and Engineering*, a journal of the American Institute of Mathematical Sciences.
- Associate Editor for the *SIAM Journal of Scientific Computing* since Jan. 2022.
- Special Editor for Annals of Mathematical Sciences and Applications: Vol. 8 No. 3 (2023) and Vol. 9 No. 1 (2024), dedicated to the memory of Roland Glowinski.
- One of 60 participants to the SIAM Convening on Climate Science, Sustainability, and Clean Energy whose goal was to give recommendations for funding to federal research and development agencies towards support of research and education related to climate change, Oct 10-12, 2022.
- Reviewer for the Harvard Radcliffe Institute Fellowship Program: Dec. 2024, Dec. 2023, Jan. 2023.
- Reviewer for the Dutch Research Council: Feb. 2024.
- National Science Foundation ah hoc reviewer: Aug. 2023.
- National Science Foundation panelist: Dec. 2022, Nov. 2020, Feb. 2020, Oct. 2018, Feb. 2017, Mar. 2014, Mar. 2012.
- Member of the Gene Golub SIAM Summer School Committee since Jan 2022.
- Reviewer for the "Rita Levi Montalcini" Program (Italy), Dec. 2019.
- External reviewer for the Chilean National Science and Technology Commission, Nov. 2016.

- External reviewer for the UK Medical Research Council, Feb. 2015.
- External reviewer for the Portuguese Foundation for Science and Technology, Aug. 2012.

Organization of mini-symposia, workshops, and conferences

- Organizing committee member for SIAM Annual Meeting 2026, 07/6-10/26 (Cleveland).
- Organizing committee member for SIAM Conference on Mathematics of the Planet Earth, 06/10-12/24 (Portland).
- Organizing committee member for SIAM Conference on Uncertainty Quantification, 02/27-03/03/24 (Trieste, Italy).
- Organizer (with Dr. D. Calvetti) of a satellite event to SIAM UQ24 titled "Power of Diversity in Uncertainty Quantification", 02/26/24 (Trieste, Italy).
- Conference or workshop organizer: 7th Annual Meeting of the SIAM Texas-Louisiana Section (Baylor University, 10/12-13/24), International Workshop on Reduced Order Methods (National University of Singapore, 05/22-26/23), 5th Annual Meeting of the SIAM Texas-Louisiana Section (University of Houston, 11/4-6/22), 2017 Finite Element Rodeo (University of Houston, 03/03-04/17), Cardiovascular simulation: challenges and perspectives (University of Houston, 04/29/13).
- Mini-symposium organizer: SIAM CSE25 (Fort Worth, 03/03-07/25), WCCM 2024 (Vancouver - Canada, 07/21-26/24), ECCOMAS 2024 (Portugal, 06/3-7/24), Coupled Problems 2023 (Greece, 06/5-7/2023), SIAM CSE23 (Amsterdam - Netherlands, 02/26-03/03/23), SIAM TX-LA 2022 (University of Houston, 11/4-6/22), WCCM 2002 (online, 07/31-08/05/2022), AMS Fall Central Sectional Meeting (University of Texas at El Paso, 09/17-18/2022), Mechanistic Machine Learning and Digital Twins for Computational Science, Engineering and Technology (San Diego, 09/23-26/21), Coupled Problems 2021 (online, 06/13-16/21), SIAM CSE21 (online, 03/01-05/21), ECCOMAS 2021 (online, 01/11-15/21), AMS Fall Central Sectional Meeting (online, 09/12-13/20), ICIAM 2019 (Valencia - Spain, 07/15-19/19), Coupled Problems (Sitges - Spain, 06/3-5/19), WCCM 2018 (New York City, 07/22-27/18), ICOSAHOM (London - UK, 07/9-13/18), European Conference on Computational Mechanics (Glasgow - UK, 06/11-15/18), Coupled problems (Rhodes Island - Greece, 06/12-14/17), Finite Elements in Flow Problems 2017 (Rome - Italy, 04/05-07/17), SIAM CSE (Atlanta, 02/27-03/03/17), Coupled Problems 2016 (Crete Island - Greece, 06/5-10/16)
- Member of the Scientific Committee: 2025 Conference on Computational Methods for Coupled Problems in Science and Engineering (Italy, 05/26-29/2025), 2023 International Conference on Computational Methods for Coupled Problems in Science and Engineering (Greece, 06/5-7/2023), 2021 International Conference on Computational Methods for Coupled Problems in Science and Engineering (online, 06/13-16/21), ECCOMAS Thematic Conference "Computational Science and Artificial Intelligence in Industry and Academy (SCAI): new digital solutions for societal and economical problems" (Jyväskylä - Finland, 06/12-14/19), 2019 International Conference on Computational Methods for Coupled Problems in Science and Engineering (Sitges - Spain, 06/3-5/19), SIAM CSE19 (Spokane, 02/25-03/01/19).
- Summer school co-organizer: Computational Methods for PDEs Summer School (Colorado State University, 08/3-9/19).

Service to the department and university

- Associate Chair of the department since fall 2023.

- Member of the Annual Performance Review and Merit Committee: spring 2021, spring 2020.
- Member of the Executive Committee fall 2020-spring 2021, fall 2018-spring 2019.
- Member of the Promotion Committee for a full professor position at Politecnico di Milano (Italy), July 2023.
- Member of the Hiring Committee for a Tenure Track position and/or Research Assistant position: fall 2024, fall 2023, summer 2023 (at SISSA), fall 2022 (one search at UH and one at SISSA), spring 2020, fall 2018, fall 2016.
- Member of the Bylaws Committee fall 2018-spring 2019.
- Faculty senator spring 2018-summer 2021.
- Member of the ADVANCE Task Force to formulate advice/strategy to improve college climate, fall 2018 and spring 2019.
- Co-organizer (with W. Fitzgibbon and Y. Gorb) of the 2018 Amundson Lecture series, University of Houston, 04/10-12/2018.
- Member of the Undergraduate Studies Committee fall 2013-spring 2017.
- Member of the Graduate Studies Committee for the academic year 2014-2015, 2017-2018.
- Member of the Colloquium Committee fall 2011-spring 2023.
- Panelist at the UHSIAM event "Virtual presentation panel discussion / round table", University of Houston, 04/02/2021.
- Speaker at the NSM Talks "Women in STEM", an event organized by the NSM student leadership, University of Houston, 02/12/2020.
- Discussion leader for the "Women in Economics and Mathematics Roundtable: Know your VALUE!", University of Houston, 04/19/2018.
- Panelist at the Association for Women in Science career development event "How to build an interview-winning resume", Houston, 11/4/2014.

Annalisa Quaini

Houston, May 16, 2025.