

# Quanling Deng

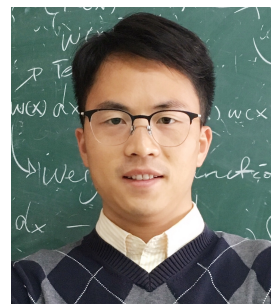
## Curriculum Vitae

Department of Mathematics  
University of Wisconsin-Madison  
Madison, WI, USA

+1 608 772 8679

✉ [Quanling.Deng@math.wisc.edu](mailto:Quanling.Deng@math.wisc.edu)

📄 [quanlingdeng.github.io](https://quanlingdeng.github.io)



## Employment

- Mar. 2020 - **Van Vleck Visiting Assistant Professor**, *Department of Mathematics*, University of Wisconsin-Madison, Madison, WI, USA.
- Feb. 2018 - **Affiliated Member**, *Institute for Geoscience Research (TIGeR)*, Curtin University, Perth, WA, Australia.  
Mar. 2020
- July 2017 - **Affiliated Member**, *Curtin Institute for Computation (CIC)*, Curtin University, Perth, WA, Australia.  
Mar. 2020
- Oct. 2016 - **Research Associate**, *Department of Applied Geology*, Curtin University, Perth, WA, Australia.  
Mar. 2020
- Aug. 2011 - **Research/Teaching Assistant**, *Department of Mathematics*, University of Wyoming, Laramie, WY, USA.  
May 2016

## Education

- 2011-2016 **Ph. D. in Mathematics**, *University of Wyoming*, Laramie, WY, USA.  
Thesis: Local conservation on continuous Galerkin finite element methods with applications  
Advisor: Prof. Victor Ginting
- 2007-2011 **B. S. in Mathematics and Applied Mathematics**, *Hebei University of Technology*, Tianjin, China.  
Thesis: An optimum seeking method and its applications  
Advisor: Prof. Xinwei Liu

## Research Areas

- Numerical methods for partial differential equations: (generalized) finite element methods, isogeometric analysis, hybrid high-order methods, discontinuous Petrov-Galerkin methods, generalized- $\alpha$  methods, discontinuous Galerkin (dG) time-integrators
- Numerical analysis: dispersion analysis, spectral approximation analysis, a priori and a posteriori error estimates, spectral error correction
- Scientific computing: operator splitting schemes, preconditioners, post-processing techniques
- Applications: flow in porous (poroelastic) media, ocean-sea-ice-atmosphere

## Publications

Publication statistics **21 publications (16 corresponding authored)**, including **1** in *Mathematics of Computation*, **1** in *SIAM Journal on Numerical Analysis*, **6** in *Computer Methods in Applied Mechanics and Engineering*, **1** in *Journal of Computational Physics*, **4** in *Journal of Computational and Applied Mathematics* . . . .  
Total citations: **154**, H index: **8**, & i10 index **5** (Google scholar).

- [21] **Q. Deng\***, V. Calo. Higher order stable generalized finite element method for the elliptic eigenvalue problem with an interface in 1D, *Journal of Computational and Applied Mathematics*, **368** (2020), 112558.
- [20] P. Behnoudfar, V. Calo, **Q. Deng\***, P. Minev. A variationally separable splitting for the generalized- $\alpha$  method for parabolic equations, *International Journal for Numerical Methods in Engineering*, **121(5)** (2020), 828-841.
- [19] M. Bartoň, V. Puzyrev, **Q. Deng**, V. Calo. Efficient mass and stiffness matrix assembly via weighted Gaussian quadrature rules for B-splines, *Journal of Computational and Applied Mathematics*, **371** (2020), 112626.
- [18] V. Calo, **Q. Deng\***, S. Rojas, A. Romkes. Residual minimization for isogeometric analysis in reduced and mixed forms. *Procedia Computer Science*, (2019), 463–476.
- [17] **Q. Deng\***, V. Ginting, B. McCaskill. Construction of locally conservative fluxes for high order continuous Galerkin finite element methods, *Journal of Computational and Applied Mathematics*, **359** (2019), 166–181.
- [16] V. Calo, **Q. Deng\***, V. Puzyrev. Dispersion optimized quadratures for isogeometric analysis, *Journal of Computational and Applied Mathematics*, **355** (2019), 283-300.
- [15] V. Calo, M. Cicuttin, **Q. Deng\***, A. Ern. Spectral approximation of elliptic operators by the Hybrid High-Order method, *Mathematics of Computation*, **88** (2018), 1559–1586.
- [14] **Q. Deng\***, V. Puzyrev, V. Calo. Optimal spectral approximation of  $2n$ -order differential operators by mixed isogeometric analysis, *Computer Methods in Applied Mechanics and Engineering*, **343** (2018), 297–313.
- [13] **Q. Deng\***, V. Calo. Dispersion-minimized mass for isogeometric analysis, *Computer Methods in Applied Mechanics and Engineering*, **341** (2018), 71–92.
- [12] **Q. Deng\***, V. Puzyrev, V. Calo. Isogeometric spectral approximation for elliptic differential operators, *Journal of Computational Science*, (2018).
- [11] V. Puzyrev, **Q. Deng**, V. Calo. Spectral approximation properties of isogeometric analysis with variable continuity, *Computer Methods in Applied Mechanics and Engineering*, **334** (2018), 22–39.
- [10] **Q. Deng\***, M. Bartoň, V. Puzyrev, V. Calo. Dispersion-minimizing quadrature rules for  $C^1$  quadratic isogeometric analysis, *Computer Methods in Applied Mechanics and Engineering*, **328** (2018), 554–564.

- [9] M. Bartoň, V. Calo, **Q. Deng\***, V. Puzyrev. Generalization of the Pythagorean eigenvalue error theorem and its application to isogeometric analysis, *Numerical methods for PDEs*. Springer, 2018, 147–170.
- [8] **Q. Deng\***, V. Ginting. Locally conservative continuous Galerkin finite element method for pressure equation in two-phase flow model in subsurfaces, *Journal of Scientific Computing*, **74** (3), 2018, 1264–1285.
- [7] Q. Zou, L. Guo, **Q. Deng**. High order continuous local-conserving flux and finite-volume-like finite element solutions for elliptic equations, *SIAM Journal on Numerical Analysis*, **55** (6), 2017, 2666–2686.
- [6] V. Puzyrev, **Q. Deng**, V. Calo. Dispersion-optimized quadrature rules for isogeometric analysis: modified inner products, their dispersion properties, and optimally blended schemes, *Computer Methods in Applied Mechanics and Engineering*, **320** (2017), 421–443.
- [5] **Q. Deng**, V. Ginting, B. McCaskill, P. Torsu. A locally conservative stabilized continuous Galerkin finite element method for two-phase flow in poroelastic subsurfaces, *Journal of Computational Physics*, **347** (2017), 78–98.
- [4] V. Calo, **Q. Deng\***, V. Puzyrev. Quadrature blending for isogeometric analysis. *Procedia Computer Science*, **108** (2017), 798–807.
- [3] **Q. Deng\***. Local conservation on continuous Galerkin finite element methods with applications, *ProQuest Dissertations Publishing*, 2016.
- [2] L. Bush, **Q. Deng\***, V. Ginting. A locally conservative stress recovery technique for continuous Galerkin FEM in linear elasticity, *Computer Methods in Applied Mechanics and Engineering*, **286** (2015), 354–372.
- [1] **Q. Deng\***, V. Ginting. Construction of locally conservative fluxes for the SUPG method, *Numerical Methods for Partial Differential Equations*, **31** (6), 2015, 1971–1994.

## Invited Talks

- July 2020 **Minisymposium "Numerical Methods for Eigenvalue Problems arising from Partial Differential Equations" at the World Congress in Computational Mechanics and ECCOMAS Congress, Paris, France, upcoming.**  
Title: "Spectral approximation of elliptic operators by the Hybrid High-Order method"
- July 2019 **Minisymposium "Variational Stabilization, Structure- and Positivity-Preserving Techniques for Complex Flows" at the US National Congress on Computational Mechanics, Austin, Texas, USA.**  
Title: "High-order generalized- $\alpha$  methods"
- June 2019 **Serena seminar, INRIA, Paris, France.**  
Title: "High-order generalized- $\alpha$  methods and splitting schemes"
- May 2019 **Computer science seminar, AGH University of Science and Technology, Kraków, Poland.**  
Title: "High-order generalized- $\alpha$  methods and splitting schemes"
- April 2019 **Mathematics seminar, Peking University, Beijing, China.**  
Title: "High-order generalized- $\alpha$  methods and splitting schemes"

- April 2019 **Computational mathematics seminar**, Chinese Academy of Sciences, Beijing, China.  
Title: "Spectral approximation of elliptic operators by the Hybrid High-Order method"
- April 2019 **Mathematics seminar**, University of Science and Technology of China, Hefei, Anhui, China.  
Title: "Spectral approximation of elliptic operators by the Hybrid High-Order method"
- Mar. 2019 **Mathematics and Statistics seminar**, Curtin University, Perth, WA, Australia.  
Title: "Spectral approximation of elliptic operators by the Hybrid High-Order method"
- July 2018 **Minisymposium "High-order isogeometric solvers" at the International Conference on Spectral and High-Order Methods (ICOSAHOM)**, Imperial College London, London, UK.  
Title: "High-order isogeometric spectral approximation properties"
- Sep. 2017 **Complex Systems seminar**, University of Western Australia, Perth, WA, Australia.  
Title: "Numerical spectral approximations"
- May 2017 **Serena seminar**, INRIA, Paris, France.  
Title: "Dispersion optimized quadratures for isogeometric analysis"

## Contributed Talks at Conferences & Workshops

- June 2019 **Workshop "Agent-Based Simulations, Adaptive Algorithms and Solvers (ABS-AAS)" at the International Conference on Computational Science (ICCS)**, University of Algarve, Faro, Portugal.  
Title: "Residual minimization for isogeometric analysis in reduced and mixed forms"
- June 2018 **Minisymposium "Higher Order Finite Element Methods" at the Emerging Trends in Applied Mathematics and Mechanics (ETAMM)**, Jagiellonian University, Kraków, Poland.  
Title: "Spectral approximation of elliptic operators by the Hybrid High-Order method"
- June 2017 **Workshop "Agent-Based Simulations, Adaptive Algorithms and Solvers (ABS-AAS)" at the International Conference on Computational Science (ICCS)**, ETH Zürich, Switzerland.  
Title: "Quadrature blending for isogeometric analysis"
- April 2016 **Finite Element Circus**, University of Maryland, College Park, MD, USA.  
Title: "High order continuous local-conserving flux and finite-volume-like finite element solutions for elliptic equations"
- Mar. 2016 **Finite Element Rodeo**, Texas A&M University, College Station, TX, USA.  
Title: "Construction of locally conservative fluxes for high order continuous Galerkin finite element methods"
- Oct. 2015 **Finite Element Circus**, University of Massachusetts Dartmouth, North Dartmouth, MA, USA.  
Title: "Construction of locally conservative fluxes for high order continuous Galerkin finite element methods"
- Feb. 2015 **Finite Element Rodeo**, Southern Methodist University, Dallas, TX, USA.  
Title: "A locally conservative stress recovery technique for continuous Galerkin FEM in linear elasticity"

- May 2014 **Center for Fundamentals of Subsurface Flow Workshop: Experimentation, Mathematical Modeling and Numerical Simulation**, *University of Wyoming, Laramie, WY, USA.*  
Title: "A postprocessing technique for FEM for advection-diffusion equation with application to semiconductor material model problem"
- April 2014 **Analysis and Computational Mathematics seminar**, *University of Wyoming, Laramie, WY, USA.*  
Title: "SUPG with a post-processing technique for the drift-diffusion equations"
- Feb. 2014 **Finite Element Rodeo**, *University of Texas at Austin, Austin, TX, USA.*  
Title: "SUPG with a post-processing technique for the drift-diffusion equations"
- Mar. 2013 **SIAM Front Range Student Conference**, *University of Colorado at Denver, Denver, CO, USA.*  
Title: "Symmetric interior penalty Galerkin method for solving semilinear elliptic problems"
- July 2012 **SAMSI 2012 Industrial Math/Stat Modeling Workshop**, *North Carolina State University, Raleigh, NC, USA.*  
Title: "Saltwater intrusion and freshwater supply in coastal aquifers"

## Research Programs/Schools & Travels

- May–June 2019 **Visiting Scholar**, *INRIA & CERMICS, INRIA Paris & ENPC, Paris, France*, three weeks.  
visited Prof. Alexandre Ern, Martin Vohralík, and their groups to collaborate on the spectral error estimators, time-integrators, and splitting schemes
- May 2019 **Visiting Scholar**, *Department of Computer Science, AGH University of Science and Technology, Kraków, Poland*, two weeks.  
visited Prof. Maciej Paszyński and his group to collaborate on the development of splitting methods for Stokes problems
- April 2019 **Visiting Scholar**, *Department of Mathematics, University of Science and Technology of China, Hefei, Anhui, China*, two weeks.  
visited Prof. Xin Li to discuss optimal blending quadratures and potential research collaborating work on spectral approximation using B-splines
- June–July 2018 **Visiting Scholar**, *Department of Computer Science, AGH University of Science and Technology, Kraków, Poland*, three weeks.  
visited Prof. Maciej Paszyński and his group to collaborate on splitting methods for isogeometric residual minimization (iGRM)
- June 2018 **Visiting Scholar**, *Institute for Computational Civil Engineering, Cracow University of Technology, Kraków, Poland*, one week.  
visited the Institute for Computational Civil Engineering to study discontinuous Petrov-Galerkin (DPG) methodology with Prof. Leszek Demkowicz
- June 2017 **Visiting Scholar**, *CERMICS, ENPC, Paris, France*, one week.  
visited Prof. Alexandre Ern and his group to collaborate on the spectral properties of the Hybrid High-Order Methods
- April–May 2017 **Visiting Scholar**, *CERMICS, ENPC, Paris, France*, three weeks.  
visited Prof. Alexandre Ern and his group to collaborate on the spectral properties of the Hybrid High-Order Methods

- Jan. 2016 **Visiting Student**, *Department of Mathematics, Texas A&M University, College Station, TX, USA*, one week.  
visited the Department of Mathematics to study numerical schemes for geometric PDEs with Prof. Ricardo Nochetto and Prof. Andrea Bonito as well as the package deal.ii with Prof. Timo Heister
- Jan. 2016 **Visiting Student**, *Joint Mathematics Meetings, Seattle, WA, USA*.
- May 2015 **Visiting Student**, *IMA Hot Topics Workshop: Hydraulic Fracturing: From Modeling and Simulation to Reconstruction and Characterization, University of Minnesota, Minneapolis, MN*.
- Feb. 2014 **Visiting Student**, *SIAM Conference on Parallel Processing for Scientific Computing, Portland, OR, USA*.
- June 2012 **Visiting Student**, *Workshop on the Stability of Coherent Structures and Patterns, University of Washington, Seattle, WA*.
- May 2012 **Visiting Student**, *IMA Annual Program Year Workshop: User-Centered Modeling, University of Minnesota, Minneapolis, MN*.
- July-Aug. 2012 **Visiting Student**, *Department of Mathematics, North Carolina State University, Raleigh, NC, USA*.  
visited the Department of Mathematics to work on a project titled 'Saltwater Intrusion and Freshwater Supply in Coastal Aquifers', led by Prof. Matthew Farthing and Prof. Lea Jenkins

## Professional Activities & Services

### ○ Referee for peer-reviewed journals & conferences:

- Applied Mathematical Modelling
- Advances in Computational Mathematics
- ESAIM: Mathematical Modelling and Numerical Analysis
- Computer Methods in Applied Mechanics and Engineering
- Journal of Computational and Applied Mathematics
- International Journal for Numerical Methods in Fluids
- Mathematical Reviews
- zbMATH
- Applied Numerical Mathematics
- Journal of Computer Science
- Journal of Low Frequency Noise, Vibration & Active Control
- Journal of Parallel Computing
- Journal of Wave Motion
- Journal of Computer Methods in Materials Science
- International Conference on Computational Science (2017–2020)
- International Conference on Numerical Modelling in Engineering (2019)

### ○ Chairs of conference sessions:

- co-chair of the Minisymposium "Variational Stabilization, Structure- and Positivity-Preserving Techniques for Complex Flows" at the US National Congress on Computational Mechanics (USNCCM) 2019
- co-chair of the thematic workshop on ABS-AA-S, International Conference on Computational Science 2019.



- co-chair of the thematic workshop on ABS-AA-S, International Conference on Computational Science 2017.
- **Serve as a reference:** *writing recommendation letters to support students' applications.*

## Teaching Experience

- Spring 2015 **Instructor**, *College Algebra*, 3 credit hours, University of Wyoming.
- Fall 2014 **Instructor**, *Trigonometry*, 3 credit hours, University of Wyoming.
- Summer 2013 **Instructor**, *Business Calculus*, 4 credit hours, University of Wyoming.
- Spring 2013 **Instructor**, *Calculus*, 4 credit hours, University of Wyoming.
- Fall 2012 **Instructor**, *Trigonometry*, 3 credit hours, University of Wyoming.
- Summer 2012 **Instructor**, *Finite Math*, 3 credit hours, University of Wyoming.
- Spring 2012 **Teaching Assistant**, *College Algebra*, 3 credit hours, University of Wyoming.
- Fall 2011 **Teaching Assistant**, *College Algebra*, 3 credit hours, University of Wyoming.

## Awards & Grants

- March 2020 **2020 Mathematics Travel Award**, *MDPI Mathematics Journal*.
- May 2015 **Paul Stock Award**, *University of Wyoming, Laramie, WY, USA.*
- April 2013 **Virindra & Gail Sehgal Award**, *University of Wyoming, Laramie, WY, USA.*
- 2016-2019 **Travel Grant**, *Curtin University, Perth, WA, Australia.*
- 2017-2019 **Travel Grants**, *AGH-UST Poland, ENPC France, USTC China, INRIA Paris.*
- Jan. 2016 **TAMU grant for Winter Graduate School**, *Texas A&M University, College Station, TX, USA.*
- May 2015 **IMA grant for IMA hot topics workshop**, *University of Minnesota, Minneapolis, MN, USA.*
- Mar. 2015 **Graduate Travel Grant**, *University of Wyoming, Laramie, WY, USA.*
- July 2012 **SAMSI grant for industrial workshop**, *North Carolina State University, Raleigh, NC, USA.*
- June 2012 **NSF travel grant for workshop**, *University of Washington, Seattle, WA, USA.*
- May 2012 **IMA grant for annual program year workshop**, *University of Minnesota, Minneapolis, MN, USA.*