

Zhuolin Qu

Curriculum Vitae

Tulane University
Department of Mathematics
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Research Interests

Mathematical and Computational Biology, Infectious Diseases Modeling, Population Dynamics, Numerical Methods for Nonlinear PDEs, Scientific Computing, Uncertainty Quantification

Education

- 2011–2016 **Doctor of Philosophy, Applied Mathematics, Tulane University.**
Advisor: Alexander Kurganov
Thesis: Fast Operator Splitting Methods for Nonlinear PDEs
- 2012–2016 **Master of Science, Statistics, Tulane University.**
Advisor: Michelle Lacey
- 2007–2011 **Bachelor of Science, Mathematics and Computational Science, University of Science and Technology of China.**
Advisor: Mengping Zhang

Academic Experience

- 2020–present **Assistant Professor, Department of Mathematics, University of Texas at San Antonio.**
- 2016–2020 **Postdoctoral Fellow, Department of Mathematics, Tulane University.**
Mentor: James (Mac) Hyman
- 2017–2019 **Visiting Scholar, Los Alamos National Laboratory.**
(Summer) Theoretical Biology and Biophysics (T-6), Host: Benjamin McMahon
- 2015 **Summer Intern, Los Alamos National Laboratory.**
Computational Earth Science (EES-16), Mentor: Carl Gable, Nataliia Makedonska
- 2012, 2013 **Visiting Fellow, Shanghai Jiao Tong University, China.**
(Summer) Institute of Natural Sciences
- 2010 **Summer Intern, Pohang University of Science and Technology, Korea.**
Combinatorial and Computational Mathematics Centre, Mentor: Kwang Ik Kim.

Publications and Preprints (*authors in alphabetical order)

- Published
- Thongsripong, P., **Qu, Zhuolin**, Yukich, J., Hyman J. M., and Wesson, D. An Investigation of Human-Mosquito Contact Using Surveys and its Application in Assessing Dengue Viral Transmission Risk. *Journal of Medical Entomology*, 2020, tjaa134
 - Kurganov, A., Rozanova, O. S., **Qu, Zhuolin***, and Wu, T. Adaptive Moving Mesh Central-Upwind Schemes for Hyperbolic System of PDEs. Applications to Compressible Euler Equations and Granular Hydrodynamics, *Accepted to Communications on Applied Mathematics and Computation*

- **Qu, Zhuolin** and Hyman, J. M. Generating a Hierarchy of Reduced Models for a System of Differential Equations Modeling the Spread of *Wolbachia* in Mosquitoes. *SIAM Journal on Applied Mathematics*, 2019, 79(5):1675-1699.
 - **Qu, Zhuolin**, Xue, L., and Hyman, J. M. Modeling the Transmission of *Wolbachia* in Mosquitoes for Controlling Mosquito-Borne Diseases. *SIAM Journal on Applied Mathematics*, 2018, 78(2):826-852.
 - Thongsripong, P., **Qu, Zhuolin**, Hyman, J. M., and Wesson, D. Quantification of Mosquito Biting Rates Using Surveys and their Implication in Determining Dengue Viral Transmission Risk in the Greater New Orleans Region. In *The American Journal of Tropical Medicine and Hygiene*, 2018, 99(4)
 - Cheng, Y. Z., Kurganov, A., **Qu, Zhuolin***, and Tang, T. Fast and Stable Explicit Operator Splitting Methods for Phase-field Models. *Journal of Computational Physics*, 2015, 303:45-65.
 - Kao, C. Y., Kurganov, A., **Qu, Zhuolin***, and Wang, Y. A Fast Explicit Operator Splitting Method for Modified Buckley-Leverett Equations. *Journal of Scientific Computing*, 2015, 64(3):837-857.
 - Chertock, A., Kurganov, A., **Qu, Zhuolin***, and Wu, T. Three-Layer Approximation of Two-Layer Shallow Water Equations. *Mathematical Modelling and Analysis*, 2013, 18(5):675-693.
- Under Review
- **Qu, Zhuolin**, Azizi, A., Schmidt, N., Craig-Kuh, M. C., Stoecker, C., Hyman, J. M., and Kissinger, P. Modelling the Impact of Screening Men for Chlamydia Trachomatis on the Prevalence in Women
 - Azizi, A., **Qu, Zhuolin**, Lewis, B., and Hyman, J. M. Generating a Heterosexual Bipartite Network Embedded in Social Network
 - Azizi, A., Dewar, J., **Qu, Zhuolin**, and Hyman, J. M. Using an Agent-based Sexual-network Model to Guide Mitigation Efforts for Controlling Chlamydia

Papers in Preparation (drafts available on request)

- **Qu, Zhuolin**, Gulbudak, H., Hyman, J. M., and Milner, F. Sensitivity Analysis in a Vector-Host Immuno-Epidemiological Model with Application to Rift Valley Fever
- **Qu, Zhuolin**, McMahon, B. H., and Hyman, J. M. Modeling the Comorbidities Impacting the Spread of Invasive Non-typhi Salmonella
- Kurganov, A., **Qu, Zhuolin***, and Wu, T. Well-Balanced Adaptive Moving Mesh Central-Upwind Schemes for the Saint-Venant Systems of Shallow Water Equations

Honors and Awards

- 2017–2019 **Postdoctoral Fellow Travel Fund**, *Tulane University*.
- 2017 **Health Sciences Research Days Award for Excellence in Research and Presentation by a Postdoctoral Fellow**, *Tulane University*.
Evaluated by a panel of judges in health science among nearly 200 presentations
- 2015–2019 **Travel Awards**, *Awarded 15 competitive grants for travel to conferences and workshops.*
- 2012–2015 **Summer Research Fellowship**, *Tulane University*.

Conference and Talks

- Invited Talks
- **SIAM Texas-Louisiana Sectional Meeting**, Mini-symposium talk, Southern Methodist University, 11/2019
 - **Mathematics and Statistics Colloquium**, Georgia State University, 10/2019
 - **Population Health Science Seminar**, School of Public Health, Georgia State University, 10/2019
 - **Seventh International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems (ICMA VII)**, Mini-symposium talk, Arizona State University, 10/2019
 - **Biostatistics Colloquium**, Louisiana State University Health Sciences Center, New Orleans, 10/2019
 - **Epidemiology Seminar**, School of Public Health and Tropical Medicine, Tulane University, 09/2019
 - **Fifth International Conference on Computational and Mathematical Population Dynamics (CMPD5)**, Mini-symposium talk, Fort Lauderdale, 05/2019
 - **Mathematics Colloquium**, University of Louisiana at Lafayette, 10/2018
 - **Los Alamos National Laboratory**, Brown bag meeting on disease transmission modeling and surveillance, Seminar talk, 07/2018
 - **42nd SIAM SEAS Sectional Conference**, Mini-symposium talk, UNC Chapel Hill, 03/2018
 - **Mathematical Biology Center**, Guangzhou University, Seminar talk, 11/2017
 - **Mathematics and Science College**, Shanghai Normal University, Seminar talk, 11/2017
 - **Tropical Medicine Seminar**, School of Public Health and Tropical Medicine, Tulane, 09/2017
 - **Los Alamos National Laboratory**, Center for Nonlinear Studies, Seminar talk, 08/2017
 - **Georgia State University**, Guest lecture, “How Mathematical Models are helping Guide Mitigation Efforts to Control Epidemics”, 05/2017
 - **Graduate Student Colloquium**, Tulane Mathematics Department, 09/2015
 - **Los Alamos National Laboratory**, SFT Brown Bag Seminar, 08/2015
 - **The Ninth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena**, Mini-symposium talk, 04/2015
 - **Applied Mathematics Seminar**, Tulane Mathematics Department, 04/2014
- Contributed Talks
- **Biology and Medicine through Mathematics (BAMM!)**, Virginia Commonwealth University, 05/2020 (abstract accepted, cancelled due to COVID-19)
 - **Scientific Computing around Louisiana**, Tulane University, 02/2019
 - **Biomathematics and Ecology: Education and Research**, Arizona State University, 10/2018
 - **SIAM Annual Meeting 2018**, Portland, OR, 07/2018
 - **Scientific Computing around Louisiana**, Louisiana State University, 02/2018

- **SIAM Annual Meeting 2017**, Pittsburgh, PA, 07/2017
- **Scientific Computing around Louisiana**, Tulane University, 03/2017
- Posters ◦ **SAMSI workshop on Model Uncertainty: Mathematical and Statistical**, Duke University, 08/2018
- **MBI Emphasis Workshop on Multiscale Dynamics of Infections**, Ohio State University, 04/2018
- **NIH-MIDAS Network Meeting**, 04/2018
- **29th Annual Health Sciences Research Days**, Tulane University, 02/2018
- **SMB Annual Meeting 2017**, 07/2017
- **NIH-MIDAS Network Meeting**, 05/2017
- **SIAM Conference on Computational Science and Engineering**, 03/2017
- **28th Annual Health Sciences Research Days**, Tulane University, 02/2017
- **KI-Net: Collective Dynamics in Biological and Social Systems**, 11/2015
- **Los Alamos National Laboratory**, Student Symposium: “Championing Scientific Careers”, 08/2015
- **Scientific Computing Around Louisiana**, Tulane University, 03/2015
- Workshops ◦ **Mathematics Research Communities**, “Dynamics of Infectious Diseases: Ecological Models Across Multiple Scales”, 05/2021
- Conferences ◦ **Workshop on Modeling the Spread of Infectious Diseases**, Tulane University, 02/2019 & 02/2020
- **NIMBioS Tutorial: Network Modeling**, University of Tennessee, 02/2019
- **Joint Research Conference on Statistics in Quality, Industry, and Technology**, Santa Fe, 06/2018
- **9th Annual Summer Institute in Statistics and Modeling in Infectious Diseases**, University of Washington, 07/2017
- **NIMBioS Tutorial: Uncertainty Quantification for Biological Models**, 06/2017
- **SAMSI Summer School on Optimization**, 08/2016
- **KI-Net Conference** on Modern Perspectives in Applied Mathematics: Theory and Numerics of PDEs, 04/2014

Service

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| Journal | Journal of Biological Dynamics, PLoS ONE, Journal of Theoretical Biology, Mathematical Biosciences, Letters in Biomathematics, Journal of Biological Systems |
| Referee | |
| Organizer | New Orleans workshop on Modeling the Spread of Infectious Diseases, Tulane University, Spring 2019 & Spring 2020 |
| Co-organizer | Clifford Lectures, Tulane University, 2017 |
| Committee | <ul style="list-style-type: none"> ◦ PhD Qualifying Exam Committee, Scientific Computing, Tulane University, Fall 2018 ◦ PhD Dissertation Defense Committee, Christian Geneus, Department of Biostatistics, Tulane University, Spring 2020 |

- Master Dissertation Defense Committee, Harley Hanes, Center for Computational Science, Tulane University, Spring 2020
- PhD Dissertation Defense Committee, Li Guan, Department of Mathematics, Tulane University, Fall 2019
- Undergraduate Honors Thesis Prospectus, Rhea Kataria, Department of Mathematics, Tulane University, Fall 2019
- Media Coverage ◦ **Math Horizons**, Evelyn J. Lamb, “Fighting an Epidemic with an Epidemic”, *Math Horizons*, 2019, 26:4, 22-23, DOI: 10.1080/10724117.2019.1574148
- **Forbes Magazine**, Innovation-Science, “Math-Based Mosquito Control To Prevent Human Diseases”, January 14th, 2019
- **Los Alamos Monitor**, “Solving epidemics with math”, October 10th, 2018
- **The Times-Picayune**, “Tulane researchers use math to contain the spread of mosquito-borne illnesses”, August 30th, 2018
- **SIAM News**, Research Nugget on “Sustained bacterial outbreak in mosquitoes limits spread of life-threatening diseases”, March 20th, 2018
- Poster Judge ◦ School of Science and Engineering Research Day, Tulane University, 2018, 2019
- SIAM Texas-Louisiana Sectional Meeting, 2019
- Newcomb Fellow Newcomb College Institute, 2016–2020, voluntary association of faculty from all undergraduate colleges to support women’s leadership/gender equity and foster faculty-student interaction and research

Teaching Experience

- Instructor of Record ◦ MATH 758: Scientific Computation III (graduate), Spring 2018, Spring 2019
- MATH 731: Applied Mathematics (graduate), Spring 2020
- MATH 221: Calculus III, Fall 2016
- MATH 122: Calculus II, Fall 2013
- MATH 116: Long Calculus II, Spring 2014
- Teaching Assistant ◦ MATH 309/609: Linear Algebra, Fall 2012, Spring 2013
- MATH 224: Introduction to Applied Mathematics, Spring – Fall 2012, Spring 2015
- MATH 131: Consolidated Calculus, Fall 2014
- MATH 221: Calculus III, Spring 2012
- MATH 122: Calculus II, Spring 2016
- MATH 121: Calculus I, Fall 2011, Fall 2015
- Guest Teaching Lectures ◦ MATH 732: Applied Mathematics II (graduate), Spring 2017
- MATH 635: Optimization (graduate), Fall 2018
- MATH 424/624: Ordinary Differential Equation, Fall 2016
- Workshop “Ready, Prep, Teach!”, The Center for Engaged Learning and Teaching (CELТ), Tulane University, Spring 2019

Mentoring Experience

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| Doctoral Dissertation | <ul style="list-style-type: none">○ Assist in mentoring doctoral dissertation, Mathematics student, on modeling epidemics with distribution parameters, committee member for Dissertation defense (Tulane, 2017-2019)○ Assist in mentoring doctoral dissertation, Biostatistics student, on characterizing the spread of epidemics over networks (Tulane, 2018-2020)○ Assist in mentoring doctoral dissertation, Public Health student, on quantifying human-mosquito contact rate, manuscript submitted. (Tulane, 2017-2018) |
| Master Thesis | <ul style="list-style-type: none">○ Assist in mentoring master thesis project, Computational Science student, on modeling chikungunya disease and quantifying model uncertainty (Tulane, 2018-2019)○ Assist in mentoring master project, Computational Science student, on modeling the Chagas disease in the New Orleans area and estimating human risk. (Tulane, 2018-2020) |
| Honor Thesis | <ul style="list-style-type: none">○ Assist in mentoring undergraduate honor thesis, Neuroscience student, on modeling Tuberculosis progression with treatment, Senior Scholar Award for undergraduate (Tulane, 2018-2019)○ Assist in mentoring undergraduate honor thesis, Mathematics student, on characterizing the stochastic spread of epidemics over networks (Tulane, 2018-2020) |
| Conference | Mentor at Society of Mathematical Biology annual meeting 2017 and 2020 |

Computer Skills

Script	Matlab, Octave, Fortran, Mathematica, C, R, Python, Maple, MySQL, NetLogo
Software	Latex, Git, Vim, Inkscape, Gephi, ParaView, Adobe Illustrator, Origin
Other	MPI, PETSc, LaGriT, PFLOTRAN