

Brian Jongwon Choi

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Nationality: USA

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| Interests | Harmonic analysis, Numerical analysis, Partial differential equations, Dynamical systems, Uncertainty quantification |
| Education | Boston University <ul style="list-style-type: none">• PhD, Mathematics, May 2020• Thesis (under Mark A Kon): <i>Weighted Fourier Analysis and Dispersive Equations</i> Boston College <ul style="list-style-type: none">• B.S., Magna Cum Laude, Mathematics (Major), Physics (Minor), May 2014• Recipient of the Sally Award 2014 (awarded to the top graduating math major)• Member of Pi Mu Epsilon (mathematics) and Sigma Pi Sigma (physics)• Thesis (under Dubi Kelmer): <i>An Algebraic Approach to Quantum Systems Using Finite Group Representation</i> |
| Appointment | University of Tennessee at Chattanooga <ul style="list-style-type: none">• Assistant professor (Department of Mathematics), Jul2025-Present United States Military Academy West Point <ul style="list-style-type: none">• Assistant Professor (Department of Mathematical Sciences), Jun 2023-Present• Deputy Director for Center for Data Science, Jun 2023-Present Southern Methodist University <ul style="list-style-type: none">• RTG Postdoctoral Fellow (Mentor: Alejandro Aceves), Jan 2021-Jun 2023 Boston University <ul style="list-style-type: none">• Research Assistant, Jun 2020-Dec 2020 Boston College <ul style="list-style-type: none">• Instructor, MATH1004 Finite Probability and Applications, Sept 2020-Dec 2020 |
| Awards/Grants | Faculty Research Funds (competitive internal grant), USMA West Point Mar 2025 Science Policy Fellowship , Society for Industrial and Applied Mathematics 25 - 2026 Faculty Research Funds (competitive internal grant), USMA West Point Apr 2024 PUI Travel Grant to JMM24 , American Mathematical Society Jan 2024 Korean Honor Scholarship , Consulate General of Korea in USA Sept 2019 DAAD RISE Scholarship , Paul-Erlich-Institut, Germany May-Aug 2014 Sally Award , Department of Mathematics, Boston College May 2014 Gilman International Scholarship , Institute of International Education May 2012 |
| Publications/ Preprints | Nonexistence of traveling wave solutions in the fractional Rosenau-Hyman equation via homotopy perturbation method (2025) arXiv:2502.07810 (submitted to <i>International Journal of Differential Equations</i>) Nonlinear Excitation of Ground States on Nonlocal Lattices (2024) arXiv:2408.11177 (submitted to <i>Discrete Contin. Dyn. Syst. Ser. B</i>) (With Parcell, Starling) Optimizing Performance of Real-time Detection and Classification for Military Personnel and Weapons <i>The ITEA Journal</i> (2024), 45 (3), DOI: 10.61278/itea.45.3.1005 |

Dynamics of periodic fractional discrete nonlinear Schrödinger equation in the continuum limit (2024) arXiv:2401.13152 (submitted to *Applicable Analysis*)

(With Norton, Xu, Kon, Castrillon) Complex Analyticity of the Nonlinear Poisson-Boltzmann Equation For the Interface Problem with Random Domains (2023) arXiv: 2309.16439 (final revision submitted to *Numerische Mathematik*)

(With Marstaller, Aceves) On Localization of the Fractional Discrete Nonlinear Schrödinger Equation (2023) arXiv:2309.11395 (submitted to *Communications in Nonlinear Science and Numerical Simulation*)

(with Walton) Infinite Speed of Propagation of Fractional Dispersive Equations (2023) ArXiv: 2301.06288 (submitted to *Communications on Pure and Applied Analysis*),

(with Aceves) Continuum Limit of 2D Fractional Nonlinear Schrödinger Equation *Journal of Evolution Equations* (2023), **23**(30), p.1-35, <https://doi.org/10.1007/s00028-023-00881-3>.

(with Aceves) Well-posedness of Mixed Nonlinear Schrödinger Equation *Partial Differential Equations in Applied Mathematics* (2022), **6**(c), p.1-11, 100406, <https://doi.org/10.1016/j.padiff.2022.100406>.

(with Castrillon, Kon, Norton, Xu) Analytic Regularity of Nonlinear Poisson Boltzmann Equation (2021), arXiv:2106.05811. (final revision submitted to *Computers and Mathematics with Applications*)

Multilinear Weighted Estimates and Quantum Zakharov System, *Mathematical Modelling and Analysis* (2022), **27**(2), 342-359, <https://doi.org/10.3846/mma.2022.15555>.

Remark on the Adiabatic Limit of Quantum Zakharov System, *Bulletin of the Malaysian Mathematical Sciences Society* (2022), **45**, 17111735, <https://doi.org/10.1007/s40840-022-01272-6>.

Small Time Behavior and Summability for Schrödinger Equation, *Graduate Journal of Mathematics* (2021), **6**(2), 9-21.

University Teaching

Academic Semester Teaching, *University of Tennessee at Chattanooga*

- MATH 1730 Combined precalculus Fall 2025

Academic Semester Teaching, *United States Military Academy*

- MA364 ENG. Math Spring 2025
- MA487 Real analysis II, MA365 ENG. Math, MA389 Indep. study Fall 2024
- MA104 Calculus I-II (Combined) Spring 2024
- MA205 Multivariable calculus Fall 2023

Academic Semester Teaching, *Southern Methodist University*

Jan21 - May23

- MATH1337,1338,3302 Calculus I-III, respectively
- STAT2331 Introduction to Statistical Methods

Academic Semester Teaching, *Boston College*

- MATH1004 Finite Probability and Applications Fall 2020

Academic Semester Teaching, *Boston University*

- MA113: Introduction to Statistics Spring 2020

Summer Instructor, *Boston University*

- MA115,116 Statistics I-II 2015
- MA123 Calculus I 2016

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| | <ul style="list-style-type: none"> • MA226 Differential Equations | 2017 |
| | Teaching Fellow (graduate student) , <i>Boston University</i> | 2014-2020 |
| | <ul style="list-style-type: none"> • EK102 Linear Algebra for Engineers • MA121,122 Calculus I for Social Sciences, Calculus II for Social Sciences • MA123 Calculus I • MA226 Differential Equations • MA411 Advanced Calculus • MA511 Analysis I • MA569 Operations Research | |
| Mentorship | Undergraduate student advising , (Mentee: <i>Theodore Grimes</i>) | AY2025 |
| | <ul style="list-style-type: none"> • USMA: MA389 (Indep. Study): Numerical methods in dynamical systems | |
| | Undergraduate student advising , (Mentee: <i>Karly Parcell</i>) | AY2024 |
| | <ul style="list-style-type: none"> • USMA: MA489-499 (Senior thesis): image classification via CNN/YOLO; paper published in the ITEA journal | |
| | PhD student advising , (Mentee: <i>Austin Marstaller</i>) | AY2023 |
| | <ul style="list-style-type: none"> • Co-advised his PhD dissertation at Southern Methodist University | |
| | PhD student advising , (Mentee: <i>Steven Walton</i>) | AY2022 |
| | <ul style="list-style-type: none"> • Southern Methodist University: paper submitted: <i>Communications on Pure and Applied analysis</i> | |
| | Undergraduate student advising , (Mentee: <i>William Graham</i>) | AY2020 |
| | <ul style="list-style-type: none"> • Directed Reading Program at Boston University: <i>Stochastic Differential Equations (Evans)</i> | |
| Talks | UKC Technical Group Symposium, Atlanta, GA | Aug 2025 |
| | “Uncertainty quantification and regularity in the stochastic nonlinear Poisson-Boltzmann equation” | |
| | SIAM Dynamical Systems, Denver, CO | May 2025 |
| | “Nonlinear excitations in nonlocal lattices” | |
| | Seminar talk, University of Tennessee Chattanooga, TN | Apr 2025 |
| | “From nonlinear waves to quantum systems: analysis, uncertainty, and applications” | |
| | Seminar talk, Creighton University, NE | Feb 2025 |
| | “Nonlinear Waves and Quantum Systems: Analysis, Uncertainty, and Beyond” | |
| | Seminar talk, Villanova University, PA | Jan 2025 |
| | “Bridging Nonlinear Waves and Quantum Systems: Analytical Tools, Uncertainty Quantification, and Real-World Models” | |
| | AMS Eastern Sectional Meeting, Albany, NY | Oct 2024 |
| | “Kuramoto oscillators with time delay and memory effects” | |
| | SIAM Nonlinear Waves and Coherent Structure, Baltimore, MD | Jun 2024 |
| | “Long-range Interaction on Lattice” | |
| | Invited Talk, PDE School (UC Berkeley), Berkeley, CA | Jun 2024 |
| | “Nonlocal Discrete Solitons” | |

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| Poster, ICERM, Providence, RI “Time Evolution of the mixed-Fractional NLS” | Apr 2024 |
| Invited Talk, AMS East Sectional (Howard University) “Modulational instability and continuum limit of periodic fractional NLS” | Apr 2024 |
| Seminar Talk, CUNY Graduate Center “Nonlocal dispersive lattice dynamics and continuum limit” | Mar 2024 |
| Invited Talk, AMS Special Session Mathematical Physics JMM “On Localization of Fractional Discrete Schrödinger Equation” | Jan 2024 |
| Seminar Talk, SUNY New Paltz “Application of Fractional Calculus to Physics Via Differential Equation” | Oct 2023 |
| SIAM NNP 2023, New Jersey Institute of Technology (Contributed Talk) “Localization of Discrete Fractional Schrödinger Dynamics” | Oct 2023 |
| Great Lakes Mathematical Physics, Oberlin College (Contributed Talk) “Discrete to Continuum Dynamics of Fractional Nonlinear Schrödinger Equation” | Jun 2023 |
| SIAM DS 2023, Oregon (Contributed Talk) “Continuum Limit of 2D Fractional Nonlinear Schrödinger Equation” | May 2023 |
| 12th Ohio River Analysis Meeting (Contributed Talk) “On the Compactness of Solution Support of Fractional Dispersive Equations” | Mar 2023 |
| United States Military Academy West Point, New York Teaching Demonstration | Feb 2023 |
| Research Talk, Navy Research Lab (Invited by Dr.Dey) “Bifurcation of Discrete Solitons of the Nonlinear Schrödinger Equation” | Jan 2023 |
| SIAM 2022 TX-LA, University of Houston “Continuum Limit of 2D Fractional Nonlinear Schrödinger Equation” | Nov 2022 |
| Computational Science Seminar, University of Texas at Dallas “Continuum Limit of 2D Fractional Nonlinear Schrödinger Equation” | Oct 2022 |
| (Poster) SIAM Analysis of PDE 2022, Berlin, Germany (Virtual) “Dynamics of the Mixed-Fractional Nonlinear Schrödinger Equation” | Mar 2022 |
| Hamilton Methods and Asymptotic Dynamics, ICERM “Quantum Zakharov System with the Periodic Boundary Condition” | Dec 2021 |
| SIAM 2021 TX-LA, UTRGV (Minisymposium) “On Mixed Nonlinear Schrödinger Equation” | Nov 2021 |
| Ohio River Analysis Meeting, University of Kentucky “Periodic Quantum Zakharov System” | Mar 2020 |
| AMS Sectional Meeting, Tufts University “Fourth-Order Perturbation of Cubic Nonlinear Schrödinger Equation” | Mar 2020 |

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| | Joint Mathematics Meetings (Contributed Paper Session) “Global Well-posedness and Modified Strichartz Estimates for the Fourth-Order Schrödinger Equation” | Jan 2020 |
| | SIAM Analysis of PDE (at La Quinta) “Global Well-Posedness of the Adiabatic Limit of Quantum Zakharov System in 1D” | Dec 2019 |
| | BU/Brown/UMASS Dynamics & PDE Seminar “Pointwise convergence of Full Schrödinger Operator” | Nov 2019 |
| | MSRI: Recent topics on well-posedness and stability of incompressible fluid and related topics “A.E. Pointwise Convergence of Schrödinger Operator to the Identity” | Jul 2019 |
| | Geometric and Harmonic Analysis, University of Connecticut “Pointwise Convergence of Schroedinger Operator to the Identity” | Mar 2019 |
| | Boston Graduate Math Colloquium, Boston College “Nonlinear Smoothing in Nonlinear Schrödinger Equation” | Feb 2018 |
| | BU Student Dynamics Seminar, Boston University | |
| | <ul style="list-style-type: none"> • “Wellposedness theory for the 1-dimensional Adiabatic Limit of Quantum Zakharov System” • “Expository Talk: Fourier Restriction” • “Difficulties in Extending Onsager’s Conjecture to a Bounded Domain” • “Time-Frequency Analysis and Carleson’s Theorem” • “Representation Theory Methods in Quantum Systems” | Feb 2019 Nov 2017 Feb 2017 Dec 2016 Nov 2016 |
| Professional Service | Final judge , Interdisciplinary Contest in Modeling (ICM) Article review , Computers & Mathematics With Applications PhD defense committee (SMU) , Austin Marstaller’s PhD defense Article review , Computational and Mathematical Biophysics 12(1) Bradley Omar Fellowship review , United States Military Academy Grant proposal review , Army Research Office Research Experience for Undergraduates (REU at SMU) , Article review , Communications in Contemporary Mathematics 23(4) Student Dynamical Systems Seminar at Boston University , Organizer | Apr 2025 Feb 2025 Dec 2024 Apr 2024 Feb 2024 Jan 2024 Jul 2023 2020 2017-2019 |
| Skills | Machine Learning Specialization (Coursera) (Stanford University, DeepLearning.AI, Credential Id: Q3JH7TCP34VD), Introductory C Programming Specialization (Coursera) (Duke University, Credential Id: GA6S3L9UMQYH) | Aug 2022 Sept 2022 |
| Miscellaneous | Assistant officer-in-charge, Korean American Relations Club, USMA Violin II, Boston University All-campus orchestra Violin II, Boston College Orchestra | 2024 - 2025 2017 - 2018 2010 - 2011 |