Alejandro N. Diaz

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EDUCATION

Rice University - Houston, TX
Ph.D., Computational and Applied Mathematics, May 2024 (expected)
M.A., Computational and Applied Mathematics, May 2022
Advisor: Prof. Matthias Heinkenschloss, GPA: 3.98

University of Maryland, College Park - College Park, MD
B.S., Mathematics with Departmental Honors, Minor Physics, May 2019, GPA 3.83

EXPERIENCE

Rice University, Department of Computational and Applied Mathematics,
2020-present. *Reduced order models with domain decomposition.*
Advisor: Prof. Matthias Heinkenschloss

Microsoft, Data Science Internship,
Summer 2023. *Applications of differential privacy to business needs.*
Advisor: Prof. Matthias Heinkenschloss

Lawrence Livermore National Laboratory,
Defense Science and Technology Internship - Graduate Summer Student,
Summer 2022.
Domain-decomposition nonlinear reduced order model with shallow masked autoencoder.
Advisor: Dr. Youngsoo Choi

University of California, Los Angeles, UCLA Applied Mathematics REU,
Summer 2018. *Data-driven approach for microfluidic device design.*
Advisors: Prof. Marcus Roper, Dr. Hangjie Ji

Williams College, SMALL NSF REU,
Summer 2017. *Tetrahedral tilings, isoperimetric surfaces in spaces with density.*
Advisor: Prof. Frank Morgan

University of Maryland, College Park, Summer Student Theoretical Physics Research Session, Summer 2016. *Tensor computations in supersymmetry.*
Advisor: Prof. S. James Gates Jr.

PUBLICATIONS

Diaz, A. N. Choi, Y. Heinkenschloss, M. *A fast and accurate domain-decomposition nonlinear manifold reduced order model.* arXiv preprint arXiv:2305.15163 (2023).

Diaz, A. N. Gosea I. V. Heinkenschloss, M. Antoulas, A. C *Interpolation-based model reduction of quadratic-bilinear dynamical systems with quadratic-bilinear outputs.* Submitted to ACOM Topical Collection on Model Reduction and Surrogate Modeling (MORe) (2023).

Diaz, A. N. Heinkenschloss, M. *Towards Data-Driven Model Reduction of the Navier-Stokes Equations using the Loewner Framework.* Active Flow and Combustion Control 2021, Notes on Numerical Fluid Mechanics and Multidisciplinary Design, vol 152. Springer, Cham. https://doi.org/10.1007/978-3-030-90727-3_14

Bongiovanni, E. Diaz, A. N. Kakkar, A. *et al. The Least-Area Tetrahedral Tile of Space.* Geom Dedicata 205, 51–93 (2020). https://doi.org/10.1007/s10711-019-00465-x

Bongiovanni, E. Diaz, A. N. Kakkar, A. Sothanaphan, N. *Isoperimetry in Surfaces of Revolution with Density.* Missouri J. Math. Sci. 30 (2018), no. 2, 150–165. https://doi.org/10.35834/mjms/1544151692

Bongiovanni, E. Di Giosia, L. Diaz, A. N. et al. (2018). *Double Bubbles on the Real Line with Log-Convex Density.* Analysis and Geometry in Metric Spaces, 6(1), pp. 64-88. https://doi.org/10.1515/agms-2018-0004

Caldwell W. Diaz A. N. Friend I. et al. *On the Four Dimensional Holoraumy of the 4D, N=1 Complex Linear Supermultiplet*, International Journal of Modern Physics A 33 (2018), 1850072. https://doi.org/10.1142/S0217751X18500720

TALKS AND PRESENTATIONS

Diaz A., *Impact of the Convergence of Series Expansions on Model Reduction of Quadratic-Bilinear Systems.* Presentation, 2022 Model Reduction and Surrogate Modeling Conference, 21 Sept. 2022, Berlin, Germany.

Diaz A. *Data-Driven Model Reduction using the Loewner Framework.* Poster, 2021 Oil and Gas HPC Conference, 5 Mar. 2021, Houston, TX (virtual).

Diaz A. *Data-Driven Model Reduction using the Loewner Framework.* Presentation, Model Order Reduction for Large-Scale Problems Minisymposium, SIAM Conference on Computational Science and Engineering, 4 Mar. 2021, Fort Worth, TX (virtual).

Diaz A., Kakkar A. *The Least-Area Tetrahedral Tile of Space.* Poster, MAA Undergraduate Student Poster Session, Joint Mathematics Meetings, 12 Jan. 2018, San Diego, CA.

Diaz A. *Existence and Boundedness of Isoperimetric Regions in Surfaces of Revolution with Density*, Informal Geometric Analysis Seminar, 14 Nov. 2017, Math Department, University of Maryland, College Park. Seminar.

Diaz A. *The Log-Convex Density Conjecture in Hyperbolic Space.* MAA Student Paper Sessions, MathFest. 28 Jul. 2017, Hilton Hotel, Chicago, IL. Student Presentation.

AWARDS

Global Young Scientists Summit 2022 Attendee, Oct. 2021

National Defense Science and Engineering Graduate Fellowship, Mar. 2021, Sponsoring Agency: Air Force Research Laboratory.

NSF Graduate Research Fellowship Program Honorable Mention, Mar. 2021.

K2I 2020/21 BP Graduate Fellowship, Rice University, Dec. 2020.

K2I Computational Science and Engineering Fellowship, Rice University, May 2019.

Departmental Honors, Department of Mathematics, University of Maryland, College Park, May 2019.

Strauss Teaching Assistantship, Department of Mathematics, University of Maryland, College Park, Fall 2018 – Spring 2019.

University Honors Citation, University of Maryland, College Park, Apr. 2018.

Outstanding Poster, Joint Mathematics Meeting, Jan. 2018.

Banneker-Key Scholarship, University of Maryland, College Park, May 2015.

SERVICE

SIAM Student Chapter, Rice University,
GSA Representative Aug. 2021 - Aug. 2022
Treasurer, Aug. 2020 - Aug. 2021

Graduate Student Mentor, Department of Computational and Applied Mathematics, Rice University, Aug 2021 - Present

Graduate Student Advisory Committee, Rice University, Member, Aug. 2020 - Present

Freshmen Math Mentorship Program, Rice University, Graduate Student Mentor, Aug. 2020 - Dec. 2020

TEACHING

Rice University, Department of Computational and Applied Mathematics
Grader, CAAM 336, Fall 2019, Spring 2020
Grader, CAAM 453/550, Fall 2020
Grader, CAAM 554, Spring 2021

University of Maryland, College Park, Department of Mathematics
Teaching assistant, Calculus II, Spring 2019
Teaching assistant, Calculus I, Fall 2018

COMPUTER SKILLS

Programming languages: MATLAB, Python, LaTeX, C/C++, Mathematica