

Sean Reiter | Curriculum Vitae

New York, NY, 10012

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Education

- **Virginia Tech** **Blacksburg, VA**
Ph.D. in Mathematics, Advised by Dr. Mark Embree and Dr. Serkan Gugercin
GPA: 3.81/4.00
Expected May 2025
- **Virginia Tech** **Blacksburg, VA**
M.S. in Mathematics, Advised by Dr. Mark Embree and Dr. Serkan Gugercin
Thesis: On the Tightness of the Balanced Truncation Error Bound with an Application to Arrowhead Systems
GPA: 3.81/4.00
December 2021
- **Virginia Tech** **Blacksburg, VA**
B.S. in Mathematics, 'In Honors,' Minor in Chemistry, Summa Cum Laude
GPA: 3.86/4.00
May 2018

Professional Experience

- **Courant Instructor** **New York, NY**
Courant Institute of Mathematical Sciences, New York University
August 2025 - Present
- **Graduate Research Assistant** **Blacksburg, VA**
Department of Mathematics, Virginia Tech
January 2019 - May 2025
- **Givens Associate** **Lemont, IL**
MCS Division, Argonne National Laboratory
June - August 2022, 2023

Research Interests

- Model-order reduction of large-scale dynamical systems, optimal model-order reduction, structure-preserving model-order reduction, data-driven methods for reduced-order modeling and system realization, rational approximation, low-rank matrix decompositions, scientific machine learning, data assimilation, filtering

Publications

Journal Articles

- Reiter, S., Gosea, I. V., and Gugercin, S. (2025). Generalizations of data-driven balancing: What to sample for different balancing-based reduced models. *Automatica*, 182:112518. 10.1016/j.automatica.2025.112518.
- Reiter, S., Pontes Duff, I., Gosea, I. V., and Gugercin, S. (2025). \mathcal{H}_2 Optimal Model Reduction of Linear Systems with Multiple Quadratic Outputs. *IEEE Transactions on Automatic Control* (published online, 2025). 10.1109/TAC.2025.3636441.
- Reiter, S., Damm, T., Embree, M., and Gugercin, S. (2024). On the balanced truncation error bound and sign parameters from arrowhead realizations. *Advances in Computational Mathematics*, 50:10. 10.1007/s10444-024-10105-y.

Conference Proceedings.....

- Reiter, S., and Werner, S. W. R. (2025). Interpolatory model reduction of dynamical systems with root mean squared error. *IFAC-PapersOnLine*, 59(1):385–390. 10.1016/j.ifacol.2025.03.066.

Submitted (arXiv preprints).....

- Reiter, S., Gosea, I. V., Pontes Duff, I., and Gugercin, S. (2025). \mathcal{H}_2 -optimal model reduction of linear quadratic-output systems by multivariate rational interpolation. *arXiv preprint arXiv:2505.03057*. 10.48550/arXiv.2505.03057.
- Reiter, S., and Werner, S. W. R. (2025). Data-driven balanced truncation for second-order systems with generalized proportional damping. *arXiv preprint arXiv:2506.10118*. 10.48550/arXiv.2506.10118.
- Reiter, S., Embree, M., Gugercin, S., and Kekatos, V. (2025). Interpolatory Approximations of PMU Data: Dimension Reduction and Pilot Selection. *arXiv preprint arXiv:2510.20116*. 10.48550/arXiv.2510.20116.
- Ackermann, M. S., Reiter, S., and Trefethen, L. N. (2025). L2 and Linfinity rational approximation. *arXiv preprint arXiv:2512.23357*. 10.48550/arXiv.2512.23357.

Theses.....

- Reiter, S. J. (2025). *Dimension Reduction in Structured Dynamical Systems: Optimal- \mathcal{H}_2 Approximation, Data-Driven Balancing, and Real-Time Monitoring*. Ph.D. dissertation, Virginia Polytechnic Institute and State University. [hdl:10919/134223](https://hdl.handle.net/10919/134223).
- Reiter, S. J. (2022). *On the Tightness of the Balanced Truncation Error Bound with an Application to Arrowhead Systems*. M.S. thesis, Virginia Polytechnic Institute and State University. [hdl:10919/107999](https://hdl.handle.net/10919/107999).

Conference Contributions

Organizational Work.....

- Organizational committee member, *Young Mathematics in Model Order Reduction (YMMOR)*
- Minisymposium organizer “Recent Advances in Model Order Reduction and Data-driven Modeling”, *MATHMOD 2025, 11th Vienna International Conference on Mathematical Modeling*, Vienna, Austria, Co-organizers: Hendrik Kleikamp (University of Münster), Steffen W. R. Werner (Virginia Tech), Jens Saak (MPI Magdeburg)

Conference and Oral Presentations.....

- Optimal- \mathcal{H}_2 approximation of linear quadratic output systems by multivariate rational interpolation. *Joint Mathematics Meeting 2026*, Jan 4 - 7, 2026, Washington, D.C.
- \mathcal{H}_2 -optimal model reduction by multivariate rational interpolation. *Challenges, Opportunities, and New Horizons in Rational Approximation*, Apr 6 - 11, 2025, Banff, Canada
- Interpolatory model reduction of dynamical systems with root mean squared error. *MATHMOD 2025, 11th Vienna International Conference on Mathematical Modeling*, Feb 19 - 21, 2025 Vienna, Austria
- Interpolatory \mathcal{H}_2 optimal model reduction of linear systems with quadratic outputs. *Model Reduction and Surrogate Modeling (MORe24)*, Sep 9 - 13, 2024, La Jolla, CA, United States
- Generalizations of data-driven balancing: what to sample for different Riccati equation-based variants. *SIAM Conference on Applied Linear Algebra*, May 13 - 17, 2024, Paris, France
- \mathcal{H}_2 -optimal model reduction of linear systems with quadratic outputs. *Young Mathematicians in Model Order Reduction (YMMOR) Conference 2024*, March 4 - 8, 2024, Stuttgart, Germany
- Generalizations of data-driven balancing: What do you need to sample for different balancing-based reduced models? *Mid-Atlantic Numerical Analysis Day*, November 10, 2023, Philadelphia, PA, United States
- Interpolatory Matrix Approximations for Pilot Bus Selection and Disturbance Detection. *2023 Algorithms for Threat Detection PI Workshop*, October 10 - 12, 2023, Fairfax, VA, United States
- Interpolation-based \mathcal{H}_2 -optimal model reduction of systems with quadratic outputs. *Nonlinear Model Reduction for Control*, May 22 - 26, 2023, Blacksburg, VA, United States
- Structure-preserving Extensions of the QuadBT Framework. *SIAM Southeastern Atlantic Section Annual Meeting*,

March 25 - 26, 2023, Blacksburg, VA, United States

- Power System Event Localization via DEIM. *SIAM Conference on Computational Science and Engineering*, February 26 - March 3, 2023, Amsterdam, The Netherlands

Poster Presentations.....

- Interpolatory Approximations for PMU Data: Dimension Reduction, Pilot Bus Selection, and Event Detection. *2024 AMPS/ATD PI Workshop*, October 7 - 9, 2024, Alexandria, VA, United States
- On Balanced Truncation Error Bound and Sign Parameters. *Model Reduction and Surrogate Modeling (MORE)*, September 19 - 23, 2022, Berlin, Germany
- On the Tightness of the Balanced Truncation Error Bound, with an Application to Arrowhead Systems. *Southeast Control Conference*, November 29 - 30, 2021, Blacksburg, VA, United States
- A Tight Balanced Truncation Error Bound for a Certain Class of SISO Systems. *SIAM Conference on Computational Science and Engineering*, March 1 - 5, 2021, Virtual

Teaching Experience

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| Instructor of Record <ul style="list-style-type: none">○ <i>MATH-UA 4424: Numerical Analysis</i> | New York Univeristy, New York NY
<i>Spring 2026</i> |
| Instructor of Record <ul style="list-style-type: none">○ <i>MATH-UA 352: Numerical Analysis</i> | New York Univeristy, New York NY
<i>Fall 2025</i> |
| Graduate Teaching Assistant <ul style="list-style-type: none">○ <i>MATH 4864: Computational Modeling and Data Analytics Capstone</i> | Virginia Tech, Blacksburg VA
<i>Fall 2024</i> |
| Graduate Instructor of Record <ul style="list-style-type: none">○ <i>MATH 2534: Intro to Discrete Math</i> | Virginia Tech, Blacksburg VA
<i>Fall 2023</i> |
| Graduate Instructor of Record <ul style="list-style-type: none">○ <i>CMDA 1634: Discovering Computational Modeling and Data Analytics</i> | Virginia Tech, Blacksburg VA
<i>Fall 2022</i> |
| Graduate Instructor of Record <ul style="list-style-type: none">○ <i>MATH 1225: Calculus of a Single Variable</i> | Virginia Tech, Blacksburg VA
<i>Fall 2021</i> |
| Graduate Teaching Assistant <ul style="list-style-type: none">○ <i>CMDA 1984: First-year Experience</i> | Virginia Tech, Blacksburg VA
<i>Fall 2019, 2020</i> |
| Urban Teachers Resident Teacher <ul style="list-style-type: none">○ <i>College and Career Readiness Math</i> | New Era Academy, Baltimore MD
<i>Fall 2018</i> |

Professional Service and Society Membership

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| Virginia Tech SIAM Student Chapter <ul style="list-style-type: none">○ <i>Member</i> | Virginia Tech, Blacksburg VA
<i>January 2023 - May 2025</i> |
| Virginia Tech Mathematics Graduate Student Organization <ul style="list-style-type: none">○ <i>President and Founder</i> | Virginia Tech, Blacksburg VA
<i>January 2023 - May 2025</i> |
| Department of Mathematics Computational Resources Committee <ul style="list-style-type: none">○ <i>Graduate student representative</i> | Virginia Tech, Blacksburg VA
<i>January 2022 - May 2025</i> |
| Society for Industrial and Applied Mathematics (SIAM) <ul style="list-style-type: none">○ <i>Student Member</i> | United States
<i>January 2021 - May 2025</i> |
| Department of Mathematics Applied Numerical Analysis Seminar <ul style="list-style-type: none">○ <i>Organizer</i> | Virginia Tech, Blacksburg VA
<i>January 2021 - January 2022</i> |