Sean Reiter | Curriculum Vitae

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Education

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

Professional Experience

- **Virginia Tech, Graduate Research Assistant** — **Blacksburg, VA**
  Model-order reduction and data-driven modeling — *January 2019 - Present*
  Advised by Dr. Mark Embree and Dr. Serkan Gugercin
- **Argonne National Laboratory, Givens Associate** — **Lemont, IL**
  Development of distributed algorithms for quantum chemistry problems — *June - August 2022, 2023*
  Advised by Dr. Swann Perarnau and Dr. Thomas Applencourt

Research Interests

- Optimal model reduction of dynamical systems, data-driven reduced-order modeling, structure-preserving model reduction, real-time monitoring for electrical power systems, approximation theory, numerical linear algebra, high-performance computing for quantum chemistry.

Publications

Journal Articles

- 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(1):1–23

Submitted

- Reiter, S., Gosea, I. V., and Gugercin, S. (2024). Generalizations of data-driven balancing: what to sample for different balancing-based reduced models. *arXiv preprint arXiv:2312.12561*
- Reiter, S., Werner, S. W. R., (2024). Interpolatory model-order reduction of large-scale dynamical systems with root mean squared error measures. *arXiv preprint arXiv:2403.08894*
- Reiter, S., Pontes Duff, I., Gosea, I. V., and Gugercin, S. (2024). $\mathcal{H}_2$ optimal model reduction of linear systems with multiple quadratic outputs. *arXiv preprint arXiv:2405.05951*

In Preparation

- Reiter, S., Gosea, I. V., Pontes Duff, I., and Gugercin, S. (2024). $\mathcal{H}_2$ optimal model reduction of linear quadratic output systems by tangential interpolation.
- Reiter, S., Embree, M., Gugercin, S., and Kekatos, V., (2024). Interpolatory Approximations for PMU Data: Dimension Reduction, Pilot Bus Selection, and Event Detection.
- Reiter, S., Werner, S. W. R., (2024). Data-driven balanced truncation for second-order systems with generalized proportional damping.

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 Modelling", *MATHMOD 2025, 11th Vienna International Conference on Mathematical Modelling*, Vienna, Austria, Co-organizers: Hendrik Kleikamp (University of Münster), Steffen W. R. Werner (Virginia Tech), Jens Saak (MPI Magdeburg)

Conference and Oral Presentations

- 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

- **Graduate Teaching Assistant** — **Virginia Tech, Blacksburg VA**
  MATH 4864: Computational Modeling and Data Analytics Capstone — *Fall 2024*
- **Graduate Instructor of Record** — **Virginia Tech, Blacksburg VA**
  MATH 2534: Intro to Discrete Math — *Fall 2023*

- **Graduate Instructor of Record** — **Virginia Tech, Blacksburg VA**
  CMDA 1634: Discovering Computational Modeling and Data Analytics — *Fall 2022*
- **Graduate Instructor of Record** — **Virginia Tech, Blacksburg VA**
  MATH 1225: Calculus of a Single Variable — *Fall 2021*
- **Urban Teachers Resident Teacher** — **New Era Academy, Baltimore MD**
  College and Career Readiness Math — *Fall 2019*

Professional Service and Society Membership

- **Virginia Tech SIAM Student Chapter** — **Virginia Tech, Blacksburg VA**
  Member — *January 2023 - Present*
- **Virginia Tech Mathematics Graduate Student Organization** — **Virginia Tech, Blacksburg VA**
  President and Founder — *January 2023 - Present*
- **Department of Mathematics Computational Resources Committee** — **Virginia Tech, Blacksburg VA**
  Graduate student representative — *January 2022 - Present*
- **Society for Industrial and Applied Mathematics (SIAM)** — **United States**
  Student Member — *January 2021 - Present*
- **Department of Mathematics Applied Numerical Analysis Seminar** — **Virginia Tech, Blacksburg VA**
  Organizer — *January 2021 - January 2022*