

## CURRICULUM VITAE - SERKAN GUGERCIN

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### EDUCATION

#### **Rice University, Houston, Texas**

Ph.D. in Electrical Engineering, May 2003

Thesis: *Projection Methods for Model Reduction of Large Scale Dynamical Systems*

Advisor: A.C. Antoulas

M.S. in Electrical Engineering, December 1999

Thesis: *Model Validation and Consistency*

Advisor: A.C. Antoulas

#### **Middle East Technical University, Ankara, Turkey**

B.S. in Electrical and Electronics Engineering, June 1997

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### EMPLOYMENT

The Class of 1950 Professor of Mathematics –	Department of Mathematics, Virginia Polytechnic Institute and State University, Blacksburg, VA, USA, August 2019 – current
A.V. Morris Professor of Mathematics –	Department of Mathematics, Virginia Polytechnic Institute and State University, Blacksburg, VA, USA, September 2016 – August 2019
Visiting Professor – (Humboldt Fellowship)	Institut für Mathematik, Technical University Berlin, Berlin, January 2016 – December 2016 and July 2017 – August 2017.
Professor –	Department of Mathematics, Virginia Polytechnic Institute and State University, Blacksburg, VA, USA, August 2013 – present
Associate Professor –	Department of Mathematics, Virginia Polytechnic Institute and State University, Blacksburg, VA, USA, June 2008 – August 2013
Visiting Professor –	Institut für Mathematik, Technical University Berlin, Berlin, October 2009 – May 2010
Assistant Professor –	Department of Mathematics, Virginia Polytechnic Institute and State University, Blacksburg, VA, USA, August 2003 – June 2008
Research Instructor –	Jacobs University Bremen, Bremen, March 2003 – July 2003

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## RESEARCH INTERESTS

- Dynamical systems, numerical analysis and scientific computing
- Optimal approximation and model reduction of large-scale dynamical systems
- Inverse problems, parameter inversion, and optimization
- Data-analytics for smart buildings
- Data-driven dynamical modeling
- Nonlinear eigenvalue problems

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## HONORS AND AWARDS

- Ralph Budd Award for Research in Engineering, Rice University, School of Engineering, May 2003. Given annually to the person judged to have written the best doctoral thesis in the School of Engineering.
- Jacobs University Bremen 2003 Teaching Award, May 2003.
- National Science Foundation Early CAREER Award in Computational and Applied Mathematics, 2007.
- Humboldt Research Fellowship for Experienced Researchers, 2016. (Spent at Technical University Berlin)
- A.V. Morris Professor of Mathematics, September 2016 – August 2019.
- J.T. Oden Faculty Fellow, University of Texas at Austin, October 17 - October 31, 2018.
- The Class of 1950 Professor of Mathematics, August 2019 – current.

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## SPONSORED RESEARCH

- National Science Foundation Grant DMS-0505971, *Model Reduction with Rational Krylov Methods*, Co-PIs: C. Beattie and S. Gugercin, June 1, 2005 - May 31, 2008, \$210,766
- National Science Foundation Grant DMS-0513542, *Computation and Analysis of Reduced-Order Models for Distributed Parameter Systems*, Co-PIs: J. Borggaard, C. Beattie, S. Gugercin, and T. Iliescu, June 15, 2005 - June 14, 2008, \$431,342
- Air Force Office of Scientific Research Grant FA9550-05-1-0449, *High Performance Parallel Algorithms for Improved Reduced-Order Modeling*, Co-PIs: J. Borggaard, C. Beattie, S. Gugercin, and T. Iliescu, August 15, 2005 - November 30, 2007, \$502,245
- National Science Foundation Grant DMS- 0645347, *CAREER: Reduced-order Modeling and Controller Design for Large-scale Dynamical Systems via Rational Krylov Methods*, May 1, 2007 - April 30, 2013, \$400,000.
- Department of Energy, *Advanced Computer Design Tools for Modeling, Design, Control, Optimization and Sensitivity Analysis of Integrated Whole Building Systems* (VT ICAM component of the Greater Philadelphia Innovation Cluster, DOE HUB). Co-PIs: J. Burns, E. Cliff, S. Gugercin, T. Herdman, T. Iliescu, M. Marathe and L. Zietsman, 2010-2015, \$1,463,459.
- National Science Foundation Grant DMS- 1217156, *Collaborative Research: Innovative Integrative Strategies for Nonlinear Parametric Inversion*, Co-PIs: C. Beattie, E. de Sturler, S. Gugercin, and M. Kilmer. September 2012- August 2015, \$359,942 (VT component), \$190,00 (Tufts component).

- National Institute for Occupational Safety and Health, *Investigation of Reduced Order Fire Modeling for Improved Safety and Response in Underground Coal Mines*, Co-PIs: J. Borggaard, S. Gugercin, B. Lattimer, K. Luxbacher, S. Schafrik. September 2014- August 2019, \$1,247,839.
- National Science Foundation Grant DMS-1522616, *Interpolatory Model Reduction for the Control of Fluids*, Co-PIs: J. Borggaard and S. Gugercin, July 15, 2015 - July 14, 2018, \$319,933.
- National Science Foundation, *SBIR Phase I: Increasing Infrastructure IQ: Developing the Internet of Livable Spaces for Older Adults*, Co-PIs: M. Embree and S. Gugercin, September 1, 2016 Aug 31, 2017, \$54,500.
- National Science Foundation Grant DMS-1720257, *Algorithms for Large-Scale Nonlinear Eigenvalue Problems: Interpolation, Stability, Transient Dynamics*, Co-PIs: M. Embree and S. Gugercin, July 01, 2017 - July 30, 2020, \$349,999.
- National Science Foundation Grant DMS-1720257, *Efficient Algorithms for Optimal Control of Time-Periodic and Nonlinear Systems*, Co-PIs: C.A. Beattie, J. Borggaard, and S. Gugercin, August 01, 2018 - July 31, 2021, \$279,913.
- VTF - Hamlett Undergrad Research Support, Virginia Tech Foundation Inc, January 16 - June 15, 2018, \$1,883.
- National Science Foundation Grant DMS-1923221, *AMPS: Model Reduction for Analysis, Identification, and Optimal Design of Power Networks*, Co-PIs: C.A. Beattie, M. Embree, and S. Gugercin, and V. Kekatos, August 1, 2019 - July 31, 2022, \$376,481.
- Croatian Science Foundation Grant CSF IP-2019-04-6774, *Vibration Reduction in Mechanical Systems*, Co-PIs: S. Gugercin, I. Ivicic, S. Miodragovic, Z. Tomljanovic. January 1, 2020 December 31, 2023, \$129,777 (867,500 Croatian Kuna).
- Croatian Science Foundation Grant CSF IP-2019-04-6268, *Randomized low rank algorithms and applications to parameter dependent problems*, Co-PIs: Z. Drmac, Z. Bujanovic, N. Bosner, I. Glibic, L. Perisa, D. Kressner, S. Gugercin, J. Oval, H. Hakula. January 15, 2020 January 14, 2024, \$96,176 (641,569 Croatian Kuna).

#### PROFESSIONAL SERVICE:

##### **Editorial Service:**

- Associate Editor for SIAM Journal on Scientific Computing (2016-Present)
- Associate Editor for Systems and Control Letters (2010-Present)
- Associate Editor for IEEE Control Systems Society Conference Editorial Board (2009- June 2018)
- Associate Editor for the International Symposium on Mathematical Theory of Networks and Systems, 2014, 2016, 2018, and 2020.
- Co-editor: *Realization and Model Reduction of Dynamical Systems: A Festschrift in Honor of the 70th Birthday of Thanos Antoulas*, Eds. Beattie C; Benner P; Embree M; Gugercin S; Lefteriu Sanda, Springer, 2020 (anticipated).

##### **Conferences Organized**

- International Symposium on Mathematical Theory of Networks and Systems (MTNS 2008) in Blacksburg, VA, July 2008 (with A.C. Antoulas, J. Ball, C.A. Beattie, and T. Georgiou).

- Scientific Committee Member for MoRePaS 2015, Model Reduction of Parametrized Systems III, October 2015, Italy.
- Local Organizing Committee Member for Householder Symposium XX, June 2017.
- Scientific Committee Member for MoRePaS 2018, Model Reduction of Parametrized Systems IV, April 2018, France.
- Co-organizer for Model and dimension reduction in uncertain and dynamic systems, an Institute for Computational and Experimental Research in Mathematics (ICERM) Semester Program, Brown University, from Jan 27 - May 1, 2020. <https://icerm.brown.edu/programs/sp-s20/>. Co-organizers: Yanlai Chen; Misha Kilmer; Yvon Maday; Shari Moskow; Akil Narayan; Daniele Venturi.
- Co-organizer for the Workshop: Mathematics of the Reduced Order Models; one of the three workshops to take place at ICERM during Model and dimension reduction in uncertain and dynamic systems program, Feb 17-21, 2020. Co-organizers: P. Benner, A. Cohen, S. Gugercin, O. Mula, A. Narayan, K. Veroy-Grepl.

### Minisymposia Organized

- Model Reduction of Dynamical Systems, SIAM Annual Meeting, July 2006, Boston, MA (with K. Willcox). 2 sessions, 8 Talks.
- Model Reduction, 2009 SIAM Conference on Computational Science and Engineering, March 2009, Miami, FL (with C.A. Beattie). 5 sessions, 20 Talks.
- Recent Advances in Model Reduction, 2012 SIAM Conference on Applied Linear Algebra, June 2012, Valencia, Spain (with A.C. Antoulas). 2 Sessions, 8 Talks.
- Data-Driven and Nonlinear Model Reduction, 2013 SIAM Conference on Computational Science and Engineering, February-March 2013, Boston, MA (with B. Haasdonk). 3 sessions, 12 Talks.
- Parametric Model Reduction and Inverse Problems, 2015 SIAM Conference on Computational Science and Engineering, March 2015, Salt Lake City, UT (with C.A. Beattie, E. de Sturler, E. Haber, M. Kilmer, L. Ruthotto). 4 sessions, 16 Talks.
- Modeling and simulation of transport-dominated phenomena, European Congress of Mathematics, July 2017, Berlin, Germany (with C.A. Beattie, P. Schulz, and B. Unger). 2 Sessions, 8 Talks.
- Data-driven Modeling, 2015 SIAM Conference on Computational Science and Engineering 2017, Feb 2017, Atlanta, GA (with A.C. Antoulas). 2 Sessions, 8 Talks.
- CSE Education and Workforce, SIAM Conference on Computational Science and Engineering 2019, Feb 25-March 1, 2019, Spokane, WA (with K. Willcox).

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### REFEREED PUBLICATIONS

#### Books

- 1 A.C. Antoulas, C.A. Beattie, and S. Gugercin. Interpolatory Methods for Model Reduction. Computational Science and Engineering 21. SIAM, Philadelphia, 2020.

#### Book Chapters

- A.1 A. Castagnotto, C.A. Beattie, and S. Gugercin. Interpolatory methods for  $H_\infty$  model reduction of multi-input/multi-output systems. Model Reduction of Parametrized Systems III. Springer, 2017: [doi.org/10.1007/978-3-319-58786-8-22](https://doi.org/10.1007/978-3-319-58786-8-22)

- A.2 J.T. Borggaard and S. Gugercin. Model Reduction for DAEs with an Application to Flow Control. Active Flow and Combustion Control 2014, R. King editors, Springer-Verlag, Notes on Numerical Fluid Mechanics and Multidisciplinary Design, Vol. 127, (ISBN 978-3-319-11966-3), pp. 381-396, 2015: [doi.org/10.1007/978-3-319-11967-0-23](https://doi.org/10.1007/978-3-319-11967-0-23)
- A.3 C.A. Beattie and S. Gugercin. Model Reduction by Rational Interpolation. Model Reduction and Approximation: Theory and Algorithms, edited by P. Benner, A. Cohen, M. Ohlberger, and K. Willcox, SIAM, Philadelphia, 2017: [doi.org/10.1137/1.9781611974829.ch7](https://doi.org/10.1137/1.9781611974829.ch7)
- A.4 S. Gugercin and J.-R. Li. Smith-type methods for balanced truncation of large-sparse systems. Dimension Reduction of Large-scale Systems, P. Benner, G.H. Golub, V.L. Mehrman and D.C. Sorensen editors, Springer-Verlag, Lecture Notes in Computational Science and Engineering, Vol. 45 (ISBN 3-540-24545-6), Berlin/Heidelberg, 2005: <https://doi.org/10.1007/3-540-27909-1-2>
- A.5 A.C. Antoulas, C.A. Beattie and S. Gugercin. Interpolatory model reduction of large-scale systems. Efficient Modeling and Control of Large-Scale Systems, J. Mohammadpour and K. Grigoriadis editors, Springer-Verlag, ISBN 978-1-4419-5756-6, 2010: <https://doi.org/10.1007/978-1-4419-5757-3-1>
- A.6 C. Beattie, S. Gugercin, and V. Mehrmann. Structure-preserving interpolatory model reduction for port-Hamiltonian differential-algebraic systems. To appear in Realization and Model Reduction of Dynamical Systems – A Festschrift in Honor of 70th Birthday of Thanos Antoulas, Springer-Verlag, 2020. Available as arXiv:1909.13764 [arXiv:1910.05674](https://arxiv.org/abs/1910.05674).
- A.7 T. Breiten, C. Beattie, and S. Gugercin.  $H_2$ -gap model reduction for stabilizable and detectable systems. To appear in Realization and Model Reduction of Dynamical Systems – A Festschrift in Honor of 70th Birthday of Thanos Antoulas, Springer-Verlag, 2020. Available as [arXiv:1909.13764](https://arxiv.org/abs/1909.13764)

## Journal Publications

- B.1 A.C. Antoulas, D.C. Sorensen, and S. Gugercin. A survey of model reduction methods for large-scale systems. Structured Matrices in Operator Theory, Numerical Analysis, Control, Signal and Image Processing, Contemporary Mathematics, AMS publications, 280:193-219, 2001: Available at <http://www.ams.org/books/conm/280/4630/conm280-4630.pdf>
- B.2 S. Gugercin, D.C. Sorensen, and A.C. Antoulas. A modified low-rank Smith method for large-scale Lyapunov Equations. Numerical Algorithms, Vol. 32, Issue 1, pp. 27-55, January 2003: [doi.org/10.1023/A:1022205420182](https://doi.org/10.1023/A:1022205420182)
- B.3 S. Gugercin, A.C. Antoulas, and H.P. Zhang. An approach to identification for robust control. IEEE Transactions on Automatic Control, Vol: 48 Issue: 6, pp. 1109-1115, June 2003: [doi.org/10.1109/TAC.2003.812821](https://doi.org/10.1109/TAC.2003.812821)
- B.4 S. Gugercin and A.C. Antoulas. A survey of model reduction by balanced truncation and some new results. International Journal of Control, Volume: 77 Issue: 8, pp. 748-766, 2004: [doi.org/10.1080/00207170410001713448](https://doi.org/10.1080/00207170410001713448)
- B.5 S. Gugercin and A.C. Antoulas. Model reduction of large-scale systems by least squares. Linear Algebra and its Applications, Special Issue on Order Reduction of Large-Scale Systems, Vol. 415/2-3, pp. 290-321, 2006: [doi.org/10.1016/j.laa.2004.12.022](https://doi.org/10.1016/j.laa.2004.12.022)
- B.6 S. Gugercin and K. Willcox. Krylov projection framework for Fourier model reduction. Automatica, Vol. 44, No: 1, pp. 209-215, 2008: [doi.org/10.1016/j.automatica.2007.05.007](https://doi.org/10.1016/j.automatica.2007.05.007)
- B.7 S. Gugercin. An iterative SVD-Krylov based algorithm for model reduction of large-scale dynamical systems. Linear Algebra and its Applications, Vol. 428, No: 8-9, pp. 1964-1986, 2008: [doi.org/10.1016/j.laa.2007.10.041](https://doi.org/10.1016/j.laa.2007.10.041)

- B.8 S. Gugercin, A.C. Antoulas and C.A. Beattie.  $H_2$  model reduction for large-scale linear dynamical systems. *SIAM Journal on Matrix Analysis and Applications*, Vol. 30, Issue: 2, pp. 609-938, 2008: [doi.org/10.1137/060666123](https://doi.org/10.1137/060666123)
- B.9 C.A. Beattie and S. Gugercin. Interpolatory projection methods for structure-preserving model reduction. *Systems and Control Letters*, Vol. 58, Issue: 3, pp. 225-232, 2009: [doi.org/10.1016/j.sysconle.2008.10.016](https://doi.org/10.1016/j.sysconle.2008.10.016)
- B.10 C.A. Beattie, Z. Drmač and S. Gugercin. A note on shifted Hessenberg systems and frequency response computation. *ACM Transactions on Mathematical Software*, Vol. 38, No.2, 2011: [doi.org/10.1145/2049673.2049676](https://doi.org/10.1145/2049673.2049676)
- B.11 U. Baur, C.A. Beattie, P. Benner, and S. Gugercin. Interpolatory projection methods for parameterized model reduction. *SIAM Journal of Scientific Computing*, Vol. 33, Issue: 5, pp. 2489- 2518, 2011: [doi.org/10.1137/090776925](https://doi.org/10.1137/090776925)
- B.12 C.A. Beattie, S. Gugercin and S. Wyatt. Inexact solves in interpolatory model reduction. *Linear Algebra and Its Applications*, Special Issue dedicated to Danny Sorensen's 65th birthday, Vol. 436, Issue: 8, pp. 2916-2943, 2012: [doi.org/10.1016/j.laa.2011.07.015](https://doi.org/10.1016/j.laa.2011.07.015)
- B.13 S. Gugercin, R. V. Polyuga, C.A. Beattie and A. van der Schaft. Structure-preserving tangential interpolation based model reduction of port-Hamiltonian Systems. *Automatica*, Volume: 48, No: 9, pp. 1963-1974, 2012: [doi.org/10.1016/j.automatica.2012.05.052](https://doi.org/10.1016/j.automatica.2012.05.052)
- B.14 K. Ahuja, E. de Sturler, S. Gugercin and R. Chang. Recycling BiCG with an application to model reduction. *SIAM Journal on Scientific Computing*, Vol. 34, No: 4, pp. A1925-A1949, 2012: [doi.org/10.1137/100801500](https://doi.org/10.1137/100801500)
- B.15 G. Flagg, C.A. Beattie and S. Gugercin. Convergence of the Iterative Rational Krylov Algorithm. *Systems and Control Letters*, Vol. 61, Issue: 6, pp. 688-691, 2012. [doi.org/10.1016/j.sysconle.2012.03.005](https://doi.org/10.1016/j.sysconle.2012.03.005)
- B.16 G. Flagg, C.A. Beattie and S. Gugercin. Interpolatory  $H_\infty$  model reduction. *Systems and Control Letters*, Vol. 62, Issue: 7, pp. 567-574, 2013: [doi.org/10.1016/j.sysconle.2013.03.006](https://doi.org/10.1016/j.sysconle.2013.03.006)
- B.17 G. Flagg and S. Gugercin. On the ADI Method for the Sylvester Equation and the optimal  $H_2$  points. *Applied Numerical Mathematics*, Vol. 64, pp. 50-58, 2013: [doi.org/10.1016/j.apnum.2012.10.001](https://doi.org/10.1016/j.apnum.2012.10.001)
- B.18 B. Anic, C.A. Beattie, S. Gugercin and A.C. Antoulas. Interpolatory weighted  $H_2$  model reduction. *Automatica*, Volume 49, Issue: 5, pp. 1275-1280, 2013: [doi.org/10.1016/j.automatica.2013.01.040](https://doi.org/10.1016/j.automatica.2013.01.040)
- B.19 S. Gugercin, T. Stykel and S. Wyatt. Model Reduction of Descriptor Systems by Interpolatory Projection Methods. *SIAM Journal on Scientific Computing*, Vol. 35, Iss. 5, pp. B1010-B1033, 2013: [doi.org/10.1137/130906635](https://doi.org/10.1137/130906635)
- B.20 G. Flagg and S. Gugercin. Multipoint Volterra Series Interpolation and  $H_2$  Optimal Model Reduction of Bilinear Systems. *SIAM Journal on Matrix Analysis and Applications*, Vol. 36, Issue: 2, 549579, 2015: [doi.org/10.1137/130947830](https://doi.org/10.1137/130947830)
- B.21 P. Benner, S. Gugercin, and K. Willcox. A Survey of Model Reduction Methods for Parametric Systems. *SIAM Review*, Vol. 57, Issue: 4, pp. 483-531, 2015: [doi.org/10.1137/130932715](https://doi.org/10.1137/130932715)
- B.22 E. de Sturler, S. Gugercin, M. E. Kilmer, S. Chaturantabut, C. Beattie, and M. O'Connell. Nonlinear Parametric Inversion using Interpolatory Model Reduction. *SIAM Journal on Scientific Computing*, Vol. 37, Issue: 3, B495B517, 2015: [doi.org/10.1137/130946320](https://doi.org/10.1137/130946320)
- B.23 T. Breiten, C. Beattie, and S. Gugercin (2013). Near-optimal frequency-weighted interpolatory model reduction. *Systems and Control Letters*, Vol. 78, pp. 818, 2015: [doi.org/10.1016/j.sysconle.2015.01.005](https://doi.org/10.1016/j.sysconle.2015.01.005)
- B.24 Z. Drmač, S. Gugercin and C.A. Beattie. Quadrature-Based Vector Fitting for discretized  $H_2$  Approx-

- imation. SIAM Journal on Scientific Computing, Vol. 37, Issue: 2, A625A652, 2015: [doi.org/10.1137/140961511](https://doi.org/10.1137/140961511)
- B.25 Z. Drmač, S. Gugercin and C.A. Beattie. Vector Fitting for Matrix-valued Rational Approximation. SIAM Journal on Scientific Computing, Vol. 37, Issue: 5, pp. A2151-A2379, 2015: [doi.org/10.1137/15M1010774](https://doi.org/10.1137/15M1010774)
- B.26 Z. Drmač, and S. Gugercin. A New Selection Operator for the Discrete Empirical Interpolation Method – improved a priori error bound and extensions. SIAM Journal on Scientific Computing, Vol. 38, Issue: 2, pp. A631-A648, 2015: [doi.org/10.1080/13873954.2016.1198389](https://doi.org/10.1080/13873954.2016.1198389)
- B.27 B. Kramer and S. Gugercin. The Eigensystem Realization Algorithm from Tangentially Interpolated Data. Mathematical and Computer Modeling of Dynamical Systems, Vol. 22, Issue: 4, pp. 282-306, 2016: [doi.org/10.1080/13873954.2016.1198389](https://doi.org/10.1080/13873954.2016.1198389)
- B.28 S. Chaturantabut, C. Beattie, and S. Gugercin. Structure-preserving Model Reduction for Nonlinear Port-Hamiltonian Systems. SIAM Journal on Scientific Computing, Vol. 38, Issue: 5, pp. B837–B865. 2016: [doi.org/10.1137/15M1055085](https://doi.org/10.1137/15M1055085)
- B.29 M. O’Connell, M. Kilmer, E. de Sturler, and S. Gugercin. Computing Reduced Order Models via Inner-Outer Krylov Recycling in Diffuse Optical Tomography. SIAM Journal on Scientific Computing, Vol. 39, Issue 2, pp. B272–B297, 2017: [doi.org/10.1137/16M1062880](https://doi.org/10.1137/16M1062880)
- B.30 Peherstorfer, S. Gugercin, and K. Willcox. Data-driven Reduced Model Construction with Time-domain Loewner Models. SIAM Journal on Scientific Computing, Vol. 39, Issue 5, pp. A2152–A2178, 2017: [doi.org/10.1137/16M1094750](https://doi.org/10.1137/16M1094750)
- B.31 Benner, P. Goyal, and S. Gugercin.  $H_2$ -Quasi-Optimal Model Order Reduction for Quadratic- Bilinear Control Systems. SIAM Journal on Matrix Analysis and Applications, Vol. 39, No:2, pp. 983 –1032. 2018: [doi.org/10.1137/16M1098280](https://doi.org/10.1137/16M1098280)
- B.32 Magruder, C. Beattie, S. Gugercin. Linear time-periodic dynamical systems: An  $\mathcal{H}_2$  analysis and a model reduction framework. Mathematical and Computer Modelling of Dynamical Systems, pp. 1–24, 2017: [doi.org/10.1080/13873954.2017.1382538](https://doi.org/10.1080/13873954.2017.1382538)
- B.33 V. Malladi, M. Albakri, S. Gugercin, P. Tarazaga. Application of projection-based model reduction to finite-element plate models for two-dimensional traveling waves. Journal of Intelligent Material Systems and Structures, Vol 28, Issue 14, pp. 1886–1904, 2017: [doi.org/10.1177/1045389X16679295](https://doi.org/10.1177/1045389X16679295)
- B.34 C. Beattie, S. Gugercin and V. Mehrmann. ” Model Reduction for Systems with Inhomogeneous Initial Conditions”. Systems and Control Letters, Vol. 99, pp. 99-106, 2017: [doi.org/10.1016/j.sysconle.2016.11.007](https://doi.org/10.1016/j.sysconle.2016.11.007)
- B.35 P. Schulze, B. Unger, C.A. Beattie, and Gugercin. Data-driven Structured Realization. Linear Algebra and Its Applications, Volume 537, Issue 15, pp. 250–286, 2018: [doi.org/10.1016/j.laa.2017.09.030](https://doi.org/10.1016/j.laa.2017.09.030)
- B.36 A. Carracedo Rodriguez, S. Gugercin, and J. Borggaard. Interpolatory Model Reduction of Parameterized Bilinear Dynamical Systems. Advances in Computational Mathematics, Vol. 44., Issue 6, pp. 1887–1916, 2018: [doi.org/10.1007/s10444-018-9611-y](https://doi.org/10.1007/s10444-018-9611-y)
- B.37 Z. Tomljanovic, C.A. Beattie, and S. Gugercin S.. Damping optimization of parameter dependent mechanical systems by rational interpolation. Advances in Computational Mathematics, submitted, Vol. 44., Issue 6, pp. 1797–1820, 2018: [doi.org/10.1007/s10444-018-9605-9](https://doi.org/10.1007/s10444-018-9605-9)
- B.38 B. Peherstorfer, Z. Drmač, and S. Gugercin. Stabilizing discrete empirical interpolation via randomized and deterministic oversampling. Submitted, 2018. Available as [arXiv:1808.10473](https://arxiv.org/abs/1808.10473).
- B.39 A. Grimm, C.A. Beattie, Z. Drmač, and S. Gugercin. Empirical least-squares fitting of parametrized

dynamical systems. Submitted 2018. Available as [arXiv:1808.05716](https://arxiv.org/abs/1808.05716)

- B.40 K. Sinani and S. Gugercin.  $H_2(t_f)$  Optimality Conditions for a Finite-time Horizon. *Automatica*, Vol 110, 2019: [doi.org/10.1016/j.automatica.2019.108604](https://doi.org/10.1016/j.automatica.2019.108604)
- B.41 B. Unger and S. Gugercin. Kolmogorov  $n$ -widths for linear dynamical systems. *Advances in Computational Mathematics*, Vol. 45, pp. 2273-3386, 2019: [doi.org/10.1007/s10444-019-09701-0](https://doi.org/10.1007/s10444-019-09701-0)
- B.42 M.I. Albakri, S. Malladi, S. Gugercin, and P. Tarazaga. Estimating Dispersion Curves from Frequency Response Functions via Vector-Fitting. *Mechanical Systems and Signal Processing*, Vol. 140, 106597, 2020: [doi.org/10.1016/j.ymssp.2019.106597](https://doi.org/10.1016/j.ymssp.2019.106597)
- B.43 C. Beattie, S. Gugercin, and Z. Drmač. Revisiting IRKA: Connections with pole placement and backward stability. To appear in *Vietnam Journal of Mathematics*, 2020. Available as [arXiv:1911.05804](https://arxiv.org/abs/1911.05804)
- B.44 C. Beattie, S. Gugercin, and Z. Tomljanovic. Sampling-free parametric model reduction for structured systems, 2019. Available as [arXiv.org/abs/1912.11382](https://arxiv.org/abs/1912.11382)
- B.45 A. Carracedo Rodriguez and S. Gugercin. The p-AAA algorithm for data driven modeling of parametric dynamical systems. Submitted, 2020. Available as [arXiv:2003.06536](https://arxiv.org/abs/2003.06536)

### Refereed Conference Proceedings

- C.1 S. Gugercin and A.C. Antoulas. On the assignment of eigenvalues in LTI systems. *Proceedings of the 38th IEEE Conference on Decision and Control*, Vol. 1, pp. 486, Phoenix, AZ, USA, December 1999.
- C.2 S. Gugercin and A.C. Antoulas. On consistency and model validation for systems with parameter uncertainty. *Proceedings of SYSID2000*, Santa Barbara, California, USA, June 2000.
- C.3 S. Gugercin and A.C. Antoulas. A comparative study of 7 algorithms for model reduction. *Proceedings of the 39th IEEE Conference on Decision and Control*, Vol. 3, pp. 2367-2372, Sydney, Australia, December 2000.
- C.4 S. Gugercin, A.C. Antoulas, N. Bedrossian. Approximation of International Space Station 1R and 12A Models. *Proceedings of the 40th IEEE Conference on Decision and Control*, Vol. 3, pp. 1515-1516, Orlando, Florida, USA, December 2001.
- C.5 A.C. Antoulas and S. Gugercin. A new approach to model reduction which preserves stability and passivity. *Proceedings of the 41st IEEE Conference on Decision and Control*, Vol. 3, pp. 2544-2545, Las Vegas, NV, USA, December 2002.
- C.6 S. Gugercin and A.C. Antoulas. A survey of balancing methods for model reduction. *Proceedings of European Control Conference 2003*, Cambridge, UK, September 2003. (This is an earlier version of the publication [B.4].)
- C.7 S. Gugercin and A.C. Antoulas. A time-limited balanced reduction method. *Proceedings of the 42nd IEEE Conference on Decision and Control*, Vol. 5, pp. 5250-5253, Maui, HI, USA, December 2003.
- C.8 S. Gugercin and A.C. Antoulas. An  $H_2$  error expression for the Lanczos procedure. *Proceedings of the 42nd IEEE Conference on Decision and Control*, Vol. 2, 1869-1872, Maui, HI, USA, December 2003.
- C.9 C.A. Beattie, S. Gugercin, A.C. Antoulas and E. Gildin. Controller reduction by Krylov projection methods. *Proceedings of the 16th International Symposium on Mathematical Theory of Networks and Systems*, Katholieke Universiteit Leuven, Leuven, Belgium, July 2004.
- C.10 S. Gugercin, A.C. Antoulas, C.A. Beattie, and E. Gildin. Krylov-based controller reduction for largescale systems. *Proceedings of the 43rd IEEE Conference on Decision and Control*, Vol. 3, pp. 3074- 3077, Paradise Island, Bahamas, December 2004.

- C.11 S. Gugercin. An iterative SVD-Krylov based method for model reduction of large-scale dynamical systems. Proceedings of the 44th IEEE Conference on Decision and Control, and The European Control Conference 2005, pp. 5905-5910, Seville, Spain, December 2005. (This is an earlier version of the publication [B.7].)
- C.12 C.A. Beattie and S. Gugercin. Krylov-based model reduction of second-order systems with proportional damping. Proceedings of the 44th IEEE Conference on Decision and Control, and The European Control Conference 2005, pp. 2278-2283, Seville, Spain, December 2005.
- C.13 C.A. Beattie, J. Borggaard, S. Gugercin and T. Iliescu. A domain decomposition approach to POD. Proceedings of the 45th IEEE Conference on Decision and Control, pp. 6750-6756, San Diego, CA, USA, December 2006.
- C.14 C.A. Beattie and S. Gugercin. Inexact solves in Krylov-based model reduction. Proceedings of the 45th IEEE Conference on Decision and Control, pp. 3405-3411, San Diego, CA, USA, December 2006. (Despite a similar name, [B.12] contains a significant reformulation and expansion of this publication.)
- C.15 S. Gugercin, A. C. Antoulas and C. A. Beattie. A rational Krylov iteration for optimal H2 model reduction. Proceedings of the 17th International Symposium on Mathematical Theory of Networks and Systems, pp. 1665-1667, Kyoto, Japan, July 2006. (This is the first publication where IRKA was introduced. The article [B.8] contains a significant reformulation and expansion.)
- C.16 C.A. Beattie and S. Gugercin. Krylov-based minimization for optimal H2 model reduction. Proceedings of the 46th IEEE Conference on Decision and Control, pp. 4385-4390, New Orleans, LA, USA, December 2007.
- C.17 C.A. Beattie and S. Gugercin. Interpolation theory for structure-preserving model reduction. Proceedings of the 47th IEEE Conference on Decision and Control, pp. 4204-4208, Cancun, Mexico, December 2008. (This is an earlier version of the publication [B.9].)
- C.18 S. Gugercin, R. Polyuga, C.A. Beattie and, A. van der Schaft. Interpolation-based H2 model reduction for port-Hamiltonian systems. Proceedings of the Joint 48th IEEE Conference on Decision and Control, and 28th Chinese Control Conference, pp. 5362-5369, Shanghai, P.R. China, December 2009. (This is an earlier version of the publication [B.13].)
- C.19 C.A. Beattie and S. Gugercin. A trust region method for optimal H2 model reduction. Proceedings of the Joint 48th IEEE Conference on Decision and Control, and 28th Chinese Control Conference, pp. 5370-5375, Shanghai, P.R. China, December 2009.
- C.20 G. Flagg, S. Gugercin and C.A. Beattie. An interpolation-based approach to H model reduction of dynamical systems. Proceedings of the 49th IEEE Conference on Decision and Control, pp. 6791-6796, Atlanta, GA, USA, December 2010. (This in an earlier version of [B.16], which introduced a substantial modification to the computation of the reduced-model.)
- C.21 C. Magruder, C.A. Beattie, and S. Gugercin. Rational Krylov methods for optimal L2 model reduction. Proceedings of the 49th IEEE Conference on Decision and Control, pp. 6797-6802, Atlanta, GA, USA, December 2010.
- C.22 C.A. Beattie and S. Gugercin. Weighted model reduction via interpolation. Proceedings of the 18th IFAC World Congress, pp. 12757-12760, Milano, Italy, August 28- September 2, 2011.
- C.23 C.A. Beattie, and S. Gugercin. Structure-preserving model reduction of nonlinear port-Hamiltonian systems. Proceedings of the 50th IEEE Conference on Decision and Control, pp. 6564-6569, Orlando, FA, USA, 2011.

- C.24 J. Borggaard, E. Cliff and S. Gugercin. Model reduction for indoor-air behavior in control design for energy-efficient Buildings. Proceedings of the 2012 American Control Conference, Montreal, Canada, June 2012.
- C.25 D. Kim, J. Braun, J. Borggaard, E. Cliff, S. Gugercin. Coupled CFD/Building Envelope Model for the Purdue Living Lab. Proceeding of the 2012 High Performance Buildings Conference at Purdue, West Lafayette, IN, USA, July 2012.
- C.26 C.A. Beattie, and S. Gugercin. Realization-independent H2-approximation. Proceedings of the 51st IEEE Conference on Decision and Control, Maui, HI, USA, December 2012.
- C.27 J. Borggaard, S. Gugercin, and Lizette Zietsman. Compensators via H2-based Model Reduction and Proper Orthogonal Decomposition. Proceedings of 19th IFAC World Congress, 2014.
- C.28 C.A. Beattie, Z. Drmac, S. Gugercin (2014) Quadrature-Based IRKA Fitting for optimal H2 approximation. Proceedings of Mathmod, 2015.
- C.29 S. Malladi, M. Albakri, S. Gugercin, and P. Tarazaga, Reduced plate model used for 2D traveling wave propagation. Proceedings of the ASME Conference on Smart Materials, Adaptive structures and Intelligent Systems, Colorado Springs, Co., 2015.
- C.30 A. Lattimer, J. Borggaard, S. Gugercin, K. Luxbacher, and B. Lattimer. Computationally Efficient Wildland Fire Spread Models. Accepted to appear in the Proceedings of the 14th International Conference and Exhibition on Fire Science and Engineering, 2015.
- C.31 A. Lattimer, B. Lattimer, S. Gugercin and J. Borggaard. High Fidelity Reduced Order Models for Wildland Fires. Proceedings of the 5th International Fire Behavior and Fuels, 2015.
- C.32 I. P. D. Pereira, S. Gugercin, C.A. Beattie, C. Poussat-Vassal, and C. Seren. H2 Optimality Conditions for Reduced Time-delays Systems of Dimension One. Proceedings of the 13th IFAC Workshop on Time Delay Systems, 2016.
- C.33 K. Sinani, C.A. Beattie and S. Gugercin, A Structure-preserving Model Reduction Algorithm Dynamical Systems with Nonlinear Frequency Dependency. Proceedings of the 6th IFAC Symposium on System Structure and Control, 2016.
- C.34 J. Borggaard, S. Gugercin, and L. Zietsman. Feedback Stabilization of Fluids Using Interpolatory and POD Reduced-Order Models for Control and Compensator Design. Proceedings of the 55th IEEE Conference on Decision and Control, 2016.
- C.35 S. Gugercin, J. Borggaard, and L. Zietsman. Compensators via based Model Reduction and Proper Orthogonal Decomposition. In IFAC Proceedings Volumes, Vol. 47 pp. 7779-7784, 2016.
- C.36 M. Kasarda, P. Tarazaga, M. Embree, S. Gugercin, A. Woolard, B. Joyce, and J. Hamilton. Detection and Identification of Firearms Upon Discharge Using Floor-Based Accelerometers. In D. DiMiao, P. Tarazaga, and P. Castellini (Eds.), Special Topics in Structural Dynamics, VOL 6, 34TH IMAC, pp. 45-53, 2016.
- C.37 V. Malladi, M. Albakri, P. Tarazaga, S. Gugercin, (2016). Reduced Plate Model Used for 2d Traveling Wave Propagation. Proceedings of ASME Conference on Smart Materials, Adaptive Structures and Intelligent Systems, VOL 1, 2015.
- C.38 A. Carracedo Rodriguez A, S. Gugercin S, and J. Borggaard J. Subsystem Interpolation for Parameterized Bilinear Dynamical Systems. Proceedings of 9th Vienna International Conference on Mathematical Modelling, 2018. [doi:10.11128/arep.55.a55253](https://doi.org/10.11128/arep.55.a55253)
- C.39 V. V. N. S. Malladi, M. I. Albakri, P. Tarazaga, and S. Gugercin. Data-driven modeling techniques to estimate dispersion relations of structural components. Proceedings of the ASME 2018 Conference on

Smart Materials, Adaptive Structures and Intelligent Systems, 2018. [doi:10.1115/SMASIS2018-8135](https://doi.org/10.1115/SMASIS2018-8135)

- C.40 E. Kessler, P. Tazaraga, and S. Gugercin. Kessler E; Tarazaga P; Gugercin S. Recreating Periodic Events: Characterizing Footsteps in a Continuous Walking Signal. Proceedings of the IMAC Conference & Exposition on Structural Dynamics (IMAC 2019).
- C.41 R. Sarlo and S. Gugercin. Efficient System-Identification of Densely Instrumented Infrastructure through Model Order Reduction Techniques. Proceedings of 9th International Conference on Structural Health Monitoring of Intelligent Infrastructure, 2019.

### Other Publications

- D.1 C.A. Beattie and S. Gugercin. CSE 2009: Theory, Algorithms, Applications: Advances in Model Reduction, SIAM News, Vol. 42, No: 5, June 2009.

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### INVITED KEYNOTE PRESENTATIONS AND INVITED NAMED LECTURES

- E.1 The Opening Ceremony of the Berlin International Graduate School in Model and Simulation Based Research, Berlin, Germany, November 2014.
- E.2 Model Reduction for Transport Dominated Phenomena, Berlin, Germany, May 2015.
- E.3 Workshop on Computational Methods for High-Dimensional Problems, Ringberg, Germany, May 2016.
- E.4 Workshop on Model Reduction Methods and Optimization, Opatija, Croatia, September 2016.
- E.5 BIRS Workshop: Data-Driven Methods for Reduced-Order Modeling and Stochastic Partial Differential Equations Jan 29 - Feb 3, 2017, BIRS, Banff, Canada.
- E.6 47th Annual John H. Barrett Memorial Lectures, The University of Tennessee, Knoxville May 1-3, 2017, Knoxville, Tennessee.
- E.7 MIT Distinguished Seminar Series in Computational Science and Engineering March 23, 2017, MIT, Cambridge, MA.
- E.8 Magdeburg Lectures on Optimization and Control Otto von Guericke Universität Magdeburg, 18 July 2017, Magdeburg, Germany
- E.9 International Workshop on Optimal Control of Dynamical Systems and Applications, June 2018.
- E.10 Workshop on Identification, Simulation and Control of Complex Dynamical Systems from Data Schloss Ringberg, Germany, May 2019.
- E.11 4th Workshop on Model Reduction of Complex Dynamical Systems - MODRED 2019 -, University of Graz, Graz, Austria, August 2019.

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### INVITED COLLOQUIUM, SEMINAR, AND WORKSHOP TALKS

- E.1 University of Trier, Trier, Germany, June 2003.
- E.2 Bilkent University, Ankara, Turkey, July 2003.
- E.3 Sandia National Laboratories, Albuquerque, NM, USA, March 2004.
- E.4 Oak Ridge National Laboratories, Oak Ridge, TN, USA, November 2004.
- E.5 Bilkent University, Ankara, Turkey, August 4, 2005.

- E.6 Computational Prototyping Group, MIT, Cambridge, USA, October 20, 2005.
- E.7 Aerospace Computational Design Lab., MIT, Cambridge, USA, October 21, 2005.
- E.8 Koc University, Istanbul, Turkey, July 3, 2007.
- E.9 Bilkent University, Ankara, Turkey, June, 2008
- E.10 Technical University Berlin, Institute for Mathematics, Berlin, Germany, November 2009.
- E.11 Technical University Berlin, Numerical Mathematics Seminar, Berlin, Germany, November 2009.
- E.12 Scientific Computing Seminar, Technical University of Chemnitz, Chemnitz, Germany, January 2010.
- E.13 Department of Mathematics, Karlsruhe Institute for Technology, Karlsruhe, Germany, February 2010.
- E.14 Institute for Computational Mathematics, Technical University of Braunschweig, Braunschweig, Germany, February 2010.
- E.15 Technical University Berlin, Numerical Mathematics Seminar, Berlin, Germany, April 2010.
- E.16 Department of Mathematics, University of Zagreb, Zagreb, Croatia, May 2010.
- E.17 Naval Research Laboratory, Oceanography Division, Stennis Space Center, Stennis, MS, November 2010.
- E.18 Inverse Problems Seminar, Virginia Tech., Blacksburg, VA, March 2011.
- E.19 Max Planck Institute, Magdeburg, Germany, October 2011.
- E.20 Department of Mathematics, Virginia Tech., Blacksburg, VA, August 2012.
- E.21 Department of Computer Science, University of Maryland, College Park, MD, October 2012.
- E.22 ONERA (French Aerospace Research Center), Toulouse, France, November 2014.
- E.23 Technical University Berlin, Berlin, Germany, November 2014
- E.24 InformsVT Seminar, Virginia Tech, March 2014.
- E.25 Workshop on Model Reduction, Pilzen, Czech Republic, September 2015.
- E.26 Joint Annual Meeting of DMV and GAMM, Braunschweig, Germany, March 2016.
- E.27 The Workshop on Data-Driven Model Reduction and Machine Learning, Stuttgart, Germany, March 2016.
- E.28 Technical University Trier, April 2016.
- E.29 University of Hamburg, Hamburg, Germany, May 2016
- E.30 Technical University Braunschweig, Braunschweig, Germany, June 2016
- E.31 University of Oxford, Oxford, UK, June 2016
- E.32 Technische Universität Munchen. Munich, Germany, November 2016.
- E.33 Technische Universität Berlin. Berlin, Germany, November 2016.
- E.34 Kolloquium der Abteilung 8, Physikalisch-Technische Bundesanstalt, August 16, 2017, Berlin, Germany
- E.35 University of Texas, Institute for Computational Engineering and Sciences Seminar, October 2018.
- E.36 NC State University, Department of Mathematics, November 2017.
- E.37 NYU, Courant Institute of Mathematical Sciences, March 2018.
- E.38 Department of Mathematics Colloquium, Virginia Tech, Blacksburg, VA, 24 August 2018.
- E.39 Biomedical Engineering and Mechanics Seminar, Virginia Tech, Blacksburg, VA, 14 November 2018.

- E.40 George Mason University, Applied and Computational Math Seminar, March 2019  
E.41 Technische Universität Berlin, Berlin, Germany, June 2019.  
E.42 NYU, Courant Institute of Mathematical Sciences, September 2019.
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#### INVITED LECTURES AT MODEL REDUCTION SCHOOLS

- F.1 DAAD International School on Linear and Optimal Control, September 2013, Osijek, Croatia.  
F.2 Reduced Basis Summer School 2016, October 2016, Kloster Hedersleben, Hedersleben, Germany.  
F.3 LMS Durham Symposium on Model Order Reduction, August 2017, Durham, UK.  
F.4 Approximation of Large-scale Dynamical Systems, 38th International Summer School of Automatic control, September 2017, Grenoble, France.  
F.5 Groningen Autumn School on Model Order Reduction, November 2017, University of Groningen, Netherlands.
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#### TUTORIALS

- G.1 2010 IEEE Multi-Conference on Systems and Control, Kyoto, Japan, September 2010. Recent Advances in Model Reduction of Large-Scale Systems (with. A.C. Antoulas and T. Reis)
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#### INVITED CONFERENCE PRESENTATIONS

- H.1 4th SIAM Conference on Linear Algebra in Signals, Systems and Control, Boston, MA, August 2001.  
H.2 SIAM Conference on Applied Linear Algebra, Williamsburg, VA, July 2003.  
H.3 Mini-workshop: Dimensional Reduction of Large-Scale Systems, Mathematisches Forschungsinstitut Oberwolfach, Oberwolfach, Germany, October 2003.  
H.4 SIAM Conference on Computational Science and Engineering, Orlando, FL, USA, February 2005.  
H.5 SIAM Annual Meeting, New Orleans, LA, USA, July 2005.  
H.6 Workshop on Large-scale Robust Optimization, Santa Fe, NM, USA, Aug 31-Sep 2, 2005.  
H.7 Conference on Adaptive Model Reduction Methods for PDE Constrained Optimization, Rice University, Houston, TX, USA, May 17-19, 2006.  
H.8 Joint GAMM-SIAM Conference on Applied Linear Algebra, Duesseldorf, Germany, July 2006.  
H.9 SIAM Conference on Computational Science and Engineering, Costa Mesa, CA, February 2007.  
H.10 Workshop on Structured Perturbations, and Distance Problems in Matrix Computations, Mathematical Research and Conference Center in Bedlewo, Poland, March 2007.  
H.11 6th International Congress on Industrial and Applied Mathematics, Zurich, Switzerland, July 2007  
H.12 ENUMATH 2007, Graz, Austria, September 2007.  
H.13 15th ILAS Conference, Mexico, June 2008.  
H.14 Two invited talks at the 48th IEEE Conference on Decision and Control, December 2009.  
H.15 SIAM Annual Meeting, Pittsburgh, July 2010.  
H.16 Workshop on Control and Optimization with Differential-Algebraic Constraints, BIRS, Banff Center,

Canada, 2010.

- H.17 SIAM Conference on Computational Science and Engineering, Reno, NV, February 2011.
- H.18 One of the four invited speakers at The Workshop on Advances in Model Reduction, University of Manchester, July 2011.
- H.19 Three invited talks at ICIAM 2011, Vancouver, Canada, July 2011.
- H.20 Workshop on Nonlinear Model Reduction, Tegernsee, Germany, May 2012.
- H.21 SIAM Applied Linear Algebra Meeting, Valencia, Spain, June 2012.
- H.22 CIRM Workshop on Model Reduction and Approximation of Complex Systems, Luminy, France, June 2013.
- H.23 2014 SIAM Conference on Control and Its Applications, San Diego, July 2013.
- H.24 MPI Model Reduction Workshop at Schloss Ringberg, Tegernsee, Germany, June 2014.
- H.25 Active Flow and Combustion Control Conference, TU Berlin, Germany, September 2014.
- H.26 MathMod 2015, Vienna, February 2015.
- H.27 SIAM CSE 2015, Salt Lake City, March 2015.
- H.28 ICIAM 2015, Beijing, China, August 2015.
- H.29 University of Hamburg Model Reduction Workshop, Hamburg, Germany, June 2015.
- H.30 Joint DMV and GAMM Annual Meeting, Braunschweig, Germany, March 2016.
- H.31 Conference of the International Linear Algebra Society, Leuven, Belgium, July 2016
- H.32 SIAM Conference on Computational Science and Engineering, Feb 27-March 3, 2017, Atlanta, GA.
- H.33 Householder Symposium XX on Numerical Linear Algebra, The Inn at Virginia Tech, June 18-23, 2017, Blacksburg, VA.
- H.34 SIAM Conference on Computational Science and Engineering, February 25 - March 1, 2019, Spokane, WA.
- H.35 International Congress on Industrial and Applied Mathematics (ICIAM 2019), July 2019, Valencia, Spain.

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#### OTHER CONFERENCE PRESENTATIONS

- I.1 IEEE Conference on Decision and Control, Phoenix, AZ, USA, December 1999.
- I.2 SYSID200, Santa Barbara, CA, USA, June 2000.
- I.3 IEEE Conference on Decision and Control, Sydney, Australia, December 2000.
- I.4 IEEE Conference on Decision and Control, Orlando, FL, USA, December 2001.
- I.5 IEEE Conference on Decision and Control, Las Vegas, NV, USA, December 2002.
- I.6 Two talks at IEEE Conference on Decision and Control, Maui, HI, USA, December 2003.
- I.7 IEEE Conference on Decision and Control, Paradise Island, Bahamas, December 2004.
- I.8 Householder Symposium XVI, PA, USA, May 2005.
- I.9 IEEE Conference on Decision and Control, Seville, Spain, December 2005.
- I.10 SIAM Annual Meeting, Boston, MA, USA, July 10-14, 2006.
- I.11 Ninth Copper Mountain Conference on Iterative Methods, Copper Mountain, CO, USA, April 2-7,

2006.

- I.12 IEEE Conference on Decision and Control, San Diego, CA, USA, December 2006.
- I.13 IEEE Conference on Decision and Control, New Orleans, LA, USA, December 2007.
- I.14 Tenth Copper Mountain Conference on Iterative Methods, CO, April 2008.
- I.15 Householder Symposium XVII, Zeuthen, Germany, June 2008.
- I.16 IEEE Conference on Decision and Control, Cancun, Mexico, December 2008.
- I.17 SIAM Conference on Control and Its Applications (jointly held with SIAM Annual Meeting), July 2009.
- I.18 2010 GAMM Annual Meeting, Karlsruhe, Germany, March 2010.
- I.19 GAMM Dynamical System and Control Theory Meeting, Berlin, Germany, April 2010.
- I.20 Householder Symposium XVIII, Lake Tahoe, CA, June 2011.
- I.21 IEEE Conference on Decision and Control, Orlando, FL, December 2011.
- I.22 Second International Workshop on Model Reduction for Parameterized Systems, Günzburg, Germany, October 2012.
- I.23 2013 SIAM Conference on Computational Science and Engineering, Boston, February 2013.
- I.24 Model Reduction of Complex Dynamical Systems, December 2013, Magdeburg, Germany.
- I.25 Householder Symposium XIX, Belgium, June 2014.
- I.26 Workshop on Energy Based Modeling, Simulation, and Control of Complex Physical Systems. Technical University Berlin, Germany, April 2016.

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#### TEACHING EXPERIENCE

**Rice University:** ECE 501: Approximation of large-scale dynamical systems

**Jacobs University Bremen:** EE 201: Signals and Systems

#### **Virginia Tech:**

MATH 2984H: Mathematics in a Computational Context

MATH 2224: Multivariable Calculus

MATH 2214: Introduction to Differential Equations

MATH 2214H: Introduction to Differential Equations Honors Sections

MATH 3054: Programming and Mathematical Problem Solving

MATH 3144: Linear Algebra

MATH 4445: Introduction to Numerical Analysis I

MATH 4446: Introduction to Numerical Analysis II

MATH 5414: Approximation of Dynamical Systems

MATH 5465: Numerical Analysis I

MATH 5466: Numerical Analysis II

CMDA 3605: Mathematical Modeling: Methods and Tools I

### Postdoctoral Research Associate Supervision

- Sonja Schmelter (2007)
- Ulrike Baur (2009)
- Saifon Chaturantabut (2011-2013)

### Ph.D. Student Supervision

- Garret Flagg, (Ph.D. 2012)  
Ph.D. Dissertation: Interpolation Methods for Model Reduction of Bilinear Systems.  
Currently working for Schlumberger/WesternGeco in Houston, TX as a Research Geophysicist.
- Sarah Wyatt, (Ph.D. 2012)  
Ph.D. Dissertation: Issues in Interpolatory Model Reduction: Inexact Solves, Second-order Systems and DAEs.  
Currently working for Indian River State College in Fort Pierce, FL as a Tenured Associate Professor.
- Alan Lattimer, (Ph.D. 2016) (Co-advised with J. Borggaard)  
Ph.D. Dissertation: Model Reduction of Nonlinear Fire Dynamics Models  
Currently working as a Chief Data Scientist for Socially Determined in Blacksburg, VA.
- Alex Grimm, (Ph.D. May 2018)  
Ph.D. Dissertation: Parametric Dynamical Systems: Transient Analysis and Data Driven Modeling  
Currently working as Postdoctoral Research Associate at the University of Stuttgart.

### Masters Student Supervision

- Branimir Anic, (M.S. 2008)  
M.S. Thesis: An interpolation-based approach to the weighted- $H_2$  model reduction problem.
- Benjamin Beach, (M.S. 2017)  
M.S. Thesis: An implementation-based exploration of HAPOD: Hierarchical Approximate Proper Orthogonal Decomposition.  
Currently a Ph.D. Student in the ISE Department at Virginia Tech.
- Michael Brennan, (M.S. 2018)  
M.S. Thesis: Rational Interpolation Methods for Nonlinear Eigenvalue Problems  
Currently a PH.D. Student at MIT.
- Garret Flagg (M.S. 2009)  
M.S. Thesis: An Interpolation-based Approach to Optimal  $H_\infty$  Model Reduction.
- Sarah Wyatt (M.S. 2009)  
M.S. Thesis: Inexact Solves in Interpolatory Model Reduction.
- Caleb Magruder (M.S. 2013)  
M.S. Thesis: Model Reduction of Linear Time-Periodic Dynamical Systems
- Walid Chaabene (M.S. 2015)  
Masters Presentation: A Link Prediction Framework Using Influence Features
- Will Frey (M.S. 2015)  
M.S. Thesis: Masters Presentation: Modifying IRKA to Use Strictly Imaginary Shifts

- Klajdi Sinani (M.S. 2015)  
M.S. Thesis: Iterative Rational Krylov Algorithm for Unstable Dynamical Systems and Generalized Coprime Factorizations

### **Current Graduate Students**

- Andrea Carrecado Rodriguez (Ph.D. Student)
- Ellis Kessler (ME Ph.D. Student, co-advised with Pablo Tarazaga)
- Klajdi Sinani (Ph.D. Student)
- Bitu Safaee (Ph.D. Student)

### **Undergraduate Student Research Project Supervision**

- Jennifer Meister (Spring 2007): Singular Value Decomposition and Some Applications
- Harold Metz and Patrick Sheridan (Fall 2008 and Spring 2009): A pole-residue framework for optimal  $H_2$  model reduction.
- Christian Zinck (Fall 2010): Model Reduction using IRKA with Newton's Method and Convergence Criteria Analysis.
- Caleb Magruder (Fall 2010 and Spring 2011): Model Reduction of Inhomogenous Initial Conditions. (This research project won the Layman Prize for Undergraduate Research in Mathematics in 2011)
- Andy Lassiter (Spring, Summer and Fall 2012): Using Singular Value Decomposition for image reconstruction from noisy or missing data.
- Wenqi Hu (Fall 2013): Model Reduction: Theory and Applications
- Mark Brandao (Fall 2013): Rational Approximation and Model Reduction
- Michael Brennan (Fall 2014, Spring 2015, Fall 2015): Implementation of Parametric Model Order Reduction using Loewner Framework and Iterative Rational Krylov Algorithm. (This research project won the Layman Prize for Undergraduate Research in Mathematics in 2016)
- Aimee Maurais (Spring 2017, Fall 2017)
- Ganesh Annan (Spring 2018)
- George Gavrila and Shirong Ku (Fall 2018)
- George Gavrila and Shirong Ku (Spring 2019)