

Teaching & related

Courses for Master Students

1. Model Reduction of Dynamical Systems, University of Magdeburg (OvGU), Magdeburg, Germany. Years 2025, 2019, 2017, 2015, 2014.
2. Introduction into MOR for Linear and Nonlinear Systems (Guest lecture), Department of Microsystems Engineering, University of Freiburg, Germany, December, 2012.
3. Model Order Reduction for Nonlinear Systems (Guest lecture), Department of Microsystems Engineering, University of Freiburg, Germany, January, 2012.
4. Compact Modelling of Large Scale Systems, Department of Microsystems Engineering, University of Freiburg, Germany. Years 2009, 2010.
5. Methods for Modern Integrated Circuits Analysis, Microelectronics Department, Fudan University, Shanghai, P. R. China. Years 2003, 2005.

Supervising and Mentoring

PhD students under supervision: Harshit Kapadia

PhD students under mentoring: Shuwen Sun, Chenzi Wang (visiting PhD student, Tsinghua University, 03.2024-04.2025), Clara Iglesias-Tesouro (visiting PhD student, Universidad Politécnica de Madrid, 01-06.2025)

Graduated PhD students: Supervised: Sridhar Chellappa (with the highest praise), Yongjin Zhang (with excellence); Mentored: Cleophas Kweyu (with excellence); Maria Cruz Varona (TU München)

Academic Activities

Since 2018, board member of the graduate research school IMPRS at Max Planck Institute for Dynamics of Complex Technical Systems, Magdeburg, Germany.

Since 2022, scientific committee member of the international conference Model Reduction and Surrogate Modeling (MORE).

Minisymposia and workshops organization

Minisymposium "Model order reduction methods and their broad applications in engineering", at International Congress on Industrial and Applied Mathematics, July 15-19, 2019, Spain.

Minisymposium "Mathematical Modeling and Simulation for Nanoelectronic Coupled Problems (nanoCOPS)", at the 19th European Conference on Mathematics for Industry, June 13-17, 2016, Spain.

Summer school "Reduced Basis Summer School 2016". October 4 to October 7, 2016 at Kloster Hedersleben, Germany.

Minisymposium "New Advances in Model Order Reduction: Methods, Algorithms, and Applications", at the 8th International Congress on Industrial and Applied Mathematics, August 10-14, 2015, Beijing, China.

Workshop "MOR 4 MEMS 2015", Karlsruhe Institute of Technology. Karlsruhe, Germany. November 17-18, 2015. (URL: <https://sites.google.com/site/mor4mems2015/home>)

Co-editor for book:

System-level Modeling of MEMS, WILEY-VCH, 2013. ISSN 18651399, ISBN 9783527319039.

Referee for

IEEE Transactions on Automatic Control

IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems

IEEE Transactions on Microwave Theory and Techniques

IEEE Transactions on Components, Packaging and Manufacturing Technology

Computer Methods in Applied Mechanics and Engineering

International Journal for Numerical methods in Engineering

SIAM journal on Scientific Computing

SIAM journal on Numerical Analysis

SIAM journal on Matrix Analysis

Journal of Computational Physics

AIAA journal, ESAIM M2AN, etc.

Funding & Scholarships

Dec. 2006-Jan. 2009, Research funding & Fellowship of Alexander von Humboldt Foundation, Germany.

Jan. 2004-Dec. 2004, Research funding & Scholarship of Alfried Krupp von Bohlen und Halbach Foundation, Germany.

Invited scientific reports

Report Oberseminar Numerik 2025 invited by Prof. Mario Ohlberger, University of Münster. Date: 22 Jan. 2025. Topic of talk: “Non-intrusive Surrogate Modelling using Deep Learning”.

1. Report invited by Prof. Shufang Xu, Beijing University. Location: Morningside Center of Mathematics Chinese Academy of Sciences. Date: Dec. 2019. Topic of talk: “Macromodelling of Large-scale Systems”.

2. Report at IMTEK in 2012, Department of Microsystems Engineering, University of Freiburg. Topic of talk: “A Fully Adaptive Scheme for Model Order Reduction Based on Moment Matching”.

Conference talks

1. Challenges, Opportunities, and New Horizons in Rational Approximation 2025, BIRS, Banff 07-11 April 2025. Plenary talk: “Iterative active subspace for surrogate modeling of systems with many parameters”.

2. EMS-TAG SciML 2025, 24-26 March 2025, Milan, Italy. Invited talk: “All-at-once Parameter-time Sequence Prediction with Deep Learning and Augmented Data”.

3. ECM 2024, July 15-19, 2024, Sevilla, Spain. Invited MS talk: “Accurate kernel-based approximation via efficiently learning the kernel centers and shape parameters”.

4. ECCOMAS 2024, 03 – 07 June 2024, Lisbon, Portugal. MS talk: “Efficient active learning for high dimensional data”.

5. AT-RASC 2024, 19-24, May, Gran Canaria, Spain. Invited session talk: “Reduced-order modeling of time-harmonic systems in electromagnetics using efficient error estimation”.

6. EPEPS 2023, 15-18 Oct, Milpitas, California, USA. Invited session talk: “Fast Frequency-Domain Analysis for Parametric Electromagnetic Models Using Deep Learning”.

7. ICIAM 2023, August 20-25, 2023. Tokyo, Japan. Invited MS talk: “Some Recent Advances in A Posteriori Error Estimation and Adaptive Model Order Reduction”. (presented by my student Sridhar Chellappa).

8. ADMOS 2023, 19-21 June, Gothenburg, Sweden. Invited MS talk: “Multi-fidelity Error Estimation accelerates Greedy Model Reduction of Complex Dynamical Systems”.

9. MORE 2022, 19-23 Sep 2022 Berlin, Germany. Talk: “Matrix-free transfer function prediction using model reduction and machine learning”.

10. SIAM CSE, 2021, March 1-5 2021 (virtual). Invited talk: “Surrogate-Based Adaptive Parameter Sampling for Interpolatory Model Order Reduction”. (presented by my student Sridhar Chellappa)

11. WCCM-ECCOMAS CONGRESS, 2020, January 11-15, 2021 (virtual). Invited talk: “A Training Set Subsampling Strategy for the Reduced Basis Method”. (presented by my student Sridhar Chellappa)

12. 9th edition of the International Conference on Computational Methods for Coupled Problems in Science and Engineering (COUPLED PROBLEMS 2021), June 13-16, 2021 (virtual). Invited talk: “Adaptive model reduction for coupled nonlinear parametric dynamical systems”. (presented by my student Sridhar Chellappa)

13. 8th European Congress of Mathematics (ECM 8), June 20-26, 2021, Portoroz, Slovenia. Topic of Talk: "Inf-Sup-Constant-Free State Error Estimator for MOR of Parametric Systems in Electromagnetics". (presented by my student Sridhar Chellappa)
14. 2021 International Applied Computational Electromagnetics Society (ACES) Virtual Conference August 1-5, 2021. Invited talk: "Stable Macromodels for Delayed PEEC Models with Error Estimation".
15. 2019 European Numerical Mathematics and Advanced Applications Conference (ENUMATH 2019). Sept. 30-Oct. 04, 2019, Egmond aan Zee, The Netherlands. Invited talk: "Efficient Error Estimator for MOR of Linear (non-)Parametric Systems".
16. 4th Workshop on Model Reduction of Complex Dynamical Systems (MODRED 2019). 28-30, August, 2019, Graz, Austria. Topic of talk: "Efficient Error Estimator for MOR of Linear Non-parametric and Parametric Systems".
17. 9th International Congress on Industrial and Applied Mathematics (ICIAM 2019). 15-19, July, Valencia, Spain. Invited talk: "Adaptive parameter sampling using surrogate error model".
18. 9th International Congress on Industrial and Applied Mathematics (ICIAM 2019). 15-19, July, Valencia, Spain. Invited talk: "Efficient Error Estimator for MOR of Linear Parametric Systems".
19. 2019 IEEE/MTT-S International Microwave Symposium (IMS 2019), 2-7 June, 2019, Boston, USA. Topic of talk: "Efficient Error Estimator for Model Order Reduction of Linear Parametric Systems".
20. 2019 IEEE MTT-S International Conference on Numerical Electromagnetic and Multiphysics Modeling and Optimization (NEMO 2019), 29-31 May, 2019, Boston, USA. Invited talk: "An Adaptive Method for Interpolating Reduced-Order Models Based on Matching and Continuation of Poles".
21. Workshop Tegernsee, 8-10, May, 2019. Tegernsee, Germany. Topic of talk: "New Error Estimator for MOR of Linear Parametric Systems".
22. 2018 IEEE MTT-S International Conference on Numerical Electromagnetic and Multiphysics Modeling and Optimization (NEMO 2018), 08-10 August, 2018, Reykjavik, Iceland. Invited talk: "Interpolation of Reduced-Order Models Based on Modal Analysis".
23. 6th European Conference on Computational Mechanics (ECCM 6) and 7th European Conference on Computational Fluid Dynamics (ECFD 7), 11 - 15 June 2018, Glasgow, UK. Invited talk "An Adaptive Basis-Enriching technique for POD-Greedy Algorithm".
24. *Plenary talk* at 11th International Conference on Scientific Computing in Electrical Engineering (SCEE 2016), October, 2016, St. Wolfgang/Strobl, Austria. (Joint talk with Peter Benner) Topic of talk: "PMOR for ET Simulation Parametric Model Order reduction for Electro-thermal Simulation in Nanoelectronics".
25. Computational Methods for High Dimensional Problems Workshop, Tegernsee, Germany, May 1-4, 2016. Topic of talk: "Adaptive simultaneous adjustment of POD and DEIM basis".
26. Numerical Solution of Differential and Differential-Algebraic Equations (NUMDIFF-14), September, 2015, Halle, Germany. Topic of talk: "Model Reduction of Quadratic Bilinear Descriptor Systems using Parametric Reduction Techniques with Error Estimation".
27. International Congress on Industrial and Applied Mathematics (ICIAM 2015), August, 2015, Beijing, China. Topic of talk: "A New Error Bound for Parametrized Nonlinear Dynamical Systems".
28. SIAM Conference on Computational Science and Engineering (SIAM CSE), March, 2015, Salt Lake City, USA. Topic of talk: "An efficient output error bound for model order reduction of parametrized nonlinear evolution equations".

29. 8th Vienna International Conference on Mathematical Modelling (MATHMOD 2015), February, 2015, Vienna, Austria. Topic of talk: "A new error estimation for model order reduction of parametrized evolution equations".
30. 2014 SIAM annual meeting, July, 2014, Chicago, USA. Topic of talk: "An Efficient Output Error Bound for Reduced Basis Methods Applied to Parametrized Evolution Equations".
31. Scientific Computing in Electrical Engineering, SCEE2014, September, 2014 Wuppertal, Germany. Topic of talk: "An a posteriori error bound for reduced order modeling of micro- and nano-electrical(-mechanical) systems".
32. The 18th European Conference on Mathematics for Industry, June, 2014, Taormina, Italy. Topic of talk: "Automatic parametric model order reduction using an a posteriori output error bound".
33. Workshop on Model Reduction of Complex Dynamical Systems, December, 2013, Magdeburg, Germany. Topic of talk: "An a posteriori output error bound for linear parametric systems".
34. MAC workshop on Adaptive and Local Model Order Reduction with Machine Learning for Parametrized Systems, Sept., 2013, Technical University of Munich, Germany. Topic of talk: "An a posteriori error bound for linear parametric systems".
35. Model Reduction and Approximation for Complex Systems 2013, Workshop at the Centre International de Rencontres Mathematiques June, 2013, Marseille, France. Topic of talk: "An a posteriori error bound for Krylov subspace based PMOR".
36. Scientific Computing in Electrical Engineering, SCEE 2012, Sept., 2012 Zurich, Switzerland. Topic of talk: "Automatic model order reduction by moment-matching according to an efficient output error bound".
37. 22nd European Symposium on Computer Aided Process Engineering, June, 2012 London, UK. Topic of talk: "Efficient Optimization of Simulated Moving Bed Processes Using Reduced Order Models".
38. 5th International Conference on High Performance Scientific Computing, March, 2012 Hanoi, Vietnam. Topic of talk: "Parametric Model Order Reduction Based on Multi-moment-matching and an Acceleration Strategy".
39. 7th International Congress on Industrial and Applied Mathematics-ICIAM 2011, July, Vancouver, Canada. Topic of talk: "Fast Parametric Macromodelling of MEMS using Subspace Recycling".
40. 48th IEEE Conference on Decision and Control and 28th Chinese Control Conference, Dec., 2009, Shanghai, China. Topic of talk: "Parametric Model Order Reduction Accelerated by Subspace Recycling".
41. International Workshop on Model Reduction for Circuit Simulation, Oct. 2008, Hamburg, Germany. Topic of talk: "On recycling Krylov subspaces for solving successive linear systems with applications in model reduction".
42. Scientific Computing in Electrical Engineering (SCEE 08) Sept., Helsinki University of Technology, Finland. Topic of talk: "Model Order Reduction for Systems with Non-Rational Transfer Function Arising in Computational Electromagnetics".
43. 8th International symposium on Mathematical Theory of Networks & Systems (MTNS 08), Virginia, USA, July 2008. Topic of talk: "Using the Superposition Principle for Model Reduction of Linear Systems with a Large Number of Inputs".
44. 8th International Conference on Matrix Theory and its Applications in China (IMTA 08), TaiYuan, China, July 2008. Topic of talk: "Using the Superposition Principle for Model Reduction of Linear Systems with a Large Number of Inputs".
45. 15-th Conference of the International Linear Algebra Society (ILAS 08), Cancun, Mexico, June 2008.

Topic of talk: "Model Order Reduction of System with Coupled Parameters".

46. Symposium on Recent Advances in Model Order Reduction, TU Eindhoven, The Netherlands, Nov. 2007. Topic of talk: "Robust Algorithm for Parametric Model Order Reduction".

47. International Conference of Numerical Analysis and Applied Mathematics (ICNAAM 07), Corfu, Greece, Sept. 2007. Topic of talk: "A Note on Projection Techniques for Model Order Reduction of Bilinear Systems".

48. 6th International Congress on Industrial and Applied Mathematics (ICIAM 07), Zurich, Switzerland, Jul. 2007. Topic of talk: "A Robust Algorithm for Parametric Model Order Reduction".

49. IEEE Sensors 2004, Vienna, Austria, Oct. 2004. Topic of talk: "Model Order Reduction for Scanning Electrochemical Microscope: The treatment of nonzero initial condition".

50. Design Automation and Test in Europe (DATE 04), Feb., 2004, Paris, France. Topic of talk: "Direct Nonlinear Order Reduction with Variational Analysis".