

# PETAR MLINARIĆ

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## EXPERIENCE

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**Virginia Polytechnic Institute and State University**

*Postdoctoral associate*

Sep 2021–present

*Blacksburg, VA, United States*

- Postdoctoral Associate in the Department of Mathematics at Virginia Tech.

**Max Planck Institute for Dynamics of Complex Technical Systems**

*Research assistant, postdoctoral researcher*

Sep 2014–Jul 2021

*Magdeburg, Germany*

- Started as a Ph.D. student at the Otto von Guericke University of Magdeburg and the graduate program “International Max Planck Research School (IMPRS) for Advanced Methods in Process and Systems Engineering (Magdeburg)”.
- In January 2020, defended the Ph.D. thesis titled “[Structure-preserving model order reduction for network systems](#)”, supervised by Prof. Dr. Peter Benner.
- Developed new structure-preserving model order reduction methods, including a clustering-based method for network systems and an optimal method for parametric systems.
- Contributed to the [pyMOR](#) package since 2015, became a maintainer in September 2016.
- From January 2019, working within the “[pyMOR—Sustainable Software for Model Order Reduction](#)” project under the [DFG](#) call “[Sustainability of Research Software](#)”.

## EDUCATION

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**Otto von Guericke University of Magdeburg**, *Ph.D. in Applied Mathematics*

Thesis: Structure-Preserving Model Order Reduction for Network Systems

Supervisor: Prof. Dr. Peter Benner

Oct 2014–Jan 2020

**University of Zagreb**, *M.Sc. in Applied Mathematics*

Thesis: Approximation of Linear Dynamical Systems in  $\mathcal{H}_2^{p \times m}(\mathbb{C}_+)$

Supervisor: Prof. Dr. Zlatko Drmač

Oct 2012–Jul 2014

**University of Zagreb**, *B.Sc. in Mathematics*

Oct 2009–Jul 2012

## PREPRINTS

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M. Hund, T. Mitchell, P. Mlinarić, and J. Saak, [Optimization-based parametric model order reduction via  \$\mathcal{H}\_2 \otimes \mathcal{L}\_2\$  first-order necessary conditions, to appear in SISC](#)

## JOURNAL PUBLICATIONS

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H.-J. Jongsma, P. Mlinarić, S. Grundel, P. Benner, and H. L. Trentelman, [Model Reduction of Linear Multi-Agent Systems by Clustering with  \$\mathcal{H}\_2\$  and  \$\mathcal{H}\_\infty\$  Error Bounds](#), *Mathematics of Control, Signals, and Systems*, vol. 30, April 2018

## BOOK CHAPTERS

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P. Mlinarić, S. Rave, and J. Saak, [Parametric Model Order Reduction Using pyMOR](#), In: P. Benner, T. Breiten, H. Faßbender, M. Hinze, T. Stykel, R. Zimmermann (eds), *Model Reduction of Complex Dynamical Systems*, August 2021

P. Benner, S. Grundel, and P. Mlinarić, [Clustering-Based Model Order Reduction for Nonlinear Network Systems](#), In: P. Benner, T. Breiten, H. Faßbender, M. Hinze, T. Stykel, R. Zimmermann (eds), *Model Reduction of Complex Dynamical Systems*, August 2021

## CONFERENCE PROCEEDINGS PUBLICATIONS

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L. Balicki, P. Mlinarić, S. Rave, and J. Saak, [System-theoretic model order reduction with pyMOR](#), *Proceedings in Applied Mathematics and Mechanics*, vol. 19, November 2019

M. Hund, P. Mlinarić, and J. Saak, [An  \$\mathcal{H}\_2 \otimes \mathcal{L}\_2\$ -Optimal Model Order Reduction Approach for Parametric Linear Time-Invariant Systems](#), *Proceedings in Applied Mathematics and Mechanics*, vol. 18, December 2018

- P. Mlinarić, T. Ishizaki, A. Chakrabortty, S. Grundel, P. Benner, and J. Imura, [Synchronization and Aggregation of Nonlinear Power Systems with Consideration of Bus Network Structures](#), *Proceedings of the European Control Conference (ECC)*, pp. 2266–2271, June 2018
- P. Benner, S. Grundel, and P. Mlinarić, [Stability Preserving Model Reduction for Linearly Coupled Linear Time-Invariant Systems](#), *Proceedings in Applied Mathematics and Mechanics*, vol. 16, pp. 817–818, October 2016
- P. Mlinarić, S. Grundel, and P. Benner, [Clustering-Based Model Order Reduction for Multi-Agent Systems with General Linear Time-Invariant Agents](#), *Proceedings of the 22<sup>nd</sup> International Symposium on Mathematical Theory of Networks and Systems (MTNS)*, pp. 230–235, July 2016
- P. Mlinarić, S. Grundel, and P. Benner, [Efficient Model Order Reduction for Multi-Agent Systems Using QR Decomposition-Based Clustering](#), *Proceedings of the 54<sup>th</sup> IEEE Conference on Decision and Control*, pp. 4794–4799, December 2015

## ACTIVITIES

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- Visiting researcher** 17–23 Dec 2021  
One-week visit at the Josip Juraj Strossmayer University of Osijek within an ERASMUS+ project.
- pyMOR School 2021 co-organizer** 4–8 Oct 2021  
The third pyMOR School, taking place at WWU Münster (<https://school.pymor.org/>).
- pyMOR Online Course 2020 co-organizer** 28 Sep–2 Oct 2020  
The second pyMOR School in an online format (<https://school.pymor.org/past/2020/>).
- SAMM 2020 co-organizer** 27–31 Jul 2020  
The 7<sup>th</sup> GAMM Juniors’ Summer School on Applied Mathematics and Mechanics (SAMM) with the topic “[Learning Models from Data: Model Reduction, System Identification and Machine Learning](#)”.
- ICERM semester program participant** Jan–May 2020  
Semester program “[Model and dimension reduction in uncertain and dynamic systems](#)”.
- pyMOR School 2019 co-organizer** 7–11 Oct 2019  
The first pyMOR School, taking place at MPI Magdeburg (<https://school.pymor.org/past/2019/>).
- Undergraduate student co-supervisor** 2018–present  
Co-supervised two students contributing to [pyMOR](#).
- Visiting researcher** 7 Jul–15 Sep 2017  
Two-month visit at Prof. Dr. Jun-ichi Imura’s [research group](#) at Tokyo Institute of Technology. Worked on clustering-based model order reduction for power systems.
- Teaching assistant** Apr–Jul 2017  
Held exercises for the “Model Order Reduction of Dynamical Systems” course given at the Otto von Guericke University of Magdeburg.
- GAMM Junior** 2017–2020  
Three-year position awarded yearly to ten young academics from the field of applied mathematics and mechanics (<https://www.gamm-juniors.de/>).
- SIAM Student Chapter of Magdeburg officer** Oct 2015–Sep 2017  
Held positions as president (2015/16) and secretary (2016/17).

## CONFERENCE AND WORKSHOP TALKS

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- SIAM Conference on Control and Its Applications (CT21)**, virtual 19–21 July 2021  
*Clustering-Based Model Order Reduction for Water Networks*
- Tenth Conference on Applied Mathematics and Scientific Computing (ApplMath20)**, Brijuni, Croatia 14–18 Sep 2020  
*Optimization-Based Parametric Model Order Reduction via Wilson-Type  $\mathcal{H}_2 \otimes \mathcal{L}_2$  Conditions*
- EuroSciPy 2019**, Bilbao, Spain 2–6 Sep 2019  
*pyMOR lightning talk*
- 4<sup>th</sup> Workshop on Model Reduction of Complex Dynamical Systems (MODRED 2019)**, Graz, Austria 28–30 Aug 2019  
*Clustering-Based Model Order Reduction for Nonlinear Network Systems*
- 90<sup>th</sup> GAMM Annual Meeting**, Vienna, Austria 18–22 Feb 2019  
 *$\mathcal{H}_2$ -Optimal Model Order Reduction of Interconnected Systems*

<b>International Workshop on Optimal Control of Dynamical Systems and Applications</b> , Osijek, Croatia <i>H<sub>2</sub>-Optimal Model Order Reduction for Port-Hamiltonian Systems</i>	20–22 Jun 2018
<b>European Control Conference (ECC18)</b> , Limassol, Cyprus <i>Synchronization and Aggregation of Nonlinear Power Systems with Consideration of Bus Network Structures</i>	12–15 Jun 2018
<b>Model Reduction of Parameterized Systems IV (MoRePaS 2018)</b> , Nantes, France <i>H<sub>2</sub>-Optimal Structure-Preserving Model Order Reduction for Second-Order Systems</i>	10–13 Apr 2018
<b>89<sup>th</sup> GAMM Annual Meeting</b> , Munich, Germany <i>Clustering-Based Model Order Reduction for Nonlinear Multi-Agent Systems</i>	19–23 Mar 2018
<b>Reduced Basis (and Friends) Summer School 2017</b> , Goslar, Germany <i>H<sub>2</sub>-Optimal Model Order Reduction and Reduced Basis Methods</i>	19–22 Sep 2017
<b>88<sup>th</sup> GAMM Annual Meeting</b> , Weimar, Germany <i>H<sub>2</sub>-Optimal Model Order Reduction for Second Order Systems</i>	06–10 Mar 2017
<b>3<sup>rd</sup> Workshop on Model Reduction of Complex Dynamical Systems (MODRED 2017)</b> , Odense, Denmark <i>Model Reduction of Network Systems by Clustering</i>	11–13 Jan 2017
<b>Reduced Basis Summer School 2016</b> , Hedersleben, Germany <i>Model Order Reduction for Multi-Agent Systems</i>	04–07 Oct 2016
<b>Workshop on Model Reduction Methods and Optimization</b> , Opatija, Croatia <i>Almost Almost-Equitableness and Clustering-Based Error Bounds</i>	20–21 Sep 2016
<b>22<sup>nd</sup> International Symposium on Mathematical Theory of Networks and Systems (MTNS)</b> , Minneapolis, USA <i>Clustering-Based Model Order Reduction for Multi-Agent Systems with General Linear Time-Invariant Agents</i>	12–15 Jul 2016
<b>6<sup>th</sup> Croatian Mathematical Congress</b> , Zagreb, Croatia <i>Clustering-Based Model Order Reduction for Multi-Agent Systems</i>	14–17 Jun 2016
<b>Joint Annual Meeting of DMV and GAMM</b> , Braunschweig, Germany <i>Stability Preserving Model Reduction for Linearly Coupled Linear Time-Invariant Systems</i>	07–11 Mar 2016
<b>10<sup>th</sup> Elgersburg Workshop</b> , Elgersburg, Germany <i>Efficient Model Order Reduction for Multi-Agent Systems Using Graph Partitions</i>	07–11 Feb 2016
<b>54<sup>th</sup> IEEE Conference on Decision and Control (CDC)</b> , Osaka, Japan <i>Efficient Model Order Reduction for Multi-Agent Systems Using QR Decomposition-Based Clustering</i>	15–18 Dec 2015
<b>Reduced Basis Summer School 2015</b> , Hegne, Germany <i>Efficient Model Order Reduction for Multi-Agent Systems Using Graph Partitions</i>	14–18 Sep 2015

## SCHOOLS

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<b>Groningen Autumn School on Model Order Reduction</b> , Groningen, The Netherlands	30 Oct–02 Nov 2017
<b>The Third International School on Model Reduction for Dynamical Control Systems</b> , Dubrovnik, Croatia	05–09 Oct 2015
<b>7<sup>th</sup> Elgersburg School</b> , Elgersburg, Germany	01–07 Mar 2015
<b>DAAD International School on Linear Optimal Control of Dynamic Systems</b> , Osijek, Croatia	23–28 Sep 2013

## TECHNICAL SKILLS

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Advanced	Python, Git, L <sup>A</sup> T <sub>E</sub> X
Intermediate	C/C++, Matlab/Octave
Basic	HTML, CSS, Fortran, FEniCS, DUNE, Subversion