






Curriculum Vitae

Andrés Rueda-Ramírez

 GoogleScholar |  ResearchGate |  LinkedIn (amruedar) |  andres.rueda-ramirez.com
 GitHub (amrueda)

Business Address

Prof. Dr. Andrés Rueda-Ramírez
Cardenal Cisneros, 3, despacho A.313, 28040 Madrid
Depto. de Matemática Aplicada a la Ing. Aeroespacial
Escuela Técnica Superior de Ingeniería Aeronáutica y del Espacio (E.T.S.I.A.E.)
Universidad Politécnica de Madrid
am.rueda@upm.es

RESEARCH INTERESTS AND METHODS

- Numerical analysis of hyperbolic and parabolic partial differential equations
- High-order numerical methods
- *Discontinuous Galerkin* finite-element methods
- Computational fluid dynamics
- Physics-preserving and structure-preserving numerical methods
- High-performance computing (HPC)

ACADEMIC EDUCATION

- 10/2019 **Ph.D. in Aerospace Engineering** (Grade: Cum Laude¹, International Ph.D.)
Universidad Politécnica de Madrid
Madrid, Spain
Dissertation: “Efficient Space and Time Solution Techniques for High-Order Discontinuous Galerkin Discretizations of the 3D Compressible Navier-Stokes Equations”
Supervisors: Prof. Dr. Eusebio Valero and Prof. Dr. Esteban Ferrer
- 03/2015 **Diploma in Mechanical Engineering** (Grade: 4.5/5.0²)
Universidad Nacional de Colombia
Bogotá, Colombia
Thesis: “Design, Konstruktion und numerische Simulation eines Geräts zur Beurteilung der Zündqualität von Dieselmotoren und Ersatzstoffen” (Design, construction, and numerical simulation of a device for evaluating the ignition quality of diesel fuels and alternatives)
Supervisor: Prof. Dr. Juan Miguel Mantilla

¹“Cum Laude” is the highest distinction that can be awarded for a doctoral thesis in Spain.

²The lowest grade in Colombia is 0.0, the highest is 5.0, and 3.0 is considered passing. I achieved the highest GPA in my cohort in Mechanical Engineering.

ACADEMIC POSITIONS

- 12/2024 - present **“Beatriz Galindo” (tenure-track) “Distinguished Professor”**
School of Aerospace Engineering (E.T.S.I.A.E.)
Universidad Politécnica de Madrid (Madrid, Spain)
- **Teaching:** Lectures in Mathematics and Numerical Methods for the B.Sc. in Aerospace Engineering.
 - **Research:** Robust and modern *Discontinuous Galerkin* (DG) high-order methods for compressible flow problems and atmospheric modeling.
 - **Mentoring:** Supervision of Ph.D., M.Sc., and B.Sc. theses in Aerospace Engineering.
- 04/2024 - 09/2024 **Acting Professor (Vertretungsprofessor) of Computational Mathematics**
Fachgruppe Mathematik
RWTH Aachen (Aachen, Germany)
- **Teaching:** Lectures in Numerical Mathematics for the B.Sc. in Computational Engineering Science (CES) and CES seminars (M.Sc.).
 - **Research:** Structure-preserving (e.g., entropy-stable) *Discontinuous Galerkin* (DG) high-order methods for the self-consistent multi-ion magnetohydrodynamics (MHD) equations and HPC implementation to study the interactions of Jupiter’s moons with Jupiter’s magnetosphere.
- 04/2022 - 03/2024 **Principal Investigator (PI) / Postdoctoral Researcher**
Department Mathematik/Informatik
Universität zu Köln (Cologne, Germany)
- **Teaching:** Development of a new course “Introduction to Climate Modeling”, in which students implement a climate model from scratch. Based on the open-source solver [Klimakoffer.jl](#).
 - **Mentoring:** Supervision of several bachelor’s and master’s theses on climate modeling and structure-preserving DG methods.
 - **Research:** Structure-preserving high-order DG methods for complex plasma models such as multi-ion MHD with divergence cleaning; invariant-domain-preserving subcell limiting strategies for DG; implementation of methods in the Julia framework [Trixi.jl](#).
- 01/2020 - 03/2022 **Postdoctoral Researcher**
Department Mathematik/Informatik
Universität zu Köln (Cologne, Germany)
- **Teaching:** Teaching assistance for all Numerical Analysis lectures for the B.Sc. and M.Sc. degree programs in Mathematics.
 - **Research:** *Shock Capturing* methods for high-order DG discretizations for the compressible Navier–Stokes and MHD equations; development of the massively parallel HPC code [Fluxo](#).
- 03/2015 - 07/2016 **Student Research Assistant**
Universidad Nacional de Colombia (Bogotá, Colombia)
- **Research:** Simulation of bone-healing mechanisms with mechanobiological processes using the finite-element method (formulation and implementation of mathematical models).

RESEARCH VISITS

- 04/2026 - 04/2026 **Visiting Professor**
Linköping University (Linköping, Sweden)
Topic: Discontinuous Galerkin methods for geophysics applications, with particular emphasis on shallow water models and compressible gas dynamics for atmospheric flow applications. Collaborative work with Prof. Andrew R. Winters and Patrick Ersing.
- 02/2019 - 03/2019 **Visiting Researcher**
ONERA - The French Aerospace Lab (Paris, France)
Topic: iLES turbulence modeling using high-order DG methods in collaboration with Dr. Marta de la Llave and Dr. Vincent Couaillier.
- 02/2018 - 03/2018 **Visiting Researcher**
San Diego State University (San Diego, USA)
Topic: Implementation of implicit time-integration methods for DGSEM in collaboration with Prof. David Kopriva.

ACADEMIC DISTINCTIONS

- 12/2024 - 11/2024 Spanish Ministry of Science, Innovation and Universities
Recipient of a “Beatriz Galindo” grant for the creation of a tenure-track “Distinguished Professorship” at Universidad Politécnica de Madrid.
- 04/2015 - 05/2016 Colombian Administrative Department of Science (Colciencias)
Scholarship for a research internship in the Biomechanics research group at the Universidad Nacional de Colombia
- 02/2014 - 12/2014 Universidad Nacional de Colombia
10-fold exemption from tuition fees during studies due to academic performance
- 07/2012 - 07/2013 German Academic Exchange Service (DAAD) and Colombian Administrative Department of Science (Colciencias)
“Young Engineers” scholarship for exchange studies at the Technical University of Munich

LANGUAGE SKILLS

- Spanish Native
English Fluent - TOEFL iBT: 103/120 (11/14/2015)
German Fluent - TestDaF: 5/5 (07/18/2013)

SECURED FUNDING

THIRD-PARTY FUNDING (TOTAL: €774 K€)

- 07/2026 - 06/2028 Industrial Knowledge-Transfer Project (Madrid, Spain)
“Aerodynamic Study of On-Wing Distributed Propulsion in Non-Uniform Boundary Layer Flow”
Role: *Principal Investigator* (PI).
Status: Selected for funding.
Total Amount: €170k. **Local Amount:** €170k.
- 12/2024 - 11/2028 Spanish Ministry of Science, Innovation and Universities (Madrid, Spain)
“Beatriz Galindo Grant for the Attraction of Talent” used for co-funding the creation of a “Distinguished Professorship” at Universidad Politécnica de Madrid (**Grant number:** BG23-00062)
Role: “Beatriz-Galindo” (*tenure-track*) “Distinguished Professor”.
Total Amount: €120k. **Local Amount:** €120k.
- 07/2024 - 06/2027 German Federal Ministry of Education and Research (BMBF) (Cologne, Germany)
through WarmWorld Module 4 “Smarter”
“**ICON-DG:** Gearing up the ICON Model with Smarter Discretizations” (**Grant number:** 01LK2315B)
Role: *Principal Investigator* (PI) together with Prof. Gregor Gassner (University of Cologne), Dr. Johannes Markert and Dr. Johannes Holke (German Aerospace Center - DLR), Dr. Michael Baldauf and Dr. Florian Prill (German Weather Service - DWD). Co-supervisor of one Ph.D. student.
Total Amount: €576k. **Local Amount:** €225k.
- 04/2022 - 09/2025 Klaus-Tschira Stiftung (Cologne, Germany)
“**HiFiLab:** High-Fidelity Laboratory for the Simulation of Celestial Bodies with their Space Environment” (**Grant number:** 00.014.2021)
Role: *Principal Investigator* (PI) together with Prof. Gregor Gassner and postdoctoral researcher.
Total Amount: €259k. **Local Amount:** €259k.

REVIEWER DUTIES

- I am registered in the data base of the Spanish National Research Agency (Agencia Estatal de Investigación - AEI) as an Expert Reviewer for national grants. 1 review completed.
- I served on the doctoral committees of:
 - Dr. Antonio Blanco-Casares (08/05/2026). Universitat Politècnica de Catalunya. Ph.D. in Computational and Applied Physics.
 - Dr. Suyash Shrestha (11/02/2026). Universidad Politécnica de Madrid. Ph.D. in Aerospace Engineering.
 - Dr. Hatem Kessasra (16/12/2025). Universidad Politécnica de Madrid. Ph.D. in Aerospace Engineering.
 - Dr. Johannes Markert (05/30/2022). University of Cologne. Ph.D. in Mathematics.
 - Dr. Wojciech Laskowski (09/15/2022). Universidad Politécnica de Madrid. Ph.D. in Aerospace Engineering.
 - Dr. Christof Czernik (11/28/2022). University of Cologne. Ph.D. in Mathematics.
- I have refereed for several international journals. The following list shows all reviews I completed (this

can include more than one revision of the same manuscript):

- Journal of Computational Physics: 26 completed.
- Computers and Mathematics with Applications: 2 completed, 1 in progress.
- Journal of Hydroinformatics: 2 completed.
- Communications on Applied Mathematics and Computation: 2 completed.
- Springer Journal of Scientific Computing: 1 completed.
- Physics of Fluids: 1 completed.

CONFERENCE ORGANIZATION

09/13–09/15/2017 Organization of the minisymposium “Sensitivity and adjoint methods for optimization in flow stability problems” at the 12th edition of the International Conference on Evolutionary and Deterministic Methods for Design Optimization and Control with Applications to Industrial and Societal Problems (EUROGEN 2017). Madrid, Spain.

REFERENCES

1. Prof. Dr. Gregor Gassner
Professor of Applied Mathematics
University of Cologne
ggassner@uni-koeln.de
Relationship: Postdoc supervisor (01/2020 - 03/2024) and Co-PI (04/2022 - present).
2. Prof. Dr. Eusebio Valero
Professor of Applied Mathematics for Aerospace Engineering
Universidad Politécnica de Madrid
eusebio.valero@upm.es
Relationship: Ph.D. supervisor (10/2016 - 12/2019).
3. Prof. Dr. Esteban Ferrer
Professor of Applied Mathematics for Aerospace Engineering
Universidad Politécnica de Madrid
esteban.ferrer@upm.es
Relationship: Ph.D. supervisor (10/2016 - 12/2019).

Publication List

SUMMARY

- 20 published peer-reviewed journal articles.
- 2 articles under review in peer-reviewed journals.
- 3 articles in conference proceedings.
- h-index: 13. 734 citations (see [🔍 GoogleScholar](#)).

PEER-REVIEWED JOURNALS

- [1] A. M. **Rueda-Ramírez**, P. Ersing, A. R. Winters, and G. J. Gassner, “Well-balanced subcell limiting for discontinuous galerkin discretizations of the shallow-water equations,” 2026. arXiv: [2605.02560 \[math.NA\]](#). [Online]. Available: <https://arxiv.org/abs/2605.02560>.
- [2] D. Bach, A. **Rueda-Ramírez**, D. A. Kopriva, and G. J. Gassner, “Mimetic metrics for the dgsem,” *Journal of Scientific Computing*, vol. 105, no. 2, pp. 1–8, 2025. DOI: [10.1007/s10915-025-03082-x](#).
- [3] D. Bach, A. M. **Rueda-Ramírez**, E. Sonnendrücker, D. C. D. R. Fernández, and G. J. Gassner, “SBP-FDEC: Summation-by-parts finite difference exterior calculus,” *Major revisions at Journal of Computational Physics*, 2025. arXiv: [2511.20529](#).
- [4] T. Montoya, A. M. **Rueda-Ramírez**, and G. J. Gassner, “Entropy-stable discontinuous spectral-element methods for the spherical shallow water equations in covariant form,” *Journal of Computational Physics*, p. 114 782, 2025, ISSN: 0021-9991. DOI: [10.1016/j.jcp.2026.114782](#). arXiv: [2509.08790](#).
- [5] A. M. **Rueda-Ramírez**, A. Sikstel, and G. J. Gassner, “An entropy-stable discontinuous Galerkin discretization of the ideal multi-ion magnetohydrodynamics system,” *Journal of Computational Physics*, vol. 523, p. 113 655, 2025. DOI: [10.1016/j.jcp.2024.113655](#).
- [6] A. M. **Rueda-Ramírez**, B. Bolm, D. Kuzmin, and G. J. Gassner, “Monolithic convex limiting for Legendre-Gauss-Lobatto discontinuous Galerkin spectral-element methods,” *Communications on Applied Mathematics and Computation*, vol. 6, no. 3, pp. 1860–1898, 2024. DOI: [10.1007/s42967-023-00321-6](#).
- [7] A. M. **Rueda-Ramírez** and G. J. Gassner, “A flux-differencing formula for split-form summation by parts discretizations of non-conservative systems: Applications to subcell limiting for magneto-hydrodynamics,” *Journal of Computational Physics*, vol. 496, p. 112 607, 2024. DOI: [10.1016/j.jcp.2023.112607](#).
- [8] E. Ferrer, G. Rubio, G. Ntoukas, W. Laskowski, O. Mariño, S. Colombo, A. Mateo-Gabín, H. Marbona, F. M. de Lara, D. Huergo, J. Manzanero, A. M. **Rueda-Ramírez**, D. A. Kopriva, and E. Valero, “HORSES3D: A high-order discontinuous Galerkin solver for flow simulations and multi-physics applications,” *Computer Physics Communications*, vol. 287, p. 108 700, 2023. DOI: [10.1016/j.cpc.2023.108700](#).
- [9] A. Mateo-Gabín, A. M. **Rueda-Ramírez**, E. Valero, and G. Rubio, “A flux-differencing formulation with Gauss nodes,” *Journal of Computational Physics*, vol. 489, p. 112 298, 2023. DOI: [10.1016/j.jcp.2023.112298](#).
- [10] H. Ranocha, M. Schlottke-Lakemper, J. Chan, A. M. **Rueda-Ramírez**, A. R. Winters, F. Hindenlang, and G. J. Gassner, “Efficient implementation of modern entropy stable and kinetic energy preserving discontinuous Galerkin methods for conservation laws,” *ACM Transactions on Mathematical Software*, vol. 49, no. 4, pp. 1–30, 2023. DOI: [10.1145/3625559](#).

- [11] A. M. **Rueda-Ramírez**, F. J. Hindenlang, J. Chan, and G. J. Gassner, “Entropy-stable Gauss collocation methods for ideal magneto-hydrodynamics,” *Journal of Computational Physics*, vol. 475, p. 111 851, 2023. DOI: [10.1016/j.jcp.2022.111851](https://doi.org/10.1016/j.jcp.2022.111851).
- [12] A. M. **Rueda-Ramírez**, G. Ntoukas, G. Rubio, E. Valero, and E. Ferrer, “Truncation error-based anisotropic p-adaptation for unsteady flows for high-order discontinuous Galerkin methods,” *International Journal of Computational Fluid Dynamics*, vol. 37, no. 6, pp. 430–450, 2023. DOI: [10.1080/10618562.2024.2326557](https://doi.org/10.1080/10618562.2024.2326557).
- [13] J. Chan, H. Ranocha, A. M. **Rueda-Ramírez**, G. Gassner, and T. Warburton, “On the entropy projection and the robustness of high order entropy stable discontinuous Galerkin schemes for under-resolved flows,” *Frontiers in Physics*, vol. 10, p. 898 028, 2022. DOI: [10.3389/fphy.2022.898028](https://doi.org/10.3389/fphy.2022.898028).
- [14] A. M. **Rueda-Ramírez**, W. Pazner, and G. J. Gassner, “Subcell limiting strategies for discontinuous Galerkin spectral element methods,” *Computers & Fluids*, vol. 247, p. 105 627, 2022. DOI: [10.1016/j.compfluid.2022.105627](https://doi.org/10.1016/j.compfluid.2022.105627).
- [15] S. Hennemann, A. M. **Rueda-Ramírez**, F. J. Hindenlang, and G. J. Gassner, “A provably entropy stable subcell shock capturing approach for high order split form DG for the compressible Euler equations,” *Journal of Computational Physics*, vol. 426, p. 109 935, 2021. DOI: [10.1016/j.jcp.2020.109935](https://doi.org/10.1016/j.jcp.2020.109935).
- [16] A. M. **Rueda-Ramírez**, E. Ferrer, D. A. Kopriva, G. Rubio, and E. Valero, “A statically condensed discontinuous Galerkin spectral element method on Gauss-Lobatto nodes for the compressible Navier-Stokes equations,” *Journal of Computational Physics*, vol. 426, p. 109 953, 2021. DOI: [10.1016/j.jcp.2020.109953](https://doi.org/10.1016/j.jcp.2020.109953).
- [17] A. M. **Rueda-Ramírez**, S. Hennemann, F. J. Hindenlang, A. R. Winters, and G. J. Gassner, “An entropy stable nodal discontinuous Galerkin method for the resistive MHD equations. Part II: Subcell finite volume shock capturing,” *Journal of Computational Physics*, vol. 444, p. 110 580, 2021. DOI: [10.1016/j.jcp.2021.110580](https://doi.org/10.1016/j.jcp.2021.110580).
- [18] W. Laskowski, A. M. **Rueda-Ramírez**, G. Rubio, E. Valero, and E. Ferrer, “Advantages of static condensation in implicit compressible Navier–Stokes DGSEM solvers,” *Computers & Fluids*, vol. 209, p. 104 646, 2020. DOI: [10.1016/j.compfluid.2020.104646](https://doi.org/10.1016/j.compfluid.2020.104646).
- [19] A. M. **Rueda-Ramírez**, J. Manzanero, E. Ferrer, G. Rubio, and E. Valero, “A p-multigrid strategy with anisotropic p-adaptation based on truncation errors for high-order discontinuous Galerkin methods,” *Journal of Computational Physics*, vol. 378, pp. 209–233, 2019. DOI: [10.1016/j.jcp.2018.11.009](https://doi.org/10.1016/j.jcp.2018.11.009).
- [20] A. M. **Rueda-Ramírez**, G. Rubio, E. Ferrer, and E. Valero, “Truncation error estimation in the p-anisotropic discontinuous Galerkin spectral element method,” *Journal of Scientific Computing*, vol. 78, no. 1, pp. 433–466, 2019. DOI: [10.1007/s10915-018-0772-0](https://doi.org/10.1007/s10915-018-0772-0).
- [21] J. Manzanero, A. M. **Rueda-Ramírez**, G. Rubio, and E. Ferrer, “The Bassi Rebay 1 scheme is a special case of the symmetric interior penalty formulation for discontinuous Galerkin discretisations with Gauss–Lobatto points,” *Journal of Computational Physics*, vol. 363, pp. 1–10, 2018. DOI: [10.1016/j.jcp.2018.02.035](https://doi.org/10.1016/j.jcp.2018.02.035).
- [22] J. P. Corredor-Gómez, A. M. **Rueda-Ramírez**, M. A. Gamboa-Márquez, C. Torres-Rodríguez, and C. J. Cortés-Rodríguez, “An intramembranous ossification model for the in silico analysis of bone tissue formation in tooth extraction sites,” *Journal of Theoretical Biology*, vol. 401, pp. 64–77, 2016. DOI: [10.1016/j.jtbi.2016.04.023](https://doi.org/10.1016/j.jtbi.2016.04.023).

CONFERENCE PROCEEDINGS

- [1] A. M. **Rueda-Ramírez** and G. J. Gassner, “A subcell finite volume positivity-preserving limiter for DGSEM discretizations of the Euler equations,” in *Proceedings of WCCM-ECCOMAS2020 Conference*, 2021. doi: [10.23967/wccm-eccomas.2020.038](https://doi.org/10.23967/wccm-eccomas.2020.038).

- [2] E. Ferrer, J. Manzanero, A. M. **Rueda-Ramírez**, G. Rubio, and E. Valero, “Implicit large eddy simulations for NACA0012 airfoils using compressible and incompressible discontinuous Galerkin solvers,” in *Selected Papers from the Spectral and High Order Methods for Partial Differential Equations Conference (ICOSAHOM 2018)*, London, UK, July 9-13, 2018, Springer International Publishing, 2020, p. 477. doi: [10.1007/978-3-030-39647-3_38](https://doi.org/10.1007/978-3-030-39647-3_38).

- [3] A. M. **Rueda-Ramírez**, G. Rubio, E. Ferrer, and E. Valero, “An anisotropic p-adaptation multigrid scheme for discontinuous Galerkin methods,” in *Selected Papers from the Spectral and High Order Methods for Partial Differential Equations Conference (ICOSAHOM 2018)*, London, UK, July 9-13, 2018, Springer International Publishing, 2020, pp. 549–560. doi: [10.1007/978-3-030-39647-3_44](https://doi.org/10.1007/978-3-030-39647-3_44).

Talks and Conference Contributions

SUMMARY

- 7 invited contributions.
- 18 conference talks, including 1 semi-plenary talk and 1 plenary talk.

INVITED CONTRIBUTIONS

1. Andrés M. **Rueda-Ramírez**. Adaptive High-Order Simulations with Discontinuous Galerkin Methods in Julia using Trixi.jl. Finite Element Methods Seminar at the Universidad Nacional de Colombia. Bogotá, Colombia. June 19, 2025.
2. Andrés M. **Rueda-Ramírez**. Shock Capturing and Subcell Limiting for High-Order Discontinuous Galerkin Methods. Seminar series of the Priority Research Program “Complexity, Scales, Randomness” (CoScaRa), Universität Stuttgart. Stuttgart, Germany (online). June 17, 2025.
3. Andrés M. **Rueda-Ramírez**. Introduction to Mathematical Modeling and Methods. Lecture series “The World in the Computer” (“Die Welt im Computer”) of the University of Cologne. Cologne, Germany. October 8, 2024.
4. Andrés M. **Rueda-Ramírez**, Aleksey Sikstel, Gregor J. Gassner. A Robust Entropy-Stable Discontinuous Galerkin Scheme for the Multi-Ion MHD System. Lunch Seminar of the Department of Computational and Applied Mathematics, RWTH Aachen University. Aachen, Germany. April 16, 2024.
5. Andrés M. **Rueda-Ramírez**, Aleksey Sikstel, Gregor J. Gassner. A Robust Entropy-Stable Discontinuous Galerkin Scheme for the Multi-Ion MHD System. Department of Mathematics, University of Bordeaux. Bordeaux, France. January 24, 2024.
6. Andrés M. **Rueda-Ramírez**, Florian J. Hindenlang, Jesse Chan, Gregor J. Gassner. Entropy-Stable Gauss Collocation Discontinuous Galerkin Methods for the Euler and MHD Equations. DG Seminar of the Research Group Numerical Methods in Fluid Mechanics, Institute of Aerodynamics and Gas Dynamics, Universität Stuttgart. Stuttgart, Germany (online). March 15, 2023.
7. Andrés M. **Rueda-Ramírez**, Will Pazner, Florian J. Hindenlang, Andrew Winters, Alexander Astanin, Gregor J. Gassner. Bounds-Preserving Discontinuous Galerkin Methods and Adaptivity. Department of Applied Mathematics for Aerospace Engineering. Madrid, Spain. June 22, 2022.

CONFERENCE CONTRIBUTIONS

I presented the following talks at international conferences:

Plenary/Semi-Plenary Talks:

1. **Plenary:** Andrés M. Rueda-Ramírez. Recent Advances in Subcell Limiting for Spectral Element Solvers (Shock Capturing, Bounds Preservation, Well Balancing). [Trixi User and Developer Interaction \(TRUDI\) 2026](#). Cologne, Germany. March 16–20, 2026.
2. **Semi-plenary at minisymposium:** Andrés M. **Rueda-Ramírez**, Will Pazner, Gregor J. Gassner. A Unified Framework to Construct Robust High-Order Discontinuous Galerkin Schemes. The 8th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS Congress 2022). Oslo, Norway. June 5–9, 2022.

Other Contributions:

1. Tristan Montoya, Andrés M. **Rueda-Ramírez**, Gregor J. Gassner. Entropy-stable discontinuous Galerkin spectral-element methods for the spherical shallow water equations in flux form. Modeling and Simu-

- lation of Transport Phenomena (MosT workshop) 2025. Organizing Institution: Technische Universität Dortmund. Moselle Valley, Germany. July 27 - 31, 2025.
2. Andrés M. **Rueda-Ramírez**, Aleksey Sikstel, Gregor J. Gassner. A Robust Entropy-Stable Discontinuous Galerkin Scheme for the Multi-Ion MHD System. SIAM Conference on Computational Science and Engineering (CSE25). Organizer: Society of Industrial and Applied Mathematics. Fort Worth. March 7, 2025. Fort Worth. March 7, 2025.
 3. Andrés M. **Rueda-Ramírez**, Aleksey Sikstel, Gregor J. Gassner. Entropy-Stable Discontinuous Galerkin Discretizations for the Multi-Ion MHD System. High-Order Nonlinear numerical Methods for evolutionary PDEs: theory and applications (HONOM2024). KAM Conference Center. Chania, Crete Island, Greece. 8-13 September 2024.
 4. Andrés M. **Rueda-Ramírez**, Benjamin Bolm, Dmitri Kuzmin, Gregor J. Gassner. Monolithic Convex Limiting for Legendre-Gauss-Lobatto Discontinuous Galerkin Spectral Element Methods. ALGORITHMY Conference on Scientific Computing. High Tatra Mountains, Slovakia. April 15–20, 2024.
 5. Andrés M. **Rueda-Ramírez**, Florian J. Hindenlang, Jesse Chan, Gregor J. Gassner. Entropy-Stable Gauss Collocation Discontinuous Galerkin Methods for the Euler and MHD Equations: High-Order Discretization and Subcell Limiting Strategies. Sharing High-order Advanced Research Know-how on Finite Volume (SHARK-FV). Minho, Portugal. May 23, 2023.
 6. Andrés M. **Rueda-Ramírez**, Jesse Chan, Florian J. Hindenlang, Gregor J. Gassner. Entropy-Stable Gauss Collocation Methods for Magneto-Hydrodynamics. 22nd Computational Fluids Conference - CFC 2023. Cannes, France. April 25–28, 2023.
 7. Andrés M. **Rueda-Ramírez**, Gregor J. Gassner. Bounds-Preserving Discontinuous Galerkin Methods for Multi-Component MHD Flows. SIAM CSE 2023. Amsterdam, Netherlands. February 26 – March 3, 2023.
 8. Andrés M. **Rueda-Ramírez**, Will Pazner, Gregor J. Gassner. Subcell Limiting Strategies for Discontinuous Galerkin Spectral Element Methods: Applications for Multi-Species Flows. MultiMat 2022. Zurich, Switzerland. August 22–26, 2022.
 9. Andrés M. **Rueda-Ramírez**, Will Pazner, Gregor J. Gassner. Subcell Limiting Strategies for Discontinuous Galerkin Spectral Element Methods. VIII European Workshop on High Order Numerical Methods for Evolutionary PDEs (HONOM 2022): Theory and Applications. Braga, Portugal. April 4–8, 2022.
 10. Andrés M. **Rueda-Ramírez**, Sebastian Hennemann, Florian J. Hindenlang, Andrew R. Winters, Gregor J. Gassner. An Entropy-Stable Discontinuous Galerkin Scheme for Compressible Magneto-hydrodynamics with Subcell Finite Volume Shock Capturing. 16th U.S. National Congress on Computational Mechanics (USNCCM). Chicago, IL (online). July 25–29, 2021.
 11. Andrés M. **Rueda-Ramírez**, Sebastian Hennemann, Florian J. Hindenlang, Andrew R. Winters, Gregor J. Gassner. A Subcell Finite Volume Shock-Capturing Method for h-Adaptive Discontinuous Galerkin Discretizations of the Compressible Magneto-hydrodynamics Equations. ICOSAHOM 2020/21, International Conference on Spectral and High Order Methods. Vienna, Austria. July 12–16, 2021.
 12. Sebastian Hennemann, Andrés M. **Rueda-Ramírez**, Florian J. Hindenlang, Gregor J. Gassner. A Provably Entropy Stable Subcell Shock Capturing Approach for High Order Split Form DG for the Compressible Euler Equations. 14th World Congress on Computational Mechanics (WCCM) ECCOMAS Congress 2020. Paris, France (online). July 19–24, 2020.
 13. Andrés M. **Rueda-Ramírez**, David A. Kopriva, Esteban Ferrer, Gonzalo Rubio, Eusebio Valero. A Time-Implicit Static Condensation Scheme for High-Order Discontinuous Galerkin Spectral Element Methods with Gauss-Lobatto Points. North American High-Order Methods Conference (NAHOMcon 2019). San Diego, USA. June 2–5, 2019.
 14. Andrés M. **Rueda-Ramírez**, David A. Kopriva, Esteban Ferrer, Gonzalo Rubio, Eusebio Valero. A Static Condensation Algorithm for Time-Implicit Discretizations of Gauss-Lobatto Discontinuous Galerkin Spec-

tral Element Methods. VII European Workshop on High Order Numerical Methods for Evolutionary PDEs (HONOM 2019): Theory and Applications. Madrid, Spain. April 1–5, 2019.

15. Andrés M. **Rueda-Ramírez**, Gonzalo Rubio, Esteban Ferrer, Eusebio Valero. An Approach to Unsteady p-Adaptation Based on Truncation Error Estimations for High-Order Discontinuous Galerkin Methods. VII European Workshop on High Order Numerical Methods for Evolutionary PDEs (HONOM 2019): Theory and Applications. Madrid, Spain. April 1–5, 2019.
16. Andrés M. **Rueda-Ramírez**, Gonzalo Rubio, Esteban Ferrer, Eusebio Valero. An Anisotropic p-Adaptation Multigrid Scheme for the Discontinuous Galerkin Spectral Element Method. International Conference on Spectral and High-Order Methods (ICOSAHOM 2018). London, UK. July 9–13, 2018.
17. Andrés M. **Rueda-Ramírez**, Gonzalo Rubio, Esteban Ferrer, Eusebio Valero. Error Estimation and Mesh Adaptation Algorithms in p-Multigrid Discontinuous Galerkin Methods. International Conference on Evolutionary and Deterministic Methods for Design Optimization and Control with Applications to Industrial and Societal Problems (EUROGEN 2017). Madrid, Spain. September 13–15, 2017.

Teaching

LIST OF COURSES TAUGHT

- Courses for which I served as the main lecturer:

Semester	Institution/ Program	Type/ Title	Hours
Fall 2025	Universidad Politécnica de Madrid B.Sc. Aerospace Engineering	Lecture “Calculus 1” Topics: Differential and integral calculus Language: Spanish	120h
Summer 2024	RWTH Aachen B.Sc. Computational Engineering Science	Lecture “Mathematical Fundamentals II: Numerical Part” Topics: Eigenvalues and eigenvectors, least squares, systems of nonlinear equations, polynomial interpolation, condition numbers, linear solvers, numerical integration. Language: German	45h
Summer 2024	RWTH Aachen B.Sc. Computational Engineering Science	Lecture “Mathematical Fundamentals IV: Numerical Part” Topics: Fourier transform, FFT, finite difference methods, iterative solvers. Language: German	30h
Summer 2024	RWTH Aachen B.Sc. Mathematics	Seminar Bachelor-Seminar in Applied and Computational Mathematics Topics: Various research topics of the Applied and Computational Mathematics group. Language: German	10h
Summer 2024	RWTH Aachen M.Sc. Computational Engineering Science	Seminar Computational Engineering Science Master Seminar Topics: Various research topics of the Applied and Computational Mathematics group. Language: German	10h
Summer 2024	RWTH Aachen M.Sc./Ph.D. Computational Engineering Science + M.Sc./Ph.D. Mathematics	Seminar Research-Seminar in Computational Science and Engineering Topics: Various research topics of the Applied and Computational Mathematics group. Language: English	10h

Semester	Institution/ Program	Type/ Title	Hours
Summer 2023	University of Cologne (UoC) All STEM programs of the university	Lecture ³ “Introduction to Climate Modeling” New course at UoC in which students learn to develop a simple 2D climate-modeling software from scratch. Topics: physical models, numerical methods for ordinary and partial differential equations. Online Material Language: English	30h

- Courses for which I served as teaching assistant/tutor:

Semester	Institution/ Program	Type/ Title	Hours
Winter 2023/2024	University of Cologne B.Sc. Mathematics	Lecture “Computational Fluid Mechanics” (Main lecturer: Prof. Gregor Gassner). Topics: conservation laws, FV methods, Riemann problems, compressible Euler equations. Language: German	30h
Summer 2022	University of Cologne B.Sc. Mathematics	Lecture “Numerical Mathematics” (Main lecturer: Prof. Gregor Gassner). Topics: Eigenvalues and eigenvectors, least squares, systems of nonlinear equations, polynomial interpolation and numerical integration. Language: German	30h
Winter 2021–22	University of Cologne B.Sc. Mathematics	Lecture “Algorithmic Mathematics and Programming” (Main lecturer: Prof. Gregor Gassner). Topics: Floating-point arithmetic, sparse matrices, condition numbers, linear solvers, three-term recurrences. Language: German	30h
Summer 2021	University of Cologne B.Sc./M.Sc. Mathematics	Lecture “Scientific Computing 2” (Main lecturer: Prof. Gregor Gassner). Topics: Advanced <i>Discontinuous Galerkin</i> methods, e.g., nonconservative systems, <i>shock capturing</i> methods, curved meshes, physically relevant applications. Language: German	30h

³The course “Introduction to Climate Modeling” was given together with Prof. Dr. Gregor Gassner

Semester	Institution/ Program	Type/ Title	Hours
Summer 2020	University of Cologne B.Sc. Mathematics	Lecture “Computational Fluid Mechanics” (Main lecturer: Prof. Gregor Gassner). Topics: conservation laws, FV methods, Riemann problems, compressible Euler equations. Language: German	30h
Winter 2020–21	University of Cologne B.Sc./M.Sc. Mathematics	Lecture “Scientific Computing 1” (Main lecturer: Prof. Gregor Gassner). Topics: <i>Discontinuous Galerkin</i> methods for fluid dynamics, entropy stability, summation-by-parts operators, shallow-water equations. Language: German	30h
2018/2019	Polytechnic University of Madrid B.Sc. Aerospace Engineering	Lecture “Computer Science” (Main lecturer: Prof. Eusebio Valero). Multiple introductory computer science lectures for first-year aerospace engineering students. Language: Spanish	60h

SUPERVISION OF THESES

PH.D. THESES

2025 - today **Mr. Cian McDonnell**. Ph.D. in Aerospace Engineering. Universidad Politécnica de Madrid.. Co-Supervisor together with Prof. Eusebio Valero. Title: “Flow Stability Algorithms for Strongly Unsteady Configurations”.

BACHELOR AND MASTER THESES

As a postdoctoral researcher at the University of Cologne I co-supervised six bachelor’s and master’s theses as second reviewer. The primary review, as usual at the mathematical institute of the University of Cologne, was conducted by the chair holder Prof. Dr. Gregor Gassner. The list of supervised theses is as follows:

- 2024 Ricarda Jaworski (Master). “Auswirkungen des ozeanischen Wärmetransports auf die Oberflächentemperatur der Erde” (“Effect of the oceanic heat transfer on the surface temperature of Earth”). University of Cologne.
- 2023 Benjamin Bolm (Master). “Subcell shock capturing methods for discontinuous Galerkin methods in Julia”. University of Cologne.
- 2023 Thomas Bek (Bachelor). “Analyse der Auswirkung eines lokal konstanten und variablen Kohlenstoffdioxidgehalts auf die mittlere Erdtemperatur anhand des Projekts ‘Klimakoffer’ ” (“Analysis of the effect of locally constant and variable carbon dioxide content on the mean temperature of Earth using the ‘Klimakoffer’ project”). University of Cologne.
- 2022 Nico Rolle (Master). “Assessment of adaptive error-based high-order Runge-Kutta methods for Euler and magneto-hydrodynamics Simulations with the discontinuous Galerkin method”. University of Cologne.

- 2022 Xenia Ibach (Bachelor). “Auswirkung der Saisonalität von Meereis auf das zweidimensionale Energiebilanzmodell” (“Effect of the seasonality of sea ice on the two-dimensional energy balance model (of Earth)”). University of Cologne.
- 2021 Fabian Daniel (Master). “Assessment of the robustness of sparse Invariant Domain Preserving (IDP) schemes for high-order Discontinuous Galerkin Spectral Element Methods (DGSEM) for the compressible Euler equations”. University of Cologne.