

Publications of Dr. Andrea Lani 2014-2005

Contributions to books

1. **A. Lani**, B. Sjogreen, H. C. Yee, W. D. Henshaw, “*Variable high-order overset grid methods for mixed steady and unsteady multiscale viscous hypersonic nonequilibrium flows*”, CTR annual brief, Centre for Turbulence Research, Stanford, CA, 2011.
2. **A. Lani**, B. Sjogreen, H.C. Yee, “*High order simulation of hypersonic nonequilibrium flows on overset grids*”, CTR annual brief, Centre for Turbulence Research, Stanford (CA), 2010.
3. **A. Lani**, B. Sjogreen, H.C. Yee and W.D. Henshaw, “*Hypersonic flow past a CEV-like capsule on multiblock overlapping grids*”, CTR annual brief, Centre for Turbulence Research, Stanford (CA), 2010.
4. F. Pinna, K. Bensassi, P. Rambaud, O. Chazot, **A. Lani** and O. Marxen, “*Development of an integrated methodology for the post-flight analysis of the transition payload on the EXPERT mission*”, CTR Proceedings of the Summer Program, 2010.
5. **A. Lani** and T. Quintino, “*Design techniques for high performance multi-physics simulations*”, VKI Lecture Series on High performance computing of industrial flows, May 2009, VKI, Rhode Saint Genese, Belgium.

Archival journals

1. J. Garicano Mena, R. Pepe, **A. Lani**, H. Deconinck, “*Assessment of Heat Flux Prediction Capabilities of Residual Distribution Method: Application to Atmospheric Entry Problems*”, under review in Commun. Comput. Phys.
2. **A. Lani**, M. S. Yalim and Stefaan Poedts, “*A GPU-enabled Finite Volume solver for global magnetospheric simulations on unstructured grids*”, Computer Physics Communication, 185(10), pp. 2538–2557, 2014, WOS:000340340200018, IF 2.407 (2013).
3. A. Munafo, **A. Lani**, A. Bultel, M. Panesi, “*Modeling of Non-Equilibrium Phenomena in Expanding Flows by means of a Collisional-Radiative Model*”, Physics of Plasma, 20(7), 2013, WOS:000340340200018, IF 2.249.
4. M. Panesi and **A. Lani**, “*Collisional radiative coarse-grain model for ionization in air*”, Physics of Fluids, 25, 057101, 2013, WOS:000320001200051, IF 2.040.
5. **A. Lani**, B. Sjogreen, H. C. Yee, W. D. Henshaw, “*Variable high-order multiblock overlapping grid methods for mixed steady and unsteady multiscale viscous flows, part II: hypersonic nonequilibrium flows*”, Commun. Comput. Phys., 13, pp. 583-602, 2013, WOS:000315984700013, IF. 1.775.
6. **A. Lani**, M. Panesi and H. Deconinck, “*Conservative Residual Distribution Method For Viscous Double Cone Flows In Thermochemical Nonequilibrium*”, Commun. Comput. Phys., 13, pp. 479-501, 2013, WOS:000315984700008, IF 1.775.
7. D. Knight, J. Longo, D. Drikakis, D. Gaitonde, **A. Lani** et al., “*Assessment of CFD Capability for Prediction of Hypersonic Shock Interactions*”, Prog. Aerosp. Sci., Vol. 48-49, pp. 8–26, 2012, WOS:000315984700013, IF 2.396.
8. M. S. Yalim, D. Vanden Abeele, **A. Lani**, T. Quintino, H. Deconinck, “*An implicit time integration method for solving the equations of ideal magnetohydrodynamics in the hyperbolic divergence cleaning approach*”, J. Comput. Phys., Vol. 230, Issue 15, July, 2011, WOS:000291901000018, IF 2.310.

9. G. Degrez, **A. Lani**, M. Panesi, O. Chazot and H. Deconinck, “*Modelling of high-enthalpy, high-Mach number flows*”, J. Phys. D: App. Phys. 41, 2009, WOS:000269993100006, IF 2.083.
10. **A. Lani**, T. Quintino, D. Kimpe, H. Deconinck, S. Vandewalle and S. Poedts, “*Reusable Object-Oriented Solutions for Numerical Simulation of PDEs in a High Performance Environment*”, Scientific Programming. ISSN 1058-9244, Vol. 14, N. 2, pp. 111-139, IOS Press, 2006.

Conference proceedings

1. A. Alvarez Laguna, **A. Lani**, N. N. Mansour, A. Kosovichev, S. Poedts, “*A two-fluid computational model to study reconnection in reactive plasmas under chromospheric conditions*”, WCCM XI, ECCM V, ECFD VI, 2014.
2. J. Garicano Mena, **A. Lani**, H. Deconinck, G. Degrez, “*Residual distribution schemes for the computation of hypersonic flows with strong bow shock waves: enforcing total enthalpy conservation*”, WCCM XI, ECCM V, ECFD VI, 2014.
3. R. Pepe, A. Bonfiglioli, R. Paciorri, **A. Lani**, J. Garicano Mena and C. F. Olliver-Gooch, “*Towards a modular approach for unstructured shock-fitting*”, WCCM XI, ECCM V, ECFD VI, 2014.
4. J. Garicano Mena, R. Pepe, **A. Lani**, H. Deconinck, “*Assessment of Residual Distribution Method Heat Flux Prediction Capabilities: Application to Atmospheric Entry Problems*”, 52nd Aerospace Sciences Meeting, AIAA 2014-1391, National Harbor, Maryland, 2014.
5. W. Zhang, **A. Lani**, H. B. Chew, M. Panesi, “*Modeling of Non-equilibrium Plasmas in an Inductively Coupled Plasma Facility*”, 45th Plasmadynamics and Laser Conference, AIAA 2014-2235, Atlanta (GA), 2014.
6. **A. Lani**, N. Villedieu, K. Bensassi, L. Kapa, M. Panesi, M. S. Yalim , “*COOLFluiD: an open computational platform for multi-physics simulation*”, 21st AIAA CFD Conference, AIAA 2013-2589, San Diego, June 2013.
7. **A. Lani**, P. Duarte Santos, A. Sanna, “*An efficient Monte Carlo method for radiation transport in aerothermo-dynamic simulations*”, 44th AIAA Thermophysics Conference, AIAA 2013-2893, San Diego, June 2013.
8. K. Bensassi, **A. Lani**, H. Deconinck, O. Chazot, P. Rambaud, “*Numerical exploration of transient flow phenomena in hypersonic gun tunnel*”, AIAA-2013-2694, 21st AIAA CFD Conference, San Diego, CA, 2013.
9. **A. Lani**, A. Sanna, N. Villedieu, M. Panesi, “*COOLFluiD: an open computational platform for aerothermo-dynamics and flow-radiation coupling*”, Radiation of High Temperature Gas, Barcelona, 2012.
10. K. Bensassi, **A. Lani**, O. Chazot, P. Rambaud, “*Arbitrary Lagrangian Eulerian Simulation of a Moving Piston in Hypersonic Ground Test Facility*”, AIAA-2012-3265, 43rd AIAA Thermophysics Conference, New Orleans, Louisiana, June 25-28, 2012.
11. K. Bensassi, **A. Lani**, P. Rambaud, “*Numerical Investigation of Local Correlation-Based Transition Model in Hypersonic Flows*”, AIAA-2012-3151, 43rd AIAA Thermophysics Conf., New Orleans, June 25-28, 2012.
12. **A. Lani**, J. Garicano Mena and H. Deconinck, “*A Residual Distribution Method for Symmetrized Systems*

in Thermochemical Nonequilibrium”, AIAA-2011-3546, 20th AIAA CFD Conference, Hawaii, 2011.

13. **A. Lani**, B. Sjogreen, H. C. Yee, W. D. Henshaw, “*Variable high-order multiblock overlapping grid methods for mixed steady and unsteady multiscale viscous flows, part II: hypersonic nonequilibrium flows*”, AIAA 2011-3140, 42nd AIAA Thermophysics Conference, Honolulu, Hawaii, 2011.
14. K. Bensassi, **A. Lani**, O. Chazot, P. Rambaud, “Assessment and Validation of the Rebuilding process of Test conditions in VKI-Longshot Hypersonic facility”, AIAA 2011-3886, 2011.
15. K. Bensassi, **A. Lani**, A. Lico, P. Rambaud, O. Chazot, “*Unsteady Simulation of Hypersonic Flow over a Heat Probe in Ground Test Conditions*”, 7th ESA Symposium on Aerothermodynamics for Space Vehicles, 2011.
16. J. Garicano Mena, **A. Lani**, K. Sermeus, H. Deconinck, “*An Effective Treatment of Numerical Shock Wave Instabilities with Residual Distribution Schemes: Application to Hypersonic Nonequilibrium Flows around Blunt Bodies*”, 7th ESA Symposium on Aerothermodynamics for Space Vehicles, Brugge, Belgium, 2011.
17. J. Garicano Mena, **A. Lani**, G. Degrez, H. Deconinck, “*A Symmetrizing variable formulation for Hypersonic Thermo-chemical Non-equilibrium Flows with application to Residual Distribution schemes*”, 5th ECCOMAS CFD 2010, Lisbon, Portugal, June 14-17, 2010.
18. A. Munafò, M. Panesi, R. Jaffe, **A. Lani**, T. Magin, “*Vibrational State to State Kinetics in Expanding and Compressing Nitrogen Flows*”, AIAA-2010-4335, Chicago, Illinois, 28/6-1/7, 2010.
19. K. Bensassi, **A. Lani**, P. Rambaud and O. Chazot, “*Numerical Simulation of Hypersonic Flow in VKI-Longshot Contoured Nozzle.*”, AIAA-2010-4857, 40th Fluid Dynamics Conf., Chicago, 28/6-1/7, 2010.
20. M. Panesi, **A. Lani** and O. Chazot, “*Reduced Kinetic Mechanism for CFD Applications*”, AIAA-2009-3920, 41st AIAA Thermophysics Conference, San Antonio, Texas, 22/6-25/6, 2009.
21. **A. Lani** and H. Deconinck, “*Conservative Residual Distribution Method For Hypersonic Flows In Thermochemical Nonequilibrium*”, AIAA-2009-460, Orlando, 2009.
22. **A. Lani** and H. Deconinck, “*A Residual Distribution Method For Hypersonic Flows In Thermo-Chemical Non-Equilibrium*”, 6th ESA Symposium on Aerothermodynamics for Space Vehicles, France, 2008.
23. M. Panesi, **A. Lani**, T. Magin, F. Pinna, O. Chazot and H. Deconinck, “*Numerical investigation of the non equilibrium shock-layer around the EXPERT vehicle*”, AIAA Paper 2007-4317, Miami (FL), 2007.
24. M. Panesi, **A. Lani**, P. Rambaud, D. Kimpe, T. Quintino, H. Deconinck and O. Chazot, “*Simulation of thermal non equilibrium effects on the EXPERT vehicle*”, Proc. 2nd EUCASS, VKI, 2007.
25. **A. Lani**, J. Molnar, D.V. Abeele, P. Rini, T. Magin, G. Degrez, “*Numerical study of elemental demixing in atmospheric entry flow regimes near local thermodynamic equilibrium*”, ECOOMAS, The Netherlands, 2006.
26. **A. Lani** and H. Deconinck, “*Typesafe and Size-Deducing Fast Expression Templates for Small Arrays*”, POOSC'06 Workshop Notes, ECOOP 06, Nantes (France), VKI ed., 2006.
27. D. Kimpe, **A. Lani**, T. Quintino, S. Vandewalle, S. Poedts, H. Deconinck, “*A Study of Real World I/O Performance in Parallel Scientific Computing*”, Proc. PARA 2006, pp. 871-881, 2006, WOS:000250904900104.

28. R. Hontzatko, D. Vanden Abeele, **A. Lani**, M. Panesi, T. Quintino, H. Deconinck, "*A convenient working assumption for the development of numerical models of high-pressure Inductively Coupled Plasma flows*", Proc. of the Czech–Japanese Seminar in Applied Math., University in Prague, Sept. 14-17, pp. 72-80, 2006.
29. M. Yalim, D. V. Abeele and **A. Lani**, "*Simulation of field-aligned ideal MHD flows around perfectly conducting cylinders using an artificial compressibility approach*", Proc. of the 11th International Conf. on Hyperbolic Problems, ISBN 978-3-540-75711-5, pp.1085-92, Lyon (France), Springer-Verlag, 2006, WOS:000254106200116.
30. **A. Lani**, T. Quintino, D. Kimpe, H. Deconinck and S. Vandewalle, "*COOLFluiD: a high-performance multi-layer architecture for solving PDE*", ECOOP 05 (POOSC workshop), Glasgow (UK), VKI ed., 2005.
31. D. Kimpe, **A. Lani**, T. Quintino, S. Poedts and S. Vandewalle, "*The COOLFluiD Parallel Architecture*", Proc. 12th European Parallel Virtual Machine and Message Passing Interface Conference", ISSN 0302-9743, pp. 520-527, Sorrento (Italy), Springer, 2005, WOS:000233236700066.
32. T. Quintino and **A. Lani**, "*Method-Command-Strategy Pattern: A Multi-Component Solution for High-Performance Scientific Computing*", ECOOP 05 (POOSC workshop), Glasgow (UK), VKI ed., 2005.
33. **A. Lani**, T. Quintino, D. Kimpe, H. Deconinck, "*The COOLFluiD Framework - Design Solutions for High-Performance Object Oriented Scientific Computing Software*", ICCS 2005, Atlanta (GA), LNCS 3514, Vol.1, pp. 281-286, Springer-Verlag, 2005, WOS:000250904900104.

Thesis/Dissertations

1. A. Lani, "*An Object Oriented and High Performance Platform for Aerothermodynamics*", PhD thesis, Von Karman Institute / Université Libre de Bruxelles, Belgium, 2008 (Supervisor: Prof. Herman Deconinck).
2. A. Lani, "*Development of an Object Oriented Framework for PDE Solvers on Unstructured Grids*", DEA thesis, Université Libre de Bruxelles, Belgium, September 2003 (Supervisor: Prof. Herman Deconinck).
3. A. Lani, "*Numerical simulation of vibrational relaxation in hypersonic flows*", Master Thesis, Politecnico di Torino, Italy, December 2000 (Supervisor: Prof. Maurizio Pandolfi).