

Laurent Monasse
CERMICS – ENPC
6 et 8 avenue Blaise Pascal
Cité Descartes – Champs-sur-Marne
77455 Marne-la-Vallée

Born 05/22/1983
French nationality
Married, 1 child

Tel. : +33 1 64 15 35 08
email : laurent.monasse@enpc.fr
Web page :
<http://cermics.enpc.fr/~monassel>

Work experience

2012–present	Full-time researcher CERMICS, Ecole des Ponts ParisTech
2011–2012 (11 months)	Postdoc Farhat Research Group, Stanford University, California Subject : <i>A priori and a posteriori error analysis in reduced order models</i>
2008–2011	PhD in applied mathematics CERMICS, CEA and LIMSI Advisors: <i>Serge Piperno (ENPC), Virginie Daru (LIMSI) Christian Mariotti (CEA)</i> Subject: <i>Analysis of a Discrete Element method for structure dynamics and coupling with a compressible fluid flow method</i>
2007–2008 (11 months)	Research internship CEA Subject : <i>Analysis of a Discrete Element Method for structure dynamics</i>

Education

2006–2007	Engineer degree of the Ecole Nationale des Ponts et Chaussées
2006–2007	MS in Numerical Analysis and scientific computing with high honors University Paris VI
2003–2006	Ecole Polytechnique <i>Major in Mathematics</i>
2001–2003	Preparatory classes for entrance to the French Grandes Ecoles Centre International de Valbonne (Sophia Antipolis)
2001	French Baccalauréat with international option <i>with high honors</i>

Language skills

- French: native
- English: fluent
- German: working knowledge
- Chinese: notions

Informatic skills

Java, C++, Maple, Scilab, L^AT_EX, Python, MPI, OpenMP

Research themes

- Discrete Element method
- Fluid-structure interaction
- Numerical schemes for hyperbolic systems
- Application of Riemannian geometry in structural mechanics
- Geometrical shock dynamics

Books

1. C. Mariotti and L. Monasse, From general mechanics to discontinuity - Unified approach to elasticity, Presses des Ponts, 2011, ISBN 978-2-85978-460-7.

Publications in international peer-reviewed journals

1. H. Nassar, A. Lebéé, L. Monasse, *Curvature, metric and parametrization of origami tessellations: Theory and application to the eggbox pattern*, Proceedings of the Royal Society A 473(2197) (2017), doi:10.1098/rspa.2016.0705
2. T. Jourdan, G. Stoltz, F. Legoll, L. Monasse, *An accurate scheme to solve cluster dynamics equations using a Fokker-Planck approach*, Computer Physics Communications 207 (2016), pp. 170–178.
3. Y. Masson, L. Monasse, *Existence of global Chebyshev nets on surfaces of absolute Gaussian curvature less than 2π* , Journal of Geometry 108(1) (2017), pp. 25–32, doi:10.1007/s00022-016-0319-1.
4. M. A. Puscas, L. Monasse, A. Ern, C. Tenaud, C. Mariotti, *A conservative embedded boundary method for an inviscid compressible flow coupled with a fragmenting structure*, International Journal for Numerical methods in Engineering 103(13) (2015), pp. 970–995.
5. M. A. Puscas, L. Monasse, A. Ern, C. Tenaud, C. Mariotti, V. Daru, *A time semi-implicit scheme for the energy-balanced coupling of a shocked fluid flow with a deformable structure*, Journal of Computational Physics 296 (2015), pp.241–262.
6. M. A. Puscas, L. Monasse, *A three-dimensional conservative coupling method between an inviscid compressible flow and a moving rigid solid body*, accepté, SIAM Journal on Scientific Computing (2015).
7. L. Monasse, R. Monneau, *Gradient entropy estimate and convergence of a semi-explicit scheme for diagonal hyperbolic systems*, SIAM Journal on Numerical Analysis 52:6 (2014), pp.2792–2814.
8. L. Monasse, V. Daru, C. Mariotti, S. Piperno, C. Tenaud, *A conservative coupling algorithm between a compressible flow and a rigid body using an Embedded Boundary method*, Journal of Computational Physics 231 (2012), pp.2977–2994.
9. L. Monasse, C. Mariotti, *An energy-preserving Discrete Element Method for elastodynamics*, ESAIM: Mathematical Modelling and Numerical Analysis 46 (2012), pp.1527–1553.

Submitted articles

1. J. Ridoux, F. Coulouvrat, N. Lardjane, L. Monasse, *Comparison of Geometrical Shock Dynamics and Kinematic models for shock wave propagation.*

In preparation

1. T. Goudon, L. Monasse, *Fokker-Planck approach of Ostwald ripening: simulation of a modified Lifschitz-Slyozov-Wagner system with a diffusive correction.*
2. Y. Masson, A. Ern, L. Hauswirth, L. Monasse, *Construction of Chebyshev nets with singularities.*

Oral presentations (conferences)

- ECCOMAS 2016 (Crete, Greece, June 2016)
- International symposium on modeling, adaptive discretizations and fluid-structure interaction (Linz, Austria, January 2016)
- International workshop on numerical methods and applications in fluid-structure interactions (Grenoble, France, November 2014)
- EUROMECH Colloquium on Immersed Boundary methods (Leyden, Netherlands, June 2013)
- SMAI 2011 (Guidel, France, May 2011)
- WCCM 2010 (Sydney, Australia, July 2010)
- CANUM 2010 (Carcans-Maubuisson, France, June 2010)
- ECCM 2010 (Paris, France, May 2010)
- USNCCM10, (Columbus, Ohio, USA, July 2009)
- Academy Colloquium on Immersed Boundary Methods : Current Status and Future Research Directions (Amsterdam, Netherlands, June 2009)
- SMAI 2009 (La Colle-sur-Loup, France, May 2009)
- WCCM8 – ECCOMAS 2008 (Venise, Italy, July 2008)

Organization of minisymposia

- “Fluid-structure interaction and fictitious domain methods”, with Sébastien Boyaval and Miguel A. Fernández, SMAI 2013 (Seignosse, France, May 2013)

Seminar presentations

- Sixth Montreal Problem solving workshop, CRM, Université de Montréal (August 2015)
- Farhat Research Group, Stanford University (February 2012)

Industrial contracts

2011–2019

CEA/DAM contract *Fluid-structure interaction, Discrete Elements, front tracking*

Software development

- Mka3d (with C. Mariotti, CEA/DAM), Discrete Elements for elasticity, academic version on <http://cermics.enpc.fr/~monassel/Mka3D/>
- CELIA3d (with M. A. Puscas), interaction of a compressible fluid with a deformable, possibly fracturing structure using immersed boundaries, <http://cermics.enpc.fr/~monassel/CELIA3D>

Participation in PhD supervision

2016–2019	Frédéric Marazzato “ <i>Modeling of fracture and fragmentation using a discrete element approach</i> ” (PhD advisors: Alexandre Ern and Karam Sab)
2015–2017	Julien Ridoux “ <i>Fast simulation of blast wave propagation</i> ” (PhD advisors: François Coulouvrat and Nicolas Lardjane)
2013–2017	Yannick Masson “ <i>Form-finding for elastically deformed structures and application to gridshells</i> ” (PhD advisors: Alexandre Ern and Olivier Baverel) <i>PhD thesis defended on June 9th, 2017</i>
2011–2014	Maria Adela Puscas “ <i>Conservative coupling method between an inviscid compressible fluid and a three-dimensional deformable structure with possible fragmentation</i> ” (PhD advisors: Alexandre Ern et Christian Tenaud) <i>PhD thesis defended on October 9th, 2014</i>

Participation in postdoc supervision

2015–2016	Hussein Nassar “ <i>(Meta) surfaces accessible to periodic folds</i> ” (with Arthur Lebé)
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Teaching

2016–2017	B.S. course on dynamics and stability of structures ENPC <i>15h/year + project for first year students: dynamical systems theory, numerical integration, bifurcations</i>
2015–2017	B.S. course on analysis and scientific computing ENPC <i>30h/year for first year students: Banach and Hilbert spaces, Lebesgue integral, distributions, solving the Poisson problem, Finite Elements, numerical integration of ODEs</i>
2013–2015	B.S. course on scientific computing ENPC <i>18h/year for first year students: optimization, Finite Elements, Finite Differences, hyperbolic equations of conservation laws</i>
2010, 2012–2015	B.S. course on analysis ENPC <i>26h/year for first-year students: Banach and Hilbert spaces, Lebesgue integral, distributions, solving the Poisson problem, Fourier transform</i>
2009	Internship supervision of first year students (3 months) ENPC <i>Students: Barnabé Croizat, Natacha Dufour et Anton Kitanov-Doutreleau</i> <i>Subject: Introduction to fluid-structure interaction</i>

Scientific animation - administrative tasks

2016–present	Co-animator of Axis 4, Labex MMCD
2015–present	Computing cluster manager in CERMICS
2013–2015	Library corresponding member of CERMICS
2009–2011	Co-organization of the scientific computation seminar of CERMICS

Extra-curricular activities

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- Long-distance running in competitions
 - Music (piano, choir singing)