

## Thématiques de recherches

Méthodes de frontières immergées  
Discrétisation implicite/explicite  
Méthodes Elements Finis stabilisés (VMS) / Schémas aux résidus distribués  
Formalisme ALE / Adaptation de maillage  
Schémas de Galerkin discontinus/enrichis multi-échelles  
Problèmes d'advection/diffusion, Navier-Stokes, problème de Darcy  
Interaction fluide-structure

## Publications

### Journaux

- 2021 **A weighted Shifted Boundary Method for free surface flow problems**, *Journal of Computational Physics*, O. Colomé, A. A. Main, L. Nouveau, G. Scovazzi, 424, p109837.  
[SBM-FS] <https://www.sciencedirect.com/science/article/pii/S0021999120306112>
- 2020 **A reduced-order shifted boundary method for parametrized incompressible Navier–Stokes equations**, *Computer Methods in Applied Mechanics and Engineering*, E.N. Karatzas, G. Stabile, L. Nouveau, G. Scovazzi, G. Rozza, 370, p113273.  
<https://arxiv.org/abs/1907.10549>
- 2019 **High-Order gradients with the Shifted Boundary Method : An embedded enriched mixed formulation for elliptic PDEs**, *Journal of Computational Physics*, L. Nouveau, M. Ricchiuto, G. Scovazzi, 398, p108898.  
[SBM-PE] <https://hal.inria.fr/hal-02269007>
- 2018 **A Reduced Basis approach for PDEs on parametrized geometries based on the Shifted Boundary Finite Element Method and application to fluid dynamics**, *Computer Methods in Applied Mechanics and Engineering*, E.N. Karatzas, G. Stabile, L. Nouveau, G. Scovazzi, G. Rozza, (<https://arxiv.org/abs/1807.07790>).
- 2018 **Dual-Scale Galerkin Methods for Darcy Flow**, *Journal of Computational Physics*, G. Wang, G. Scovazzi, L. Nouveau, C.E. Kees, S. Rossi, O. Colomes, A. Main, 354, p111–134(<http://www.sciencedirect.com/science/article/pii/S0021999117308148>).
- 2016 **An adaptive, residual based, splitting approach for the penalized Navier Stokes equations**, *Computer Methods in Applied Mechanics and Engineering*, L. Nouveau, H. Beaugendre, C. Dobrzynski, R. Abgrall, M. Ricchiuto, 303, p208–230.  
[IBM-RD] (<http://www.sciencedirect.com/science/article/pii/S0045782516300019>)
- 2016 **Residual Schemes Applied to an Embedded Method Expressed on Unstructured Adapted Grids**, *Acta Aerodynamica Sinica*, R. Abgrall, H. Alcin, C. Dobrzynski, H. Beaugendre, L. Nouveau, 34(02), p214–223.  
(<http://html.rhhz.net/KQDLXXB/2016-02-214.htm>).

### En préparation

- [IB-ALE] **Adaptive ALE residual based penalization for laminar flows with moving bodies**, L. Nouveau, H. Beaugendre, C. Dobrzynski, M. Ricchiuto.

### Articles de conférences

- 2018 **High-fidelity methods for the prediction of ice debris trajectories**, H. Beaugendre, L. Nouveau, C. Wervaecke, M. Costes, T. Kilian, Kissimmee, Florida.  
*AIAA*
- 2014 **Residual Distribution Schemes for Penalized Navier Stokes Equations on Adapted Grids**, L. Nouveau, R. Abgrall, H. Alcin, H. Beaugendre, C. Dobrzynski, Barcelone, Spain.  
*ECCM V - ECFD VI*
- 2014 **Residual schemes applied to an embedded method expressed on unstructured adapted grids**, R. Abgrall, H. Alcin, H. Beaugendre, C. Dobrzynski, L. Nouveau, Chengdu, China.  
*ICCFD8*

### Rapports de recherche

- 2016 **An adaptive ALE residual based penalization approach for laminar flows with moving bodies**, *RR N 8936*, L. Nouveau, H. Beaugendre, M. Ricchiuto, C. Dobrzynski, R. Abgrall, (<https://hal.inria.fr/hal-01348902>).
- [ALE-RD]

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## Conférences et Workshop

- Fev. 2021 **Workshop Inira SURF**, *visio*, Numerical resolution of the penalized Navier-Stokes equations with rigid moving bodies.  
L. Nouveau, H. Beaugendre, C. Dobrzynski, M. Ricchiuto
- Jan. 2021 **Journée d'analyse Rennes-Nantes**, *Rennes, France*, Méthodes de frontières immergées en mécanique des fluides numériques.  
L. Nouveau, H. Beaugendre, C. Dobrzynski, M. Ricchiuto
- Nov. 2020 **Séminaire ACSIOM**, *Montpellier, France (visio)*, High order immersed computations : from the Shifted Boundary Method towards high order Penalization.  
L. Nouveau, O. Colomés, A. Main, G. Scovazzi, M. Ricchiuto
- June 2019 **GT EDP Calcul Scientifique LMI LMRS**, *Rouen, France (visio)*, Immersed Boundary Methods in Computational Fluid Dynamics.  
L. Nouveau O. Colomés, A. Main, G. Scovazzi, M. Ricchiuto
- Sep. 2019 **Séminaire Analyse Numérique IRMAR**, *Rennes, France*, Adaptive mesh and the Shifted Boundary Method, Numerical tools for high order embedded computations.  
L.Nouveau, O. Colomés, N. Abboud, N. Atallah, A. Main, G. Scovazzi, H. Beaugendre, C. Dobrzynski, M. Ricchiuto
- June 2019 **Coupled Problems**, *Sitges, Espagne*, Conférence internationale, The Shifted Boundary Method for CFD.  
L.Nouveau, N. Atallah, O. Colomés, M. Khalloufi, A. Main, G. Scovazzi, T. Song.
- Ap. 2019 **Séminaire d'Analyse Numérique et Calcul Scientifique LMB**, *Besançon, France*, Mesh adaptation and the Shifted Boundary Method : Numerical tools for high order embedded computations..  
L. Nouveau, N. Abboud, N. Attalah, O. Colomés, G. Scovazzi, H. Beaugendre, C. Dobrzynski, M. Ricchiuto
- Mar. 2019 **Séminaire calcul scientifique IMB**, *Bordeaux, France*, The Shifted Boundary Method : A tool for high order embedded computations on unstructured grids.  
L. Nouveau, N. Abboud, N. Attalah, O. Colomés, G. Scovazzi
- 2018 **WCCM2018**, *New York, USA*, International Conference, The shifted boundary method for free surface flow problems.  
L. Nouveau, A. Main, G. Scovazzi
- 2017 **USNCCM14**, *Montreal, Canada*, International Conference, An Adaptive Residual Based Approach for Solving the Penalized Navier-Stokes Equations in Fluid Structure Interaction.  
L. Nouveau, H. Beaugendre, C. Dobrzynski, M. Ricchiuto
- 2016 **ECCOMAS VII**, *Hersonissos, Creete*, European Conference, An adaptive, residual based splitting approach for the time dependent penalized Navier Stokes equations.  
L. Nouveau, M. Ricchiuto, H. Beaugendre, C. Dobrzynski, R. Abgrall
- 2016 **CANUM**, *Obernai, France*, National Conference, An ALE residual distribution approach applied to the penalized Navier Stokes equations on adapted grids for moving solids.  
L. Nouveau, M. Ricchiuto, H. Beaugendre, C. Dobrzynski, R. Abgrall
- 2015 **Workshop DIP Total/INRIA**, *Pau, France*, Mesh adaptation by local remeshing and application to immersed boundary methods in fluid mechanics.  
L. Nouveau, H. Beaugendre, M. Ricchiuto, R. Abgrall, C. Dobrzynski
- 2014 **ECCOMAS VI**, *Barcelona, Spain*, International Conference, Residual Distribution Schemes for Penalized Navier Stokes Equations on Adapted Grids.  
L. Nouveau, R. Abgrall, H. Alcin, H. Beaugendre, C. Dobrzynski

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## Activités et responsabilités collectives de recherche

- 2021–now **Séminaire analyse numérique de l'IRMAR**, *IRMAR, Rennes, France*, Co-organisation : N. Seguin.
- 2021–now **Comité ECCOMAS YIC**, Membre et représentant Français du comité Européen EYIC (ECCOMAS Young Investigator Committee").

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## Enseignements

### Responsabilités académiques

- 2020–now **Modélisation par EDP et Résolution Numérique (MERN)**, *INSA, Rennes, France*, GM4 (~ M1).  
Théorie des EDP (advection, chaleur et ondes 1D), Différences Finies, Eléments Finis.
- 2020–now **Séminaire entreprise**, *INSA, Rennes, France*, GM4/GM5 (~ M1/M2).  
Co-responsable : Ayse. N. Arslan. Organisation de séminaires par des intervenants industriels auprès des étudiants.
- 2020–now **Reponsable partenariat et relation entreprises**, *INSA, Rennes, France*, 3h/year.  
Co-responsable : Ayse N. Arslan. Contact au sein du départements GM pour les partenaires industriels.
- 2019–now **Méthodes Numériques du Non Linéaire (MNNL)**, *INSA, Rennes, France*, GM3 (~ L3).  
Interpolation, intégration numérique, problèmes non-linéaires, schéma EDO, introduction Différences Finies.

## Cours/TD/TP

- 2020–now **CM/TD/TP MERN**, INSA, Rennes, France, GM4 (~ M1).  
2019–now **CM/TD/TP MNNL**, INSA, Rennes, France, GM3 (~ M1).  
2019–now **TD EDP**, INSA, Rennes, France, GMA3 (~ L3).  
2019–now **TD Analyse I**, INSA, Rennes, France, STPI 1 (~ L1).  
2019–now **Référent stage**, INSA, Rennes, France, GM3, GM4, GM5 (~ L3, M1, M2).  
2017 **Séminaire**, *Duke University*, Durham, USA, M2.  
Implémentation des méthodes de Galerkin discontinues.  
2013–2015 **TP Fortran 90**, *ENSEIRB-MATMECA*, Bordeaux, France, 48h/year - MMK1 (~ L3).

## Encadrements

- 2020–2021 **Projet d'Initiation à la recherche**, INSA, Rennes, France, GM4 (~ M1).  
Schéma de type MAC pour la résolution des équations de Navier-Stokes pénalisées. (A. Gicquel)  
2019–now **Projets inter-disciplinaires**, INSA, Rennes, France, GM4 (~ M1).  
Mécanique quantique.  
2017–2018 **Co-encadrant de Master**, *Duke University*, Durham, USA.  
*Méthodes éléments finis pour le problème de Darcy*. (S. Boyana).  
2016 **Co-encadrant thèse de Master**, *ENSEIRB-MATMECA*, Bordeaux, France.  
*Schéma aux résidus distribués implicite en temps pour les problèmes d'advection-diffusion*. (A. Fondaneche).  
2013–2015 **Travaux d'études et de recherches**, *ENSEIRB-MATMECA*, Bordeaux, France, MMK1 (~ L3).

## Expérience

- 2019–Now **Maître de Conférences**, *INSA/IRMAR*, Rennes, France.  
Département Génie Mathématiques de l'INSA et équipe Analyse Numérique de l'IRMAR.  
2017–Jan. **PostDoctorat**, *Duke University, Pratt School of Engineering*, Durham, USA,  
2019 • Développement d'outils numériques pour simulations de frontières immergées avec imposition à l'ordre élevé des conditions de bord (Shifted Boundary Method). Application aux équations de Stokes, Navier-Stokes et problème de Darcy.  
• Méthodes de Galerkin discontinues/enrichies multi-échelles pour le problème de Darcy .  
*Encadrant : G. Scovazzi*  
2013–2016 **Thèse en Mathématiques appliquées**, *INRIA*, Bordeaux, France, European Project STORM (<http://www.fp7-storm.eu/>).  
Defended the 12/16/2016.  
ALE residual distribution schemes for solving the penalized Navier Stokes equations on adaptive meshes to account for moving objects. Application to ice shedding trajectory.  
*Encadrants : H. Beaugendre, C. Dobrzynski, M. Ricchiuto*  
Feb–Aug **Stage PFE**, *INRIA*, Bordeaux, France.  
2013 Penalization for steady problems on anisotropic unstructured mesh and metric based mesh adaptation.  
*Encadrants : R. Abgrall, H. Beaugendre, C. Dobrzynski*  
June–Aug **Stage**, *RMIT*, Melbourne, Australia.  
2012 Solid optimisation creating a truss based on a mesh using Abaqus.  
*Encadrant : M. Leary*

## Short classes

- 2018 **Computational Methods for Shallow Water Flow Simulation**, *Jan 23–26, Duke University, USA*, by M. Ricchiuto (INRIA Bordeaux Sud-Ouest, France).  
2016 **Training Course on Immersed Boundary method**, *Jan 26–27, INRIA Bordeaux, France*, by G. Iaccarino (Stanford University, USA).  
2014 **Computational Fluid–Structure Interaction**, *July 19–20, Barcelona, Spain (WCCM XI - ECCM V - ECFD VI)*, by Y. Bazilevs (Brown University, USA), K. Takizawa (Waseda University), T. Tezduyar (Rice University, USA), <http://www.tafsm.org/BarcFSI2014/>.

## Diplômes

- 2013–2016 **PhD : Applied Mathematics**, *INRIA*, Bordeaux, France.  
2010–2013 **Engineering degree : Mathematical and Mechanical modelling**, *ENSEIRB-MATMECA*, Bordeaux, France, (<http://www.enseirb-matmeca.fr>).  
2012–2013 **Master : Mathematical Engineering and Modelling at Bordeaux1 University**, Bordeaux, France, (<https://mimse.math.u-bordeaux.fr/pmwiki.php/Main/Spec1>).  
2008–2010 **Engineering preparatory classes** †, *Lycée Carnot*, Dijon, France.

†. Post-secondary preparatory school / classes preparing for entrance examinations to the French Grandes Ecoles