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## EDUCATION

- 2013 Habilitation, Institute of Mathematics of the Romanian Academy
- 1992 Ph.D., Pierre et Marie Curie University, Paris 6, France
- 1971 M.S., University of Bucharest, Faculty of Mathematics and Mechanics
- 1966 High school graduation, High School no. 2 in Bârlad, Romania

### PhD Thesis

Title: Sur le calcul parallèle en elasto-plasticité par la méthode de décomposition des domaines de Schwarz (On the parallel computing in elasto-plasticity by the Schwarz domain decomposition method)

Advisor: Professor M. Predeleanu

Board of examiners: G. Duvaut (Chairman), P. Le Tallec (Referee), Q. S. Nguyen (Referee), P. Ladevèze (Examiner), P. L. Lions (Examiner), J. F. Maître (Examiner), M. Predeleanu (Examiner)

### Habilitation Thesis

Title: Metode de descompunerea domeniilor (Domain decomposition methods)

Board of examiners: Olivier Pironneau, Sorin Micu, Csaba Varga

## EMPLOYMENT

- 2002-present Senior Researcher I, Institute of Mathematics of the Romanian Academy, Bucharest
- 1997-2002 Researcher II, Institute of Mathematics of the Romanian Academy, Bucharest
- 1990-1997 Researcher III, Institute of Mathematics of the Romanian Academy, Bucharest
- 1975-1990 Mathematician, Institute of Power Studies and Designs, Bucharest
- 1975-1975 Mathematician, Institute of Mathematics, Bucharest
- 1971-1974 System Analyst, Central Institute of Informatics, Bucharest

## AWARDS AND HONOURS

- "Spiru Haret" prize of the Romanian Academy (for the year 1999), Section of Mathematics, 2001.

## ADMINISTRATION

Head of the Research Group of Mathematical modelling, functional and numerical methods (2012-present).

Member of the Scientific Council of the Institute of Mathematics of the Romanian Academy (2012-present).

## **PROFESSIONAL MEMBERSHIP**

Member of the AMS.

## **RESEARCH INTERESTS**

Domain decomposition methods for PDEs

Embedding domain methods and optimal control problems

Numerical methods for nonlinear mechanical problems

Numerical methods for financial derivatives

Parallel computation

## **RESEARCH RESULTS** (see list of publications)

59 articles published in peer-reviewed journals and proceedings

2 books

19 scientific reports and preprints

## **RESEARCH IMPACT AND DISSEMINATION OF RESULTS**

The articles have been cited in more than 650 papers

The Web of Science h-index is 9, Scopus and ResearchGate h-indexes are 10, Scholar Google h-index is 15 and the h-index calculated by myself on the basis of the above mentioned citations is 12.

The research results have been presented in 46 international conferences and 22 scientific seminars as an invited lecturer (see the list of conferences and scientific seminars below)

Plenary lectures presented in international conferences as an invited speaker:

- Global convergence rates of some multilevel methods for variational and quasi-variational inequalities, 23th International Conference on Domain Decomposition Methods, ICC Jeju island, Korea, July 6-10, 2015 (<http://dd23.kaist.ac.kr>).

- Méthodes multi-niveau et multigrille pour quelques problèmes non linéaires, 12e Colloque Franco-Roumain en Mathématiques Appliquées, l'Université de Lyon, France, 25-30 août 2014.

## RESEARCH AND TEACHING ABROAD

(visiting professor or researcher - positions between 1 week and 8 months)

Laboratoire de Mathématiques et Physique, Université de Perpignan, France (2011 - 1 week)

Laboratoire de Mécanique et d'Acoustique CNRS et Université d'Aix-Marseille, France (2018 - 2 weeks, 2015 - 1 week, 2014 - 1 week, 2013 - 1 week, 2012 - 1 week, 2010 - 1 week, 2009 - 2 weeks, 2008 - 2 weeks)

Free University of Berlin, Germany (2009 - 1 week)

Institut de Mathématiques, Ecole Polytechnique Fédérale de Lausanne, Switzerland (2009 - 1 month, 2007 - 1 week, 2004 - 1 month, 2002 - 1 month)

Institute of Applied Mathematics, University of Bonn, Germany (2007 - 2 weeks)

Laboratoire de Mathématiques, Université de Savoie, France (2007 - 2 weeks, 2006 - 2 weeks, 2005 - 3 months, 2003 - 3 months, 1997 - 1 month)

Laboratoire Jacques-Louis Lions, Pierre et Marie Curie (Paris 6) University, France (2004 - 2 weeks)

Department of Mathematics, University of Bergen, Norway (2003 - 2 weeks, 2001 - 2 weeks)

Laboratoire des Propriétés Mécaniques et Thermodynamiques des Matériaux, Paris 13 University, France (2001 - 1 month + 6 months (associated researcher at CNRS), 1999 - 1 month, 1998 - 2 months, 1997 - 1 month)

Texas A&M University, Department of Mathematics, College Station, USA (2000 - 4.5 months, 1998 - 4.5 months)

Ecole Nationale Supérieure d'Informatique et de Mathématiques Appliquées de Grenoble, National Polytechnic Institute of Grenoble, France (1999 - 1 month, 1997 - 2 months, 1995 - 6 months)

Laboratoire de Mécanique et Technologie, ENS Cachan, Paris 6 University, France (1996 - 6 months)

Centre de Mise en Forme des Matériaux, Ecole Normale Supérieure des Mines de Paris in Sophia Antipolis, France (1993 - 8 months)

## TEACHING EXPERIENCE

Graduate courses of numerical analysis at Faculty of Mathematics and Informatics, University of Bucharest, 2012-2013.

Graduate courses in mathematics at Université de Savoie in Chambéry, France, in 2003.

Undergraduate courses in mathematics at Texas A&M University, College Station, USA, in 1998.

Graduate courses in applied mathematics at Université de Savoie in Chambéry, France, in 1996.

Graduate and undergraduate courses in applied mathematics at ENSIMAG, National Polytechnic Institute of Grenoble, France, from 1995 to 1997.

Graduate and undergraduate courses in applied mathematics at the Polytechnic University of Ploiesti, Romania, from 1994 to 1995.

Undergraduate courses in mathematics at the Polytechnic University of Bucharest, Romania, from 1978 to 1980.

## CONFERENCES AND SCIENTIFIC SEMINARS

### 1. Talks in conferences

1. L. Badea, Convergence of the Damped Additive Schwarz Methods and the Subdomain Coloring, Cluj Academic Days, Tiberiu Popoviciu Institute of Numerical Analysis, October 26-28, 2022
2. L. Badea, Additive and restricted additive Schwarz-Richardson methods for inequalities with nonlinear monotone operators, *9th Congress of Romanian Mathematicians*, June 28-July 3, 2019, Galați, Romania (<https://sites.google.com/view/congmatro9/home>).
3. L. Badea, Méthodes de décomposition du domaine à deux niveaux pour les inégalités de la deuxième espèce et les inégalités quasi-variationnelles, *XIV-ème colloque franco-roumain de mathématiques appliquées*, Bordeaux (France), 27-31 août 2018 (<https://france-roumanie.sciencesconf.org/>).
4. L. Badea, Two-level methods with optimal computing complexity for variational inequalities of the second kind, *Mini workshop ICUB-FMI UB*, Bucharest, 9 November, 2018 (<http://icub.unibuc.ro/>).
5. L. Badea, Additive and restricted additive Schwarz methods for quasilinear inequalities, *The twenty-fourth international conference on domain decomposition methods*, Spitsbergen, Svalbard, Norway, 6-10 February, 2017 (<http://www.ddm.org/dd24/home.html>).
6. Méthodes multigrille pour les inégalités contenant un terme non-différentiable, *XIII-ème Colloque Franco-Roumain de Mathématiques Appliquées*, Université "Alexandru Ioan Cuza" de Iași, 25-29 Août, 2016 (<http://www.math.uaic.ro/cfr2016/>).

7. Global convergence rates of some multilevel methods for variational and quasi-variational inequalities, *23th International Conference on Domain Decomposition Methods*, ICC Jeju island, Korea, July 6-10, 2015 (<http://dd23.kaist.ac.kr>).
8. Méthodes multi-niveau et multigrille pour quelques problèmes non linéaires, *12e Colloque Franco-Roumain en Mathématiques Appliquées*, l'Université de Lyon, France, 25-30 août 2014.
9. On the convergence rate of the multigrid methods for constrained minimization problems, *Conference dedicated to Professor Nicolai D. Cristescu on his 85th birthday*, University of Bucharest, June 20, 2014.
10. Two-level methods for variational and quasi-variational inequalities of the second kind, *Joint International Meeting of the AMS and the Romanian Mathematical Society*, Alba Iulia, Romania, June 27-30, 2013.
11. On the convergence of some hybrid multigrid methods for variational inequalities - *Anniversary Conference, Faculty of Sciences -150 years*, Bucharest, 29 august-1 september, 2013.
12. Multigrid Method with Constraint Level Decomposition for Variational Inequalities with Contraction Operators, *The Twenty First International Conference on Domain Decomposition Methods*, June 25-29, 2012, Rennes, France.
13. Sur la convergence d'une méthode multigrille pour quelques inégalités variationnelles nonlinéaires, *11-ème Colloque Franco-Roumain de Mathématiques Appliquées*, 24-30 August 2012, Bucharest, Romania.
14. Multigrid method with constraint level decomposition for some quasi-variational inequalities, *25-th IFIP TC7 Conference on System Modeling and Optimization*, 12-16 September, 2011, Berlin, Germany
15. Multigrid methods for constrained minimization problems, *The Seventh Congress of Romanian Mathematicians*, 27 June - 5 July, 2011, Brasov, Romania
16. Multigrid methods for nonlinear problems, *Exploratory Workshop: Current research topics in applied mathematics*, Institute of Mathematics of the Romanian Academy, Bucharest, 22-23 September 2010 (Conference - Diaspora in Higher Education and Scientific Research in Romania, Bucharest, 21-24 September 2010)
17. Méthodes multi-grille pour les inégalités variationnelles, *10ème Colloque Franco-Roumain de Mathématiques Appliquées*, University of Poitiers, France, 26-31 August, 2010
18. (coauthor: M. Cocou) Analyse d'une classe d'inéquations dévolution implicites et applications à des problèmes quasi-statiques de contact, *10ème Colloque Franco-Roumain de Mathématiques Appliquées*, University of Poitiers, France, 26-31 August, 2010

19. (coauthor: M. Cocou) Approximation results for quasistatic contact problems, *ECCM 2010, IV European Conference on Computational Mechanics*, Paris, France, May 16-21, 2010
20. One- and Two-Level Domain Decomposition Methods for Nonlinear Problems, *First International Conference on Parallel, Distributed and Grid Computing for Engineering*, 6-8 April 2009, Pécs, Hungary
21. L. Badea, *Méthodes de décomposition du domaine pour de problèmes nonlinéaires*, 9-ème Colloque Franco-Roumain, 28 août-2 septembre 2008, Brasov, Roumanie
22. Additive and multiplicative Schwarz methods for inequalities with contraction operators, *6-th Congress of Romanian Mathematicians*, June 28 - July 4, 2007, Bucharest, Romania
23. Méthodes de décomposition des domaines de Schwarz pour les inéquations avec opérateurs de contraction, *8ème Colloque Franco-Roumain de Mathématiques Appliquées*, August 28 – Septembre 1, 2006, Chambéry, France
24. Additive Schwarz method for the constrained minimization of functionals in reflexive Banach spaces, *17th International Conference on Domain Decomposition Methods*, St. Wolfgang/Strobl, Austria, July 3–7, 2006
25. Domain decomposition method for fixed-point problems, *"Caius Iacob" National Conference of Fluid Mechanics and Tehnical Applications*, November 25-26, 2005, Bucharest, Romania
26. Multilevel Schwarz method for the minimization with constraints of non-quadratic functionals, *Conference on Applied Nonlinear Functional Analysis*, June 9-11, 2005, Constanta, Romania
27. Sur l'Evaluation des Options Américaines, *7ème Colloque Franco-Roumain de Mathématiques Appliquées*, August 30 – September 3, 2004, Craiova, Romania
28. (coauthors: I. R. Ionescu and S. Wolf) Schwarz decomposition method in capturing dynamic friction instabilities, *ECCOMAS 2004 - European Congress on Computational Methods in Applied Sciences and Engineering*, 24-28 July 2004, Jyväskylä, Finland
29. Constrained minimization of non quadratic functionals by a multilevel Schwarz method, *IMAR Workshop*, June 22-27, 2004, Bucharest, Romania
30. Schwarz-Neumann method with more than two domains, *The Second European Finite Element Fair*, Berlin, June 4-5, 2004, Germany
31. One and two-level multiplicative Schwarz methods for the constrained minimization of non-quadratic convex functionals, *Conference on New trends in continuum mechanics*, September 8-12, 2003, Constanta, Romania
32. On a multilevel Schwarz method for the constrained minimization of non-quadratic functionals, *The 15th International Conference on Domain Decomposition Methods*, July 21-25, 2003, Berlin, Germany

33. On a Schwarz multigrid method for the constraint minimization of non-quadratic functionals, *The 5th Congres of Romanian Mathematicians*, June 22-28, 2003, Pitesti, Romania
34. (coauthor P. Daripa) A Domain Embedding/Boundary Control Method to Solve Elliptic Problems in Arbitrary Domains, *The 41st IEEE Conference on Decision and Control*, December 10-13, 2002, Las Vegas, Nevada
35. Convergence rate of a multiplicative Schwarz method for strongly nonlinear variational inequalities, *Conference on Analysis and Optimization of Differential Systems*, September 10-14, 2002, "Ovidius" University, Constanta, Romania
36. Taux de convergence d'une méthode de Schwarz multi-niveaux pour des inéquations variationnelles fortement nonlinéaires, *6ème Colloque Franco-Roumain de Mathématiques Appliquées*, September 2-6, 2002, Perpignan, France
37. On an embedding domain method using a distributed optimal control, *Second International Conference on Applied Mathematics*, October 19-21, 2000, Baia Mare, Romania
38. Sur une méthode spectrale de domaines fictifs utilisant un contrôle optimal distribué, *5-ème Colloque Franco-Roumain de Mathématique Appliquées*, August 28- September 1st, 2000, Constanta, Romania
39. Adaptive mesh finite element method for the sedimentary basin problem, *Conference of Mechanics of Solids*, May 28-29, 1999, Ploiesti, Romania
40. (coauthors: A. Miroux, D. Arizmendi, B. Bacroix and J. L. Raphanel) Prediction of stored energy during rolling of bcc materials as a function of final orientation using various polycrystalline models and a FE code, *Annual GAMM Meeting 99*, April 12-16, 1999, Metz, France
41. (coauthors: A. Miroux, D. Arizmendi, B. Bacroix and J. L. Raphanel) The influence of grain orientation on the stored energy during cold rolling of steels - experimental evidence and finite element simulation, *Le 7ème colloque franco-polonais "Heterogeneities of deformation"*, October 22-24, 1998, Cracovia, Poland
42. (coauthor: J. Wang) The Schwarz method for variational inequalities with applications, *Third IMACS International Symposium on Iterative Methods in Scientific Computation*, July 9-12, 1997, Jackson Hole, Wyoming, USA
43. On the dynamic cavitation in solids, *Third International Conference on Material Processing Defects*, July 1-3, 1997, Cachan, France
44. Finite element solution for a seepage flow problem through a non-homogeneous multiply-connected dam, *The 5<sup>th</sup> International Conference on Boundary and Finite Element*, 27-29 April, 1995, Constanta, Romania
45. Damage and buckling in elasto-plastic bars, *Conference of Mechanics of Solids*, June 9-11, 1994, Constanta, Romania

46. On a domain decomposition method for parallel computing in elasto - plasticity, *The First European Conference on Numerical Methods in Engineering*, September 7-11, 1992, Brussels, Belgium

## 2. Invited talks in scientific seminars

1. Multilevel methods for variational and quasi-variational inequalities and applications in mathematical finance, Angel Kanchev University of Ruse, Bulgaria, May 14, 2015.
2. Méthodes multi-grille pour les problèmes de minimisation avec contraintes, *Seminar of "Laboratoire de Mécanique et d'Acoustique", CNRS de Marseille*, 3 September, 2010
3. One- and two-level Schwarz methods for inequalities with nonlinear operators, *SFB 611 Seminar*, Institute of Applied Mathematics, University of Bonn, April 26, 2007
4. Méthode Multiréseau pour la Minimisation avec Contraintes de Fonctionnelles Non-Quadratiques, *Seminar of the Laboratory of Applied Mathematics, University of Chambéry*, March 14, 2005, Chambéry, France
5. On the Schwarz-Neumann method with an arbitrary number of domains, *Institut de Mathématiques, Ecole Polytechnique Fédérale de Lausanne*, March 24, 2004, Switzerland
6. Méthode de Schwarz multi-échelle pour la minimisation de fonctionnelles non quadratiques, *Laboratoire Jacques-Louis Lions, Pierre et Marie Curie (Paris 6) University*, January 19th, 2004, France
7. Multigrid methods for variational problems, *Joint seminar of IMAR and Faculty of Mathematics, University of Bucharest*, October 9th, 2003 (first part), October 23th, 2003 (second part), Romania
8. Taux de convergence d'une méthode de Schwarz multiéchelle pour la minimisation de fonctionnelles non quadratique, November 13, 2003, *Institut de Mathématiques, Ecole Polytechnique Fédérale de Lausanne*, Switzerland
9. Convergence rate of a one and two level Schwarz method for strongly nonlinear variational inequalities, *Seminar of Applied Mathematics*, April 15, 2002, University of Bucharest, Faculty of Mathematics, Romania
10. Taux de convergence d'une méthode multiréseau pour des inéquations variationnelles fortement nonlinéaires, *Seminar of the Laboratory of Applied Mathematics, University of Chambéry*, January 29, 2002, Chambéry, France
11. On the Schwarz-Neumann method with an arbitrary number of domains, *Seminar of Institute of Mathematics, Bergen University*, May 9, 2001, Bergen, Norway



12. On the Schwarz-Neumann method with an arbitrary number of domains, *Seminar of the Institute of Mathematics of the Romanian Academy*, February 11, 1999, Bucharest, Romania
13. Quelques conclusions sur une tentative de parallélisation, *Seminar of the Laboratory of Mechanical and Thermodynamic Properties of the Materials, Paris 13 University*, October 22, 1997, Paris, France
14. Solution faible et approche éléments finis du problème des Options américaines, *Seminar of the Laboratory of Applied Mathematics, University of Chambéry*, September 26, 1997, Chambéry, France
15. Sur le phénomène de cavitation dans les solides, *Seminar of the Laboratory of Applied Mathematics, University of Chambéry*, September 23, 1997, Chambéry, France
16. La cavitation en plasticité, *Seminar of the Laboratory of Modelling and Computing, Joseph Fourier University, National Polytechnic Institute of Grenoble*, March 20, 1996, Grenoble, France
17. Décomposition de domaines. Application à la mécanique des solides, *Seminar of the Laboratory of Modelling and Computing, Joseph Fourier University, National Polytechnic Institute of Grenoble*, April 4, 1996, Grenoble, France
18. Cavitation et endommagement dans les solides, *Seminar of the Laboratory of Mechanics and Technology, Paris 6 University*, February 20, 1996, Cachan, France
19. Quelques méthodes pour le calcul parallèle, *Seminar of the Laboratory of Mechanics and Technology, Paris 6 University*, February 6, 1996, Cachan, France
20. Calcul parallèle en élasto-plasticité en utilisant la méthode de Schwarz, *Seminar of the Laboratory of Applied Mathematics, University of Savoie*, January 24, 1996, Chambéry, France
21. Calcul parallèle dans des problèmes de mécanique des solides et de mécanique des fluides par décomposition de domaines, *Seminar of Numerical Analysis Lyon - Saint-Etienne Universities*, May 18, 1993, Saint-Etienne, France
22. Sur une méthode de décomposition des domaines en élasto - plasticité, *Seminar of the Laboratory of Mechanics and Technology, Paris 6 University*, November 11, 1992, Paris, France

## **OTHER ACTIVITIES**

### **1. Member of International Conference Program Committees**

1. Member of the International Program Committee of the Third IMACS International Symposium on Iterative Methods in Scientific Computation, Jackson, Wyoming, USA, July 9-12, 1997.

2. Member of the International Program Committee of the First International Conference on Parallel, Distributed and Grid Computing for Engineering, Pecs, Hungary, 6-8 April 2009.
3. Member of the International Program Committee of The Second International Conference on Parallel, Distributed, Grid and Cloud Computing for Engineering, Ajaccio, Corsica, France, 12-15 April 2011.
4. Member in the Scientific Committee of the "XI-ème Colloque Franco-Roumain de Mathématiques Appliquées", 24-30 August, 2012, Bucharest, Romania
5. Member of the International Program Committee of The Third International Conference on Parallel, Distributed and Grid Computing for Engineering, Pécs, Hungary, 25-27 March 2013.
6. Member of the International Program Committee of The Fourth International Conference on Parallel, Distributed, Grid and Cloud Computing for Engineering, Dubrovnik, Croatia, 24-27 March 2015,  
<http://www.civil-comp.com/conf/peng2015/peng2015.htm>.
7. Member in Conference Editorial Board of The Fifth International Conference on Parallel, Distributed, Grid and Cloud Computing for Engineering (PARENG 2017), Pecs, Hungary, 30th-31st May 2017,  
<http://www.ctresources.info/csets/chapter.html?id=642>.
8. Member of the Conference Editorial Board of The Sixth International Conference on Parallel, Distributed, GPU and Cloud Computing for Engineering (PARENG 2019), Pecs, Hungary, 4th-5th June 2019, <https://pareng.hu/>.

## **2. Organizer of international scientific meetings**

1. Organizer (with Yvon Maday, University Paris 6, France) of the special session "Analyse Numérique" at "8ème Colloque Franco-Roumain de Mathématiques Appliquées", 28 août-1 septembre, 2006, Chambéry, France.
2. Organizer (with Mickael Barbotteu, University of Perpignan, France, and Andrei Constantinescu, Ecole Polytechnique, Palaiseau, France) of the special session "Analyse, contrôle et approche numérique en mécanique des solides" at the "10ème Colloque Franco-Roumain de Mathématiques Appliquées", 26-31 August 2010, Poitiers, France.
3. Organizer (with Marcus Sarkis, Worcester Polytechnic Institute, USA) of the special session "Domain Decomposition Methods and their Applications in Mechanics and Engineering" at the Joint International Meeting of the AMS and the Romanian Mathematical Society, Alba Iulia, Romania, June 27-30, 2013.

## **3. Member of the examiner boards and referee activity**

1. Member in Habilitation Thesis at University of Bucharest (2017).

2. Member in the PhD board of examiners at: Ecole Normale Supérieure de Cachan (France), University of Constanta, University of Bucharest, Polytechnic University of Bucharest.
3. Referee at the funding proposals of the: National Science Foundation, USA (2003), Romanian Academy (2005).
4. Reviewer at Mathematical Reviews
5. Referee at: IMA Journal of Numerical Analysis, Journal of Computational and Applied Mathematics, ZAMP, SIAM Journal on Numerical Analysis, Mathematical Finance, Applied Numerical Mathematics, Numerical Methods for Partial Derivative Equations, Journal of Computational Mathematics, Numerische Mathematik, Proceedings of the Romanian Academy, etc.

## GRANTS

### 1. Participation in Romanian projects

1. Director of the IMAR subcontract in the research contract CEEEX06-11-12/2006, budget 510091 RON.
2. Participant in research contracts: PCCE ID 100/2010, ID-PCE nr. 566/2009, PN-II-ID-PCCE-2008-1, CEEEX05-D11-23/2005, CNCSIS nr. 33079/2004, CERES 4-187/2004 and CNCSIS 844/2004.

### 2. Participation in international projects

1. Romanian co-responsible in the Joint Research Group on Domain Decomposition Methods for Nonlinear Problems. Applications in Applied Sciences and Engineering with Department of Mathematics, University of Bergen, Norway, under the contract nr. ICA1-CT-2000-70022 with the European Commission (2001-2004).
2. Romanian co-responsible for the research sub-theme Domain Decomposition Methods for Nonlinear Problems in Program SCOPES 2005 - contract between Institute of Mathematics of the Romanian Academy and Ecole Polytechnique Fédérale de Lausanne, Switzerland.
3. Romanian co-responsible of the projects "Méthodes de Décomposition de Domaine pour les Problèmes de Contact avec Frottement" (2008-2009, 2012-2013 and 2014-2015) in the Laboratoire Européen Associé CNRS Franco-Roumain (LEA Math-Mode). Cooperation with Laboratoire de Mécanique et d'Acoustique CNRS et Université de Provence (Aix-Marseille 1), France.
4. Romanian co-responsible in Le Groupement de Recherche International ECHO-Math and in cooperation with the Centre Francophone en Mathématiques de Bucarest (2018-present) of the projects:
  - Modèles mathématiques et méthodes numériques en mécanique des solides. Cooperation with Université d'Aix-Marseille, France.

– Méthodes de Décomposition du Domaine pour les Problèmes de Stokes et de Navier-Stokes. Cooperation with Laboratoire Jacques Louis Lions, CNRS UMR 7598 Université Pierre et Marie Curie, France.