CURRICULUM VITAE

—— Patrick Ciarlet ——

October 2008

PERSONAL

- **Address:** Laboratoire POEMS, UMR 2706 CNRS/ENSTA/INRIA, ENSTA ParisTech, 32, boulevard Victor, 75739 Paris Cedex 15, France
- **Email:** Patrick.Ciarlet@ensta.fr ; **Phone:** (33) 1 45 52 54 78 ; **Fax:** (33) 1 45 52 52 82

- **Born:** April 1965, Cleveland, USA.

EDUCATION

- **Ecole Polytechnique:** 1985–1988
- **ENSTA:** 1988–1990
- **Ph. D in Applied Mathematics:** 1992, Paris 6 University
- **Habilitation à Diriger les Recherches in Mathematics:** 1998, Paris 6 University

WORKING EXPERIENCE

- **Professor-Researcher:** 1997–present, Dept of Applied Mathematics, ENSTA
- **Researcher:** 1994–1997, Dept CSA at the Commissariat à l'Energie Atomique
- **Post Doctoral Research Fellow:** 1993–1994, Dept of Math., Univ. of California at Los Angeles, USA
- **Junior Researcher:** 1990–1993, Parallel Computing Project at the Commissariat à l'Energie Atomique

MAIN RESEARCH INTERESTS/FIELDS OF SPECIALIZATION

Maxwell system of equations and related models in electromagnetism

Numerical solution of low-regularity PDE problems

New solvers in linear elasticity

Parallel computing

FELLOWSHIPS/AWARDS/HONORS

- **Associate Professor:** 2005–2007, Ecole Polytechnique
- **Guest Professor:** 2002, Graduate Studies at Strasbourg Univ.
- **Guest Professor:** 2002, Graduate Studies at Univ. of Houston, USA
- **Associate Professor:** 1999–2000, Ecole Polytechnique
- **Guest Professor:** 1998, Ecole des Ondes, INRIA

EDITORIAL BOARD MEMBER OF A MATHEMATICAL JOURNAL

July 2008 – present: Differential Equations and Applications. Element d.o.o., Croatia

REFEREES FOR MATHEMATICAL JOURNALS

Journals: Applied Numerical Mathematics (1), C. R. Acad. Sci. Paris, Ser. I (4), Comput. Methods Appl. Mech. Engrg. (2), Discrete and Continuous Dynamical Systems, Series B (1), Int. J. Supercomputer Applications (1), Inverse problems (1), J. Applied Numerical Analysis (1), J. Comput. Appl. Math. (3), J. Computational Mathematics (1), J. Sci. Comput. (2), Math. Models Meth. App. Sci. (2), Math. Comp. (1), Math. Mod. Num. Anal. (2), Numer. Methods Partial Differ. Equations (2), Numer. Math. (2), Physics of the Earth and Planetary Interiors (1), SIAM J. Sci. Comput. (2), SIAM J. Numer. Anal. (2)

SERVICE AT PROFESSIONAL COMMITTEES

- **Rapporteur of Ph. D:** 2003–present
- **Rapporteur of Habilitation à Diriger les Recherches:** 2008–present
- **Academic Committee:** 2005–2007, external assessment for the Academy of Mathematics & Systems Science, Chinese Academy of Sciences
- **Grant evaluation:**
  - 2006, Délégation Générale pour l'Armement
  - 2006, Swiss National Science Foundation

PROFESSIONAL MEMBERSHIP

Société de Mathématiques Appliquées et Industrielles (SMAI)

European Mathematical Society (EMS)

CO-ORGANIZER OF CONFERENCES/WORKSHOPS

TIPE Earth and Space Conference, Paris, 1998

Motion of Charged Particles Conference, Strasbourg, 2001

Vector Finite Elements Day, Paris, 2004

RESEARCH GRANTS

Délégation Générale pour l'Armement postdoctoral fellowship, Oct. 1993 – Oct. 1994

France/Hong Kong PROCORE Joint Research Scheme Oct. 2000 – Sep. 2001

France/Hong Kong PROCORE Joint Research Scheme Oct. 2001 – Sep. 2002

DGA/ENSTA contract 0360074 'Computation of intense electromagnetic fields', Sep. 2003 – Aug. 2006

TEACHING EXPERIENCE

Parallel Computing: From Practice To Theory (ENSTA, Versailles-St-Quentin Univ.)

Maxwell's Equations (ENSTA, Versailles-St-Quentin Univ., Strasbourg Univ., Univ. of Houston)

Electromagnetic Waves (ENSTA, Versailles-St-Quentin Univ., INRIA)

Finite Element Methods (ENSTA)

Numerical Solution of PDEs (ENSTA, Ecole Polytechnique)

Introduction to Scientific Computing (ENSTA)

Quadratic Optimization & Linear Algebra (ENSTA)

PUBLICATIONS IN REFEREED JOURNALS

1. P. Ciarlet, Jr. **(1993)**. A decomposition of $L^2(\Omega)^3$ and an application to magnetostatic equations. *Math. Models Meth. App. Sci.*, **3**, 289-301.
2. P. Ciarlet, Jr. **(1994)**. Implementation of a domain decomposition method well-suited for parallel architectures. *High Speed Comp.*, **6**, 157-182.
3. P. Ciarlet, Jr. **(1994)**. Repeated Red-Black ordering: a new approach. *Numerical Algorithms*, **7**, 295-324.
4. P. Ciarlet, Jr., F. Lamour **(1996)**. On the validity of a front-oriented approach to partitioning large sparse graphs with a connectivity constraint. *Numerical Algorithms*, **12**, 193-214.
5. F. Assous, P. Ciarlet, Jr., E. Sonnendrücker **(1996)**. Résolution des équations de Maxwell dans un domaine avec un coin rentrant. *C. R. Acad. Sci. Paris, Ser. I*, **323**, 203-208.

6. P. Ciarlet, Jr., F. Lamour **(1996)**. Does contraction preserve triangular meshes? *Numerical Algorithms*, **13**, 201-223.

7. P. Ciarlet, Jr., J. Zou **(1997)**. Finite element convergence for the Darwin model to Maxwell's equations. *Math. Mod. Num. Anal.*, **31**, 213-250.

8. T. F. Chan, P. Ciarlet, Jr., W. K. Szeto **(1997)**. On the optimality of the median cut spectral bisection graph partitioning method. *SIAM J. Sci. Comput.*, **18**, 943-948.

9. P. Ciarlet, Jr., E. Sonnendrücker **(1997)**. A decomposition of the electric field. Application to the Darwin model. *Math. Models Meth. App. Sci.*, **7**, 1085-1120.

10. F. Assous, P. Ciarlet, Jr. **(1997)**. Une caractérisation de l'orthogonal de $\Delta(H^2(\Omega) \cap H_0^1(\Omega))$ dans $L^2(\Omega)$. *C. R. Acad. Sci. Paris, Ser. I*, **325**, 605-610.

11. F. Assous, P. Ciarlet, Jr., E. Sonnendrücker **(1998)**. Resolution of the Maxwell equations in a domain with reentrant corners. *Math. Mod. Num. Anal.*, **32**, 359-389.

12. P. Ciarlet, Jr., C. Hazard, S. Lohrengel **(1998)**. Les équations de Maxwell dans un polyèdre : un résultat de densité. *C. R. Acad. Sci. Paris, Ser. I*, **326**, 1305-1310.

13. F. Assous, P. Ciarlet, Jr. **(1998)**. Quelques résultats sur la régularité en temps des équations de Maxwell instationnaires. *C. R. Acad. Sci. Paris, Ser. I*, **327**, 719-724.

14. F. Assous, P. Ciarlet, Jr., P.-A. Raviart, E. Sonnendrücker **(1999)**. A characterization of the singular part of the solution to Maxwell's equations in a polyhedral domain. *Math. Meth. Appl. Sci.*, **22**, 485-499.

15. P. Ciarlet, Jr., J. Zou **(1999)**. Fully discrete finite element approaches for time-dependent Maxwell's equations. *Numer. Math.*, **82**, 193-219.

16. F. Assous, P. Ciarlet, Jr., S. Labrunie **(1999)**. Caractérisation de la partie singulière et résolution des équations de Maxwell en géométrie singulière axisymétrique. *C. R. Acad. Sci. Paris, Ser. I*, **328**, 767-772.

17. F. Assous, P. Ciarlet, Jr., E. Garcia **(2000)**. Résolution des équations de Maxwell instationnaires avec charges dans un domaine singulier bidimensionnel. *C. R. Acad. Sci. Paris, Ser. I*, **330**, 391-396.

18. F. Assous, P. Ciarlet, Jr., J. Segré **(2000)**. Numerical solution to the time-dependent Maxwell equations in two-dimensional singular domains: the Singular Complement Method. *J. Comput. Phys.*, **161**, 218-249.

19. P. Ciarlet, Jr., N. Filonov, S. Labrunie **(2000)**. Un résultat de fermeture pour les équations de Maxwell en géométrie axisymétrique. *C. R. Acad. Sci. Paris, Ser. I*, **331**, 293-298.

20. A. Buffa, P. Ciarlet, Jr. **(2001)**. On traces for functional spaces related to Maxwell's equations. Part I: an integration by parts formula in Lipschitz polyhedra. *Math. Meth. Appl. Sci.*, **24**, 9-30.

21. A. Buffa, P. Ciarlet, Jr. **(2001)**. On traces for functional spaces related to Maxwell's equations. Part II: Hodge decompositions on the boundary of Lipschitz polyhedra and applications. *Math. Meth. Appl. Sci.*, **24**, 31-48.

22. F. Assous, P. Ciarlet, Jr., S. Labrunie **(2002)**. Theoretical tools to solve the axisymmetric Maxwell equations. *Math. Meth. Appl. Sci.*, **25**, 49-78.

23. P. Ciarlet, Jr., V. Girault **(2002)**. Condition inf-sup pour l'élément fini de Taylor-Hood P_2-iso-P_1, 3D; application aux équations de Maxwell. *C. R. Acad. Sci. Paris, Ser. I*, **335**, 827-832.

24. P. Ciarlet, Jr., J. He **(2003)**. The Singular Complement Method for 2d problems. *C. R. Acad. Sci. Paris, Ser. I*, **336**, 353-358.

25. F. Assous, P. Ciarlet, Jr., S. Labrunie **(2003)**. Solution of axisymmetric Maxwell equations. *Math. Meth. Appl. Sci.*, **26**, 861-896.

26. P. Ciarlet, Jr., J. Huang, J. Zou **(2003)**. Some observations on generalized saddle-point problems. *SIAM J. Matrix Anal. Appl.*, **25**, 224-236.

27. P. Ciarlet, Jr. **(2003)**. Système de Stokes avec flux de vitesse et pression imposés. *C. R. Acad. Sci. Paris, Ser. I*, **337**, 119-124.

28. F. Assous, P. Ciarlet, Jr., S. Labrunie, J. Segré **(2003)**. Numerical solution to the time-dependent Maxwell equations in axisymmetric singular domains: the Singular Complement Method. *J. Comput. Phys.*, **191**, 147-176.

29. Philippe Ciarlet, P. Ciarlet, Jr. **(2004)**. Another approach to linearized elasticity and Korn's inequality. *C. R. Acad. Sci. Paris, Ser. I*, **339**, 307-312.

30. P. Ciarlet, Jr., E. Garcia, J. Zou **(2004)**. Solving Maxwell equations in 3D prismatic domains. *C. R. Acad. Sci. Paris, Ser. I*, **339**, 721-726.

31. P. Ciarlet, Jr. **(2005)**. Augmented formulations for solving Maxwell equations. *Comput. Methods Appl. Mech. Engrg.*, **194**, 559-586.

32. Philippe Ciarlet, P. Ciarlet, Jr. **(2005)**. Another approach to linearized elasticity and a new proof of Korn's inequality. *Math. Models Meth. App. Sci.*, **15**, 259-271.

33. F. Assous, P. Ciarlet, Jr., E. Garcia **(2005)**. Singular electromagnetic fields: inductive approach. *C. R. Acad. Sci. Paris, Ser. I*, **341**, 605-610.

34. P. Ciarlet, Jr., B. Jung, S. Kaddouri, S. Labrunie, J. Zou **(2005)**. The Fourier Singular Complement Method for the Poisson problem. Part I: prismatic domains. *Numer. Math.*, **101**, 423-450.

35. P. Ciarlet, Jr., B. Jung, S. Kaddouri, S. Labrunie, J. Zou **(2006)**. The Fourier Singular Complement Method for the Poisson problem. Part II: axisymmetric domains. *Numer. Math.*, **102**, 583-610.

36. F. Assous, P. Ciarlet, Jr., E. Garcia, J. Segré **(2006)**. Time-dependent Maxwell's equations with charges in singular geometries. *Comput. Methods Appl. Mech. Engrg.*, **196**, 665-681.

37. P. Ciarlet, Jr., S. Kaddouri **(2006)**. Justification de la loi de Peek en électrostatique. *C. R. Acad. Sci. Paris, Ser. I*, **343**, 671-674. (Corrigendum *C. R. Acad. Sci. Paris, Ser. I*, **344**, 657 (2007).)

38. A.-S. Bonnet-Ben Dhia, P. Ciarlet, Jr., C. M. Zwölf **(2007)**. Two- and three-field formulations for wave transmission between media with opposite sign dielectric constants. *J. Comput. Appl. Math.*, **204**, 408-417.

39. P. Ciarlet, Jr., G. Legendre **(2007)**. Well-posedness of the Drude-Born-Fedorov model for chiral media. *Math. Models Meth. App. Sci.*, **17**, 461-484.

40. R. Barthelmé, P. Ciarlet, Jr., E. Sonnendrücker **(2007)**. Generalized formulations of Maxwell's equations for numerical Vlasov-Maxwell simulations. *Math. Models Meth. App. Sci.*, **17**, 657-680.

41. P. Ciarlet, Jr., S. Kaddouri **(2007)**. Multiscaled asymptotic expansions for the electric potential: surface charge densities and electric fields at rounded corners. *Math. Models Meth. App. Sci.*, **17**, 845-876.

42. Philippe Ciarlet, P. Ciarlet, Jr., G. Geymonat, F. Krasucki **(2007)**. Characterization of the kernel of the operator CURL CURL. *C. R. Acad. Sci. Paris, Ser. I*, **344**, 305-308.

43. P. Ciarlet, Jr., E. Jamelot **(2007)**. Continuous Galerkin methods for solving the time-dependent Maxwell equations in 3D geometries. *J. Comput. Phys.*, **226**, 1122-1135.

44. C. Amrouche, Philippe Ciarlet, P. Ciarlet, Jr. **(2007)**. Vector and scalar potentials, Poincaré's theorem and Korn's inequality. *C. R. Acad. Sci. Paris, Ser. I*, **345**, 603-608.

45. Philippe Ciarlet, P. Ciarlet, Jr. **(2008)**. A new approach for approximating linear elasticity problems. *C. R. Acad. Sci. Paris, Ser. I*, **346**, 351-356.

46. F. Assous, P. Ciarlet, Jr., E. Garcia **(2008)**. A characterization of singular electromagnetic fields by an inductive approach. *Numerical Analysis and Modeling*, **5**, 491-515.

47. A.-S. Bonnet-Ben Dhia, P. Ciarlet, Jr., C. M. Zwölf **(2008)**. A new compactness result for electromagnetic waves. Application to the transmission problem between dielectrics and metamaterials. *Math. Models Meth. App. Sci.*, **18**, 1605-1631.

48. A.-S. Bonnet-Ben Dhia, P. Ciarlet, Jr., C. M. Zwölf. Time harmonic wave diffraction problems in materials with sign-shifting coefficients. *To appear in J. Comput. Appl. Math.*.

49. P. Ciarlet, Jr., G. Hechme. Computing electromagnetic eigenmodes with continuous Galerkin approximations. *To appear in Comput. Methods Appl. Mech. Engrg.*.

50. Philippe Ciarlet, P. Ciarlet, Jr.. Direct computation of stresses in planar linearized elasticity. *To appear in Math. Models Meth. App. Sci.*.

INVITED TALKS TO CONFERENCES

1st Singular Days, Lyon (Nov. 1996)

5èmes JEDP, Valenciennes (Sep. 2003)

4th Singular Days, Pont-à-Mousson (Jun. 2004)

17th Chemnitz FEM Symposium, Chemnitz (Sep. 2004)

5th Singular Days, Luminy (Apr. 2007)

INVITED COLLOQIUMS AND SEMINAR TALKS

- **France:** Evry Univ. (Jun. 1995), Ecole Polytechnique (Dec. 1996), CRESPO Seminar at INRIA (Nov. 1997), Ecole Centrale de Lyon (Jun. 2003), Paris 11 Univ. (Apr. 2004), Paris 6 Univ. (Feb. 2005), Rennes Univ. (Mar. 2008), Nancy Univ. (Jun. 2008)
- **Europe:** Univ. of Pavia, Italy (Oct. 1998), Univ. of Chemnitz, Germany (Nov. 2001), Univ. of Zürich, Switzerland (Jan. 2006), Univ. of Zürich, Switzerland (Apr. 2008)
- **Other Locations:** Univ. of Southern California, USA (Mar. 1994), Chinese Univ. of Hong Kong, China (May 1996), Univ. of Houston, USA (Sep. 2001), Univ. of Houston, USA (Mar. 2003), Chinese Univ. of Hong Kong, China (Apr. 2007)