

Enea Parini

Assistant Professor in Applied Mathematics

Positions held

- sep 2012 – **Assistant Professor (“Maître de Conférences”)**, *Institut de Mathématiques de Marseille*.
present
feb 2011 – **Research and teaching assistant (“A.T.E.R”)**, *Ceremade - Université Paris-Dauphine*.
aug 2012
nov 2009 – **Research and teaching assistant (“Wiss. Mitarbeiter”)**, *Universität zu Köln*,
jan 2011 Cologne, Germany, in the group of Prof. Bernd Kawohl.
sep 2006 – **Ph. D. student**, *Universität zu Köln*, Cologne, Germany.
nov 2009

Ph. D thesis

- title *Asymptotic behaviour of higher eigenfunctions of the p -laplacian as p goes to 1*
supervisor Prof. Bernd Kawohl - Universität zu Köln, Cologne, Germany
date November 2009

Teaching activities

Responsabilities

- Member of the responsibility committee of the L2 Math (Aix-Marseille Université) at St. Charles campus (September 2020 - June 2024).

Courses and exercise classes (last three years)

- 2022/23, 1S “Analysis 2” (course and exercise classes, L2 Math).
2022/23, 2S “Differential equations and Numerical Analysis” (course and exercise classes, L3 MPCI).
2023/24, 1S “Analysis 2” (course and exercise classes, L2 Math).
2024/25, 1S “General Mathematics” (course and exercise classes, Portail Descartes), “Fourier Analysis” (course and exercise classes, L3 MPCI).
2024/25, 2S “Mathematics S4 - Analysis” (course and exercise classes, L2 Math).

Other teaching activities

In January 2014 I spent one week at the Kwame Nkrumah University of Science and Technology in Kumasi (Ghana) to give a doctoral course on Differential Equations.
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Scientific and administrative responsibilities

Grants and distinctions

- Recipient of the PEDR ("Prime d'Encadrement Doctoral et de Recherche"), between October 2016 and September 2024.

Responsability positions

- Deputy director of the IRES (Institute for Research in Science Teaching) in Marseille, in charge of the organization of "Stages Hippocampe" (February 2024 - current).

Participation in committees

- Member of the steering committee of the FRUMAM (September 2023 - current).
- Member of the planning committee ("comité de prospective") of the Institut de Mathématiques de Marseille (April 2019 - April 2024), whose task is to identify promising research directions developed at the institute, and recruitment needs.
- Member of the scientific committee of the Institut de Mathématiques de Marseille (April 2016 - January 2018), which is competent for the evaluation and ranking of postdoctoral applications and conference proposals.
- Member of the hiring committee for Assistant Professor ("Maître de Conférences") positions in Marseille (2016, 2019).
- Member of the hiring committee for a Teaching Assistant ("Professeur agrégé") position in Marseille (2022).

Participation in research groups

- Member of the ANR STOIQUES (Shape and Topology Optimization: Immanent Questions and Emerging Subjects, principal investigator: Yannick Privat), January 2025 - ongoing.
- Member of the RT Optimisation (principal investigator: Filippo Santambrogio), April 2024 - ongoing.
- Member of the ANR SHAPO (Shape Optimization, principal investigator: Jimmy Lamboley), September 2018 - May 2023.
- Member of the GdR CALVA (Calculus of Variations, principal investigator: Antoine Lemenant), September 2019 - August 2023.

Organization of scientific activities

- Since September 2020 I am the general coordinator of "Stages Hippocampe" at the IRES in Marseille, which consist in letting high school students work on mathematical problems related to current research.

Organization of recurrent scientific events

- Co-organizer of the weekly seminar of the Applied Analysis Group in Marseille (September 2020 - January 2025).
- Organizer of the online seminar of the ANR SHAPO (September 2020 - July 2021).

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- Responsible for the organization of “Thematical workshops” for the Applied Analysis Group in Marseille (January 2017 - December 2020).
- Co-organizer of the periodic seminar “Calculus of Variations and PDE” (Marseille, September 2014 - December 2018), in collaboration with the IMATH (Toulon).

Organization of workshops

- Co-organizer of a special session in Spectral Optimization at the AMS-EMS-SMF Meeting (Grenoble, 18–22.7.2022).
- Co-organizer of the meeting of the ANR SHAPO (Montpellier, 12–14.6.2019)
- Co-organizer of the workshop “Recent progress in Partial Differential Equations” (Marseille, 2.12.2016).
- Co-organizer of the workshop “Optimisation et contrôle” (Marseille, 5.12.2014).
- Organizer of the workshop “Recent progress in Nonlinear Analysis” (Marseille, 10-11.12.2012).

Ph.D. thesis advised

- Giulio Romani (October 2014 - October 2017), together with François Hamel (I2M, Marseille) and Bernhard Ruf (Milano).
- Arthur Sahakian (October 2019 - December 2023), together with François Hamel (I2M, Marseille).
- Roméo Leylekian (October 2021 - September 2024), together with François Hamel (I2M, Marseille).

Ph.D. referee activity

- External referee for the Ph.D. thesis of Giorgio Saracco (Università di Modena e Reggio Emilia, 2017).
- External referee for the Ph.D. thesis of Antonella Ritorto (Universidad de Buenos Aires, 2017).

Other Ph.D. related activities

- Member of the follow-up committee for the Ph.D. thesis of Y. Oudghiri (Marseille, September 2018 - June 2022) and B. Colombari (Marseille, September 2019 - July 2023).

Master thesis advised

- N. Abbad (April 2018 - June 2018), M2 Mathématiques et Applications (Marseille).
- N. Mai (April 2018 - June 2018), M2 Mathématiques et Applications (Marseille).
- A. Sahakian (April 2019 - June 2019), M2 Mathématiques et Applications (Marseille).
- R. Leylekian (April 2021 - July 2021), M2 Analyse Modélisation Simulation (Paris-Saclay).

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Editorial activity

- Referee for the following journals (**bold:** ranked “top” (best 5 %) or “leading” (second-best 10 %) level by the JUFO portal of the Federation of Finnish Learned Societies):
 - Acta Math. Sci. Ser. B
 - Adv. Calc. Var. (2x)
 - Adv. Nonlinear Anal.
 - Afr. Mat.
 - An. Acad. Brasil. Ciênc.
 - Ann. Acad. Sci. Fenn. Math.
 - Ann. Global Anal. Geom.
 - Ann. Mat. Pura Appl. (2x)
 - Appl. Anal. (3x)
 - Appl. Math. Comput.
 - Appl. Math. Lett.
 - **Appl. Math. Optim. (2x)**
 - Arch. Math. (Basel) (5x)
 - Bol. Soc. Mat. Mex. (2x)
 - Bull. Malays. Math. Sci. Soc.
 - **Calc. Var. Partial Differential Equations (2x)**
 - Canad. Math. Bull.
 - Commun. Contemp. Math.
 - **Commun. Pure Appl. Anal. (2x)**
 - C. R. Math. Acad. Sci. Paris
 - Differential Integral Equations
 - Discrete Contin. Dynam. Systems (preliminary advice)
 - Discrete Contin. Dyn. Syst. Ser. B
 - Electron. J. Qual. Theory Differ. Equ.
 - Eur. J. Math.
 - ESAIM Control Optim. Calc. Var. (4x)
 - Experiment. Math.
 - Indian J. Pure Appl. Math.
 - **J. Anal. Math.**
 - J. Éc. polytech. Math.
 - **J. Funct. Anal.**
 - **J. Geom. Anal.**
 - J. Math. Anal. Appl. (2x)
 - J. Math. Imaging Vision
 - J. Optim. Theory Appl.
 - Manuscripta Math. (2x)
 - **Math. Ann.**
 - **Math. Methods Appl. Sci.**
 - Math. Nachr. (2x)
 - Milan J. Math. (2x)
 - Nonlinear Anal. (3x)
 - NoDEA Nonlinear Differential Equations Appl. (3x)
 - **Potential Anal.**
 - **Proc. Amer. Math. Soc. (preliminary advice)**
 - Proc. Edinburgh Math. Soc. (preliminary advice)
 - Proc. Roy. Soc. Edinburgh Sect.
 - Results Math. (2x)
 - Rev. Mat. Complut.
 - Rocky Mountain J. Math.
 - **SIAM J. Appl. Math.**
 - Topol. Methods Nonlinear Anal.
- Reviewer for “Mathematical Reviews”.
- Reporter ("Berichterstatte") for the Oberwolfach Report 08/2010.

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Research activities

My research interests are focussed on elliptic partial differential equations of various kinds (nonlinear, nonlocal, higher-order...) with a particular attention for eigenvalue problems, and related shape optimization problems.

Scientific visits

- 3–7.11.2008 Dipartimento di Matematica "F.Brioschi" - Politecnico di Milano, Milan (Italy).
- 2–4.12.2009 Technische Universität Dresden (Germany).
- 19–23.7.2010 Departamento de Matemáticas - Universidad Autónoma de Madrid, Madrid (Spain).
- 16–27.1.2012 University of Texas at Austin (USA).
- 27.2–2.3.2012 Université de Toulouse 1 - Capitole.
- 29.10–1.11.2012 Goethe-Universität Frankfurt (Germany).
- 12–14.11.2012 Dipartimento di Matematica - Università di Pisa (Italy).
- 24–28.6.2013 Goethe-Universität Frankfurt (Germany).
- 12–16.5.2014 KTH, Stockholm (Sweden).
- 26–27.10.2015 Università di Napoli "Federico II", Napoli (Italy).
- 23–25.11.2015 Universität Kassel (Germany).
- 13–22.7.2016 University of West Bohemia, Plzeň (Czech Republic).
- 9–13.12.2016 University of Reading (United Kingdom).
- 14–16.12.2016 Universität Kassel (Germany).
- 15–25.5.2017 Universidade Federal da Paraíba, Joao Pessoa (Brazil).
- 6–9.6.2017 Université Libre de Bruxelles (Belgium).
- 8–12.1.2018 Universidade de Lisboa (Portugal).
- 15–17.10.2018 University of West Bohemia, Plzeň (Czech Republic).
- 13–24.5.2019 Wayne State University, Detroit (USA).
- 3–7.6.2019 Università di Pavia (Italy).
- 30.1–2.2.2023 Università La Sapienza, Roma (Italy).
- 17–20.4.2023 Università degli Studi di Trento (Italy).
- 11–15.3.2024 Università di Modena e Reggio Emilia, Modena (Italy).

Talks given (upon invitation)

- 15–16.3.2008 AMS Eastern Sectional Meeting, New York (U.S.A.).
79th Annual Meeting of the International Association of Applied Mathematics and Mechanics (GAMM), Bremen (Germany)
- 31.3–4.4.2008 Workshop on "Topological and Variational Methods for PDEs", Oberwolfach (Germany).
- 3.12.2009 Institutsseminar Technische Universität Dresden (Germany).
- 14.1.2010 Seminari di Analisi Nonlineare, Università degli Studi di Milano (Italy).
- 7–13.2.2010 Workshop on "Optimal constants in the theory of Sobolev spaces and PDEs", Oberwolfach (Germany).

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- 22–26.2.2010 XX Conferenza Nazionale di Calcolo delle Variazioni, Levico Terme (Italy).
- 27.4.2010 Séminaires d'Analyse non linéaire, Université Catholique de Louvain-la-Neuve (Belgium).
- 14.3.2011 Groupe de Travail “Calcul des Variations”, Ceremade, Université Paris-Dauphine (France).
- 16.5.2011 Séminaire d'Analyse Appliquée A3, LAMFA, Université de Picardie, Amiens (France).
- 22.9.2011 DMV-Tagung (Conference of the German Mathematical Union), Köln (Germany).
- 6.12.2011 Séminaire MIP, Institut Mathématique de Toulouse (France).
- 14.12.2011 GT Calcul des Variations, CMAP, Ecole Polytechnique, Palaiseau (France).
- 25.1.2012 Analysis Seminar, University of Texas at Austin (USA).
- 10.2.2012 Séminaires de l'équipe EDPs, LAMA, Université de Savoie, Chambéry (France).
- 21.2.2012 Séminaires d'Analyse Appliquée, LATP, Université de Marseille (France).
- 2.3.2012 Séminaires du CeReMath, Université de Toulouse 1 - Capitole (France).
- 4–6.6.2012 Quasilinear equations and singular problems, Tours (France) (poster).
- 1.11.2012 AG-Seminar Differentialgleichungen, Frankfurt (Germany).
- 13.11.2012 Seminari di Calcolo delle Variazioni e Analisi Geometrica, Università di Pisa (Italy).
- 27.2.2013 Cologne Conference on Nonlinear Differential Equations, Cologne (Germany).
- 17.5.2013 Journées Nice-Toulon-Marseille, Porquerolles (France).
- 14.5.2014 SMC Analysis Seminar, Stockholm (Sweden).
- 24.2.2015 Seminario di Equazioni differenziali, Università Tor Vergata, Roma (Italy).
- 2.4.2015 Séminaire d'Analyse non-linéaire et Optimisation, Avignon (France).
- 7.5.2015 Seminario d'Analisi, Università degli Studi di Napoli “Federico II”, Napoli (Italy).
- 6.7.2015 Oberseminar Nichtlineare Analysis, Köln (Germany).
- 21.10.2015 Séminaire de Dynamique Quantique et Classique (CPT), Marseille (France).
- 23.11.2015 Oberseminar Analysis und Angewandte Mathematik, Kassel (Germany).
- 28.04.2016 Geometric aspects of PDE's and functional inequalities, Cortona (Italy).
- 01.07.2016 Geometric and physical aspects of Trudinger-Moser type inequalities, Institut Mittag-Leffler, Djursholm (Sweden).
- 13.12.2016 PDE Seminars, University of Reading (United Kingdom).
- 6–10.2.2017 XXVII Conferenza Nazionale di Calcolo delle Variazioni, Levico Terme (Italy).
- 6.6.2017 Séminaire d'Analyse non linéaire et EDP, Bruxelles (Belgium)
- 10.1.2018 Seminar of the Grupo de Física Matemática, Lisboa (Portugal)
- 20–24.2.2018 Workshop in Nonlinear PDE's and Geometric Analysis, Joao Pessoa (Brazil)
- 10.4.2018 Séminaire de l'équipe ACSIOM, Université de Montpellier (France)
- 15.5.2019 Mathematics PDE Seminar, Wayne State University (USA)
- 5.6.2019 Dipartimento di Matematica, Università di Pavia (Italy)
- 29.7.2019 XI Workshop in Nonlinear Differential Equations, Varese (Italy)
- 13.9.2019 Joint Seminar in Geometric Analysis, Marseille (France)
- 29.10.2019 Journées d'Optimisation de Forme JOFA 4, Palaiseau (France)

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- 20.01.2020 Groupe de Travail CalVa, Paris 6 (France)
- 26.11.2021 Seminari di Analisi Nonlineare, Milano (Italy)
- 01.02.2022 ICMC Summer Meeting on Differential Equations, Rio de Janeiro (Brazil, online)
- 06.04.2022 Journées ANR SHAPO, Autrans (France)
- 26.04.2022 Séminaire équipe EDP, Nancy (France)
- 30.01.2023 Seminario di Analisi Matematica, Università La Sapienza, Roma (Italy)
- 18.04.2023 Analysis Seminar, Università degli Studi di Trento (Italy)
- 01.06.2023 13th AIMS International Conference on Dynamical Systems, Differential Equations and Applications, Wilmington NC (United States)
- 11.09.2023 XII Workshop on Nonlinear Differential Equations, Brasilia (Brazil)
- 12.03.2024 Seminario di Analisi Matematica, Modena (Italy)
- 26.07.2024 Joint Meeting AMS-UMI Palermo 2024, Palermo (Italy)

Publications

Research publications in peer-reviewed international journals

- [1] C. Grumiau, E. Parini, *On the asymptotics of solutions of the Lane-Emden problem for the p -Laplacian*, Arch. Math. **91** (2008), 354-365.
- [2] E. Parini, A. Stylianou, *On the positivity preserving property of hinged plates*, SIAM J. Math. Anal. **41** (2009), 2031-2037.
- [3] E. Parini, *The second eigenvalue of the p -Laplacian as p goes to 1*, Int. J. Differ. Equ. (2010), Article ID 984671, 23 pp.
- [4] F. Charro, E. Parini, *Limits as $p \rightarrow \infty$ of p -Laplacian problems with a superdiffusive power-like nonlinearity: positive and sign-changing solutions*, J. Math. Anal. Appl. **372** (2010), 629-644.
- [5] E. Parini, *Continuity of the variational eigenvalues of the p -Laplacian with respect to p* , Bull. Aust. Math. Soc. **83** (2011), 376-381.
- [6] F. Charro, E. Parini, *Limits as $p \rightarrow \infty$ of p -laplacian eigenvalue problems perturbed with a concave or convex term*, Calc. Var. Partial Differential Equations **46** (2013), 403-425.
- [7] E. Parini, B. Ruf, C. Tarsi, *The eigenvalue problem for the 1-biharmonic operator*, Ann. Sc. Norm. Super. Pisa Cl. Sci. (5) **13** (2014), 307-332.
- [8] E. Parini, N. Saintier, *Shape derivative of the Cheeger constant*, ESAIM Control Optim. Calc. Var. **21** (2015), no. 2, 348-358.
- [9] E. Parini, B. Ruf, C. Tarsi, *Higher-order functional inequalities related to the 1-biharmonic operator*, Ann. Mat. Pura Appl. (4) **194** (2015), no. 6, 1835-1858.
- [10] L. Brasco, E. Lindgren, E. Parini, *The fractional Cheeger problem*, Interfaces Free Bound. **16** (2014), 419-458.
- [11] F. Charro, E. Parini, *On the existence threshold for positive solutions of p -laplacian equations with a concave-convex nonlinearity*, Commun. Contemp. Math. **17** (2015).

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- [12] E. Parini, T. Weth, *Existence, unique continuation and symmetry of least energy nodal solutions to sublinear Neumann problems*, Math. Z. **280** (2015), 707–732.
- [13] E. Parini, *Reverse Cheeger inequality for planar convex sets*, J. Convex Anal. **24** (2017), no. 1, 107–122.
- [14] L. Brasco, E. Parini, *The second eigenvalue of the fractional p -Laplacian*, Adv. Calc. Var. **9** (2016), no. 4, 323–355.
- [15] L. Brasco, E. Parini, M. Squassina, *Stability of variational eigenvalues for the fractional p -Laplacian*, Discrete Contin. Dyn. Syst. **36** (2016), no. 4, 1813–1845.
- [16] N. Katzourakis, E. Parini, *The eigenvalue problem for the ∞ -bilaplacian*, NoDEA Nonlinear Differential Equations Appl. **24** (2017), no. 6, art. 32, 18 pp.
- [17] B. Audoux, V. Bobkov, E. Parini, *On multiplicity of eigenvalues and symmetry of eigenfunctions of the p -Laplacian*, Topol. Methods Nonlinear Anal. **51**, no. 2 (2018), 565–582.
- [18] E. Parini, A. Stylianou, *A free boundary approach to the Rosensweig instability of ferrofluids*, Z. Angew. Math. Phys. **69** (2018), no. 2, art. 32, 18 pp.
- [19] V. Bobkov, E. Parini, *On the higher Cheeger problem*, J. Lond. Math. Soc. **97** (2018), no. 3, 575–600.
- [20] E. Parini, B. Ruf, *On the fractional Moser-Trudinger inequality in Sobolev-Slobodeckij spaces*, J. Anal. Math. **138** (2019), no. 1, 281–300.
- [21] E. Parini, A. Salort, *Compactness and dichotomy in nonlocal shape optimization*, Math. Nachr. **293** (2020) 2208–2232.
- [22] D. Buoso, E. Parini, *The buckling eigenvalue problem in the annulus*, Commun. Contemp. Math. **23** (2021), no. 4, Paper No. 2050044, 19 pp.
- [23] V. Bobkov, E. Parini, *On the Cheeger problem for rotationally invariant domains*, Manuscripta Math. **166** (2021), 503–522.
- [24] E. Parini, A. Salort, J. D. Rossi, *Reverse Faber-Krahn inequality for a truncated laplacian operator*, Publ. Math. **66** (2) (2022), 441–455.
- [25] D. Bonheure, E. Moreira dos Santos, E. Parini, H. Tavares, T. Weth, *Nodal solutions for sublinear-type problems with Dirichlet boundary conditions*, Int. Math. Res. Not. IMRN **2022** (5) (2022), 3760–3804.
- [26] E. Parini, G. Saracco, *Optimization of the anisotropic Cheeger constant with respect to the anisotropy*, Canad. Math. Bull. **66** (3) (2023), 1030–1043.
- [27] A. DelaTorre, E. Parini, *Uniqueness of least-energy solutions to the fractional Lane-Emden equation in the ball*, Math. Ann. **391** (2025), 3987–4010.
- [28] A. DelaTorre, E. Parini, *On Hopf’s Lemma for sign-changing supersolutions to fractional Laplacian equations*, submitted (2025)

Research publications in conference proceedings

- [1] E. Parini, *On the Lane-Emden problem for the p -Laplacian*, Oberwolfach reports **6** (2009), 1457–1459.
- [2] E. Parini, *Positivity preserving property for the hinged plate*, Oberwolfach reports **7** (2010), 335–336.

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- [3] E. Parini, B. Ruf, C. Tarsi, *Limiting Sobolev inequalities and the 1-biharmonic operator*, Adv. Nonlinear Anal. **3** S1 (2014), s19-s36.
- [4] E. Parini, B. Ruf, *On the fractional Moser-Trudinger inequality in Sobolev-Slobodeckij spaces*, Rend. Lincei Mat. Appl. **29** (2018), 315–319.

[Other publications \(peer-reviewed\)](#)

- [1] E. Parini, *An introduction to the Cheeger problem*, Surv. Math. Appl. **6** (2011), 9-22.