

# Arnaud Triay | Curriculum Vitae

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## Position / Education

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- **Professor (5 years non tenure track, W2 position)** **Munich**  
*Mathematisches Institut - LMU* *September 2022–*
- **Postdoctorant** **Munich**  
*Mathematisches Institut - LMU* *September 2019– August 2022*  
Advisor: Phan Thành Nam
- **Ph.D. student** **Paris**  
*Ceremade - Université Paris-Dauphine* *September 2016–August 2019*  
Advisor: Mathieu Lewin, Title: Mean-field limits in Quantum Mechanics  
- 24 June 2019: Ph.D. defense, Université Paris-Dauphine
- **Student of the École Normale Supérieure de Lyon** **Lyon**  
*École Normale Supérieure de Lyon* *September 2012– August 2016*
  - 2012/2013 : Bachelor in Mathematics, dissertation on the Bose-Einstein condensation [Dissertation](#) / [Slides](#) (advisor: Mathieu Lewin)
  - 2013/2014 : Master 1, 1 semester Erasmus exchange in Stockholm, Master thesis on Semi-classical limits and inequalities [Dissertation](#) / [Slides](#) (Advisor: Mathieu Lewin)
  - 2014/2015 : Master 2, Master thesis on the Derivation of the dipolar Gross-Pitaevskii theory [Dissertation](#) / [Slides](#) (advisor: Mathieu Lewin)
  - 2015/2016 : Research internship at Université Paris-Dauphine (advisor: Mathieu Lewin)
- **Classes préparatoires aux grandes écoles** **Marseille**  
*Lycée Thiers* *2009 - 2012*  
MPSI/MP\*
- **Scientific Baccalaureate** **Marseille**  
*Lycée Thiers* *June 2009*

## Projects

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- **DFG (German Research Foundation): co-PI, member of the governing body of the project** **2023-2027**  
Mathematics of many-body quantum systems and their collective phenomena  
SFB/TRR 352 collaborative research center funded  
[Webpage](#)
- **ANR (French National Agency for Research) / DFG: member of the project** **2024-2027**  
Mathematical Analysis of the Bose Polaron  
PRCI (Projet de Recherche Collaborative - International)  
[Webpage](#)

## Scholarships

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- **Mittag-Leffler Institut** **Stockholm**  
*2 months postdoctoral fellowship grant* *January-March 2019*
- **Université Paris-Dauphine** **Paris**  
*Ph.D. scholarship from the École Normale Supérieure de Lyon* *2016–2019*
- **ÉNS de Lyon** **Lyon**  
*Scholarship from the École Normale Supérieure de Lyon* *2012–2016*

## Teachings

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- **LMU München** **Munich**  
- Mathematical Quantum Mechanics II (lecture 56 hours), Master, Summer 2023 *2019–*  
- Mathematical Quantum Mechanics (lecture 56 hours), Master, Winter 2023  
- Introduction to the Calculus of Variations (lecture 56 hours), Master, Summer 2023  
- Advanced Analysis (lecture 56 hours, exercises 28 hours), Master, Winter 2022  
- PDE 2 (exercices, Golden Carathéodory Prize for Best master tutor 2022! [Link](#), 28 hours), Master, Summer 2022  
- Numerik 1 (exercices, 28 hours), Bachelor 1, Winter 2019
- **Université Paris-Dauphine** **Paris**  
- Analysis 2 (exercices, 2\*55 hours), Bachelor 1, 2016–2018 *2016– 2019*  
- Probability 1 (exercices, 3\*27 hours), Bachelor 1 2016–2019
- **Lycée Janson-de-Sailly, Classe préparatoire aux grandes écoles** **Paris**  
(*Khôlleur*) *Oral examiner (64 hours)* *September 2015– May 2016*  
Weekly oral exams for the whole program of MPSI / MP (covers a vast part of the Bachelor program of mathematics)
- **Lycée Turgot, Classe préparatoire aux grandes écoles** **Paris**  
*Exercices class (32 hours)* *September 2015– May 2016*  
Informatics, application of the mathematics program, ECT (economics section)
- **Lycée du Parc, Classe préparatoire aux grandes écoles** **Lyon**  
(*Khôlleur*) *Oral examiner (32 hours)* *September 2014– May 2015*  
Weekly oral exams for the whole program of MPSI / MP\* (covers a vast part of the Bachelor program of mathematics)

## Publications or accepted articles

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- [8] Nam, P.T., & Triay, A. (2023) . Bogoliubov excitation spectrum of trapped Bose gases in the Gross-Pitaevskii regime, *J. Math. Pures Appl. Volume 176*, p 18-101 [arXiv:2106.11949](#) [doi:10.1016/j.matpur.2023.06.002](#)
- [7] Nam, P.T., Ricaud, J. & Triay, A. (2023). The condensation of a trapped dilute Bose gas with three-body interactions, *Prob. Math. Phys., Vol.4 (1)* [arXiv:2110.08195](#) [doi:doi:10.2140/pmp.2023.4.91](#)
- [6] Hainzl, C., Schlein, B. and Triay, A. (2022) Bogoliubov theory in the Gross-Pitaevskii limit: a simplified approach, *Forum of Mathematics, Sigma, Vol. 10*, e90 [arXiv:2203.03440](#) [doi:10.1017/fms.2022.78](#)
- [5] Nam, P.T., Ricaud, J. & Triay, A. (2021). Ground state energy of the low density Bose gas with three-body interactions, *J. Math. Phys., 63*, [arXiv:2201.13440](#) [doi:10.1063/5.0087026](#)
- [4] Nam, P.T., Napiórkowski, M., Ricaud, J. & Triay, A. (2022). Optimal rate of condensation for trapped bosons in the Gross-Pitaevskii regime. *Analysis & PDE, Vol. 15, 2022, No. 6*, [arXiv:2001.04364](#) [doi:10.2140/apde.2022.15.1585](#)
- [3] Fournais, S., Lewin, M. & Triay, A. (2020). The Scott correction in Dirac-Fock theory. *Comm. Math. Phys.* , 2020 [arXiv:1911.09482](#) [doi:10.1007/s00220-020-03781-6](#)

- [2] Lewin, M., Madsen, P. S., & Triay, A. (2019). Semi-classical limit of large fermionic systems at positive temperature. *Journal of Mathematical Physics* 60:091901, 2019 [arXiv:1902.00310](#) [doi:10.1063/1.5094397](#)
- [1] Triay, A. (2018). Derivation of the Dipolar Gross–Pitaevskii Energy. *SIAM Journal on Mathematical Analysis*, 50(1), 33-63. [arXiv:1703.03746](#) [doi:10.1137/17M112378X](#)

## Proceedings

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- Nam, P.T., Ricaud, J. & Triay, A. (2022). Dilute Bose gas with three-body interaction: recent results and open questions, *Journal of Mathematical Physics*, Contribution to the Proceedings of the 20th ICMP, Geneva 2021 [arXiv:2202.13967](#) / [doi:10.1063/5.0089775](#))

## Preprints

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- Haberberger F., Hainzl C., Schlein, B. and Triay, A. Upper Bound for the Free Energy of Dilute Bose Gases at Low Temperature [arXiv:2405.03378](#)
- Lampart J., & Triay A. (2024) The excitation spectrum of a dilute Bose gas with an impurity [arXiv:2401.14911](#)
- Haberberger F., Hainzl C., Nam P.T., Seiringer R. & Triay A. (2023) The free energy of dilute Bose gases at low temperatures [arXiv:2304.02405](#)
- Triay, A. (2019). Existence of minimizers in generalized Gross-Pitaevskii theory with the Lee-Huang-Yang correction. [arXiv:1904.10672](#)
- Triay, A. (2019). Derivation of the time-dependent Gross-Pitaevskii equation for the dipolar gases. [arXiv:1904.04000](#)

## Invited talks

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- AMS-UMI International Joint Meeting, special session: Functional Analytic Methods in Quantum Many-Body Theory, Palermo, Italy, July 23-26 2024
- Frontiers in Analysis and Mathematical Physics, Seoul, Korea, April 8-12, 2024,
- Many-Body Quantum Systems, Oberwolfach, Sept. 10 - Sept. 15, 2023 [Link](#)
- Recent advances in Bose-Einstein condensation, TUM Munich, Aug. 30 - Sept. 1, 2023 [Link](#)
- Effective theories in classical and quantum particle systems, Les Diablerets, Switzerland, June 18 - 23, 2023 [Link](#)
- On Fermionic Quantum Systems, CAS Munich, Jan. 23-24, 2023 [Link](#)
- The analysis of relativistic quantum systems, CIRM Marseille, Jan. 9-13, 2023 [Link](#)
- Mini-Symposium: Mathematical Analysis of Complex Quantum Systems, of the DMV annual meeting, Sept. 20-22, 2022 [Link](#)
- Conference: Mathematical results of many-body quantum systems, Herrsching, June 6-11, 2022 [Link](#)
- Conférence annuelle du GDR Dynqua – Online (Université de Bourgogne), Mars 12, 2021 [Link](#)
- Kick-off conference: Spectral Methods in Mathematical Physics, Mittag Leffler Institut Stockholm, Jan. 14-18, 2019 [Link](#)
- Workshop: Many-Body Quantum Mechanics, CRM Montréal, Sept. 10-14 2018 [Link](#)

## Contributed talks

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- Internation Congress of Mathematical Physics 2021, Genève, Aug. 4, 2021 [Link](#)
- Conference 'Analysis of Complex Quantum Systems', CIRM Marseille, Oct. 21, 2019 [Link](#)
- Young Researcher Symposium, ICMP 2018, Montréal, Jul. 20-21 2018 [Link](#)
- Arizona School of Analysis and Mathematical Physics, Tucson University, Mar. 5-9 2018 [Link](#)

## Seminars

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- Séminaire de Physique Mathématiques – Université de Bourgogne, Mars 2, 2022 [Link](#)
- Seminar "Analysis and Mathematical Physics", LMU-Munich, Nov 12, 2021
- Munich-Aarhus-Santiago Seminar in Mathematical Physics – Online, Nov. 8, 2021 [Link](#)
- Séminaire de Physique Mathématiques – Université de Genève, Feb 22, 2021
- Séminaires Dynamique Quantique et Classique – CPT-Marseille, 18 Nov. 2020, 15 Mai. 2020 [Link](#)
- Oberseminar 'Analysis and Mathematical Physics' – LMU-Munich, May 15, 2020 [Link](#)
- Oberseminar Institut für Mathematik – Universität Kassel, Jul. 15, 2019 [Link](#)
- Oberseminar 'Calculus of Variations and Applications', LMU Munich, May 29, 2019 [Link](#)
- Seminar Mathematical Physics Analysis, IST Vienna, Mar. 21, 2019 [Link](#)
- Analysis seminar of the Mathematics department, Aarhus University, Apr. 19 2018 [Link](#)
- Young Seminar, Université de Lorraine, Apr. 10 2018 [Link](#)
- Young Seminar, Université Paris-Dauphine, Nov. 5 2015 [Link](#)

## Supervision

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### PhD students.....

- François Visconti (PhD student, co-supervision with P.T. Nam): 2023 –
- Florian Haberberger (PhD student, co-supervision with C. Hainzl): 2021–

### Master and bachelor students.....

- François Visconti (ENPC, end-of-studies thesis): 2022
- Cema Yigit Özkan (LMU, Bachelor thesis): 2022

## Other

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- Co-organizer of the Workshop of Young Researchers in Mathematical Physics, [Link](#)
- Co-organizer of the Oberseminar, LMU Munich, [Link](#)
- Master thesis committee: Nicco Mietzsch (2020), Chun Yin Lam (2021)
- Representative for PhD students at the Doctoral School at Université Paris-Dauphine, 2017-2019
- Organizer of the "Young seminar", Ceremade, Université Paris-Dauphine, Sept. 2017 - June 2019, [Link 1](#), [Link 2](#)
- "Reviewer" for Images des Mathématiques, [Link](#)