

Sofía ALLENDE

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EDUCATION

PhD in Physics	Université Côte d'Azur , Nice, France CEMEF, MINES PARISTECH.
2017-2021	Dissertation: "Dynamics and Statistics of Elongated and Flexible Particles in Turbulent Flows". Supervised by Dr. J. BEC, conferred on 4 March 2021.
Master in Physics	Université Aix-Marseille , Marseille, France. Speciality: Diphasic flows, energy and combustion.
2016-2017	LAGRANGE team, Observatoire de la côte d'Azur. Dissertation: "Numerical study of a compressible turbulent flow". Supervised by Dr. H. Homann, conferred on September 2017.
Engineer	Polytech Marseille , France, Master level, major in Mechanical engineering.
2010-2017	Universidad técnica Federico Santa María , Chile, Master level, major in Industrial engineering.

RESEARCH EXPERIENCE

Present	Postdoctoral Researcher, UNIVERSITÉ CATHOLIQUE DE LOUVAIN, EARTH AND LIFE INSTITUTE, Belgium
May 2021	My current work addresses the physical processes occurring in sea ice covered regions of the Arctic ocean. It is based on data analysis applied to general circulation models. <div>Polar regions Ocean mixed layer Sea ice Ocean Model Intercomparison Project</div>
March 2021	PhD in physics "Dynamics and Statistics of Elongated and Flexible Particles in Turbulent Flows", COLLABORATION BETWEEN INRIA, CEMEF AND EDF, Sophia Antipolis, France
Nov 2017	My PhD work addressed the dynamics of small complex particles suspended in turbulent flows, relying on massive numerical simulations and systematic statistical analysis. We analyzed the effects of shapes, mass and rheology on the turbulent dynamics of small particles and developed statistical models of turbulent fragmentation. <div>Turbulence Data science Numerical simulations</div>

JOURNAL PUBLICATIONS

Published

1. **Allende, S.**, Fichet, T., Goosse, H. and Treguier, A.M., 2023. "On the ability of OMIP models to simulate the ocean mixed layer depth and its seasonal cycle in the Arctic Ocean". *Ocean Modelling*, 184, p.102226. (published in August 2023, 1 citation)
2. **Allende, S.** and Bec, J., 2023. "Velocity and acceleration statistics of heavy spheroidal particles in turbulence". *Journal of Fluid Mechanics*, 967, p.R4. (published in July 2023, 0 citations) [arXiv 2304.11139v1](#)
3. Goosse, H., **Allende S.**, Bitz, C.M., Blanchard-Wrigglesworth, E., Eayrs, C., Fichet, T., Him-mich, K., Huot, P.V., Klein, F., Marchi, S. and Massonnet, F., 2023. "Modulation of the sea-sonal cycle of the Antarctic sea ice extent by sea ice processes and feedbacks with the ocean and the atmosphere". *The Cryosphere*, 17(1), pp.407-425. (published in January 2023, 1 citation) [The Cryosphere, 17, 407–425, 2023](#)
4. **Allende, S.**, Henry, C. and Bec, J., 2020. "Dynamics and fragmentation of small inexten-sible fibres in turbulence". *Philosophical Transactions of the Royal Society A*, 378(2175), p.20190398. (published in July 2020, 6 citations) [arXiv 1912.06716](#)
5. **Allende, S.**, Henry, C. and Bec, J., 2018. "Stretching and buckling of small elastic fibers in turbulence". *Physical review letters*, 121(15), p.154501.(published in October 2018, 34 citations) [arXiv 1805.05731](#)

In preparation

1. **Allende, S.**, Fichet, T., Goosse, H. and Treguier, A.M., 2023. "Impact of ocean vertical mixing parametrization on sea ice properties using NEMO-SI3 model". *Target Journal: Geoscientific Model Development*.
2. Bec, J. and **Allende, S.** 2023. "Small-scale alignment and clusters of heavy inertial spheroids in turbulent flow". *Target Journal: Physical review letters*.

These

Allende, S., 2021. "Dynamics and statistics of elongated and flexible particles in turbu-lent flows". (Doctoral dissertation, Université Côte d'Azur) (published in 2021, 1 citation) [HAL tel-03284996](#)

TEACHING EXPERIENCE

2022	Physics Department, UNIVERSITÉ CATHOLIQUE DE LOUVAIN, Belgium
2021	Undergrad level. Electromagnetism (instructor: Vincent Boucher) and Introduction to Physics II (instructor: Vincent Lemaitre). About 100 hours.
2015	Physics Department, UNIVERSIDAD TÉCNICA FEDERICO SANTA MARÍA, Chile
2012	Undergrad level. Laboratory of Physics I, II, III and IV (instructor: Rodrigo Quiroz). About 80 hours.
	Mathematics Department, UNIVERSIDAD TÉCNICA FEDERICO SANTA MARÍA, Chile
	Undergrad level. Computer laboratory mathematics IV. About 30 hours.
	Industrial Eng. Department, UNIVERSIDAD TÉCNICA FEDERICO SANTA MARÍA, Chile
	Microeconomics (instructor: Alvaro Brunel), Macroeconomics (instructor: Alvaro Brunel), Econometrics (instructor: Pedro Fernández). About 100 hours.



CONFERENCES AND PRESENTATIONS

1. **(Invited talk)** “Summer and winter deepening of the mixed layer in Arctic Seas from Ice-Tethered Profilers”. Tuesday’s discussions seminar, LOPS IFREMER, Brest, France. (May 2023)
2. **(Poster)** “On the ability of OMIP models to simulate the seasonal cycle of the ocean mixed layer depth in pan-Arctic Seas”, EGU General Assembly, Vienna, Austria. (April 2023)
3. **(Invited talk)** “Mixed layer depth in Arctic Seas”. Seminar, CPT, Marseille, France. (Nov. 2022)
4. **(Poster)** “On the ability of CMIP6 OMIP models to simulate the seasonal cycle of the ocean mixed layer depth in multiyear sea ice covered regions”. GDR Défis théoriques pour les sciences du climat meeting, Paris, France. (June 2022)
5. **(Talk)** “On the ability of CMIP6 OMIP models to simulate the seasonal cycle of the ocean mixed layer depth in the central Arctic Ocean”. EGU General Assembly, Vienna, Austria. (May 2022)
6. **(Talk)** “Dynamics and fragmentation of small inextensible fibers in turbulence”, 17th European Turbulence Conference, Torino, Italy. (Sept. 2019)
7. **(Talk)** “Dynamics and fragmentation of small inextensible fibers in turbulence”, 10th International Conference on Multiphase Flow, Rio de Janeiro, Brazil. (May 2019)
8. **(Poster)** “Dynamics and fragmentation of small inextensible fibers in turbulence”, Rencontre du non-linéaire, Paris, France. Poster. (March 2019))
9. **(Talk)** “Buckling of small inextensible fibers in turbulence”, GDR 2685 Phénoménologie de la turbulence, Université Côte d’Azur, Nice, France. (Oct. 2018)
10. **(Talk)** “Buckling of small inextensible fibers in turbulence”, Fluids and Complexity conference, Université Côte d’Azur, Nice, France. (Dec. 2018)
11. **(Talk)** “Stretching and buckling of small fibers in turbulence”, Deformable objects in flows, IRPHE, Marseille, France. (May 2018)



ADVANCED COURSES

- 2022** GDR “Défis théoriques pour les sciences du climat” school on Climate Sensitivity, Lyon, France.
- 2020** IMPA summer program in mathematics, Rio de Janeiro, Brazil.
- 2019** ICTS Bangalore school in statistical physics-x. Bangalore, India.
Winter school : New Challenges in Turbulence Research. Les Houches, France.



AWARDS AND FELLOWSHIPS

- 2021-present** BELSPO postdoctoral fellowship at Université Catholique de Louvain, Belgium.
- 2019** Prize “Ismael Valdés Valdés”, rewarding the most distinguished student in industrial engineering at Universidad Técnica Federico Santa Maria. Awarded by College of Engineers of Chile A.G.
- 2015** Movilidad scholarship Universidad Técnica Federico Santa Maria to obtain a double degree with Université Aix-Marseille. Grant amount: 17.000 euros.
- 2012-2015** Honour Roll, Universidad Técnica Federico Santa Maria.

COMPUTING SKILLS

- Advanced use** Data analysis software: Python, Matlab, Paraview.
Work environment: bash and Git.
Numerical codes: NEMO-SI3 (GCM) and LaTu (DNS).
Scientific editing: LaTeX and Keynote.
- Common use** C++ , Fortran, and Mathematica languages.
Parallel computing in Unix and MacOS environments.

HIGH-PERFORMANCE COMPUTING EXPERIENCE

- 2021-present** Consortium des Équipements de Calcul Intensif; 150.000 CPU-hour.
- 2020** Azzurra HPC center Université Côte d’Azur; 150.000 CPU-hour (lead: J. Bec).
- 2019-2020** HPC Idris; 5 Million CPU-hour available on Turing; grant number: A0062A10800 (lead: J. Bec).

LANGUAGES

Spanish	●	●	●	●	●
French	●	●	●	●	●
English	●	●	●	●	○
Portuguese	●	●	●	○	○