Postdoctoral Research Position
Resolvent Modelling of Jet Noise

Project SALSA: A DGAC-funded initiative under AIRBUS coordination
(Simulations Acoustiques pour la modéLiSation du bruit Avion)

The *Aerodynamics, Acoustics & Turbulence* (2AT) group at Institut Pprime is seeking a highly motivated postdoctoral researcher to join a collaborative project with Airbus.

Project overview

Building on recent advances in mean-field-based linearised models for turbulent jet dynamics and aeroacoustics [1, 2], the 2AT group has developed resolvent-based tools for jet-noise modelling, estimation, and control [3–13]. The successful candidate will use these tools—working in collaboration with Airbus and 2AT researchers—to develop a predictive model for sound radiation associated with the dominant resolvent modes, explicitly accounting for decoherence effects arising from two-point turbulence statistics. This framework will initially be validated on axisymmetric jets and subsequently applied to fully three-dimensional cases.

Position details

- **Duration:** 24 months (with potential continuation on related projects)
- **Start date:** May 2026 (± 2 months)
- **Location:** Institut Pprime, Poitiers, France
- **Net salary:** €2.4–3.3k per month

Required qualifications

- PhD in Mechanical or Aerospace Engineering (or a closely related field)
- Proven experience in numerical simulation for fluid mechanics and/or aeroacoustics
- Strong background in linear algebra and signal processing

Desired qualities

- Strong teamwork and communication skills
- Motivation for applied, high-impact research
- Capacity for independent and creative problem-solving
- Openness to collaboration with industrial partners (Airbus)
- Interest in future modelling projects for aerospace applications

A unique opportunity

This position offers an opportunity to work at the interface of fundamental and applied research, connecting advanced modelling and computation with real-world aeronautical challenges. Depending on project development and results, further collaboration with Airbus and related research initiatives may follow.

To apply

Please send a CV and cover letter outlining your relevant experience and motivation to peter.jordan@univ-poitiers.fr.

References

[1] P. Jordan and T. Colonius. Wave packets and turbulent jet noise. *Annual Review of Fluid Mechanics*, 45: 173–195, 2013.

[2] A. V. G. Cavalieri, P. Jordan, and L. Lesshafft. Wave-packet models for jet dynamics and sound radiation. *Appl. Mech. Rev.*, 71(2), 2019.

[3] U. Karban, B. Bugeat, A. Towne, L. Lesshafft, A. Agarwal, and P. Jordan. An empirical model of noise sources in subsonic jets. *J. Fluid Mech.*, 965:A18, 2023.

[4] B. Bugeat, U. Karban, A. Agarwal, L. Lesshafft, and P. Jordan. Acoustic resolvent analysis of turbulent jets. *Theoretical and Computational Fluid Dynamics*, 38(5):687–706, 2024.

[5] E. Pickering, A. Towne, P. Jordan, and T. Colonius. Resolvent-based modeling of turbulent jet noise. *The Journal of the Acoustical Society of America*, 150(4):2421–2433, 2021.

[6] K. Sasaki, S. Piantanida, A.V.G. Cavalieri, and Jordan, P. Real-time modelling of wavepackets in turbulent jets. *J. Fluid Mech.*, 821, 2017.

[7] E. Martini, D. Rodríguez, A. Towne, and A.V.G. Cavalieri. Efficient computation of global resolvent modes. *Journal of Fluid Mechanics*, 919:A3, 2021.

[8] E. Martini, J. Jung, A. V. G. Cavalieri, P. Jordan, and A. Towne. Resolvent-based tools for optimal estimation and control via the Wiener–Hopf formalism. *J. Fluid Mech.*, 937:A19, 2022.

[9] F. R. Amaral, A. V.G. Cavalieri, E. Martini, P. Jordan, and A. Towne. Resolvent-based estimation of turbulent channel flow using wall measurements. *Journal of Fluid Mechanics*, 927:A17, 2021.

[10] I. A. Maia, P. Jordan, A. V. G. Cavalieri, E. Martini, K. Sasaki, and F. J. Silvestre. Real-time reactive control of stochastic disturbances in forced turbulent jets. *Phys. Rev. Fluids*, 6(12):123901, 2021.

[11] I. A. Maia, P. Jordan, and A. V. G. Cavalieri. Wave cancellation in jets with laminar and turbulent boundary layers: The effect of nonlinearity. *Phys. Rev. Fluids*, 7(3):033903, 2022.

[12] D. Audiffred, A. V. G. Cavalieri, I. A. Maia, E. Martini, and P. Jordan. Reactive experimental control of turbulent jets. *J. Fluid Mech.*, 994:A15, 2024.

[13] M. Mancinelli, D. B. Audiffred, E. Martini, P. Jordan, A.V.G. Cavalieri, and A. Lebedev. Linear reactive control of jet installation noise. *J. Fluid Mech.*, 1017:A8, 2025.