

## **Franck Malige**

PhD in Astronomy, mathematics teacher, attached to lycée Victor Hugo of Marseille

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July 2022

# Curriculum vitae

## **Studies**

- 1994 - 1998 Ecole Normale Supérieure de Cachan, département of Mathematics. Master 1 in mathematics. Master 2 "Astronomie fondamentale", Observatoire de Paris.
- 1997 Agrégation in Mathematics
- 1998 - 2001 PhD in astronomy 'Stabilité effective des systèmes planétaires', at the "Bureau des longitudes/IMCCE", directors : Dr Jacques Laskar and Dr Philippe Robutel ([4, 10])
- 2002 : Post doctoral position in celestial mechanics in Universidad de Lisboa. director : Dr Ana Nunes.

## **Professional positions**

- Since 2006 : Permanent teaching position (professeur agrégé in mathematics) in Victor Hugo High School in Marseilles.
- Since 2018 : Member of LIS laboratory, DYNI team.

## **Professional projects**

- 2013 : Project HERACLES in Nouvelle Calédonie : acoustical follow up of humpback whales in the Lagon Sud with Hervé Glotin and Pascale Giraudet (2013) [1, 16].
- 2013-2017 : Long-term monitoring of sperm whales around the Port-Cros National Parc (France) with the DYNI team of Toulon university[3].
- 2016-2019 Three years sabbatical for a professional research project in collaboration with Toulon university and Stic Am Sud ( $n^{\circ}17 - STIC - 01$ ) : Participation in the project linked to the PhD of Julie Patris "Contributions en méthodes pour le suivi de mysticètes par acoustique passive" [12, 15]. Development of new techniques based on boundary elements methods to compute the sound propagation of cetaceans [6]. Mathematical modelisation and signal processing analysis of long term trend of Southeast Pacific blue whales songs [8, 13, 11]. Acoustical analysis of underwater explosions in northern Chile [7]. Analysis of patterns in humpback whales songs by means of recurrence plots [5].
- 2019 : Sphyrna-Odyssey mission with Toulon university (<https://www.sphyrna-odyssey.com/>) [2].
- 2021 : Scientific project in France and Chile : acoustic study of coastal dolphins in Chilean fjords, theoretical research on long-term evolution of blue whale's songs [14, 17, 9].
- Organisation of LAMLA II conference (Listening to Aquatic Mammals in Latin America), Valparaiso, november 2016 (<http://www.lamla2016.com/lamla-valparaiso-2016>), LAMLA III workshop in Lima in november 2018 and LAMLA IV in Salvador de Bahia, september 2022.

## References

- [1] H. Glotin, P. Giraudet, J. Patris, F. Malige, J. Razik, S. Paris, R. Balestrierio, J. Piquet, and J.-M. Prévot. Heracles: Humpback whale real-time acoustics in new-caledonia for localization, density estimation and survey in the 'grand lagon sud'. Technical report, Report to the gov. of New-Caledonia, Province Sud, 2013-2014.
- [2] H. Glotin, M. Poupard, M. Ferrari, J. Patris, R. Marxer, P. Giraudet, J.M. Prevot, V. Barchasz, V. Gies, C. Ciausu, J. Schlüter, F. Sarano, G. Pavan, N. Boizot, P. d'Ales, J.B. Hanrion, S. Paris, J. Razik, P. Cosentino, V. Sarano, F. Malige, M. Asch, T. Soriano, and F. De Varenne. Etho-acoustique 3d du cachalot en zone anthropisée depuis le drone surface sphyrna. premiers résultats et perspectives de nouvelles mesures de protection. Technical report, Université de Toulon, LIS DYNI, 2020.
- [3] Hervé Glotin, Pascale Giraudet, Julien Ricard, Franck Malige, Julie Patris, Vincent Roger, Jean-Marc Prévot, Marion Poupard, Olivier Philippe, and Philippe Cosentino. Suivi long terme du cachalot sur l'observatoire bioacoustique toulonnais bombyx. Technical report, Université de Toulon and Parc national de Port-Cros au titre d'animateur de la Partie française de Pelagos Sanctuaire pour les mammifères marins and Toulon Var-Technologie, 2017.
- [4] F. Malige. *Stabilité effective des systèmes planétaires. Application au problème séculaire de Jupiter et Saturne*. PhD thesis, Observatoire de Paris, November 2001.
- [5] F. Malige, D. Djokic, J. Patris, R. Sous-Lima, and H. Glotin. Use of recurrence plots for identification and extraction of patterns in humpback whale song recordings. *Bioacoustics*, 2020.
- [6] F. Malige and M. Hauray. Research report : Méthode d'éléments finis aux frontières. application à la propagation de vocalises de baleines bleues. 2017.
- [7] F. Malige, J. Patris, S. Buchan, and H. Glotin. Acoustical analyses of submarine explosions in northern chile on long term continuous recordings. June 2018. Poster in DCLDE conference, Paris.
- [8] F. Malige, J. Patris, S. Buchan, K. Stafford, F. Shabangu, K. Findlay, R. Huckle-Gaete, S. Neira, C. Clark, and H. Glotin. Inter-annual decrease in pulse rate and peak frequency of southeast pacific blue whale song types. *Scientific reports*, 10:8121, 2020.
- [9] F. Malige, J. Patris, M. Hauray, P. Giraudet, H. Glotin, and C. Nous. Mathematical models of long term evolution of blue whale song types' frequencies. *Journal of theoretical biology*, 2022. 548/ 111184.
- [10] F. Malige, P. Robutel, and J. Laskar. Partial reduction in the n-body planetary problem using the angular momentum integral. *Celestial Mechanics and Dynamical Astronomy*, 84:283–316, 2002.
- [11] J. Patris, S. Buchan, G. Alosilla, F. Malige, N. Balcazar, and H. Glotin. Southeast pacific blue whale song recorded off isla chañaral, northern chile. *Marine Mammal Science Note*, 2020. 1-8.
- [12] J. Patris, D. Komatitsch, M. Sepulveda, M. Santos, H. Glotin, F. Malige, S. Buchan, and M. Asch. Mono-hydrophone localization of baleen whales : a study of propagation using spectral element method applied in northern chile. *IEEE*, 2019.
- [13] J. Patris, F. Malige, H. Glotin, M. Asch, and S. Buchan. A standardized method of classifying pulsed sounds and its application to pulse rate measurement of blue whale southeast pacific song units. *JASA*, 146(4), October, 2019.
- [14] J. Patris, F. Malige, M. Hamame, H. Glotin, V. Barchasz, V. Gies, S. Marzetti, and S. Buchan. Medium-term acoustic monitoring of patagonian coastal dolphins. *submitted to PeerJ*, 2022.
- [15] Julie Patris. *Contributions en méthodes pour le suivi de mysticètes par acoustique passive*. PhD thesis, 12 2019. Thèse de doctorat dirigée par Glotin, Hervé et Asch, Mark.
- [16] Julie Patris, Pascale Giraudet, Franck Malige, Laurence Bachet, and Hervé Glotin. A l'écoute des cétacés. *Revue Espèces*, 15, 2015.
- [17] C. Rojas, S.J. Buchan, T.A. Branch, F. Malige, J. Patris, R. Huckle-Gaete, and I. Staniland. Presence of southeast pacific blue whales (*balaenoptera musculus*) off south georgia in the south atlantic ocean. *Marine Mammal Science*, pages 1–17, 2022.