

# Jonathan M. Lilly

NorthWest Research Associates  
4118 148th Ave. NE, Redmond, WA 98052  
lilly@nwra.com | [www.jmlilly.net](http://www.jmlilly.net) | (425) 556-9055

## Professional Preparation

Yale University	Geology and Geophysics	B. S. 1994
University of Washington	Physical Oceanography	M. S. 1997, Ph. D. 2002
University of Washington	Physical Oceanography	Postdoc 2002–2003
Université Pierre et Marie Curie, Paris	Physical Oceanography	Postdoc 2003–2005

## Appointments

NorthWest Research Associates	Senior Research Scientist	May 2010–present
Earth and Space Research	Research Associate	Sept. 2005–April 2010
Université Pierre et Marie Curie, Paris	Postdoctoral Research Fellow	Sept. 2003–Aug. 2005
UW Applied Physics Laboratory	Postdoctoral Research Associate	June 2002–May 2003
UW School of Oceanography	Graduate Research Assistant	Sept. 1994–June 2001

## Publications

31. Lilly, J. M., A. M. Sykulski, J. J. Early, and S. C. Olhede (2017). Fractional Brownian motion, the Matérn process, and stochastic modeling of turbulent dispersion. *Nonlinear Processes in Geophysics*, **24**: 481–514.
30. Guillaumin, A., A. M. Sykulski, S. C. Olhede, J. J. Early, and J. M. Lilly (2017). Analysis of non-stationary modulated time series with applications to oceanographic surface flow measurements. *Journal of Time Series Analysis*, **38** (5): 668–710.
29. Lilly, J. M. (2017). Element analysis: a wavelet-based method for analyzing time-localized events in noisy time series. *Proceedings of the Royal Society of London, Series A*, **473** (2200): 20160776, 1–28.
28. Sykulski, A. M., S. C. Olhede, J. M. Lilly, and J. J. Early (2016). Stochastic modeling and estimation of stationary complex-valued signals. *IEEE Transactions on Signal Processing*, **65** (12): 3136–3151.
27. Sykulski, A. M., S. C. Olhede, and J. M. Lilly (2016). A widely linear complex autoregressive process of order one. *IEEE Transactions on Signal Processing*, **64** (23): 6200–6210.
26. Elipot, S., R. Lumpkin, R. C. Perez, J. M. Lilly, J. J. Early, and A. M. Sykulski (2016). A global surface drifter data set at hourly resolution. *Journal of Geophysical Research: Oceans*, **121** (5): 2937–2966.
25. Sykulski, A. M., S. C. Olhede, J. M. Lilly, and E. Danioux (2016). Lagrangian time series models for ocean surface drifter trajectories. *Journal of the Royal Statistical Society: Series C*, **65** (1): 29–50.
24. Stewart, K. D., P. Spence, S. Waterman, J. Le Sommer, J.-M. Molines, J. M. Lilly, and M. H. England (2015). Anisotropy of eddy variability in the global ocean. *Ocean Modelling* **95**: 53–65.
23. Wain, D. J., J. M. Lilly, A. H. Callaghan, I. Yashayaev, and B. Ward (2015). A breaking internal wave in the surface ocean boundary layer. *Journal of Geophysical Research* **120** (6): 4151–4161.
22. Waterman, S. N., and J. M. Lilly (2015). Geometric decomposition of eddy feedbacks in barotropic systems. *Journal of Physical Oceanography* **45** (4): 1009–1024.

## Publications, continued

21. Hattermann, T., L. H. Smedsrud, O. A. Nøst, J. M. Lilly, and B. Galton-Fenzi (2014). Eddy-resolving model reveals two states of basal melting below Fimbul Ice Shelf, Antarctica. *Ocean Modeling*, **82**: 28–44.
20. Bower, A. S., R. M. Hendry, D. E. Amrhein, and J. M. Lilly (2013). Direct observations of formation and propagation of subpolar eddies into the subtropical North Atlantic. *Deep-Sea Research*, **85**: 15–41.
19. Lilly, J. M. and S. C. Olhede (2012). Generalized Morse wavelets as a superfamily of analytic wavelets. *IEEE Transactions on Signal Processing* **60** (11): 6036–6041.
18. Hattermann, T., O. A. Nøst, J. M. Lilly, and L. H. Smedsrud (2012). Two years of oceanic observations below the Fimbul Ice Shelf, Antarctica. *Geophysical Research Letters* **39** L12605: 1–6.
17. Lilly, J. M. and S. C. Olhede (2012). Analysis of modulated multivariate oscillations. *IEEE Transactions on Signal Processing* **60** (2): 600–612.
16. Lilly, J. M., R. K. Scott, and S. C. Olhede (2011). Extracting waves and vortices from Lagrangian trajectories. *Geophysical Research Letters* **38** L23605: 1–5.
15. Lilly, J. M. (2011). Modulated oscillations in three dimensions. *IEEE Transactions on Signal Processing* **59** (12): 5930–5943.
14. Lilly, J. M. and S. C. Olhede (2010). On the analytic wavelet transform. *IEEE Transactions on Information Theory* **56** (8): 4135–4156.
13. Lilly, J. M. and S. C. Olhede (2010). Bivariate instantaneous frequency and bandwidth. *IEEE Transactions on Signal Processing* **58** (2): 591–603.
12. Rykova, T., F. Straneo, J. M. Lilly, and I. Yashayaev (2009). Irminger Current anticyclones in the Labrador Sea observed in the hydrographic record, 1990–2004. *Journal of Marine Research* **67** (3): 361–384.
11. Lilly, J. M. and S. C. Olhede (2009). Higher-order properties of analytic wavelets. *IEEE Transactions on Signal Processing* **57** (1): 146–160.
10. Lagerloef, G, F.R. Colomb, D. Le Vine, F. Wentz, S. Yueh, C. Ruf, J. Lilly, J. Gunn, Y. Chao, A. deCharon, G. Feldman, and C. Swift (2008). The Aquarius/SAC-D mission: Designed to meet the salinity remote-sensing challenge. *Oceanography* **21** (1): 69–81.
9. Rilling, G., P. Flandrin, P. Gonçalves, and J. M. Lilly (2007). Bivariate empirical mode decomposition. *IEEE Signal Processing Letters* **14** (12): 936–939.
8. Lilly, J. M. and J.-C. Gascard (2006). Wavelet ridge diagnosis of time-varying elliptical signals with application to an oceanic eddy. *Nonlinear Processes in Geophysics* **13**: 467–483.
7. Bunge, L., C. Provost, J. M. Lilly, M. D’Orgeville, A. Kartavtseff, and J.-L. Melice (2006). Structure of the horizontal velocity in the upper 1600 m of the water column on the equator at 10° W. *Journal of Physical Oceanography* **36**: 1287–1304.
6. Lilly, J. M. and E. E. Lettvin (2004). The “switch-on” problem for linear time-invariant operators. *Signal Processing* **84**: 763–784.
5. Lilly, J. M., P. B. Rhines, F. Schott, K. Lavender, J. R. N. Lazier, U. Send, and E. D’Asaro (2003). Observations of the Labrador Sea eddy field. *Progress in Oceanography* **59** (1): 75–176.
4. Lilly, J. M. and P. B. Rhines (2002). Coherent eddies in the Labrador Sea observed from a mooring. *Journal of Physical Oceanography* **32**: 585–598.
3. Lilly, J. M., P. B. Rhines, M. Visbeck, R. E. Davis, J. R. N. Lazier, F. Schott, and D. Farmer (1999). Observing deep convection in the Labrador Sea during winter 1994–95. *Journal of Physical Oceanography* **29**: 2065–2098.
2. Lilly, J. M., and J. Park (1995). Multiwavelet spectral and polarization analysis. *Geophysical Journal International* **122**: 1001–1021.
1. Bolton, E. W., K. A. Maasch and J. M. Lilly (1995). A wavelet analysis of Plio-Pleistocene climate indicators. *Geophysical Research Letters* **22**: 2753–2756.