Ariane Ducellier

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Experience

2022–Present **Applied Scientist**, Zillow, Seattle, USA.
- Develop statistical models and computational codes to housing market forecasts. These data products provide insights on the housing market to audiences inside and outside of Zillow.
- Participate in monthly production of new, updated forecasts using latest data available.

2016–2022 **Research Assistant**, University of Washington, Department of Earth and Space Sciences, Seattle, USA.
- Signal processing and statistical analysis of large seismic datasets. This research aims to understand slow earthquake phenomena and subduction zone processes.
- Teaching Assistant for course Data science for Earth and planetary systems (https://github.com/UW-ESS-DS/ESS490-590-Spr21). Developed and taught labs on data science and machine learning.
- Geohackweek (https://geohackweek.github.io/). One-week-long workshop on geospatial data science. Taught a tutorial on visualization and led a data science project.

2021 **Applied Scientist Intern**, Zillow, Seattle, USA.
- Developed statistical models and computational codes to forecast home sales. These data products provide insights on the housing market to audiences inside and outside of Zillow.

2006–2015 **Research Scientist**, BRGM, the French Geological Survey, Orléans, France.
- Developed computational codes to model seismic wave propagation (PDE solvers with finite differences, finite elements and finite volumes). These models are widely used to evaluate ground displacement during an earthquake for seismic hazard assessment and mitigation.
- Developed a computational code for the vulnerability assessment of utility networks (e.g. roads, water, electricity) and buildings. This research uses graph models to forecast and mitigate network disruptions following a natural disaster.
- Clearly presented technical results in high impact journals (6 peer-reviewed, published articles). Wrote scientific proposals. Project management and auditing for "Quality and Environment".

Fall 2010 and Fall 2011 **Visiting Research Scientist**, Disaster Prevention Research Institute, Kyoto University, Kyoto, Japan.
Wrote global optimization codes for highly nonlinear inverse problems. This research resulted in a new, innovative method to model earthquake ground displacement for civil engineering purposes.

Technical Proficiencies

Programing Python (numpy, scipy, pandas, scikit-learn, pytorch), AWS, R.

Courses Statistical Learning, Nonparametric Regression and Classification, Time Series Analysis, Wavelets, Statistical Inference, Stochastic Modeling, Data Visualization.

Education

2016–2022 **PhD**, University of Washington, Earth and Space Sciences: Data Science, Seattle, USA, Graduated in March 2022.

2021 **Master of Science**, University of Washington, Statistics, Seattle, USA, Graduated in December 2021.

2001–2004 **Master**, Ecole Centrale Paris, France, Major in engineering and applied mathematics.

Publications

Journals

A. Ducellier, K.C. Creager, and D.A. Schmidt - Detection of slow slip events using wavelet analysis of GNSS recordings. *In revision for Bulletin of the Seismological Society of America*.

A. Ducellier, and K.C. Creager (2022) - An eight-year-long low-frequency earthquake catalog for Southern Cascadia. *Journal of Geophysical Research: Solid Earth*, 127(4):e2021JB022986.

A. Ducellier, and K.C. Creager (2022) - Depth and thickness of tectonic tremor in the northeastern Olympic Peninsula. *Journal of Geophysical Research: Solid Earth*, 127(1):e2021JB022708.

T. Ulrich, C. Negulescu, and A. Ducellier (2015) - Using the discrete element method to assess the seismic vulnerability of aggregated masonry buildings. *Bulletin of Earthquake Engineering*, 13:3135–3150.

A. Ducellier, and H. Aochi (2015) - Importance of crustal structure and anelastic attenuation for estimating ground motion parameters by finite difference simulation. *Bulletin of Earthquake Engineering*, 13:1893–1911.

A. Ducellier, H. Kawase, and S. Matsushima (2013) - Validation of a new velocity structure inversion method based on horizontal-to-vertical (H/V) spectral ratios of earthquake motions in the Tohoku area, Japan. *Bulletin of the Seismological Society of America*, 103:958–970.

H. Aochi, A. Ducellier, F. Dupros, M. Delatre, T. Ulrich, F. De Martin, and M. Yoshimi (2013) - Finite difference simulations of seismic wave propagation for the 2007 Mw 6.6 Niigata-ken Chuetsu-Oki earthquake: Validity of models and reliable input ground motion in the near-field. *Pure and Applied Geophysics*, 170:43–64.

A. Ducellier, and H. Aochi (2012) - Interactions between topographic irregularities and seismic ground motion investigated using a hybrid FD-FE method. *Bulletin of Earthquake Engineering*, 10:773–792.

W. Imperatori, H. Aochi, P. Suhadolc, J. Douglas, A. Ducellier, and G. Costa (2010) - 2D versus 1D ground-motion modelling for the Friuli region, north-eastern Italy. *Bollettino di Geofisica Teorica e Applicata*, 51:43-56.

Conferences

A. Ducellier (2022) - Long-range dependence in low-frequency earthquake catalogs. *Symposium on Data Science & Statistics*, Pittsburgh - USA, June 8th 2022.

A. Ducellier (2022) - Long-range dependence in earthquake occurrence rates. *SIAM Pacific Northwest Biennal Meeting*, Vancouver - USA, May 20th 2022.

A. Ducellier (2022) - Statistical analysis of low-frequency earthquake catalogs. *SSA Annual Meeting*, Bellevue - USA, April 22nd 2022.

K.C. Creager, and A. Ducellier (2021) - Analysis of eight-year-long low-frequency earthquake catalog for Southern Cascadia. *AGU Fall Meeting*, New Orleans - USA, December 14th 2021.

A. Ducellier, K.C. Creager, and D. A. Schmidt (2021) - Wavelet methods for detecting slow slip events in GNSS recordings. *AGU Fall Meeting*, New Orleans - USA, December 14th 2021.

A. Ducellier, and K.C. Creager (2020) - Analysis of a decade-long low-frequency earthquake catalog in southernmost Cascadia. *AGU Fall Meeting*, December 7th 2020.

A. Ducellier, and K.C. Creager (2019) - Wavelet methods for the analysis of GPS recordings of slow earthquakes. *AGU Fall Meeting*, San Francisco - USA, December 9th 2019.

A. Ducellier, and K.C. Creager (2019) - Long-range dependence in low-frequency earthquakes catalogs? *SSA Annual Meeting*, Seattle - USA, April 24th 2019.

A. Ducellier, and K.C. Creager (2017) - Seismic wave velocity in the subducted oceanic crust from autocorrelation of tectonic tremor signals. *AGU Fall Meeting*, New Orleans - USA, December 14th 2017.

A. Ducellier, and K.C. Creager (2017) - Seismic wave velocity in the subducted oceanic crust from autocorrelation of tectonic tremor signals, *Geological Society of America Annual Meeting*, Seattle - USA, October 23rd 2017.