QUENTIN BRISSAUD - PHD

PROFILE

PHONE	(+33) 6 99 34 13 78
EMAIL	quentinbrissaud@gmail.com
ADDRESS	Oslo, Norway
WEBSITE	quentinbrissaud.github.io
LANGUAGES	French (native) English (fluent)
CITIZENSHIP	French
VISA	Eligible Green Card through mariage

EDUCATION

Research Master 2013 - 2014
PAUL SABATIER UNIVERSITY, TOULOUSE, FRANCE
Nonlinear dispersive and elliptic equations

Master degree in Engineering 2010 - 2014
INSA TOULOUSE, TOULOUSE, FRANCE
Optimization, CFD, Structural mechanics, Image processing, Data Assimilation and Wave theory

PhD degree 2014 - 2017
SSPA TEAM, ISAE, TOULOUSE, FRANCE
Numerical modeling of atmospheric waves due to Earth/Ocean/Atmosphere couplings and applications

TEACHING & SUPERVISION

Fall 2021 **Guest lecturer**
- University of Oslo - Master - DIgital processing
- Practical use of frequency and wavelet analysis in seismo-acoustic research - The Beirut catastrophe

2021 - 2022 **Master students supervisor**
- University of Oslo - 2 students in machine learning and dIgital processing
- infrasound to enhance long-term weather forecasting

2018 - 2019 **PhD student mentor**
- seismo-acoustic wave propagation theory
- spectral element modeling
- depozit.isae.fr/theses/2020/2020_Martire_Leo_D.pdf

2015 - 2017 **Lecturer**
- University of Toulouse - Bachelor - 1st Year Mathematics
- Calculus - Taylor series, partial differential equations

2017 **Lecturer**
- University of Toulouse - Bachelor - 1-2 Year Math/Computer science
- Numerical integration, poly. interpolation, roots of eq.

2016 - 2017 **Master student supervisor**
- Research projects - students in aeronautical engineering
- Heating of the thermosphere by infrasound breaking
- Acousto-gravity waves in Venus' and Mars' atmosphere

SELECTED PUBLICATIONS

2022 **R. Matoza [...] Q. Brissaud, et al, Atmospheric waves and global seismoacoustic observations of the January 2022 Hunga eruption, Tonga, Science**
https://doi.org/10.1126/science.abo7063
- Global detections of the 2022 Hunga eruption using seismic, acoustic, hydroacoustic, and satellite data

2022 **Q. Brissaud and E. Astafyeva, Near-real-time detection of co-seismic ionospheric disturbances using machine learning, GJI**
https://doi.org/10.1093/gji/ggac167
- First automatic machine learning based method to detect and associate co-seismic ionospheric disturbances
- This method enables the construction of ionospheric images in near-real-time for early warning applications

2022 **Q. Brissaud et al, Predicting infrasound transmission loss using deep learning, GJI**
https://doi.org/10.1002/essoar.10509609.2
- Amplitudes predicted by parabolic equations can be accurately reproduced (error < 5 db) and quickly (0.05 s) through deep learning

2021 **Q. Brissaud et al, The first detection of an earthquake from a balloon using its acoustic signature, GRL**
NASA press release https://go.nasa.gov/2YfNRiO
- First detection of a natural earthquake using balloon-borne infrasound data
- Seismic infrasound waves provide constraints on subsurface velocities

2020 **Q. Brissaud et al, Extension of the Basin Rayleigh-Wave Amplification Theory to Include Basin-Edge Effects, BSSA**
- 1D theory to predict surface-wave amplification in basins is a good approximation for low velocity contrasts
- 1D theory + transmission coef. provide a good estimate of amplification in realistic basin structures

2017 **Q. Brissaud et al., Hybrid Galerkin numerical modelling of elastodynamics and compressible Navier–Stokes couplings: applications to seismo-gravito acoustic waves, GJI**
- Modeling of non-linear acoustic-gravity waves and linear seismic waves in Earth-atmosphere media with topography

2016 **R. Garcia, Q. Brissaud et al., Finite-difference modeling of acoustic and gravity wave propagation in Mars atmosphere: application to infrasounds emitted by meteor impacts, Space Science Review**
- Implementation of complex vibrational absorption processes
- At night, a near-surface waveguide enables long distance propagation of acoustic signals in flat regions

RESEARCH EXPERIENCE

Editorial board Seismica
since 2022

Handling editor & part of the media/branding team

Guest editor BSSA
2022-2023

Guest editor in Section on seismoacoustics & Data Fusion

Research scientist
since Sept 2020

NORSAR, Kjeller, Norway

Infrasound modeling, study of the Earth-atmosphere couplings, machine learning

Post-doc
2017 - 2020

CALTECH, PASADENA, USA

Advisers: Jennifer Jackson, Victor TSAI

Near-surface seismic modeling and study of the Earth-atmosphere couplings

RESEARCH INTERESTS

- Using seismic and acoustic records to constrain seismic sources and subsurface seismic velocities
- Exploring planetary interiors and surface sources with stratospheric balloons equipped with pressure sensors
- Building efficient near-real time tsunami early warning systems using GPS data
- Understanding relationships between basin characteristics and surface amplification
- Deep learning to model wave propagation and facilitate source inversions

RECENT PRESENTATIONS

2022 **AGU 2022 Session convener**

- Main convener of session P029 Seismo-acoustics: a planet's dialog from the ground to the edge of space

2022 **Invited seminar at the Chinese Academy of Sciences: listening to earthquakes from the clouds**

2022 **Invited presentation - Infrasound arrays as probes for atmospheric dynamics in polar regions**

- Security and preparedness in the changing north, Oslo

2021 **Invited presentation - What can the sound of earthquakes tell us about a planet's interior structure?**

- AGU 2021: https://doi.org/10.1002/essoar.10509682.1

2021 **Invited presentation - Near-real-time automatic detection of co-seismic ionospheric disturbances**

- JPL, Pasdena - GNSS Space Weather Science Meeting

OTHER PUBLICATIONS & PROJECTS

2022 **Q. Brissaud et al, Near and far-field seismo-acoustic analysis of mb 4.9 mining induced earthquake nearby Kiruna, Sweden [in prep.]**
https://bit.ly/2ZMHTGh

- Largest minequake ever recorded in Scandinavia
- Near field infrasound enable the characterization of source processes and atmospheric effects in the far field

2022 **J. Vergoz [...] Q. Brissaud, et al, IMS observations of infrasound and acoustic-gravity waves produced by the January 2022 volcanic eruption of Hunga, Tonga**

- Random forests trained over synthetics provides an accurate nonlinear regression model for surface-wave amplification in basinsshorturl.at/dFQ19

2021 **L Martire, R Martin, Q Brissaud, RF Garcia, SPECFEM2D-DG, an open source software modeling mechanical waves in coupled solid-fluid systems: the Linearised navier-stokes approach, GJI**

- Open-source release of a full-waveform modeling tool in coupled earth-atmosphere media

2021 **VH Lai, Z Zhan, Q Brissaud, O Sandanbata, MS Miller, Inflation and Asymmetric Collapse at Kilauea Summit during the 2018 Eruption from Seismic and Infrasound Analyses, JGR**

- Characterization seismic events at the Kilauea summit using particle motion, infrasound, and moment tensor inversion
- Near-field seismic observation is essential to resolve the isotropic contribution due to inflation of the reservoir

2019 **Q Brissaud and VC Tsai, Validation of a fast semi-analytic method for surface-wave propagation in layered media, GJI**

- highly discontinuous near-surface velocity profiles can be approximated by a combination of power-law scalings and the corresponding Green's functions can be derived anytically

2016 **Q Brissaud et al, Finite-difference numerical modelling of gravitoacoustic wave propagation in a windy and attenuating atmosphere, GJI**

- 3d modeling of acoustic and gravity waves in the atmosphere

AWARDS & FELLOWSHIPS

2020 Member Young Profesionnal Network CTBTO

2017 Caltech Seismolab fellowship

2017 Geophysical Journal International (GJI), Student Author Awards.