



QUENTIN BRISSAUD - PHD

PROFILE

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 ADDRESS Pasadena, CA, USA
 LANGUAGES French (native) English (fluent)
 CITIZENSHIP French - married to US citizen
Green Card holder in 2020

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.

Interests 1) *Mechanical couplings between a planet and its atmos. are a major source of signal that can provide insights of a planet internal and atmos. structure. Understanding the underlying processes that drive the transmission of energy at the surface (basins, topo.) and the propagation in the atmos. (winds, attenuation, nonlinearities) is crucial to explain and make use of seismic and atmos. observations.* 2) *Ground-motion predictions in sedimentary basins are essential to prevent earthquake disasters. However, the impact of the basin geometry on the site response is poorly constrained. Using analytical and machine-learning models show a great trade-off between cost and accuracy.*

SKILLS

Coding Python, Fortran, MATLAB, Maxima

Analysis: Beam forming, Back-projection, Triggerring, FK

Modeling: 3D nonlinear FEM/FV/FD, Ray tracing, Random forests, CNN

Theory: Mechanical-wave propagation theory. Functional analysis

RESEARCH EXPERIENCE

Post-doc

CALTECH, PASADENA, USA

Adviser: Victor TSAI

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

TEACHING EXPERIENCE

2017 - 2018 **phD student supervision on wave theory**

2015 - 2017 **1st Year Math Bachelor - Analysis**

2017 **1st Year Info Bachelor - Numerical modeling**

2016 - 2017 **Tutoring Master interns (Space Engineer.)**

WORK & MAIN PUBLICATIONS

2019 **Publication - Earth, Planets and Space - *submitted***

Q. Brissaud et al, MACHINE-LEARNING BASED NONLINEAR REGRESSION MODEL FOR RAYLEIGH-WAVE BASIN AMPLIFICATION, *GRL*

- Random forests trained over synthetics provides an accurate nonlinear regression model for surface-wave amplification in basins

2019 **Publication - BSSA - *in revision***

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 sedimentary basins is a good approximation for low velocity contrasts (< 2.5)
- 1D theory + transmission coef. provide a good estimate of amplification in realistic basin structures

2019 **Remote-sensing seismology co-Investigator**

Q. Brissaud et al, VENUS REMOTE-SENSING SEISMOLOGY, *NASA ISC report*

- Sensitivity analysis of quake-induced signals on source properties and atmospheric specifications on Venus
- Quakes with magnitudes > 5 might be observed 300km from the epicenter
- Adaptation of a full-waveform modeling tool to Venus atmospheric and magnetic specifications

2019 **Publication - GJI**

Q. Brissaud & V. C. Tsai, VALIDATION OF THEORETICAL MODELS OF WAVE PROP. AGAINST HIGH-ORDER NUMERICAL SOLUTIONS, *GJI*

- Nondimensionalization of surface-wave eigenfunctions enables one to analytically derive Green's functions in vertically heterogeneous media

2018 **Publication - GRL**

L. Martire, Q. Brissaud et al., NUMERICAL SIMULATION OF THE ATMOS. SIGNATURE OF ARTIFICIAL AND NATURAL SEISMIC EVENTS, *GRL*

- Very shallow subsurface structures determine the directivity and amplitude of seismically-induced infrasounds
- High impedance contrasts allow infrasound observations from airborne instruments

2017 **Publication - GJI**

Q. Brissaud et al., HYBRID GALERKIN NUMERICAL MODELING OF

ELASTODYNAMICS AND COMPRESSIBLE NAVIER-STOKES COUPLINGS:

APPLICATIONS TO SEISMO-GRAVITO ACOUSTIC WAVES, *GJI*

- Earth-atmosphere coupling with topography of non-linear acoustic-gravity waves and elastic seismic waves.

2016 **Publication - Space Science Review**

R. Garcia, Q. Brissaud et al., FINITE-DIFFERENCE MODELING OF 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.

2016 **Publication - GJI**

Q. Brissaud et al., FINITE-DIFFERENCE NUMERICAL MODELLING

OF GRAVITO-ACOUSTIC WAVE PROPAGATION IN A WINDY AND

ATTENUATING ATMOSPHERE, *GJI*

- 3D gravito-acoustic wave propagation in a windy, attenuating atmos.
- Study of acoustic and gravity waves from ground forcing and atmospheric explosions.