KEVISH NAPAL

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EDUCATION

Sorbonne Université Sep. 2011 - Jun. 2014
Bachelor degree in applied mathematics *Paris, France*

- Main courses: Differential Calculus, Complex Analysis, Linear Algebra, Group theory, Arithmetic.
- Transversal courses: Quantum Mechanics, Special Relativity, Mechanical & Light Waves, History of Mathematics.

Sorbonne Université/École Polytechnique Sep. 2014 - Oct. 2016
Master degree in applied mathematics *Paris, France*

- Mathematics of modeling speciality.
- PDEs, Optimal Control, Supervised Classification, Convex Optimisation, Mathematical Modeling for Biology (Tumors, Neurosciences).

École Polytechnique, CMAP Nov. 2016 - Dec. 2019
PhD in applied mathematics under the supervision of Houssem Haddar *Palaiseau, France*

- Imaging crack networks using transmission eigenvalues.
- Acoustic Scattering, Crack Identification, Interior Transmission Problem.

University of Colorado Boulder, CEAE Jan. 2020 - Jul. 2021
Post Doc in mechanical engineering, coll. with Dr. Fatemeh Pourahmadian *Boulder, Colorado*

- Inverse problem in poroelastodynamics: sampling methods, machine learning.
- Spectral signature of the physical parameters in highly heterogeneous media.

University of Sheffield, DRG Nov. 2021 - Present
Post Doc in mechanical engineering, coll. with Dr. Artur L. Gower *Sheffield, UK*

- Homogenization of random particulate media in the high frequency regime
- add item

PUBLICATIONS

1. Pourahmadian, Fatemeh, and Kevish Napal. "Poroelastic near-field inverse scattering." Journal of Computational Physics 455 (2022): 111005. (Impact Factor: 4.645 in 2021)
2. L. Audibert, L. Chesnel, H. Haddar, K. Napal, Qualitative indicator functions for imaging crack networks using acoustic waves, SIAM J. Sci. Comput., vol. 43, 2:B271-B297, 2021.
3. L. Audibert, L. Chesnel, H. Haddar, K. Napal, Detecting sound hard cracks in isotropic inhomogeneities, Advances in Acoustics and Vibration II. ICAV 2018. Applied Condition Monitoring, Springer, pp.61-73, 2019.
4. Kevish Napal. On the use of sampling methods and spectral signatures to identify defects in inhomogeneous media. Analysis of PDEs [math.AP]. Université Paris Saclay (COmUE), 2019. English. ⟨NNT : 2019SACLX102⟩. ⟨tel-02885422⟩. (Phd Thesis)
5. Crack monitoring using transmission eigenvalues with artificial backgrounds, Audibert, L. Chesnel, H. Haddar, K. Napal, Waves conference, Vienna, August 2019.

CURRENT PROJECTS

1. Imaging crack aggregates in a homogeneous isotropic elastic medium using Steklov eigenvalues, with Fatemeh Pourahmadian.
2. Use of Physics-Informed Neural Networks to estimate the parameters of a poroelastic background, with Fatemeh Pourahmadian and Yang Xu.
3. On the existence of transmission eigenvalues for inhomogeneities containing sound hard inclusions, with Lorenzo Audibert, Lucas Chesnel and Houssem Haddar.

TALKS

CNRS-Imperial Metamaterials Conference
September 2022, Imperial college of London.

International Conference on Mathematical and Numerical Aspects of Wave Propagation
August 2019, Vienna University.

Applied Inverse Problems Conference
July 2019, Institut Fourier, Grenoble.

Engineering Mechanics Institute Conference
June 2019, Caltech.

CNRS colloquium MecaWave
November 2018, Fréjus.

PhD students workshop
June 2018, École Polytechnique.

International Conference on Accoustic and Vibrations
March 2018, Hamamet.

EXPERIENCE

Orsay Institute of Mathematics Jan. 2019
Study Groups with Industry - One week Machine Learning Workshop *Orsay, France*

- work with the startup Dataswaty on the project Measuring Similarities and Improving Quality Prediction of Factory Outputs. Final Oral Report: [slides].
- Applying Transfer Learning and Domain Adaptation techniques to improve the quality of water after a treatment process.

University of Bremen Sep. 18-22, 2017
Summer School on Inverse Problems and Imaging *Bremen, Germany*

- Analytical and numerical treatment of inverse problems in the context of multi-modal and hybrid schemes as well as in imaging.
- Adapted sparsity regularization and suitable numerical algorithms.

École Polytechnique,
INRIA Saclay May - Oct. 2016
Introductory Research Dissertation supervised by Houssem Haddar *Palaiseau, France*

- Imaging with Interior Transmission Eigenvalue.

COLLABORATORS AND OTHER AFFILIATIONS

Collaborators

- L. Audibert, Department PRISME, EDF R&D, 6 quai Watier, 78401, Chatou CEDEX, France.

- H. Haddar, INRIA/Centre de mathématiques appliquées, École Polytechnique, Institut Polytechnique de Paris, Route de Saclay, 91128 Palaiseau, France.
- L. Chesnel, INRIA/Centre de mathématiques appliquées, École Polytechnique, Institut Polytechnique de Paris, Route de Saclay, 91128 Palaiseau, France.
- F. Pourahmadian, Department of Civil, Environmental & Architectural Engineering, University of Colorado Boulder, USA

Graduate Advisor

- H. Haddar, INRIA/Centre de mathématiques appliquées, École Polytechnique, Institut Polytechnique de Paris, Route de Saclay, 91128 Palaiseau, France.

TEACHING EXPERIENCE

2016 - 2019 : Sorbonne Université

- Numerical methods for differential equations (2016-2018) L3, UPMC, Tutorial sessions and practical exercises on Python for the lectures of Marie Postel.
- Error-correcting codes & Cryptography [course material] (2018-2019) L2, UPMC, Tutorial sessions for the lectures of Laurent Koelblen.
- Mathematical symbolic computation with Wolfram Alpha (2016-2018) L1, UPMC.
- Khôlles (preparation to the oral sessions of the entrance exam to French schools of Engineering) (2016-2017) L3, UPMC.

LEADERSHIP

- I participated to the **Exploring STEM for Girls outreach event** (event held annually as part of British Science Week in a bid to inspire the next generation of female scientists and engineers through a variety of interactive experiments, demonstrations and workshops to (Science, Technology, Engineering and Mathematics)
- I successfully obtained a funding for a 2 month summer studentship from the DSTL (The Defence Science and Technology Laboratory is the science inside UK defence and security). Dstl has selected my project from the submissions list as 1 out of 5 they would like to run.

Add codes contribution somewhere: Poroelastic equations, phd thesis,