Kajetan Chrapkiewicz

physicist, geologist, software developer

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An applied physicist and geologist with expertise in high-resolution, elastic-wave imaging applicable to a variety of academic, industrial, and medical problems. Particularly interested in Earth's interior, wave mechanics, inverse problems and object-oriented design. A firm believer in reproducible research and open-source software. Click on the hyperlinks to know more!

Selected academic projects

HIGH-RESOLUTION IMAGING BENEATH AN ACTIVE VOLCANO | PhD

Imperial College London

- ➔ developed a framework & QC tools for active-source full-waveform inversion;
- ➔ obtained a first-ever image of a small magma chamber, challenging the existing models of melt storage;
- ➔ calculated physical properties of a partially molten granitic intrusion.

Methods: 3D full-waveform inversion; effective-medium theory.

ADVANCING FULL-WAVEFORM MODELLING & INVERSION | PhD

Imperial College London

- ➔ developed a numerical method for simulating hydrophone and geophone data in the presence of irregular 3D free surface;
- ➔ implemented the above in FORTRAN with a thin API for 3rd-party codes.

Methods: immersed-boundary method; radial-basis functions; acoustic reciprocity.

CONSTRAINING LITHOSPHERE-ASTHENOSPHERE BOUNDARY | MSc

University of Warsaw

- ➔ developed a highly automated and robust workflow for 1D inversion;
- ➔ compared resolution-matrix and checkerboard-test analyses;
- ➔ compared linearised and Markov-chain Monte Carlo schemes.

Methods: joint inversion of receiver functions and Rayleigh-wave dispersion curves.

UNDERSTANDING NEUTRON HALO STRUCTURE OF EXOTIC NUCLEI | BSc

University of Warsaw

- ➔ calculated efficiency of the optical β-decay detector at CERN;
- ➔ developed a method of determining diffusivity of extremely short-lived nuclei.

Methods: quantum-mechanical calculation of particle trajectories, max-likelihood.

Honours

Scholarships:

2017-2020	scholarship of the Leverhulme Trust;
2012–2014	scholarship for best students, Faculty of Physics, University of Warsaw;
2008–2011	scholarship of the Polish Children's Fund for exceptionally gifted pupils.

Awards:

Faculty of Physics' award for the best MSc thesis in geophysics (2017) • 3rd best talk of the 9th Polish Geophysical Workshop (2016) • Laureate (top10 in Poland) of the 9th African Studies Olympiad (2011) • Finalist of the 36th Geography Olympiad (2010) • 2nd best poster of the 35th Geography Olympiad (2009).

Education

IMPERIAL COLLEGE LONDON

Dep. of Earth Science & Engineering

2017-21: **PhD** in **Earth Science**

UNIVERSITY OF WARSAW

Inter-Faculty Individual Studies in Mathematics and Natural Sciences

2015-17: **MSc** in **Geophysics** (5/5)
2011-15: **BSc** in **Physics** (5/5)
2011-14: **BSc** in **Geology** (5/5)

Computer skills

PROGRAMMING

Proficient:
Python • Fortran • [ba,z]sh
Experienced:
C++ • Matlab • Mathematica
Familiar:
C • MPI • OpenMP • R

MISCELLANY

Git(Hub) • GLOBEClaritas
Google[Colab,Cloud] • Jekyll
LaTeX • MyBinder
OpendTect • Paraview • SeismicUnix
Shearwater Reveal

References

Michele Paulatto, PhD, Imperial College London

Joanna Morgan, Prof., Imperial College London

Emilie Hooft, PhD, University of Oregon

Monika Wilde-Piórko, PhD, Institute of Geodesy and Cartography, Warsaw

Michał Malinowski, PhD, Polish Academy of Sciences

Marek Pfützner, Prof., Faculty of Physics, University of Warsaw

Andrzej Konon, Prof., Department of Geology, University of Warsaw