

# Ioannis Nikiteas

London, United Kingdom

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## Education

### PhD in Computational Nuclear Physics

London, UK

IMPERIAL COLLEGE LONDON

Jan. 2019 – PRESENT

- Researched and authored algorithms for error estimation used in multidimensional adaptive mesh refinement
- Authored performant and scalable algorithms for massively parallel architectures (ARCHCER & ARCHER2 HPCs)
- Funded via Imperial College, Cambridge University & Open University (ICO) CDT and **Jacobs Engineering**

### MSc in Advanced Nuclear Engineering

London, UK

IMPERIAL COLLEGE LONDON

Sept. 2017 – Sept. 2018

- Obtained knowledge and developed skills on the fields of Material Science, Nuclear, Mechanical and Chemical Engineering
- Thesis on Dynamic Load balancing on angular adaptive mesh refinement for radiation transport

### BSc in Experimental Physics

Egham, UK

ROYAL HOLLOWAY UNIVERSITY OF LONDON

Sept. 2014 – May. 2017

- Obtained fundamental skills for analysing and solving problems in the fields of Physics and Mathematics
- Dissertation title: Investigating the transition from Molecular Dynamics to Smoothed Particle Hydrodynamics

### International Baccalaureate Diploma

Athens, Greece

THE MORAITIS SCHOOL

2012 – 2014

## Awards & Scholarships

### SCHOLARSHIPS

2017 **Alexander S. Onassis Public Benefit Foundation**, Scholarship for academic excellence £13,000

Athens, Greece

## Experience

### Senior Research Software Engineer

London, UK

TOFFEEEX

Dec. 2022 – PRESENT

- Single-handedly lead the development of software products for reverse engineering of complicated, organic 2D and 3D meshed geometries to NURBS and CAD models
- Work on the development of CFD and topology optimisation software products
- Work on advanced geometry modelling, meshing and CAD software products
- Work on commercialising an automated system for the solution of partial differential equations using the finite element method (FEM) as part of an EPSRC grant with Imperial College London
- Work on developing a multi-scale finite element fluid-structure optimisation solver for coldplate designs
- Setup and maintain the CI, CD and testing pipelines for the core products of the company
- Work on the development of a cloud-based platform for the deployment of the software products (SaaS)
- Responsible for enforcing software engineering best practices and improving code quality of the core codebases
- Work in an AGILE environment, with emphasis on collaborative practices

### Fortran-lang – The Fortran Programming Language

London, UK

ADMIN – MAINTAINER

Jan. 2021 – PRESENT

- Administrator of the **Fortran-lang** organisation, a NUMFOCUS fiscally sponsored project, and maintainer of the projects under the **Fortran-lang GitHub** organisation
- Author and principal developer of **fortls** Language Server for Fortran & **Modern Fortran for Visual Studio Code** extension
- Org Admin, supervisor and mentor for the **Google Summer of Code** program, for multiple projects
- Collectively secured a €800,000+ grant from the **Sovereign Tech Fund** to develop new open-source tools for Fortran-lang projects (package managers, package registries, compilers, high level APIs to linear algebra libraries, etc.)

### StudentShapers Placement - Research Computing and Data Science Exemplars (ReCoDE)

London, UK

IMPERIAL COLLEGE LONDON

Jul. 2022

- Reviewed, edited and improved Computational & Data Science projects targeted at training PhD candidates across multiple disciplines.
- Worked on 5 projects in vastly different fields: Computer Vision & Convolutional Neural Networks, Nuclear Engineering using Diffusion theory, Physics modelling using Markov Chain Monte Carlo, RNA sequencing of biological data, COVID-19 Transmission modelling using Bayesian inference
- Worked with various programming languages: Python, Fortran, R, STAN

## Graduate Teaching Assistant

IMPERIAL COLLEGE LONDON

London, UK

Dec. 2018 – Dec. 2022

Taught various principles of programming, linear algebra, numerical methods and computational modelling to both final year Undergraduate students and Master's students:

- Module: 375 Advanced Programming C++
- Module: ACSE-5 Numerical methods with C++
- Module: ACSE-6 Parallel Programming using MPI

## Intern Engineer, Maintenance of Alumina, Non-Invasive Testing Methods

ALUMINIUM OF GREECE

Viotia, Greece

Jul. 2016 – Aug. 2016

- Was part of a team responsible for the optimisation and maintenance of equipment used in the production of aluminium oxide (alumina)
- Was familiarised with methods and techniques used to investigate for structural failures in industrial equipment
- Performed non-destructive testing (e.g. Ultrasonic testing, liquid penetrant, eddy-current testing, remote visual inspection)

## Projects

### Gmsh Fortran API

AUTHOR – MAINTAINER

London, UK

Sept. 2022 – PRESENT

- Author and maintainer of the Python autogenerated Fortran API for the popular **Gmsh** meshing library
- Author and maintainer of the Fortran Package Manager module **gmsh-fpm allowing** for easy access to the API via Fortran

### Load balancing for adaptive radiation transport simulations

M.Sc. THESIS

London, UK

Feb. 2018 – Sept. 2018

- Studied the use cases between spatial and angular discretisation methods e.g. FDM, FEM, FVM, DGFEM,  $S_n$ ,  $P_n$  and wavelets
- Wrote a report on the application of global and goal based adaptive methods on transport problems
- Benchmarked, improved and optimised existing code in FETCH2 for load balancing of radiation transport problems

### Investigating the transition from Molecular Dynamics to Smooth Particle Hydrodynamics

B.Sc. DISSERTATION

Egham, UK

Sept. 2016 – Apr. 2017

- Investigated the existence of a continuous transition between Molecular Dynamics (MD) and Smooth Particle Hydrodynamics (SPH) by creating computational models in C++ and Python
- Used Statistical Mechanics e.g. RDF, VAF, MSD, to make quantitative observations for the transition limits between the two models
- A continuous transition between MD and SPH was discovered, for the first time, for a small range of parameters of the pair potential

## Publications

### Load balancing angular adaptivity on energy dependent reactor problems

NIKITEAS, IOANNIS, DARGAVILLE, STEVEN, SMITH, PAUL N. SMEDLEY-STEVENSON, RICHARD P. PAIN, CHRISTOPHER C.

*EPJ Web Conf.* 247 (Feb. 2021) p. 03025. 2021

### Reentrant melting and multiple occupancy crystals of bounded potentials: Simple theory and direct observation by molecular dynamics simulations

I. NIKITEAS, D. M. HEYES

*Phys. Rev. E* 102 (4 Oct. 2020) p. 042102. American Physical Society, 2020

### Impact of load balancing on parallel performance with Haar wavelets angular adaptivity

I. NIKITEAS, S. DARGAVILLE, C. C. PAIN, P. N. SMITH, R. P. SMEDLEY-STEVENSON

*International Conference on Mathematics and Computational Methods Applied to Nuclear Science and Engineering, (M&C 2019)*, 2019

### Bounded inverse power potentials: Isomorphism and isosbestic points

I. NIKITEAS, D. M. HEYES

*J. Chem. Phys.* 150.14 (Apr. 2019) p. 144504. American Institute of Physics Inc., 2019

## Skills and Interests

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|-----------------------|---|
| <b>Programming</b>    | Python, C/C++, Fortran, TypeScript, Bash and many more...   |
| <b>Other Software</b> | Git, LaTeX, Inkscape, FreeCAD, GMSH, VTK, ParaView, Blender, OpenFOAM, FEniCS                                 |
| <b>Languages</b>      | English, Greek, French  |
| <b>General Skills</b> | Communication, Leadership, Multidisciplinary Teamwork, Risk assessment, Report authoring, Experimental design |
| <b>Interests</b>      | Coding, Interactive data visualisation, Active member of the Fortran Programming Language Organisation        |