



Konstantinos Markakis

Nationality: Greek

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ABOUT ME

Ambitious, self-starter and highly motivated individual with 6+ years of combined experience in Biotechnology, Synthetic Biology and Bioinformatics. Academic research and professional experience across 4 distinct science fields - Physics, Mathematics, Computer science and Biology.

WORK EXPERIENCE

Postdoctoral research associate - Data engineer

Foundation for Research and Technology - Crete [08/01/2021 – 03/31/2023]

City: Herakion

Country: Greece

1. Design the architecture of a crowdsourcing application for biodiversity, weather conditions, issue reporting and facilities of coastal areas in greece.
2. Backend Implementation of a VRE (Virtual Research Environment) designed to perform scalable data analysis of the above kinds of datasets with advanced statistics and machine learning algorithms (accepted as batch jobs).
3. Critical data source analysis for the above kinds
4. Full stack development of a mobile end-user application to facilitate two-way communication with the visitors of coastas areas (information dissemination and crowdsourcing).

Postdoctoral research associate

University of Edinburgh [08/24/2020 – 12/09/2020]

Address: School of Engineering, University of Edinburgh Faraday Building, King's Buildings Colin Maclaurin Road, EH9 3DW Edinburgh (Greece)

City: Edinburgh

Country: United Kingdom

Name of unit or department: Institute for Bioengineering

1. Coordination of a team of advisors
2. Discovering and contacting key people in relevant industrial fields
3. Participation in international conferences
4. Delivering a business plan

Software engineer

Freelance [02/01/2019 – Current]

City: Rethymno

Country: Greece

- Android application development
- Development of an automatic code generation and modification software for the encryption of strings in an executable (C++)
- Data engineering (Python)

Tutor and demonstrator

University of Edinburgh [09/01/2016 – 05/31/2017]

Address: School of Engineering, The University of Edinburgh Sanderson Building, The King's Buildings Robert Stevenson Road, EH9 3FB Edinburgh (United Kingdom)

City: Edinburgh

Country: United Kingdom

Name of unit or department: School of Engineering - **Business or sector:** Education

- Deliver educational material to students
- Mark assignments and final exam papers

Assistant researcher in university

University of Edinburgh [01/01/2015 – 05/31/2018]

Address: School of Engineering, University of Edinburgh Faraday Building, King's Buildings Colin Maclaurin Road, EH9 3DW Edinburgh (United Kingdom)

City: Edinburgh

Country: United Kingdom

Name of unit or department: Institute for Bioengineering - **Business or sector:** Professional, scientific and technical activities

- Perform routine lab maintenance
- Perform robotic platform diagnostics and maintenance
- Design and execute molecular biology experiments
- Perform spectroscopic analysis of samples
- Design and implement algorithms for analyzing biological samples (growth, fluorescence etc.)
- Design and implement algorithms for analyzing Raman spectra

Application developer

Freelance [01/01/2011 – 11/10/2014]

City: Rethymno

Country: Greece

- Design and delivery of android applications

Military communications operator

Hellenic armed forces [06/01/2010 – 11/01/2010]

Address: 5th Infantry Division Vlites, Souda, 73200 Chania (Greece)

City: Chania

Country: Greece

Name of unit or department: Communications - **Business or sector:** Public administration and defence; compulsory social security

- Perform daily change of encryption keys
- Monitor server performance
- Forward intranet messages
- Establish communication between different centers on request

ICT network administrator

PC CLUB Gaming Centre [09/01/2003 – 08/01/2008]

Address: Prevelaki 10, 74100 Rethymno (Greece)

City: Rethymno

Country: Greece

Business or sector: Administrative and support service activities

- Development of a routing system for efficient traffic separation for a low-latency QoS experience
- Development of a python-based system for dynamic management of gaming keys and accounts
- Maintenance of reliable data communications through LAN and WAN

EDUCATION AND TRAINING

Degree of Doctor of Philosophy

University of Edinburgh [01/01/2015 – 11/28/2019]

Address: Old College South Bridge, EH8 9YL Edinburgh (United Kingdom)

Website: www.ed.ac.uk

Field(s) of study: Bioengineering

Final grade: Pass – **Level in EQF:** EQF level 8

Thesis: Re-engineering E. coli for in vivo production of fluorometabolites

Link: <https://www.era.lib.ed.ac.uk/handle/1842/36147>

Bachelor's Degree

University of Crete [09/10/2009 – 07/25/2014]

Address: University of Crete, 700 13 Heraklion (Greece)

Website: <https://en.uoc.gr/>

Field(s) of study: Pure Mathematics

Final grade: 7.25 – **Level in EQF:** EQF level 6

National classification: Ptychion – **Type of credits:** ECTS – **Number of credits:** 240

Operator of digital devices and encryption machines

Hellenic Armed Forces [03/10/2010 – 04/15/2010]

Address: Military communications training center Stratopedo Karaiskaki, chaidari, 12461 Athens (Greece)

Field(s) of study: Information and Communication Technologies

Master of Science

University of Edinburgh [09/01/2008 – 08/31/2009]

Address: Old College South Bridge, EH8 9YL Edinburgh (United Kingdom)

Website: www.ed.ac.uk

Field(s) of study: Informatics

Final grade: with Distinction – **Level in EQF:** EQF level 7

Type of credits: ECTS – **Number of credits:** 120

Thesis: Extending the Bio-PEPA workbench into a modeling platform

Link: <https://homepages.inf.ed.ac.uk/stg/research/biopepa/archive/IM090708.pdf>

- Machine Learning
- Probabilistic modelling and reasoning
- Bioinformatics
- Neural computation
- Computer Security
- Functional programming
- Formal modelling

Bachelor's Degree

University of Crete [09/14/2001 – 07/22/2008]

Address: University of Crete, 700 13 Heraklion (Greece)

Website: <https://en.uoc.gr/>

Field(s) of study: Physics

Final grade: 7.36 – Level in EQF: EQF level 6

National classification: Ptychion – Type of credits: ECTS – Number of credits: 240

DIGITAL SKILLS

Machine Learning

Gaussian processes / ANOVA / SVM / Hidden Markov Models / PCA / Process algebras

Programming languages

C, C++, C# / Assembly(x86, ARM) / • Parallel and Concurrent Programming with MPI / JAVA / Python / R / Standard ML / Matlab

Databases

MongoDB / Google Firebase / SQL/MYSQL / SQLITE

PUBLICATIONS

[An Engineered E. coli Strain for Direct in Vivo Fluorination](#)

[2020]

Selectively fluorinated compounds are found frequently in pharmaceutical and agrochemical products where currently 25–30% of optimised compounds emerge from development containing at least one fluorine atom. There are many methods for the site-specific introduction of fluorine, but all are chemical and they often use environmentally challenging reagents. Biochemical processes for C–F bond formation are attractive, but they are extremely rare. In this work, the fluorinase enzyme, originally identified from the actinomycete bacterium *Streptomyces cattleya*, is engineered into *Escherichia coli* in such a manner that the organism is able to produce 5'-fluorodeoxyadenosine (5'-FDA) from S-adenosyl-L-methionine (SAM) and fluoride in live *E. coli* cells. Success required the introduction of a SAM transporter and deletion of the endogenous fluoride efflux capacity in order to generate an *E. coli* host that has the potential for future engineering of more elaborate fluorometabolites.

[PROTEUS: A coupled iterative force-correction immersed-boundary cascaded lattice Boltzmann solver for moving and deformable boundary applications](#)

[2018]

Many realistic [fluid flow problems](#) are characterised by high [Reynolds numbers](#) and complex moving or deformable geometries. In our previous study, we presented a novel coupling between an iterative force-correction immersed boundary and a multi-domain cascaded [lattice Boltzmann](#) method, Falagkaris et al., and investigated flows around rigid bodies at Reynolds numbers up to . Here, we extend its application to flows around moving and [deformable bodies](#) with prescribed motions. Emphasis is given on the influence of the internal mass on the computation of the [aerodynamic forces](#) including deforming boundary applications where the rigid body approximation is no longer valid. Both the rigid body and the internal [Lagrangian](#) points approximations are examined. The resulting solver has been applied to [viscous flows](#) around an in-line [oscillating cylinder](#), a pitching foil, a plunging SD7003 [airfoil](#) and a plunging and flapping NACA-0014 airfoil. Good agreement with experimental results and other [numerical schemes](#) has been obtained. It is shown that the internal Lagrangian points approximation accurately captures the internal mass effects in linear and [angular motions](#), as well as in deforming motions, at Reynolds numbers up to . In all cases, the [aerodynamic loads](#) are significantly affected by the internal fluid forces.

[Analytical approach for the calculation of promoter activities based on fluorescent protein expression data](#)

[2017]

Engineering Biology, 1(2), 77-85

Characterisation of promoters, repressors, enhancers and so on, is not only essential for unravelling the inner workings of gene regulation, but also to enable the rational engineering of novel synthetic elements. Each putative regulatory region requires experimental assessment across a range of chassis and growth conditions, in order to be categorised as a fully defined functional element. In most studies, promoter activity is represented as the magnitude of a reporter signal, usually fluorescence, normalised to the biomass, as given by the optical density (OD). Such experimental values are often obtained from a coupled time-series experiment. Applying simple mathematical reasoning, a tool that describes promoter activity at each time point has been implemented.

Protein expression and maturation, are modelled as first-order differential equations, taking into account the degradation and maturation rates which need to be known in advance. The promoter activity is then expressed based on the measured values of fluorescence and OD with a formula derived by mathematical manipulations of the defined quantities and the differential equations that comprise the model. Continuous expressions for fluorescence and OD are obtained from Gaussian process regression. Validation of the tool with experimental data from several constructs showed the expected behaviour of promoter activities.

PROTEUS: A coupled iterative force-correction immersed-boundary multi-domain cascaded lattice Boltzmann solver

[2017]

Most realistic [fluid flow problems](#) are characterized by high [Reynolds numbers](#) and complex boundaries. Over the last ten years, [immersed boundary methods](#) that are able to cope with realistic geometries have been applied to Lattice-Boltzmann (LB) methods. These methods, however, have normally been applied to [low Reynolds number](#) problems. Here we present a novel coupling between an iterative force-correction immersed boundary (Zhang et al., 2016) and a multi-domain cascaded LB method. The iterative force-correction immersed boundary method has been selected due to the improved accuracy of the computation, while the cascaded LB formulation is used due to its superior stability at high Reynolds numbers. The coupling is shown to improve both the stability and numerical accuracy of the solution. The resulting solver has been applied to [viscous flow](#) (up to a Reynolds number of 100000) passed a NACA-0012 [airfoil](#) at a 10 [degree angle](#) of attack. Good agreement with results obtained using a body-fitted Navier–Stokes solver has been obtained. The formulation provides a straight forward and efficient method for modeling realistic geometries and could easily be extended to problems with moving boundaries.

RECOMMENDATIONS

Professor

Name: Prof Susan Rosser

Phone number: (+44) 1316505086

Email: Susan.Rosser@ed.ac.uk

PhD project supervisor

Professor

Name: Prof Stephen Gilmore

Phone number: (+44) 1316505189

Email: stg@staffmail.ed.ac.uk

Master thesis supervisor

HOBBIES AND INTERESTS

Riddles

I enjoy solving a difficult riddle from time to time

Gym

For the past 2 years I enjoy high intensity workouts

Music

I have played many instruments in the past, lately I have taken up the bass guitar

VOLUNTEERING

STEM Ambassador

[Edinburgh, UK, 01/01/2016 – 01/01/2018]

As a STEM ambassador, I was entrusted with the duty of outreaching to public schools and give presentation to students regarding the latest advances in my field of research (specifically synthetic biology) and gauge their interest for this particular field.