Takfarinas SABER

PERSONAL DATA

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SUMMARY

I am currently a **Post-doctoral Researcher** at the Natural Computing Research & Applications Group located in Michael Smurfit Graduate Business School, University College Dublin (UCD), under the supervision of Prof. Michael O'Neill. I have a strong background in **Operations Research**, **Nature-Inspired Computing** and **Machine Learning**, and their application on **Communication Network Systems**, **Cloud Computing**, and **Software Engineering and Testing**. I have published 12 papers on these topics (3 journal and 9 conference papers). In addition, I have 2 recently accepted papers (1 journal and 1 conference papers) and 2 papers currently under review (2 journal papers). I love finding solutions to challenging engineering questions; people see me as **enthusiastic**, **focused** and **hard worker**.

My Post-doctoral position is in close collaboration with **Bell Labs, Nokia** and aims at delivering the work programme outlined in the **Applications of Evolutionary Design** (App'ED) project. App'ED aims to bring us closer to automated design tools inspired by the natural world. The tools will be applied to optimise Future Networks & Communications such as 5G networks.

I obtained my PhD in Computer Science in 2017 from University College Dublin (UCD), Ireland. My PhD topic is **Multi-objective Optimisation of Large-Scale Data Centres**: I applied multi-objective meta-heuristics to satisfy complex requirements of capital allocators. I obtained both my **BSc** in Computer Science and my **MSc** in Computer Science, track: Optimisation In Operations Research in 2013 from the University of Nantes, France.

EDUCATION

AUG 2017	**PhD** in Computer Science, University College Dublin, Ireland. Title: "Multi-objective Virtual Machine Reassignment for Large Scale Data Centres". – Supervisors: Prof. Liam MURPHY & Dr Anthony VENTRESQUE.
AUG 2013	**MSc** in Computer Science, track: Optimisation in Operations Research, University of Nantes, France.
AUG 2011	**BSc** in Computer Science, University of Nantes, France.

WORK EXPERIENCE

Now Oct 2017	Post-doctoral Researcher Fellow *NCRA, UCD Michael Smurfit Graduate Business School, Ireland.* Delivering the work programme outlined in the Applications of Evolutionary Design (App'ED) project, in close collaboration with Bell Labs, Nokia. App'ED aims to bring us closer to automated design tools inspired by the natural world. The tools will be applied to optimise Future Networks & Communications such as 5G networks. Publications: 2 conference (EuroGP and TPNC) and 1 journal (GPEM) papers.
Apr 2018	Guest Lecturer *NCRA, UCD Michael Smurfit Graduate Business School, Ireland.* Preparing and delivering lectures on Text Mining (2 x 1h30) as part of the Data Mining for Business Analytics module (MIS40970). Designing and evaluating the module's final project.
Nov 2017	Guest Lecturer *NCRA, UCD Michael Smurfit Graduate Business School, Ireland.* Preparing and delivering lectures on Big Data (2 x 1h30) as part of the Data Management module (MIS41060): What is Big Data?, NoSQL, Map-Reduce, and Hadoop Ecosystem. Designing and evaluating the module's final project.
Sep 2017 Jun 2013	Teaching Assistant / Demonstrator *School of Computer Science, UCD, Ireland.* Planning and delivering a total of 721 hours of well-structured lab sessions which engage and motivate both undergraduate and postgraduate students. Preparing and implementing practical/assignments on the Moodle on-line checker. Correcting assignments and reporting. Modules: Computer Science for Engineers 1 and 2 (COMP10060 and COMP20080), Introduction to AI (COMP30030), Networks and Internet Systems (COMP30040), Operating Systems (COMP30640), Introduction to Relational Databases and SQL Programming (COMP40725).
Aug 2015 Jun 2015	Research Intern *Bell Labs, Alcatel-Lucent, Dublin, Ireland.* Modelling and optimising CPU interference in a virtualised environment using Fluid Limits. Implementing a virtualised test-bed (using KVM-QEMU, and libvirt), and using Machine Learning techniques to infer parameters of the model and validate its accuracy. 1 journal paper under review at FGCS (IF: 4.6).
Aug 2013 Mar 2013	Research Intern *Performance Engineering Laboratory, UCD, Ireland.* Optimising urban traffic using a novel prediction mechanism to detect congestion and to reroute vehicles. Publication at a CORE rank B conference (IEEE/ACM DS-RT).
Jan 2013 Apr 2010	Debt Collector *General Electric Money Bank, Nantes, France.* Managing a portfolio of customers with late payments: contacting customers, study their solvency and putting a personalised debt collection plan (around 800 hours/year).
May 2012 Jan 2012	Research Intern *University of Nantes, France.* Worked on the Clustered, Capacitated, Vehicle Routing Problem (CCVRP) and extended a C++ library of heuristics and meta-heuristics (VRPH) to address it. The library is available in open-source on GitHub.
Aug 2011 Apr 2011	Work Placement *Ovialis (French IT Company, Subsidiary of Proservia), Carquefou France.* Designing and implementing a JEE application for processing job application, based on a Service Oriented Architecture (SOA) using Eclipse Acceleo (model-driven code generator).
Mar 2011 Sep 2010	Research Intern *Laboratoire d'Informatique de Nantes-Atlantique (LINA), University of Nantes, France.* Worked on complexity analysis of the interval Newton method for the resolution of non- linear problems.

Awards

Apr 2018	**Best Paper Nomination:** at EuroGP 2018 for the paper "Multi-level grammar genetic programming for scheduling in heterogeneous networks".
Feb 2017	**Google Hash Code:** Best score in Ireland at the extended round of the Google HashCode, with the design of an algorithm to optimise the placement of videos on cache servers in order to reduce the overall endpoint request latency.
Nov 2015	**Blockchain Hackathon:** 3rd prize (€1000) at the 1st edition of Chainhack: The biggest Blockchain Hackathon in Europe with a project called "Open Charity", a safe and decentralized system allowing to issue IOUs ("I Owe You" tokens) for the benefit of Charity.
Nov 2015	**Best Paper Nomination:** at ICTAI 2015 for the paper "MILP for the Multi-objective VM Reassignment Problem".

Talks

May 2017	**Invited Talk:** Multi-objective Feature Selection in Evolving Software Product Lines. Invited by Prof. Michael O'Neill to give a presentation to the Natural Computing Research & Applications Group.
Dec 2015	**Keynote:** Multi-objective VM Reassignment For Large Scale Data Centres. Invited by Prof. Barry O'Sullivan to give the keynote at the 1st International Workshop on Sustainable Data Centres and Cloud Computing (S3DC).

Supervision / Mentoring

Now Sep 2018	H. Egemen Ciritoglu for his PhD in Computer Science at University College Dublin, Ireland. Designing and developing a smart and adaptive replication factor framework for Hadoop systems. In collaboration with IBM Ireland. (1 conference paper)
Aug 2018 Apr 2018	Kavya Rao and Shalvika Mishra for their Master's project in UCD Smurfit Business School, Ireland. Combining Evolutionary Algorithms with Multi-Criteria Decision Aid techniques for multi-objective Feature Selection in Software Product Lines.
Aug 2017 Feb 2017	Florian Delavernhe for his MSc Internship in University College Dublin, Ireland. Designing a hybrid algorithm for the Multi-objective Test Case Minimisation in Regression Testing. (1 conference paper)
Aug 2016 Feb 2016	David Brevet for his MSc Internship in University College Dublin, Ireland. Study of Multi-objective Features Selection for Evolving Software Product Lines. (1 conference paper and 1 journal paper)

PUBLICATIONS

Journals

J1   <u>Saber, Takfarinas</u>, James Thorburn, Murphy Liam, and Anthony Ventresque. Vm reassignment in hybrid clouds for large decentralised companies: a multi-objective challenge. *Future Generation Computer Systems (FGCS)*, 2018. (IF: 4.6, SJR: 0.8, Q1)

J2   <u>Saber, Takfarinas</u>, David Brevet, Goetz Botterweck, and Anthony Ventresque. Is seeding a good strategy in multi-objective feature selection when feature models evolve? *Information and Software Technology (IST)*, 2017. (IF: 2.6, SJR: 0.6, Q2)

J3   <u>Saber, Takfarinas</u>, Joao Marques-Silva, James Thorburn, and Anthony Ventresque. Exact and hybrid solutions for the multi-objective vm reassignment problem. *International Journal on Artificial Intelligence Tools (IJAIT)*, 2017. (IF: 0.8, SJR: 0.2)

Conferences / Workshops

C1   Hilmi Egemen Ciritoglu, <u>Saber, Takfarinas</u>, Teodora Sandra Buda, John Murphy, and Christina Thorpe. Towards a better replica management for hadoop distributed file system. In *IEEE BigData Congress*. IEEE, 2018.

C2   <u>Saber, Takfarinas</u>, Florian Delavernhe, Mike Papadakis, Michael O'Neill, and Anthony Ventresque. A hybrid algorithm for multi-objective test case selection. In *Evolutionary Computation (CEC), IEEE Congress on*. IEEE, 2018. (CORE B)

C3   <u>Saber, Takfarinas</u>, David Fagan, David Lynch, Stepan Kucera, Holger Claussen, and Michael O'Neill. Multi-level grammar genetic programming for scheduling in heterogeneous networks. In *Genetic Programming (EuroGP), 21st European Conference on*, pages 118–134. Springer, 2018. (CORE B, **Best Paper Nomination**)

C4   David Brevet, <u>Saber, Takfarinas</u>, Goetz Botterweck, and Anthony Ventresque. Preliminary study of multi-objective features selection for evolving software product lines. In *Search Based Software Engineering (SSBSE), 8th International Symposium on*, pages 274–280. Springer, 2016.

C5   <u>Saber, Takfarinas</u>, Anthony Ventresque, Joao Marques-Silva, James Thorburn, and Liam Murphy. Milp for the multi-objective vm reassignment problem. In *Tools with Artificial Intelligence (ICTAI), IEEE 27th International Conference on*, pages 41–48. IEEE, 2015. (CORE B, **Best Student Paper Nomination**)

C6   <u>Saber, Takfarinas</u>, Anthony Ventresque, Ivona Brandic, James Thorburn, and Liam Murphy. Towards a multi-objective vm reassignment for large decentralised data centres. In *Utility and Cloud Computing (UCC), IEEE/ACM 8th International Conference on*. IEEE/ACM, 2015.

C7   <u>Saber, Takfarinas</u>, Anthony Ventresque, Liam Murphy, and El-Ghazali Talbi. Multi-objective vm reassignment for the enterprise. In *Metaheuristics and Nature Inspired Computing (Meta), 5th International Conference on*, 2014.

C8   <u>Saber, Takfarinas</u>, Anthony Ventresque, Xavier Gandibleux, and Liam Murphy. Genepi: A multi-objective machine reassignment algorithm for data centres. In *Hybrid Metaheuristics (HM), 9th International Workshop on*, pages 115–129. Springer, 2014.

C9   <u>Saber, Takfarinas</u>, Anthony Ventresque, and John Murphy. Rothar: Real-time on-line traffic assignment with load estimation. In *Distributed Simulation and Real Time Applications (DS-RT), IEEE/ACM 17th International Symposium on*, pages 79–86. IEEE/ACM, 2013. (CORE B)

Accepted (J: Journal, C: Conference)

J4   <u>Saber, Takfarinas</u>, David Fagan, David Lynch, Stepan Kucera, Holger Claussen, and Michael O'Neill. A multi-level grammar approach to grammar-guided genetic programming the case of scheduling in heterogeneous networks. *Genetic Programming and Evolvable Machines (GPEM)*, 2018. (IF: 1.5, SJR: 0.38, Q2)

C10   <u>Saber, Takfarinas</u>, David Fagan, David Lynch, Stepan Kucera, Holger Claussen, and Michael O'Neill. A hierarchical approach to grammar-guided genetic programming the case of scheduling in heterogeneous networks. In *Theory and Practice of Natural Computing (TPNC), 7th International Conference on the*, pages 118–134. Springer, 2018.

Under Review (J: Journal)

J5   Yue Jin, <u>Saber, Takfarinas</u>, Ventresque Anthony, and Ryan Jennifer. Cloud service consolidation with minimal interference. *Future Generation Computer Systems (FGCS)*, 2018. (IF: 4.6, SJR: 0.8, Q1)

J6   <u>Saber, Takfarinas</u>, Gandibleux Xavier, Michael O'Neill, Murphy Liam, and Anthony Ventresque. A comparative study of multi-objective machine reassignment algorithms for data centres. *Journal of Heuristics (JoH)*, 2018. (IF: 1.8, SJR: 1.0, Q1)

Volunteering Experience

Reviewing

Now	Conferences and Journals.
Sep 2013	I review regularly for different conferences and journals in my different areas of expertise, such as: DSRT (2013, 2015 and 2016), PIMRC (2016), GC14 SAC (2014), Cloud Computing (2016 and 2017), MASCOTS (2015), IJAIT (2016), IET Software (2017 and 2018), COR (2018), and FGCS (2018).

Conference / Workshop Organisation

Aug 2018	The 3rd Computer Simulation of Musical Creativity (CSMC). I helped with the organisation of the conference.
Mar 2014	International Conference on Performance Engineering (ICPE). I participated in the organisation of the conference.
Aug 2013	First Irish SUMO User Workshop (ISUW). I participated in the organisation of the workshop.

Teaching

Sep 2015 Mar 2015	Coder Dojo of the Science Gallery at Trinity College Dublin. Introducing participants (10 to 18 years old) to the basics of programming using Python, and teaching children (10 to 12 years old) how to create and code their own interactive stories, games, and animations using the free programming language Scratch. (2 hours per week)
Jun 2009 Jan 2009	Charles Lebourg Primary School and LAMAP44, Nantes, France. Preparing and Mentoring scientific experiments in Charles Lebourg primary School (Nantes, France), which allow pupils to learn interesting science and technology facts in a funny way. (1 hour per week)

Building / Administrating Clusters

Nov 2017	Building and managing a scientific cluster for the NCRA Group. Building a cluster of 15 machines from scratch. Putting in place the useful management tools: LDAP (centralised user logging), Network File Sharing, and Ganglia (performance monitoring).

Creating / Administrating Group Wiki Page

Nov 2017	Creating and managing the Wiki page for the NCRA Group. Installing a FOSWIKI website and configuring it to fill the need of the lab with an internal and a public part.

Skills

Operations Research

- **Mono- and Multi-Objectives Linear Problems:** IBM Ilog CPLEX, COIN-OR and GLPK.

- **Blackbox and Non-Linear Problems:** meta-heuristics, direct search and model-based optimisation.

- **Large-Scale Optimisation:** relaxation, column generation, cuts, surrogate constraints, heuristics and adapted meta-heuristics (e.g., Genetic Programming, Genetic Algorithm, Local Search, Ant Colony, etc.).

Data Analysis

- **Machine Learning, Data Mining and Data Analytics:** using Python, R and Weka.

- **Big Data:** Hadoop and MongoDB.

Networking

- **Communication Networks:** LAN, WAN, 4G-LTE.

- **Simulators and Emulators:** Mininet, NS-3 Simulation, Emulation and Taps.

Data Centres / Clusters

- **Creating and Controlling Private Clouds:** using OpenStack/DevStack.

- **Virtualisation:** KVM, VirtualBox and Linux Containers.

- **Cloud Providers:** Amazon EC2.

- **Cloud Computing Simulators:** CloudSim.

- **Performance Monitoring:** Ganglia.

- **Job Queuing:** Torque.

- **User Management:** LDAP.

- **File Sharing:** NFS.

Other Skills

- **Data Structures**, **Graphs** and algorithms **Complexity Analysis**.

- **Multi-Agent Systems:** JAVA Agent Development Framework (JADE).

- **Parallel and Distributed Systems:** Apache Hadoop and Map-Reduce.

- **Bioinformatics:** Alignment and Phylogeny.

- **Databases:** Oracle (SQL and PL/SQL) and MongoDB.

- **Programming and Scripting Languages:** Bash, C, C++, Java, JEE, Latex, Lisp, Prolog, PHP and Python.

- **Graphical User Interfaces:** JSP, SDL and Qt.

- **Websites and Wikis:** FOSWIKI.

- **IDEs:** Code::Blocks, Eclipse, IntelliJ IDEA, PyCharm.

- **OSes:** Linux, Mac and Windows.

- **Virtual Learning Environments:** Blackboard and Moodle.

- **Coding for Kids:** Scratch visual programming language.

LANGUAGES

ENGLISH:	Fluent
FRENCH:	Fluent
ARABIC:	Fluent
BERBER:	Mother tongue

INTERESTS AND ACTIVITIES

I am an amateur handball and football player, and love playing chess whenever I have time.