Ferran Gonzalez Hernandez

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EDUCATION

University College London, UCL **London, UK**
PhD, Dept. of Computer Science *2018 - Present*

Second-year PhD candidate at the the centre for Computation, Mathematics and Physics in the Life Sciences and Experimental Biology (CoMPLEX). Working on information extraction from the clinical literature. The main areas of my research include biomedical Natural Language Processing, machine learning and pharmacokinetic modelling. Supported by the UCL Graduate Research Scholarship for a CDT programme (MRes + PhD). Courses taken from the UCL MSc in Machine Learning: *Introduction to Deep Learning* and *Statistical Natural Language Processing*.

Supervision: Dr. Joseph Standing, Dr. Frank Kloprogge, Dr. Watjana Lilaonitkul and Dr. Juha Iso-Sipilä

University College London, UCL **London, UK**
MRes Modelling Biological Complexity, CoMPLEX *2017 - 2018*

One-year Master of Research (MRes) degree programme at CoMPLEX. Initial foundation courses in applied mathematics, machine learning, software engineering and biomedicine. Three cross-disciplinary research projects (6.5 weeks) + summer project (11 weeks) which presented biomedical challenges that were faced using computational approaches. Graduated with distinction and awarded with the MRes 2018 prize for the highest average grade (81%).

Thesis: *"An integrated approach to characterize Autism Spectrum Disorder"*. Supervised by Dr. Ilias Tachtsidis & Prof. Paul Brugess

Universitat Politècnica de Catalunya, UPC **Barcelona, Spain**
BEng (Hons), Biosystems Engineering *2013 - 2017*

Interdisciplinary bachelors education, which combines modules in biochemistry, genetics and cell biology with strong foundation in mathematics, physics and computer science. Bachelor's degree of 240 ECTS credits with a length of four years with a full-time dedication. Average grade of 84% and 14 modules with *honours cum laude*.

Dissertation: *"Modelling in vitro cultures of Mycobacterium tuberculosis"*. Supervised by Dr. Daniel Lopez & Dr. Clara Prats. Awarded with the national Collaboration Scholarship from *Ministerio de Educación Cultura y Deporte*

RESEARCH EXPERIENCE

The Alan Turing Institute **London, UK**
Enrichment Scheme *2019 - Present*

Nine-month placement at the national institute for data science and artificial intelligence. Focusing on my current PhD research and working on document classification, biomedical named-entity recognition, entity linking and information extraction from biomedical tables. Formal training on research software engineering. Attending weekly sessions at the institute's reading group in NLP. Co-organised and presented the workshop "Make a Christmas song using Artificial Intelligence! With the Turing Institute" at Canopy Market. Profile available here.

Institute of Cognitive Neuroscience & Dept. of Medical Physics, UCL **London, UK**
Supervision: Dr. Ilias Tachtsidis & Prof. Paul Burgess *2018*

Development of a machine learning platform for the diagnosis of autism spectrum disorder integrating behavioural and neuroimaging information. Focusing on the extraction of useful time-series features to detect potential biomarkers. Implementations in MATLAB for time-series processing and Python (scikit-learn) for machine learning applications. Report available here.

Institute of Cognitive Neuroscience & Dept. of Medical Physics, UCL **London, UK**
Supervision: Dr. Ilias Tachtsidis & Dr. Paola Pinti *2018*

Study of characteristic and discriminant neural patterns in autistic patients using multivariate pattern analyses to process functional near-infrared spectroscopy (fNIRS) neuroimaging data. Report available here.

Dept. of Health Psychology & Dept. of Computer Science, UCL **London, UK**
Supervision: Dr. Amanda Williams & Prof. Peter Bentley *2018*

Modelling the effect of post-injury behaviour and pain expression in a hierarchical community of wild chimpanzees using agent-based modelling. The project was part of a collaboration between experimental Psychologists at UCL and AI researchers at Braintree Ltd. Report available here.

Laboratory for Molecular Cell Biology & Dept. of Physics, UCL **London, UK**
Supervision: Prof. Buzz Baum & Dr. Andela Šarić *2018*

Development of a computational model using molecular dynamic (MD) simulations to understand the self-assembly of COPII outer coat subunits. Implementations in LAMMPS for MD simulations, R and Mathematica for statistical analyses and set-up geometrical configurations. Report available here.

Computational Biology and Complex Systems, UPC **Castelldefels, Spain**
Supervision: Dr. Daniel Lopez & Dr. Clara Prats *2016 - 2017*

Modelling antibiotic (*rifampicin*) mechanisms in *Mycobacterium tuberculosis* at *BIOCOMSC* using agent-based modelling approaches. Analysis and processing of experimental data growth provided by Hospital Clinic de Barcelona and the National Institute for Public Health and the Environment (RIVM, Netherlands). Implementations in NetLogo and MATLAB. Report available here.

CONFERENCES AND PRESENTATIONS

Gonzalez Hernandez, F., et al. (2020, April). *"Structuring pharmacokinetic literature with Natural Language Processing"*. Accepted abstract at the upcoming World Conference on Pharmacometrics 2020, Cape Town, South Africa.

Gonzalez Hernandez, F. (2019, November). *" Natural Language Processing to structure pharmacokinetic literature"*. Oral presentation at Pharmacokinetics UK 2019, Stratford, United Kingdom.

Standing, J. & Gonzalez Hernandez, F. (2019, September). *"Natural Language Processing to structure pharmacokinetic literature"*. Invited talk at the UK Quantitative Systems Pharmacology Network 2019, Reading, United Kingdom. Abstract available here.

Gonzalez Hernandez, F., et al. (2019, June). *"Pharmacokinetic model development for total and free vancomycin in critically ill children"*. Poster session presented at the Population Approach Group Europe 2019, Stockholm, Sweden. Abstract available here.

TEACHING EXPERIENCE

Department of Applied Physics, UPC **Barcelona, Spain**
University mentor *2014 - 2017*

Weekly sessions of problem-solving exercises for reduced groups of first-year engineering students pursuing Biophysics, Physics I and II. Teaching fundamental concepts in heat and mass transfer, thermodynamics, fluid mechanics and electromagnetism.

Wallace Chess **London, UK**
Chess coach *2018 - 2019*

Coaching junior chess students in several schools based in London. Leading the Wallace Chess talent squad, focusing on weekly sessions for advanced players.

Kepler Centre Foment Martinenc and C.C. Sant Andreu **Barcelona, Spain**
Chess coach *2009 - 2017*

Training children and adult groups from different levels at Sant Andreu chess club during 8 years. Three-year experience on one-to-one lessons at Kepler Centre training the U-12 rapid Spanish champion. Two-year experience training children at Foment Martinenc chess club.

IT SKILLS AND LANGUAGES

Programming Languages

- Advanced: Python, R, MATLAB, Mathematica, NetLogo
- Familiar: Java, HTML, CSS, C#

Core Skills

- Five-year experience with Unix/Linux OS environments, frequent Bash scripting
- Experience using parallel HPC systems and Cloud Computing with Amazon Web Services and Microsoft Azure
- Frequent use of Apache Spark through Pyspark API and familiar with MySQL relational databases
- Machine Learning libraries: extensive experience building scikit-learn pipelines. Practical experience with Spark MLlib. Familiar with PyTorch and TensorFlow
- NLP libraries: Using spaCy pipelines for most NLP applications. Experience with NLTK for text processing and Gensim for topic modelling and word2vec embeddings. Experience with HuggingFace Transformers for dealing with pre-trained transformer models. Development of SparkNLP pipelines from John Snow LABS. Experience with MetaMap Java API to link biomedical entities to UMLS concepts

Languages

Native in Spanish and Catalan, fluent in English (7.5 IELTS band score, British Council, December 2016)

EXTRA-CIRRUCULAR

Competitive chess player (2194 FIDE rating). Gold medal in the blitz British University Chess Championship 2019. Barcelona Champion 2012, third place in the Spanish Chess Championship 2012. Committee member of the UCL chess society and currently playing the London Chess League.