Ph.D. Candidate | Software Developer | Data Scientist hithamh@live.com

LINKS

LinkedIn: hitham-hassan GitHub: Hitham2496

Website: hitham2496.github.io ORCiD: 0000-0002-6183-5875

BIC

Enthusiastic and hard working software developer, data scientist and Ph.D. researcher in theoretical particle physics with well-honed academic, technical, professional and interpersonal skills including a proven ability to communicate complex scientific concepts to diverse audiences.

SKILLS

TECHNICAL SKILLS

Experienced:

c/c++ • Python • CI/CD • Git • Linux/Unix • Bash/Shell • ATEX • Data Science • Software Development • High Performance Computing • Statistical Analysis • Primary and Secondary Databases • Data Visualisation • Docker & Containerisation • Multithreading / Multiprocessing

Familiar:

Machine Learning • HTML • CSS JavaScript • Fortran • SQL • XML

PROFESSIONAL & INTERPERSONAL SKILLS

Science Communication • Confident
Presentation • Management • Leadership •
Strong Work Ethic • Time Management •
Teamwork • Problem Solving

LANGUAGES

English (native) Arabic (fluent) French (highly proficient)

AWARDS

St. Cuthbert's Soc., Durham University

- New Student of the Year (2015).
- Ranald Michie Prize (2016).
- Principal's Award for Outstanding Contribution to College Life (2019).

INTERESTS

- Research
- Science Outreach
- Machine Learning and Data Science
- Computational Physics and Biology
- Climate Science
- Informatics and Bioinformatics

EDUCATION AND RESEARCH EXPERIENCE

PH.D. CANDIDATE IN THEORETICAL PARTICLE PHYSICS

IPPP. DURHAM UNIVERSITY

Oct 2019 - Present (expected submission: 31/03/2023)

Examination results: 99.5%

- Developing software implementation of a merging procedure for Monte Carlo simulations of particle collisions at the LHC.
- Using C++ to develop applications for use on high performance computing systems following a test-based approach.
- Working in the Linux/Unix environment and with version control systems in GitLab, using continuous integration to streamline the development process.
- Using **Python** to interpret **data structures** in predictions made with High Energy Physics (HEP) software and perform **statistical analyses** of the results.
- Displayed strong management and organisational skills in organising conferences and in teaching
 undergraduate students in physics courses and teaching postgraduate students in data science and high
 performance computing courses.

M.SCI NATURAL SCIENCES IN MATHEMATICS AND PHYSICS

DURHAM UNIVERSITY

Oct 2015 - July 2019

Classification: First Class Honours

Thesis: Jet Multiplicity Measurements at the LHC

- Integrated Masters degree in mathematics and physics, specialised into theoretical and computational particle physics.
- Topics include: Numerical Analysis, Probability and Statistics, Partial Differential Equations, Analysis in Many Variables, Complex Analysis, Quantum Computing and Optics, Quantum Field Theory, Condensed Matter Theory.

SUMMER RESEARCH STUDENT

IPPP, DURHAM UNIVERSITY

Jul 2018 - Aug 2018

- Awarded one month studentship at the IPPP, Durham producing predictions for Higgs boson production at the LHC with Monte Carlo event generators.
- Produced sophisticated tools in **Python** to **pre-process** the data as **images**.
- Produced simple unsupervised machine learning analysis in Python (w/sklearn) to classify the
 production mechanisms of the Higgs.

SELECTED PRESENTATIONS

PROFILING APPLICATIONS IN C/C++ AND PYTHON

OCT 2022 | IPPP COMPUTING SEMINAR SERIES, DURHAM UNIVERSITY Presentation Material Available Online

ALL-ORDER MERGING OF HIGH ENERGY AND SOFT-COLLINEAR RESUMMATION

AUG 2022 | ISMD 2022, PITLOCHRY, SCOTLAND

Presentation Material Available Online

PYTHON PROJECTS AND UNIT TESTING

FEB 2022 | IPPP COMPUTING SEMINAR SERIES, DURHAM UNIVERSITY Presentation Material Available Online

DEBUGGING C++ WITH GDB

Nov 2021 | IPPP Computing Seminar Series, Durham University

Presentation Material Available Online

SELECTED PUBLICATIONS

HIGH ENERGY RESUMMED PREDICTIONS FOR THE PRODUCTION OF A HIGGS BOSON WITH AT LEAST ONE JET

SUBMITTED OCT 2022 • JOURNAL OF HIGH ENERGY PHYSICS • PREPRINT: ARXIV:2210.10671

EMPLOYMENT AND SUPPORTING EXPERIENCE

PRESIDENT OF YTF22 CONFERENCE ORGANISING COMMITTEE

IPPP, DURHAM UNIVERSITY

Sept 2022 - Jan 2023

- Led the organisation of a hybrid conference of \sim 80 in-person and \sim 40 online attendees for early career researchers from around the UK.
- Displayed strong organisational and management skills in directing a committee of 10 for the months before and after the conference.
- Secured funding amounting to over 5,000 GBP from several sponsors including the Institute of Physics and other academic and corporate institutions.
- Ensured smooth running of the conference by managing the available time to overcome logistical hurdles well in advance of the conference and oversaw the publicising of the event to other institutions.
- Gathered experience producing risk assessments and taking health and safety precautions for large events.
- Conference website available online and hosted by Indico

ORGANISER OF IPPP COMPUTING SEMINAR SERIES

IPPP, DURHAM UNIVERSITY

Jan 2022 - Present

- Co-organised internal speakers for the IPPP computing club seminar series on interesting topics related to and outside the scope of research at the IPPP to an audience of postgraduate students, postdoctoral researchers and senior academics.
- Gained logistical experience in hosting regular events in the work environment (e.g. room booking, risk assessments, timetabling and liaising with speakers).
- Presented (see selected presentations above) several topics including unit testing, profiling, debugging during this seminar series to audiences with diverse backgrounds.

TEACHING ASSISTANT

DURHAM UNIVERSITY

Oct 2018 - Present

- Employed part time by Dept. of Mathematical Sciences (2018-2019) and Dept. of Physics (2019-present) as a homework/examination marker and postgraduate teaching assistant in: Complex Analysis (2018-19), Relativistic Electrodynamics (2019-22), Quantum Theory (2019-23), Classical Mechanics (2019-23).
- Marking role involves producing constructive feedback for students on their scripts and liaising with the lecturers to outline where students struggled such that the teaching can reflect this.
- Teaching assistant role involves preparing for workshop style lessons, demonstrating the material during the workshops (twice weekly, each with ~ 40 students) and **interacting constructively** with students to ensure their comprehension.
- 2022: Taught postgraduate students in practical demonstration sessions on data science techniques and high performance computing including OpenMP and MPI.

COURSES, WORKSHOPS AND CONFERENCES

- Course: EMBL-EBI Introductory Bioinformatics (Aug 2022)
- Conference: International Sympososium on Multiparticle Dynamics (ISMD) 2022 (Jul 2022)
- Course: Introduction to Profiling with the Intel toolchain (Jun 2022)
- Workshop: 15th Monte Carlo Net Summer School and Kraków School of Theoretical Physics (May 2022)
- Course: STFC Summer School on Data Intensive Science (Sept 2021)
- Course: DCAD Effective Remote Working (May 2020)

OUTREACH AND EXTRA-CURRICULAR

MEMBER OF EQUITY, DIVERSITY AND INCLUSION COMMITTEE

IPPP, DURHAM UNIVERSITY

Oct 2021 - Present

- $\bullet \quad \text{Organised, led and participated in in-depth discussions related to } \textbf{equity, diversity} \text{ and } \textbf{inclusion} \text{ (EDI) in our department.} \\$
- Examined and interpreted data relevant to EDI initiatives in department and have transmitted these to other departments.
- Co-drafted an inclusive **code of conduct** to be used in future conferences in the research group.

MEMBER OF OUTREACH COMMITTEE

IPPP, DURHAM UNIVERSITY

Oct 2019 - Present

- Produced and held demonstrations on science to schools and the general public at such events as Celebrate Science and Pint of Science.
- Responsible for producing and maintaining technical apparatus used in demonstrations including a Galton board and a model dark matter detector, instructions for use hosted on my IPPP website.
- Founder of cloud chamber project: we produce a sophisticated simulation of a cloud chamber for use in outreach demonstrations at schools (written in C++ and WASM with code hosted on GitLab).