

Matt Williams

Physicist
Software Developer



www.linkedin.com/in/m4tt-willi4ms



www.github.com/m4tt-willi4ms



m4tt.willi4ms@gmail.com



+1-226-788-0931

Summary

Software developer with a Ph.D. in physics and 8+ years of software development experience. Specializing in data analysis, statistics, and optimization using tools in the Python/JS/TS/React ecosystems

Skills

- Familiar with Python in the context of machine learning and data science. Extensive experience with PyTorch, JAX, tensorflow, numpy, scipy, cctbx, pandas
- Proficient in writing C/C++, C#, Python, JS/TS, Fortran, bash scripts, \LaTeX , HTML
- Bilingual: French and English

Work Experience

2016–present Physicist, Software Developer

Proto XRD (Oldcastle, ON)

- Trained a Feed-Forward Neural Network to identify spots in a multi-grain Laue image and index the orientations of the grains within the crystal, inspired by the approach outlined [here](#). This work contributes significantly in automating a turbine blade inspection system used throughout the aerospace industry
- Led an agile development team to design and implement a new approach to the company's software architecture, consisting of a UI for collecting, viewing X-ray CT images and a server coordinating the operation of motors, PLC, scintillation detectors, and the X-ray source. The design was chosen to guarantee a clear separation of concerns between a UI-facing client and hardware-facing server
- Wrote a C++ wrapper to allow for hardware control of a Varex flat-panel detectors from a dedicated python web service
- Guided the development of a React Native application for iOS and Android: *XraySource: The X-ray Physics Handbook*. This included UI/UX design, implementation of business logic for performing conversions and calculations, and streamlining application deployment
- Built a desktop application for performing least-squares optimization of X-ray powder diffraction profiles (also known as Rietveld refinement). The application consists of a UI coded in C#, that acts as a client making calls to a [backend server](#) – written in Python – performing the computations. This project makes use of many open-source Python packages, including: numpy, scipy, jinja2, pandas, as well as the cctbx (computational crystallography toolbox)
- Adopted and advocated for the use of many modern software development best practices: SOLID design principles, a version control system (git), continuous integration, documentation (using sphinx, mkdocs), issue-tracking (using Backlog, Monday)
- Led the recruitment effort of new developers to build a flexible team of high-performing developers who could iterate quickly on exciting problems and develop out-of-the-box solutions to meet the demands of our customers. This involved generating job listings, screening potential candidates, and conducting coding interviews aimed at attracting the most suitable talent available
- Represented the company at various trade shows and conferences in a sales context; prepared quotes for XRD systems and held meetings with potential customers to discuss how our products might help meet their research needs

Education

2009–2013 Ph.D. Physics

McMaster University

- Dissertation topic: *Accidental Supersymmetry and the Naturalness of Codimension-2 Branes*; Supervisor: Dr. Cliff Burgess

2007–2009 M.Sc. Physics

McMaster University

- Specializing in cosmology and particle physics

2003–2007 B.Sc. Physics and High Technology (Co-op)

University of Windsor

- Magna cum laude (91% cumulative average)
- Recipient of Board of Governor's Medal in Physics

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Publications and Patents

- Oh et al., *Taking three-dimensional x-ray diffraction (3DXRD) from the synchrotron to the laboratory scale*, Nature Communications (2025, accepted for publication)
- Vukotic et al., *Transmission X-ray Diffraction Apparatus and Related Method*, U.S. Patent 2023/0273134 A1. Published Aug. 31, 2023.
- See <http://inspirehep.net/search?p=f+a+m.r.williams.1> for others

Conferences and Schools

- APS March Meeting (2024)
- Denver X-ray Conference (2018, 2019, 2022)
- ECACOMSIG Computational Crystallography School (2017, 2018, 2019)
- MRS Boston (2017, 2018, 2019)

Other Work Experience

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|-----------|---|--|
| 2014–2016 | Postdoctoral Fellow | University of Leuven (Leuven, Belgium) |
| | <ul style="list-style-type: none">• Contributed to research collaborations and projects with members of the Institute for Theoretical Physics and others abroad• Extensive application of analytic and critical-thinking skills• Leadership experience in the context of mentoring, supervising master's students | |
| 2009–2014 | Private Tutor | Self-employed (Hamilton, ON) |
| | <ul style="list-style-type: none">• Use of clarification, elaboration and elucidation techniques in providing advanced tutoring for high school and university students• Specific experience in providing supplemental work for AP-level courses, preparing students for SAT examinations | |
| 2007–2013 | Teaching Assistant | McMaster University (Hamilton, ON) |
| | <ul style="list-style-type: none">• Intensive use of public speaking, verbal communication skills while leading tutorial sessions, student meetings• Critical evaluation of students' performance in grading assignments, midterms | |
| 2010–2013 | Outreach Demonstrator | McMaster University (Hamilton, ON) |
| | <ul style="list-style-type: none">• Creative use of data visualization and demonstration techniques in preparing presentations on the history of particle physics• Extensive application of public-speaking skills in presenting concise, intriguing workshops to local high school classes | |

Honours and Awards

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|------------|---|
| 2014 | FWO (Belgian Science Foundation) Fellowship |
| 2010, 2012 | Ontario Graduate Scholarship |
| 2011 | Q.E.II Graduate Scholarship in Science and Technology |
| 2009 | Desmond G. Burns Scholarship in Theoretical Physics |
| 2007 | NSERC Canada Graduate Scholarship |

Interests and Hobbies

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|---------|---|
| Running | P'tit Train Du Nord Marathon (2023), 3h43m15s; Around the Bay 30K (2022), 2h12m20s; Antwerp Marathon (2015), 3h47m53s. |
| Music | Contrabassist, Arenberg Orchestra (2014–2016); cellist, Symphony Hamilton (2008–2010); bass vocalist, Macappella (2012–2013). |