Marcin Abram

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PROFESSIONAL EXPERIENCE

Fetch.AI, Cambridge, UK and New Haven, CT, USA

Lead Research Scientist   *January 2019 – Present*

Responsibilities: Establishing and leading a new US research unit for Fetch.AI in New Haven, CT. Presenting research at scientific conferences. Research on consensus algorithms, blockchain security and stability, and machine learning applications in multi-agent systems.

Results: Talks at two international conferences Tokenomics 2019 (Paris) and Genesis 2019 (Toronto). A talk at PyData Cambridge. Prototype of a parking-agent system.

Machine Learning Scientist   *July 2018 – January 2019*

Responsibilities: Consensus design, research on blockchain security. Modelling actors' incentives in multi-agent systems. Machine learning applications for peer-to-peer networks. Leading group of 3 researchers.

Results: Threshold random oracle based on a multi-signature scheme (implementation). Bayesian-based ranking algorithm for agents in a peer-to-peer network (proposal and implementation).

TypeScore, London, UK

Machine Learning Engineer   *August 2016 – June 2018*

Responsibilities: Technical lead for other developers. Data collection and cleaning. Building, training and evaluating machine learning models. Software development. Database and servers maintenance. Monitoring the latest technological advancements and proposing new development directions.

Results: Design and deployment of an end-to-end data pipeline that automatically collected data, re-trained the models and uploaded the predictions to final database.

Jagiellonian University, Kraków, Poland

Research Assistant   *October 2011 – August 2016*

Responsibilities: Mathematical modeling. Analytical and numerical computation. Software development. Algorithm optimization. High-performance computing (on a supercomputer). Data analysis and interpretation.

Results: Research-member in two EU-funded projects. Results of work published in 7 peer-reviewed articles in leading international journals and presented at several international conferences.

Teaching Assistant   *October 2011 – Jun 2015*

Courses: • *Physics with Biophysics Elements* for environmental science students (one semester, two classes with 20 students each), • *Statistical Physics* for senior-students of physics-major (two consecutive years, 15 students), • *Physics Laboratory* for non-physics majors (one semester, groups 4-6 students), • *Physics Classes for Gifted High-School Students* (three consecutive years, up to 180 hours per year, both theory and laboratory classes, up to 30 students per class).

Student evaluation: 4.88/5.0 in 2013 and at 4.97/5.0 in 2014. *Students achievements:* a silver medal at the 7th International Olympiad on Astronomy and Astrophysics (IAOO 2013) and several finalist titles in the National Physics Olympiad in years 2012-2014.

EDUCATION

Jagiellonian University, Kraków, Poland

Ph.D. in Physics   *2011 – 2016*

Research on approximation methods used in modeling strongly-correlated quantum systems. Focus on scientific simulations and high-performance computing techniques.
Dissertation title: *"Nonstandard Representation of Correlated-Fermion Models and its Application to Description of Magnetism and Unconventional Superconductivity."*
Supervisors: Prof. J. Spałek and Dr. M. Zegrodnik.
Degree awarded with Distinction.

Interdisciplinary studies: Society–Environment–Technology   *2012 – 2015*

This competitive, application–only program for top Ph.D. students, consisted of three years of coursework and independent research using social science, natural science and humanities research methods in English.
Final mark: 4.4 (maximum 5.0)

B.Sc. in Computer Science   *2009 – 2012*

Obtained independently from the Physics program as a second degree. Final project resulted in a publication in *Physical Review E.*
Final mark: 4.5 (maximum 5.0)

M.Sc. in Physics (Theoretical Physics Major)   *2006 – 2011*

5-year Master's program completed with 413.5 ECTS credits (in the European Union, 300 credits are required to obtain an M.Sc. degree).
Dissertation title: *"Selected methods of correlated particles applied to atomic systems in optical lattices."*
Supervisor: Prof. J. Spałek.
Final mark: 5.0 (maximum 5.0)

PUBLICATIONS

1. M. Abram, D. Galindo, D. Honerkamp, J. Ward, J.-M. Wong, *Democratising blockchain: A minimal agency consensus model* (a working paper presented at Tokenomics 2019, Paris)

2. M. Abram, M. Zegrodnik, and J. Spałek, *Antiferromagnetism, charge density wave, and d-wave superconductivity in the extended t–J–U model*, J. Phys.: Condens. Matter **29**, 365602 (2017).

3. M. Abram, M. M. Wysokiński, and J. Spałek, *Tricritical wings in UGe_2: A microscopic interpretation*, J. Magn. Magn. Mater. **400**, 27–30 (2016).

4. M. M. Wysokiński, M. Abram, and J. Spałek, *Criticalities in the itinerant ferromagnet UGe_2*, Phys. Rev. B **91**, 081108(R) (2015).

5. M. M. Wysokiński, M. Abram, and J. Spałek, *Ferromagnetism in UGe_2: A microscopic model*, Phys. Rev. B **90**, 081114(R) (2014).

6. A. Kapanowski and M. Abram, *Model of hard spheroplatelets near a hard wall*, Phys. Rev. E **89**, 062503 (2014).

7. M. Abram, *t–t′–J–U Model in Mean-Field Approximation: Coexistence of Superconductivity and Antiferromagnetism*, Acta. Phys. Pol. A **126**, 25 (2014).

8. M. Abram, J. Kaczmarczyk, J. Jędrak, and J. Spałek, *d-wave superconductivity and its coexistence with antiferromagnetism in t–J–U model: Statistically consistent Gutzwiller approach*, Phys. Rev. B **88**, 094502 (2013).

SERVICE

Reviewer for: *Journal of Physics: Material* (3), *Journal of Physics: Condensed Matter* (2), *New Journal of Physics* (3), *Physica Scripta* (1).

TEACHING EXPERIENCE

Jagiellonian University, Kraków, Poland

Statistical Physics *Spring 2013 and Spring 2014*
Practical sessions for senior students of physics specialization. Preparing and marking exams.
Classes: 30 hours per semester, 15 students in one class.
Student's Evaluation: 4.88/5.0 (2013) and at 4.97/5.0 (2014).

Physics with Biophysics Elements *Fall 2013*
Introductory classes for environmental science majors.
Classes: 15 hours per semester, 2 classes, 20 students in one class.

Physics Laboratory *Spring 2015*
Physics laboratory for non-Physics major.
Classes: 15 hours per semester, 4-6 students in a group.

Physics Classes for Gifted High-School Students *2012 – 2014*
Program for gifted high-school students, preparing them for the National Physics and the Astronomy Olympiads.
Classes: 90 hours of theory and 90 hours of laboratory sessions per year, up to 30 students in one class.
Student's achievement: A silver medal on 7th International Olympiad on Astronomy and Astrophysics (IAOO 2013) and several finalist titles in the National Physics Olympiad

Additional Teaching Experience

Data Science Bootcamp, PyData Conference, London, UK *26 April 2018*
Organization and tutoring (introduction to machine learning and to natural language processing).

Math tutor, Kraków, Poland *2012 – 2014*
Math tutor in the Center for the Blind and Visually Impaired.

Cultural mentor for Erasmus Student Network, Kraków, Poland *2010 – 2011*
Working as a mentor with foreign students.

CONFERENCES AND INVITED TALKS (SELECTION)

Astro Hack Week 2019, Cambridge, UK (invited lecture)	*August 2019*
Consensus 2019, New York, NY, USA (participation)	*May 2019*
Tokenomics 2019, Paris, France (lecture, peer-reviewed working paper)	*May 2019*
PyData Cambridge Meetup, Cambridge, UK (invited lecture)	*May 2019*
Genesis 2019 – Rebuild Conference, Toronto, Canada (invited lecture)	*April 2019*
Machine learning in Physics, Physics in Machine Learning, Jagiallonian Univeristy, Kraków, Poland (seminar)	*January 2019*
CESC 2018: Cryptoeconomics and Security Conference, San Francisco, USA (participation)	*September 2018*
PyData London 2018, London, UK (participation)	*April 2018*
Data Science Bootcamp, London, UK (tutorial)	*April 2018*
Natural Language Processing, Jagiellonian University, Kraków, Poland (invited lecture)	*March 2017*
20th International Conference on Magnetism, Barcelona, Spain (poster)	*March 2015*
Cracow Colloquium on f-electron systems, Zakopane, Poland (lecture)	*June 2015*
From Spins to Cooper Pairs: New Physics of Spins, Zakopane, Poland (lecture)	*September 2014*
XVI National Conference on Superconductivity, Zakopane, Poland (lecture)	*March 2014*
50th Karpacz Winter School of Theoretical Physics, Karpacz, Poland (poster)	*October 2013*

SCHOLARSHIPS, AWARDS AND GRANDS (SELECTION)

Grant participation — *2015 – 2016*
Fundamental Properties of Strongly Correlated Systems: Unconventional Superconductivity, Quantum Critical Behavior, and Complex Electronic Structure – funded by The National Science Centre (NSC).

Exceptional Doctoral Performance Award — *2013 – 2015*
Awarded to the top 15% of PhD students departmentally at Jagiellonian University in Kraków, Poland.

Grant participation — *2011 – 2015*
PhD Student Member in *Correlations and coherence in quantum materials and structures (CCQM) - unique properties on macro and nano scale* – funded by The Foundation for Polish Science (FNP).

Scholarship: Interdisciplinary Ph.D. studies in English Program — *2012 – 2015*
Awarded to the top PhD students at Jagiellonian University in Kraków, Poland.

Scholarship: Study Abroad — *January – June 2010*
Erasmus Scholarship in Niels Bohr Institute in Copenhagen, Denmark.

Academic Achievement Scholarship — *2008 – 2009*
Awarded to the top students departmentally at Jagiellonian University in Kraków, Poland.

Scholarship of Silesia Region for talented students — *2006*

Scholarship of The President of Gliwice for talented students — *2016*

Finalist (top 60 in the country) in the LV Polish Physics Olympiad — *April 2006*

Finalist (the 9th place) in the XLIX Polish Astronomy Olympiad — *March 2006*

ADDITIONAL TRAINING (SELECTION)

Summer Schools

STAQ Quantum Ideas Summer School, Duke University, Durham, CT, USA — *June 17-21, 2019*

Autumn School on Correlated Electrons: Emergent Phenomena in Correlated Matter,
Forschungszentrum Juelich GmbH, Jülich, Germany — *September 23-27, 2013*

Quantum Monte Carlo: Fundamentals and Applications,
University of Illinois, Urbana-Champaign, IL, USA — *July 23-27, 2012*

XVI Training Course in the Physics of Strongly Correlated Systems,
Vietri sul Mare, Salerno, Italy — *October 3 - 14, 2011*

Quantum Transport in Low Dimensional Systems,
Niels Bohr Institute, Copenhagen, Denmark — *May 31 – June 4, 2010*

Study Abroad

Erasmus Scholarship Program, Niels Bohr Institute, Copenhagen, Denmark — *January 2010 – June 2010*

Additional Certificates

Certificate in Advanced English (CAE), No.: *163PL0015030*,
University of Cambridge English Language Assessment — *March 2016 – No Expiration Date*

Other (non-credit)

Economics and Computation (CPSC 455/555), Yale University, New Haven, CT, USA — *August – December 2019*

*Professional Meetups: London Machine Learning, PyData London,
South England Natural Language Processing, London Data Science Journal Club* — *2016 – 2018*

The Analytics Edge, MITx (an online learning initiative of MIT) — *June – August 2015*