Dr. Andrzej Piotr Kądzielawa

Curriculum Vitae

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Mellechowicz

Experience

2018 – **Researcher**, *IT4Innovations National Supercomputing Centre*, Ostrava, Czechia.
Modelling for Nanotechnologies Lab; Responsibilities: Development of high-level software for magnetic symmetry detection and assessment of the interaction scale; Design of new materials including robust Cobalt alloys and permanent magnets; Utilization of HPC libraries to model strongly-correlated electron systems with disorder.

2017 – **Researcher & Lecturer**, *Marian Smoluchowski Institute of Physics*, Kraków, Poland.
Member of MAESTRO team (– 2018); Responsibilities: Development of high-performance low-level quantum-chemical libraries; Expansion and administration of the new comptutational cluster (to 12 TFLOPS DP); Teaching (cf. Teaching section); Organization of 2018 *Spin to Cooper Pairs* conference; Research (cf. andrzejkadzielawa.github.io for details);

2015 – 2017 **Research assistant**, *Marian Smoluchowski Institute of Physics*, Kraków, Poland.
Member of MAESTRO team; Responsibilities: Development of high-performance low-level libraries for realistic crystalline systems; Acquisition and administration of the new computational cluster (8 TFLOPS DP) for Institute of Physics; Organization of 2016 *Spin to Cooper Pairs* conference; Research (cf. andrzejkadzielawa.github.io for details);

Education

2011 – 2015 **PhD**, *Jagiellonian University*, Kraków, Poland.
First-Principle Approach to Electronic States and Metal - Insulator Transition in Selected Correlated Model Systems

2006 – 2011 **MSc**, *Jagiellonian University*, Kraków, Poland.
Evolution of a massless test scalar field on Boson Star space-time

2010 **Graduate Level**, *Niels Bohr Institute*, Copenhagen, Denmark.
Courses in Quantum Field Theory and Quantum Optics

Research and Scientific Activities

Conferences, Schools and Seminars

2013 – **8 oral presentations**, (cf. ↘).

2013 – **6 seminars & lectures**, (cf. ↘).

2012 – **10 poster presentations**, (cf. `andrzejkadzielawa.github.io/projects` for details).

Publications

2013 – **8 papers**, *in peer-reviewed journals*, (cf. `andrzejkadzielawa.github.io/articles` for details).
Phys. Rev. B, Scientific Reports, Comput. Phys. Commun., New J. Phys., Acta Phys. Pol. A, Eur. Phys. J. B

Topics include: **Condensed Matter Physics, Computational Methods** — *ab-initio calculations, metallization hydrogen, high-performance computing, multilevel parallelism*

Miscellaneous

2015 – 2018 **Project MAESTRO**, *researcher*, National Science Centre (NCN).
Fundamental Properties of Strongly Correlated Systems: Unconventional Superconductivity, Quantum Critical Behavior, and Complex Electronic Structure

2012 – 2015 **Project TEAM**, *doctoral scholarship*, Foundation for Polish Science (FNP), PI: Prof. Józef Spałek.
Correlations and coherence in quantum materials and structures (CCQM) - unique properties on macro and nano scales

2010 **Erasmus student exchange**, Erasmus programme.
Niels Bohr Institute, University of Copenhagen

Teaching

2017 – **research and teaching assistant**, *Faculty of Physics*, Jagiellonian University, Kraków.
3D Geometry for Video Games Programming, Basics of Computer Programming: C with Elements of C++, Advanced Object Programming Techniques in C++, Robotics Laboratory, and Programming of Real-Time Physics

2013 – **teaching assistant**, *civil contract*, Jagiellonian University, Kraków.
Programming of Real-Time Physics for game developers

2011 – 2015 **doctoral student / teaching assistant**, *Faculty of Physics*, Jagiellonian University, Kraków.
Courses included: Physics 101, Physics Laboratory, and Programming of Real-Time Physics

Skills

Programming

C++ `c++11, c++17` *original library (with with Dr. A. Biborski) Quantum Metallization Tools; usage of GSL, LAPACK (inc. CBLAS), openMP, MPI, llvm in: (generalized) eigenproblem, (Quantum) Monte Carlo, Simulated Annealing, (multidimensional) (non-)deterministic optimization procedures, (non-)deterministic integration (cf. `bitbucket.org/azja/qmt` and `github.com/Mellechowicz`)*

Python `python2.7` *`numpy` and `scipy` for complex, deterministic and stochastic methods (Gutzwiller Ansatz, Monte-Carlo integration, Quantum-Chemical basis construction, phase identification), `tensorflow` for simple ML input automization*

other **Fortran 2008, Bash, Go,** *for either abandoned projects, data analysis,*
Wolfram Mathematica, Godot 3.0 *teaching or computational cluster administration*

HPC **Programming**, *Agile (XP)*, in small teams (up to 5 people), software for clusters.
`shiva`, `deszno`, `edabi` (Jagiellonian University); `tera` (Academic Centre for Materials and Nanotechnology, AGH); `anselm`, `salomon` (IT4Innovations, VŠB)

Administrative tasks

2016 – **administration of Computational Cluster `EDABI`**, *Jagiellonian University*, Kraków, Poland.
Acquisition (2016) and expansion (2018); performance of ~ 12 `TFLOPS DP`

2013 – **co-writing grant proposals**.

2013 **writing grant proposals**.
Grant-in-aid for two-week visit at the University of Parma, as well as coverage of publication costs.

typesetting **LaTeX, office-suite-type software** *inc. word processor, spreadsheet, presentation program, database software (e.g., LibreOffice), and graphics editors (e.g., GIMP, InkScape)*

Scientific knowledge

Physics
- Classical Physics (i.e., Newtonian, Lagrangian, and Hamiltonian Mechanics, Electromagnetism, Optics, Statistical Physics with Thermodynamics, as well as both Special and General Relativity)
- Quantum Physics (with emphasis on condensed-matter applications, e.g., the many-body problem, Quantum Statistics, (Super)conductivity, Crystalline Structure)

Mathematics
- Linear algebra (e.g., Vector and Tensor Spaces)
- Group Theory (e.g., Spacial Symmetry Groups)

Languages

CEFR levels

Polish (native)
Spanish (B1)
Russian (A2 - alphabet, lexically similar)
English (C2)
German (A2)
Danish (A1)

Interests

professional
- electronic correlations
- stochastic algorithms
- computational physics
- low-level computing

other
- traveling and hiking
- scuba-diving
- tea
- gaming

Licenses

driving licence **A, B** *motorcycles and cars*
diving licence **Advanced Open Water Diver, Ice Diver** *PADI*
licence **counsellor** *day care*