

József Konczer

PHYSICIST, RESEARCHER, SENIOR AI/ML RESEARCH ENGINEER.

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Summary

Physicist, Researcher, Senior AI/ML Research Engineer. I am curious about the world, and my vocation is to construct theoretical and applied tools that can empower others by capturing and formalizing the describable parts of the Universe. I like to see things from different angles and explore connections between fields and viewpoints. I am also interested in utilizing novel or less-known approaches to enhance efficiency and make innovation possible.

I am a Theoretical Physicist by training, but drifted to Machine Learning and Software Development at Wolfram Research.

I have many interests, and I have an ability to connect seemingly distant fields. I am eager to explore new, interesting areas and align myself with meaningful projects.

(The latest Curriculum Vitae / Résumé at all times is available on OverLeaf.)

Experience

Imagination Technologies

SENIOR RESEARCH ENGINEER

Kings Langley, UK

Apr. 2023 - Feb. 2024

- Developing hardware-conscious AI/ML algorithms,
- using techniques such as Compression and Quantization (see our poster on Self-Compressed Nano GPT).
- As a member of the AI Research team.

Wolfram Research

CONSULTANT

Champaign, Illinois, US (Remote)

2020 - 2022

- Designing and Developing functionalities related to Game Theory:
 - Introducing Game Theory (Wolfram Technology Conference 2021 presentation)
 - Presenting a Demo: Language Design in Wolfram Language [Game Theory] Part 1, Part 2
- Member of the Machine Learning Group
- Contributions to the Wolfram Function Repository:
 - MetropolisHastingsSequence: Metropolis-Hastings Markov chain Monte Carlo
 - RichardsonExtrapolate

HELORO s.r.o.

RESEARCHER

Komárno, Slovakia

2020 - 2023

- Research and development in the field of Energetics
- Intellectual Properties:
 - Utility Model: SK PUV 50018-2023, application published
 - Patent: SK PP 50015-2023, pending
- Conference Publication:
 - Industrial Research and Development of Innovative Technologies for the Energy Sector
- Popular article:
 - ATP Journal 10/2022 (in Slovak language)

Wolfram Summer School

TEACHING ASSISTANT

Online

June - July 2020

- Helping students in various computational based projects
- Answering questions regarding Theoretical Physics and the Wolfram Physics Project

Milestone Institute

MODULE LEADER

Budapest, Hungary

2018 - 2022

- Teaching and preparing course material for:
 - Data Science (in both Wolfram Mathematica and Jupyter Notebook). A few published final projects:
 - ★ Predicting whether a mushroom is poisonous or edible using five variables
 - ★ Using basic attributes to predict stellar spectral classes
 - ★ Constructing universities dataset and showing some queries examples
 - Chaos and Order, Mechanics, Thermodynamics, PAT-ENGAA preparation

Milestone Institute

MENTOR

Budapest, Hungary

2017 - 2020

- Mentoring, Coaching, Interdisciplinary education
 - my experience distilled and extended in Open and Subjective Curriculum

Institute for Particle and Nuclear Physics, Wigner RCP, HAS

Budapest, Hungary

ASSISTANT RESEARCH FELLOW

2013 - 2016

- Performing numerical simulations in integrable quantum field theories
- Understanding AdS/CFT
- As a member of Holographic Quantum Field Theory Research Group
 - in Wigner Research Centre for Physics
 - belonging to the Hungarian Academy of Sciences
- Paper resulted from collaboration:
 - Strong coupling results in the AdS_5/CFT_4 correspondence from the numerical solution of the quantum spectral curve

Jagiellonian University

Kraków, Poland

GUEST RESEARCHER

May 2015

- Gauge-string duality and its application bilateral project
- Faculty of Physics, Astronomy and Applied Computer Science
- Collaborating with Romuald A. Janik

Tokyo Institute of Technology

Tokyo, Japan

GUEST RESEARCHER

December 2013

- Japanese-Hungarian bilateral exchange project
- Department of Physics, Tokyo Institute of Technology
- Theoretical High Energy Group / Particle Physics Group
- Collaborating with Katsushi Ito and Yuji Satoh

Budapest University of Technology and Economics (BME)

Budapest, Hungary

DEMONSTRATOR

2009, 2012 fall

- Teaching Physics II (electrodynamics and modern physics) for 3rd year BSc students of Faculty of Electrical Engineering and Informatics
- as a teaching staff of Faculty of Natural Sciences

Private Tutoring

Budapest, Hungary;

Komárno, Slovakia

TUTOR IN PHYSICS, MATHEMATICS, AND CALCULUS FOR BOTH HIGH SCHOOL AND UNIVERSITY STUDENTS

2006 - 2016

Education

Eötvös Loránd University (ELTE)

Budapest, Hungary

PHD PROGRAM IN THEORETICAL PHYSICS · DISCONTINUED

2013 - 2017

- Topic: Integrable methods in the AdS/CFT correspondence
- Supervisor: Dr. Zoltán Bajnok
- Principal subjects: Particle physics, Integrable (Quantum Field) theories, conformal field theories, AdS/CFT duality
- Doctoral Pre-Degree Certificate (Absolutorium) gained in 2017

Budapest University of Technology and Economics (BME)

Budapest, Hungary

MSC IN THEORETICAL PHYSICS · EXCELLENT WITH HIGHEST HONOURS

2010 - 2013

- Thesis: Integrable methods in gauge and string theories
 - which has been extended to a paper:
 - Finite volume form factors in the presence of integrable defects
- Supervisor: Dr. Zoltán Bajnok
- Principal subjects: Statistical physics, Particle physics

Budapest University of Technology and Economics (BME)

Budapest, Hungary

BSC IN PHYSICS · EXCELLENT

2007 - 2010

- Thesis: Fisher information in quantum mechanics
- Supervisor: Prof. Dénes Petz
- Principal subjects: Theoretical Physics, Information Theory

Selye János Gimnázium

Révkomárom (Komárno), Slovakia

FINAL EXAMINATION · EXCELLENT

1999 - 2007

Skills

Programming	Python, Wolfram Language, MATLAB, GNU Octave, \LaTeX , HTML, bash, C, C++
Scientific Computing	Wolfram Mathematica, PyTorch, SageMath, Google JAX, Numpy, Scipy, Scikit Learn
DevOps	Anaconda, Git, CVS, Perforce
Graphic design	Inkscape, GIMP
OS	Linux, Mac OS and Windows user skills
Languages	Hungarian (native), English (full proficiency), Slovak (proficient), Czech (intermediate)
Other skills	diving (one ★ diver since 2013 at CMAS), paragliding, waveboarding, hobby drawing, driving licence since 2008

Extracurricular Studies

The University of Queensland	<i>Online</i>
INTRODUCTION TO SOCIAL PSYCHOLOGY on edX	2022
The Chinese University of Hong Kong	<i>Online</i>
CLASSICS OF CHINESE HUMANITIES: GUIDED READINGS on Coursera	2021
Stanford University & The University of British Columbia	<i>Online</i>
GAME THEORY II: ADVANCED APPLICATIONS on Coursera	2021
Stanford University & The University of British Columbia	<i>Online</i>
GAME THEORY on Coursera	2021
Princeton University	<i>Online</i>
BUDDHISM AND MODERN PSYCHOLOGY on Coursera	2016

Awards

2013	1st place , on NYIFFF physics team competition as a member of “TBA...” team	<i>Szigliget, Hungary</i>
2010	3rd place , on Rudolf Ortway Competition in Physics	<i>Correspondence Competition</i>
2007	Bronze Medal , at the 38 th International Physics Olympiad	<i>Isfahan, Iran</i>
2006	Honourable Mention , at the 37 th International Physics Olympiad	<i>Singapore</i>

Communal Activity

Eugene Wigner College for Advanced Studies	<i>Budapest, Hungary</i>
FOUNDER AND PRESIDENT	2011 - 2013
<ul style="list-style-type: none"> Eugene Wigner College for Advanced Studies is a Talent Nurturing and Extracurricular college associated to the Faculty of Natural Sciences of Budapest University of Technology and Economics. 	
Science communication	<i>Slovakia and Hungary</i>
SPEAKER	
<ul style="list-style-type: none"> Gombaszögi Nyári Tábor: Mit tud a tudomány a világról, és azt honnan tudja?: (in Hungarian language), Gombaszög, Slovakia, 2023 <ul style="list-style-type: none"> A performed experiment has been summarized in: Chill Jegyzőkönyv (in Hungarian language) One week workshop titled: Reality and it's models; a guided tour into theoretical physics at S.U.N. festival, Csobánkapuszta, Hungary, 2016 	

Media

Popular article	<i>ATP Journal</i>
Co-AUTHOR	2022
<ul style="list-style-type: none"> ATP Journal 10/2022 (in Slovak language) 	
Blog	<i>Medium</i>
WRITER	2022 - PRESENT
LinkedIn, Twitter (X), Mastodon	<i>Social Media</i>
CONTENT CREATOR	2021 - PRESENT

Publications

- 2024 **Statistical Games**, József Konczer; (Mathematical exploration of a few prototypical games in which central concepts from Statistics and Probability theory naturally emerge); arXiv:2402.15892 *arXiv*
- 2023 **Industrial Research and Development of Innovative Technologies for the Energy Sector**, Marek Pípa, Attila Kment, František Janíček, József Konczer, Jozef Konczer, Tomáš Potásch, Ignác Havran, Botond Sánta, Lajos Csonka; 2023 23rd International Scientific Conference on Electric Power Engineering (EPE); DOI:10.1109/EPE58302.2023.10149262 *Brno, Czech Republic*
- 2016 **Strong coupling results in the AdS_5/CFT_4 correspondence from the numerical solution of the quantum spectral curve**, Árpád Hegedűs and József Konczer; Journal of High Energy Physics; DOI:10.1007/JHEP08(2016)061; arXiv:1604.02346 *JHEP*
- 2014 **Finite volume form factors in the presence of integrable defects**, Z. Bajnok, F. Buccheri, L. Hollo, J. Konczer, G. Takacs; Nuclear Physics B; DOI:10.1016/j.nuclphysb.2014.03.010; arXiv:1312.5576 *Nuclear Physics B*

Memberships

- 2023- **AI for QFT**, Artificial Intelligence meets Quantum Field Theory on Queen Mary University of London *London, UK*
- 2013-2017 **Holographic QFT Group**, MTA Lendület Holographic Quantum Field Theory Group *Budapest, Hungary*
- 2011- **Eugene Wigner College of Advanced Studies**, Founder and President for two years *Budapest, Hungary*
- 2010-2011 **BME Student Body/Union**, Elected Educational officer at Faculty of Natural Sciences Students' Union *Budapest, Hungary*
- 2009- **Hungarian Nuclear Societies Young Generation Network**, Organiser in 2010 *Hungary*

Conferences and International Courses

- 2023 **Eastern European Machine Learning Summer School**, (EEML2023) Presented poster: Self-Compressed Nano GPT *Košice, Slovakia*
- 2021 **Wolfram Virtual Technology Conference**, (WTC-2021), Online talk given: Introducing Game Theory *Champaign, IL, US (Virtual)*
- 2021 **Eastern European Machine Learning Summer School**, (EEML2021), Joined the Project Group: DeepExplain *Budapest, Hungary (Virtual)*
- 2021 **The Math(s) Fix Conference**, Agenda; Talks *Online*
- 2018 **Crunch Conference**, Data Engineering and Analytics as technological representative of Wolfram Research *Budapest, Hungary*
- 2018 **European Wolfram Technology Conference**, promo *Oxford, UK*
- 2016 **Wolfram Summer School**, (WSS16) , Project summary in a Community post: Simulating the Universe (an alternative approach) *Waltham, MA, US*
- 2015 **Young Researchers Integrability School**, one-week school on Integrability *Durham, UK*
- 2014 **Summer School on String Theory and Holography**, on the subject of Gauge/Gravity Duality, followed by the Mathematica Summer School on Theoretical Physics *Lisbon/Porto, Portugal*
- 2014 **Integrability in Low Dimensional Quantum Systems**, as Participant and Local Organizer, Presentation given: Finite volume form factors of the defect scaling Lee-Yang model *Tihany, Hungary*
- 2014 **Finite-size Technology in Low Dimensional Quantum Systems (VII)**, as Participant and Local Organizer *Budapest, Hungary*
- 2014 **Fizikus Doktoranduszok Országos Konferenciája**, (DOFFI), presentation titled: Egzaktul megoldható kvantumtérelméletek (in Hungarian language) *Balatonfenyves, Hungary*
- 2013 **Wigner 111 Scientific Symposium**, Colourful & Deep *Budapest, Hungary*
- 2013 **Spring School on Superstring Theory and Related Topics**, at ICTP *Trieste, Italy*
- 2013 **Mathematica School in Theoretical Physics: Advanced Topics in Conformal Field Theory**, (MSSTP) *Trieste, Italy*
- 2012 **Theoretical Physics School on Quantum Gravity**, *Szeged, Hungary*
- 2012 **One week course Introduction to Symbolic Computation for Engineers**, (ATHENS programme 2012) at the Technical University of Madrid *Madrid, Spain*
- 2011 **One week course On Quanta, Chaos and Daemons**, (ATHENS programme 2011) at ParisTech *Paris, France*
- 2011 **Mini-Workshop on "Spin and Quantum Transport"**, at Humboldt-Universität zu Berlin *Berlin, Germany*
- 2011 **PIME conference**, Participating in a workshop about Communicating with young people about Nuclear Energy *Brussels, Belgium*
- 2010 **Information Geometry and its Applications III**, at Universität Leipzig *Leipzig, Germany*