

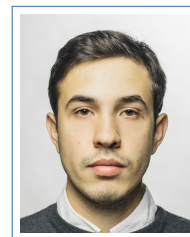
# Yuriy Volkotrub

## Curriculum vitae

+48 792 608 016

yuvolkotrub@gmail.com

in yuriy-volkotrub id 0000-0002-3114-3798 yuvolkotrub



## Experience

### Research Experience

- Jun. 2021 – **BAND Summer Fellowship**, *BAND Collaboration*, USA.
- Aug. 2021 Bayesian analysis in various applications of theoretical nuclear physics and development of the BAND software
- train a Faddeev emulator with an off-the-shell method
  - use a set of three-nucleon (3N) parameters (informed by prior calculations) and obtain an array of nucleon-deuteron cross section
  - use the emulator to perform uncertainty quantification on the 3N force (fixing the two-nucleon force)
- Oct. 2016 – **Junior Research Associate**, *Dpt. of Theory of Nuclear Systems, Jagiellonian University*, Cracow, Poland.
- Present Investigations of elastic nucleon-deuteron scattering and nucleon-induced deuteron breakup processes
- Developed programs/scripts, performed calculations on the elastic and inelastic nucleon-deuteron scattering using different models of the nuclear forces
  - Investigated the impact of various theoretical uncertainties in the three-nucleon scattering systems
  - Performed analysis on theoretical data sets using Mathematica<sup>®</sup>, which was carried out to study the correlations among various two- and three-nucleon observables, as well as between the observables and specific potential parameters of the model of a nucleon-nucleon interaction.
- 2013 – 2016 **Student projects**, *Dpt. of Theoretical and Experimental Nuclear Physics, Odesa National Polytechnic University (ONPU)*, Odesa, Ukraine.
- Worked in a team of 6 people, performed some part of calculations of the cross section for the proton-proton inelastic scattering by applying the Laplace method.
  - Developed a Monte-Carlo generator based on the Laplace method for the inelastic hadron scattering process using the simplest model  $\phi^3$ .
  - Tested the model of the solar luminosity which is based on the model of axion mechanism of solar radiation in combination with the solar dynamo model of Parker.

### Teaching Experience

- 2017 – 2019 **Teaching Assistant**, Cracow, Poland.
- Tutored weekly laboratory classes for “Advanced Materials and Nanotechnologies” students each summer semester.
  - Prepared statistical web applets for students’ practice (in Javascript).
  - Led Physics laboratory classes for schoolchildren at the Jagiellonian University.
  - Led weekly practical classes of the course “Probability and Statistics” for Computer Science students.
- Oct. 2014 – **Private tutor**, Odesa, Ukraine.
- Jul. 2015 ○ Private tutoring the students at the primary school level, a secondary school in Maths, Chemistry, and Physics. Also preparing students to apply for universities.

## Education

- Oct. 2016 – **Doctor of Philosophy in Physics**, Jagiellonian University, Kraków.
- Sept. 2021 Thesis: “Covariance matrix of nucleon-nucleon potential parameters in few-nucleon studies”  
Supervisor: dr hab. Roman Skibiński
- Sept. 2015 – **Erasmus Mundus exchange programme for master students**, Jagiellonian University, Kraków, Poland.
- Jun. 2016 Full time graduate study in the field of physics and astronomy

- Sept. 2014 – **Master of Science in Physics of nucleus and high energies**, ONPU, Odesa.  
 Jun. 2016 *with honours*  
 Thesis: “Thermomagnetic Ettingshausen-Nernst effect in tachocline and axion mechanism of Sun luminosity”  
 Supervisor: prof. dr V.D. Rusov
- Sept. 2010 – **Bachelor of Science in Physics**, ONPU, Odesa.  
 Jun. 2014 *with honours*  
 Thesis: “Laplace’s method for scattering processes of Monte-Carlo event generators”  
 Supervisor: dr I.V. Sharph

#### Selected courses

- Advanced Quantum Mechanics (Path Integrals)
- Introduction to Data Science
- Time Series Analysis
- Few-body nuclear physics
- Quantum Mechanics in Nuclear Physics
- Relativistic Heavy-Ion collisions

### Skills

<b>Programming</b>	confident in <i>Mathematica</i> , Fortran 90 and Python (NumPy, SciPy, Seaborn, Pandas, Matplotlib, Scikit-learn etc.), JavaScript (basics), C/C++ and <i>R</i> (rudimentary)
<b>Tools/Software</b>	<i>Mathematica</i> <sup>®</sup> , Jupyter Notebook, Bash, Gnuplot, <i>L</i> <sup>A</sup> T <sub>E</sub> X, Vim
<b>Computer/Technical</b>	Git and version control, Linux (Debian, Mint), ssh etc.
<b>Laboratory equipment</b>	Multimeters, oscilloscopes, spectrum analyzers
<b>General</b>	Data visualization and manipulation
<b>Other</b>	Strong mathematics and statistics background

### Languages

English (Upper Intermediate), Polish (Upper Intermediate), Russian (Fluent), Ukraine (Native)

### Professional Interests

- Research Nuclear physics, Nuclear Theory, Quantum Few-Body Physics, Scattering Theory, Statistical and Machine Learning, Calculus
- Other Data Science, Bayesian Statics and Machine Learning, AI

### Interests

- Mountaineering
- Solving mathematical problems and coding
- History
- Music

### Online-Courses

- [Python](#), Kaggle
- [Python Programmer Track](#), [Data Scientist with Python](#), DataCamp

### Selected talks and publications

- “The 8th Asia-Pacific conference (online) on Few-Body problems in Physics (APFB2020)”, March 1-2, 2021, Kanazawa, Japan  
 Title: “Covariance matrix of nucleon-nucleon potential parameters in few-nucleon systems”
- “Bayesian Inference in Subatomic Physics - A Marcus Wallenberg Symposium”, Chalmers University, Gothenburg, Sweden, September 17-20, 2019  
 Title: “Uncertainty quantification and correlation among three-nucleon scattering observables”

- “The 24th European Conference on Few-Body Problems in Physics”, University of Surrey, Guildford, UK, September 2-6, 2019  
Title: “Correlation analysis and statistical uncertainty of three-nucleon scattering observables”
- Zakopane Conference on Nuclear Physics “Extremes of the Nuclear Landscape”, Zakopane, Poland, August 26 - September 2, 2018  
Title: “Theoretical uncertainties in the description of the nucleon-deuteron elastic scattering up to 200 MeV”
- P. Maris *et al.*, “Light nuclei with semilocal momentum-space regularized chiral interactions up to third order”, [Phys. Rev. C 103, 054001 \(2021\)](#) [Editors’ suggestion]
- Yu. Volkotrub, J. Golak, R. Skibiński, K. Topolnicki, H. Witała, E. Epelbaum, H. Krebs, P. Reinert, “Uncertainty of three-nucleon continuum observables arising from uncertainties of two-nucleon potential parameters”, [J. Phys. G: Nucl. Part. Phys. 47 10 \(2020\)](#)
- E. Epelbaum, J. Golak, K. Hebeler, H. Kamada, H. Krebs, U.-G. Meißner, A. Nogga, P. Reinert, R. Skibiński, K. Topolnicki, Yu. Volkotrub, and H. Witała, “Towards high-order calculations of three-nucleon scattering in chiral effective field theory”, [Eur. Phys. J. A \(2020\) 56:92](#)
- R. Skibiński, Yu. Volkotrub, J. Golak, K. Topolnicki and H. Witała, “Theoretical uncertainties of the elastic nucleon-deuteron scattering observables”, [Phys. Rev. C 98, 014001 \(2018\)](#).
- R. Skibiński, J. Golak, K. Topolnicki, H. Witała, and Yu. Volkotrub *et al.*, “Nucleon-deuteron scattering with the JISP16 potential”, [Phys. Rev. C 97, 014002 \(2018\)](#)