

# ROMAN DERCO

## PERSONAL DATA

---

PLACE AND DATE OF BIRTH: SLOVAKIA | 29 SEPTEMBER 1986  
ADDRESS: 684/12 GEN. SVOBODU, SVIDNIK, SLOVAKIA  
PHONE: 00421 915 303 500  
EMAIL: [ROMAN.DERCO@GMAIL.COM](mailto:ROMAN.DERCO@GMAIL.COM)

## WORK EXPERIENCE

---

OCT-DEC 2012 | INTERNSHIP AT WOLFRAM RESEARCH, CHAMPAIGN, IL, USA  
COMPUTER ALGEBRA, NUMERICAL COMPUTATION  
PROJECT: APPROXIMATIONS TO SPECIAL FUNCTIONS

## EDUCATION

---

CURRENT 2<sup>ND</sup> YEAR PHD AT **University of Debrecen**, HUNGARY  
MAJOR: PARTICLE PHYSICS  
THESIS: PRECISION AT THE LHC  
ADVISOR: PROF. ZOLTAN TROCSANYI

JAN 2012 MASTER OF SCIENCE IN PHYSICS, **Charles University in Prague**, CZECH REPUBLIC  
FACULTY OF MATHEMATICS AND PHYSICS, INSTITUTE OF PARTICLE AND NUCLEAR PHYSICS  
MAJOR: PARTICLE PHYSICS  
THESIS: INSTANTONS AND UNITARILY INEQUIVALENT QUANTUM VACUA  
ADVISOR: DOC. ALFREDO IORIO, PH.D.

OCT 2009 BACHELOR DEGREE IN PHYSICS, **Charles University in Prague**, CZECH REPUBLIC  
FACULTY OF MATHEMATICS AND PHYSICS  
MAJOR: GENERAL PHYSICS  
THESIS: DESCRIPTION OF CP VIOLATION IN DECAYS OF NEUTRAL K MESONS  
ADVISOR: DOC. RNDR. RUPERT LEITNER, DRSC.

JUN 2006 **Gymnasium Duklianskych Hrdinov**, SVIDNIK, SLOVAKIA

## SCHOLARSHIPS

---

JUN 2012 - JUN 2014 MARIE CURIE FELLOWSHIP, LHCPHENO<sup>NET</sup>

## PUBLICATIONS

---

2013 ROMAN DERCO, SIMPLE ANALYTIC EXPRESSIONS FOR THE POLE PARTS OF DOUBLE VIRTUAL CORRECTION TO  $e^+ e^- \rightarrow 3$  PARTONS, ACTA PHYSICA DEBRECINA 2013

## TRAINING COURSES AND CONFERENCE PARTICIPATION

---

7-17 JUL, 2013	CTEQ SCHOOL ON QCD AND ELECTROWEAK PHENOMENOLOGY, UNIVERSITY OF PITTSBURGH, USA
3-6 JUN, 2013	THE LATSIS SYMPOSIUM 2013, NATURE AT THE ENERGY FRONTIER, ZURICH, SWITZERLAND
11-15 MAR, 2013	COMPUTER ALGEBRA AND PARTICLE PHYSICS, ZEUTHEN, GERMANY
17-19 OCT, 2012	WOLFRAM TECHNOLOGY CONFERENCE 2012, CHAMPAIGN, IL, USA
16-20 SEP, 2012	LHCPHENONET MID-TERM MEETING, RAVELLO, ITALY

## OVERVIEW OF DISSEMINATION ACTIVITIES, SEMINAR AND PRESENTATIONS AT WORKSHOPS, CONFERENCES

---

JAN 15, 2013	SEMINAR AT UNIVERSITY OF DEBRECEN, APPROXIMATIONS TO SPECIAL FUNCTIONS
AUG 30, 2011	TALK AT JOHANNES GUTENBERG UNIVERSITY OF MAINZ, INSTANTONS AND UNITARILY INEQUIVALENT QUANTUM VACUA
JUN 4, 2011	TALK AT INSTITUTE OF PARTICLE AND NUCLEAR PHYSICS, PRAGUE, INSTANTONS AND UNITARILY INEQUIVALENT QUANTUM VACUA
2006-2007	I WAS ONE OF THE ORGANIZER OF THE CORRESPONDING COMPETITION IN PHYSICS-FYKOS, CZECH REPUBLIC

## LANGUAGES

---

ENGLISH:	FLUENT
SLOVAK:	MOTHER TONGUE
GERMAN:	BASIC KNOWLEDGE
RUSSIAN:	BASIC KNOWLEDGE

## COMPUTER SKILLS

---

C++, FORTRAN, PASCAL, BASH, UBUNTU,  $\text{\LaTeX}$ , Mathematica

## INTERESTS AND ACTIVITIES

---

QFT, STANDARD MODEL, NNLO, PROGRAMMING  
FOOTBALL, TRAVELLING

## PHD PROJECT IN PROGRESS

---

My main project is an implementation of a new NNLO subtraction algorithm, which was devised in Debrecen, to the specific case of three jet production in electron-positron annihilation.

SPRING, 2012	In the beginning of my PhD I focused on selected parts of the theory of NNLO computation and I also improved my computational skills. To warm up I implemented a Monte Carlo integration over the phase space of the process $e^+e^- \rightarrow q\bar{q}g$ in <b>C++</b> .
AUTUMN, 2012	I was an intern at Wolfram Research to get a training in computer algebra which proved to be very useful later. At Wolfram I worked on approximations to special functions at machine precision.
WINTER, 2013	Insertion operators $\mathbf{I}_1^{(0)}$ , $\mathbf{I}_1^{(1)}$ , $\mathbf{I}_{1,1}^{(0,0)}$ , which are important pieces of an implementation of a new NNLO subtraction algorithm to the specific case of three jet production in electron-positron annihilation, were implemented in <b>Mathematica</b> . An implementation of $\mathbf{I}_{12}^{(0)}$ , $\mathbf{I}_2^{(0)}$ was completed.
SPRING, 2013	Two-loop QCD matrix element for $e^+e^- \rightarrow 3$ jets, which will be needed for subsequent work, was implemented in <b>FORTRAN</b> . During this work an interesting observation was made which led to a short publication <b>SIMPLE ANALYTIC EXPRESSIONS FOR THE POLE PARTS OF DOUBLE VIRTUAL CORRECTION TO <math>e^+e^- \rightarrow 3</math> PARTONS</b> . A bash script, which transfers data from output given by the <b>SecDec</b> program into <b>Mathematica</b> notebook, was provided.
AUTUMN, 2013	A progress with a numerical evaluation of master integrals, which are present in insertion operators, in two specific phase space points was achieved by using <b>SecDec</b> . Insertion operators were interfaced with numerical evaluations of master integrals and the correctness of this implementation is being tested now. <b>NLOJet++</b> code is being investigated because we can reuse some parts of the code to accomplish our project.