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Born April 12, 1978 in Ljubljana, Slovenia. Lived in Brussels, Belgium, 1991-1997, then returned to Slovenia. In 2008 held a post-doc position in Göttingen, Germany. Since 2009 living in Ljubljana.

Academic and scientific promotions:

- 2012 Promoted to the academic title “**assistant professor**” (docent) at the Faculty for mathematics and physics, Uni. of Ljubljana.
- 2010 Promoted to the scientific research title “**research fellow**” (znanstveni sodelavec) at the Jožef Stefan Institute.
- 2009 Promoted to the academic title “assistant” (asistent) at the Faculty for mathematics and physics, Uni. of Ljubljana.
- 2007 Promoted to the scientific research title “assistant with PhD” (asistent z doktoratom) at the Jožef Stefan Institute.

Awards:

- 2008 “**Jožef Stefan Golden emblem**” award for outstanding contributions made to science in Doctoral thesis.
- 2002 “**Univerzitetna Prešernova nagrada**” awarded by the University of Ljubljana for work on transport properties of nanoscopic wires and rings.
- 1997 “**Cinquième accessit**” at French “**Concours général**” (physics-chemistry).

Education:

- 2007 PhD thesis defense (May 18, 2007). Thesis title *Many-particle effects in resonant tunneling of electrons through nanostructures*, advisers prof. dr. Janez Bonča, prof. dr. Igor Muševič.
- 2002 Accepted in the “young researchers” program funding program for graduate students. Entered postgraduate school of physics at the University of Ljubljana, Faculty of mathematics and physics, program Physics of condensed matter.
- 2002 Graduated with diploma thesis *Electronic transmittivity of nanoscopic wires and rings, described using models of strongly correlated electrons*, adviser prof. dr. Janez Bonča.
- 1997-2002 Undergraduate studies of physics, mathematical physics program at the University of Ljubljana.
- 1991-1997 Lycee Français Jean Monnet in Brussels, Belgium, finishing with French baccalauréat série S.

Teaching experience:

- 2013 *Computer technologies*, lecturer, FRI, Uni. of Ljubljana.
- 2011 *Classical mechanics*, teaching assistant, FMF, Uni. of Ljubljana.

- 2010 *Dynamical systems*, teaching assistant, FMF, Uni. of Ljubljana.
- 2009-2012 *Experimental lab 3*, teaching assistant, FMF, Uni. of Ljubljana.
- 2008 *Introduction to programming in natural science*, teaching assistant, Uni. of Goettingen.

Research projects and grants:

- **Postdoctoral project Z1-2058** funded by Slovenian research agency (ARRS), 2009-2011. The project "Single magnetic atoms and magnetic nanostructures on metal surfaces" was a combined experimental and theoretical study of magnetic adsorbates on metals, involving the use of a scanning tunneling microscope (STM) to explore magnetic atoms and their clusters on surfaces, the application of the density functional theory (DFT) to model the surface and adsorption, and the numerical renormalization group (NRG) to study impurity physics. Funding: 1 FTE for two years.

Work experience:

- 2011 Research fellow at F-1, Theoretical physics, Jožef Stefan Institute, Ljubljana, Slovenia.
- 2009 Teaching assistant at Faculty for mathematics and physics, Uni. of Ljubljana, Slovenia (part-time employment).
- 2009 Research assistant at F-5, Solid state physics, Jožef Stefan Institute, Ljubljana, Slovenia.
- 2008 Postdoc at the Institute for theoretical physics, Uni. of Goettingen, Germany, with prof. Thomas Pruschke.
- 2005, 2006 Design and optimization of an improved helium-bath cryostat for STM applications in collaboration with VACUTECH d.o.o., Ljubljana.
- 2003-2007 Young researcher at the Department of condensed matter physics, Jožef Stefan Institute. Area of work: surface physics (tunneling microscopy, LEED, AES, deposition of metals and organic materials) and solid state theory (conductance through interacting regions in the Kondo regime).
- 2002+ Collaboration in the project of building a low-temperature scanning tunneling microscope at the Department of condensed matter physics, JSI.
- 2000 Internship at the Department of ceramics, JSI.

Areas of recent interest and possible future directions:

- Ordered phases in heavy-fermion compounds (Kondo lattice systems)
- Ultra-cold gases, synthetic fields (in particular non-Abelian), artificial spin-orbit coupling, gases in non-connected geometry (toruses, possibly with constrictions)
- Quantum Monte Carlo methods for bosonic systems
- DMFT studies of multi-orbital systems
- Role of electron-electron interactions in topological insulators
- Low-temperature STM studies of magnetic impurities on surfaces of topological insulators, on half-metals, superconductors, and other non-conventional substrates
- Geometrical phases in physics, topological effects
- Scientific workflow and management of data provenance

Present research activities:

- Quantum impurity physics, impurity solvers (numerical renormalization group, continuous-time quantum Monte Carlo), ongoing development of the "NRG Ljubljana" code, determination of maximal accuracy limits of the NRG method, continuum discretization techniques, spectral function broadening
- Magnetic impurities coupled to systems with topologically non-trivial states (topological insulators, topological superconductors with Majorana edge states)
- Theory of magnetic adatoms on normal metals and superconductors, theory of impurity induced sub-gap states, relating experimental results to computed high-energy-resolution spectral functions (NRG), universality of the Kondo effect, magnetic anisotropy of adsorbate atoms
- Strongly correlated systems and quantum phase transitions (Mott physics), antiferromagnetism in the periodic Anderson and Kondo lattice models, long-range order
- Dynamical mean-field theory (DMFT), convergence acceleration using Broyden method, new impurity solver techniques
- Transport through nanostructures (systems of coupled quantum dots), development of new numerical techniques
- Physics of double quantum dot (DQD) devices, effects of coupling to ferromagnetic and superconducting contacts, spin currents, Josephson currents
- Vibrational degrees of freedom in nanostructures, electron-phonon coupling

Past research interests and activities:

- Scanning tunneling microscopy and spectroscopy, apparatus design and building, instrumentation, surface preparation and deposition of materials, controlled manipulations of adsorbates, spectroscopy of magnetic adatoms
- DFT and maximally-localized Wannier functions, modeling of metal surfaces and adsorbate systems
- Automatic code generation for scientific applications: approaches to minimize the number of lines of code and reduce the number of potential bugs
- Symbolic computation using computer algebra systems (package "SNEG")

- Renormalization group techniques
- Non-Fermi liquid states, in particular possible realizations of the two-channel Kondo model behavior in coupled quantum dot systems

Computer skills:

- Programming: C, C++ (with STL and Boost), Perl, Python, Mathematica (in particular pattern matching and functional programming), portability tools (autoconf, automake), linear algebra and numerical libraries (BLAS, LAPACK, Intel MKL, GSL, gmp), parallelization (OpenMP, MPI).
- Density functional theory codes (Quantum Espresso, PWSCF), visualization (xcrysden), maximally localized Wannier functions.
- Collaboration and version control tools: RCS, CVS, Subversion, unison.
- I wrote a Mathematica package “SNEG” for calculations with second quantization operators, and a Mathematica/C++ package “NRG Ljubljana” for performing numerical renormalization group calculations (<http://nrgljubljanaijs.si>).
- Hardware skills: data acquisition, interfacing, networking, heat dissipation. Designing and building computer clusters for high performance computing and computer rooms.
- Miscellaneous: grace, latex, Corel Draw, Corel Designer Technical Suite, SolidWorks, Adobe Illustrator, Adobe Photoshop, Keynote.

Language skills:

- English – fluent.
- German – functional.
- French – fluent.
- Slovenian – fluent.

Experimental physics skills:

- Apparatus building, especially ultra-high vacuum and low-temperature setups.
- Electronics, instrumentation, interfacing, noise and interference.
- Visualization of experimental data, interpretation of scanning tunneling spectroscopy results.
- Surface science: Auger electron spectroscopy, low-energy electron diffraction, scanning probe microscopy.

Specializations and summer schools:

- 16. 5.-28. 5. 2010 *Spring College on Computational Nanoscience*, ICTP, Trieste, Italy.
- 30. 9.-14. 10. 2006 *XI Training Course in the Physics of Strongly Correlated Electron Systems*, IIASS, Vietri sul mare, Salerno, Italy.
- 26. 6. - 30. 7. 2004 *Summer school Nanoscopic Quantum Transport*, les Houches, France.
- 6. - 17. 10. 2002 *VIII Training Course in the Physics of Correlated Electron Systems and High-Tc Superconductors*, IIASS, Vietri sul mare, Salerno, Italy.
- 6. 8. - 19. 8. 2000 *Board of European Students of Technology (BEST) summer*

school *Microsystems and Nanotechnology*, Mikroelektronik Centret (MIC) at the Danish technical University (DTU), Lyngby, Denmark.