CURRICULUM VITAE

September 2021

1. Full name

RANTALA, Tapio Tuomas, male

2. Date and place of birth, nationality, current residence, contact info

16 February 1955, Pielisjärvi, Finland
Finnish

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TCOMP – Electronic Structure Theory http://research.tuni.fi/EST/

3. Education and degrees awarded

1987	Doctor of Philosophy (PhD) in Physics at the University of Oulu. Thesis title: *Local-density electronic structure calculations on the spectra and reactivity of metals.*
1984	Master of Science (MSc) in Engineering (major in Technical Physics (Materials Science)) at the University of Oulu. Thesis title: *Calculation of elastic x-ray scattering factors of Aluminium with density functional method.*
1983	Licentiate in Philosophy (Physics) at the University of Oulu. Thesis title: *Spin-density functional method in calculation of the conduction electron screening of core electron transitions of metal atoms.*
1978	Master of Science (MSc) in Physics at the University of Oulu. Thesis title: *Relaxation energies in photo and Auger electron emission.*
1976	Bachelor of Science (BSc) at the University of Oulu.
1973	High school graduation from Sodankylän lukio.

4. Other education and training, qualifications and skills

1984	Pedagogical studies of subject teacher in Didactics, Physics, Chemistry and Mathematics.
1984	Approbatur examination in education (included in the above) at the University of Oulu.

5. Linguistic skills

	Finnish (native), English, German (modest), French (elementary), Spanish (elementary)
1988	Swedish (with a certificate of good skill)

6. Current position

10.1999 —	Professor of Physics at the Institute of Physics, Tampere University of Technology (TUT). (Permanently appointed from 1.1.2000)
11.1989 —	Adjunct Professor of Physics at the Department of Physical Sciences, University of Oulu.

7. Previous work experience

8.2014 – 7.2015	Senior Scientist, Sabbatical from Tampere Univ. of Tech.
1.2009 – 12.2009	Senior Scientist (varttunut tieteenharjoittaja) of the Academy of Finland; Sabbatical from Tampere Univ. of Technology.
2.2009 – 5.2009	**Visiting Scientist at Physics in the University of Illinois at Urbana–Champaign, Illinois, USA.**
9.2009 – 10.2009	**Visiting Scientist at Theoretical Chemistry in the University of Pierre and Marie Curie, Paris, France**
1.1999 – 12.1999	Lecturer in Physics (lehtori) at the Department of Physical Sciences, University of Oulu.
8.1998 – 7.1999	Senior Research Fellow (vanhempi tutkija) at the Academy of Finland.
1.1996 – 12.1998	Senior Assistant of Physics (yliassistentti) at the Department of Physical Sciences, University of Oulu.
7.1995 –12.1995	Senior Scientist (varttunut tieteenharjoittaja) of the Academy of Finland.
2.1995 – 5.1995	Research Fellow at the University of Oulu.
1.1991 – 6.1994	Acting Senior Assistant of Physics at the University of Oulu.
8.1990 –12.1990	Acting Associate Professor of Physics at the Univ. of Oulu.
9.1989 – 8.1990	**Visiting Scientist at the Department of Physics and Astronomy at the State University of New York at Buffalo, USA.**
8.1987 – 7.1990	Junior research fellow in Technical Sciences at the Academy of Finland.
9.1985 – 8.1986	Research Associate in a Surface Science Project of the Universities of Jyväskylä and Oulu.
9.1984 – 8.1985	**Visiting Scientist at the Department of Physics at the Chalmers University of Technology, Gothenburg, Sweden.**
1.1980 –12.1995	Teaching assistant of Physics at the University of Oulu.
9.1976 –12.1979	Acting Assistant of Physics at the University of Oulu.

8. Supervision of PhD theses

1993 – 1997	Juha Vaara, *Simulation and quantum investigations of small molecules dissolved into liquids and liquid crystals.*
1998 – 2000	Jarmo Koivusaari, *Structural, mechanical and electronic properties of pulsed laser deposited carbon thin films and C–Si–heterojunctions.*
1994 – 2001	Marja Hyvönen, *Molecular dynamics simulations on phospholipid membranes.*
2000 – 2004	Matti Mäki-Jaskari, *Computational modelling of tinoxide and its surfaces.*
2001 – 2006	Oana Cramariuc, *Computational characterization of photoabsorption and structure of porphyrin-fullerene dyads.*
2002 – 2007	Markku Leino, *Finite-temperature quantum statistics of a few confined electrons and atoms – Path-integral approach.*
2003 – 2008	Hannu-Pekka Komsa, *First-principles study of nitrogen in GaInAsN – defects and interfaces.*
2006 – 2011	Ilkka Kylänpää, *"First-principles finite temperature electronic structure of some small molecules".*
2006 – 2012	Matti Viitala, *"First-principles studies of Organic Adsorption on SnO2 Surfaces"*
2009 – 2014	Mikael Kuisma, *"Approaches to light–matter interaction and surface phenomena within density fuctional theory"*
2012 – 2018	Outi Kontkanen, *"Modeling of Charge Transfer at Dye-Semiconductor Interfaces in p-type Solar Cells"*
2014 – 2019	Juha Tiihonen, *"Thermal Effects in Atomic and Molecular Polarizabilities with Path Integral Monte Carlo"*
2013 – 2019	Ilkka Ruokosenmäki, *"Real Time Path Integral Simulation Methods for Quantum Particles"*

9. Teaching experience and merits	1999 —	Professor of physics with the regular teaching duty at the Department of Physics in Tampere University of Technology.
	1976 – 1999	Involved in teaching of most of the courses offered by the Department of the Physical Sciences (former Department of Physics), University of Oulu, either as a teaching assistant or a lecturer, including preparation of lecture material. Also, conduction of laboratory exercises and project work of students.
pedagogical competence	1983 – 1984	Pedagogical studies of subject teacher in Didactics, Physics, Chemistry and Mathematics. Qualified and competent for the post of subject teacher.
	1991 —	Supervision and reviewing of Masters and Licentiate theses.
	1991 – 1996	Member in the committee for the development of teaching at the Department of Physical Sciences.
	1994 – 1995	Participation in the advanced course of university pedagogics.
	1992 —	Preparation and lectures of new advanced (senior level) courses: Quantum theory of atoms and molecules (Molekyylifysiikka) and Computational Physics (Laskennallinen fysiikka). Preparation and lectures of graduate level courses.
Test lectureships	1989	for the adjunct professorship in Physics at the Department of Physics, University of Oulu; accepted with grading "2+/3".
	1996	for the professorship in Physical Chemistry at the University of Oulu; accepted with grading "2.13/3".
	1996	for the professorship in Materials Science at the University of Turku; accepted with grading "excellent" (erinomainen).
	1999	for the professorship in Physics at the Tampere University of Technology, Tampere; accepted.
10. Awards and honours	1998	Award due to the quality of research: Internationally notable publishing (The Faculty of Sciences, University of Oulu).
	1998	Reward due to effectiveness in teaching, (tuloksellisuuslisä) (The Faculty of Sciences, University of Oulu).
11. Other academic merits	1989	Scientific qualification to the post of *Associate Professor in Technical Physics, Quantum Mechanics in particular* (Teknillisen fysiikan, erityisesti kvanttimekaniikan apulaisprofessuuri) at the Helsinki University of Technology.
Evaluation of scientific competence	1996	Qualification and competence to the post of *Professor in Physical Chemistry* (computational chemistry; experimental and theoretical methods involved in the chemical characterization of materials; synthetic chemistry of materials; physical and chemical applications of materials). The second position in the short list of three best qualified applicants, at the University of Oulu.
	1998	Qualification and competence to the post of *Associate professor in Biophysics.* The fourth position in the short list of four best qualified applicants, at the University of Oulu.
	1999	Qualification and competence to the post of *Professor of Physics.* The first position in the short list of three best qualified applicants, at the Tampere University of Technology.
	2000	Qualification and competence to the post of *Professor of Atomic and Molecular Physics.* The second position in the short list of three best qualified applicants, at the University of Oulu.

Memberships in scientific societies	1980 — 1993 – 1995 2001 – 2003 2003 – 2005 2001 – 2006	Finnish Physical Society, - member of the executive board - member of the executive board, vice president - member of the executive board, president - member of the executive board - member of computational physics section
	1986 —	European Physical Society
	1990 —	American Physical Society - member of subgroups
	2004 —	Institue of Physics (UK)
	1998 – 2012	Biophysical Society (USA) - member of the subgroup of molecular biophysics
	1990 —	Finnish Chemical Society - member of the section for computational chemistry - member of catalysis section
	1995 —	Materials Research Society (USA)
	1999 —	Finnish Optical Society
	2000 —	Tampereen teknillinen seura (Tampere, Finland)
	1993 –1994	Electrochemical Society (USA)
Editor	2003	Guest editor (& M. Pessa) for the Proceedings of the 20th Nordic Semiconductor Meeting.
	2004	Guest editor (& M. Valden) for the Proceedings of the5th NordicConference on Surface Science.
	2012 —	Member of the Editorial Board of Physica Scripta.
12. Scientific and societal impact	1979 —	132 peer review scientific publications.
	2005 —	Layman review of the Nobel prize winners, topics and relevance for the public, in Physics, Chemistry and Medicine by invited speakers. — Annual, since 2005. http://iki.fi/trantala/popular/Nobel
Expert evaluations and statements	1999	Jouko Nieminen, for the adjunct professorship in *Computational Materials Physics* at the Tampere University of Technology.
	1999	Jan Åström, for the adjunct professorship in *Statistical Physics* at the University of Jyväskylä.
	2000	Klavs Hansen, for the adjunct professorship in *Physics* at the University of Jyväskylä.
	2001	Juha Merikoski, for the adjunct professorship in *Materials Physics* at the University of Jyväskylä.
	2001	Petri Salo, for the adjunct professorship in *Computational Solid State Physics* at the Helsinki University of Technology.
	2003	Evaluation and statement of the applicants to the professorship in *Experimental materials science*, University of Turku.
	2005	Aleksi Soininen, for the adjunct professorship in *Theoretical Physics* at the University of Helsinki.

Expert evaluations and statements, contd . . .

2007	Mikko Hakala, for the adjunct professorship in *Physics* at the University of Helsinki.
2012	Kari Jänkälä, for the adjunct professorship in *Physics of Materials* at the University of Oulu.
2016	Minna Patanen, for the adjunct professorship in *Synchrotron radiation excited spectroscopy* at the University of Oulu.
2017	Wolfram Hergert for the adjunct professorship in *Computational materials physics* at the University of Turku.
1995—	Evaluation of applications for research grants and researcher positions, Member of the evaluation panel (The Academy of Finland; Academy of Sciences of the Czech Republic; NSF).

Dissertation Opponent/Referee

1992	Harri-Pekka Kaukonen, *Classical and coupled quantum–classical simulations: Applications to chemical reactions and film growth,* Helsinki University of Technology (referee).
1993	Juha Mansikka-aho, *Electronic shell structure in large metal clusters,* University of Jyväskylä (referee).
1993	Riikka Virkkunen, *Electron-mediated properties of materials studied by quantum simulations,* Helsinki University of Technology (referee).
1995	Tuija Raaska, *Molecular modeling of pyruvic acid and polystyrene,* University of Helsinki (referee).
1998	Sami Pöykkö, *First principles calculations for doping and metastability in semiconductors,* Helsinki University of Technology (referee).
1998	Anniina Rytkönen, *Phase transitions in clusters,* University of Jyväskylä (referee).
1999	Marko Punkkinen, *Theoretical investigation concerning transition metal compounds and alloys and some oxide systems by using various LMTO methods,* University of Turku (opponent).
1999	Tuomo Hjelt, *Diffusive Dynamics of Chainlike Molecules on Surfaces,* Helsinki University of Technology (referee).
1999	Eerik Viitala, *Magnetic properties of small clusters of spins,* University of Jyväskylä (referee).
2001	Jukka Mäkinen, *The mechanical and geometrical properties of fibrous structures,* University of Jyväskylä (referee).
2001	Juha Päivärinta, *Theoretical Calculations on Aggregation of Molecules in Solutions: Applications on Surfactants, Aluminium Hydroxides and Pharmaceutical Compounds,* Åbo Akademi University (opponent).
2002	Juhani Hämäläinen, *Partitioning of parameter spaces – a self-consistent method with applications to EMC simulations,* University of Jyväskylä (referee).
2003	Henri Saarikoski, *Density-Functional Approaches to Interacting Electrons in Quantum Dots,* Helsinki University of Technology (referee).
2003	Janne Nord, *Modeling of high-dose radiation damage in semiconductors,* University of Helsinki (referee).
2004	Riku Linna, *Dynamic aspects in brittle fragmentation,* University of Jyväskylä (referee).

Dissertation Opponent/Referee contd . . .

2005	Pekka Laukkanen, *Atomic and electronic properties of GaAs(100) and InAs(100) semiconductor surfaces,* University of Turku (referee).
2006	Hannes Raebiger*, Ferromagnetism in (Ga,Mn)As and (Ga,Mn)N,* Helsinki University of Technology (referee).
2007	Ulla Vainio, *Characterisation of Cellulose- and Lignin Based Materials Using X-Ray Scattering Methods,* University of Helsinki (referee).
2007	Fredrik Boxberg, *Modeling the effect of elastic strain on ballistic transport and photonic properties of semiconductor quantum structures,* Helsinki University of Technology (referee).
2007	Ropo Matti, *Ab initio simulation of substitutionally disordered materials,* University of Turku (referee).
2008	Tanskanen Juha,*One- and Two-dimensional Nanostructures of Group 14 Elemental Hydrides and Group 13-15 Binary Hydrides,* University of Joensuu (opponent).
2010	Heikki Pitkänen, *First principles modeling of metallic alloys and alloy surfaces*, Lappenranta University of Technology (referee).
2010	Antti Taskinen, *Molecular Modeling of Asymmetric Induction in Heterogeneously Catalyzed Hydrogenation of the C=O Bond,* Åbo Akademi University (referee).
2011	Aapo Varpula, *Electrical properties of granular semiconductors – Modelling and experiments on metal-oxide gas sensors,* Aalto University (referee).
2011	Arto Sakko, *New Computational Approaches for Inelastic X-Ray Scattering,* University of Helsinki (referee).
2012	Suvi Ikäläinen, *Computational investigations of nuclear mag- netic resonsance and magneto-optic properties at the basis set limit,* University of Helsinki (referee).
2012	Teija Kangas, *Theoretical Study of the Oxidation of a Pure and Alloyed Copper Surface,* University of Oulu (opponent).
2012	Jussi Lehtola, *Computational Modeling of the Electron Momentum Density,* University of Helsinki (referee).
2012	Lauri Nykänen*, Computational studies of carbon chemistry on transition metal surfaces,* University of Jyväskylä (referee).
2013	Ville Virkkala, *Computational study of isovalent group-V impurity doping and native point defects of III–V compound semiconductors*, Aalto University (referee).
2013	Sami Auvinen, *Computational modeling of the properties of TiO_2 nanoparticles*, Lappeenranta University of Technology (opponent).
2014	Pauli Parkkinen, *Computational study of proton ordering in ice and ice-like systems*, University of Helsinki (referee).
2014	Johnny Dahl, *Spectrocopic studies of III–V semiconductor materials for improved devices,* University of Turku (referee).
2015	Alexander Karpenko, *Exploring electronic structure of alkali bromide molecules by means of electron spectroscopy and relativistic computations*, University of Oulu (referee).
2015	Andreas Östlin, *Electronic Structure Studies and Method Development for Complex Materials,* KTH Royal Institute of Technology (member of the defense committee).
2016	Topi Korhonen, *Modeling of the Mechanical Properties of Carbon Nanostructures,* University of Jyväskylä (referee).

Dissertation Opponent/Referee contd . . .

2017	Syed Rouf, *Paramagnetic NMR Chemical Shift Theory: Combined ab initio/Density-Functional Theory Method,* University of Oulu (referee).
2018	Jaakko Mäkelä*, Investigation and suppression of semiconductor–oxide related defect states: from surface science to device tests,* University of Turku (referee).
2019	Maria Malitckaya, *Improving Cu(In,Ga)Se_2 solar cell absorbers based on atomic-level modeling,* Aalto University (referee).
2019	Eero Nurmi, *Ab initio investigations of durability of iron alloys and titanium,* University of Turku (opponent).
2019	Chian-YeLing, *Atomic-Level Understanding of the Rubber-Brass Adhesion and the Effect of Additivities,* University of Eastern Finland (referee).
2020	Xiaojie Li, *Materials for advanced energy technology from quantum-mechanical modeling,* KTH Royal Institute of Technology (opponent).
2020	Joni Ikonen, *Enhanced elementary operations for quantum computing,* Aalto University (referee).
2020	Elli Selenius, *Optical Properties of Metal Clusters and Cluster Arrangements,* University of Jyväskylä (opponent).