

## CV of Jouko Nieminen (Dr. Tech.)

Laboratory of Physics, Tampere University of Technology (TUT), Finland  
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### BASIC FACTS

**Name and Birth:** Jouko Aulis Nieminen, September 26<sup>th</sup> 1962, Tampere, Finland.  
ORCID: [orcid.org/0000-0003-0817-1448](https://orcid.org/0000-0003-0817-1448)  
SCOPUS: Author ID: 7005439559

### EDUCATION AND DEGREES AWARDED

**Most Recent Degree:** Dr. Tech. in physics, Tampere University of Technology, 1989.  
**Former Degrees:** M.Sc (Tech.) in physics, Tampere University of Technology, 1985.  
**Docent in:** Computational materials physics, Tampere University of Technology, 1999.

### LINGUISTIC SKILLS:

Finnish (native), English (fluent written and spoken), Swedish (basics), German (basics)

### RESEARCH INTERESTS

Battery materials, Nanophysics and -technology, spintronics, theory of scanning tunneling spectroscopy, electronic structure of novel superconducting and topological materials, development of computational methods.

### CURRENT POSITION

**University lecturer**, Physics, TUT, 2011->.  
**Research career phase 3)** Established or independent researcher

### OTHER AFFILIATIONS

**Adjunct professor**, Northeastern University, Boston, MA, USA. 2007- 2017.  
**Affiliated professor**, *Northeastern University, Boston, MA, USA. 2017->*.

### POSITIONS OF TRUST

**Scientific head of the steering board of the Tampere Centre of Scientific Computing, TCSC**, TUT 2017-.

### PREVIOUS POSITIONS

**Lecturer**, Physics, TUT, 1992-2011.  
**Junior research fellow**, Academy of Finland (Natural Sciences Council), 1991-1994.  
**Research assistant**, Physics, TUT, 1991.  
**Senior assistant**, Physics, TUT, 1990.  
**Research assistant**, Academy of Finland (Natural Sciences Council), TUT, 1986-1990.  
**Assisting researcher**, Physics, TUT, various periods 1982-1985.

### ACADEMIC VISITS and POST-DOC POSITIONS

Center for Advanced 2D Materials, **National University of Singapore**, (1 week), 2015.  
Department of Physics, **Northeastern University**, Boston, MA, (several short visits 1-2 times a year), 2005 ->.  
Institut für Experimentalphysik, **Freie Universität Berlin** (1 month), 2004.  
Institut für Experimentalphysik, **Freie Universität Berlin** (1 month), 2003.  
Royal Society visiting fellowship, Department of Materials, **University of Oxford** (3 months), 1994.  
Royal Society visiting fellowship, Department of Materials, **University of Oxford** (10 months), 1991.

## RESEARCH FUNDING AS WELL AS LEADERSHIP AND SUPERVISION

### SUPERVISED DOCTOR'S THESES

**Timo Saari**, Dissertation in preparation, thesis defence expected spring 2019, (TUT).  
**Ilpo Suominen**, A Multiband Green's Function Approach for Scanning Tunneling Spectroscopy of High-Tc Superconductor Bi-2212, 2011, TUT.  
**Eeva Niemi**, Channel Sensitive Computer Simulations of Scanning Tunneling Microscopy, 2006, TUT.  
**Sami Paavilainen**, Geometric and Electronic Properties of Adsorbate-Substrate Systems Modelled with Density-Matrix Tight-Binding Method, 2002, TUT.

## OTHER SCIENTIFIC EXPERT POSITIONS AND SCIENTIFIC ACHIEVEMENTS

### EVALUATION OF DOCENT OR POSTDOC APPLICATIONS

**Reviewer** for the post-doc proposal 8865354 to National Research Fund Luxembourg, 2014.  
**Evaluation** of applications to FICS (Finnish Graduate School in Computational Sciences), 2009.  
**Evaluation** of application for adjunct professorship of computational materials physics (docent) by Marko Punkkinen, University of Turku, 2008.

### REFeree FOR SCIENTIFIC JOURNALS

**Reviewer** for Nano Letters, Scientific Reports, Physical Review Letters, Physical Review X, Physical Review B, Surface Science, Physica Scripta, Journal of Physical Chemistry, Applied Surface Science, Journal of Physics: Condensed Matter, Condensed Matter Physics.

**Invited speaker** at E-MRS 2018 Fall meeting, Warsaw 17.9.-20.9.2018. An invited presentation in Emerging layered functional materials and their characterization -symposium, 2018.

**Invited speaker** at ICMAT2015, Singapore 28.6.-3.7.2015 (8th International Conference on Materials for Advanced Technologies of the Materials Research Society of Singapore). An invited lecture in Functional Spin-Orbit Coupling Materials -symposium, 2015.

**Invited speaker** at CECAM-SIMU Workshop 27.-30.8.2001, Lyon, France, 2001.

**Member** of the executive committee organizing the Annual Meeting of Finnish Physical Society, 2014.

## AWARDS

**Elegant work prize** of the Institute of Materials. 1994 for A.P. Sutton, J.B. Pethica, H. Rafii-Tabar and J.A. Nieminen, Mechanical properties of metals at the nanometre scale, Chapter 7 of Electron Theory in Alloys Design, eds. D.G. Pettifor and A.H. Cottrell, Inst. of Metals.: London, (1992). 1992.

## PATENTS and INVENTION FILINGS

Arun Bansil, Timo Saari, Cheng-Yi Huang, Jouko Nieminen, Wei-Feng Tsai, and Hsin Lin, Electrically tunable localized tunneling channels in Silicene nanoribbons – an invention filing TTY/501/431/2014 and a provisional patent disclosure US *Provisional Patent Application No. 61/976,878. 2014.*

## SCIENTIFIC AND SOCIETAL IMPACT OF RESEARCH

### RECENT ARTICLES DESCRIBING THE AUTHOR'S RESEARCH

**Fifty four peer-reviewed papers** (cited 816 times, h-index: 16, Scopus) published in international peer-reviewed journals like Nano Letters, Physical Review Letters, Physical Review B, etc. In addition, a chapter in two printed books.

#### Selected recent publications:

- Spectroscopic signatures of different symmetries of the superconducting order parameter in metal-decorated graphene – Saari, Timo, Nieminen, Jouko and Bansil, Arun, **Journal of Physics: Condensed Matter**. 29, 21, p. 215601 (2017).
- Inter-Layer Coupling Induced Valence Band Edge Shift in Mono- to Few-Layer MoS<sub>2</sub> – Trainer, Daniel, et. al., **Scientific Reports** 7, 40559 (2017)
- Coexisting Honeycomb and Kagome Characteristics in the Electronic Band Structure of Molecular Graphene – Paavilainen, Sami et. al., **Nano Lett.**, 2016, 16 (6), pp 3519–3523.
- Electrically tunable localized tunneling channels in silicene nanoribbons - Saari, Timo; Huang, Cheng-Yi; Nieminen, Jouko; et al., **Applied Physics Letters** Vol.104, Issue: 17, APR 28 2014, (DOI: 10.1063/1.4873716).
- Origin of the Electron-Hole Asymmetry in the Scanning Tunneling Spectrum of the High-Temperature Bi<sub>2</sub>Sr<sub>2</sub>CaCu<sub>2</sub>O<sub>8+δ</sub> Superconductor - Nieminen, Jouko; Lin, Hsin; Markiewicz, R. S.; et al., **Physical Review Letters** Vol.102 Issue: 3 JAN 23 2009 (DOI: 10.1103/PhysRevLett.102.037001).
- Spectral decomposition and matrix element effects in scanning tunneling spectroscopy of Bi<sub>2</sub>Sr<sub>2</sub>CaCu<sub>2</sub>O<sub>8+δ</sub>, Jouko Nieminen, Ilpo Suominen, R. S. Markiewicz, Hsin Lin, and A. Bansil, *Phys. Rev. B* 80, 134509 – Published 9 October 2009.
- Nanoscale Interplay of Strain and Doping in a High-Temperature Superconductor - Zeljkovic, Ilija; Nieminen, Jouko; Huang, Dennis; et al., **Nano Letters** Vol. 14 Issue: 12, 6749-6753, DEC 2014 (DOI: 10.1021/nl501890k).
- Photon energy dependence of circular dichroism of the Au(111) surface state - Arrala, M.; Nieminen, J.; Braun, J.; et al., **Physical Review B** 88, 2013 (DOI: 10.1103/PhysRevB.88.195413).
- Evidence of strong correlations at the Van Hove singularity in the scanning tunneling spectra of superconducting Bi<sub>2</sub> Sr<sub>2</sub> CaCu<sub>2</sub> O<sub>8+δ</sub> single crystals, Jouko Nieminen, Ilpo Suominen, Tanmoy Das, Robert Markiewicz, and Arun Bansil, **Phys. Rev. B** 85, 214504 (2012).

- Effect of orbital symmetry of the tip on Scanning Tunneling Spectra of  $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ , Ilpo Suominen, Jouko Nieminen, R.S. Markiewicz, and A. Bansil, **Physical Review B** **84**, 014528 (2011).

## TEACHING EXPERIENCE

A very experienced teacher, capable of teaching both in Finnish and English at different levels from introductory to advanced courses.

First lectured course Quantum mechanics 1 (in Finnish, TUT) year 1985.

Appointed to a position of a lecturer in 1992.

### Arranged graduate courses (mainly seminars):

Classical mechanics

Statistical physics

Elements of advanced quantum theory

Many body quantum theory

Condensed matter physics

Electronic structure of materials

### Lectures in undergraduate courses:

Basic physics courses in the International B.Sc. degree programme (programme launched in TUT fall 2016)

Nanophysics

Classical mechanics

Statistical physics

Condensed matter physics

Quantum physics

Mathematical methods in physics

Elementary courses

## OTHER SCIENTIFIC MERITS

### EXAMINED DOCTOR'S THESES

**Aki Pulkkinen**, Towards better understanding of activity and selectivity trends involving K and O adsorption on selected metal surfaces, 2017, Lappeenranta University of Technology. (Opponent).

**Mikko Ervasti**, Simulating impurities and edges in graphene, 2016, Aalto University. (Pre-examiner).

**Karri Saloriutta**, Electronic Structure in Graphene Nanostructures, 2013, Aalto University. (Pre-examiner).

**Sampsa Jaatinen**, Catalytic and Surface Oxidation Processes on Transition Metal Surfaces, 2007. Helsinki University of Technology. (Pre-examiner).

**Jonas Frantz**, Kinetics of Nanoclusters on Surfaces and in Thin Films, 2004. University of Helsinki. (Pre-examiner).

**Ari Lukkarinen**, Electrorheological and Magnetorheological Fluids, 1999. Helsinki University of Technology. (Pre-examiner).

**Mihailis Lazaridis**, Theoretical studies on heterogenous nucleation, 1993. University of Helsinki. (Opponent).

#### **EXAMINED LICENTIATE'S THESES**

**Heikki Heiskanen**, Electronic structure of triangular, hexagonal and round graphene flakes 2009, University of Jyväskylä.

#### **EXAMINED MASTER'S THESES**

**Lassi-Pekka Taskinen**, Hissin johteen rakenteen optimointi. (Structural Optimization of an Elevator Guide Rail), 2014, TUT.

**Timo Saari**, Electronic Structure and Spin Polarization in Silicene Nanostructures, 2013, TUT.

**Tiia Tikkanen**, Computer Simulations of Scanning Tunneling Microscopy of Adsorbate Molecules in Metal Surfaces, 2012, TUT.

**Tero Huttunen**, Inertial Navigation in Itikka Experiment, 2010, TUT.

**Antti Korventausta**, Eristekalvoille adsorboituneiden orgaanisten molekyylien tunnelointimikroskopian mallintaminen (Modeling tunneling spectroscopy of organic molecules adsorbed on insulating thin films), 2007, TUT.

**Ilpo Suominen**, Antiferromagnetismi ja suprajohtavuus aukkotyyppisissä kupraateissa (Antiferromagnetism and superconductivity in hole-doped cuprate materials), 2007, TUT.

**Sakari Lahti**, Modeling of Scanning Tunneling Microscopy of Substrate-Adsorbate Systems, 2002, TUT.

**Eeva Niemi**, Spin-erotteinen tiukan sidoksen approksimaatio molekyyli-pinta -systemeille (Spin-resolved tight-binding approximation for molecule-surface adsorbate-systems), 2002, TUT.

**Sami Paavilainen**, Adatomien ja pinnan välisen vuorovaikutuksen mallintaminen tiheysmatriisimenetelmällä (Modeling the interaction between adatoms and surface with the density matrix method), 1998, TUT.

**Katianna Pihakari**, Molecular dynamics simulation of Langmuir-Blodgett films, 1996, TUT.

**Ari Lukkarinen**, Computer simulation of liquid droplet spreading, 1993, TUT.