

Anton Tamtögl

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Education

Habilitation

higher-education teaching qualification
in *Experimental Physics*

Energy dissipation on Dirac and semimetal surfaces, Graz University of Technology
Apr 2021 | Graz, Austria

PhD in Physics

graduation with distinction (highest possible grade)
PhD thesis: *Surface Dynamics and Structure of Bi(111) from Helium Atom Scattering*
Jun 2012 | Graz, Austria

Master's degree in Technical Physics

graduation with distinction
master's thesis: *Adsorption and Desorption Processes on Clean and Zn-modified Pd(111)*
Jun 2008 | Graz, Austria

Study stay at University of Strathclyde

Jan 06 – Jun 06 | Glasgow, UK

Apprenticeship training

as electronics technician and electrician
Apprenticeship examination in both professions
Sep 00 – Jul 01 | Austria

Languages

German: mother tongue

English: proficient user (C2)

Spanish: basic user (A1)

Computer Skills

MATLAB, Python, C++

Autodesk Inventor, SPS(LabView)

Publishing software (LaTeX, InDesign)

Mathematica, Office

Operating systems (Windows, Linux)

Experience

Sep 2021 - Present **PI and R&T-House, Graz University of Technology**

- PI of an FWF project, 2 publications on the cover including *Nanoscale Horiz.*, One *Adv. Phys. X* review, Guest editor *Front. in Chem.*, Latest *Comm. Chem.* paper as *Featured image*
- Support for other researchers' in proposal writing & administration at the R&T House (Due to both roles my publication output is smaller.)

2017 - Jul 2021 **Senior Researcher, Graz University of Technology**

- Research lead, lecturing of full courses and supervision
- *Habilitation* in *Experimental Physics* with 03/21
- First measurement of water diffusion at a surface based on scattering - first authored *Nature communications* features in **top 5%** of all scientific articles (according to *altmetric*)
- Organisation of an online *summer school*
- Interdisciplinary *publications*
- Several large scale facility measurements

2016 **Research Fellow, Graz University of Technology**

- Extended collaboration and supervision of master students
- Development of further simulation tools in MATLAB & Simulink based on *Monte-Carlo* and molecular dynamics approaches
- Further improvements and developments of the machines both in Cambridge (control system running on a microcontroller, published in *Rev. Sci. Instr.*) and Graz (including *in-situ* sample preparation and *sample transfer*)

2014 - 2015 **Research Fellow, University of Cambridge**

- Initiated a close collaboration with Aarhus University / *Centre of Excellence for Dirac Materials* (world-leading group for the growth of *topological* and two-dimensional materials)
- Pioneered e-ph coupling approach for *topological insulators*
- Experimental studies of molecular motion at surfaces, e.g.:
 - First unequivocal proof of motion in the *ballistic regime*
 - Hydrogenation of a *graphene surface*
- Faster data acquisition via implementation of new findings in image reconstruction & *compressed sensing* (interdisciplinary collaboration with department of mathematics)

Jul 2012 - Sep 2013 **Research Associate, Graz University of Technology**

- Initiation of a collaboration with theorists and demonstrating the ability of the experimental method to quantify the electron-phonon (e-ph) *coupling strength*
- Modelling of *scattering intensities* with Python

Aug 2008 - Jun 2012 **PhD, Graz University of Technology** Supervisor: Prof. W. E. Ernst

- Construction and setup of a unique apparatus to study the structure & dynamics of surfaces
- First characterisation of the apparatus, designing a control system for automated measurements & monitoring
- Modelling surface properties & scattering using MATLAB
- Extension of the method to *new materials*

Mar 2007 - Jun 2008 **MSc, Graz University of Technology** Supervisor: Prof. A. Winkler

- Introduction to professional research in surface science
 - Ultrahigh vacuum & surface spectroscopic techniques
 - *Interaction with gases* in the context of catalysis
 - Preparation, structure, stability & kinetics of *ultra-thin films*

Jul 2007 - Sep 2007 **Study and research stay at DESY** German electron-synchrotron

- Supervisor: Prof. G. Grindhammer. Analysis & reconstruction of jets, Implementation of a jet finding algorithm in C++

Publications and dissemination

Scientific publications

- **44** articles published in international peer-reviewed journals (see list)
- 9 invited talks and numerous conference contributions (see list)

Outreach

- 2020 (Austrian) Long Night of Research
- 2019 Current research (elective subject at the end of secondary school)
- 2015 Physics at work (demonstration of an STM to school students)
- 2014 Cambridge science festival

Refereeing for Phys. Rev. Lett., Phys. Rev. A & B, 2D Mater., Front. in Chem., Phys. Chem. Chem. Phys., Surf. Sci., Ann. Phys., Res. in Phys.

External Referee for the **ERC**, Referee for the GACR (Czech Science Foundation)

Guest Editor for Frontiers in Chemistry, Poster prize committee at the ECOSS

Funding and awards

- 2021 FWF (Austrian science fund) stand-alone project [P34704](#) (€ 404 057)
- 2016–2024: 10 accepted neutron beamtime proposals at about € 6 000 per day, ranging from 5-10 days at the [Institut Laue-Langevin](#) (Grenoble) and [FRM II](#) (TU Munich)
- 2018: TU Graz competitive initial funding program (€ 10 000)
- 2013–2016: Erwin Schrödinger research fellowship by the FWF [J3479-N20](#) (€ 152 670)
- 2003–2005: Merit grant for exceptional achievements from the faculty of natural sciences (TU Graz)

Teaching and further training

Teaching and supervision of students

See teaching directory in the appendix for full list of courses I have taught and students I have supervised

- Thin Film Science and Processing (TU Graz, 2024)
- Surface Dynamics at the Nanoscale (TU Graz, 2018-2021)
- Special Topics of Technical Physics: Molecules of Interest (TU Graz, 2018)
- Introduction to Surface Physics (University of Cambridge, 2015)
- Calculus in Experimental Physics 2 (Electricity, Optics) (TU Graz, 2013)
- Physics for Geomatics Engineering (TU Graz, 2012)
- Calculus in Physics (TU Graz, 2009)

Continuing education

- Gender and Diversity Competencies for Scientists (2021-22)
- Intercultural Communication (2021)
- Teach, Present, Publish (program by Montclair State University at TU Graz, 2019)
- TU Graz Management development program (2019)
- Leading Diverse Teams (2017)
- Teaching in English: Presenting in Class (2017)
- Teaching in English: Introduction (2017)
- Leading and Delegating (2017)
- Psychology of Leadership and Motivation: Fundamentals (2017)
- Introduction to Lecturing (Rob Wallach, University of Cambridge, 2015)

Academic service & conference organisations

- 2022 Substitute member of the Working Group for Equal Opportunities
- 2010–2011 Head of the students' union for doctoral studies
- Organisation committee of the ICPS2010 (International conference of physics students)
- 2006–2007 Elected students' representative and head of the students' union for physics
- Long-term member of the students' union

Interests

- Music (incl. playing guitar/drums/singing & making music in a band)
- Sports (soccer, skiing, hiking), cinema
- Organistaion of a yearly [music festival](#) in southeastern Styria

Lectures and laboratory demonstration

Course title	LV-NO	Type	SWS	Year
Thin Film Science and Processing	PHT.304UF	VO	2	2024
Fundamental and Applied Research: Third-Party Funding, Grant...	930.001	SE	1	2022-24
Surface Dynamics at the Nanoscale	PHT.025UF	VO	2	2018-21
Molecules of Interest	PHT.022UF	VO	2	2017
Introduction to Surface Physics	University of Cambridge			2015
Experimental Physics 2 (electricity, optics)	511.062	UE	2	2013
Physics for Geomatic Engineering	511.061	UE	2	2012
Advanced Laboratory Exercises	511.121	LU	5	2012
Basic Laboratory Course (electricity and optics)	511.804	LU	6	2012
Advanced Laboratory 1	511.121	LU	5	2012
Basic Laboratory Course (mechanics and thermodynamics)	511.803	LU	3	2012
Advanced Laboratory Exercises	511.121	LU	5	2011
Basic Laboratory Course (electricity and optics)	511.804	LU	6	2011
Advanced Laboratory 1	511.121	LU	5	2011
Basic Laboratory Course (mechanics and thermodynamics)	511.803	LU	3	2011
Advanced Laboratory Exercises	511.121	LU	5	2010
Basic Laboratory Course (electricity and optics)	511.804	LU	6	2010
Advanced Laboratory 1	511.121	LU	5	2010
Physics	511.202	UE	1	2009
Advanced Laboratory Exercises	511.121	LU	5	2009
Basic Laboratory Course (electricity and optics)	511.804	LU	4	2009
Advanced Laboratory 1	511.121	LU	5	2009
Advanced Laboratory Exercises	511.121	LU	5	2008

Supervision of Bachelor, Master and PhD theses

Title	Name	Type	
Surface Structure and Dynamics of Dirac and 2D Material Surfaces.	Noah J. Hourigan	PhD	ongoing
Investigation of Dirac and 2D material surfaces with neutral matter.	Phlipp Maier	PhD	ongoing
Investigating 2D layered materials with helium atom scattering.	Victoria Schwab	MA	ongoing
tbc	Benno Hacker	BA	ongoing
Surface dynamics of nitrogen-containing heterocycles from ...	Jonathan Pischler	BA	2024
Surface Dynamics and Atom-Surface Interaction of Topological ...	Adrian Ruckhofer	PhD	2021
Structure and Form Factor of Adsorbed Organic Molecules.	Victoria Schwab	BA	2021
Studying Stepped Semimetals and Dirac Materials with ...	Stephan J. Schmutzler	MA	2021
Surface Dynamics and Phonon Dispersion of Sb ₂ Te ₃ (111) from ...	Simon Halbritter	MA	2020
Bestimmung der Gitterkonstanten von Kristallen & Molekülfilmen ..	Maximilian Grillitsch	BA	2020
Molecular Dynamics Simulations: Modelling Surface Diffusion ...	Stephan J. Schmutzler	BA	2018
Setup and Characterisation of an Atomic Hydrogen source.	Andreas Grantner	BA	2018
Atom-surface Interaction of Topological Insulators Determined ...	Michael Pusterhofer	MA	2017
Surface Dynamics of the Topological Insulator Bi ₂ Se ₃ from ...	Adrian Ruckhofer	MA	2017
A New Method of Polarisation Measurement for Spin-Echo ...	Benjamin Davey	MA*	2014

*part III project at the University of Cambridge (equivalent to a master's project)

Supervision on a day-to-day basis

Title	Name	Type	
Diffusion of Light Adsorbates on Transition Metal Surfaces.	Peter S. M. Townsend	PhD	2018
Thin Layers of Phthalocyanines on the (100) Surface of Silver.	Agata Sabik	PhD	2018
Molecular Diffusion on Surfaces of Carbon Materials.	Emanuel Bahn	PhD	2015
Classical and Quantum-Mechanical Atom-Surface ...	Patrick Kraus	PhD	2014
Surface Structure and Dynamics of Bi(111) and ...	M. Mayrhofer-Reinhartshuber	PhD	2013