

# *Gareth S. Parkinson*

Date of Birth: 02 / 06 / 1981

Place of Birth: Darlington, UK

[Web Site](#) / [Google Scholar Profile](#) / [ORCID](#)

## • EDUCATION

- 2016 Habilitation in Experimental Physics  
Department of Physics, TU Wien, Vienna, Austria
- 2007 PhD – Surface Studies Using Medium Energy Ion Scattering  
(Advisor D. P. Woodruff)  
Department of Physics, University of Warwick, UK
- 1999-2004 Masters Degree in Physics (MPhys)  
Department of Physics, University of Warwick, UK

## • POSITIONS HELD

- 2021 - Full Professor of Surface Reactivity  
Institut für Angewandte Physik/ TU Wien
- 2017 - 2020 Associate Professor  
Institut für Angewandte Physik, TU Wien
- 2015 – 2017 Assistant Professor (Laufbahnstelle)  
Institut für Angewandte Physik, TU Wien
- 2010 – 2015 University Assistant  
Institut für Angewandte Physik, TU Wien
- 2009 – 2010 Postdoctoral Researcher (supervisor U. Diebold)  
Department of Physics, Tulane University, New Orleans LA, USA
- 2007 – 2009 Postdoctoral Researcher (supervisor B.D. Kay)  
Pacific Northwest National Laboratory (PNNL), Richland WA, USA

## RESEARCH INTERESTS

Single Atom Catalysis, Structure-function relationships in catalysis, Metal Oxide Surfaces, Scanning probe microscopy.

## • PUBLICATION SUMMARY

81 articles in peer reviewed journals: 14 first author, 24 senior author. 3 single author  
Articles include: 2 Science, 2 PNAS, 3 Nature Materials, 4 Angewandte Chemie, 4 Physical Review Letters, 1 JACS, 2 ACS Nano, 2 ACS Catalysis  
**Google scholar h-index – 33**, ≈4400 total citations

## • AWARDS

- 2022 Elected as AVS fellow
- 2022 [Young Innovator Award in Nano Research](#) (Nanocatalysis)
- 2020 ERC Consolidator grant (€2m over 5 years)
- 2018 [Gaede-Prize](#) of the German Physical Society (DPG) “...*For his excellent experimental work on iron oxide surfaces as model systems for single atom catalysis.*” One prize annually for outstanding work in vacuum-related research.
- 2017 Kardinal Innitzer Förderungspreis (Awarded annually for best habilitation thesis in Austria)

- 2015 FWF START Prize (similar to ERC starting grant, ca. 8 per year in all of research, comes with €1.2 million in unrestricted research funds)
- 2013 Department of Energy Office of Science Postdoctoral Researcher Competition

- **PROFESSIONAL SERVICE**

- 2023 - Advisory board for Surface Science Discussions
- 2019 - Elected to IUVESTA Surface Science Division committee
- 2019 - Elected IUVESTA representative for Austria by the Austrian Vacuum Society (BWG)
- 2019 - 2023 Committee for “Fundamental Discoveries in Heterogeneous Catalysis Focus Session” at AVS
- 2018 - Appointed representative for the surface science division of the Austrian Physics Society (ÖPG)
- 2017 - 2019 Board of the Austrian Chemical-Physics Society (CPG)
- 2017 - 2019 AVS surface science division executive board
- 2011 – 2012 Member of Editorial Board, Energy Frontier Research Centre Newsletter

- **INVITED TALKS**

**53 invited talks** at international conferences, workshops and summer schools, including 3 keynote lectures, 3 plenary lectures and the „**Future Stars of the AVS**“ **Symposium**”.

**28 invited seminars** and colloquia at universities and research institutions (see full list for details).

- **CONFERENCE ORGANIZATION**

- 2024 ECOSS Surface Science Division
- 2022 Organizing symposium on Single Atom Catalysis at DPG 2022 Spring Meeting
- 2020-2022 Co-organizing “Fundamentals of heterogeneous catalysis” focus session at AVS 67 (cancelled due to Covid-19)
- 2019-2022 Organized surface science division sessions for joint ÖPG/SPG national meeting
- 2019 Co-organized “Fundamental Aspects of Materials Degradation” symposium at AVS 66 with Marcus Valtiner (TU Wien)
- 2017 Co-organized fundamentals of metal-oxide surface chemistry at DPG spring meeting with Joachim Paier (Helmholtz Univ. Berlin)

- **INSTITUTIONAL RESPONSIBILITIES**

- 2019 Ersatzmitglied for Appointment Committee Professorship “Experimentelle Quantentechnologie”
- 2019 Hauptmitglied for IAP in the TU Wien Physics Faculty Council (Fakultätsrat)
- 2019 Chair of “[Vienna young scientists symposium](#)” – Catalysis section
- 2016 – 2019 IAP “Mittelbau” representative on the TU Wien Physics Faculty Council
- 2016 – Member in 8 Habilitation committees

- RESEARCH FUNDING**

<b>Title</b>	<b>Funding Agency</b>	<b>Amount</b>	<b>Duration</b>	<b>Role</b>
Cluster of Excellence “MECS”	Austrian Science Foundation	€34.4M (€775k to GSP)	2023-2028	PI
Single-atom Catalysis in Photocatalytic Investigations	EU - Marie Curie Fellowship for Moritz Eder	300k	2023-2025	Supervisor
Advanced Single Atom Electrochemistry	EU - Marie Curie Fellowship for Hao Yin (EPFL)	300k	2023-2025	Supervisor
TU-dx – Towards applications of 2D materials and their heterostructures	Austrian Science Foundation – Docfunds Program	150k to GSP	2023-2027	PI
SFB: Taming complexity in Materials Modelling	Austrian Science Foundation	€4.8M (€430k to GSP)	2021-2026	PI
ERC Consolidator Grant	ERC	€2.0M	2020-2025	PI
FWF “START” Prize	Austrian Science Foundation	€1.2M	2015-2021	PI
Surface Science of Magnetite	Austrian Science Foundation – single investigator project	€152k	2013-2016	PI
TU-d Doctoral College	TU Wien	€76,5k (one PhD student)	2016-2019	PI
SFB ‘Functional Oxide Surfaces and Interfaces, <a href="#">FOXSI</a> ’	Austrian Science Foundation	€2M	2015-2019	Co-Applicant
An Artificial Leaf: a photo-electro-catalytic cell from earth-abundant materials for sustainable solar production of CO <sub>2</sub> -based chemicals and fuels (participant)	H2020 (EU)	€7.98M; (€547,612€ to TU Wien)	2016-2019	Participant
An Apparatus for Investigating Organic Molecules on Oxide Surfaces	TU Wien	€141k	2012-2014	Co-Applicant

• **INVITED TALKS AT INTERNATIONAL MEETINGS**

1. ACS Spring 2012 National Meeting and Exposition San Diego, March 25-29, 2012
2. Nature Conference "Frontiers in Electronic Materials", June 17-20, 2012, Aachen, Germany
3. SPIE Optics & Photonics San Diego, USA, August 12-16, 2012
4. IUPAC 8th International Conference on Novel Materials and their Synthesis (NMS-VIII), Xi'an, China, 14 to 19 October, 2012
5. 28<sup>th</sup> International Workshop on Novel Materials and superconductors, Plannersalm, Austria, February 9 - 16, 2013
6. ACS Spring 2013 National Meeting and Exposition New Orleans, April 7-11, 2013
7. Austrian Physical Society (ÖPG) Meeting, Linz Austria, 3-6 September 2013
8. 3<sup>rd</sup> International Conference on Physics at Surfaces and Interfaces (PSI2014), Puri, India, Feb 24-28 2014
9. 79<sup>th</sup> DPG Annual Meeting and DPG Spring Meeting (DPG-Frühjahrstagung), Berlin (TU), 15-20 March 2015
10. Nanoforum 2015, June 8-9, 2015, University Linz
11. ACS Fall 2015 National Meeting and Exposition Boston, August 16-20, 2015
12. CRC 1109 Summer School, Berlin, Germany, 03.09.2015
13. International SFB FOXSI Symposium, TU Wien, 12.5.2015
14. AMISPEC Workshop, Central European Institute of Technology, March 8 2016
15. ACS Spring 2016 National Meeting and Exposition San Diego, March 13-17, 2016
16. IUVESTA 76 Workshop, Avilla, Spain, July 2016
17. **(Keynote Lecture)** International Symposium on Single-Atom Catalysis, Dalian, China, June 30-July 2, 2016
18. **(Keynote Lecture)** 20th International Vacuum Congress (IVC-20), Busan, Korea August 21 to 26, 2016.
19. ECOS 32. Grenoble France, 28th August -2nd September 2016
20. Summer School of the Oldenburger LandesgraduiertenKolleg in Elstal, Germany. September 12-14, 2016.
21. Austrian Physical Society (ÖPG) Meeting, Vienna Austria, 3-6 September 2016
22. AVS 63rd International Symposium and Exhibition, Nashville November 6-11, 2016
23. 2016 Fall MRS Meeting, Boston, November 27- December 2, 2016
24. IUVESTA International Summer School on Physics at Nanoscale, June 10th-June 17th 2017, Devět Skal, Czech Republic
25. 5th International Conference on Chemical Bonding, ICCB, Kauai, Hawaii, June 22-26, 2017
26. E-MRS 2017 Fall Meeting, Warsaw Poland, September 18-21, 2017.
27. **(Plenary Lecture)** 82<sup>nd</sup> Annual Meeting of the German Physical Society (DPG-Frühjahrstagung), Berlin (TU), 11-16 March 2018
28. STINT workshop, Fort Myers, Florida, USA. 3-6 April 2018
29. **(Plenary Lecture)** 2nd International Symposium on Single Atom Catalysis, Beijing, China 15-18 July, 2018
30. SFB 986 Summer School, Hamburg, Germany, 9-13 July 2018
31. Telluride Workshop on Semiconductor Surface Chemistry, Telluride, Colorado July 2018
32. Deutsch-Brasilianischer Workshop, Bad Dürkheim Germany, 23.9 - 28.9 2018
33. AVS 65th International Symposium and Exhibition – Long Beach California – **„Future Stars of the AVS“ Symposium**
34. Gordon Research Conference on „Chemical Reactions at Surfaces“ – Ventura CA, Feb 2019
35. IWSP Workshop, Wroclaw Poland, 24-28 June 2019
36. Festkörper Analytic Symposium (FKA-20), Wien, Austria 3rd July 2019
37. AVS 66th International Symposium and Exhibition – Columbus Ohio October 2019
38. Materials Research Meeting (MRM) 2019 – December 10-14, 2019, Yokohama, Japan
39. **(Plenary Lecture)** – International workshop on oxide surfaces (IWOX) Lake Placid NY, USA, Jan 2020
40. DPG Spring Meeting (DPG-Frühjahrstagung), Dresden, 15-20 March 2020 - conference cancelled due to Covid-19
41. ACS Spring Meeting, Philadelphia, USA – conference cancelled due to Covid-19
42. ACS Fall Meeting, San Francisco, USA - conference cancelled due to Covid-19

43. Summer school in Photo- and electro-catalysis at the atomic scale (PECAS), San Sebastian, Spain, June 22-25 2021 – postponed to 2022.
44. Multiscale approaches for modeling water splitting with nanocrystals, COST action online Workshop. 16.02.2021
45. Cluster Meeting Prague. (July 2021)
46. Surface Science Discussions 2022, Online workshop (January 2022)
47. LINXS Catalysis Workshop, June 30, 2022, Lund, Sweden
48. International workshop on Single Atom Catalysis, Milan, Italy, (October 2022)
49. Cluster Meeting Prague. (June 2023)
50. Mechanisms and Kinetics Symposium - ACS Spring Meeting, New Orleans, USA (March 17-21 2024)
51. **(Keynote Lecture)** Single Atom Catalysis Symposium - ACS Spring Meeting, New Orleans, USA (March 17-21 2024)
52. Symposium in memory of Renato Ugo, Accademia Nazionale dei Lincei, Rome (May 30-31, 2024)
53. International summer school Physics at Nanoscale. Czech Republic (July 3-8 2024)

• **INVITED TALKS AT UNIVERSITIES AND RESEARCH INSTITUTIONS**

1. University of Cambridge, UK (2007)
2. Pacific Northwest National Laboratory (2009)
3. Ludwig-Maximilians University, Munich (2010)
4. Louisiana State University (2012)
5. Georgia Institute of Technology (2012)
6. Max Plank Institute for Solid State Research Stuttgart (2013)
7. TU Wien, IAP Seminar (2013)
8. Max Plank Institute for Microstructure Physics, Halle Saale (2014)
9. Chemisch Physikalische Gesellschaft (July 2015)
10. TU Munich (November 2015)
11. TU Graz (May 2016)
12. York University (June 2016)
13. Tufts University (December 2016)
14. Harvard University (December 2016)
15. Pacific Northwest National Laboratory (June 2017)
14. TU Hamburg (April 2018)
15. Aarhus iNano centre (June 2018)
16. TU Wien - Institute of Theoretical Physics (July 2018)
17. University of Marburg (May 2019)
18. University of Warwick (June 2019)
19. University of Duisburg-Essen (November 2019)
20. Tufts University (October 2020)
21. Michigan Technological University (October 2020)
22. Chalmers University (November 2021)
23. University of Zurich (May 2022)
24. Peking University (June 2022)
25. Loyola University Chicago (November 2022)
26. Herovsky Institute Prague (December 2022)
27. TU Chemnitz (May 2023)
28. Pacific Northwest National Laboratory (Nov 2023)

• **PhD STUDENT SUPERVISION**

Ongoing: David Rath (2022), Lena Puntcher (2023), Ali Rafsanjani (2023), Panukorn Sombut (2023), Faith Lewis (2025), Nail El-Hocine Barama (2026)

September 2021 Florian Kraushofer, Institute of Applied Physics, TU Wien  
*“Iron Oxide Surfaces as Support Materials for Single Atom Catalysis”*  
 Currently postdoc at TU Munich with Barbara Lechner

- June 2020 Zdenek Jakub, Institute of Applied Physics, TU Wien  
*“Surface Science Studies of Iron Oxides as Model Catalyst Supports”*  
 Obtained a Marie Curie Grant to work as postdoc at CEITEC, Brno
- May 2019 Jan Hulva, Institute of Applied Physics, TU Wien  
*“Studies of adsorption on Fe<sub>3</sub>O<sub>4</sub>(001) using molecular beams*
- April 2019 Jiri Pavelec, Institute of Applied Physics, TU Wien  
*“Surface Chemistry Setup and Adsorption of CO<sub>2</sub> on Fe<sub>3</sub>O<sub>4</sub>(001)”*  
 Currently Senior Scientist at TU Vienna.
- October 2016 Oscar Gamba, Institute of Applied Physics, TU Wien  
*“Surface Chemistry of Fe<sub>3</sub>O<sub>4</sub>(001)”*  
 Postdoc in Spain
- August 2016 Roland Bliem, Institute of Applied Physics, TU Wien  
 Awarded the Christian Doppler Prize for his PhD thesis  
*“Single Metal Adatoms at the Reconstructed Fe<sub>3</sub>O<sub>4</sub>(001) Surface”*  
 Currently Assistant professor at the University of Amsterdam
- 2013 Zdenek Novotny, Institute of Applied Physics, TU Wien.  
 Awarded Loschmidt Prize of the CPG for his thesis  
*“The Reconstructed Fe<sub>3</sub>O<sub>4</sub>(001) Surface as an Adsorption Template”*  
 Currently a staff scientist at PNNL, WA, USA.

• **PHD OPPONENT FOR:**

- 2024 Lisa Rämisch (Supervisor Edvin Lundgren) – Lund University, Sweden  
 2023 Jens Jakob (Supervisor Jeppe Vang Lauritsen) – Aarhus University, Denmark  
 2023 Sebastian Kaiser (Supervisor Friedrich Esch) – TU Munich, Germany  
 2023 Mert Taskin (Supervisor Zbynek Novotny) - University of Zurich, Switzerland  
 2023 Dajo Boden (Supervisor Irene de Groot) – University of Leiden, Netherlands  
 2023 Öyküm Avci (Supervisor Allesandro Fortunelli) - University of Pisa, Italy  
 2022 Moritz Eder (supervisor Ueli Heiz) – TU Munich Germany  
 2018 Bjorn Arndt (supervisor Andreas Stierle) – DESY, Germany  
 2018 Jakob Fester (supervisor Jeppe Lauritsen) – Aarhus University, Denmark  
 2017 Brian Walls (supervisor Igor Shvets) – Trinity College, Dublin, Ireland  
 2014 Matteo Monti (supervisor Juan de la Figuera) – CISC Madrid, Spain

• **MAJOR COLLABORATIONS**

- Prof. Cesare Franchini (University of Vienna, Austria) – Theoretical modelling (DFT)  
 Prof. Peter Blaha (TU Wien, Austria) - Theoretical modelling (DFT)  
 Prof. Florian Libisch (TU Wien, Austria) – DFT with the “embedding” approach  
 Prof. Edvin Lundgren (Lund, Sweden) – Surface x-ray diffraction  
 Prof. Andreas Stierle (DESY, Germany) – Surface x-ray diffraction  
 Prof. Lutz Hammer – (Erlangen, Germany) – Low energy electron diffraction  
 Dr. Zdenek Dohnalek (PNNL, USA) - SAC studies on Fe<sub>3</sub>O<sub>4</sub>(001)  
 Dr. David Duncan (Diamond, UK) – Synchrotron studies (quantitative structural determination)  
 Prof. Juan de la Figuera (CISC Madrid) – Low energy electron microscopy and magnetite in general.  
 Prof. Phillip Christopher (UCSB, USA) – Single atom catalysis  
 Prof. Barbara Lechner (TU Munich) – High temperature and ambient pressure STM  
 Prof. Chris Heard (Charles University, Prague) – Theoretical modelling (DFT)

### Ten Most Important Research Papers:

1. Matthias Meier, Jan Hulva, Zdenek Jakub, Florian Kraushofer, Mislav Bobić, Roland Bliem, Martin Setvin, Michael Schmid, Ulrike Diebold, Cesare Franchini and Gareth S. Parkinson  
“CO oxidation by Pt<sub>2</sub>/Fe<sub>3</sub>O<sub>4</sub>: metastable dimer and support configurations facilitate lattice oxygen extraction”  
**Science Advances** 8 (13), eabn4580 (2022) – <https://doi.org/10.1038/s41467-021-26601>
2. Jan Hulva, Matthias Meier, Roland Bliem, Zdenek Jakub, Michael Schmid, Ulrike Diebold, Cesare Franchini, Gareth S. Parkinson  
“Unravelling CO Adsorption on Model Single-Atom Catalysts”  
**Science** 371 (2021) 375-379 – <https://doi.org/10.1126/science.abe5757>
3. Zdenek Jakub, Jan Hulva, Matthias Meier, Roland Bliem, Florian Kraushofer, Martin Setvin, Michael Schmid, Ulrike Diebold, Cesare Franchini, Gareth S. Parkinson  
“Local Structure and Coordination Effects Define Adsorption in a Model Ir<sub>1</sub>/Fe<sub>3</sub>O<sub>4</sub> Single-Atom Catalyst”  
**Angewandte Chemie** 58, 13961 (2019) - <https://doi.org/10.1002/anie.201907536>
4. Matthias Meier, Jan Hulva, Zdeněk Jakub, Jiří Pavelec, Martin Setvin, Roland Bliem, Michael Schmid, Ulrike Diebold, Cesare Franchini, and Gareth S. Parkinson  
“Water Agglomerates on Fe<sub>3</sub>O<sub>4</sub>(001)”  
**PNAS** 115, E5642-E5650 (2018) - <https://doi.org/10.1073/pnas.1801661115>
5. Roland Bliem, Jessi van der Hoeven, Adam Zavodny, Oscar Gamba, Jiri Pavelec, Petra E de Jongh, Michael Schmid, Ulrike Diebold, Gareth S Parkinson  
“Dual role of CO in the stability of sub-nano Pt clusters at the Fe<sub>3</sub>O<sub>4</sub>(001) surface”  
**PNAS** 113, 8921 (2016) - <http://dx.doi.org/10.1073/pnas.1605649113>
6. Gareth S. Parkinson  
“Iron Oxide Surfaces”  
**Surface Science Reports** 71 (2016) 272 - [10.1016/j.surfrep.2016.02.001](https://doi.org/10.1016/j.surfrep.2016.02.001)
7. Roland Bliem, Jessi van der Hoeven, Adam Zavodny, Oscar Gamba, Jiri Pavelec, Petra E de Jongh, Michael Schmid, Ulrike Diebold, Gareth S Parkinson  
“An Atomic-Scale View of CO and H<sub>2</sub> Oxidation on a Pt/Fe<sub>3</sub>O<sub>4</sub> Model Catalyst”  
**Angewandte Chemie International Edition** 54 (47), 13999-14002 (2016)  
<http://dx.doi.org/10.1002/anie.201507368>
8. Roland Bliem, Eamon McDermott, Pascal Ferstl, Martin Setvin, Oscar Gamba, M. Alexander Schneider, Michael Schmid, Ulrike Diebold, Peter Blaha, Lutz Hammer, Gareth S. Parkinson  
“Subsurface Cation Vacancy Stabilization of the Magnetite (001) Surface”  
**Science** 346 (2014) 1215-1218. - <http://dx.doi.org/10.1126/science.1260556>
9. G. S. Parkinson, Z. Novotny, G. Argentero, M. Schmid, J. Pavelec, R. Kosak, P. Blaha, U. Diebold.  
“CO Induced Adatom Sintering in a Pd/Fe<sub>3</sub>O<sub>4</sub> Model Catalyst”  
**Nature Materials**, 12, 724 (2013) - <http://dx.doi.org/10.1038/nmat3667>
10. Z. Novotny, G. Argentero, Z. Wang, M. Schmid, U. Diebold, G.S. Parkinson.  
“Ordered Array of Single Adatoms with Remarkable Thermal Stability: Au/Fe<sub>3</sub>O<sub>4</sub>(001)”  
**Phys. Rev. Lett.**, 108, 216103 (2012) - <http://dx.doi.org/10.1103/PhysRevLett.108.216103>