Jutta Toscano

jutta.toscano@unibas.ch

ORCID: 0000-0003-3594-9462

Education

DPhil in Physical and Theoretical Chemistry — *University of Oxford (UK)*
Thesis title: Cold state-selected radicals for the study of low temperature chemistry — 2014 – 2018

MSci Chemistry (Integrated BSc and MSci degree) — *University College London (UK)*
First Class Honours — 2010 – 2014

Research experience

Ambizione Fellowship – Junior principal investigator — *University of Basel (Switzerland)*
Topic: Controlled laboratory astrochemistry, cold and controlled carbon chemistry, rotational-state-selected ion–molecule reactions — 2023 – present

Postdoctoral research associate — *University of Basel (Switzerland)*
Topic: Conformer-selected sympathetic cooling, ion trapping, laser cooling, conformer-selected ion–molecule reactions — 2021 – 2023
Advisor: Prof. Stefan Willitsch

Lindemann Fellowship – Postdoctoral fellow — *JILA, University of Colorado Boulder (USA)*
Topic: Spectroscopy and dynamics of carbon-60, buffer-gas cooling, cavity-enhanced direct frequency comb spectroscopy — 2019 – 2021
Advisor: Prof. Jun Ye

EPSRC Doctoral Prize Fellowship – Postdoctoral fellow — *University of Oxford (UK)*
Topic: Radical beams purification — 2018 – 2019
Advisor: Dr Brianna Heazlewood

DPhil research – PhD student — *University of Oxford (UK)*
Topic: Zeeman deceleration and magnetic guiding — 2014 – 2018
Supervisors: Prof. Timothy Softley and Dr Brianna Heazlewood

Summer internship — *ESRF–ILL, Grenoble (France)*
Topic: Surfactants – Supervisor: Prof. Richard Campbell — 2014

Masters research — *University College London (UK)*
Topic: Surface astrochemistry – Supervisor: Prof. Stephen Price — 2013 – 2014

Erasmus research placement — *Uppsala University (Sweden)*
Topic: Photovoltaics – Supervisor: Prof. Leif Hammarström — 2013

Nuffield research placement — *University College London (UK)*
Topic: Atmospheric chemistry – Supervisor: Dr David Rowley — 2012

Supervision and mentoring

PhD students: 4 (1 as main supervisor, 3 as postdoctoral supervisor) — 2019 – present

Masters' students: 4 (1 as main supervisor, 3 as doctoral and postdoctoral supervisor) — 2017 – present

Undergraduate project students: 9 — 2021 – present

CIMER mentoring training course tailored for STEM research environments — 2020

Graduate mentor for undergraduate chemistry students at Merton College, Oxford — 2016 – 2018

Teaching and lecturing

Lecturer for a Masters' course on Molecular and Chemical Physics 2023 – 2024
Evaluation panel member for SmallTalk 2023, SNI nanoscience students' symposium 2023
Examination assistant for a Masters' course on Chemical Reaction Dynamics 2022
Tutor in 1st year *Physics for Chemists* at Merton, Christ Church, Jesus and Trinity College 2016 – 2018
Tutor in 3rd year *Physical Chemistry* at Merton College 2016 – 2017
Demonstrator in undergraduate physical chemistry laboratories 2015 – 2016

Scholarships and fellowships

- Lindemann Postdoctoral Research Fellowship 2019 – 2020
- EPSRC Doctoral Prize Fellowship 2018 – 2019
- Prize Scholarship from Merton College, Oxford 2016 – 2017
- EPSRC Studentship at the University of Oxford 2014 – 2017
- UCL Graduate School Research Scholarship (declined) 2014 – 2017
- Jackson Lewis Scholarship 2013
- Nuffield Undergraduate Research Scholarship 2012
- UCL Undergraduate Scholarship for Excellence 2011
- UCL Chemistry Entrance Scholarship 2010

Grants and bursaries

- Germaine de Staël French-Swiss Collaboration Grant 2024 – 2026
- Swiss National Science Foundation Ambizione Grant 2023 – 2027
- American Physical Society Young Investigator Travel Award 2020
- Royal Society of Chemistry Travel Grant 2017, 2018
- Simms Bursary from Merton College, Oxford 2018
- BBSRC Innovation Travel Grant 2017
- Merton College Graduate Research Grant 2015, 2016, 2017
- Chemistry Departmental Travel Grant 2016
- Erasmus Exchange Bursary 2013
- Kathleen Lonsdale Bursary 2010 – 2014

Awards and honours

- Award for runner-up best talk presented at the SCS conference (Zurich, Switzerland) 2022
- Forbes' 30 Under 30 list for Science and Healthcare in Europe 2019
- Award for best talk presented at the SDG meeting (University of Durham, UK) 2018
- Award for best talk presented at the SUSDG meeting (University of Nottingham, UK) 2016
- Award for best poster presented at the CPLT conference (Biarritz, France) 2016
- Award for best presentation at the 1st year Oxford Chemistry DPhil symposium 2015
- UCL Dean's List commendation for excellence in undergraduate studies 2014
- Harry Poole Prize for the most distinguished work in Physical Chemistry 2014
- Christopher Ingold Prize for academic excellence 2011, 2012, 2013

Professional affiliations

Member of the Swiss Chemical Society 2022 – present
Early Career Member of the American Physical Society 2019 – 2022
Member of the Royal Society of Chemistry (MRSC) 2019 – present
Associate Member of the Royal Society of Chemistry (AMRSC) 2014 – 2019
Member of Merton College, Oxford 2014 – present

Academic service

Chair of the Faculty Appointment Didactic Skills Evaluation Committee 2022
Graduate representative for the Graduate Studies Committee (GSC) 2017 – 2018
Member of the Graduate Chemists Joint Consultative Committee (GCJCC) 2017 – 2018
Graduate representative for the Chemists Joint Consultative Committee (CJCC) 2016 – 2018

Public engagement

Scientific host of an interactive Departmental visit by a local primary school class 2022
Featured interview for the 'Physics World' science magazine (Institute of Physics, IOP) 2021
Featured interview for the 'Light & Matter' research magazine (JILA and NIST) 2021
Featured interview for the 'Periodic' research magazine (University of Oxford) 2020
Featured researcher profile highlighting diversity on the Oxford Chemistry website 2019
Selected exhibitor at the 'STEM for Britain' poster competition at the Houses of Parliament 2018
Outreach seminar given at the Merton College MCR Colloquium series 2016
Student volunteer at the Oxford Chemistry Annual Alumni Reception 2015
Student representative at the Merton College 750$^{\text{th}}$ Anniversary Conversation 2014

Invited seminars

- Department of Molecular Physics seminar Mar 2024
  Fritz Haber Institute Berlin (Germany)
- Atomic Molecular Optical and Positron Physics Group seminar Jan 2024
  University College London (UK)
- Quantum Light and Matter Section seminar Nov 2023
  University of Durham (UK)
- Center for Complex Quantum Systems seminar (recording) Jan 2023
  University of Aarhus (Denmark)
- Chemical Society research seminar Nov 2022
  University of Basel (Switzerland)
- Department of Chemistry seminar Sept 2021
  University of Basel (Switzerland)
- Chemistry, Light and Dynamics Group seminar Dec 2020
  University College London (UK)
- Cold Atomic and Molecular Ensembles Group seminar Jan 2018
  University of Freiburg (Germany)
- Cold and Controlled Molecules and Ions Group seminar Nov 2017
  University of Basel (Switzerland)
- Cold Molecules Group seminar July 2017
  JILA, University of Colorado Boulder (USA)
- Physical and Theoretical Chemistry Graduates seminar series Apr 2017
  University of Oxford (UK)

Conference contributions

Invited talk – Cold and Controlled Molecules and Ions (CCMI) conference Sept 2024
ISTA, Klosterneuburg (Austria)

Invited talk – Symposium on Controlled Molecular Collisions, DPG spring meeting Mar 2024
University of Freiburg (Germany)

Talk – 24$^{\text{rd}}$ Symposium on Atomic, Cluster and Surface Physics (SASP) Jan 2024
Andalo (Italy)

Talk – Spectroscopy and Dynamics Group (SDG) meeting of the RSC Jan 2024
University of Leicester (UK)

Talk – 7th European Conference on Trapped Ions (ECTI) Sept 2023
Hanover (Germany)

Talk – Swiss Chemical Society (SCS) fall meeting Aug 2023
University of Bern (Switzerland)

Poster – 28th Dynamics of Molecular Collisions (DMC) conference July 2023
Salt Lake City, Utah (USA)

Poster – Winter school on Laboratory Astrophysics Feb 2023
Les Houches (France)

Talk – Swiss Chemical Society (SCS) fall meeting Sept 2022
University of Zurich (Switzerland)

Talk – 23rd European Conference on the Dynamics of Molecular Systems (MOLEC) Aug 2022
Hamburg (Germany)

Poster – 23rd Symposium on Atomic, Cluster and Surface Physics (SASP) Feb 2022
Obergurgl (Austria)

Talk – Optics in the Medical World symposium June 2021
Online conference

Poster – Division of Atomic, Molecular and Optical Physics (DAMOP) meeting May 2021
Online conference

Talk – American Physical Society (APS) virtual March meeting Mar 2020
Denver, Colorado (USA)

Talk and session chair – Spectroscopy and Dynamics Group (SDG) meeting of the RSC Jan 2020
University of Warwick (UK)

Local organiser – New Horizons in Chemical Physics (NHCP) conference Apr 2019
University of Oxford (UK)

Poster – Spectroscopy and Dynamics Group (SDG) meeting of the RSC Jan 2019
University of Nottingham (UK)

Invited talk – 22nd European Conference on the Dynamics of Molecular Systems (MOLEC) Aug 2018
Dinard (France)

Talk – Cold and Controlled Molecules and Ions (CCMI) conference Mar 2018
University of Georgia, Athens (USA)

Talk – Spectroscopy and Dynamics Group (SDG) meeting of the RSC Jan 2018
University of Durham (UK)

Poster – Gas Kinetics symposium Nov 2017
University of Leeds (UK)

Talk – Southern Universities Spectroscopy and Dynamics Group (SUSDG) meeting of the RSC Sept 2017
University of Bristol (UK)

Poster – 26th Dynamics of Molecular Collisions (DMC) conference July 2017
Tahoe City, California (USA)

Poster – 1st Faraday Joint Interest Group conference of the RSC Apr 2017
University of Warwick (UK)

Talk – Southern Universities Spectroscopy and Dynamics Group (SUSDG) meeting of the RSC Sept 2016
University of Nottingham (UK)

Poster – Chemistry and Physics at Low Temperatures (CPLT) conference July 2016
Biarritz (France)

Poster – Cold and Controlled Molecules and Ions (CCMI) conference Mar 2016
Weizmann Institute (Israel)

Poster – Solvay Atomic and Molecular Collision Mechanisms (AMCM) conference Apr 2015
Brussels (Belgium)

Publications

14. J. Toscano
Rotational-state-selected carbon astrochemistry
Chimia *78*, 40 **(2024)**

13. L. Xu, J. Toscano and S. Willitsch
Trapping and sympathetic cooling of conformationally selected molecular ions
Phys. Rev. Lett. *132*, 083001 **(2024)**

12. Q. Liang, Y.-C. Chan, J. Toscano, K. K. Bjorkman, L. A. Leinwand, R. Parker, E. S. Nozik, D. J. Nesbitt and J. Ye
Breath analysis by ultra-sensitive broadband laser spectroscopy detects SARS-CoV-2 infection
(**NIST video**; U.S. patent application 63/366,779) **J. Breath Res.** *17*, 036001 **(2023)**

11. L. R. Liu, P. B. Changala, M. L. Weichman, Q. Liang, J. Toscano, J. Kłos, S. Kotochigova, D. J. Nesbitt and J. Ye
Collision-induced C_{60} rovibrational relaxation probed by state-resolved nonlinear spectroscopy
(Featured in Physics) PRX Quantum *3*, 030332 **(2022)**

10. Q. Liang, Y.-C. Chan, P. B. Changala, D. J. Nesbitt, J. Ye and J. Toscano
Ultra-sensitive multi-species spectroscopic breath analysis for real-time health monitoring and diagnostics
(U.S. patent application 63/269,385) **PNAS** *118*, e2105063118 **(2021)**

9. C. Miossec, L. Y. Wu, P. Bertier, M. Hejduk, J. Toscano and B. R. Heazlewood
A stand-alone magnetic guide for producing tuneable radical beams
(2020 JCP best paper) J. Chem. Phys. *153*, 104202 **(2020)**

8. J. Toscano, H. J. Lewandowski and B. R. Heazlewood
Cold and controlled chemical reaction dynamics
(Editor's choice) Phys. Chem. Chem. Phys. *22*, 9180 **(2020)**

7. J. Toscano, L. Y. Wu, M. Hejduk and B. R. Heazlewood
Evolutionary algorithm optimisation of Zeeman deceleration:Is it worthwhile for longer decelerators?
(Cover article) J. Phys. Chem. A *123*, 5388 **(2019)**

6. J. Toscano, M. Hejduk, H. G. McGhee and B. R. Heazlewood
Manipulating hydrogen atoms using permanent magnets: Characterisation of a velocity-filtering guide
Rev. Sci. Instrum. *90*, 033201 **(2019)**

5. J. Toscano, C. J. Rennick, T. P. Softley and B. R. Heazlewood
A magnetic guide to purify radical beams
J. Chem. Phys. *149*, 174201 **(2018)**

4. H. J. Kimber, J. Toscano and S. D. Price
The surface reactivity of acrylonitrile with oxygen atoms on an analogue of interstellar dust grains
MNRAS *476*, 5332 **(2018)**

3. A. Tummino, J. Toscano, F. Sebastiani, B. A. Noskov, I. Varga and R. A. Campbell
Effects of aggregate charge and subphase ionic strength on the properties of spread polyelectrolyte/surfactant films at the air/water interface under static and dynamic conditions
Langmuir *34*, 2312 **(2018)**

2. J. Toscano, A. Tauschinsky, K. Dulitz, C. J. Rennick, B. R. Heazlewood and T. P. Softley
Zeeman deceleration beyond periodic phase space stability
New J. Phys. *19*, 083016 **(2017)**

1. K. Dulitz, J. Toscano, A. Tauschinsky and T. P. Softley
Zeeman deceleration of metastable nitrogen atoms
J. Phys. B: At. Mol. Opt. Phys. *49*, 075203 **(2016)**