

Shantanu Mishra

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Education

2020	PhD in Condensed Matter Physics University of Zurich, Switzerland, and EMPA—Swiss Federal Laboratories for Materials Science and Technology
2015	MSc in Materials Chemistry University of Montpellier, France
2014	MSc in Applied and Engineering Physics Technical University of Munich, Germany
2013	BTech in Engineering Physics National Institute of Technology, Calicut, India

Employment

05/2025– present	Assistant Professor of Physics Chalmers University of Technology, Gothenburg, Sweden
02/2021– 03/2025	Postdoctoral Researcher IBM Research Europe – Zurich, Rüschlikon, Switzerland
07/2020– 01/2021	Postdoctoral Researcher EMPA—Swiss Federal Laboratories for Materials Science and Technology, Dübendorf, Switzerland

Grants and Fellowships

2025	Wallenberg Academy Fellowship SEK 17.1 million (~€1.6 million) five-year individual research grant awarded by the Knut and Alice Wallenberg Foundation, Sweden. Project: Quantum Simulation with Carbon (role: principal investigator).
2013	European Commission Graduate Fellowship €44,000 grant for Master's studies.
2012	Indian Academy of Sciences Summer Research Fellowship in Physics One of the premier competitive undergraduate research fellowships in India in natural sciences and engineering.

Awards

- 2025 Pat Goldberg Memorial Best Paper Award
Competitive annual award of IBM Research that recognizes selected papers spanning the breadth of IBM Research, including computer science and AI, mathematical sciences, physical sciences and quantum computing.
- 2024 Max Auwärter Prize
Awarded by the Max Auwärter Foundation in Liechtenstein and the Austrian Physical Society once every two years for significant scientific work in the fields of surface physics, surface and interfacial chemistry, or organic and inorganic thin films.
- 2024 Gerhard Ertl Young Investigator Award
Annual award of the German Physical Society for outstanding research in surface science by an individual.
- 2023 IBM Outstanding Research Accomplishment Award
Awarded for projects, teams and individuals demonstrating exemplary teamwork, reuse and technical or professional excellence leading to high business and/or scientific impact. Team award for demonstrating advancements in atomic force microscopy for molecular mixture characterization, with implications in petroleum chemistry, combustion, fuel pyrolysis, global carbon cycling and astrochemistry.
- 2020 Swiss Physical Society Award in Condensed Matter Physics
Annual award of the Swiss Physical Society for outstanding contributions to condensed matter physics by an early-career physicist in Switzerland or a Swiss physicist abroad.
- 2020 Doctoral Distinction
Awarded to the top 5% of PhD theses in the Faculty of Mathematics and Natural Sciences of the University of Zurich in an academic year, and the highest award for a PhD thesis at the University of Zurich.
- 2020 Swiss Nanotechnology PhD Award
Annual award of the Swiss Micro- and Nanotechnology Network for excellent lead-author publications in nanoscience or nanotechnology.
- 2019 EMPA Research Award
Awarded by EMPA—Swiss Federal Laboratories for Materials Science and Technology once every two years for an outstanding publication or dissertation by an early-career scientist.

Selected Publications

- 2025 **S. Mishra**, V. Malave, R. Svensson, H. Grönbeck, F. Albrecht, D. Peña, L. Gross. Skeletal editing by tip-induced chemistry. *J. Am. Chem. Soc.* 147, 44055–44059.

- 2025 E. Turco, L. Tejerina, G. Catarina, A. Ortega-Guerrero, N. Krane, L. Gross, M. Juríček, **S. Mishra**. Multiconfigurational ground state of a diradicaloid characterized at the atomic Scale. *J. Am. Chem. Soc.* 147, 39616–39622.
- 2025 S.-H. Phark, B. Weber, Y. Yoshida, P. R. Forrester, R. J. G. Elbertse, J. A. Stroschio, H. Wang, K. Yang, L. Gross, **S. Mishra** et al. Roadmap on atomically-engineered quantum platforms. *Nano Futures* 9, 032001.
- 2024 **S. Mishra**, M. Vilas-Varela, L.-A. Lieske, R. Ortiz, S. Fatayer, I. Rončević, F. Albrecht, T. Frederiksen, D. Peña, L. Gross. Bistability between π -diradical open-shell and closed-shell states in indeno[1,2-*a*]fluorene. *Nat. Chem.* 16, 755–761.
- 2024 F. Albrecht, I. Rončević, Y. Gao, F. Paschke, A. Baiardi, I. Tavernelli, **S. Mishra**, H. L. Anderson, L. Gross. The odd-number cyclo[13]carbon and its dimer cyclo[26]carbon. *Science* 384, 677–682.
- 2023 Y. Gao, F. Albrecht, I. Rončević, I. Ettetdgui, P. Kumar, L. Scriven, K. Christensen, **S. Mishra**, L. Righetti, M. Rossmannek, I. Tavernelli, H. L. Anderson, L. Gross. On-surface synthesis of a doubly anti-aromatic carbon allotrope. *Nature* 623, 977–981.
- 2021 **S. Mishra**, G. Catarina, F. Wu, R. Ortiz, D. Jacob, K. Eimre, J. Ma, C. A. Pignedoli, X. Feng, P. Ruffieux, J. Fernández-Rossier, R. Fasel. Observation of fractional edge excitations in nanographene spin chains. *Nature* 598, 287–292.
- 2021 **S. Mishra**, X. Yao, Q. Chen, K. Eimre, O. Gröning, R. Ortiz, M. Di Giovannantonio, J. C. Sancho-García, J. Fernández-Rossier, C. A. Pignedoli, K. Müllen, P. Ruffieux, A. Narita, R. Fasel. Large magnetic exchange coupling in rhombus-shaped nanographenes with zigzag periphery. *Nat. Chem.* 13, 581–586.
- 2020 **S. Mishra**, D. Beyer, K. Eimre, S. Kezilebieke, R. Berger, O. Gröning, C. A. Pignedoli, K. Müllen, P. Liljeroth, P. Ruffieux, X. Feng, R. Fasel. Topological frustration induces unconventional magnetism in a nanographene. *Nat. Nanotechnol.* 15, 22–28.
- 2019 J. I. Urgel, **S. Mishra**, H. Hayashi, J. Wilhelm, C. A. Pignedoli, M. Di Giovannantonio, R. Widmer, M. Yamashita, N. Hieda, P. Ruffieux, H. Yamada, R. Fasel. On-surface light-induced generation of higher acenes and elucidation of their open-shell character. *Nat. Commun.* 10, 861.

Total publications: 33, of which 18 lead-author and 1 last-author publications.

Citations: 3,269; h-index: 24 (Google Scholar: tinyurl.com/shmishra).

Invited Talks

- 07/2025 Many-body phenomena in molecular nanostructures investigated by scanning probe microscopy – Workshop: It happens at the surface: growth, properties, and function; Chalmers University of Technology, Gothenburg, Sweden.

09/2024	Investigating many-body phenomena through organic molecules and molecular nanostructures on surfaces – 73 rd Annual Meeting of the Austrian Physical Society, Linz, Austria.
08/2024	Many-body phenomena in single molecules and molecular nanostructures on surfaces – Chalmers University of Technology, Gothenburg, Sweden.
04/2024	Carbon magnetism: from single molecules to quantum spin chains – Institute of Condensed Matter Physics, TU Braunschweig, Germany.
03/2024	Investigating many-body phenomena through molecular nanostructures – German Physical Society Spring Meeting, Berlin, Germany.
01/2024	Carbon magnetism: from single molecules to quantum spin chains – Grenoble Nanoelectronics Seminar, Institut Néel – CNRS, Grenoble, France.
08/2022	Fractionalization in carbon-based quantum spin chains – 35 th European Conference on Surface Science, Esch-sur-Alzette, Luxembourg.
06/2021	Probing emergent magnetism in graphene nanostructures using scanning tunneling spectroscopy – 15 th Swiss Molecules at Surfaces Meeting, Bern, Switzerland.
08/2019	Scanning tunneling microscopy and spectroscopy studies of open-shell polyaromatic hydrocarbons – Department of Chemistry, University of Zurich, Switzerland.

Teaching

2025	Guest lecturer in the graduate course Functional Energy Materials at Chalmers University of Technology, Sweden (~20 students).
2019–2024	Training Master's and PhD students in low-temperature scanning tunneling microscopy and atomic force microscopy at IBM Research (2021–2025) and EMPA (2019–2021), Switzerland.
2017–2019	Teaching, grading and supervision of BSc Physics laboratory courses (5 semesters) at the University of Zurich, Switzerland.

Academic Services

- Committee member, Gerhard Ertl Young Investigator Award, German Physical Society (2025 and 2026).
- Committee member, Department of Physics annual prize for the best PhD thesis, Chalmers University of Technology, Gothenburg, Sweden (2025–present).
- Peer review for Nature Chemistry, Nature Communications, Journal of the American Chemical Society, Chemical Science, Nanoscale and Nanoscale Advances.

Last updated: April 1, 2025