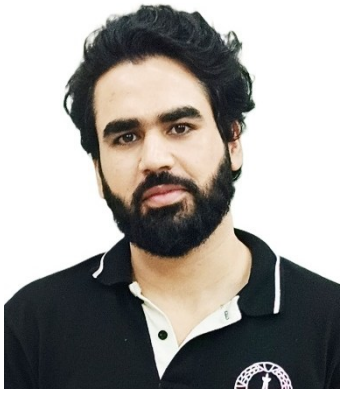
Curriculum vitae



Umar Rashid

Senior research fellow

+91 9018899853

+919880263165

https://arman-rashid.github.io/

https://linktr.ee/armanrashid/

umarrashid@iisc.ac.in

arhan.arman0712@gmail.com

Born

Semthan Bijbehara, Kashmir, India

01-01-1995

Present address:

Senior Research fellow, Single molecular Science labouratory

C/O Dr. Veerabhadrarao Kalignedi

Department of Inorganic and Physical Chemistry

Indian Institute of Science(IISc.)

Bangaluru 560012, Karnataka

Permanent address

75- Lonepora Semthan, Bijbehara-192124, Anantnag Kashmir

Academic details

- **Secondary (2012) :** **87.8 %** Physics, Chemistry, Biology, English, Environmental Science: Jammu and Kashmir State board of school Education
- **Bachelors (2015) : (1st position college level):** B.Sc. In Chemistry, Zoology, Botany, English: University of Kashmir, Srinagar-190008
- **Masters (2018) : (Gold medalist)** M.Sc. Chemistry: Department of Chemistry, University of Kashmir Srinagar-190008
- **Research Training Program:(Best performance award)** **12 credits (4 courses) CGPA 9.3/10.** Indian institute of Science Bangaluru-560012

Awards and Honors

1. **State board scholarship for School toppers**- Jammu and Kashmir state board of School education-2010
2. **B.Sc college topper Science stream**- Govt. degree college Bijbehara- Affiliated with University of Kashmir
3. **Merit Scholarship** for master's Program in Chemistry University of Kashmir. (Rank 1st in University entrance examination for Master's Program in chemistry)-2015
4. **Jammu and Kashmir State level Eligibility test for Assistant Professor** (SLET)-2018
5. **Gold medalist (M.Sc. Chemistry)** University of Kashmir and all its affiliated colleges-2018
6. **General Aptitude Test in Engineering** (GATE)-2018
7. **CSIR-JRF NET** Counsel of Scientific and Industrial Research (Rank 63) -2019
8. **DST Inspire fellowship** for Research Program (Chemistry). Provisional offer -2018,Final offer-2019
9. **Prime minister Research fellowship for Research program in Chemistry.** -Ministry of Education, Govt. of India, Aug 2020
10. **Vasudevamurthy-Soundararajan Award** for best performance in coursework during the academic year 2019-20-Department of Inorganic and physical chemistry Indian Institute of Science, Bangalore
11. **Best Poster Presentation Award** for best Poster Presentation at International Conference in Spin in Molecular Systems- held in Indian Institute of Science, Bangalore from 2nd Dec to 4th Dec 2022
12. **Vasudevamurthy-Soundararajan Award** for best Student seminar(2021-2022)-Department of Inorganic and physical chemistry Indian Institute of Science, Bangalore
13. **Best Presentation Award** best Oral presentation on IPC-Day symposium 2023-Department of Inorganic and physical chemistry Indian Institute of Science, Bangalore
14. **Best Presentation Award-** for best Poster presentation on International Conference on Recent Advances in materials (RAM-90) IPC-Day symposium- Held in Jawaharlal Nehru Centre For_Advanced Scientific Research, Bangalore-India from 7th to 9th Dec-2023

Languages

English	Urdu	Kashmiri
●●●●●	●●●●●	●●●●●

Skill Highlights

- **Microsoft office**
- **Adobe Illustrator, Animate, Inkscape**
- **3D designing; Autodesk 3D, Inventor, Solidworks**
- **Theoretical calculations-Gaussian, Quantum Espresso**
- **Origin,**
- **AFM/STM**
- **Programing: Labview(pro), Python(noob), MATLAB**
- **UV-visible, ATR- FTIR Spectroscopy**
- **Spectroflourimetry**
- **Electrochemical methods: Potentiometry, Voltametry, conductometry**
- **X-ray Diffraction**
- **Instrumentation development-STM-BJ, MCBJ, Ensemble based molecular junction setup**
- **XPS, UPS**

Research Area:

Instrumentation and methodology development for molecular electronics: Designing novel methods to explore the charge transport across metal(carbon) | molecule (or SAM) | metal(carbon) junctions in presence of external bias or temperature gradient. Evaluating how the charge transport through single molecules and hybrid assemblies is modulated by external stimuli like light, magnetic field, chemical gating etc.,

Technical Expertise & Research Skills:

During my PhD, I independently built specialized lab equipment, including setups for studying molecular junctions (EGaIn-based system) and tools for measuring electrical properties at the nanoscale (STM and MCBJ break junctions), using AutoCAD Inventor for design. I developed multiple prototypes for testing for these setups and adapted to the most stable ones. I am good with 3D printing and I used it extensively during the prototype testing. I also wrote custom software (mainly in LabVIEW) to control these instruments and analyze data automatically. To better understand of the results from my experiments, I created algorithms that identify meaning full correlations in noisy data, identify patterns, and calculate key metrics—work that has been published in research papers. While I used LabVIEW extensively, I'm comfortable switching to Python for future projects. I believe I am fairly familiar with the quantum mechanical calculations as well as I used them during my masters program. I mainly used Gaussian and did some primarily calculation in Siesta. Although haven't done any transport calculations during my Ph.D. I mainly focused on the experimental part. My background in chemistry includes probing chemical reactions using techniques like UV-Vis and fluorescence spectroscopy during my master's, as well as working with tools like atomic force microscopy (AFM) and various electrochemical methods. I have done some primary synthesis as well. My undergraduate courses include biology that also give me a solid foundation in biochemistry and lab techniques for biological research. I am ready to adapt to any of the bio related projects. Overall, I combine hands-on engineering skills (building instruments, coding) with deep knowledge of chemistry and biology, allowing me to solve problems across disciplines, from materials science to life sciences.

Publications

10. Differential Metal-Molecule Overlap as the Origin of Multiple Single Molecular Conductance Features in Aliphatic Systems.

Umar Rashid, Abdalghani, A. Hatef Sadeghi, Veerabhadrarao Kaliginedi, To be submitted.

9. Evaluating the Stability of Metal Complexes in Molecular Junctions: Metal Cages as a Source of Metal Ions for in-Situ Formation of Metal-Filaments in Break Junction Experiments.

Umar Rashid, Shamshad Ali, P. S Mukherjee, Veerabhadrarao Kaliginedi, *To be submitted.*

8. Mapping the extended ground state reactivity landscape of a photo switchable molecule at a single molecular level

Umar Rashid, Leonardo Medrano Sandonas, Elarbi Chatir, Zakaria Ziani, PA Sreelakshmi,1 Saioa Cobo, Rafael Gutierrez, Gianaurelio Cuniberti, Veerabhadrarao Kaliginedi1

J. Am. Chem. Soc. 2025, 147, 1, 830–840

7. Electric Field-Induced Sequential Prototropic Tautomerism in Enzyme-like Nanopocket Created by Single Molecular Break Junction

PA Sreelakshmi, Rahul Mahashaya, Susanne Leitherer, **Umar Rashid**, Joseph M. Hamill, Manivarna Nair, Pachaiyappan Rajamalli and Veerabhadrarao Kaliginedi

J. Am. Chem. Soc. 2024, 146, 51, 35242–35251

Featured on JACS Volume 146, Issue 51 **Cover page**

6. Chemistry of the Au–Thiol Interface through the Lens of Single-Molecule Flicker Noise Measurements **Umar Rashid**, William Bro-Jørgensen, KB Harilal, PA Sreelakshmi, Reetu Rani Mondal, Varun Chittari Pisharam, Keshaba N. Parida*, K. Geetharani*, Joseph M. Hamill*, and Veerabhadrarao Kaliginedi*

J. Am. Chem. Soc. 2024, 146, 13, 9063–9073

Featured on JACS Volume 146, Issue 13 **Cover page**

5. Dithienylethene-Based Single Molecular Photothermal Linear Actuator

Umar Rashid, Elarbi Chatir, Leonardo Medrano Sandonas, PA Sreelakshmi, Arezoo Dianat, Rafael Gutierrez*, Gianaurelio Cuniberti, Saioa Cobo*, Veerabhadrarao Kaliginedi*

Angew. Chem. Int. Ed. 2023, 62, e202218767

Featured in **Hot Topic:Robotics**

4. Extraordinary Electrical Conductance of Non-conducting Polymers Under Vibrational Strong Coupling Sunil Kumar, Subha Biswas, **Umar Rashid,** Kavya S. Mony, Robrecht M. A. Vergauwe, Veerabhadrarao Kaliginedi*, Anoop Thomas*

J. Am. Chem. Soc. 2024, 146, 28, 18999–19008

# Equal contribution

Featured on JACS Volume 146, Issue 28 **Cover page**

3.. Modulating the charge transport in metal | molecule | metal junctions via electrochemical gating Anas Akhtar#, **Umar Rashid#**, Charu Seth, Sunil Kumar, Peter Broekmann, Veerabhadrarao Kaliginedi,# Equal contribution with first author

Electrochimica Acta, Volume 388, 2021,138540

2. Making the Most of Nothing: One-class Classification forSingle-molecule Transport Studies William Bro-Jørgensen, Joseph M. Hamill, Gréta Mezei, Brent Lawson, **Umar Rashid,** András Halbritter, Maria Kamenetska,Veerabhadrarao Kaliginedi,and Gemma C. Solomon

ACS Nanosci. Au 2024, 4, 4, 250–262

1. Imidazolium Based Surface Active Ionic Liquids: Promising Boosters to Enhance the Radical Scavenging and Antioxidant Activity of Conventional Surfactant Solubilised Quercetin.

Fayaz Ahmad Butt, Murtaza Manzoor Bhat, **Umar Rashid**, Imtiyaz Ahmad Lone, Parvaiz Ahmad Bhat, Sajad Ahmad Bhat, Mudasir Ahmad Rather, Ghulam Mohammad Rather & Mohsin Ahmad Bhat

Catal Lett 2022, *152* (5), 1276–1285.