

Dr. Sumati N. Patil

ICTP TRIL Postdoctoral fellow at CNR-IOM - Istituto Officina dei Materiali,
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Personal Particulars:

Date of birth - 19th July 1986
Nationality - Indian
Languages known - English, Hindi, Marathi

Educational Details:

Name of Examination	Name of The Board/University	Percentage Of Marks	Div/Class
Ph.D. (Physics) (Aug 2008- Sep 2014)	Department of Physics, SP Pune University, Pune, India.	Received	--
M.Sc. in Physics [Specialization- Material Science] (2006-2008)	Department of Physics, SP Pune University, Pune, India.	G.P.A* [Grade Point Average] = 3.8/6	1st class
B.Sc. (Honors in Physics) (2003-2006)	SP Pune University, Pune, India.	93 % (Subject Topper of Pune University)	1st class with distinction

Details of M.Sc. and Ph.D. projects:

Supervisor	Prof. Dr. C.V. Dharmadhikari
Title of M.Sc. project	“Study of Imaging Parameters and Noise in Scanning Tunneling Microscope (STM) of Nanoparticles”.
Title of Ph.D. project	“Development of Scanning Tunneling Microscopic Techniques for the investigation of nanostructures: Imaging, electron transport, tunneling spectroscopy”.

Research Experience:

Duration	Position served
Since 16/01/2020	TRIL Fellow, International Centre for Theoretical Physics (ICTP), Trieste 34151, Italy. In collaboration with CNR-IOM, Trieste, Italy. with Dr. Cristina Africh.
01/04/2019 to 01/08/2019	Postdoctoral researcher at Department of Physics, Indian Institute of Science (IISc), Bengaluru, India. with Prof. Arindam Ghosh.
01/12/2016 to 01/04/2019	UGC's Dr. D. S. Kothari postdoctoral fellow at Solid State and Structural Chemistry Unit, Indian Institute of Science (IISc), Bengaluru, India. with Prof. D. D. Sarma.
10/07/2015 to 01/12/2016	UGC's Dr. D. S. Kothari postdoctoral fellow at Indian Institute of Science Education and Research (IISER), Pune, India. with Dr. Aparna Deshpande.
2008 to 2014	BARC- Uni Pune collaborative doctoral research fellow, SP Pune University, Pune, India. with Prof. C. V. Dharmadhikari.

Research Interests:

1. Scanning Probe Microscopy/ Spectroscopy (SPM/S) includes Scanning Tunneling Microscopy and Spectroscopy (STM/S) and Atomic Force Microscopy/Spectroscopy (AFM/S).
2. Design and development of probe microscopy techniques like AFM/S, STM/S.
3. Designing of control electronics for probe microscopy.

List of Publication:

1. "Phenazine-containing poly (phenylenevinylene): a new polymer with impressive field emission properties", S. Chhatre, A. Ichake, K. Harpale, **S. Patil**, A. Deshpande, M. More, P. Wadgaonkar, **J. Polym. Res.** 25(3), 61, 2018.
2. "Investigations of disordered graphene using field emission and scanning tunneling microscopy/spectroscopy: probing defect sites", **S. Patil**, S. Kolekar, A. Kumar, P. Alegaonkar, S. Datar and C. V. Dharmadhikari. **J. Nanosci. Nanotechnol.** 18(4), 2504-2512, 2018.
3. "Temperature dependent electron transport properties of goldnanoparticles and composites: scanning tunneling spectroscopy investigations", **S. Patil**, S. Datar and C. V. Dharmadhikari. **J. Nanosci. Nanotechnol.** 18(3), 1626-1635, 2018.
4. "Study of Thermal-Field Emission properties and investigation of temperature dependent noise in the emission current form vertical Carbon nanotube emitters", S. Kolekar, S. P. Patole, **S. Patil**, J. B. Yoo, C. V. Dharmadhikari, **Surf. Sci.** 664, 76-81, 2017.
5. "Revisiting HOPG superlattices: structure and conductance properties" **S. Patil**, S. Kolekar, A. Deshpande. **Surf. Sci.** 658, 55-60, 2017. (Also included as "**Highlighted Article**" in the same journal).
6. "Electronic and optical properties of agglomerated hydrogen terminated silicon nanoparticles", P. Francis, **S. Patil**, Ch. Rajesh, S. Chakraborty, S. Mahamuni, C. V. Dharmadhikari and S. V. Ghaisas, **European physical journal D.** 67(7), 1, 2013.
7. "Charge storage and electron transport properties of gold nanoparticles decorating urethane - methacrylate comb polymer network", **S. Patil**, S. Datar, R. Narayan, Asha SK and C. V Dharmadhikari, **Nanoscale**, 5, 4404, 2013.
8. "Passivation of n-type emitter and p-type base in solar cells via oxygen terminated silicon nanoparticles", **S. Patil**, Ch. Rajesh, M. R. Pramod, S. More, S. Mahamuni, S. R. Jadhkar, R. O. Dusane, C. V. Dharmadhikari and S. V. Ghaisas, **Prog. Photovolt: Res. Appl.** 21(5), 1146, 2013.
9. "Mixed phase, sp^2 - sp^3 bonded, and disordered few layer graphene-like nanocarbon: Synthesis and characterizations", A. Kumar, **S. Patil**, A. Joshi, V. Bhoraskar, S. Datar, P. Alegaonkar, **Appl. Surf. Sci.** 271, 86, 2013.
10. "Reduction in surface recombination through hydrogen and 1-heptene passivated silicon nanocrystals film on silicon solar cells", Ch. Rajesh, M.R. Pramod, **S. Patil**, S. Mahamuni, S. More, R. O. Dusane, S.V. Ghaisas, **Solar Energy**, 86, 489, 2012. (Also included as "**Key Scientific Article**" in Renewable Energy Global Innovations).
11. "Water adsorption on oxygen passivated silicon nanoparticles", Ch. Rajesh, **S. Patil**, S. Datar, D. Bhattacharyya, A. K. Tripathi, S. Mahamuni, C. V. Dharmadhikari, and S. V. Ghaisas, **Nanosci. Nanotechnol. Lett.** 3, 622, 2011.

Workshops and Conferences:

1. Invited talk on "Scanning Tunneling Microscopic Techniques for investigation of Nanostructures: Imaging, Electron transport, Tunneling spectroscopy." on 22nd July 2014, Paul Scherrer Institute, **Switzerland**.

2. Poster presented at “XXI International Summer School “Nicolás Cabrera”: New Frontiers in Scanning Force Microscopy: From Ultrahigh-Vacuum to Biological Material”, July 14th - 18th, 2014, **Madrid, Spain**.
3. Poster presented at “International conference on Nanoscience + Technology (ICN+T 2012)”, July 23-27, 2012, **Paris, France**.
4. Poster presented at “International Conference on Nano Science and Technology (ICONSAT 2012)”, January 20-23, 2012, **Hyderabad, India**.
5. Attended workshop on ‘Scanning probe techniques’ March 11-12, 2011, Department of Physics, SP Pune University, **Pune, India**.
6. Attended workshop on “Sensing Forces on Biological Materials at Nanoscales using AFM and Optical Tweezers”, 2010, National Center for Nanomaterials and Nanotechnology, University of Mumbai, **Mumbai, India**.
7. Poster presented at “NTAFM -09” July 9-11, 2009, National Chemical Laboratory (NCL), **Pune, India**.
8. Poster presented at “Raman Memorial Conference 2009”, SP Pune University, **Pune, India**.
9. Participated in International Conference on “Biology Beyond Borders”, 2009, SP Pune University, **Pune, India**.
10. Participated in “2nd International Symposium on Advanced Materials and Polymers for Aerospace and Defence Applications”, (SAMPADA), 2008, **Pune, India**.

Teaching experience:

Worked as Laboratory instructor of Material Science Lab, conducted for M. Sc. II year students, at the Department of Physics, SP Pune University, Pune, India. (Jan 2009- Nov 2009) and (Jan 2010- Nov 2010).

Achievements:

1. Secured TRIL postdoctoral fellowship from International Centre for Theoretical Physics (ICTP), Trieste, Italy.
2. Secured Dr. D. S. Kothari Post-Doctoral fellowship from University Grants Commission, Delhi, India.
3. Secured Doctoral fellowship from Bhaba Atomic Research Center (BARC), Mumbai, India.
4. Stood as University subject topper (for Physics) in B.Sc for year 2006 at SP Pune University, Pune, India.
5. Received several awards for highest marks secured in B. Sc. Physics, SP Pune University, Pune, India.
6. One of the articles named “Reduction in surface recombination through hydrogen and 1-heptene passivated silicon nanocrystals film on silicon solar cells”, was selected under the category of “Key Scientific Articles” in Renewable Energy Global Innovations.

7. One of the articles named “Revisiting HOPG superlattices: structure and conductance properties”, was selected under the category of “Highlighted Scientific Articles” in the journal named “Surface Science”.
8. “Revisiting HOPG superlattices: structure and conductance properties”, was also highlighted as a news story under the title “Graphite: much more than pencil lead”.
9. Got selected under “Young Researcher” category to attend International Conference on Nano Science and Technology (ICONSAT 2012) January 20-23, 2012, Hyderabad, India.
10. Got selected for International travel support/ Foreign Travel Grant for Young Scientist by Department of Science and Technology (DST), New Delhi as well as Council of Scientific and Industrial Research (CSIR), Human Resource Development Group, New Delhi to attend and present work in International conference on Nanoscience + Technology (ICN+T 2012) July 23-27, 2012, Paris, France.
11. Received “Dr. R. K. Bhalla prize” as a “Best research student” for the year 2013 at the Department of Physics, SP Pune University, India.
12. Got selected for International travel support/ Foreign Travel Grant for Young Scientist by University of Pune, Pune to attend and present work in International summer school “Nicolás Cabrera”: New Frontiers in Scanning Force Microscopy: From Ultrahigh-Vacuum to Biological Material”, July 14th - 18th, 2014, Madrid, Spain.
13. Secured scholarship from summer school organizers to attend International summer school “Nicolás Cabrera”: New Frontiers in Scanning Force Microscopy: From Ultrahigh-Vacuum to Biological Material”, July 14th - 18th, 2014, Madrid, Spain.