SAI VIJAY BHASKAR MOCHERLA

M.S. in Chemistry,
University of Rochester.

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EDUCATION

M.S. in Chemistry **August 2020**
University of Rochester, USA
CGPA: 3.72/4.00 (Theoretical Chemistry)

M.Sc. in Chemistry **April 2019**
Sri Sathya Sai Institute of Higher Learning (SSSIHL), Prasanthi Nilayam, India
CGPA: 8.2/10.00 Thesis: Effect of Torsional Disorder on Exciton Migration in Conjugated Polymers

B.Sc. (Hons.) in Chemistry **April 2016**
Sri Sathya Sai Institute of Higher Learning (SSSIHL), Bangalore, India
CGPA: 7.3/10.0 (Major's CGPA: 7.65/10.0)

RESEARCH EXPERIENCE

Summer Research Project, University of Rochester **05/2020 - 08/2020**
Advisor: Prof. Andrew Jordan, Department of Physics and Astronomy
- Studied time-dependent Ginzburg-Landau models to understand vortex transport and low-temperature physics of Vortex-matter phases in Type-II Superconductors for quantum refrigeration applications.

Research Intern, Indian Institute of Science, Bangalore **05/2019 - 07/2019**
Advisor: Prof. Upendra Harbola, Department of Inorganic and Physical Chemistry(IPC)
- Modeled transport of quasiparticles in nano materials using different Random-walk mechanisms

M.Sc. Research Project, Sri Sathya Sai Institute of Higher Learning, India **08/2018 - 02/2019**
- Developed a theoretical model of an exciton coupled to torsional modes of a polymer subunit to study the effects of torsional disorder on exciton transport in conjugated polymers.
- Numerically evaluated disorder-averaged intramolecular exciton migration rates were found to scale inversely with the increasing length of the polymer chain.
- Built numerical routines to simulate the quantum dynamics and explored the implementation of Tensor Network methods (based on DMRG) to handle quantum entanglement with increasing systems size.

Summer Research Fellow, Tata Institute of Fundamental Research, Mumbai **04/2018 - 06/2018**
Advisor: Prof. Venu Gopal Achanta, Department of Condensed Matter Physics and Material Science
- Worked on design of optical nanostructures with dispersion-less plasmon modes, and their fabrication on gold thin films using e-beam lithography and other cleanroom techniques.
- Studied the emergence of broadband optical transmission in these 'plasmonic quasi-crystals' using angle-resolved optical transmission measurements.
- Assisted in setting up the multi-color pump-probe spectroscopy apparatus to further measure the lifetimes of charge carriers(hot electrons) in fabricated optical nanostructures.

Research Intern, Sri Sathya Sai Institute of Higher Learning, India **11/2017 - 02/2018**
Advisor: Prof. Sai Sathish Ramamurthy, Department of Chemistry
- Worked on fabrication of nano-gratings made up polymer thin films by using Fracture induced-structuring(FIS) for surface-plasmon enhanced fluorescence sensing applications.

SKILLS

Programming and Software: Python and Mathematica.

- Packages in Python: Numpy, SciPy, Pandas, Scikit-learn, Matplotlib, SymPy.
- Illustration and Graphics: Blender and Adobe Creative Cloud.

Nano Fab:

- Trained in design and fabrication of optical nanostructures using e-beam lithography.
- Skilled in wet chemistry and clean room techniques, including thin-film deposition, sputtering, etching.

Computational:

- Working proficiency with Ab initio packages such as Gaussian, GAMESS and Quantum Espresso.

TEACHING EXPERIENCE

Teaching Assistant, Department of Chemistry, University of Rochester **08/2019 - 04/2020**

- Organised and supervised lab sessions for freshman General Chemistry(CHEM-131L) in fall '19
- Led problem solving and workshop for undergraduate and graduate students taking the course : Physical Chemistry-II : Thermodynamics and Statistical Mechanics (CHEM-252).

ACADEMIC ACHIEVEMENTS

- Qualified the 'IIT JEE Mains' in 2013 within the top 90 percentile (a National-level entrance test for undergraduate admissions in Science and Engineering).
- Qualified the IIT JAM, Chemistry in 2017 and GATE Chemistry in 2019 within 95 percentile. (National-level entrance tests for masters and Ph.D. admissions).

LEADERSHIP AND COMMUNITY SERVICE

- Served, organised and led various initiatives as a part of the Sri Sathya Sai Grama Seva, a village service project with a sustainable impact on ~150 villages in the state of Andhra Pradesh, India.
- Managed the operations of co-operative society stores on the University campus that on an average served the needs of ~350 students and the local community.
- Undergraduate Student coordinator for cultural events at Sri Sathya Sai Institute of Higher Learning.
- Volunteered to teach at local schools after my Bachelors through the Sri Sathya Sai Vidya Vahini Program.
- Handled video editing, photography and graphic design in the University multimedia team.

SOME RELEVANT COURSEWORK

- **MATHEMATICS:** Multivariable Calculus, Vector Analysis, Theory of Probability, Theory of Ordinary and Partial Differential Equations, Linear Algebra and Boundary Value Problem
- **PHYSICS:**

  Graduate Level Courses: (at University of Rochester) Quantum Mechanics, Mathematical Methods for Physics and Optics, Quantum Optics, Quantum Dynamics, Statistical Mechanics, Modern Statistics and Data Exploration in Physics.

  Undergraduate Courses: Classical Mechanics, Electricity and Magnetism, Electronics, Optics.
- **CHEMISTRY:**

  Masters Courses: Advanced aspects of Physical Chemistry, Quantum Chemistry, Thermodynamics and Statistical Mechanics, Computational Chemistry, Molecular Spectroscopy, Advanced aspects of Group Theory, Polymers Chemistry, Bio-Catalysis, Organic Structure and Stereochemistry

  Undergraduate Courses: Fundamentals of Theoretical chemistry, Physical Chemistry, Inorganic Chemistry, Organic Chemistry and Biochemistry

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