

Ari Pereira

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SUMMARY

I'm broadly interested in quantum chemistry and quantum systems. Specifically, the study of decoherence effects in quantum-classical systems and its applications in quantum computing.

EDUCATION

Birla Institute of Technology and Science, Pilani - Goa Campus 2018 – 2023 (expected)
Dual Degree - M.Sc (Hons.) Chemistry , B.E (Hons.) Electrical and Electronics Engineering Goa, IN
Current CGPA: 7.46

EXPERIENCE

Institut de Chimie Physique, Université Paris-Saclay Orsay, FR
MSc Thesis in Chemistry June 2022 – Present

- Working on coupled trajectory methods based on the exact factorization for non-adiabatic dynamics in the group of Prof. Federica Agostini.

Institut de Chimie Physique, Université Paris-Saclay Orsay, FR (remote)
Summer Internship May 2021 – July 2021

- Worked on ultra-fast non-adiabatic dynamics with Prof. Federica Agostini
- Compared the quantum decoherence effects of Coupled Trajectory Mixed Quantum-Classical algorithm with Surface Hopping and exact calculations for a variety of systems.
- A second line of work was accounting for a classical laser field explicitly in the simulations to simulate both the excitation and the dynamics after scattering.

Süd-Chemie India Pvt. Ltd. Vadodara, IN
Summer Internship May – June 2020

- Explored analytical tools to study catalytic converters.
- Proposed using XANES, EXAFS and XPS to study their oxidation state and structure.
- Worked under Dr Joseph Raj, Chief Manager R&D.

PROJECTS

Molecular Dynamics of model polymers | *Supervisor: Prof R.N Behera* August 2021 – May 2022

- Performed molecular dynamics simulations using the ESPResSo software package.
- Studied aggregation behaviour of a model nano-particle as well as the effect of varying chain length in a model polymer.

Solutions to the Ornstein-Zernike Equation | *Supervisor: Prof R.N Behera* Jan 2020 – June 2020

- The project covered an introduction to statistical mechanics.
- Studied different methods to solving an integral equation for ideal liquids.
- Studied two closure relations: the Percus-Yevick approximation, and the Hypernetted-chain equation.

Field Effect Transistor based Biosensors | *Supervisor: Dr Gautam Bacher* August 2021 – December 2021

- Studied different FET configurations for use in biosensors.
- Compared different gate and bio-receptor materials.

SELECTED COURSEWORK

Chemistry: Introduction to Quantum Chemistry, Quantum Chemistry and Group Theory, Chemical Kinetics and Liquid Theory, Thermodynamics, Instrumental Methods of Analysis, Inorganic Chemistry I, II & III

Mathematics: Probability and Statistics, Ordinary Differential Equations, Linear Algebra and Complex Variables, Vector Calculus, Optimization

Physics: Electromagnetic Theory, Mechanics Oscillations and Waves

Engineering: Computer Programming, Power Electronics, Analog Electronics, Analog and Digital VLSI Design, Communication Systems, Digital Design, Electronic Devices, Microelectronics, Signals & Systems, Control Systems

TECHNICAL SKILLS

Languages: Fortran, Python, C/C++, LaTeX, Bash

Algorithms: CT-MQC, FSSH, Ehrenfast, Exact Dynamics

Instrumentation: FTIR, UV-Vis spectrophotometer, XRD, NMR, Analog Electronics Laboratory

PERSONAL INFORMATION

Indian Citizen

Languages: English(native), Hindi, French(basic), Konkani(basic)