

# Rohit Goswami

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*“An unproblematic state is a state without creative thought. It’s  
other name is Death.”  
– David Deutsch*

## Personal Data

Name Rohit Goswami  
Date Of Birth 10.08.1995  
Birthplace Brookhaven, New York, United States of America

## Work Experience

- 2019–PRESENT **Department of Chemistry, Indian Institute Of Technology, Kanpur**, Senior Project Associate.  
I am affiliated to the Femtolab under the project “Femtosecond Laser Approaches to Quantum Information and Quantum Computation (SPO/MEITY/CHM/2018356)”
- 2018–2019 **Department of Chemical Engineering, Indian Institute Of Technology, Kanpur**, Project Associate.  
I was associated with the Computational Nanoscience group. Over the course of two centrally funded projects, “Nucleation On Nanostructured Surfaces Computer Simulation Studies (SPO/DST/CHE/2017294)” and “Advanced Computation Research and Education (SPO/MHRD/CC/20130176)”:
- I worked on the implementation of an enhanced version of the CHILL (CHILL+) algorithm for tracking ice types.
  - Designed a linear discriminant analysis technique for near-surface ice structure determination which is undergoing rigorous testing
  - Implemented a graph based network connectivity model for ice structures
  - Spearheaded the development of High Performance GPU accelerated molecular dynamics simulation analysis tools
  - Worked on the determination of optimal GPU cluster configurations
  - Designed and administered academic outreach websites

## Education

- 2014–2018 **B.Tech. Chemical Engineering, Harcourt Butler Technical University, Kanpur, India.**  
First Division (PROJECT: Gas Sweetening Plant Design)
- 2011–2013 **Intermediate (AISSCE), Delhi Public School Kalyanpur, Kanpur, India.**  
87.2% Central Board of Secondary Education (CBSE)
- 2009–2011 **High School (AISSE), Delhi Public School Kalyanpur, Kanpur, India.**  
9.8 Cumulative Grade Point Average (CGPA) in Central Board of Secondary Education (CBSE)

## Undergraduate Experience

## Internships

- 2017–2018 **Dr. Debojit Chakrabarty**, *Keva Fragrances Ltd, Mumbai*, R&D Industrial Intern.  
Modeling complex multi-component perfumes in a predictive method via experimental and theoretical considerations. In collaboration with Prof. Rajdip Bandyopadhyaya of the ChemE Dept. at IIT Bombay.
- SUMMER 2017 **Prof. Sibasish Ghosh**, *The Institute of Mathematical Sciences, Chennai*, Visiting Scholar.  
Discussed computational techniques for the simulation and understanding of quantum tomography.
- SUMMER 2017 **Prof. Nisanth Nair**, *Indian Institute Of Technology Kanpur*, SURGE Scholar.  
An exploratory project to understand and deal with bottlenecks in computational chemistry, the major objectives were to investigate hybridization of existing code via OpenMP and MPI.
- POSTER: Development of Computational Tools for Free Energy Calculations of Chemical Reactions
- SUMMER 2016 **Dr. Rajarshi Chakrabarti**, *Indian Institute Of Technology Bombay*, Research Intern.  
Retoold a server with ArchLinux and also simulated patchy colloids (Janus Particles).

PROJECT REPORT: Computational Survey of Coarse Grained Soft Matter Molecular Dynamics Simulations

## Volunteer Work

- 2017–2018 **ChemE Herald**, *Harcourt Butler Technical University, Kanpur*, Editor-in-Chief.  
Inaugurated and managed an interdisciplinary technical newsletter.
- 2017–2018 **HBTU-MUN 2018**, Secretary General.  
Designed a ReactJS based static website, with Trello backed user registration, also performed outreach pre-events to raise awareness and participation, in addition to overseeing the working of the executive board.
- 2016–2017 **HBTU-MUN 2017**, Executive Board Chairperson.  
Designed a Jekyll based static website and ensured adherence to standard MUN rules as Chairperson.
- 2014–2016 **The Curiosity Magazine**, *Harcourt Butler Technical University, Kanpur*, Editor-in-Chief.  
Managed a diverse team of student content writers and also later typeset a spin-off multi-lingual newsletter in X<sub>Y</sub>L<sup>A</sup>T<sub>E</sub>X.

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## Technical Skills

### Programming Languages

EXPERIENCED	CSS, JS, HTML, Sass, C, C++, R, FORTRAN, OpenMP, OpenMPI, Tcl	FAMILIAR	Ruby, Julia, Python, Shell (zsh, bash), Golang, ReactJS, Node, CUDA
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### Projects

EXPERIENCED	Android (Cyanogen, LineageOS, AOSP), Web-Design (static), Arch-Linux	FAMILIAR	Linux Kernel (Android)
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### Simulation Projects

EXPERIENCED	ESPResSo (Extensible Simulation Package for Research on Soft matter), LAMMPS (Large-scale Atomic/Molecular Massively Parallel Simulator)	FAMILIAR	OpenFOAM, GROMACS (GROningen MACHine for Chemical Simulations), VMD (Visual Molecular Dynamics), CPMD (Car-Parrinello Molecular Dynamics)
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## Tools

EXPERIENCED  $\text{\LaTeX}$ , pandoc, Git (version control), tmux, ssh, Vim, Sublime Text Editor 3, gnuplot, gadfly, bspwm (tiling window manager), mosh, babun, MATLAB (matrix laboratory), Continuous Integration Services (Wercker, Travis CI, Semaphore CI), docker

FAMILIAR AWS (Amazon Web Services), moltemplate, jekyll, middleman, grunt, gulp, Frameworks (Bourbon, Skeleton, neat) Markup Languages (Textile, HAML, Jade(pug)), Office-Suites (MS, OpenOffice, LibreOffice)

## Operating Systems

PREFERRED ArchLinux

EXPERIENCED Windows (95, 2000, XP, 7, 8, 10), MacOS (10.7, 10.11, 10.12), Android (1.5, 1.6, 2.2.\*, 2.3.\*, 4.0.\*, 4.4.\*, 5.0.\*, 6.0.\*, 7.\*), Linux Distro (Ubuntu, Sabyon, Puppy, Manjaro, Debian, Red Hat)

## Opensource Contributions

CREATED PixN ROM & Kernel (AOSP based rom for the Xperia Z5)  
HaoZeke's LineageOS

MANTAINED Xperia Z5 LineageOS (14.\*)

## Opensource Projects Created

ZENYODA Pandoc based, tup driven stand-alone multi format (revealJS, beamer etc.) presentation system with static site generation.

DOCUYODA A document generation system based on pandoc and latexmk driven by gulp with yaml configuration and easy templating.

STARDOCK Docker compose based containerized self-updating setup for media hosting, with traefik for reverse proxying. Includes music, ebook and video acquisition and management.

PYQTNUMSIM A Qt interface for verbose numerical methods assignments.

GRIMOIRE Metalsmith and webpack based open source educational experiment with a strong focus on readability, equations and references.

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## Affiliations & Accolades

### Memberships

2014–PRESENT **OSA (Optical Society of America)**, Student Member → Early Career Member (2018).

2015–PRESENT **AIChE (American Institute Of Chemical Engineers)**, Student Member → Young Professional (2018).

2015–PRESENT **APS (American Physical Society)**, Student Undergraduate Member → Early Career Member (2019).

2015–PRESENT **IEEE (Institute of Electrical and Electronics Engineers)**, Student Member → Early Career Member (2018).

2015–PRESENT **IOP (Institute of Physics)**, Student Member (2018) → Member (2019).

2006–PRESENT **World Taekwondo**, Red Belt.

2009–PRESENT **XDA Developers**, Senior Member.

2019–PRESENT **InRaSS (Indian Radio Science Society)**, Student Member.

2019–PRESENT **ICHEM (Institute of Chemical Engineers)**, Associate Member.

2019–PRESENT **URSI (Union Radio-Scientifique Internationale)**, Corresponding Member.

2019–PRESENT **ASAPBio (Accelerating Science and Publication in biology)**, Ambassador.

- 2019–PRESENT **ACM (Association for Computing Machinery)**, Professional Member.
- 2019–PRESENT **SPIE (Society of Photo-Optical Instrumentation Engineers)**, *Early Career Professional*.
- 2019–PRESENT **IEI (The Institution of Engineers [India])**, *Associate Member*.
- 2019–PRESENT **OSI (Open Source Initiative)**, *Individual Member*.

## Awards

- DECEMBER 2016 **Photonics-2016**, *Indian Institute Of Technology Kanpur*, Springer Best Student Paper Award, Nonlinear-Optics Session.
- 2014–2015 **IITG Zephyr Creative Writing**, *Indian Institute Of Technology Guwahati*, First Prize.
- 2014–2015 **Antaragni IITK-MUN GA-DISEC**, *Indian Institute Of Technology Kanpur*, Best Speaker.

## Reviews

- OCTOBER 2018 **Journal Of Open Source Software**, *Reviewer*.
- 2018 I review submissions pertaining to molecular dynamics, virtualization, HPC, web platforms, finite element methods, optimization and computer geometry written primarily in C++, Rust, FORTRAN, Julia, Javascript. I am also listed for Python and R submissions. Specifically:
- DEPP - Differential Evolution Parallel Program
  - RHEOS - A Julia package for Rheology Data Analysis
  - Computing diffusion coefficients in macromolecular simulations: the Diffusion Coefficient Tool for VMD
  - Simple-Web-Server: a fast and flexible HTTP/1.1 C++ client and server library
  - HyperNaut: a navigator for the hyperbolic plane
  - The Biddy BDD package
  - Prest: Open-Source Software for Computational Revealed Preference Analysis

## Publications

### JOURNALS

Prerna, Rohit Goswami, Atanu K. Metya, S. V. Shevkunov, and Jayant K. Singh. “Study of Ice Nucleation on Silver Iodide Surface with Defects.” In: *Molecular Physics* (Aug. 25, 2019), pp. 1–13. ISSN: 0026-8976, 1362-3028. DOI: 10.1080/00268976.2019.1657599.

### CONFERENCE PROCEEDINGS

R. Goswami and D. Goswami. “Quantum Distributed Computing with Shaped Laser Pulses.” In: *13th International Conference on Fiber Optics and Photonics* (2016). DOI: 10.1364/photonics.2016.w4c.3.

R. Goswami, A. Goswami, and D. Goswami. “Space Filling Curves: Heuristics For Semi Classical Lasing Computations.” In: *2019 URSI Asia-Pacific Radio Science Conference (AP-RASC)*. Mar. 2019, pp. 1–4. DOI: 10.23919/URSIAP-RASC.2019.8738612.

### PREPRINTS

Nairhita Samanta, Rohit Goswami, and Rajarshi Chakrabarti. *Diffusion of self-propelled Janus tracer in polymeric environment*. 2017. arXiv: 1704.06207.

## Conference Records

### Posters

- MARCH 2019 **Space Filling Curves: Heuristics For Semi Classical Lasing Computations**, *URSI Asia-Pacific Radio Science Conference (AP-RASC 2019)*, R. Goswami, A. Goswami, and D. Goswami.
- DECEMBER 2018 **FDTD Numerical Computations for Ultrafast Non-linear Optics**, *Photonics-2018*, R. Goswami, A. Goswami, and D. Goswami.

## Oral Presentations

- DECEMBER 2016 **Quantum Distributed Computing with Shaped Laser Pulses**, *13th International Conference on Fiber Optics and Photonics*, R. Goswami and D. Goswami.
- OCTOBER 2019 **Semi-Supervised Approaches to Ultrafast Optimal Control Theory**, *43rd Symposium of the Optical Society of India, International Conference on Optics & Electro-Optics*, R. Goswami, A. Goswami and D. Goswami.

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## Workshops

- MAY-JUNE 2019 **Artificial Intelligence, E & ICT Academy**, IIT Kanpur, A four week course on AI foundations culminating in a time-series prediction project.
- JUNE 2019 **AI Foundations Certificate Course**, *univ.ai*, A summer school taught in-person by faculty from Harvard and UCLA, culminating in a computer vision and neural network based identification project.
- JULY 2019 **Rare Events Summer School**, *Indian Institute of Science, Bangalore*, A short course consisting of lectures and hands-on sessions by experts in the field, organized by Prof. Baron Peters.

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## Certifications

### NPTEL Courses

- JAN-APR 2019 **Graph Theory**, *IISER Pune*, 55%.  
License: NPTEL19MA13S21460067
- AUG-SEP 2018 **Computational Chemistry and Classical Molecular Dynamics**, *IIT Bombay, Elite*, 77%.  
License: NPTEL18CS13S21440127
- AUG-SEP 2018 **Introduction to Parallel Programming in OpenMP**, *IIT Madras*, 40%.  
License: NPTEL18CS55S11440122
- JAN-APR 2018 **Quantum Computing**, *IIT Kanpur, Elite*, 65%.  
License: NPTEL18CY07S4480024