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"

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)

Voluntary Positions

April-March 2020 **CS106A - Code in Place**, *Stanford University*, Section Leader (TA).
As part of the special COVID-19 `code-in-place` initiative, I worked as a section leader (teaching assistant). The course covered the fundamentals of computer programming using Python and was built off the first half of CS106A.

2019–present	**IEEE P1940**, *IEEE Standards Committee*, Working group member.
	Am actively engaged in working with stake holders in industry and academia to create a collection of standard profiles that define integration of authentication services with ISO 8583 used for financial transactions.
2019–present	**R Novice Inflammation**, *The Carpentries*, Maintainer.
	As a maintainer for the Software Carpentries lesson on R, I work with the community to make sure that lessons stay up-to-date, accurate, functional and cohesive.
2019–present	**CarpentryCon 2020**, *The Carpentries*, Program Committee co-chair & Website subcommittee member.
	Working for an international conference with diverse leads from across the world, as part of the program committee I reached out to keynote speakers and managed the overall schedule. Wrote content with the website subcommittee and also contributed due to my web development expertise.
2019–present	**Univ.ai**, *Earth2Orbit Analytix Private Limited*, Teaching Fellow and Developer.
	Tested course-content and developed interactive labs to work with an online cohort of students. Am presently teaching labs and mentoring small batches. I also work with the front and backend teams to facilitate workflows including shopify stores and NodeJS authentication systems.
2018–2019	**Animal Welfare Group**, *Indian Institute of Technology Kanpur*, Member and Web-developer.
	Have worked with student bodies to rescue and care for local animals. Also designed and maintain a site with ReactJS to enhance knowledge dissemination.

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.
	Retooled 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∃L^AT_EX.

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

Projects

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

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) |

Tools

| EXPERIENCED | X$_{\exists}$L^{A}T$_E$X, 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 Distros (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.

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	**AAAI (Association for the Advancement of Artificial Intelligence)**, Professional Member.
2019–present	**ACM (Association for Computing Machinery)**, Professional Member. Also part of the SIGHPC (Special Interest Group for High Performance Computing) & SIGHPC-Education
2019–present	**ASAPBio (Accelerating Science and Publication in biology)**, Ambassador.
2019–present	**IChemE (Institute of Chemical Engineers)**, Associate Member.
2019–present	**IEEE IAS (Industrial Applications Society)**, Member.
2019–present	**IEI (The Institution of Engineers [India])**, Associate Member.
2019–present	**InRaSS (Indian Radio Science Society)**, Student Member.
2019–present	**OSI (Open Source Initiative)**, Individual Member.
2019–present	**OSI (Optical Society of India)**, Life Fellow.
2019–present	**SPIE (Society of Photo-Optical Instrumentation Engineers)**, Early Career Professional.
2019–present	**The Carpentries**, Certified Instructor.
2019–present	**URSI (Union Radio-Scientifique Internationale)**, Corresponding 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

2018–present	**Journal Of Open Source Software**, *Reviewer*.
	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
2019–present	**PeerJ - Life & Environment**, *Reviewer*.
2019–present	**PeerJ - Computer Science**, *Reviewer*.
2019–present	**PeerJ - Organic Chemistry**, *Reviewer*.
2019–present	**PLOS ONE**, *Reviewer*.

Publications

JOURNALS

Rohit Goswami, Amrita Goswami, and Jayant Kumar Singh. "d-SEAMS: Deferred Structural Elucidation Analysis for Molecular Simulations." In: *Journal of Chemical Information and Modeling* (Mar. 2020). ISSN: 1549-9596. DOI: 10.1021/acs.jcim.0c00031. URL: https://doi.org/10.1021/acs.jcim.0c00031.

Rohit Goswami. "Don't Pull Punches in Peer Review." In: *Nature* 574 (Oct. 8, 2019), pp. 176–176. DOI: 10.1038/d41586-019-03024-2. URL: /articles/d41586-019-03024-2 (visited on 10/09/2019).

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.

Rohit Goswami, Amrita Goswami, and Jayant K. Singh. *d-SEAMS: Deferred Structural Elucidation Analysis for Molecular Simulations*. 2019. arXiv: arXiv:1909.09830.

Conference Records

Posters

MARCH 2020	**Ultrafast Insights for Predictive Fragrance Compounding**, *ACS Spring 2020 National Meeting*, R. Goswami, A. K. Rawat, D. Chakrabarty, and D. Goswami, Accepted.
DECEMBER 2019	**Qubit Network Barriers to Deep Learning**, *IEEE WRAP-2019*, R. Goswami, A. Goswami, and D. Goswami.
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 2019	**Process Safety in terms of Latent Dirichlet Allocations**, *72nd Annual Session of of the Indian Institute of Chemical Engineers, CHEMCON-2019*, R. Goswami, Accepted.
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.
DECEMBER 2016	**Quantum Distributed Computing with Shaped Laser Pulses**, *13th International Conference on Fiber Optics and Photonics*, R. Goswami and D. Goswami.

Workshops

OCTOBER 2019	**TriangleSCI 2019**, *Invited to the Triangle Scholarly Communication Institute*, A week long fully-funded incubator to discuss actionable goals towards Bringing Equity and Diversity to Peer Review. This was undertaken as part of the larger discussion on Equity in Scholarly Communications, **declined to attend**.
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.

Short Courses

SEPTEMBER 23rd 2019 **Surface Area and Porous Material Characterization**, *Dept. of ChemE, IIT Kanpur*, An intensive day long course on the basics of experimental classification and DFT methods for pore distribution by Dr. Martin Thomas from Anton-Paar.

SEPTEMBER 21st 2019 **OpenACC GPU Bootcamp**, *Chemistry Department, IIT Kanpur*, Day long programming session and discussion covering the acceleration of Institute in-house code facilitated by a Senior Nvidia Solution Architect (Mr. Bharatkumar) and Prof. Debabrata Goswami.

Certifications

Coursera

MARCH 2020 **Deep Learning Specialization**, *deeplearning.ai*, 99.5%.

The specialization can be verified by ID Q3DLMMZJ42TR. This signifies the completion of the following five courses:
- Neural Networks and Deep Learning - **100.0**%
- Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization - **99.2**%
- Structuring Machine Learning Projects - **98.3**%
- Convolutional Neural Networks - **100.0**%
- Sequence Models - **100.0**%

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