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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)

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 XeLaTeX.

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	XɟLaTeX, 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