

DETAILED APPLICATION: Mr. Elankovan M. Gopal

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This page is intended for the hiring team of HTuObio

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I. About myself and my academic background: I'm at the verge of completing my Masters(research) program from Indian Institute of Technology Madras(IITM), Chennai. IIT Madras one among the top premier research universities in India and marked as institute of national eminence. My masters research work is on modelling grain boundaries and investigating the thermal heat transport properties of various symmetric tilt grain boundaries in silicon crystal samples using non equilibrium molecular dynamics simulations. I have 3+ years of academic research experience and am very proficient in linux environment and running simulations in LAMMPS. Since I'm the first person to study GBs in my research group I had to write scripts for modelling materials and post-processing simulations results from scratch. I took this challenging opportunity to hone my computer skills being a student from mechanical background and always enjoyed it. I discovered my interest in solving challenging mathematical problems using computers during my stay at IITM. Right now I am participating in a campus-recruitment drive organised by my university in search of a job after graduations. I mean to say, I'm looking for challenging and exciting job-opportunities in India or Abroad.

II. My experience in molecular dynamics simulations:

- I can model any crystalline structures like Fe, Al using my own scripts and using AtomsK software package
- I can calculate lattice parameters, energy, etc of any cubic crystalline structures corresponding to the given force fields. I have worked with Tersoff Pair Potential and Stillinger-weber bond order potential for modelling silicon bicrystal samples
- I can create simple defects in crystalline structure like point defects, and calculate the defect energy.
- I can create 2d defects like grain boundaries using a simple bicrystal geometry model.
- I can figure out the most stable grain boundary configuration investigating all possible microscopic degrees of freedom of the grain boundary. It's a challenging task, I can predict the stable structure using conjugate gradient method and simple annealing techniques.
- I can find the thermal conductivity of any given crystalline structure using non-equilibrium MD technique by inducing heat flux and computing temperature gradient of the material.
- I use the same technique to find the thermal conductance of different grain boundary interfaces.
- I can excite a given set of atoms and can create a wave-packet that can propagate the grain boundary interface. I have discovered the methodology to achieve this spending so many months.
- My skills are not only limited to these activities, based on your challenges and project I can refer the lammps documentation and read relevant literatures and can accomplish the given tasks with little guidance on my own.

III. Why do I fit well in a start-up environment?

Start-ups usually don't enjoy the luxury of resources like well established organisations. I think having the right minded people and highly competent people is crucial for any start-up. I truly have so much of entrepreneurial drive from my early days and every time I get to hear about people who have built business from scratch that leaves me fascinated. I'm currently leading a project OnlineTANGEDCO that sells online exams and online courses for my living. So I have good experience on how to handle small teams and good experience in project planning. I have also worked on a couple of live social projects with an international students team and I think I am a very good teamplayer, and truly understands the meaning of teamwork.

IV. Work experiences

Solving challenging math problems excites me very much. Since mathematics is a very powerful research tool, I realized teaching is the best way to master any

subject and so I have been teaching engineering mathematics during my weekends to have a one-level deeper understanding of the subject.

V. Expectations

(a)My Expectations

- It was clearly mentioned your organisation is looking for PhD graduate
- I am writing to you despite my masters qualification since I believe this job role was relevant to my profile.
- I wish to intern or work as a freelancer for a few weeks/months in your organisation. I can perform several tasks including documentation, research activities, project planning and report writing.
- So you get a chance to see if I am the right fit in your organisations and meeting your skill requirements. At the moment I can take any job roles(freelance/part-time/full-time) that you think that fits my skill sets.
- If you think I am competent enough and interested in hiring me full-time in the future, I would be very much interested in joining your organization in that case and I can manage my visa fees and travel costs by myself.

(b)Your expectations:

- I have always pushed beyond my boundaries and keep exploring my self by constantly challenging me
- I believe myself to be creative and industrious person
- I am interested to get involved in your project at the very fundamental level and contribute to your team.
- I can work remotely now
- I wish to move to Canada if offered a full-time position
- I am aiding the development of your molecular modelling platform.
- I can support your team and submit the tasks as per given deadlines.
- I can work on expanding and developing new mathematical models.
- I can perform simulations of systems for rigorous validations. I have good exposure working with virtual clusters and amazon ec2 instances.
- I would be very much interested to participate in the development of machine learning tools for force fields modeling. I can perform well with little guidance.
- I have good IT knowledge and fundamental understanding of software development. I have built one mobile application recently and got exposure to github and working with push, pull request and clingin a repo. I can assist with hiring software engineering.
- I can communicate with a leadership attitude and coordinate tasks and resources. I have good experience in this, I can do this job well.

- I have a sound subject knowledge in Mechanical engineering concepts, Material Science and Mathematics
- I can figure out methods to implement mathematics in python or matlab.
- Yes, I have in-depth knowledge of MD simulations and basic understanding of force fields. I have no idea on development of force fields, but would be willing to learn.
- Yes, I can compute the free energy calculation of the system and be good at performing CG minimisations.
- Good experience in scripting. I can achieve any given task in python and Matlab for task completion, but sometimes my codes are not well optimised.
- I have some exposure to C/C++ long back; If that's mandatory, I can revise some concepts and work on this programming language very quickly.
- I did an abstract level course in Machine Learning and Deep Learning from Mathworks. I have the fundamental idea of ML concepts.
- Leading a project is no easy task, you learn only through experience. The best thing that I did recently was writing a proposal to exam preparation companies and signed a contract agreement to build education resource materials from scratch. This has given me a very good experience on managing project funds, how to push sales, how to motivate and manage people to get work completed. I think I'm pursuing my dreams and strongly believe in my potential.

VI. Other FAQs

Motivation to apply:

- flexible schedule
- “we are also striving to create a work environment that's family friendly and respectful of everyone in our community - in the office and out”
- work remotely
- to make some money