

## Computational Materials Software Developer – EMTD-JD-SWD-2022111501

### THE COMPANY

EmTDLab is a company incepted in 2018 with the vision to advance the future of space exploration.

Effective shielding against space radiation remains one of the most challenging concern of space missions, from satellite on-board systems to deep space human flight. Our goal is to participate in the discovery of entirely new materials for space radiation shielding. Our engineering services and product will soon complement the technologies deployed by the largest and most ambitious aerospace companies.

To do so, EmTDLab has developed a novel proprietary method to identify new advanced materials with optimal radiation shielding parameters and mechanical properties. Based on the support of the European Space Agency, EmTDLab aims to actively develop the technology to synthesize and manufacture those materials with optimal properties.

### THE POSITION

EmTDLab is growing and actively recruiting a Computational Materials Software Developer who will report to the Chief Technology Officer. This position aims to support our fundamental goal of discovering a generation of entirely new materials for space radiation shielding.

We are looking to hire a creative, self-starting scientist or engineer with a profound desire to learn and innovate.

As a key member of the R&D team, you will be responsible for developing core component of the computational discovery engine and for integrating computational optimisation modules into a larger algorithmic platform.

As a team member, you will develop your own internal and external networks and cultivate collaboration across multi-disciplinary team members that include systems engineers, computational chemist, computational mechanics scientists, materials scientist and software developers.

### SCOPE AND DESCRIPTION OF RESPONSIBILITIES

Developing state-of-the-art materials computational digital solutions using the latest technology, based on internal scientific research. Embrace the importance of maintaining data quality through accurate and data-driven approaches, inspired by the opportunity to contribute to and learn from related competence fields.

The responsibilities are organised around four groups of activities. The weight of activities is shared within the available work capacity; the split among activities will change over time based on the computational platform development progress.

Additional group of activities may be created over time based on team growth and completion of core algorithmic modules.

### **Group I – Computational Materials Discovery Engine Development**

- Search for Shielding Materials Optimization - Materials Science:
- Research, review, study, analysis and benchmark of search and optimisation algorithms relevant for the purpose of systematic materials discovery, in the context of radiation shielding;
- Identification and verification of underlying scientific laws relevant to the search and optimisation algorithms;
- Develop and write discovery algorithm pseudo-code;
- Code programming of core discovery engine;
- Writing organized, well-documented software;
- Ensuring that any code that is released into production is properly tested and monitored
- Link with: code optimization and project governance

### **Group II – Computational Platform Integration**

- Working with users to convert specifications into technical designs, building intensive data acquisition and integration solutions in line with requirements, and optimizing data integration platforms
- Responsible for the life cycle of platform integration, from requirements and analysis to design and development
- Integrate materials discovery core engine with other materials optimisation modules
- Conception, design, and development of interfaces and integration architecture
- Managing data analysis and integrating disparate systems, documentation of technical requirements in the interface context
- Link with: code optimization and project governance

### **Group III – Software Development Governance**

- Creating and maintaining relevant documents for software design and specifications: blueprints and schematics.
- Improve software knowledge management and development workflows
- Proactively spot and drive opportunities to simplify workflows
- Deliver key software documentation related to group I and II based on systems engineering standards;
- Attend and prepare presentation material for customer and partner project meetings

### **Group IV – Computational Efficiency**

- Implement computationally intensive algorithms on cloud and HPC platforms
- Evaluate and help make decisions on cloud and hardware choices
- Profile codes to find and eliminate performance bottlenecks
- Work with cloud vendors / service providers
- Recommend configurations and settings for different types of hardware and cloud / HPC
- Support the installation and deployment of Radiation Transport Codes on cloud servers
- Opportunity to re-run existing codes / rewrite codes / Develop a partial proprietary code
- Operate on future workflows that combine CPU and GPU
- Integration with global HPC facilities

## REQUIREMENTS

### Degree

Master's Degree in Engineering, Physics, mathematics, including computational science and a PhD in computer sciences, physics, materials sciences

### Personal, interpersonal skills and experience

Excellent written and verbal communication skills

Proven ability to communicate, collaborate, and deliver results as a member of a multi-disciplinary team

Experience of collaboration with academic teams

Ability to work unsupervised and autonomously

Ability to work in a fast paced, multitasking environment

Solves problems in a novel way

A genuine interest in learning about new technology

Fluent in English - knowledge of other language is an asset.

### Technical experience and seniority

Work experience can be minimal (1 to 3 years) but a proven track record of fast learning is required;

Strong physics, mathematics and algorithmic foundations

Work experience in software development and simulation;

Proficiency in at least C++ and Python

Computational experience in other programming languages including Java, Matlab, SQL, CUDA

Experience with continuous integration of code repositories, code reviews, and version control

High performance computing (cluster) experience;

Engineering-related experimental / laboratory experience;

Experience with an agile culture

Superior analytical skills with keen attention to details and quality;

Fair knowledge of systems engineering and product assurance principles;

## WHAT WE OFFER

EmTDLab is a freshly incorporated company in Luxembourg. You will be a key member of a new team with opportunities to have a direct influence in shaping the future of the company. Your opinion matters. EmTDLab is a no nonsense company with a highly systematic approach to research, development and engineering.

EmTDLab promotes a work culture driven by technical excellence, transparency, integrity, respect and humour.

We encourage diversity in backgrounds. Your appetite for creativity, innovation, intellectual curiosity will be deeply appreciated. Being convinced that cross-functional collaboration is a key success factor, the human capital development policy is not to assign you in fixed roles but to encourage personal development.

We work according to flexible organisational principles with respect to work location, working hours and contractual agreements (e.g. part-time work and full time work). We expect that each team member fulfils her/ his objectives as a part of the company's objective with little constraint added to your R&D and engineering work.

We although expect that we all work as professionals and all respect common sense business logic, commonly agreed research practices, quality assurance and quality control. We are an open door policy company where team communication is considered as critical for success.

We offer a remuneration package in line with the industry market, including fringe benefits, yearly bonuses and training opportunities.

The place of work is the Grand Duchy of Luxembourg. Some travel will be required for external reporting meeting within EU.

## APPLICATION PROCESS

Please send the following information to [jointheteam@emtdlab.com](mailto:jointheteam@emtdlab.com) :

- An up-to-date resume;
- A short introduction letter answering the question why our key company approach is important in this role;
- The name of at least two references (MSc-PhD supervisors/current employers); A copy of your diploma and educational certificates (if invited for an interview); Publications, non-confidential papers and previous technical use cases, if any.

Three rounds of interview will take place in total either through videoconferencing or face-to-face.

*It is the policy of EmTDLab to provide equal employment opportunity without regard to race, colour, religion, age, national origin, sex, gender, sexual orientation, gender identity/expression, disability, health status, genetic information, or any other basis, protected by data privacy, institutional policy or by state or local laws unless such distinction is required by law.*