

RADIATION EFFECTS SIMULATION RESEARCH ENGINEER

THE COMPANY

EmTDLab is a company founded 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 Radiation Effects Simulation and Engineer who will report to the head of systems engineering. 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 evaluating the space radiation environment for different mission types, along with assessing the effects on space systems and human flights.

As a team member, you will develop your own internal and external networks and cultivate collaboration across multi-disciplinary team members that include materials scientists, software programmers, mission scientists, spacecraft systems engineer, radiation engineers.

DESCRIPTION OF RESPONSIBILITIES

To define, implement, and execute project plans, which involves (among others) to manage milestones, and hold reviews to assure reliability of projects plan.

To prepare and conduct radiation simulation campaigns including the development of simulation set-up and subsequent data analysis, the simulation of structures and materials radiation effects in support of the computational materials discovery team, research, study, evaluates radiation effects on electronics and living organism by the mean of scientific literature and studies.

To predict environmental stresses to vehicles flown in ionizing radiation environments.

To define relevant radiation studies, experimental and development activities (also including future in-flight component radiation characterization experiments); to initiate and manage such activities implemented under public tendering contracts;

To conduct simulations of radiation effects in components and materials using suitable device physics-based SW-tools, with the objective to produce new - or improve - existing models;

To coordinate such activities with internal and external partners and promoting the results achieved in the form of project delivery reports;

To establish in-situ testing protocols of materials in collaboration (?) with third parties providing particle accelerators;

To elaborate project management process (including scope, resources, timing and quality assurance) for both simulation and testing;

To comply with all radiation regulatory requirements for radiation safety;

To write verification test plans, procedures, and reports against product requirements;

To make recommendations for design, process improvements, and data collection;

To perform root-cause analysis of test failures and communicate recommended actions;

To conduct end-to-end R&D collaboration with research institutes or commercial clients in the field of systems or subsystems simulation and testing campaigns.

The scope and description of responsibilities are likely to evolve according to the internal process and product development lifecycle.

SCOPE OF RESPONSIBILITIES

- Space Radiation Environment - mission profiles
- Particle and heavy ion transport calculations
- Deterministic codes: Boltzmann Transport Equation (BTE)
- Monte Carlo Codes - Radiation Transport Codes and Computing Models
- Opportunity to re-run existing codes / rewrite codes / Develop a partial proprietary code
- Shielding in Space - Aerospace shielding materials structure
- Numeric simulation of radiation exposure of EEE parts
- Numeric simulation of radiation exposure of astronauts during interplanetary flights
- Search for Shielding Materials Optimization - Materials Science

REQUIREMENTS

Degree

Bachelor's degree in electrical engineering or physics. Master's Degree in Engineering, Master's degree in Science, Physics or Engineering field, including computational science; Master's degree or PhD in electrical engineering, particle physics, nuclear physics, or astrophysics.

Interpersonal skills and experience

Ability to communicate, collaborate, and deliver results as a member of multi-disciplinary teams;
Excellent written and verbal communication skills with recent publications and/or presentations;

Experience of collaboration with programmers.

Fluent in English; knowledge of other language is an asset. **Technical experience and seniority**

Work experience in the modelling, testing, and/or analysis of radiation effects;

Work experience in the field of radiation effects on EEE Parts and human on-board spacecraft, including irradiation simulation and testing;

Work experience can be minimal but a proven track record of fast learning is then required; Otherwise, relevant work experience up to 4 to 5 years in the field of radiation effects.

Engineering-related laboratory experience.

The ideal candidate would have the following technical knowledge and skills:

Strong physics, mathematics and statistics knowledge base;

Superior organizational and analytical skills with keen attention to details and quality;

Computational experience in programming languages including Python, Matlab, C/C++, and SQL;

Experience in using one or more radiation computational simulation tools (eg. GEANT4, MCNPX, NOVICE, SpaceRad, FASTRAD or CRÈME);

Fair knowledge of component engineering and product assurance principles and modelling/simulation of radiation effects on EEE components for radiation hardening;

Familiarity with shielding analysis tools (sectoring and 3D MonteCarlo based), device physics simulation tools, modern programming techniques, modelling and simulation of radiation effects on EEE components for radiation hardening and software engineering practices.

OPTIONAL ADDITIONAL SKILLS AND EXPERIENCE:

Proficiency with hardware blueprints/schematics and circuit functions based on designs;

Knowledge of the effects of launch vibrations, thermal cycling, heat transfer and EM interferences;

Knowledge of the effects of UV and atomic oxygen on materials and components;

Experience in analysis, control, and mitigation for spacecraft charging;

Experience with meteoroid/orbital debris, electron/proton/x-ray transport, and atomic oxygen calculations;

Experience with avionics hardware spanning integrated circuits, PCBA boards, sensors/transducers, functional troubleshooting, and defect detection;

Experienced with SEE rate prediction tools and have sufficient knowledge of the space environment to correctly employ these tools;

PHITS – Medical physics simulations

Radiation dose safety training.

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 market, including yearly bonuses and training opportunities.

The main place of work (headquarters) is the Grand Duchy of Luxembourg.

The present job offering also covers provisional recruitment for the Kingdom of Belgium.

Candidates from any third-country national (a person who is not an EEA national – i.e. from an EU Member State, Iceland, Norway and Liechtenstein – or a Swiss Confederation national) space are encouraged to apply under a residency permit application.

APPLICATION PROCESS

Please send the following information to 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.