



**PROTom**  
proton therapy technologies

## **JOIN OUR TEAM, CREATE A FUTURE FOR EVERYONE**

Our team is the core of our mission to transform cancer treatment by expanding worldwide access to proton therapy – an advanced form of radiation therapy. We are always interested in hearing from anyone who shares our vision and believes that they can advance our mission.

### **Principal Mechanical Engineer**

Regular, Full-Time  
North Reading, MA

### **Summary**

ProTom's flagship product is the Radiance 330<sup>®</sup> Proton Therapy System ("Radiance 330"). This cutting-edge radiation therapy system uses a synchrotron to generate, transport, and steer high-energy protons to treat with sub-mm accuracy. Under the direction of the Director of Mechanical Engineering, the Principal Mechanical Engineer will be involved in, and lead aspects of the design, analysis, fabrication, installation, validation, verification, documentation, certification, support, upgrade, and maintenance of ProTom's proton therapy system. Areas of concentration include engineering project leadership, large articulating mechanism design, optimization and analysis, assembly level structural Finite Element Analysis (FEA) static and dynamic, thermal cooling calculations (heat transfer FEA and CFD), large gear drive systems, large bearing systems, beamline component development, vacuum systems, and design for tight tolerance alignment of critical beamline components including large electromagnets

### **Job Functions and Responsibilities**

1. Provide technical leadership in mechanical design, installation, verification and ongoing development of the system components as directed by the Director of Mechanical Engineering.
2. Develop protocols and perform system and sub-system design verification and qualification testing.
3. Prepare and document specifications; ensure designs meet ProTom requirements (coordinating with the Quality department).
4. Lead the efforts in failure analysis of large mechanical systems, including accelerator and beam transport systems, rotating gantry structures, beam delivery, and robotic positioning subsystems that fall under ProTom's area of responsibility.



5. Responsible for leading teams for in-house development projects and for leading outside development subcontractor teams.
6. Work with the Engineering and Physics teams to refine the mechanical system, subsystem, and component-level technical architecture needed to meet user, regulatory, and system-level requirements and to ensure that the top-level requirements are properly flowed into each subsystem and component-level specification as required by the FDA and the ProTom Quality Management System (QMS).
7. Must be well-versed in documenting requirements in such a way that they can be partitioned into a mechanical system architecture with direct downward and upward traceability to design requirements to ensure they meet the ProTom QMS requirements.
8. Responsible for development of modeling and simulations including facilities and cooling systems and analysis used to validate the mechanical architecture which meets mechanical requirements.
9. Responsible for working with the rest of the ProTom organization to produce a set of test plans, test protocols, and support tooling which demonstrate that ProTom products meet all requirements, specifications, and regulations.
10. Responsible for leading the team in execution of these test protocols and in documenting the test results in formal test reports.
11. Lead the design and layout of radiation room facilities and provide input for equipment-building interface documents by liaising with outside Architectural design teams and providing technical translation between the architectural and the mechanical 3D worlds.
12. Lead and mentor junior engineers.
13. Capable of leading a team of technical contributors through the development, analysis, documentation, fabrication, assembly, troubleshooting, testing, commissioning, and certification of a large complex piece of capital equipment.
14. Well-developed interpersonal and verbal communications skills for work with physicists, engineers, vendors, client administrators, etc.

## **Education and Experience**

1. Bachelor of Science degree in Mechanical Engineering; MSME preferred
2. Candidate will possess a minimum of 15 years mechanical engineering experience
3. Experience required in:
  - a. Design of mechanism with multiple degrees of freedom in motion.
  - b. Electromechanical design.
  - c. Use of Finite Element Analysis (FEA) on large complex capital equipment structures.
  - d. Thermal analysis tools – FEA, CFD.
  - e. Cooling calculations and piping networks analysis.



4. Experience preferred in:
  - a. FDA cleared medical device development (or other regulated industry)
  - b. Project management (use of project management software is a plus)
  - c. Development history with high energy physics components (vacuum, electromagnets, optical alignment systems, etc.)
  - d. Vacuum System Design.
  - e. The use of a PLM system.
  - f. Project Management process and use of project management software.

## **Working Conditions**

1. Office environment for the majority of time.
2. Some work will be performed at proton therapy sites, which are typically installed underground with no natural light.
3. Occasional domestic and international travel to client, vendor, or training sites will likely be required; must be able to acquire all necessary travel documents.