Dr. Mohammed Maniruzzaman
Advanced Materials Technology, Caterpillar Inc.

Dr. Mohammed Maniruzzaman is an **accomplished expert in Materials Science and Engineering**, holding a **PhD in Materials Science and Engineering from Worcester Polytechnic Institute**. He currently serves as an **Engineering Specialist – Development & Research at Caterpillar Inc.**, a role he has held since December 2017. His responsibilities at Caterpillar include **research and development of surface hardening and quenching heat treatment processes**, finite element simulation, thermo-chemical simulation for alloy development, and applying material science fundamentals to solve heat treatment challenges.

Prior to this, he was a **Senior Engineer – Development & Research at Caterpillar Inc.** for nearly nine years, focusing on similar areas of heat treatment and alloy development. Before his industry roles, Dr. Maniruzzaman was a **Research Assistant Professor/Postdoctoral Fellow at Worcester Polytechnic Institute** for over eight years. At WPI, he **managed diverse research projects** on topics such as carburizing, aluminum alloy optimization, and quenching processes. His academic contributions also included performing fluid dynamics and structural simulation, materials modeling, and microstructural investigations using electron and optical microscopy and X-ray diffraction analysis.

Earlier in his career, he served as an **Assistant Professor/Lecturer at Bangladesh University of Engineering and Technology (BUET)**, teaching various mechanical engineering subjects and supervising student research. Dr. Maniruzzaman's expertise is further demonstrated by his **extensive synergistic activities**, encompassing **computational thermodynamics, fluid dynamics, and finite element simulations** of material systems and processes. He is proficient with tools like Thermocalc, JMatPro, Matlab, Python, FLUENT, ABAQUS/DANTE, and Ansys Mechanical/DANTE for advanced materials modeling. His work also involves **microstructural investigation** using optical and scanning electron microscopy. He has authored and co-authored numerous publications in leading journals, covering significant research on topics like **quenching performance, heat transfer coefficients, and predicting mechanical properties of alloys**. His publications also include mathematical modeling and computer simulation of complex processes, such as particle flotation using a rotating impeller.