position description

Date: June 2019

Title: Senior Research Engineer

Department: Materials Science and Engineering

School: Engineering

Location: Swagelok Center for Surface Analysis of Materials, Glennan Building 101

Supervisor Name and Title: Stephanie Piatt, Executive Director

POSITION OBJECTIVE

Independently perform most assignments with instructions as to the general results expected. The senior research engineer will apply advanced methods and both qualitative and quantitative analysis for advanced materials characterization and research. The engineer receives technical guidance on unusual or complex problems and supervisory approval on proposed plans for projects. The engineer is responsible for the maintenance, safety and instruction in operation for potential users of the FEI Helios 650 field-emisison gun scanning electron microscope with focused ion beam and XEDS system, FEI Nova Nanolab 200 field-emission gun scanning electron microscope with focused ion beam and XEDs-, and EBSD system, FEI Quanta 3D environmental scanning electron microscope with focused ion beam and XEDS system, and Tecnai F30 300 keV transmission electron microscope. XRD experience is a plus.

The Swagelok Center for Surface Analysis of Materials is a premier Case Western Reserve core facility providing a variety of instrumentation for advanced materials characterization and research. High performance optical and electron microscopes allow for the examination of a wide range of materials. Providing high-resolution imaging, microstructural, and chemical composition are but only a few of Swagelok Center's capabilities. The facility also incorporates surface analysis instrumentation effective in analyzing and characterizing the chemical state and composition at a nanometer scale.

ESSENTIAL FUNCTIONS

1. Interface with client/ customer project managers and university research/ engineering management for existing or proposed projects addressing multiple analytical needs. May evaluate proposed or ongoing projects. Make substantial contributions to determining feasibility of goals/ objectives to ensure success.
2. Plan, schedule, conduct, or coordinate detailed phases of the work of a major project or in a total project of moderate scope. Use basic and advanced electron microscopy techniques including but not limited to EBSD, XEDS elemental mapping, FIB, TEM bright-field and dark field imaging, STEM imaging including Z-contrast imaging by HAADF, interpreting TEM diffraction patterns, and HRTEM still imaging.
3. Develop opportunities to enhance technical methodology or content through expansion of existing, or development of, new efforts. May extend technology into new application areas. Contribute or lead in major intellectual development activities.
4. Provide innovative problem-solving approaches to enhance organizational capabilities; use peer network to expand technical capabilities and identify new research opportunities. Crosstrain other associates on Helios, Nova, Quanta, and Tecnai.

5. Understand broad strategic objectives and contribute to them; nurture and maintain relationships with major customers/ grantors of external research and development grant funding.
6. Identify grant/ project extensions and persuade customers/ grantors to fund; impact customer decisions and strategies. May initiate new project concepts and seek funding; develop technical proposals and makes presentations to potential customers.

NONESSENTIAL FUNCTIONS

1. May chair sessions at technical meetings; give invited papers; or participate in external seminars, workshops, professional societies and committees.
2. Assess the performance and determine different requirements of each instrument. Manage the maintenance with each respective equipment manufacturer and service engineers to ensure proper functioning of equipment. Responsible for applications and/or support for assigned instruments.
3. Actively participate in open houses and all Swagelok Center events. Maintain awareness and knowledge of engineering trends. May initiate new project concepts and seek funding; develop technical proposals and make presentations to potential clients.
4. Perform other duties as assigned.

CONTACTS

Department: Recurring contact with university faculty and engineers regarding equipment.

University: May have contact with other university staff regarding equipment, analysis, or billing. Interface with university research/ engineering management for existing or proposed projects.

External: Contact with non-local academic industrial clients facilitating analysis and providing testing consultation. Interface with each respective equipment manufacturer and service engineers to address concerns.

Students: Daily contact with students needing training on instrumentation.

SUPERVISORY RESPONSIBILITY

Technical oversight of students, faculty and external clients in the operation and caring of the equipment.

QUALIFICATIONS

Education and Experience: Master’s degree in engineering or other related field and 4 years of related experience OR Ph.D. in engineering, majoring in Materials Science, Physics or other related field and 2 years of related experience.

REQUIRED SKILLS

1. Expert knowledge of operating electron microscopes. Ability to apply a comprehensive knowledge of particular field of specialization to the completion of complex assignments. Established technical expertise; ability to serve as a resource to research unit/ department and the university.
2. Demonstrated knowledge of basic and advanced EM techniques including, but not limited to, EBSD, XEDS elemental mapping, FIB, TKD, TEM bright-field and dark-field imaging, STEM

imaging including Z-contrast imaging by HAADF, interpreting TEM diffraction patterns, and HRTEM still imaging.

3. Ability to advance state-of-the-art research in field of specialization.
4. Knowledge and experience in multiple facets of SEM and TEM instrumentation and sample preparation.
5. Knowledge and experience with XRD applications desired.
6. Knowledge and experience with other materials characterization concepts is desired.
7. Experience with various sample preparation techniques, metallography, AFM (atomic force microscopy), and Nanoindentation Hardness testing is desired.
8. Computer skills and those associated with complex simulation programs.
9. Experience writing technical reports.
10. Attention to detail.
11. Ability to work well within a team is required.
12. Excellent organizational skills
13. Ability to meet consistent attendance.
14. Excellent communication skills. Ability to interact with colleagues, supervisors, and customers face to face.
15. Ability to solve problems efficiently, accurately, and in a timely manner.
16. Excellent decision-making ability.
17. Strong understanding of structure and property of materials, material analysis, and materials characterization.

WORKING CONDITIONS

Standard research laboratory working conditions containing computers and materials research instrumentation. Employee may be present when x-rays are generated but these are usually well-shielded and not a health hazard. The position will require participation in implemented General Laboratory Safety program. Some travel (<20%) to industrial client facilities and collaborating universities.