

Position Title: **Principal Systems Software Engineer/Computer Scientist**  
Organizational Unit: Center for Imaging Science, College of Science  
FLSA Status: Exempt

**BASIC FUNCTION:**

The principal systems software engineer/computer scientist provides an acknowledged technical leadership within the Center and is a recognized contributor to the missions of the Center. S/he designs, develops and maintains with a high degree of independence software systems applied to technical, scientific or engineering problems for a subsystem and/or an overarching system. The principal software engineer or computer science will lead the design, development, and deployment of system level architectures, working with groups of users, scientists and engineers. S/he will work with customers and uses to develop requirements, and analyze and resolve problems, developing and specifying requirements for modifications, enhancements or new system development. S/he will generate and pursue ideas for new development and new business. Provide technical direction and mentoring to more junior software engineers, including students.

**MINIMUM QUALIFICATIONS\***

\*Substitution of relevant education or experience for stated qualifications may be considered.

*Knowledge, Skills, and Abilities:*

- Expert technical knowledge of major software subsystems and subsystems and fluent knowledge of the scientific application of those systems
- Expert knowledge of software development techniques and practices.
- Expert knowledge of at least two high level languages (e.g. FORTRAN, C, C++, or Java).
- Fluent level of proficiency in a computer operating system such as NT, Unix, or VMS.
- Expert knowledge of software support products such as text editors, debuggers, or email.
- Excellent verbal and written communication skills.
- Expert mentoring and/or teaching ability.
- Proven Ability to establish and maintain effective professional working relationships.
- Acknowledged technical leadership in software development activities.
- Fluent knowledge in at least 3 of the following areas and Expert knowledge in another 3 areas:
  - ◆ Any physical science (e.g., physics, imaging science, chemistry, color science, etc.) , mathematics, or engineering discipline
  - ◆ Compiler design
  - ◆ Operating and network system design
  - ◆ Distributed processing/computing
  - ◆ Client/server protocols
  - ◆ OO development methodologies
  - ◆ Scripting languages
  - ◆ Configuration Management
  - ◆ Algorithm design
  - ◆ Relational/OO database technology
  - ◆ Data structure selection
  - ◆ Software Testing Methodologies
  - ◆ Artificial Intelligence
  - ◆ Graphical User Interfaces
  - ◆ Web application development

*Education*

- Advanced University Degree, preferably a Master's or PhD in Computer Science, Physics, Math, Engineering, technical management or a technically related field (*suitable experience and accomplishments can be substituted*)

#### *Experience*

- Minimum of 10 years experience in large software and/or computer systems development and design projects.

#### *Duties and Responsibilities\**

\* See annual performance goals and objectives for complete list

A **Principal Computer Scientist/Software Engineer** will design, develop, and make modifications and enhancements to very large and technically complex software systems. To support this effort, a Principal Computer Scientist/Software Engineer will:

- Develop integrated schedules for software development projects.
- Identify requirements, perform feasibility studies and vendor surveys for team hardware needs.
- Provide system level software and computer expertise for new activities.
- Performs system level analysis from requirements definition through deployment.
- Lead teams in the development of software and computer system architectures, perform system level architecture trade studies, develop operational concepts and flow requirements.
- Support proposal generation and other new business efforts.
- Document work in requirements documents, design specifications, white papers, and proposals.
- Organize and lead center wide teams to perform in house reviews of proposals, concepts and detailed software and computer system designs.
- Lead the design or participate in the design of software and computer systems, and their modification or enhancements. This includes usage of good design practices, documentation, and presentation of design reviews.
- Organize systems level code reviews and support code reviews of peers
- Document work in requirements documents, design specifications, white papers, and proposals.
- Investigate, analyze and share knowledge of new and/or pertinent software methodologies and tools and create and follow appropriate guidelines for software development/maintenance and deliveries.
- Keep technically abreast in software development and maintenance areas and provide input to lab managers and project leaders.
- Provide technical direction and mentoring to less senior staff members, including students.

#### Definitions:

A **basic** level of expertise can be accomplished through the successful completion of a course in a specific area or a curriculum in a general field. This level would be assigned to someone who understands the basic topics, principles or practices within an area but has not practiced these principles in a non-class environment.

A **working** level of expertise can be accomplished through the successful completion of a curriculum in an area. This level would be assigned to someone who understands complex topics, principles or practices within an area but has not practiced these principles in a non-class environment.

A **fluent** level of expertise would be assigned to someone who understands the complex topics, principles or practices of an area and has demonstrated their competency through the completion of a small number (e.g. 3-4) of medium-sized to large-sized projects in a formal software development environment.

An **expert** level would be assigned to someone who has a thorough understanding of topics, principles or practices in an area and has demonstrated their competency through the completion of a number (e.g. 8-10) of medium-sized to large-sized projects in a formal software development environment.

A **demonstrated** skill indicates that a person has successfully completed this skill but there is some risk that the same result will not occur for the next opportunity.

A **proven** skill indicates that a person has successfully completed this skill often or with sufficient quality that it is expected that the same successful result will occur for the next opportunity.

Center Approval:  
HR Approval:  
Effective Date:  
Revised Date(s):