

## UW HEALTH JOB DESCRIPTION

### Data Science and Machine Learning Architect

Job Code: 330099	FLSA Status: Exempt	Mgt. Approval: J. Long	Date: July 2021
Department: Enterprise Analytics		HR Approval: N. Lazaro	Date: July 2021

#### JOB SUMMARY

The UW Health Data Science and Machine Learning Architect is constantly pushing the boundary of how healthcare's most important questions and problems can be answered using data. The Data Science and Machine Learning Architect embodies the data science and machine learning engineering mindset that includes the use of a wide variety of data types (structured, unstructured, large); the use of multiple techniques including statistical, machine learning, and natural language processing; the application of software engineering and big data technologies and methodologies; and the end goals of presenting actionable insights and information both to stakeholders to support decision making and to software to embed actionable outputs into real-time delivery of clinical care.

The Data Science and Machine Learning Architect works closely with data scientists, IT teams, front-line clinicians, stakeholders, informaticists, and researchers, to build or enhance robust systems with embedded artificial intelligence and data science. The Data Science and Machine Learning Architect has a bias towards actionable insights with the goal of "getting data science into the system".

The Data Science and Machine Learning Architect is conscious of advancing the data science and machine learning engineering maturity of UW Health and defining and showing how data science and machine learning engineering supports the organization's overall mission and vision.

The Data Science and Machine Learning Architect is a forward-thinking technical leader accountable for creating a sound data science architecture and technology roadmap for UW Health. The Data Science & Machine Learning Architect works with other leaders to set the strategic, technical priorities for data science and machine learning engineering.

#### MAJOR RESPONSIBILITIES

##### Solution Development, Deployment, and Delivery:

Increase the data science maturity of UW Health by defining strategic initiatives. Leads Principal Data Scientists and Principal Machine Learning Engineers who plan and execute initiatives that advance the architecture.

Design predictive and statistical models, insights, patterns, visualizations and with designs software solutions that uses machine learning engineering, including a small level of hands-on involvement. Reviews and may write production-level code as warranted, demonstrating software engineering or coding best practices. Designs original data science solutions in a problem space that is unique and critical to the company.

##### Process and Standards

Define, articulate, update the guiding principles that drive the technical standards for the organization. Endorse technical standards and ensure that technical standards are aligned with technical vision, architecture, and roadmap.

##### People:

Work with other architects, principals, and senior leadership, to communicate, coordinate and plan, the overall data science architecture, roadmap, and initiatives, across the organization.

Mentor Principal Data Scientists and Principal Machine Learning Engineers. Act as an institutional-level role model and represent the organization for data science and machine learning engineering.

##### Technical Leadership:

Define the data science architecture and technology roadmap for data science and machine learning to deliver strategic value for the organization.

Evaluate emerging technology and technology trends and create plans to ensure that the organization is well-positioned with regards to future technology while maximizing the value of current technology.

Provide strategic technical direction and the technical priorities for the staff and teams that execute data science and machine learning engineering projects.

## UW HEALTH JOB DESCRIPTION

**ALL DUTIES AND REQUIREMENTS MUST BE PERFORMED CONSISTENT WITH THE UW HEALTH PERFORMANCE STANDARDS.**

### JOB REQUIREMENTS

Education	Minimum	Master's Degree in Computer Science, Mathematics, Statistics, Software Engineering, Data Science, Computer Engineering, or relevant quantitative Engineering field (Six (6) years of combined education (e.g. Bachelor's degree) and work experience may be considered in lieu of Master's degree)
	Preferred	Doctorate degree in Computer Science, Mathematics, Statistics, Software Engineering, Data Science, Computer Engineering, or relevant quantitative Engineering field
Work Experience	Minimum	None
	Preferred	<ul style="list-style-type: none"> <li>• 2 years of experience in a technical leadership role</li> <li>• 5 years of data science or machine learning engineering experience including deploying original data science or machine learning solutions into production</li> <li>• 5 years of experience with data and statistical analysis preferably with large data sets or unstructured data (free text, images, machine or IoT)</li> <li>• 5 years of experience in software engineering including software design, development, testing, release</li> <li>• 3 years of experience in healthcare (provider or payer)</li> </ul>
Licenses & Certifications	Minimum	None
	Preferred	<ul style="list-style-type: none"> <li>• Epic certifications in Cogito</li> <li>• Epic badge or certification in Cognitive Computing Platform</li> <li>• Agile Scrum Certifications</li> <li>• ITIL Certifications</li> <li>• Azure Certifications</li> <li>• Other related certifications such as Google certification for Machine Learning Engineer</li> </ul>
Required Skills, Knowledge, and Abilities		<p>Advanced proficiency in at least one of the following seven:</p> <p>Intermediate proficiency in either:</p> <p><u>1A. Data engineering with an emphasis in machine learning applications. Competency includes:</u></p> <ul style="list-style-type: none"> <li>• Skilled at working with “big” data pipelines, including data ingestion, feature engineering, data validation; “big” data includes unstructured and streaming data</li> <li>• Strong knowledge of data structures and data modeling</li> </ul> <p><u>1B. Working with “big data” including large volumes of data, unstructured data, streaming data, data veracity:</u></p> <ul style="list-style-type: none"> <li>• Skilled at working with unstructured data such as text, streaming, or machine data, and working with “big” data technologies like Apache Spark</li> <li>• Solid understanding of data structures, data modeling, dimensional modeling</li> <li>• Skilled in creating visualizations of data such as ggplot, matplotlib</li> </ul> <p>Intermediate proficiency in either</p> <p><u>2A. Software engineering with an emphasis in machine learning applications. Competency includes:</u></p> <ul style="list-style-type: none"> <li>• Skilled at writing robust code in Python, R, Java, Scala, C++, including debugging and version control technologies</li> <li>• Strong knowledge of computer science fundamentals (including data structures and algorithms), software and application development methodologies, and software architecture including API web services</li> <li>• Skilled at software testing methodologies such as unit testing, functional testing, integration testing</li> </ul> <p><u>2B. Coding techniques, best practices, and mindset, for data science:</u></p>

## UW HEALTH JOB DESCRIPTION

- Skilled at writing robust code in Python, R, Spark, SQL including notebook-based workflows (Jupyter, R, Spark) and creation of reusable code packages and libraries, and at version control (GitHub)
- Skilled at testing code including techniques best practices used in software testing

Intermediate proficiency in either:

3A. Machine learning engineering including ML development and operations. Competency includes:

- Skilled at MLOps including machine learning best practices, design patterns, model management, and machine learning frameworks (like Tensorflow, Keras, or PyTorch) and libraries (like scikit-learn, Theano)
- Strong knowledge of machine learning concepts such as learning procedures, bias and variance tradeoff and math, probability, statistics, linear algebra.
- Strong knowledge of public cloud technologies, services, and providers, including Microsoft Azure
- Skilled at DevOps principles and practices, such as automation and orchestration with CI/CD or IaC, and at using IT frameworks like ITSM

3B. Statistics theory and techniques used in data science:

- Strong knowledge of math, probability, statistics, and algorithms, such as linear algebra, Bayesian statistics
- Skilled in using statistical methods (such as boosting, generalized linear models/regression, random forests, social network analysis) and in using machine learning techniques (such as artificial neural networks, clustering, and decision tree learning)

4. Healthcare subject matter expertise:

Subject matter expertise in one or more areas such as clinical informatics or biomedical informatics, hospital operations, ambulatory operations, population health management, performance measure development, healthcare administration, patient satisfaction, strategic planning, labor and productivity analytics, financial modeling, cost accounting, revenue cycle management, or survey design/development

Solution Development, Deployment, and Delivery:

Outstanding analytical and problem-solving abilities

Identifies and leverages the most appropriate and best statistical methods, data science techniques, or technological capabilities, to solve the problem at hand, which may include developing original and innovative approaches or adopting approaches that are new for the organization.

Process and Standards

Ability to synthesize ambiguous and inconsistent feedback and input.

Ability to drive deliverables and priorities. Defines technical specifications and requirements.

Proactively identifies risks before work occurs.

Ability to break down technical problems to root cause and first principles. Ability to reduce complexity and define elegant solutions and guiding principles.

People

Knows how and when to proactively engage others at all levels of the organization.

Ability to lead a team

Ability to work in agile, iterative frameworks and coach others on agile mindset.

Communication, Mentoring, and Teaching:

- Very good written and verbal communication skills
- Intermediate proficiency with mentoring and formally teaching on data science and machine learning concepts, techniques, and mindset

Technical Leadership:

## UW HEALTH JOB DESCRIPTION

	<p>Advanced proficiency in leadership including technical leadership. Competency includes:</p> <ul style="list-style-type: none"> <li>Leads with integrity. Maintains strategic orientation. Demonstrates business and financial acumen. Champions innovation. Manages execution. Leads and develops people.</li> <li>Advanced proficiency in technical leadership: Sound technical judgment including decision-making amidst ambiguity, trade-offs, and constraints. Fluency at multiple levels in the technical stack. Balances long-term technical vision against short-term deliverables. Promotes elegant design and reduces unnecessary technical complexity. Works backwards and drives towards meaningful requirements. Staying current with a solid technical understanding of technology trends.</li> </ul>
--	---

### PHYSICAL REQUIREMENTS

**Indicate the appropriate physical requirements of this job in the course of a shift.** *Note: reasonable accommodations may be made available for individuals with disabilities to perform the essential functions of this position.*

Physical Demand Level		Occasional Up to 33% of the time	Frequent 34%-66% of the time	Constant 67%-100% of the time
<b>X</b>	<b>Sedentary:</b> Ability to lift up to 10 pounds maximum and occasionally lifting and/or carrying such articles as docket, ledgers and small tools. Although a sedentary job is defined as one, which involves sitting, a certain amount of walking and standing is often necessary in carrying out job duties. Jobs are sedentary if walking and standing are required only occasionally and other sedentary criteria are met.	<b>Up to 10#</b>	<b>Negligible</b>	<b>Negligible</b>
	<b>Light:</b> Ability to lift up to 10 pounds maximum and occasionally lifting and/or carrying such articles as docket, ledgers and small tools. Although a sedentary job is defined as one, which involves sitting, a certain amount of walking and standing is often necessary in carrying out job duties. Jobs are sedentary if walking and standing are required only occasionally and other sedentary criteria are met.	<b>Up to 20#</b>	<b>Up to 10#</b> or requires significant walking or standing, or requires pushing/pulling of arm/leg controls	<b>Negligible</b> or constant push/pull of items of negligible weight
	<b>Medium:</b> Ability to lift up to 50 pounds maximum with frequent lifting and/or carrying objects weighing up to 25 pounds.	<b>20-50#</b>	<b>10-25#</b>	<b>Negligible-10#</b>
	<b>Heavy:</b> Ability to lift up to 100 pounds maximum with frequent lifting and/or carrying objects weighing up to 50 pounds.	<b>50-100#</b>	<b>25-50#</b>	<b>10-20#</b>
	<b>Very Heavy:</b> Ability to lift over 100 pounds with frequent lifting and/or carrying objects weighing over 50 pounds.	<b>Over 100#</b>	<b>Over 50#</b>	<b>Over 20#</b>
List any other physical requirements or bona fide occupational qualifications:				