



JOHNS HOPKINS

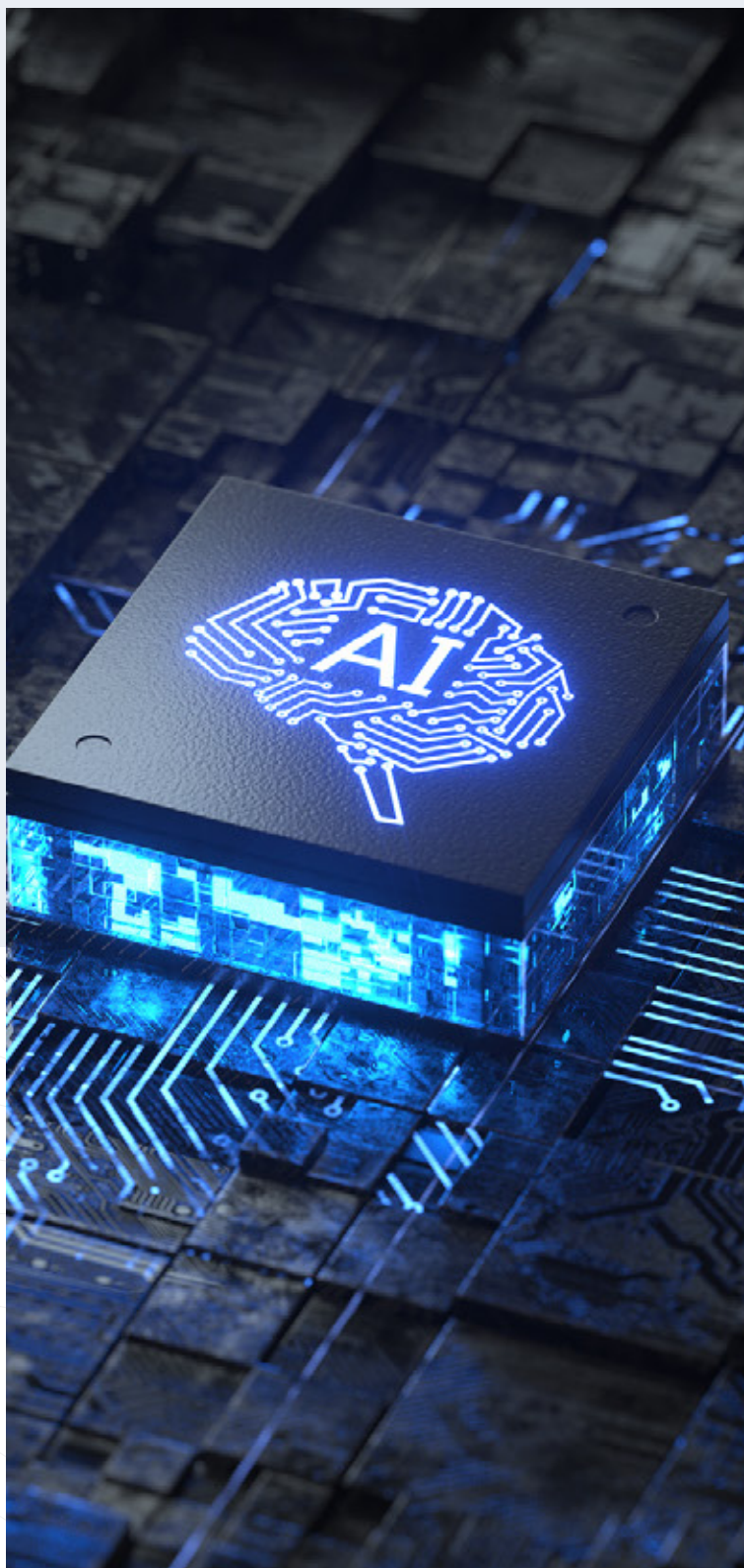
WHITING SCHOOL
of ENGINEERING



CERTIFICATE PROGRAM IN APPLIED GENERATIVE AI

16 Weeks | Online | Live Mentored Learning Sessions

GENERATIVE AI: DRIVING INNOVATIVE SOLUTIONS AND GROWTH ACROSS INDUSTRIES



Generative AI has brought a fundamental shift in how we interact with technology and the world around us. From text and image creation to coding, tasks that once required specialized knowledge and hours of effort can now be accomplished with a few simple prompts. Unlike traditional AI, which relies on pre-programmed rules, Generative AI uses patterns and examples from its training data to generate original and diverse outputs, enabling innovative applications across various industries. According to Grand View Research, the global Generative AI market size is expected to grow at a compound annual growth rate (CAGR) of 36.5% from 2024 to 2030. This rapid growth underscores the increasing reliance on GenAI to drive innovation across industries.

Using Generative AI isn't just about understanding the technology—it's much more. To succeed, businesses must align Generative AI with their goals, encourage collaboration, and handle ethical considerations. As Generative AI advances, it provides new opportunities to drive growth and handle the complexities of today's business world.



The **Certificate Program in Applied Generative AI** is a transformative 16-week online learning program tailored to equip professionals with advanced skills in Generative AI. The program is led by Dr. Ian McCulloh, who spearheads AI continuing education at Johns Hopkins University and formerly led the US Federal AI practice at Accenture; Dr. Pedro Rodriguez, a faculty member in the Johns Hopkins University Artificial Intelligence program, who oversees work of more than 250 researchers developing innovative AI solutions for government projects, and leads the Information Science branch at the Johns Hopkins Applied Physics Laboratory; and Dr. Iain Cruickshank, who holds faculty positions in Computer Science at both Johns Hopkins University and Carnegie Mellon University, and serves as a Data Scientist and AI Engineer for the U.S. Army. This program combines theoretical foundations with practical case studies. Learners will explore essential topics such as Large Language Models, Natural Language Processing, and Retrieval Augmented Generation. The curriculum is designed to provide a deep understanding of Generative AI applications, including text, image, and multimedia content generation.

The program offers live mentored learning sessions, personalized support from dedicated Program Managers, and access to peer networks and academic forums. Designed for data and technology professionals, STEM graduates, technology consultants and individuals looking to apply Generative AI in business contexts, it offers hands-on experience in developing and deploying advanced Generative AI solutions. The curriculum also covers ethical considerations and industry best practices, ensuring participants are well-prepared to integrate Generative AI responsibly and effectively into their business strategies.

PROGRAM HIGHLIGHTS



Format: Online (Recorded Video Lectures + Interactive Live Mentored Learning + Monthly Live Masterclasses by JHU Faculty)



Learning Support: Get Personalized Assistance from a Dedicated Program Manager, and Academic Support Through the GL Community, Project Discussion Forums, and Peer Groups



Weekly Commitment: 8-10 Hours per Week



Duration: 16 Weeks



In-demand Tools and Libraries: Python, Google Colab, BERT, VS Code, Vector Database (Chroma / Pinecone), Transformers, RAG (Retrieval Augmented Generation), Quick Fine-Tuning Techniques



Recognition: Earn a Certificate From Johns Hopkins University and 10 Continuing Education Units (CEUs) Upon Program Completion

JOHNS HOPKINS UNIVERSITY ADVANTAGE

Johns Hopkins University (JHU) is a prestigious institution consistently ranked in the top 10 and has a strong reputation in research and education. It is well-positioned to offer compelling differentiators for its continuing education programs in AI.

WORLD-CLASS FACULTY EXPERTISE

The courses are taught by faculty who are distinguished in academia and have real-world experience leading AI practices at Fortune 500 companies. This blend of academic rigor and industry expertise offers students unique insights into the practical applications of AI.

RESEARCH-DRIVEN CURRICULUM

The curriculum is designed based on the latest research and developments in AI, ensuring that students learn the most up-to-date and relevant information. JHU is the leading institution in research, consistently conducting nearly twice the R&D of any other university, and has maintained this unparalleled position for decades.

PRESTIGE AND REPUTATION

JHU is consistently ranked among the top ten universities globally. Earning a certificate from JHU carries significant weight and can enhance career opportunities for graduates by associating them with a recognized leader in education and research.

INTERDISCIPLINARY APPROACH

The courses leverage JHU's strengths across various disciplines, including computer science, engineering, medicine, and public policy. They offer students a holistic understanding of AI's impact across different sectors and enable them to think broadly about its applications.

Experience the Johns Hopkins University advantage

Enroll in the Certificate Program in Applied Generative AI to drive AI innovation in your organization.



WHO IS THIS PROGRAM FOR?

This program is designed for individuals looking to explore how Generative AI can solve real-world business problems.

Technology Professionals: Professionals who want to learn and apply Generative AI, enabling them to build and deploy AI-driven solutions at work or for personal projects using OpenAI and open-source LLMs.

Data Professionals: Data Analysts, Data Engineers, and Data Scientists seeking to enhance their ability to interpret and analyze data through Generative AI, uncovering deeper insights and expanding their expertise in text generation, image processing, and data analysis. They will also learn to deploy Generative AI solutions and strengthen their AI model development and data system maintenance abilities.

Technology Consultants and Technical Managers: Professionals who want to understand Generative AI, implement best practices, manage risks and ethical considerations, and guide technical teams to design and develop advanced AI solutions for their employers and clients.

STEM (Science, Technology, Engineering, and Mathematics) Graduates: Professionals who are graduates from science, technology, engineering, and mathematics fields wishing to upskill through hands-on training in Generative AI and become part of a cutting-edge industry with significant growth potential.



LEARNING OUTCOMES



Understand the theoretical foundations of Generative AI and its applications.



Develop and train Generative Models using contemporary Machine Learning frameworks.



Apply Generative AI techniques to create text, image, and multimedia content.



Evaluate the ethical implications of Generative AI.

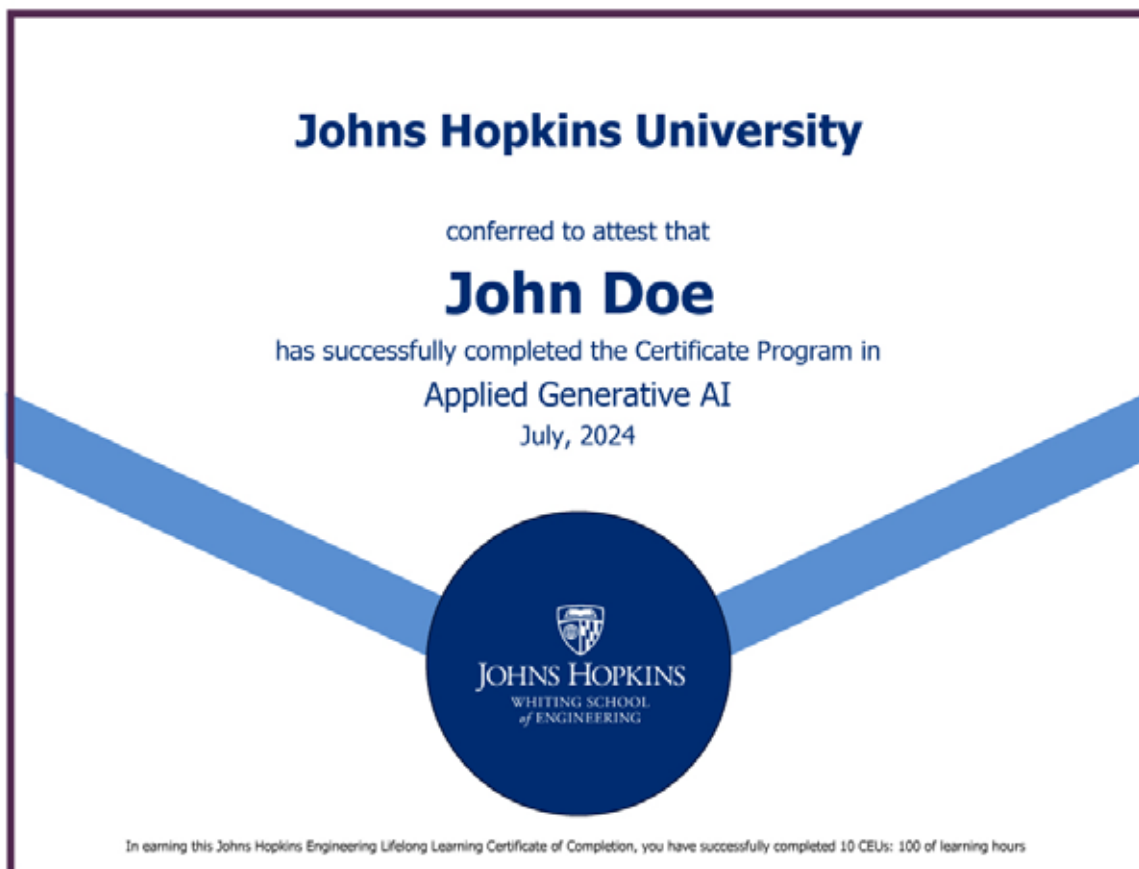


Implement best practices to mitigate potential risks in Generative AI solutions.



Critically analyze the impact of Generative AI on various industries and society as a whole.

CERTIFICATE OF COMPLETION



The image is for illustrative purposes only. The actual certificate may be subject to change at the discretion of Johns Hopkins University.

PROGRAM CURRICULUM

The curriculum, designed by the faculty of Johns Hopkins University, Great Learning, and leading industry practitioners, is taught by the best-in-class professors and practicing industry experts. The program aims to acquaint the learners with the skills needed to solve problems and deploy Generative AI solutions for various business applications.

PRE-WORK

This module provides all the necessary tools for your learning journey and establishes a solid foundation in three essential domains: Python programming, Introduction to AI and its applications, and Statistics.

MODULE 1: LEARNING PYTHON WITH GENERATIVE AI

This module provides a comprehensive introduction to Python programming fundamentals, focusing on Generative AI, and offers a solid understanding of how Large Language Models work.

WEEK 1: GENERATIVE AI LANDSCAPE

This week, you will learn the key concepts of Generative AI, how large language models (LLMs) function, what's under the hood, and why they behave the way they do. The week will conclude with an exploration of business applications of Generative AI across industries and functions, such as Marketing, Healthcare, and Productivity.

WEEK 2: PYTHON PROGRAMMING WITH GENERATIVE AI - PART 1

This week, you will learn how to use Generative AI models to generate code for simple Python-based applications, like a calculator or a database. You will also learn how to ask ChatGPT for lessons, generate code, interpret and debug code, and more.

WEEK 3: FOUNDATIONS OF AI

This week, you will learn the fundamentals of Machine Learning, which are essential for understanding how LLMs work at an intuitive level. Additionally, you will learn how to build ML classifiers using Generative AI and evaluate various Machine Learning models with the help of Generative AI.

WEEK 4: PYTHON PROGRAMMING WITH GENERATIVE AI - PART 2

This week, you will learn how to interact with Generative AI using various libraries, and you'll explore how to interface and work with different types of text and data modalities in Python. Building on the previous week, you will learn how to use Generative AI to store and manipulate text, read files, and clean text data in Python.

MODULE 2: GENERATIVE AI FOR BUSINESS PRODUCTIVITY

This module offers an opportunity to learn how to solve a variety of business problems using Generative AI. You will explore techniques such as text summarization, text classification, and text generation through prompting or Prompt Engineering with LLMs.

WEEK 5: NATURAL LANGUAGE PROCESSING

This week, you'll learn how to address fundamental text-based challenges, including sentiment analysis, topic modeling, and named entity recognition, through practical business case studies.

WEEK 6: TRANSFORMERS FOR LARGE LANGUAGE MODELS

This week, you will learn the foundational concept behind how Large Language Models (LLMs) work, specifically focusing on 'self-attention'. Additionally, you'll learn about the building block of LLMs, the 'Transformer'. Throughout the week, you will also learn how to solve text-based problems using Transformers.

WEEK 7: PROMPT ENGINEERING

This week, you will delve into the fundamentals of Prompt Engineering and prompting techniques to help you write effective prompts to obtain specific responses from an LLM for business use cases. You will learn about LLM training and development and model deployment. Additionally, you'll discover how to build useful workflows to automate problem-solving with LLMs using LangChain.

WEEK 8: CLASSIFICATION, CONTENT GENERATION AND SUMMARIZATION WITH GENERATIVE AI

This week, you will focus on addressing common issues in text processing, including summarization, content generation, and classification, in the context of Generative AI. Additionally, you'll learn how to assess the quality of these solutions using objective metrics and other LLMs.

WEEK 9: PROJECT 1 (SAMPLE BUSINESS PROBLEM)

Develop an AI-powered 'secretary' that assists users in managing emails more efficiently by highlighting the most urgent messages, summarizing email threads, and improving overall productivity. The project aims to leverage Generative AI models for classifying, prioritizing, and summarizing emails to provide concise actionable insights for users.

WEEK 10: LEARNING BREAK

MODULE 3: DESIGNING ADVANCED GENERATIVE AI WORKFLOWS

This module will focus on building and deploying advanced Generative AI solutions and agents using Retrieval Augmented Generation (RAG) and fine-tuned LLMs. You will learn to implement these technologies securely and responsibly for both private and public applications.

WEEK 11: SECURE AND RESPONSIBLE GENERATIVE AI SOLUTIONS

This week, you will be able to identify and mitigate bias and risk in AI systems, while also understanding and applying relevant laws and regulations for responsible usage of AI.

WEEK 12: DEVELOPING AGENTS WITH LANGCHAIN

This week, you will learn how to build Agentic Generative AI workflows with LangChain and create practical agents, such as Web and Database agents. Throughout this process, you will learn about LangChain library, AI agents, their types and workflows.

WEEK 13: RETRIEVAL AUGMENTED GENERATION (RAG) SEARCH

This week, you will understand the roles and differences between embeddings and tokenization in LLMs, learn the importance of Byte-Pair Encoding, gain insights into computing and applying sentence embeddings, explore how RAG improves response accuracy, and learn about the algorithms behind LLM embeddings and their impact on performance.

WEEK 14: ADVANCED RAG

This week, you will be able to differentiate between simplicity and depth in RAG implementations, fine-tune a basic RAG model, and evaluate RAGs effectively.

WEEK 15: FINE-TUNING AND CUSTOMIZATION OF GENERATIVE AI

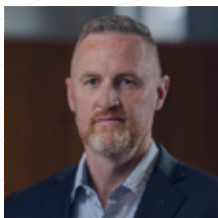
This week, you'll learn how fine-tuning works, explore different fine-tuning methods, and see how to adjust an open-source LLM for real-world business uses.

WEEK 16: PROJECT 2 (SAMPLE BUSINESS PROBLEM)

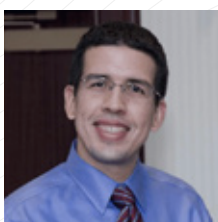
Develop a secure, fine-tuned Retrieval-Augmented Generation (RAG) system that enhances search capabilities on a personal computer, allowing users to retrieve relevant information from personal files and documents quickly and accurately. The project will emphasize ensuring data privacy, mitigating bias, and personalizing the RAG model for specific use cases.

PROGRAM FACULTY AND INDUSTRY MENTORS

FACULTY



Dr. Ian McCulloh leads the Johns Hopkins University Artificial Intelligence portfolio for Lifelong Learning. His research combines neuroscience, Artificial Intelligence, and human behavior to develop at-scale AI systems. McCulloh also served as an associate professor at Johns Hopkins and chief scientist at the Cyber Warfare Systems Group at the University's Applied Physics Laboratory. McCulloh retired as a Lieutenant Colonel from the U.S. Army after 20 years of service with expertise in social network analysis, special operations and improvised explosive device forensics. McCulloh holds a Ph.D. and Master's degrees from the Carnegie Mellon University School of Computer Science and the Florida State University, and a Bachelor's degree in Industrial Engineering from the University of Washington.



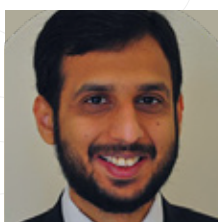
Dr. Pedro Rodriguez is a faculty member in the Johns Hopkins University Artificial Intelligence program and leads the Information Science branch at the Johns Hopkins Applied Physics Laboratory. He oversees a team of over 250 AI/ML researchers working on cutting-edge projects for the Department of Defense, the Intelligence Community, and other government agencies.

With over 20 years of experience, Dr. Rodriguez specializes in AI/ML algorithms for target detection, tracking, classification, and sensor fusion. He holds a Ph.D. in electrical engineering from the University of Maryland, Baltimore County, an M.S. in applied biomedical engineering from Johns Hopkins, and a B.S. in electrical engineering from the University of Puerto Rico.



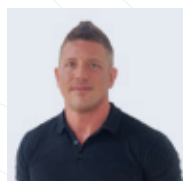
Dr. Iain Cruickshank holds faculty positions in Computer Science at both Johns Hopkins University and Carnegie Mellon University, and serves as a Data Scientist and AI Engineer for the U.S. Army. He has held key roles at the Army's AI Integration Center and Army Cyber Institute, focusing on Machine Learning techniques to analyze online information environments and evaluate AI systems. His research has been applied to studying misinformation and disinformation campaigns, and he has published over 40 peer-reviewed papers.

Dr. Cruickshank holds a Ph.D. in Societal Computing from Carnegie Mellon, an M.S. in Operations Research from the University of Edinburgh, and a B.S. in Mathematics from West Point. He is a National Science Foundation Graduate Research Fellow and Rotary Ambassadorial Scholar.



Dr. Pavankumar Gurazada is a faculty member at Great Learning, specializing in business and AI, where he teaches AI and Machine Learning across various Master's programs. He holds a Ph.D. in Applied Machine Learning, with research focused on deep learning and MLOps. His work has been published in leading journals and conferences. In 2020, his book *Marketing Analytics*, published by Oxford University Press, became a popular textbook in post graduate programs. Dr. Gurazada also serves as a data science advisor and is a board member at Constems AI, a deep-tech startup developing computer vision systems for Industry 4.0.

INDUSTRY MENTORS



**JEREMY
SAMUELSON**

Principal Data Scientist
& ML Engineer
at Equifax



**BHASKARJIT
SARMA**

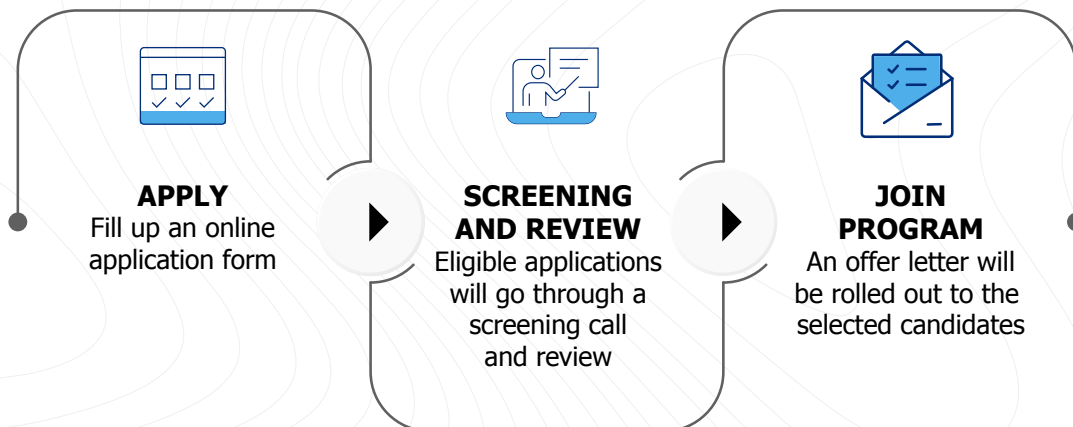
Head RQA AI Labs
at BlackRock

Note: This is an indicative list and is subject to change based on the availability of faculty and mentors.

ADMISSION PROCESS



The admission process is conducted on a rolling basis and will be closed once the requisite number of candidates are enrolled.



PROGRAM FEE
\$2,950

Please contact a program advisor for more information on offers, payment plans, and eligibility for financial assistance.

PROGRAM PARTNER



Great Learning is a leading global ed-tech company for professional and higher education. It offers comprehensive, industry-relevant programs across various cutting-edge Technology, Data, and Business domains. These programs are developed in collaboration with the world's foremost academic institutions, such as MIT Professional Education, Wharton Online, The University of Texas at Austin, Northwestern School of Professional Studies, Deakin University, Great Lakes Institute of Management, and more. They are constantly reimagined and revamped to address the dynamic needs of the industry. Offered in blended, classroom, and purely online modes, these programs are delivered with the help of expert mentors and highly qualified faculty. Great Learning is on a mission to enable transformative learning and career success in the digital economy, which has impacted 11 million+ learners from over 170 countries.



11 Mn+
Learners



170+
Countries



7300+
Industry Experts



**Ready to become an
expert in Applied GenAI?**

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