

Saudi Aramco Cybersecurity Chair at King Fahd University of Petroleum and Minerals

Python for Scientific Computing, Artificial Intelligence, & Cybersecurity

BOOTCAMP OUTLINE

Bootcamp Date: Dec 10 - 13, 2023

BOOTCAMP OBJECTIVE

This bootcamp aims to introduce delegates to Scientific Computing and Cyber Security using Python and Artificial Intelligence using TensorFlow.

Participants will be introduced to Python, Scientific Computing, and Cyber Security before moving on to Artificial Intelligence. The bootcamp will focus on the Python and TensorFlow programs and NOT on the mathematical theory.



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WHAT IS IT?

This bootcamp is designed for anyone in the engineering, computing and scientific community who wants to learn how to use Python for Scientific Computing and TensorFlow for Artificial Intelligence (AI) programming and AI-powered cyber security.

The emphasis of the bootcamp is on practical applications by means of hands-on tutorials using Python and TensorFlow. The emphasis is not on the mathematical theory.

WHAT WILL YOU LEARN?

- How to program Python using IDLE, SPYDER and JUPYTER/Google COLAB Notebooks
- How to model real-world systems in biology, chemistry, computing, data science, economics, engineering, mathematics, physics, statistics, and cyber security
- How the brain works and about Artificial Intelligence
- How to program deep neural networks In Google COLAB with TensorFlow
- How to apply AI to cyber security use cases

WHO SHOULD ATTEND?

- This bootcamp is aimed at a large professional audience: from academics and technicians, advanced undergraduate and graduate students to applied mathematicians, engineers, and researchers in a broad range of disciplines such as computing, cyber security data science, economics, nonlinear optics, neural networks, population dynamics, physics, and statistics.
- The bootcamp will help to develop a practical understanding of how Python can be used to solve real-world problems and provide scientists with a means of presenting their results.
- The bootcamp participants need no knowledge of any programming language.

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BOOTCAMP

LEADERS



Dr. Stephen Lynch

Reader, National Teaching Fellow
MANCHESTER METROPOLITAN
UNIVERSITY

Stephen is a world leader in the use of mathematics packages in teaching, learning, assessment, research and employability. He started using packages in the mid 1980's whilst studying for his Ph.D. in pure mathematics. Upon completion of his Ph., he started his lecturing career at Southampton University at the age of 24.

This Python workshop has developed from a series of mathematics lectures to undergraduates and from both national and international Python and TensorFlow workshops. Although educated as a pure mathematician, Stephen's many interests now include applied mathematics, cell biology, electrical engineering, computing, neural networks, nonlinear optics and binary oscillator computing, which he co-invented with a colleague.

He has authored 2 international patents for inventions, 8 books, 4 book chapters, over 40 journal articles and a few conference proceedings. In 2022, Stephen was awarded a National Teaching Fellowship for his work in Widening Participation, programming in the Maths curriculum, and interdisciplinary research feeding into teaching.

Stephen is a Fellow of the Institute of Mathematics and Its Applications (FIMA) and a Senior Fellow of the Higher Education Academy (SFHEA). He is currently a Reader with MMU and was an Associate Lecturer with the Open University from 2008-2012. Stephen is also the author of MATLAB®, Maple™ and Mathematica® books – all published by Springer International Publishing.



Segun Popoola

Lecturer in Cybersecurity & AI
MANCHESTER METROPOLITAN UNIVERSITY

Dr Segun Popoola is a lecturer in cyber security and artificial intelligence in the Department of Computing and Mathematics at Manchester Metropolitan University.

In June 2022, he was endorsed as a Global Talent by The Royal Society. He received a Ph.D. degree in communication engineering from Manchester Metropolitan University, a Master of Engineering degree (distinction) degree in information and communication engineering from Covenant University and a Bachelor of Technology degree (first class) in electronic and electrical engineering from Ladoke Akintola University of Technology.

Dr. Popoola's Ph.D. thesis on "federated deep learning for botnet attack detection in IoT networks" was a product of an academic-industry partnership project jointly funded by the department of engineering at Manchester Metropolitan University and a cyber security company, Cyraatek Ltd UK.

He has published more than 95 research papers in reputable journals and conference proceedings including IEEE Internet of Things Journal, IEEE Access, and IEEE Vehicular Technology Conference. His Google Scholar profile shows that he currently has more than 1800 citations, an h-index of 25, and an i10-index of 59.

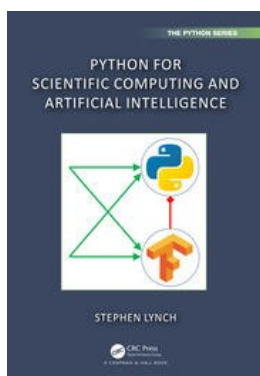
Registration by invitation only. Please contact enrique.encarnacion@kfupm.edu.sa

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BOOTCAMP PLAN

| | Day 1 – Sunday 10 Dec 2023 (Online) | Day 2 – Monday 11 Dec 2023 (Online) |
|---------------|--|--|
| 08:50 – 09:00 | Introduction and Welcome | |
| 09:00 – 09:25 | Python IDLE | Fractals and Multifractals |
| 09:25 – 09:50 | Anaconda and Spyder | Image Processing |
| 09:50 – 10:00 | Break | Break |
| 10:00 – 10:25 | Jupyter Notebooks and Google Colab | Numerical Methods for ODEs and PDEs |
| 10:25 – 10:50 | Python for AS-Level Maths | Physics |
| 10:50 – 11:05 | Break | Break |
| 11:05 – 12:30 | Python for A-Level Maths | Statistics |
| 12:30 – 12:55 | Biology | Brain-Inspired Computing |
| 12:55 – 1:05 | Break | Break |
| 01:05 – 01:30 | Chemistry | Neural Networks and Neurodynamics |
| 01:30 – 01:55 | Data Science | TensorFlow and Keras |
| 01:55 – 02:05 | Break | Break |
| 02:05 – 02:30 | Economics | Recurrent Neural Networks (RNNs) |
| 02:30 – 02:55 | Engineering | Convolutional Neural Networks (CNNs) |

| | Day 3 – Tuesday 24th Dec 2023 (Onsite) | Day 4: Wednesday 25th Dec 2023 (Onsite) |
|---------------|--|---|
| 09:00 – 09:50 | Introduction to Network Security | Introduction to Information Security |
| 09:50 – 10:00 | Break | Break |
| 10:00 – 10:50 | Deep Learning for Intelligent Intrusion Detection System | Traditional Cryptography in Python |
| 10:50 – 11:00 | Break | Break |
| 11:00 – 10:50 | Popular Datasets and Data Pre-processing | Private Key Cryptography in Python |
| 10:50 – 01:00 | Lunch | Lunch |
| 01:00 – 01:50 | Deep Learning Model Development | Public Key Cryptography in Python |
| 01:50 – 02:00 | Break | Break |
| 02:00 – 02:50 | Deep Learning Model Evaluation | Federated Learning for Privacy Preservation |
| 02:50 – 03:30 | Open Discussion | Closing Remarks Break |



A copy of this 340-page reference e-book will be available during the bootcamp

Download all files and notebooks here:
<https://github.com/proflynch/CRC-Press/>

Registration by invitation only. Please contact enrique.encarnacion@kfupm.edu.sa