CAREER PROGRESSION AND OPPORTUNITIES IN BASIC SCIENCES: PHYSICS

Dr Stephen O. IKUBANNI

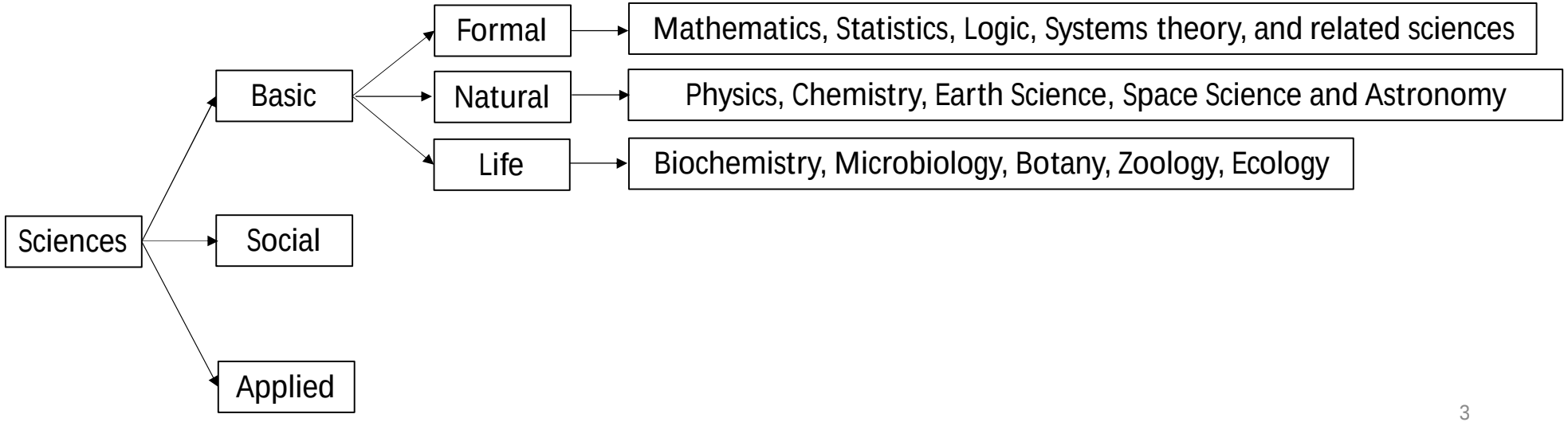
Aeronomist and Space Physicist

@ the Orientation Programme for the 2020/2021 Freshmen of the Department of Physical Sciences

OUTLINE

- Overview of careers for Physics Students
- Case Study
- Future Professional or career clusters and skills needed
- Who is needed for the skills and why?
- Examples from my circle
- Final thoughts

- **Career** is an occupation undertaken for a significant period of a person's life and with opportunities for progress.
- **Career Progression** is simply the means by which you move forward in your **career.**
- **Career Opportunities** are the openings that are available for meaningful career growth or progression.
- **Basic Sciences** is one of the divisions of Sciences. The others being Social and Applied Sciences. **Basic Sciences** is divided into Formal and Natural Sciences



Studying for a Bachelor of Science (B.Sc.) Degree in Physics?

After studies is completed, what next?

Earning a degree implies that you have been able to subject yourself to a rigorous daily routine, which can be interpreted as your readiness to cope with whatever life throws at you.

"From **cancer treatment** to tackling **climate change**, **gaming** to **robotics and artificial intelligence**, **physics and physicists** are on the front line, helping to shape the future. At a time when jobs are changing, physics offers a vast and expanding range of career paths."

- *https://www.iop.org/careers-physics/your-future-with-physics* *(17th February, 2021)*

- Astronomy and Space
- Climate Science and Meteorology
- Engineering
- Medical Physics and digital healthcare
- Renewable Energy
- Robotics and Artificial Intelligence
- Game Development
- Finance and Law

- Nigerian Metrological Agency (NiMet) (Weather & Climate Scientist; Aviation – Air traffic controller)
- National Space Research and Development Agency (NASRDA) (Atmospheric & Space Scientist)
- Nigerian Communication Satellite (NigComSat) company (Satellite design and development, payload design, satellite health monitoring)
- Nigeria Atomic Energy Commission (NAEC) (Nuclear Scientist and Engineer)
- Health (as Radiographers)
- Petroleum and gas (e.g. Nigeria National Petroleum Commission (NNPC), Shell, Oando, Mobil)
- Research Institute
- Tertiary Education subsector (Universities, Polytechnics, Colleges of Education, Technical Colleges)
- Survey and Geoinformatics

DO YOU KNOW THIS MAN?

MEET HIM

- **Elon R. Musk**
- Born June 1971 in South African
- Co-founded web software company “Zip2” - 1995
- Sold “Zip2” to Compaq for $307 million in cash (Received 7% share)
- Co-funded “X.com”, an online bank, in March 1999
- Merged “X.com” with Confinity in March 2000. The new company was named PayPal in 2001.
- Sold “PayPal” to eBay by stock for $1.5 billion (claiming 11.7% of the shares)
- Founded “Space Exploration Technologies Corp.” – “SpaceX” in May 2002
- The successful launch of Falcon 1 in 2008 after three failed attempts, was the first private liquid-fuel rocket to reach the Earth orbit.
- Invested $100 million, but received $1.6 billion Commercial Resupply Services programme contract for 12 flights of his Falcon rocket and Dragon Spacecraft to the International Space Station (ISS).
- Dragon spacecraft replaced Space Shuttle and dock with ISS in 2012.
- To reduce the cost of rocket launch and future space travel, he conceived and started working towards reusable rockets, and successfully landed the first stage of a Falcon 9 rocket.
- Presently at the forefront of satellite internet access via the LEO satellite constellation called “Starlink”

WHAT MADE THIS MAN?

- Born in Africa
- Elementary and High School Education in Africa
- Started learning programming at age 10years
- Had Bachelor degrees in Economics and Physics
- Two internships in an energy storage start-up that focuses on using electrolytic ultracapacitors
- Admitted into a PhD programme in Energy Physics/Material Science at Stanford University in 1995
- Curious, Visionary, Conceptualize, Diligent, Belief, Immune to failure and rejection, Sacrificial
- Became the world's richest man in 2020.

Professional Clusters for the future of work:

- Data and AI
- Care Economy
- Green Economy
- Engineering and cloud computing
- People and Culture
- Product Development
- Sales, Marketing, and Content

WORLD ECONOMIC FORUM

** These are expected to yield 6.1 million new job opportunities in the coming years*

Global Skills Index (GSI) report 2020

These professional clusters for the future of work need professionals with the following skills:

- Business
- Technology
- Data Science

Where and how do you fit as a Graduate of any of the Physical Sciences Programme?

Global Skills Index (GSI) report 2020

Performance of different fields of study across skill domains

BUSINESS	TECHNOLOGY	DATA SCIENCE
Physical Sciences	Physical Sciences	Physical Sciences
Engineering	Computer Science	Mathematics & Statistics
Business	Mathematics & Statistics	Engineering
Mathematics & Statistics	Arts & Humanities	Computer Science
Biological Sciences	Engineering	Biological Sciences
Computer Science	Legal Professions	Social Sciences
Social Sciences	Business	Business
Legal Professions	Social Sciences	Health Professions
Arts & Humanities	Education	Arts & Humanities
Health Professions	Biological Sciences	Legal Professions
Education	Health Professions	Educations

Why?

Global Skills Index (GSI) report 2020

"Our data reveals that students who major in Physical Sciences (e.g., physics, chemistry, meteorology) and Mathematics & Statistics currently have the strongest skill set across all three domains. These programs of study tend to **emphasize things like mathematical thinking, using data to inform decision-making,** and **measuring uncertainty, all with the use of the latest software tools** that ensure students have the ability to navigate the changing technological landscape. **Students in these fields can more easily acquire new skills because they have already mastered the foundations that future innovations will be built upon.**"

Job Title of some friends/former course mates and their qualifications (B.Sc. Physics inclusive)

Present Job Title	Qualifications	Previous job titles
IT Manager – @Sterling Oil Exploration & Energy Production Company Ltd	B.Sc. Physics (Unilorin) MBA, Business Administration (2018) (Unilag)	- Group IT Network Manager @Flour Mills of Nigeria Plc - Infrastructure Analyst, Server & Network Administration Lead @Ikeja Electric - Network Analyst (Assistant IT Projects & Network Manager) @Flour Mills of Nigeria Plc - IT Projects Lead @Flour Mills of Nigeria Plc
IT Infrastructure Expert – @Coca-Cola Hellenic Bottling Company	B.Sc. Physics (Unilorin) PGD, Electrical and Electronics Engineering (2016) (Unilag) M.Sc., Information Technology (ongoing)	- Network Support Engineer @Flour Mills of Nigeria Plc - Junior Manager, Network Support @Flour Mills of Nigeria Plc - Network and IT Expert @Sitech Nigeria Limited - Broadcast Engineer @Degue Broadcasting Network
Lead, Digital and Data Analytics – @Flinkteshnik Concept Limited	B.Sc. Physics (Unilorin)	- Technical Support Executive @Integrated Intelligent West Africa Limited - System Network Administrator @Icecool Contracts Limited

Present Job Title	Qualifications	Previous job titles
Commissioning Engineer – Security Systems @SIEMENS, United Arab Emirates	B.Sc. Physics (Unilorin)	- Team Lead, Security Systems @MVP Tech, Dubai, UAE - Senior Technical Support @MVP Tech, Dubai, UAE - Systems Engineer @Conslink Communications, Nigeria
Distributed Systems Data Engineer, AI/ML Professional – @Scale, New York, USA	B.Sc. Physics (Unilorin) M.Sc. Computer Science and Engineering, BI & Decision Engineering [Universite libre de Bruxelles. Belgium] M.Sc. Information Technologies for Business Intelligence [Universitat Politecnica de Catalunya, Spain] M.Sc. Information specialite Systemes d'information pour l'aide	- Lead Data Engineer @Collective[i], New York - Data Engineering, Analytics & Distributed Systems @Collective[i], New York - Software Engineer Analytics @Collective[i], New York - Data Scientist @Softonic, Barcelona, Spain - Analytics Engineer @Real Impact Analytics, Brussels, Belgium - R&D Software Engineer @Savonia Open Innovation Space/Juntann Oy, Kuopio, Finland - System/Network Support @Data Adminstration Centre, Savonia UAS, Finland

Present Job Title	Qualifications	Previous job titles
Founder & CEO – @Flutterwave, San Francisco, California, USA	B.Sc. Physics (Unilorin) M.Sc. IT Security Science (EC-Council University) Executive Program, Technology Operations & Value Chain Management, (MIT Sloan School of Management) Project Management & Advanced Computing, (University of Westminister)	- Senior Entrepreneur in Residence @Africa Fintech Foundry - Head, Digital Factory & Innovation, Access bank Plc - Head, Mobile Financial Services @Sterling Bank - Technology (e-business) Project Developer/Project Manager/Product Manager @Stanbic IBTC Bank - Transactional Product Development Manager @Stanbic IBTC Bank - Enterprise Infrastructure Solution Developer @GTBank - Application Engineer @PayPal, London, UK (Internship) - Application Developer @British Telecom Professional Services, London, UK (Internship) - Founder/CEO QuickFix NT (Jan 2003)
Oil & Energy Expert, USA	B.Sc. Applied Physics (Unilag) Ph.D. Electrical Engineering (North Carolina State University)	

Conclusively,

- Do your best to develop your mental capability, and cognitive reasoning by studying to pass your examinations, not cheating your way through.
- Maximize your leisure to improve on your skill sets. *“In the skill age, not certification age”*
- Creative time to learn new skill sets that might be useful post-graduation
- Connect with professionals in the area of interest for mentorship, particularly after you graduate
- Seek opportunities to learn by volunteering
- Do not think less of yourself. “You are of more value than many sparrows”

I wish you good success.

God Bless You

The Global Skill Index (GSI) Report was handled by three Data Scientist at Coursera:

- Emily Glassberg Sands – The VP of Data at Coursera – **Ph.D. in Economics** from Harvard, and **Bachelor in Economics** from Princeton
- Vinod Bakthavachalam – Senior Data Scientist – **Triple major in Economics, Statistics, and Molecular & Cellular Biology** from UC Berkeley. Then **Master's in Statistics** from Stanford
- Rachel Reddick – Staff Data Scientist – **Ph.D. in Astrophysics** from Stanford, worked in data science at a manufacturing company. Focuses on developing ways to measure the skills of learners and identify suitable roles for them based on their developed **proficiency.**