Starting a new lab

Dr Lindsey Ann Edwards, King's College London, United Kingdom

Dr Sabine Klein, University Hospital Muenster, Germany

MICROB-PREDICT 7th General Assembly Meeting,
Cologne, 27-29 January 2025

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 825694.

How do you get the opportunity to get to set up your own lab - Obtaining a Faculty/Group Leader-Post:

How Tackling Antimicrobial Resistance from Poo to Policy, Lead me along "the yellow brick road" to the "emerald city" of a Faculty Post

lindsey.edwards@kcl.ac.uk

@DrLAEdwards

Dr Lindsey Ann Edwards BSC. MSc. DLSHTM PhD FHEA

Principal Investigator, The Centre For Host Microbiota Interactions, Guy's Hospital

Research Director for Faecal Microbiota Transplant Programme, Institute of Liver Studies

British Society for Gastroenterology, Gut Microbiota for Health Expert Panel, Antimicrobial Resistance Lead. R-BiOME AMR Consortium Lead.

THE POLICY INSTITUTE

appg

BRITISH LIVER TRUST

Raising Awareness, Transforming Lives

All-Party Parliamentary Group on Liver Health

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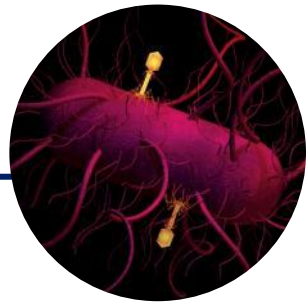
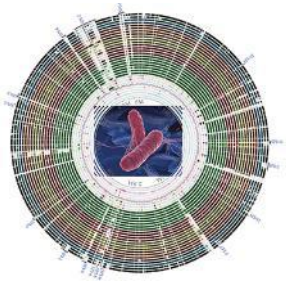
How Tackling Antimicrobial Resistance from Poo to Policy, Lead me along "the yellow brick road" to the "emerald city" of a Faculty Post



Outline



In academia, there is no clear career path

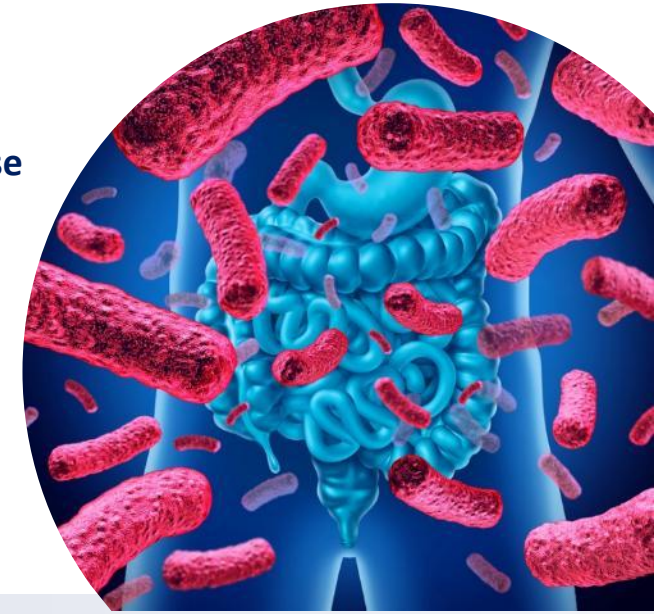
My 'Yellow Brick Road'

- Mucosal Immunologist & Microbiologist
- 23 years of experience in host-microbial Interactions

- Two global health crises: Antimicrobial resistance (AMR) & Liver Disease Driven by Microbiota Dysbiosis

- Built a programme of work that translates to patients/public, government policy & Societal impact

- **Advice for ECRs – Resilience, Adaptability, Endurance**



You need 'grit', determination and Passion!

No journey will be the same but there are some key factors that are common

A guideline that leads all who follow it, to the road's ultimate destination – An academic Faculty Post

- The *Oxford English Dictionary* defines the phrase ***yellow brick road*** as denoting a path to an especially positive or desired outcome or goal.

Need to follow your path to your own 'niche'

- Develop a Programme of translational work that you are passionate about

Programme of translational work that I am passionate about:

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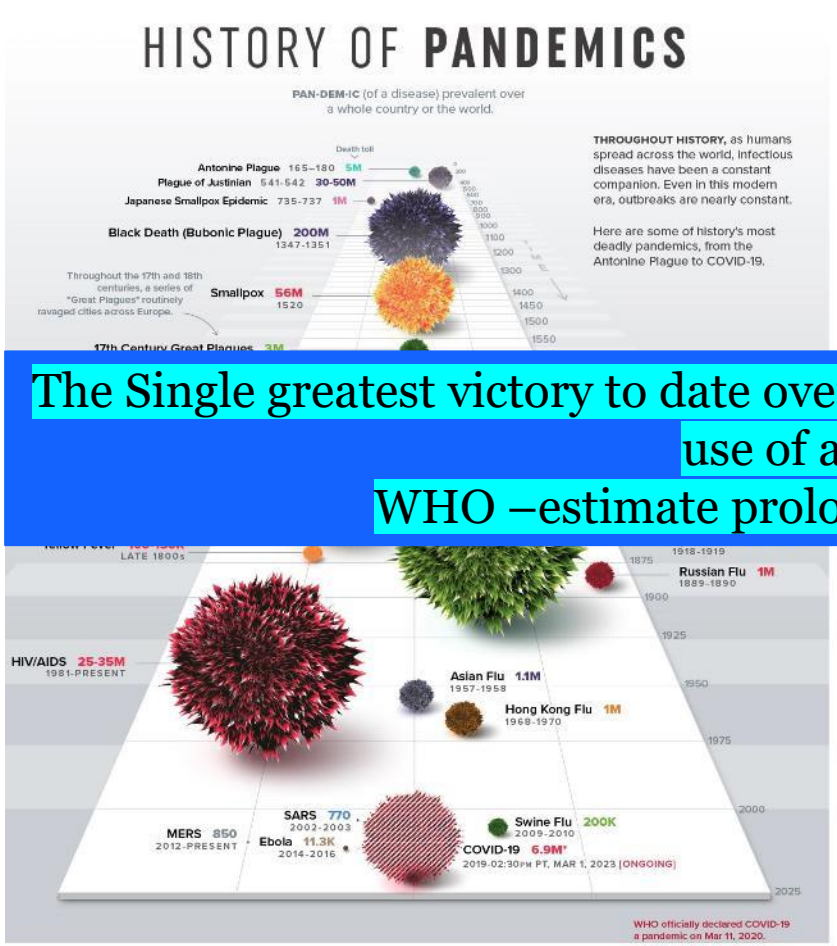
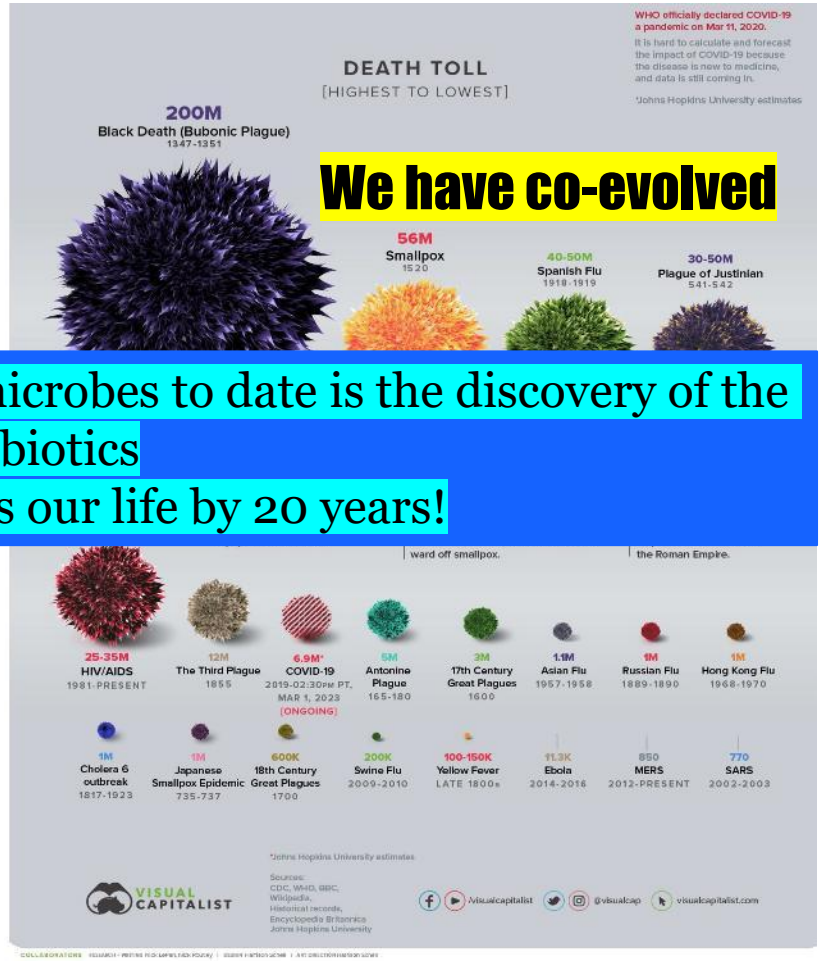
‘Host-Microbe’ interactions – Infection has been our biggest killer to date





The Single greatest victory to date over microbes to date is the discovery of the use of antibiotics

WHO –estimate prolongs our life by 20 years!

Programme of translational work that I am passionate about:

MICROB-PREDICT

Very real risk of a world where antibiotics no longer work - Antimicrobial resistance (AMR)

Microbes can become resistant to the antibiotics and survive causing more severe infections or even death!

The global challenge

The World Health Organisation describes antimicrobial resistance (AMR) as "one of the biggest threats to global health, food security, and development". Patients who have chronic diseases, especially liver disease, are at greater risk. In England, even before the incidence of Covid-19, antibiotic-resistant bloodstream infections had risen by **35%**, costing the NHS an estimated **£180 million/year.**

A failure to address the problem of antibiotic resistance could result in

10m deaths by 2050

Costing £66 trillion

Review on Antimicrobial Resistance

My Yellow Brick Road:

MICROB-PREDICT

Dr Lindsey Ann Edwards BSc MSc DLSHTM PhD FHEA

CAREER CHANGE – no funding for infection

Postdoc 2 – UCL infectious diseases

Postdoc 1 – UCL infectious diseases

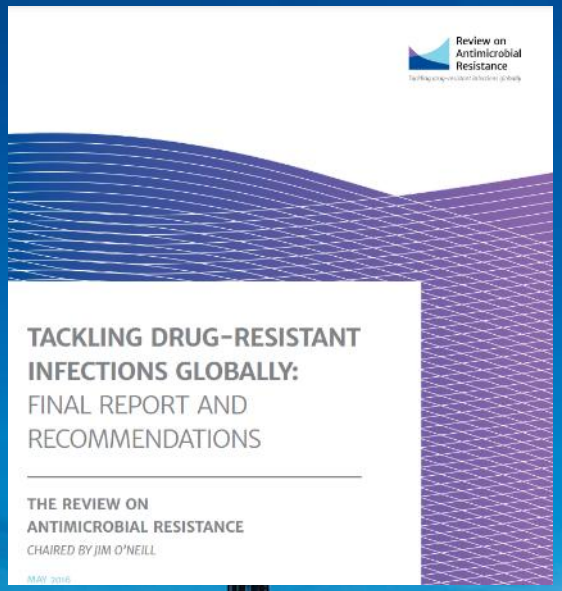
PhD – Aberrant Immune Response to the Microbiome in Crohn's Disease University College London

MSc – Immunology of Infectious Diseases

DLSHTM- London School of Hygiene & Tropical Medicine

BSc –Biological Sciences with Parasitology & Microbiology King's College

GCSEs/ A-levels



KING'S College LONDON

This field suffers from decades of under-investment by companies and governments

The post-World War II period saw a 'golden era' of antibiotic discovery, with a steady stream of new products reaching the market through the late 1940s to the early 1970s. But this rate of discovery has fallen dramatically since the 1980s. Even when

Finally, this lack of investment and interest by companies and governments has in turn contributed to a decline in the attractiveness and prestige of the field. Academic careers do not reward the skills required for antibiotic discovery, where advancement and prestige is driven by publishing in journals seen as focused on 'cutting-edge science' – not something often associated with microbiology[15].

Dr Lindsey Ann Edwards BSc MSc DLSHTM PhD FHEA

Joined FoDOCS Faculty

COVID

Research Director FMT (microbiome) – KCL

Not eligible for research council funding

2018 - Honorary Senior Lecture UCL/KCL

Junior Group Leader (PI) Institute of Hepatology

Senior Postdoc – KCL Liver

CAREER CHANGE to Liver

2012 Postdoc 3 – KCL

alloimmunity/microbiome tolerance

CAREER CHANGE – no funding for infection

Research is funded based on Societal Impact

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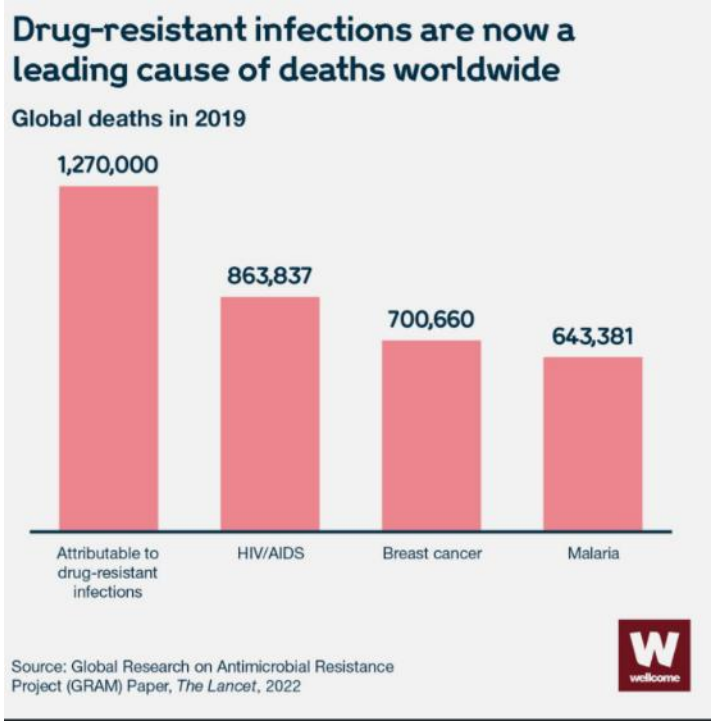
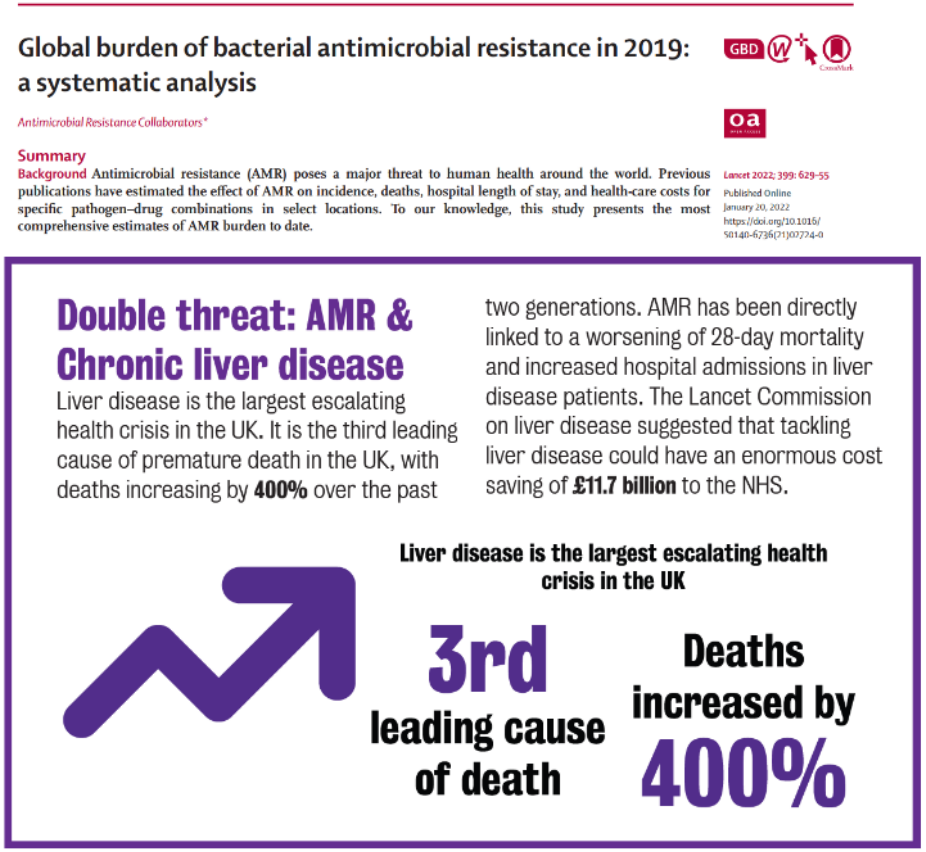
Antimicrobial resistance – Now the leading cause of death worldwide!

According to a landmark study by the Global Research on Antimicrobial Resistance (GRAM) Project published in *The Lancet*:





Research is funded based on Societal impact

Societal impact is the effect of research in the real world- a change of benefit beyond academia to the economy, society, culture, public policy or services, health, and the environment or quality of life.

My Research Does Have Societal Impact

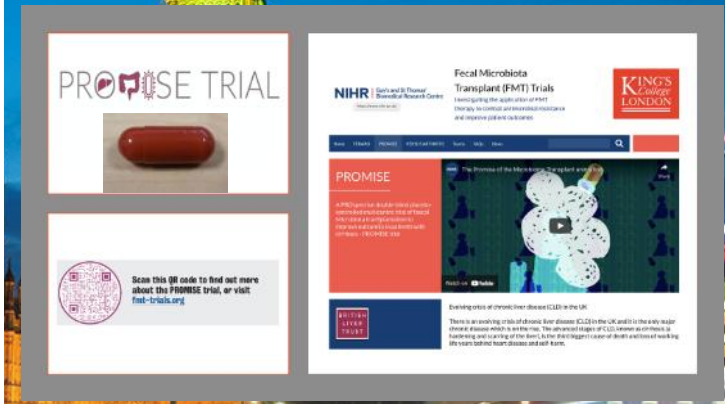
Tackling AMR in Liver Disease:

King's hosts antimicrobial resistance awareness event at Westminster

On Tuesday 22nd March, King's hosted the event Tackling Antimicrobial Resistance in Liver Disease in the Churchill Rooms at the Houses of Parliament.

Professor Debbie Shawcross (King's), Dr Lindsey Edwards (King's), Stephen McPartland (MP) and Wayne David (MP): Co-Chairs of The All-Party Parliamentary Group for Liver Disease and Liver Cancer, and Pamela Healy OBE: CEO of The British Liver Trust

The event was held in partnership with **The British Liver Trust** (BLT) and The All-Party Parliamentary Group (APPG) on Liver Disease and Liver Cancer and was funded by the National Institute of Health Research. King's researchers welcomed Members of Parliament and Members of the House of Lords. In attendance were representatives from The APPG on Antibiotics and The APPG for The Human Microbiome.



'Your research is fantastic, inspirational to be honest, with such far reaching consequences for millions of people across the globe.' Pamela Healy OBE CEO The British Liver Trust

Positives to help to keep going on a hard path

Nominated for Department for health award: Tackling antimicrobial resistance in chronic liver disease

Positives to help to keep going on a hard path

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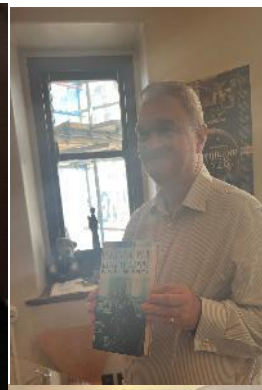
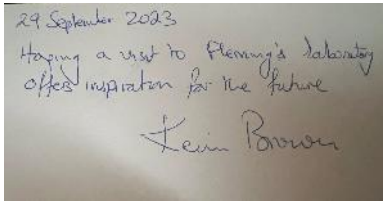
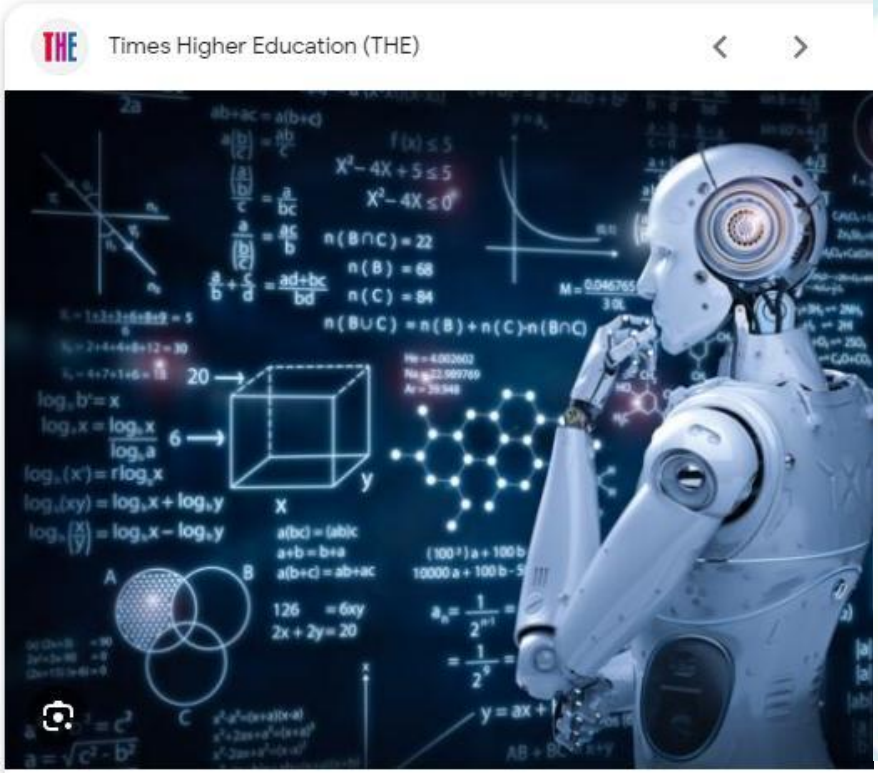
Gave a ‘state of the art lecture’ on AMR at 95-year anniversary of the discovery of penicillin at St Mary’s Hospital



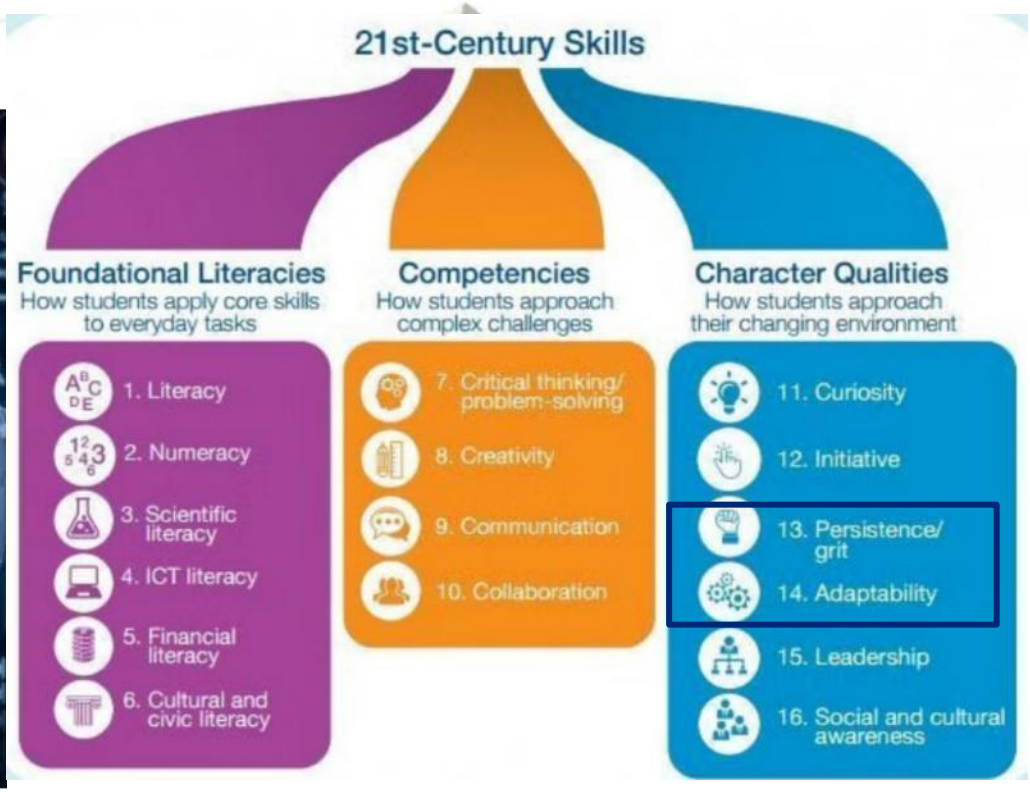


Skills to help on our career path

Fourth Industrial Revolution



How universities can prepare their students for the fourth industrial revolution | Times Higher Education (THE)



Skills to help on our career path

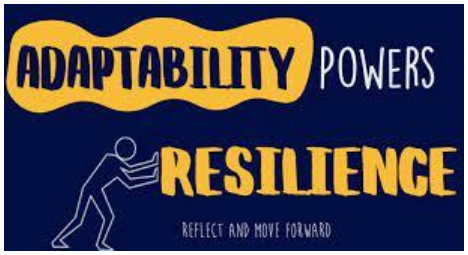
The Power of Resilience and Adaptability: Navigating Career Challenges for Long-Term Success

posted 5 months ago By Medet Ali

In the dynamic landscape of professional life, adversity is an inevitable part of the journey. It may come in the form of unforeseen challenges, unexpected job losses, or rapidly changing industry trends. While these trials may seem daunting, they're not insurmountable. By developing resilience and adaptability, you can not only overcome adversity but also thrive in your career. This article explores these two vital traits and how they can shape your successful career journey.

https://www.creativetaxrecruitment.com/blog/2023/05/the-power-of-resilience-and-adaptability-navigating-career-challenges-for-long-term-success?source=google.com

Skills to help on our career path



Cultivating Resilience

Building resilience isn't something that happens overnight; it's a process. Here are a few strategies to cultivate this trait:

1. **Embrace a Growth Mindset:**

   Instead of viewing failures as the end of the road, consider them learning opportunities. A growth mindset enables you to see every experience as a chance to learn, develop, and evolve.

2. **Practice Self-Care:**

   It's hard to be resilient when you're exhausted or stressed. Prioritize taking care of your physical and mental health. Regular exercise, a healthy diet, sufficient sleep, and mindfulness practices like meditation can all contribute to your overall wellbeing.

3. **Build a Support Network:**

   Cultivating relationships with supportive and positive individuals can help bolster your resilience. They can offer different perspectives, advice, and encouragement during tough times.

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Skills to help on our career path

Understanding Adaptability

Adaptability is the ability to change or adjust in response to new conditions. In a career context, it means being open to new ideas, challenges, and changes in the job market or your particular industry. It's about being flexible and willing to modify your behavior, strategies, or actions to achieve your goals.

Cultivating Adaptability

1. **Stay Informed:**

   Keep up to date with trends in your industry. This will help you anticipate changes and adapt your skills and strategies accordingly.

2. **Embrace Lifelong Learning:**

   Being open to acquiring new skills and knowledge not only makes you more adaptable but also more valuable in the job market.

3. **Develop Emotional Intelligence:**

   Understanding and managing your emotions, and empathizing with others, can help you navigate change more effectively.

https://www.creativetaxrecruitment.com/blog/2023/05/the-power-of-resilience-and-adaptability-navigating-career-challenges-for-long-term-success?source=google.com

The Interplay of Resilience, Adaptability, and Grit

Resilience, adaptability, and grit are three vital traits that together form a synergy enabling you to weather the storms of your career journey. While resilience helps you bounce back from adversity, adaptability ensures that you can change course and thrive in the new direction your career path takes.**Grit, defined by psychologist Angela Duckworth as a blend of perseverance and passion for long-term goals, is also a significant predictor of success.**Her research indicates that grit often plays a more substantial role in achieving long-term goals than even talent or IQ.

You need to find something you are passionate about and your purpose to give you the grit to continue on your yellow brick road

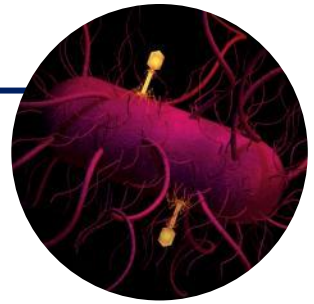
https://www.creativetaxrecruitment.com/blog/2023/05/the-power-of-resilience-and-adaptability-navigating-career-challenges-for-long-term-success?source=google.com

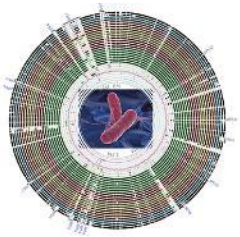
Advice to ECRs – It's a journey

Need to find something your passionate about and your purpose to continue on the yellow brick road → Patience There will be hurdles You need some endurance & grit! → Need to develop your niche → A mentor helps

Self-belief – enough to overcome imposter syndrome and the critics → Self-determination → Support structure to pick you up → Fortune 100 Women something outside academia that's creative

Start to build a programme of work, work hard for academic excellence → However, develop a programme of work that can translate to the public, patients & and government policy

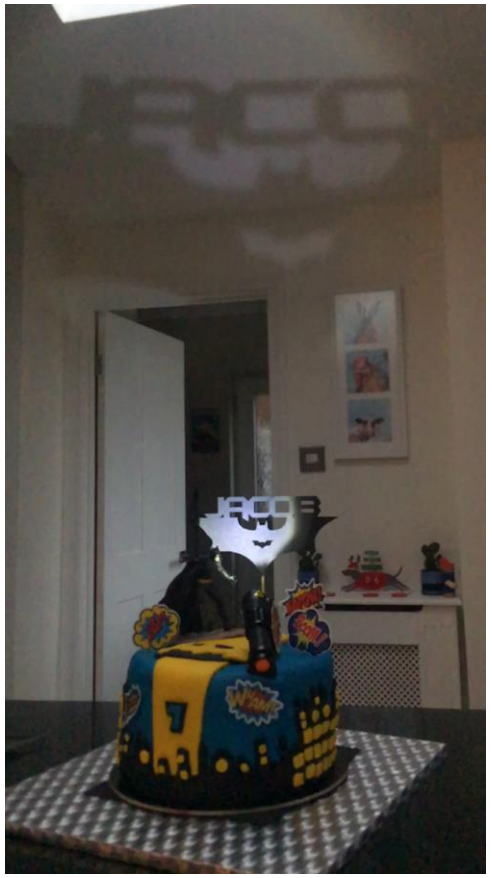




I wish you every success in your journey

My Life & Passions

MICROB-PREDICT



My Life & Passions

Irish & Viking

23andMe

My family

Qualification in Astrophysics

Scientist Barbie –
(Promoting a career in academia)

Dr Sabine Klein,

University Hospital Muenster, Germany

- How do you set up a new lab?

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 825694.

What needs to be decided and done??

1. Determine the Kind of Work to be Carried Out in the Lab

(check with the local requirements, ethics, laws, etc.)

2. Identify the Equipment Needed Early Enough

3. Determine Furniture Required

4. Design the Layout

5. Consider Chemical Reagents

6. Safety Measures

7. Conclusion

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1. Determine the Kind of Work to be Carried Out in the Lab

Research and development (R&D) laboratories:

- backbone for many companies
- providing support to entire departments

Physics laboratory

- Experiments of Physics
- Engineering science

Chemistry laboratory

- Substances that do not occur in nature are produced
- substances that can be purified exist naturally or have been extracted from something else through laboratory processes

Biosafety Laboratories:

- Handle pathogens
- to study materials safely and effectively
- BSL-1 to BSL-4

Medical or Clinical laboratories:

- Tests on clinical speciments
- Diagnosis of patients, treatments
- Basic science, applied sciences

Biological laboratory

- Research e.g. fungi, bacteria or virology (microbiology laboratories), botany, …

Animal laboratory and House

- Ethics? Import of genetically modified animals?
- S1? S2?

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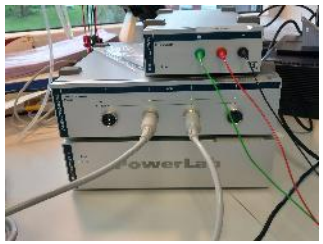
2. Identify the Equipment Needed Early Enough



Which equipment?
Equipment size? Does it fit?
Which instruments and machines can you take with you?
Are the machines useful for others? Or can you make a deal?

Microscopes

Centrifuges

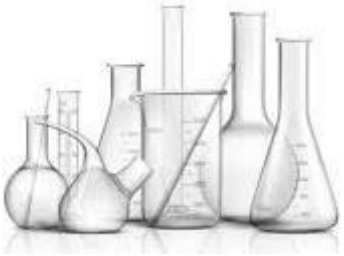
Spectrophotometers

Analytical Balances

Incubators and Ovens

Autoclaves

Lab Glassware and Plasticware

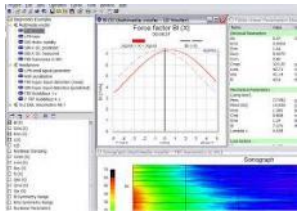


Laboratory Stirrers and Shakers

Lab Freezers and Refrigerators

pH Meters and Electrodes

Lab Software



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3. Determine Furniture Required

- Determining the furniture required
- the furniture requirements will affect the layout design of your new lab.

Functionality

Ergonomics

Durability

Material selection

Warranty and Maintainance

Resistance to Chemicals and Heat

Compliance with Safety Standards

Budget Considerations

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4. Design the Layout

The design will determine the overall effectiveness of your lab!

Aim for the best design that will optimize the workflow and maximize your productivity.

- How much workspace is required for each individual?
- How many people are sharing the space and resources?
- Where will the equipment be positioned to create room for heat output like sockets and service position for taps and sinks?
- Are special connections required (gas)?
- How much storage is required?

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5. Consider Chemical Reagents

- the chemical reagents to be used will determine your worktop choices
- There are different lab countertops: moisture resistance, chemical resistance, heat resistant, ...

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6. Safety Measures

- you must adhere to the lab safety measures
  - Who is the security representative?

Emergency lab safety supplies:

- Fire extinguishers (mounted near doorways, fully charged and unobstructed)
- Fire blankets
- Eyewash centers
- Safety showers
- Emergency lights
- Evacuation route signs
- Telephones with access to 112 (Germany) services
- Emergency information posters
- First aid kits

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6. Safety Measures

- Personal protective equipment, or PPE, are required in many laboratories

•Clean room garments, like lab coats, coveralls and full body suits
•Eye protection like lab safety glasses, goggles and face shields
•Gloves
•Surgical face masks

Clean room garments are protective clothing one wears upon entering and when inside a clean room. They are an essential piece of safety equipment in many laboratories and serve two purposes:
•To protect the wearer from exposure to dangerous materials inside the clean room
•To protect the clean room from contaminants brought in by the wearer

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What else?

- Biobanking? Who is responsible? What is in place?
- people, people, people !!!! good people are hard to find; As soon as the lab is build write Job offers!
- establish old techniques again!!!
- try to use the local expertise for elaborating your projects (Radiology for MRI in experimental models,….)
- try to have A LOT OF DATA to write papers, because everything takes so long
- take your time and prepare for a break in the publication-track record
- look for new partnerships without forgetting/neglecting your old ones

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Thank you

Enjoy your lab!

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