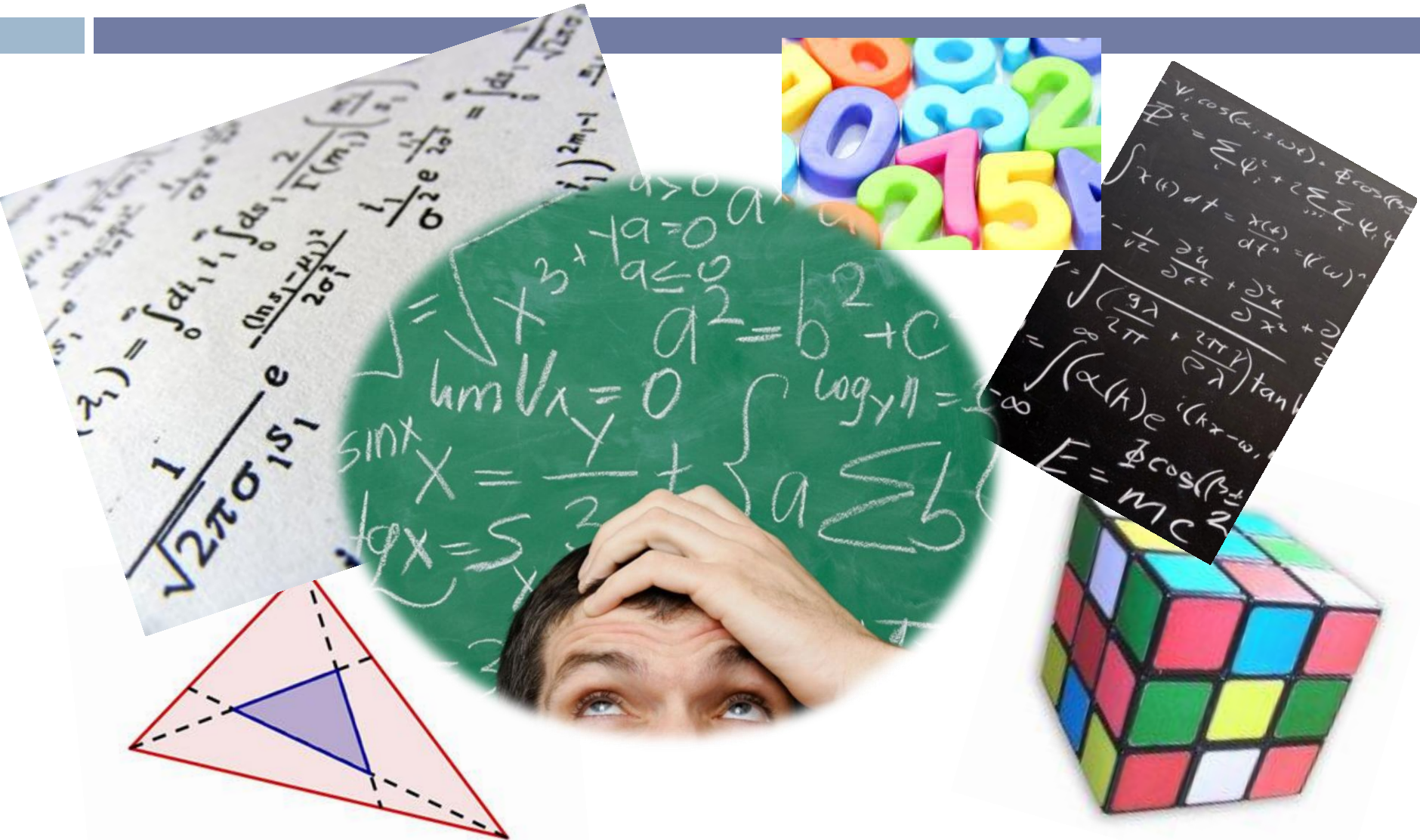


# BSC/MMATH MATHEMATICS

EMBEDDING EMPLOYABILITY IN UNDERGRADUATE  
MATHS

Dr Matthew M. Jones, Programme Leader

# What is Maths?

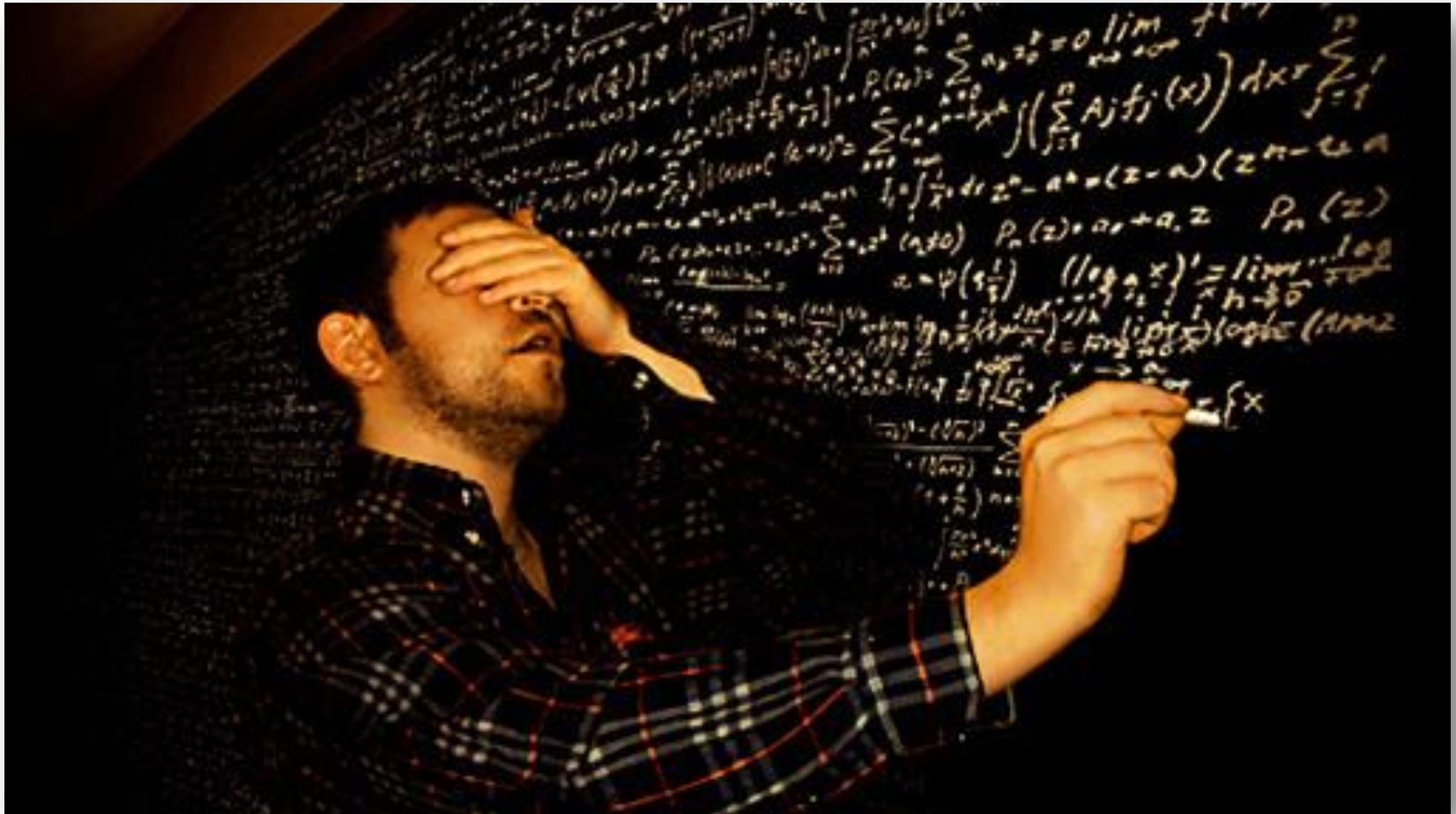


# What is maths really?

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- Study of Patterns
- Abstraction
- Rigour
- Problem Solving

# What do mathematicians do?



# What are employers looking for?

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“selection of candidates is not based on the precise mathematical content of the degree course, but on a desire to find technically able, adaptable mathematicians with the ability to pick up new skills and to communicate with non-mathematicians”

Liz Wasey. (2012). *IMA Employers' Forum: Employability of Mathematics Graduates*

# What are employers looking for?



“while you’ll need to be methodical, we’ll need you to be a creative and inquisitive thinker too. It’s also important to have broader skills – such as the ability to communicate information clearly and work as part of a team.”

GCHQ, “explore another world” mathematician recruitment brochure

# BSc/MMath Employability

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- Key Skills highlighted by employers:
  - ▣ Problem Solving
  - ▣ Communication
  - ▣ Team Work
  - ▣ Flexibility, self-motivated work ethic

# A Balancing Act



- Mathematicians are employable because they are mathematicians!
- Many skills are developed in the content



# Embedding Skills in the UG Design

- Problem Solving
  - Embedded throughout but especially developed in a 2<sup>nd</sup> year module running along side the core modules
  
- Flexibility and Self-Motivation
  - Embedded throughout 1<sup>st</sup> year and developed in the 2<sup>nd</sup> and 3<sup>rd</sup> years, specifically on the project module but elsewhere also

First Year

Calculus and Differential Equations

Vectors and Matrices

Logic and Structures

Data and Information

Portfolio of assignments built up through the year

- teamwork
- communication
- problem solving

Second Year

Mathematical Analysis

Groups and Rings

Discrete Mathematics and Geometry

Problem Solving Methods

An integrated approach to developing problem solving skills, this module mimics real life encounters with maths

# Embedding Skills in the UG Design

- Team Work
  - Is an integral part of the assessment strategy at all levels, but developed at key stages during the programme
  
- Communication
  - Embedded in the assessment strategy in the 1<sup>st</sup> year but also developed in the 3<sup>rd</sup> year module and 4<sup>th</sup> year courses

Third Year

Real and Complex Analysis

Advanced Algebra

Option Module

Communicating  
Maths

Option Module

Option Module

Both the practicalities  
and how to motivate  
communication to  
non-mathematicians

MMath  
Modules

Advanced Topics in Mathematics A

Advanced Topics in Mathematics B

Reading Course and/or Project

Option Module

Option Module

Team work and  
communication  
developed to an  
advanced level

# Maths in Use

- Operations Management – linear programming, optimisation, functional analysis
- Computer Security – number theory
- Medical Imaging (MRI) – topology, euler characteristic
- Robotics – graph theory