Turning ideas into reality

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http://www.eng.cam.ac.uk/~cipolla/people.html
http://www.toshiba.eu/eu/Cambridge-Research-Laboratory/
What is Engineering?
What is Engineering?

1. In the beginning - *Homo Faber*:
   
   *Ingenium* – clever idea/invention
   *Ingeniare* – design, devise or construct
What is Engineering?

2. Building a better future:

“Scientists investigate that which already is, Engineers create that which has never been.”
What is Engineering?

2. Building a better future:

“Scientists investigate that which already is, Engineers create that which has never been.”

“The greatest scientists are always artists as well.”
What is Engineering?

3. Problem solving:

Product design – idea, design, realise ….
Multidisciplinary thinking
Real problems cross many academic disciplines
Misconceptions
Engineers as super heroes
Outline

• Computer vision:
  – Making machines that can see

• Engineering:
  – Qualities of great engineers
  – What we look for in applicants
“Study the science of art. Study the art of science. Develop your senses…..”
Vision: what is where by looking
Computer Vision – What?
Why? Images and Video

Computer vision is now in a wide range of products:

Mobile phones

Cars

Inspection and measurement

Image and video search

Games

Internet and shopping
Example from research engineering

Recovery of 3D shape from images
Ambiguity in a single view
Stereo vision
Stereo vision
Structure from motion

Input sequence  2D features  2D track  3D points
3D Models
Final installation
Magic Mirrors
Qualities of an engineer

1. Analytical and technical skills

2. Creative and thinking skills

3. Interpersonal skills
Qualities of an engineer

1. Analytical and technical skills:
   - Aptitude in Maths, Physics and Computing
   - Attention to detail
   - Analysis of data and optimisation
   - Logical thinking
Qualities of an engineer

2. Creativity and thinking skills:

- Good problem-solving skills
- Creative – curious, asking questions, new ideas
- Organising ideas
- Making plans
Qualities of an engineer

3. Interpersonal skills:

- Effective verbal and written communication
- Teamwork – listen, lead, optimistic
- Resilience – mistakes are used to learn
- Time management – working to deadlines
Standing out at interview

• Technical skills
• Thinking skills
• Interpersonal skills

• Character:
  – Passion – enthusiasm
  – Persistence – motivation and commitment
  – Extra-curricular activities – Service and Focus
“Engineers turn ideas into reality”

“They use their technical knowledge to improve people's lives, from efficient buildings, low carbon power generation, new materials and microscopic medical devices.”