New adventures in the interdisciplinary world

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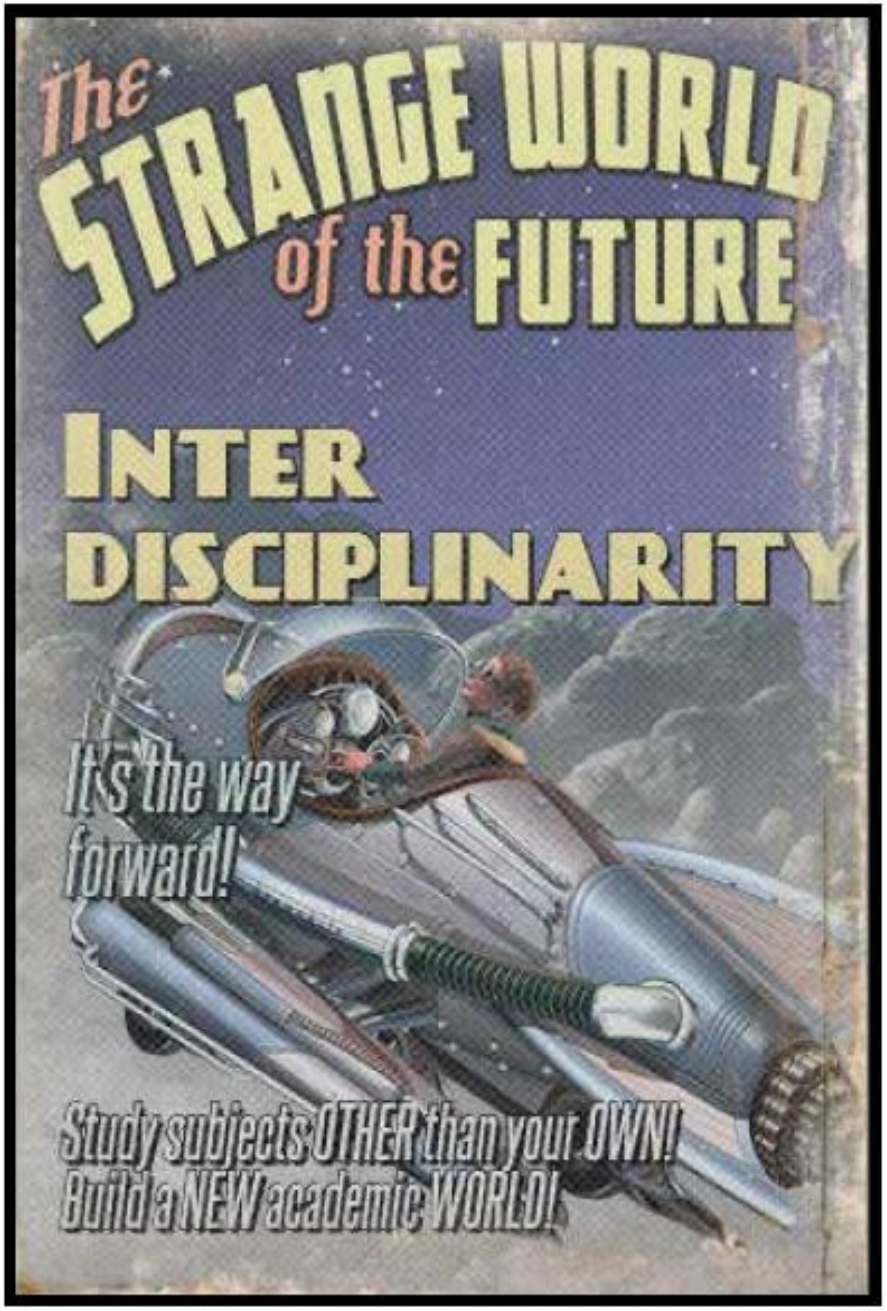


‘Science on Screen’

What is the web with which Spiderman swings, slides and jumps through the streets of New York City if not a long-chain polymer molecule?

Did you know that the ultrafast lasers utilized for ‘capturing’ the temporal behaviour of chemical and biological reactions are similar to the ones with which every spaceship involved in Star Wars was equipped?

Have you ever thought that Superman’s ‘X-ray eyesight’ that allows him to see through solid objects works on the same principle of the X-ray crystallography that allows chemists, physicists and biologists to ‘see’ molecules and proteins?

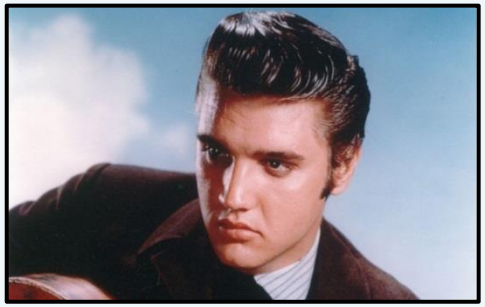
- Popular scientific and ‘superpowers’ films and radio plays from the 20th and 21st centuries can be the starting point to explain the scientific principles behind them and their applications in our real world.

- A pilot workshop ‘Science on Screen’ dedicated to 20 first year undergraduates with diverse scientific and non-scientific backgrounds.

- Films led to a interactive lectures and discussions about the scientific phenomena presented in the movie and its link with our society and daily life.

Day 1: 'Spider-man' and polymers (Marvel Comic - Film (2002), Director: Sam Raimi)

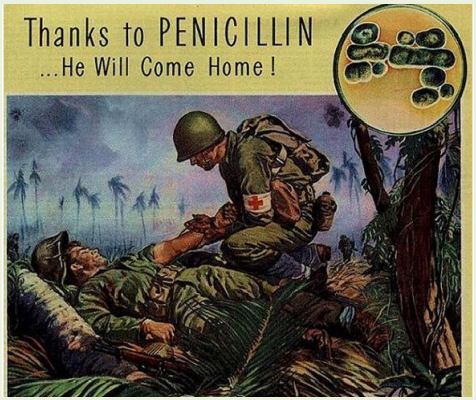
The web with which Spiderman swings, slides and jumps is a long-chain polymer similar to nylon. The viewing of the movie led to a lecture about polymers, their use in our life (plastics, medical use..) and how they affected and influenced our culture and history.

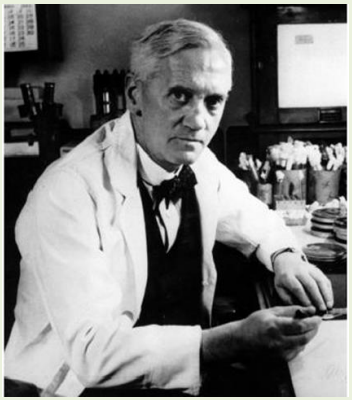


Day 2: 'War of Worlds', bacteria and antibiotic resistance (H.G. Wells novel: radio play by Orson Welles (1938) and film (2005), Director: Steven Spielberg)

Martians were killed by an attack of earthly microbial infections to which they had no immunity.
Starting point for a discussion and for locking-in concepts regarding the discovery and importance of antibiotics as well as the threat of antibiotic resistance.
Insights regarding Social Darwinism, Human Evolution theories and rejection of Colonialism and Imperialism.

Riva, E.; The *War of the Worlds* and antibiotic resistance: a case study for science teaching. *The Biochemist,* **2015**,*37*, 26- 28





BBC NEWS
HEALTH

30 April 2014 Last updated at 13:05

Antibiotic resistance now 'global threat', WHO warns

‘Science on Screen’

‘I observed a fantastic atmosphere, where the boundaries between disciplines were removed and the only goal was to enjoy being educated.’ Chemistry Student

‘I was able to really gain an insight into how the sciences and arts affect each other and how scientific advancement affects and is affected by society and what is happening at the time.’ Life Sciences Student

‘I would definitely consider taking a science on screen module/recommend it to friends.’ Economics Student

‘A different and exciting educational approach and a great way for seeing links between science and arts.’ Film and Television Studies Student

Genetics : science and society

- Cross- faculties undergraduates module
- 10 sessions of 2 hrs – 1 hr led by experts from a range of disciplines (Life Science, Chemistry, Statistics, Sociology, Philosophy, Film & TV Studies, Educational Studies, History of Science) ; 1 hr in which students (with the module leader) will develop their learning in an interdisciplinary style
- active learning methods (i.e. Team Based Learning; Problem Based Learning) to heighten student engagement and understanding of the week's topic
- Student devised assessment

Recognise the multifaceted and rounded nature of 'genetics' and the importance of a global approach to it in order to have a better understanding of such a complex topic and to attempt answers to the various questions linked to this field.

Genetics : science and society

Genetics is the study of genes, heredity, and genetic variation in living organisms.
It intersects with many of the life sciences. It is also the center of the attention of many other disciplines (i.e. statistics, sociology, philosophy, politics)

Develop students understanding of disciplinary theories and issues related to genetics (= multidisciplinarity)

Never let me go, 2010

GATTACA, 1997

Genetics : science and society

Genetics has become an integral part of our society. It forms part of our history, raises difficult questions for individuals and for regulators, and lead to vigorous debate.

Explore the impact of scientific discoveries in the field of genetics on our society and vice versa.

The boys from Brazil, 1978

Jurassic Park, 1993

Genetics : science and society

Utilise popular art, in particular films, to facilitate critical discussion of scientific technologies and the ethical, social and political topics presented in the lectures.

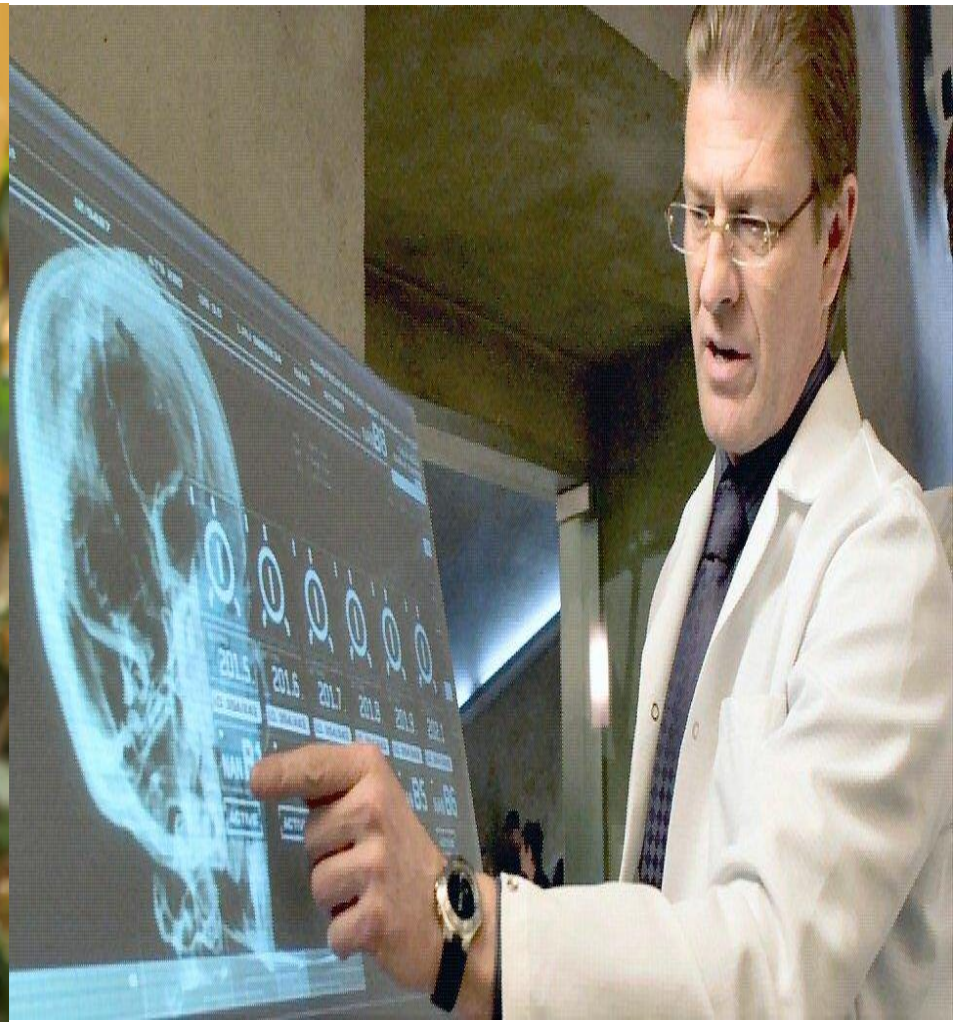
My sister's keeper, 2009

Blade runner, 1982

Genetics : science and society

Help students to summarise their multidisciplinary learning into a global approach to genetics-related issues and problems (= interdisciplinarity), developing their own research in a holistic way that crosses disciplinary boundaries (= transdisciplinarity).

Still Alice, 2014



The Island, 2005

Thinking Water

- Cross- faculties postgraduates module
- 10 sessions of 2 hrs – 1 hr led by experts from a range of disciplines (Life Science, Chemistry, Physics, Engineering, Law, Cultural Policy Studies, History and History of Medicine); 1 hr in which students (with the module leader) will develop their learning in an interdisciplinary style
- Active learning methods (i.e. Team Based Learning; Problem Based Learning)
- Use of different methodologies (i.e. field studies and archival research) for tackling issues related to a diverse range of disciplines and for expanding the approach to students own research
- Student devised assessment

Thinking Water

- **Understand the effects of scientific discoveries in the field of water on our planet's history, ecology and future** - ***properties of water; water ecosystem; environmental and water ecology (engineering perspective); water in the solar system and beyond***
- **Explain the central role of water in our society, in the organisation of our cities and in the development of political scenarios** - ***relationship between culture and water, rivers, flooding/drought; does water have an history?; regulation of water use; hydrotherapy***

Understand the importance of a global, significant and different approach to issues pertaining to water based on dialogue across the disciplines boundaries.

Take home message

Students stimulated to ‘think out of the box’ and to observe how what they study is related to everyday reality and the links between disciplines.

Movies, radio plays and modern media engage students, aid retention of knowledge, motivate interest in the subject matter, illustrate the relevance of many concepts and therefore can be utilized as powerful tools for interdisciplinary teaching and learning.

Students stimulated from the possibility of discovering the potential of an interdisciplinary approach – understanding of the importance of a holistic approach to global issues that leads to attempt answers based on dialogue across the disciplines boundaries and on utilising a variety of different methodologies.

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